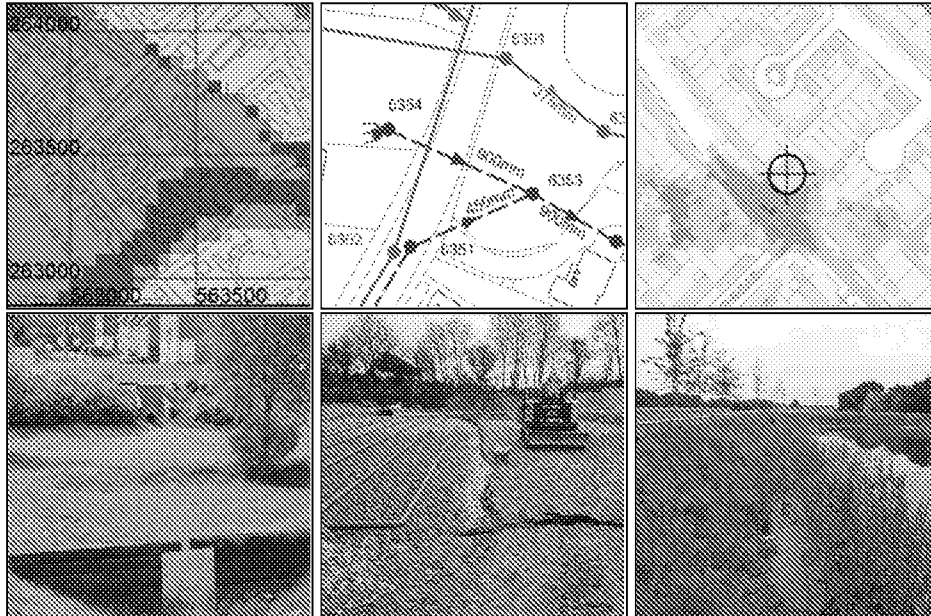




Drainage Statement

Site at Hook Lane Westergate, West Sussex

Reference:	1833	
Issue:	Date:	
1	6/3/2019	
2	20/3/2019	Layout updated

Table of Contents

1	Introduction	3
2	Development Description & Location	3
3	Surface Water Drainage (Existing)	3
4	Surface Water Strategy	3
5	Foul Water drainage (Existing)	6
6	Foul Water Strategy	6

Appendices

A	Existing Layout & Proposed Site Layout
B	Ancillary Soil Data & Local Sewer Plan
C	Surface Water Assessment
D	Conditions & Limitations

1. Introduction

- 1.1 Instructions were received from Metis Homes to set out the Drainage Statement pursuant to the development of 14 residential dwellings on land at Hook Lane, Westergate, West Sussex.
- 1.2 This Drainage Statement supersedes the Motion (Drainage Statement) of the January 2016.
- 1.3 This Drainage Statement also seeks to respond to conditions 13 and 14 of appeal decision APP/C3810/W/16/3155330 granting outline planning permission in relation to application AL/8/16/OUT.
- 1.4 This statement has been undertaken by A P Traves BSc CEng MStructE MCIHT.
- 1.5 The client's attention is drawn to the conditions and limitations contained in Appendix D.

2. Development Description & Location

- 2.1 The site comprises some 0.965 Ha of land at Hook Lane, Westergate, West Sussex (grid ref 493350 104650). The land is identified on the aerial photograph and Mountford Piggott topographical survey drawing 04.15 which are contained in Appendix A.
- 2.2 The site currently comprises a number of garages, workshops, sheds/outbuildings and hardstandings. The remainder of the site is laid to grass.
- 2.3 It is proposed to develop the site for 14 residential dwellings. The proposed layout for the site is shown on Radley House Partnership drawing 7632-D01 contained in Appendix A of this report.

3. Surface Water Drainage (Existing)

- 3.1 The site comprises a number of garages, workshops, sheds/outbuildings and hardstandings. The remainder of the site is laid to grass.
- 3.2 The site slopes from north (10.5m AOD) to the southwestern corner (10.2m AOD). There is a pond located in the southwest corner of the site which outfalls to the ditch along the western edge of the site which falls from north to south. The existing site comprises some 480m² of buildings and 235m² of pavements totalling just over 7% of the total site area. At present surface water run-off generated from the buildings and site roads gravitates to the western ditch directly or indirectly via the pond in the southwest corner of the site.

4. Surface Water Strategy

- 4.1 A site soil investigation and permeability testing has been undertaken by Geo Environmental Services Ltd (GESL) report reference GE17712-GIR-NOV18. The investigation consisted of eight trial pits and six window sampling bores. The key findings of this investigation are discussed in the following paragraphs and reference should be made to the GI report for further details.
- 4.2 Six evenly distributed, widow sample bore were advanced to depths between 4.0 and 4.8m and three of these had groundwater monitoring wells installed. Eight trial pits were excavated to between 3.0 and 3.1m depth.
- 4.3 Paragraph 4.1 of the GI report identifies a shallow depth of made ground around the buildings and a typical soils profile comprising Topsoil over cohesive River Terrace Deposits over granular River Terrace Deposits over London Clay. The cohesive River Terrace Deposits varied from very soft to firm sandy clayey SILT to very stiff slightly fine sandy silty CLAY. The granular River Terrace Deposits varied from medium dense silty

clayey GRAVEL to loose silty fine to medium SAND. The London Clay comprised silty sandy CLAY.

- 4.4 The table in paragraph 4.2 of the GI report indicates that seepage was initially noted in all the trial pits at depths ranging from 2.00 to 3.00 m below ground level ie around 8.3-9.3m AOD. It should be noted that the topographic surveyed water level in the pond was some 8.5m AOD ie about 2m below ground level at the time of that survey. Groundwater level monitoring is still underway and the final round is due to complete later this month and will be reported by GESL at that time. The results to date are tabulated below:

	31.10.18	20.11.18	17.12.18	21.1.19	22.02.19
WS1	DRY	0.77	0.73	1.3	1.40
WS2	DRY	0.69	0.60	Well Missing	Well Missing
WS4	2.28	1.08	0.89	1.49	1.08

The results to date show an increase in seasonal GWL to a maximum in December 2018 and subsequent reduction since this time. The results indicate a seasonal maximum of 9.8m AOD for WS1 and WS2 and 9.6m AOD for WS4.

- 4.5 It is apparent from cross referencing the topographical survey, geotechnical logs and GWL monitoring results that the pond is founded into the sandy soils forming the granular River Terrace Deposits and generally reflects GWL up to a level of 9.1m AOD, at which level water outfalls to the western ditch and drains to the south.
- 4.6 Whilst paragraph 5.5 of the GI report advises that permeability tests of the more granular soils yielded insufficient fall in head to calculate BRE365 permeability the test results have been obtained and reviewed. The geologists notes indicate that the tests tended to 'flatline' after a while. It is notable that this occurred at around 1.7-2.0mbgl, which is consistent with the shallowest groundwater seepages (GI 4.2 refers) and with WS4 initially recorded GWL at 2.28mbgl which would be a normalised GWL rather than an indirectly deduced GWL from a note on visual seepage. The conclusion is consistent with the targeted permeability tests in that the granular River Terrace Deposits exhibit permeability but are generally submerged below GWL.
- 4.7 Discounting the tail end of the permeability tests as test water level approached GWL implies an effective permeability of between 1.1×10^{-6} and 2.5×10^{-5} m/sec depending upon the cut off time/level adopted. A calculation adopting 2×10^{-5} m/sec for the proposed enlarged pond is contained in Appendix C. This assesses the pond infiltration capacity to be 80m³ over a 24 hour period against a total 1% AEP + 40% CC run-off of 360m³ ($C_v=1.0$ conservatively). ie Infiltration at the enlarged pond could only accommodate 22% of the design volume. There is limited scope to enlarge the pond due to ecological constraints and it is apparent that the balance of the discharge will have to be achieved by tier 2 discharge to watercourse, as currently occurs.
- 4.8 Calculations are contained in Appendix C for the existing brownfield discharge. These indicate the following existing rates:

Q₁ 9.0 l/sec
Q₃₀ 22.7 l/sec
Q₁₀₀ 28.9 l/sec

The UKSuds Greenfield estimation tool has also been used to determine the hypothetical greenfield rates for the site. This indicates the following rates:

Q_{BAR} 1.9 l/sec
Q₁ 1.6 l/sec

Q₃₀ 4.4 l/sec
Q₁₀₀ 6.1 l/sec

- 4.9 The proposed discharge rate from the pond to the ditch needs to take account of the blockage risk from vegetation. As noted on the UKSuds greenfield estimate calculator the accepted minimum rate is 5.0 l/sec. This would provide a 45% reduction on the current Q₁ rate and a 92% reduction on the current Q₁₀₀ rate. It is desirable when setting a flat discharge rate for small sites to seek to set this at Q_{BAR} rate but not less than 2.0 l/sec due to practicable constraint. A further calculation is contained in Appendix C to assess storage requirement for the residual run-off (Initial run-off less infiltration at 80m³/day, paragraph 4.7 refers) The storage/discharge requirement from the infiltration shortfall is 225m³ for a 4 hour storm rising to 280m³ for a 24 hour storm. For attenuation to 2 l/sec outfall an operational storage of 206m³ is required at 1% AEP +20%CC and 217m³ is proposed. A sensitivity test at 1% AEP +40% CC requires a storage volume of 252m³ and 331m³ is proposed. The enlarged pond proposed is therefore capable of provision of storage to 1% AEP +40%CC and attenuation to 2 l/sec. The final discharge rate is to be agreed with Arun DC Drainage Engineers but for values between the 2 l/sec absolute minimum and the 5 l/sec recommended to mitigate blockage risk, storage requirement would be lower and would therefore still be met.
- 4.10 To corroborate this a cross check was undertaken using the UK Suds surface water storage requirement tool. This estimates an approximate storage of 264m³. A copy of the output from this is also contained in Appendix C.
- 4.11 The surface water drainage system will be designed to accommodate a 1 in 100 year +40% combined climate change and urban creep rainfall event. With respect to the Non-statutory Technical Standards for Sustainable Drainage Systems (NTS SuDS) the design accords with requirements S3, S5/6 and S7-9. Design and construction details will accord with Building Regulations and Sewers for Adoption, as appropriate, so according with S10-11 and S13-14. The design does not include pumping so S12 is not applicable. The proposed arrangement of the surface water drainage is shown on drawing ACC 1833-01 contained in Appendix C.
- 4.12 Water butts should be installed to intercept roof water run-off. These will reduce the annual volume of surface water discharge but will not make any material contribution to regulation of critical run-off as these tend to be full during winter months as there is minimal demand for garden irrigation in these months.
- 4.13 In summary source control will be provided by:
- Infiltration discharge from pond
 - Attenuated discharge to watercourse from pond
 - Provision of water butts
- 4.14 The residential use comprises low and very low pollution hazard levels (C753 Table 26.2) Simple index approach calculations are contained in Appendix C. These demonstrate that the proposed SuDS infrastructure can provide the mitigation necessary. The pond is considered to be a sensitive receptor. Consultation has been made with the applicants consultant ecologist and a separator is proposed to mitigate any potential impact on the pond.
- 4.15 The existing site falls from North to the Southwest corner. The proposed development maintains the fall and generic topography. There will be no change in the existing flood flow pathway for exceedance events which will continue to flow out the south western corner of the site.
- 4.16 The GI report also advocates the use of land drains for residential garden area. It is proposed to provide a covered linear filter trench through rear gardens linking to the pond.

- 4.17 A schedule of O&M maintenance requirements for the SuDS infrastructure is also contained in Appendix C. The maintenance of communal assets will be undertaken by the estate management company. The maintenance of individual assets will be the responsibility of the individual owners.

5. Foul Water Drainage (Existing)

- 5.1 Hook Lane is served by a 150mm DN gravity public foul water sewer located within the highway on the eastern side of the site. The site is not currently connected to the sewer.. A copy of the public sewer plan is contained in Appendix B

6. Foul Water Strategy

- 6.1 The proposed development will drain by a new network of gravity drains and sewers and discharge to the public foul water sewer in Hook Lane. The proposed arrangement is shown on drawing ACC 1833-1 contained in Appendix C.
- 6.2 A capacity check has been undertaken by southern Water which confirms there is adequate capacity in the sewer to support the proposed site development.
- 6.3 The standing wastewater Infrastructure Charge (IC), which came into force from 1st April 2018, will be paid by the developer.
- 6.4 The maintenance of the foul drains within the site will be undertaken by the estate management company and individual owners where relevant, up to the demarcation chamber to the public sewer network. Beyond this point new sewers through S104 adoption will be maintained by Southern Water in accordance with their statutory duties and responsibilities

Appendix A



Aerial view on site



REF	DESCRIPTION
1-2	Hedge
2-3	Close boarded fence
3-4	Brick wall
4-5	Brick wall
5-6	Boundary follows edge of access road
6-7	Boundary unmarked - grass verge
7-8	Boundary crosses vehicular access
8-9	Wooden fence assumed - overgrown
9-10	Wooden fence assumed - overgrown
10-11	Wooden fence assumed - overgrown
11-12	Post and wire fence
12-13	Post and wire fence assumed - overgrown
13-14	Post and wire fence assumed - overgrown
14-15	Dense vegetation
15-1	Dense vegetation

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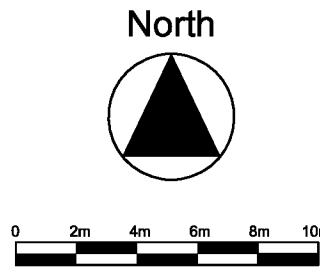
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LIST OF INFORMANTS:
ORDNANCE SURVEY

REVISIONS	DATE	ORN	REV
BOUNDARY POSITION AMENDED	17.06.15	ARR	A
BOUNDARY SCHEDULE ADDED	04.12.15	GZ	B
ISSUED FOR PLANNING	15.01.16	ARR	C

This drawing contains critical information in colour. To ensure this information is legible, only print or copy this drawing in full colour.



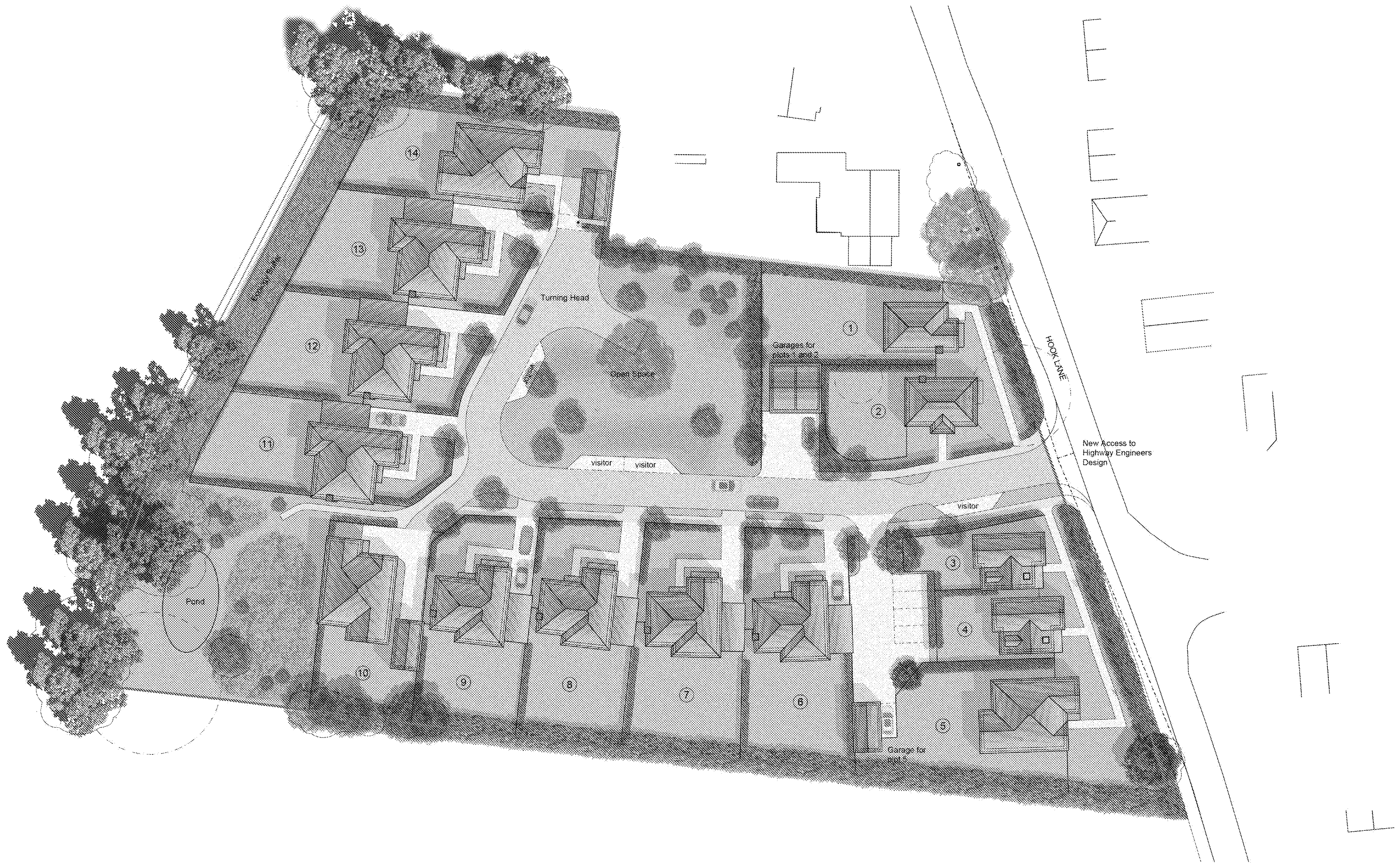
MountfordPigott

TOPOGRAPHICAL SURVEY
AS EXISTING & DEMOLITION
1265-X02-C

1:250@A1 / 1:500@A3
DRAWN BY ARR

04.15

HOOK LANE WESTERGATE



REVISIONS |

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**RADLEY
HOUSE**
PARTNERSHIP

CHARTERED
ARCHITECTS

JOB | Hook Lane, Aldingbourne

DWG | Proposed Site Plan

S | 1:500 @ A3 D | Feb 19

No. | 7632 / D01

Appendix C

Hook Lane, Westergate - 25/10/18

TP1 - 2.6m long, 2.4m deep (water level 2.25), 0.45m wide

Min	WL	1200ltrs used
0	1.09	
1	1.12	
2	1.14	
3	1.15	
5	1.19	
7	1.22	
16	1.33	
29	1.43	
45	1.52	
61	1.60	
70	1.73	
129	1.79	

TP2 - 2.6m long, 2.2m deep (water level 2.25), 0.45m wide

Min	WL	1000ltrs used
0	1.30	
1	1.31	
2	1.32	
3	1.33	
5	1.35	
14	1.41	
31	1.50	
55	1.58	
90	1.68	
112	1.72	
131	1.75	
146	1.77	
208	1.84	
253	1.85	

TP2 - 2.7m long, 2.45m deep (water level 2.5), 0.45m wide

Min	WL	1000ltrs used
0	1.59	
1	1.605	
2	1.61	
3	1.62	
5	1.63	
7	1.65	
10	1.67	
17	1.71	
27	1.76	
52	1.85	
68	1.91	
90	1.94	
139	2.00	
185	2.04	
246	2.08	
271	2.09	



Mr Andy Traves
Metis Homes
59 Tower Street
Winchester
Hampshire
SO23 8TA

RECEIVED 31 OCT 2018

Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Our Ref:
DS_CC_PDE-105295

Date:
29 October 2018

Site: Land South and West of Barnside, Hook Lane, Westergate, Chichester, West Sussex, PO20 3TE.

Dear Mr Traves,

Following initial investigations, there is currently adequate capacity in the local sewerage network to accommodate a foul flow for the above development at/downstream of manhole reference SU93044602. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system.

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal S106 connection application is required to be completed and approved by Southern Water Services. Please see the link below:

<https://developerservices.southernwater.co.uk/ConnectiontoPublicSewer/ApplicationForm>

Should you require any further information, please contact us at the above mentioned phone number or address.

Yours

Geoff

Deve

Please

The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Southern Water Sparrowgrove House Otterbourne Winchester SO21 2SW www.southernwater.co.uk

Southern Water Services Ltd Registered Office: Southern House Yeoman Road Worthing BN13 3NX Registered in England No. 2358870

SOUTHERN WATER



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.

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O.S. REF: SU9304NW

Scale: 1:1250

Sewer Plot

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNR) materials may include Bonded Asbestos Cement



Printed By: Roopa

Date: 27-10-2018

Site Plan

Requested By:

Appendix B



Revision	Amendment	Approved	Revision Date	Original Sheet Size A3 [420 x 297]		Project			
						HOOK LANE WESTERGATE WEST SUSSEX			
				 Aqua Callidus CONSULTING		Sheet			
				Aqua Callidus 52 Common Lane, Titchfield Hants, PO14 4BU 07717 759149		DRAINAGE SCHEMATIC			
				Scale	Project No.	Drawing No.	Sheet. No.	Revision	
				1:500	1833	ACC1833-01	-	1	

Project No : 1833
Project Title : Hook Lane

Rectangular Infiltration Basin (R156)

Site Location: Westergate	Catchment ID: pond infiltration base 234m2
r = 0.36 (range 0.12 to 0.45)	
Drained Area = 3400 m ²	Width of base = 10 m
Design storm 1 in = 100 year	Length of base = 23.4 m
Design-operational = 20 % for climate change	Infiltration Area = 234 m ²
Sensitivity case at rim = 40 % for climate change	
Urban Creep allowance = 0 % uplift to Drained Area	Side slopes 1 in = 3

Site Considerations

Where determined, what is the depth to highest seasonal groundwater level (GWL) from surface	1.00 m
Is the infiltration far enough from drainage mounds/fields or other soakaways etc to avoid impact?	Yes
What Source Protection Zone (SPZ) is the proposed soakaway located in?	None
What is known and proposed about potential contaminated ground on the site?	EA/LPA accept infiltration

Technical Assessment

Consequence of failure = 2-Minor inconvenience	
Measured Soil Filtration Rate = 2.00E-05 m/s	
Design Soil Filtration Rate = 4.00E-06 m/s	
Operational depth from base = 0.70 m	O/A depth rim-base = 1.00 m
Effective net porosity = 100 %	

Storm Duration	5 min	10 min	15 min	30 min	1 hr	2 hr	4 hr	6 hr	10 hr	24 hr
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
M100/M5 gf Value Z2	1.84	1.91	1.95	2.00	2.03	2.01	1.97	1.94	1.91	1.82
Rainfall M100 (mm)	13.3	19.5	24.2	31.5	40.6	49.1	58.4	64.9	72.4	88.2
OPERATIONAL LOAD										
With CC & UC uplift (mm)	15.9	23.4	29.0	37.9	48.7	58.9	70.1	77.9	86.9	105.9
RUNOFF (m ³)	54.13	79.62	98.57	128.70	165.65	200.34	238.30	264.75	295.51	359.95
Infilt capacity (m ³)	0.28	0.56	0.84	1.68	3.37	6.74	13.48	20.22	33.70	80.87
INFILTRATED (m ³)	0.28	0.56	0.84	1.68	3.37	6.74	13.48	20.22	33.70	80.87
Req'd STORAGE (m ³)	53.85	79.06	97.73	127.01	162.28	193.60	224.82	244.53	261.81	279.08
	pass	pass	pass	pass	pass	pass	fail	fail	fail	fail

TOTAL STORAGE AVAILABLE	216.71 m ³	Width at Operation depth =	14.2 m
Time to drain full to half full =	43.4 hours	Length at operational depth =	27.6 m

	SENSITIVITY LOAD									
RUNOFF (m ³)	63.16	92.89	115.00	150.14	193.26	233.73	278.02	308.87	344.76	419.94
Infilt capacity (m ³)	0.28	0.56	0.84	1.68	3.37	6.74	13.48	20.22	33.70	80.87
INFILTRATED (m ³)	0.28	0.56	0.84	1.68	3.37	6.74	13.48	20.22	33.70	80.87
Req'd STORAGE (m ³)	62.88	92.33	114.16	148.46	189.89	226.99	264.54	288.66	311.06	339.07

TOTAL STORAGE AVAILABLE	345.39 m ³	Width at rim =	16 m
Time to drain full to half full =	58.3 hours	Length at rim =	29.4 m

Overall Assessment

Base elevation above seasonal high GWL	0.00 m	fail SPZ
Will the soakaway drain from full to half full in 24 hours or less? (sensitivity case)	No	fail
Does the soakaway provide sufficient storage?	No	fail

Site Ref

Hook Lane

Catchment

Existing

CIRIA C753 Initial stormwater generation assessment**Rainfall Parameters**

SAAR	749	mm	CWI	121	
2DM5 rain	53	mm	DPRCWI	-1.1	%
r	36	%	UCWI _{winter}	133	
M560 rain	19	mm	Hydrometric area	7(SE)	

Soil Parameters

WRAP soil class	2	
SOIL	0.30	
SPR	30	%

Surface Parameters

Soft landscape	8935	m ²	Roof Standard (impermeable)	480	m ²
Permeable pavement	0	m ²	Pavement 1 (impermeable)	235	m ²
Green roof ₍₁₎	0	m ²	Pavement 2 (50% permeable)	0	m ²
A_p	8935	m ²	A	715	m ²

(1) includes standard roof directed into permeable pavement

A_i	715	m ²
PIMP	100%	
PR	80	%

$$t = 5 \text{ mins } (t_{\text{entry}}) + t_{\text{concentration}} = 5 \text{ mins}$$

Flows

QBAR _{rural}	1.8	l/sec	TOTALS		
Q ₁ rural	1.5	l/sec	Q ₁ 9.0	Q ₁ urban	7.6 l/sec
Q ₃₀ rural	4.0	l/sec	Q ₃₀ 22.7	Q ₃₀ urban	18.7 l/sec
Q ₁₀₀ rural	5.6	l/sec	Q ₁₀₀ 28.9	Q ₁₀₀ urban	23.2 l/sec

Volumes

V _{100 6hr} rural	183.5	m ³	TOTAL		
			V _{100 6hr} 219.3	V _{100 6hr} urban	35.8 m ³

Calculated by: Andy Traves
Site name: Hook Lane
Site location: Westergate

Site coordinates
Latitude: 50.83378° N
Longitude: 0.67543° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", WS-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference: 6540256
Date: 2019-03-05T17:52:01

Methodology	IH124
-------------	-------

Site characteristics

Total site area (ha)	0.965
----------------------	-------

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	2	2
HOST class	---	---
SPR/SPRHOST	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm)	749	749
Hydrological region	7	7
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

Normally limiting discharge rates which are less than 2.0 l/s/ha are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite may be a requirement for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	1.9	1.9
1 in 1 year (l/s)	1.62	1.62
1 in 30 years (l/s)	4.38	4.38
1 in 100 years (l/s)	6.07	6.07

Project No : 1833
Project Title : Hook Lane

Detention Basin

Site Location: Westergate
 $r = 0.36$ (range 0.12 to 0.45)
 Drained Area = 3200 m²
 Design storm 1 in = 100 year
 Design-operational = 20 % for climate change
 Sensitivity case at rim = 40 % for climate change
 Urban Creep allowance = 0 % uplift to Drained Area

Catchment ID: (gross- infiltration) IL 9.1 OWL 9.8 rim 10.1
 Width of base = 16 m
 Length of base = 16.5 m
 Base Area = 264 m²
 Side slopes 1 in = 1.9

Site Considerations

Where determined, what is the depth to highest seasonal groundwater level (GWL) from surface 1.00 m

Technical Assessment

Design Desicharge Rate = 2.00 l/s
 Operational depth from base = 0.70 m
 O/A depth rim-base = 1.00 m

Storm Duration	5 min	10 min	15 min	30 min	1 hr	2 hr	4 hr	6 hr	10 hr	24 hr
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
M100/M5 gf Value Z2	1.84	1.91	1.95	2.00	2.03	2.01	1.97	1.94	1.91	1.82
Rainfall M100 (mm)	13.3	19.5	24.2	31.5	40.6	49.1	58.4	64.9	72.4	88.2
OPERATIONAL LOAD										
With CC & UC uplift (mm)	15.9	23.4	29.0	37.9	48.7	58.9	70.1	77.9	86.9	105.9
RUNOFF (m ³)	50.95	74.94	92.78	121.13	155.90	188.55	224.28	249.18	278.12	338.78
Discharge capacity (m ³)	0.60	1.20	1.80	3.60	7.20	14.40	28.80	43.20	72.00	172.80
DISCHARGED (m ³)	0.60	1.20	1.80	3.60	7.20	14.40	28.80	43.20	72.00	172.80
Req'd STORAGE (m ³)	50.35	73.74	90.98	117.53	148.70	174.15	195.48	205.98	206.12	165.98
	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

TOTAL STORAGE AVAILABLE 216.71 m³ Width at Operation depth = 18.66 m
 Time to drain full to half full = 14.3 hours Length at oprational depth = 19.16 m

SENSITIVITY CASE										
RUNOFF (m ³)	59.44	87.43	108.24	141.31	181.89	219.98	261.66	290.70	324.48	395.24
Discharge capacity (m ³)	0.60	1.20	1.80	3.60	7.20	14.40	28.80	43.20	72.00	172.80
DISCHARGED (m ³)	0.60	1.20	1.80	3.60	7.20	14.40	28.80	43.20	72.00	172.80
Req'd STORAGE (m ³)	58.84	86.23	106.44	137.71	174.69	205.58	232.86	247.50	252.48	222.44

TOTAL STORAGE AVAILABLE 330.56 m³ Width at rim = 19.8 m
 Time to drain full to half full = 17.5 hours Length at rim = 20.3 m

Overall Assessment

Base elevation above seasonal high GWL 0.00 m
 Will the basin drain from full to half full in 24 hours or less? (sensitivity case) Yes pass
 Does the basin provide sufficient storage? Yes pass

Calculated by: Andy Traves

Site name: Hook Lane

Site location: Westergate

Site coordinates

Latitude: 50.83380° N

Longitude: 0.67529° W

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", WS-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Reference: 6540257

Date: 2019-03-05T17:57:39

Methodology	IH124
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Site characteristics

Total site area (ha)	0.965
Significant public open space (ha)	0.285
Area positively drained (ha)	0.6799999999
Pervious area contribution (%)	30
Impermeable area (ha)	0.34
Percentage of drained area that is impermeable (%)	50
Impervious area drained via infiltration (ha)	00
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.66
Net impermeable area for storage volume design (ha)	0.37

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage	
	Default	Edited
Climate change allowance factor	1.4	1.4
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5
Qbar estimation method	Calculate from SPR and SAAR	
SPR estimation method	Calculate from SOIL type	
	Default	Edited
Qbar total site area (l/s)	1.9	—
SOIL type	2	2
HOST class	N/A	N/A
SPR	0.3	0.3

Hydrology

	Default	Edited
SAAR (mm)	749	749
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.4	0.4
Rainfall 100 yrs 6 hrs	63	
Rainfall 100 yrs 12 hrs	91.63	
FEH/FSR conversion factor	1.19	1.19
Hydrological region	7	
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 10 year	1.62	1.62
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	1.9	1.9
Qbar net site area (l/s)	1.34	1.34
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	5	5
1 in 100 years (l/s)	5	5

Estimated storage volumes

	Default	Edited
Interception storage (m³)	14	14
Attenuation storage (m³)	250	250
Long term storage (m³)	0	0
Treatment storage (m³)	41	41
Total storage (excluding treatment) (m³)	264	264

Date: 05/03/2019

Site Ref

Hook Lane

SuDS Water Quality Management CIRIA C753 Ch26

Simple Index Approach

Catchment

Roofs

Is discharge to: SPZ1? ☐ N Drinking Water Protection Area? ☐ N
Is site in close proximity to an area with sensitive environmental designation? ☐ Y
if so how close? pond m
Is an additional treatment component required due to sensitivity? ☐ Y

Land Use

roofs-residential

Hazard

very low

TSS index	Metals index	HydroCar index
0.2	0.2	0.05

*2 residential roofs remove gross solids and sediments

Treatments

To surface water discharge ☐ Y

Component

1 Separator

2 Pond

3 N/A

mitigation index

basic OK

X1 N/A

Enhanced mitigation index

stage missing

Residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0.5	0.4	0.8	1.00
0.7	0.7	0.5	0.50
0	0	0	0.50
0.85	0.75	1.05	
0	0	0	0.50
0.85	0.75	1.05	
0	0	0	

Land Use

roofs-residential

Hazard

very low

TSS index	Metals index	HydroCar index
0	0	0

residual

*2 residential roofs remove gross solids and sediments

Treatments

To groundwater discharge ☐ N

Infiltration surface

1 N/A

2 N/A

Final residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0	0	0	1.00
0	0	0	0.50
0	0	0	

Is a groundwater risk screening required?

☐ N

Notes:

Date: 05/03/2019

Site Ref

Hook Lane

SuDS Water Quality Management CIRIA C753 Ch26

Simple Index Approach

Catchment

roads

Is discharge to: SPZ1? N Drinking Water Protection Area ? N

Is site in close proximity to an area with sensitive environmental designation?

Y

if so how close?

pond m

Is an additional treatment component required due to sensitivity?

Y

Land Use

roads-low traffic

Hazard

low

TSS index	Metals index	HydroCar index
0.5	0.4	0.4

Treatments

To surface water discharge Y

Component

1 Separator

2 Pond

3 N/A

mitigation index

basic OK

X1 N/A

Enhanced mitigation index

stage missing

Residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0.5	0.4	0.8	1.00
0.7	0.7	0.5	0.50
0	0	0	0.50
0.85	0.75	1.05	
0	0	0	0.50
0.85	0.75	1.05	
0	0	0	

Land Use

roads-low traffic

Hazard

low

TSS index	Metals index	HydroCar index
0	0	0

residual

Treatments

To groundwater discharge N

Infiltration surface

1 N/A

2 N/A

Final residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0	0	0	1.00
0	0	0	0.50
0	0	0	

Is a groundwater risk screening required?

N

Notes:

SUDS operation and maintenance - general

There are three categories on maintenance activities:

Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example). The table below summarises the likely maintenance activities required for each SUDS component and specific maintenance activities is given in the following sections.

Remedial maintenance comprises intermittent tasks that may be required to rectify faults associated with the system. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict. Remedial maintenance items can comprise items such as:

- inlet/outlet repairs
- erosion repairs
- reinstatement or realignment of edgings, barriers, rip-rap or other erosion control
- infiltration surface rehabilitation
- replacement of blocked filter fabrics
- construction stage sediment removal (although this activity should have been undertaken before the maintenance contract)
- system rehabilitation immediately following a pollution event.

O&M activity	SUDS component												
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter trench	Modular storage	Pervious pavements	Swale/bioretention/greenroofs	Filter strip	Sand filter	Pre-treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter/debris removal	■	■	■	■	□	■	■	□	■	■	■	■	■
Grass cutting	■	■	■	■	□	■	■	□	□	■	■	□	□
Weed/invasive plant control	□	□	□	□		□	□		□	□	□	□	□
Shrub management	□	□	□	□					□	□	□		□
Shoreline vegetation management	■	■	□										□
Aquatic vegetation management	■	■	□										□
Occasional maintenance													
Sediment management *	■	■	■	■	■	■	■	■	■	■	■	■	■
Vegetation/plant replacement	□	□	□	□						□	□		□
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation/repair	□	□	□	□	□	□	□	□	□	□	□	□	□
Infiltration surface reconditioning				□	□	□	□		□	□	□	□	

■ will be required

□ may be required

* sediment to be collected upstream of the main device

GENERAL MAINTENANCE

Litter/debris removal

This is an integral part of SUDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks. High litter removal frequencies may be required at high profile commercial/retail parks where aesthetics are a major driver.

Grass cutting

It is recommended that grass cutting be minimised around SUDS facilities, apart from swales and filter strips and structural embankments where a height of 100–150 mm is recommended to prevent the plants falling over, or “lodging”, when water flows across the surface. In general, allowing grass to grow tends to enhance water quality performance. Short grass around a wet system such as pond or wetland provides an ideal habitat for nuisance species such as geese; allowing the grass to grow is an effective means of discouraging them. Grass around wet pond or wetland systems should not be cut to the edge of the permanent water. Grass cutting is an activity undertaken primarily to enhance the perceived aesthetics of the facility. The frequency of cutting will tend to depend on surrounding land uses, and public requirements. Therefore, grass cutting should be done as infrequently as possible, recognising the aesthetic concerns of local residents. However, grass around inlet and outlet infrastructure should be trimmed closely to reduce risks to system performance. If a manicured, parkland effect is required, then cutting will need to be undertaken more regularly than for meadow type grass areas, which aim to maximise habitat and biodiversity potential.

Weed/invasive plant control

Weeds are generally defined as vegetation types that are unwanted in a particular area. For SUDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable. In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding should generally be required only during the first year, ie during plant establishment). However, over grassed surfaces, mowing can be an effective management measure. The use of herbicides and pesticides should be prohibited since they cause water quality deterioration. The use of fertilisers should also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

Shrub management

Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs should be selected so they can grow to their maximum natural height without pruning.

Aquatic/shoreline vegetation management

Aquatic plant aftercare in the first 1–3 years may be required to ensure establishment of planted vegetation and control nuisance weeds/invasive plants. Once established, the build-up of dead vegetation from previous seasons should be removed at convenient intervals to reduce organic silt accumulation (eg every three years and at the end of landscape contract periods).

Emergent vegetation may need to be harvested every 5–10 years to maintain flood attenuation volumes, optimise water quality treatment potential and ensure fresh growth, although this is often not required. Care should be taken to avoid nesting birds during the breeding season and to avoid great crested newt and water vole habitats. The typical window for this activity is towards the end of the growing season (September and October). As vegetation matures, plant height may also become a safety issue in residential areas.

Where emergent vegetation is managed, up to 25 per cent can be removed by cutting at 100 mm above soil level using shearing action machinery. Up to 25 per cent of submerged vegetation can be cut and raked out at any one time, using approved rakes, grabs or other techniques, depending on whether clay or waterproof membranes are present. Aquatic vegetation arisings should be stacked close to the water's edge for 48 hours to de-water and allow wildlife to return to the SUDS feature. They should then be removed to wildlife piles, compost heaps or off site before decomposition, rotting or damage to existing vegetation can occur.

Algae removal may be undertaken for aesthetic purposes during the first 3–5 years of a pond/wetland's life. The growth of algae, which is considered by some to be visually intrusive, is encouraged by nutrients introduced into the water body. This situation should settle down once upstream construction activities are complete.

Management of green waste

Appropriate methods should be implemented to dispose of green waste, including

- The development of wildlife piles
- On- or off-site composting
- Disposal to landfill

REMEDIAL MAINTENANCE

Structure rehabilitation/repair

There will come a time with most SUDS techniques when a major overhaul of the system is required to remove clogged filters, geotextiles, gravel etc. This will typically be between 10 and 25 years, depending on the technique and factors such as the type of catchment and sediment load. For example the use of geotextiles close to the surface in pervious surfaces traps the majority of sediment in a relatively easily accessible location. Reconstruction of the surface layer and bedding layer is all that is required, rather than reconstruction of the whole pavement depth.

Major overhaul is most likely to be required on techniques that rely on filtration through soils or aggregates, such as sand filters and infiltration devices. Other SUDS techniques are unlikely to need major overhaul if routine maintenance is undertaken as required (for example ponds and wetlands).

Rehabilitation activities for each SUDS component are described on the following tables.

Infiltration surface rehabilitation

In the event that grassed surface permeability has reduced, there are a number of landscape techniques that can be used to open the surface to encourage infiltration. Such activities are not commonplace and are likely to be required only in circumstances where silt has not been effectively managed upstream.

1. Scarifying to remove “thatch”. Thatch is a tightly intermingled organic layer of dead and living shoots, stems and roots, developing between the zone of green vegetation and the soil surface. Scarifying with tractor-drawn or self-propelled equipment to a depth of at least 50 mm breaks up silt deposits, removes dead grass and other organic matter and relieves compaction of the soil surface.
2. Spiking or tining the soil, using aerating equipment to encourage water percolation. This is particularly effective if followed by top dressing with a medium to fine sand, and is best undertaken when the soil is moist. Spiking or tining with tractor drawn or self-propelled equipment penetrates and perforates soil layers to a depth of at least 100 mm (at 100 mm centres) and allows the entry of air, water, nutrients and top dressing materials.
3. As a last resort, it may be necessary to remove and replace the grass and topsoil by:
 - removing accumulated silt and (subject to a toxicity test) applying to land or dispose of to landfill
 - removing damaged turf which should be composted
 - cultivating remaining topsoil to required levels
 - re turfing (using turf of a quality and appearance to match existing) or reseeded (to BS 7370: Part 3, Clause 12.6 (BSI, 1991) using seed to match existing turf) area to required levels. It may be necessary to supply and fix fully biodegradable coir blanket to protect seeded soil. Turf and seeded areas should be top dressed with fine sieved topsoil to BS 3882 (BSI, 1994) to achieve final design levels. Watering will be required to promote successful germination and/or establishment.

Water butts operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris..	Annually (or following poor performance).
Occasional maintenance	Replacement of any filters.	As required
Remedial actions	Repair of erosion damage, or damage to tank.	As required
Monitoring	Inspection of the tank for debris and sediment build up.	Annually (or following poor performance).
	Inspection of inlets, outlets and withdrawal devices.	Annually (or following poor performance).
	Inspection of areas receiving overflow, for evidence of erosion.	After extreme storms.
	Inspection of roof drain filters	Annually (or following poor performance).

Pre-treatment systems operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Removal of litter and debris.	6 monthly
Occasional maintenance	Change of filter media.	As required
	Removal of sediment, oil, grease and floatables.	As required
Remedial actions	Replacement of malfunctioning parts.	As required
Monitoring	Inspect for evidence of poor operation.	6 monthly
	Inspect filter media and establish appropriate replacement frequencies.	6 monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies.	Monthly in the first year of operation, then every 6 months.

For oil/water separators, the following items should be undertaken every six months as a minimum:

- check volume of sludge
- check thickness of light liquid
- check function of automatic closure device
- empty the separator if required
- check the coalescing material and clean or change if necessary (Class 1 only)
- check the function of the warning device (if fitted).

General inspection of oil/water separators should occur at a maximum frequency of five years, and should cover the following:

- watertightness of system
- structural condition
- internal coatings
- in-built parts
- electrical devices and installations
- checking of adjustment of automatic closure devices.
-

It is of key importance that the separator is filled with clean water before it is put into operation and each time after it is emptied for maintenance. Failure to do so will cause the separator to malfunction until stormwater builds up the required permanent water level in the facility. It is possible to fit an alarm to separators that will indicate when the collected oil volume is at a maximum, and this may be a regulatory requirement.

Trenches operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming any roots that may be causing blockages	Annual (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required)
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly.
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required
	Rehabilitate infiltration or filtration surfaces.	As required
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required
	Excavate trench walls to expose clean soils if infiltration performance reduces to unacceptable levels.	As required
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	Monthly in the first year and then annually.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Swales operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	Monthly (or as required).
	Grass cutting – to retain grass height within specified design range.	Monthly (during growing season), or as required.
	Manage other vegetation and remove nuisance plants.	Monthly (at start then as required).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible.	Annually.
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required.	Annually, or if bare soil is exposed over 10% or more of the swale treatment area.
Remedial actions	Repair erosion or other damage by re-turfing or reseeded.	As required
	Re-level uneven surfaces and reinstate design levels.	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required
	Remove and dispose of oils or petrol residues using safe standard practices.	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect infiltration surfaces for ponding, compaction, silt accumulation. Record areas where water is ponding for > 48 hours.	Monthly, or when required.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Pond operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter removal.	As required
	Grass cutting – public areas.	Monthly (during growing season)
	Grass cutting – meadow grass.	Half yearly (spring, before nesting season, and autumn)
	Inspect vegetation to pond edge and remove nuisance plants (for first 3 years).	Monthly (at start, then as required)
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1 m above pond base; include max 25% of pond surface).	Annually.
	Remove 25% of bank vegetation from waters edge to a minimum of 1 m above water level.	Annually.
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from forebay.	1–5 years, or as required.
	Remove sediment from one quadrant of the main body of ponds without sediment forebays.	2-10 years.
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%.	>25 years (usually).
Remedial actions	Repair of erosion or other damage.	As required
	Aerate pond when signs of eutrophication are detected.	As required
	Realignment of rip-rap or other damage.	As required
	Repair/rehabilitation of inlets, outlets and overflows.	As required
Monitoring	Inspect structures for evidence of poor operation.	Monthly/after large storms.
	Inspect banksides, structures, pipework etc for evidence of physical damage.	Monthly/after large storms.
	Inspect water body for signs of eutrophication.	Monthly (May–October).
	Inspect silt accumulation rates and establish appropriate removal; frequencies.	Half yearly.
	Check penstocks and other mechanical devices.	Half yearly.

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Appendix D

**ENGINEER'S INSPECTION
CONDITIONS AND LIMITATIONS**



1. The report is a record of a visual inspection carried out by, or under the direction of a Chartered Structural Engineer and must not be misinterpreted as a Structural Survey such as would be carried out by a Chartered Surveyor. The report is not a Valuation Survey.
2. The inspection is strictly limited to the items requested and these will be detailed in the report. No consideration will be given to any other aspects or parts of the building.
3. The report is confidential to the Client(s) and has been prepared to their instructions for their own purposes only and it is not permitted to disclose this report to any other parties (except the Clients own Solicitors, Surveyors, Building Societies or Estate Agents) without the prior consent of Aqua Callidus Consulting Ltd.
4. The copyright of this report remains the property of Aqua Callidus Consulting Ltd.
5. No liability for the contents of this report is accepted to any parties other than the Client(s). No parties other than the client should rely upon this report.
6. Unless specifically stated otherwise:-
 - a) Trial holes will not be excavated prior to the preparation of the report and the depth and construction of the foundations and type of sub-soil will not be inspected.
 - b) All external observations will be carried out by eye from the ground level only. Internal inspection is made within the limits of ready accessibility and it is not normal practice to lift floor coverings or floor boards, remove fixtures, panels or plaster, or move heavy items of furniture or bulky goods or materials.
 - c) No inspection will be made of any roof voids, floor joists, wall cavities, drainage pipework or any other hidden or inaccessible parts.
 - d) No timbers will be checked for damp, rot, infestation by wood-boring insects or other defects.
 - e) It should not be construed that any parts of the construction comply with the requirements of the Building Regulations Act or standard practice either current or as current at the time of original construction. No enquiries to any Authorities will be made.
 - f) No testing or enquiries into the presence of or susceptibility to pollution, contamination, radiation, methane, radon or other gases or hazardous substances has been carried out.
7. Unless specifically stated otherwise in the report, any recommendations for works given in the report are outline only and are to be confirmed or modified as appropriate at detailed design stage.
8. Where trial holes are specifically included in our instructions the condition of the footing and the founding soil relates only to the point of excavation and does not necessarily confirm a continuation of the same conditions throughout the non-inspected areas of the structure. Whilst such trial pits will usually provide a reasonable indication as to the general state of the foundations and ground conditions, these can not be determined with complete certainty.
9. Under the Construction (Design & Management) Regulations latest edition, the Client has obligations for ensuring Health and Safety arising from any construction work. If it is proposed to proceed with construction work based upon information or recommendations contained in this report, these regulations apply. Further details of any issues arising from our report or the Clients obligations generally are available on request.
10. Unless dealt with more specifically above the Association of Consulting Engineers Conditions of Engagement Short Form Agreement 2002 apply.