

24 May 2019

Laura Gibbons
Arun District Council

By Email: [REDACTED]

Cc: [REDACTED]

Reference: FG/2013/18

Dear Laura,

REVISED SURFACE WATER DRAINAGE STRATEGY - DISCHARGE OF CONDITION 4 ON DECISION NOTICE: FG/203/18/PL AT FERRING COUNTRY CENTRE RIFE WAY FERRING WEST SUSSEX BN12 5JZ

Following further consultation with yourself we have prepared an alternative surface water drainage strategy for your consideration. This document is being submitted to support the discharge of pre-commencement condition number 4 on planning permission FG/203/18/PL – surface water drainage.

This letter outlines the proposed surface water drainage strategy and incorporates Arun District Council's Supplementary Requirements for Surface Water Drainage Proposals in Annex A.

Should you wish to discuss the proposal further we would be happy to meet and look forward to receiving your comments on the scheme.

Surface Water Drainage Strategy

This surface water drainage strategy delivers a sustainable solution for managing roof water runoff from the proposed development.

The existing roof space (290m²) drains to a soakaway that has been de-sludged in the work carried out on Monday 8 April 2019. A proportion of the new proposed roof space (292m² total area) is to pass via an existing cylindrical tank located below ground 5m north of the north western corner of the development.

On investigation this existing tank was found to be 3m long by 1.8m diameter potentially hosting a total volume of 7.63m³ storage. The intention is to use this roof runoff for irrigation on site and a submersible pump will be installed for ease of access.

Overflow from this tank will pass via a 100mm diameter below ground pipe to a permeable surface to be located in the existing staff car park. Runoff will be conveyed through the permeable surface via a 100mm slotted pipe enabling shallow infiltration into the substrate at approximately 300mm below surface level.

The permeable surface will be connected to the existing soakaway located in the driveway and any excess runoff that does not permeate the substrate in the permeable surface will be discharged to this soakaway.

Design Calculations

The following data has been used to design the permeable surface and attenuation strategy:

- Roof surface area = 292m²;
- 1 in 100 rainfall event +30% over a 6 hour period = 14.27mm/hour¹;
- Tank volume = 7.63m³.

The potential runoff during a 6 hour 1 in 100 year event +30% = 25m³

Roof runoff will be split with a proportion passing via the existing storage tank (7.63m³ capacity) and the rest going directly to the permeable surface. Assuming 50% of flow requires attenuation with the gravel having a void space of 30%, an area of 100m² is required installed to a depth of 300mm.

Overall, for a 6 hour 1 in 100 year event +30% we anticipate attenuation and storage of approximately 18m³ in the tank and permeable surface with the remaining 8m³ discharging to the existing soakaway.

The anticipated flow of treated sewage effluent from the new septic tank will discharge into the permeable surface via the sampling chamber.

The drawing in Figure 1 provides details of the proposed permeable surface design, layout and storage tank.

Maintenance & Management

A maintenance plan is proposed to ensure the efficacy of the soakaway and this includes regular inspections, pumping out sludge where required (although not anticipated to be significant based on source of runoff, i.e. roof water and treated sewage effluent).

The septic tank will be maintained in line with manufacturers instructions.

Summary

Following consultation with the Local Planning Authority a revised surface water drainage strategy is proposed.

Roof water will be split with a proportion going direct to the proposed permeable surface and the remainder conveyed via down pipes to an underground tank with a capacity of 7.63m³. The overflow from here will pass via a 100mm below ground pipe and collect the septic tank discharge before discharging to a Type 3 gravel permeable surface via a slotted pipe.

Excess flow will pass to the existing soakaway currently used on site.

The Arun District Council's Surface Water Drainage Checklist has been completed and is shown in Attachment A along with any supplementary information required.

Yours sincerely



Director & Hydrogeologist



¹ Archibald Drainage Calculations

Statement of Limitations

This report was prepared in accordance with the scope of work outlined within this report and is subject to the applicable cost, time and other constraints.

H2Ogeo performed the services on behalf of the Client in a manner consistent with the normal level of care and expertise exercised by members of the environmental profession. No warranties, expressed or implied, are made.

Except as otherwise stated, H2Ogeo's assessment is limited strictly to the scope of work outlined in above and does not evaluate structural or geotechnical conditions of any part of the Site (including any buildings, equipment or infrastructure) or outside the Site boundary.

All conclusions and recommendations made in the report are the professional opinions of H2Ogeo personnel involved with the project and, while normal checking of the accuracy of data has been conducted, H2Ogeo assumes no responsibility or liability for errors in data obtained from external sources, regulatory agencies or any other external sources, nor from occurrences outside the scope of this project.

H2Ogeo is not engaged in environmental consulting and reporting for the purpose of advertising, sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity or investment purposes.

This report has been prepared for the sole use of Client. The report may not be relied upon by any other party without the express written agreement of H2Ogeo. The provision of a copy of this report to any third party is provided for informational purposes only and any reliance on this report by a third party is done so at their own risk and H2Ogeo disclaim all liability to such third party to the extent permitted by law.

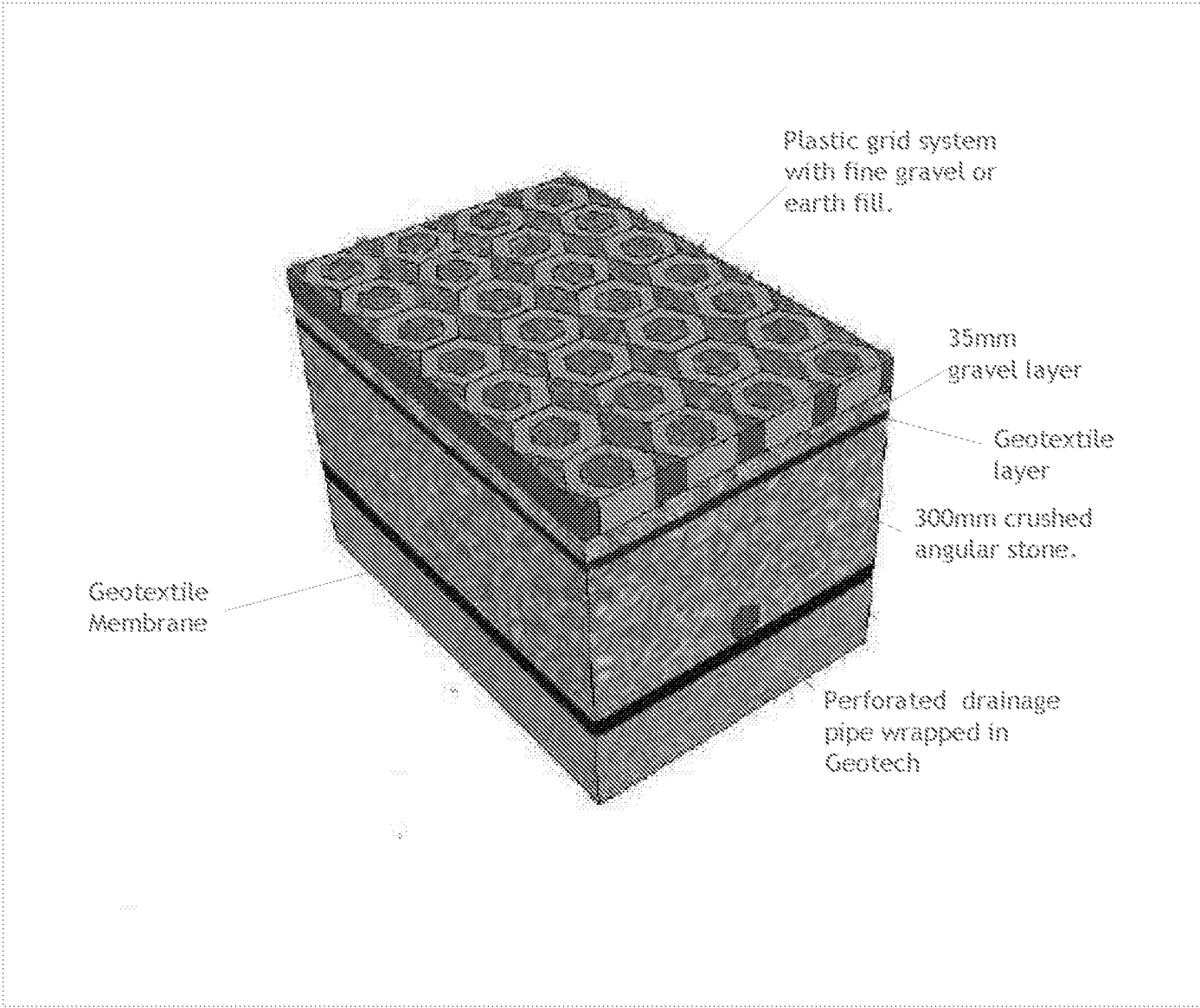
Any use of this report by a third party is deemed to constitute acceptance of this limitation.

This report does not constitute legal advice.

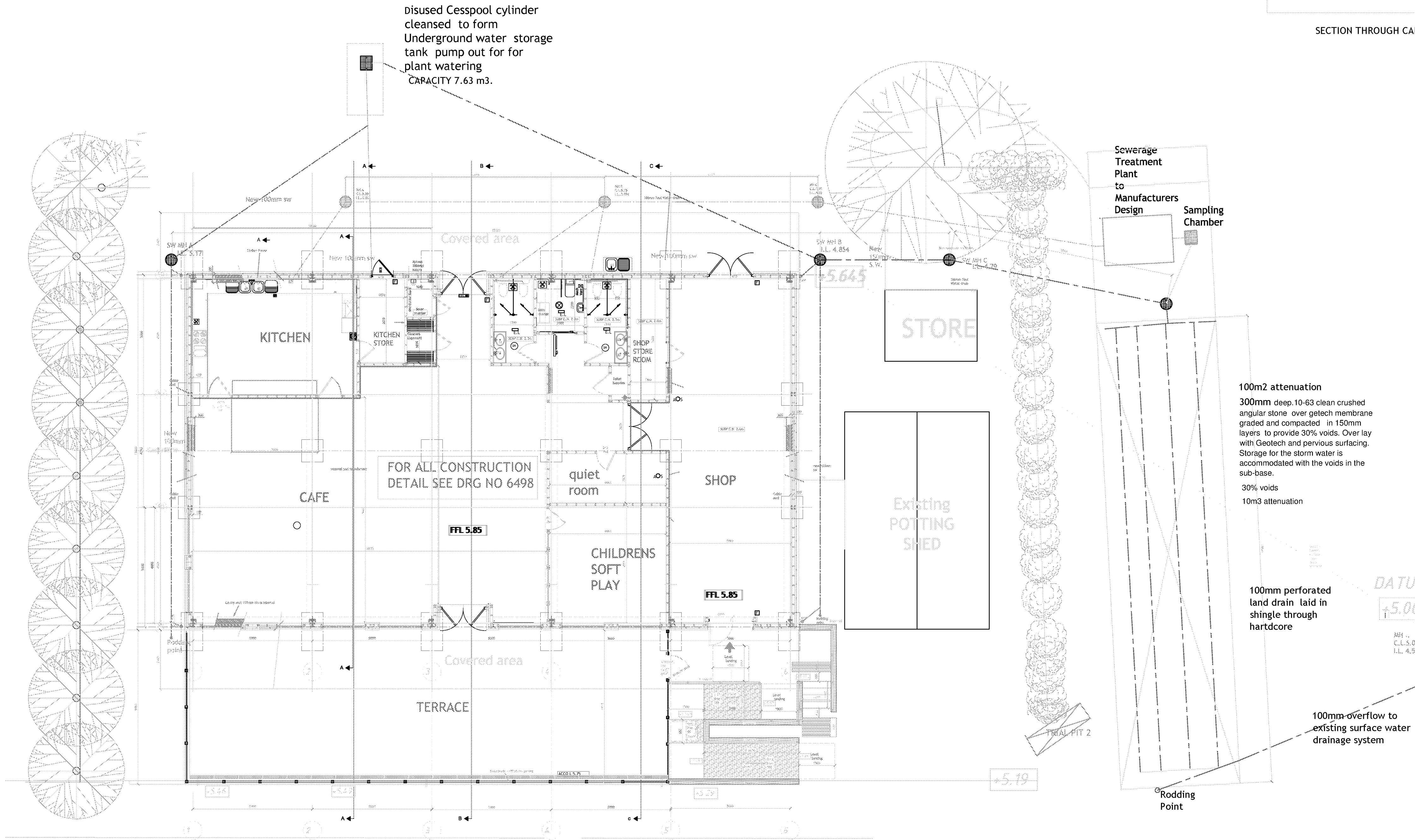
ANNEX A

Drawing 6454 Proposed Surface Water Drainage

Arun District Council's Supplementary Requirements for Surface Water Drainage Proposals & Figures



SECTION THROUGH CARPARK ATTENUATION



STANDARD B. REG KEY

	150mm S.W.
	100mm S.W.
	75mm S.W.
	50mm S.W.
	25mm S.W.
	15mm S.W.
	10mm S.W.
	5mm S.W.
	2.5mm S.W.
	1.5mm S.W.
	1mm S.W.
	0.5mm S.W.
	0.25mm S.W.
	0.125mm S.W.
	0.0625mm S.W.
	0.03125mm S.W.
	0.015625mm S.W.
	0.0078125mm S.W.
	0.00390625mm S.W.
	0.001953125mm S.W.
	0.0009765625mm S.W.
	0.00048828125mm S.W.
	0.000244140625mm S.W.
	0.0001220703125mm S.W.
	0.00006103515625mm S.W.
	0.000030517578125mm S.W.
	0.0000152587890625mm S.W.
	0.00000762939453125mm S.W.
	0.000003814697265625mm S.W.
	0.0000019073486328125mm S.W.
	0.00000095367431640625mm S.W.
	0.000000476837158203125mm S.W.
	0.0000002384185791015625mm S.W.
	0.00000011920928955078125mm S.W.
	0.000000059604644775390625mm S.W.
	0.0000000298023223876953125mm S.W.
	0.00000001490116119384765625mm S.W.
	0.000000007450580596923828125mm S.W.
	0.0000000037252902984619140625mm S.W.
	0.00000000186264514923095703125mm S.W.
	0.000000000931322574615478515625mm S.W.
	0.0000000004656612873077392578125mm S.W.
	0.00000000023283064365386962890625mm S.W.
	0.000000000116415321826934814453125mm S.W.
	0.0000000000582076609134674072265625mm S.W.
	0.00000000002910383045673370361328125mm S.W.
	0.000000000014551915228366851806640625mm S.W.
	0.0000000000072759576141834259033203125mm S.W.
	0.00000000000363797880709171295166015625mm S.W.
	0.000000000001818989403545856475830078125mm S.W.
	0.0000000000009094947017729282379150390625mm S.W.
	0.00000000000045474735088646141895751953125mm S.W.
	0.000000000000227373675443230709478759765625mm S.W.
	0.0000000000001136868377216153547393798828125mm S.W.
	0.00000000000005684341886080767736968994140625mm S.W.
	0.00000000000002842170943040383868484497072265625mm S.W.
	0.000000000000014210854715201919342422485361328125mm S.W.
	0.00000000000000710542735760095967121124426806640625mm S.W.
	0.000000000000003552713678800479835605622134033203125mm S.W.
	0.0000000000000017763568394002399178028110670166015625mm S.W.
	0.00000000000000088817841970011995890140553350330078125mm S.W.
	0.000000000000000444089209850059979450702766751650390625mm S.W.
	0.0000000000000002220446049250299897253513833758251953125mm S.W.
	0.00000000000000011102230246251499486267691668791259765625mm S.W.
	0.000000000000000055511151231257497431338455833956298828125mm S.W.
	0.0000000000000000277555756156287487156692279169781494140625mm S.W.
	0.00000000000000001387778780781437435783461395848907270703125mm S.W.
	0.000000000000000006938893903907187178917306979244536353515625mm S.W.
	0.0000000000000000034694469519535935894586534896222681767578125mm S.W.
	0.0000000000000000017347234759767967947293267448111340883828125mm S.W.
	0.00000000000000000086736173798839839736466337240556704419140625mm S.W.
	0.000000000000000000433680868994199198682331686202783522095703125mm S.W.
	0.0000000000000000002168404344970995993411658431013917610478828125mm S.W.
	0.00000000000000000010842021724854979967058292155069588052394140625mm S.W.
	0.000000000000000000054210108624274899835291460775347940261970703125mm S.W.
	0.0000000000000000000271050543121374499676457303876739701309853515625mm S.W.
	0.00000000000000000001355252715606872498382286519383698506549267578125mm S.W.
	0.000000000000000000006776263578034362491911432596918492532746337890625mm S.W.
	0.0000000000000000000033881317890171812459557162598492462663731689453125mm S.W.
	0.00000000000000000000169406589450859062477785812796462313318658447265625mm S.W.
	0.000000000000000000000847032947254295312488892926398231066593292236328125mm S.W.
	0.0000000000000000000004235164736271476562444464631991155329664461181640625mm S.W.
	0.00000000000000000000021175823681357382812222323159957776648322305908203125mm S.W.
	0.000000000000000000000105879118406786914056111115998888883241611529541015625mm S.W.
	0.0000000000000000000000529395592033934570280555579994444416208076447727078125mm S.W.
	0.00000000000000000000002646977960169672851402777899972222081040382238635390625mm S.W.
	0.000000000000000000000013234889800848364257011389499861111040520111719176953125mm S.W.
	0.00000000000000000000000661744490042418212850569474993055502026005885958828125mm S.W.
	0.000000000000000000000003308722450212091064252847374965277510130029429794140625mm S.W.
	0.0000000000000000000000016543612251060455321264236874826387550650147148970703125mm S.W.
	0.0000000000000000000000008271806125530227661063211837441318775325073574494848828125mm S.W.
	0.00000000000000000000000041359030627651138305316059187206593876625367872474244140625mm S.W.
	0.000000000000000000000000206795153138255691526580295936032969383126839362371220703125mm S.W.
	0.0000000000000000000000001033975765691278457632901479680164846915634196811856103515625mm S.W.
	0.00000000000000000000000005169878828456392288164507398400824234578170984059280527578125mm S.W.
	0.000000000000000000000000025849394142281961440822536992004121172890854902646402637890625mm S.W.
	0.0000000000000000000000000129246970711409807204112684960020605864454274513232013189453125mm S.W.
	0.00000000000000000000000000646234853557049036020563424800103029322271372566160065947265625mm S.W.
	0.00000000000000000000000000323117426778524518010281712400051514661113686282736328003297265625mm S.W.
	0.000000000000000000000000001615587133892622590051408562000257573305568441368161640016486328125mm S.W.
	0.0000000000000000000000000008077935669463112950257042810001287866527842206840808200082431640625mm S.W.
	0.00000000000000000000000000040389678347315564751285214050006439332639110344204041000412158203125mm S.W.
	0.00000000000000000000000000020194839173657782375642607025003219666319555172102020502060791015625mm S.W.
	0.00000000000000000000000000010097419586828891187821303512500160983159777586051010251030495527578125mm S.W.
	0.000000000000000000000000000050487097934144455



Surface Water Drainage Proposal Checklist

Foreword

Before completing this checklist you are advised to read “Arun/Chichester District Council Supplementary Requirements for Surface Water Drainage Proposals”.

The Surface Water Drainage Proposals Checklist is designed to clearly outline Arun/Chichester District Council’s expectations and requirements for Surface Water Drainage Proposals and to expedite their review. This document should be used when completing Discharge of Conditions Applications or if the applicant wishes to avoid pre-commencement conditions relating to surface water drainage.

The Town and Country Planning Regulations now require pre-commencement conditions to have the prior agreement of the applicant regarding their wording and use. If an applicant wishes to avoid surface water drainage pre-commencement conditions they will need to submit detailed surface water drainage proposals in line with the Surface Water Drainage Proposal Checklist.

The below details are required to enable Arun/Chichester District Council to examine if proposals follow the hierarchy for sustainable drainage and if the design will adequately drain the site.

N.B. It will be difficult for Arun/Chichester District Council to undertake an appropriate and therefore timely assessment of your application if you answer “no” to any of the questions below, or if you fail to provide any of the information requested.

Checklist

Winter groundwater monitoring results included	Presented in previous letter report 26 April 2019 and at the end of this checklist
Winter infiltration test results included	Large-scale soakage tests were carried out in TP1, TP4 and TP4A in accordance with BRE365 and the following results were obtained: TP1 – $5.0 \times 10^{-07} \text{m/s}$; TP4 – $1.0 \times 10^{-06} \text{m/s}$; and TP4A – $5.0 \times 10^{-06} \text{m/sec}$
Period of winter groundwater monitoring	February to April 2017 and February to April 2019
Maximum recorded groundwater level (AOD)	4.95mAOD (TP1 8 March 2019)
Date of infiltration testing	January 2017
Depth of infiltration testing	In TP1 – 1.8mbgl
Minimum infiltration rate recorded (At location of infiltrating structure)	$5.0 \times 10^{-07} \text{m/sec}$
Plan showing the location of winter groundwater monitoring and infiltration testing included	Yes – see attached Figure below.
Method of surface water disposal proposed (Delete as appropriate)	Reuse and infiltration – permeable surface and existing concrete ring soakaway



If infiltration is <u>not</u> to be used: Justification supplied	NA
If infiltration is proposed: half drain time for 10 year event + climate change allowance (hours)	Existing system.

If infiltration is proposed: half drain time for 100 year event+ climate change allowance (hours)	Existing system.	
If infiltration is proposed: lowest base level of infiltrating structure	2.5mAOD - Existing Soakaway and 300mm - permeable surface.	
If attenuation is proposed: calculations of pre-Development runoff rates included *	Yes – Roof water runoff	Rate 1.16 l/s
If attenuation is proposed: is proposed discharge rate less than or equal to pre-development rate?*	Equal +/- 0.01 l/sec	Rate 1.15 l/s
Calculations included demonstrating that the 1 in 100 year plus climate change event can be accommodated on site**	Adoption of existing functional system with additional storage, reuse and attenuation up gradient.	
If proposing an impermeable lined attenuation feature/s, calculations included demonstrating that resistance to floatation (due to groundwater levels) is achieved and catered for in the design	Not applicable	
If alterations or discharge to an ordinary watercourse is proposed: has Ordinary Watercourse Land Drainage Consent been sought?	NA	
Drainage layout plans included***	Yes – See Drawings 6454 (Figure 1)	
Construction detail plans included****	Yes (Drawing 6454)	
Exceedance flowroute plans included (Not required for<5 properties)	Not applicable	

*If developing brownfield sites, please provide fully detailed plans of the existing surface water drainage arrangements on site, including impermeable areas, gullies, outfalls, pipes & diameters, manholes, etc.

**If infiltration is proposed the following factor of safety should be applied to calculations (in accordance with CIRIA R156/ CIRIA C609)

Size of Area to be Drained	Consequences of failure					
	No damage or inconvenience		Minor inconvenience, e.g. surface water on car park		Damage to buildings or structures or roads.	
	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75
<100 m ²	1.5	2	2	3	10	13
100m ² to 1000m ²	1.5	2	3	4	10	13
>1000m ²	1.5	2	5	6.5	10	13



***Please note that drainage layout plans should include:

- All surface water drainage pipes labelled with; diameters, pipe materials, falls and invert levels.
- All infiltrating and attenuating structures (including permeable paving) labelled with; dimensions, invert and cover levels.
- All manholes labelled with; cover levels, invert levels, cover types detailed.
- All silt traps clearly labelled with sump depths.
- Control structures with outflow rates and invert levels.
- Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated managing of surface water runoff. Please note that ground raising should be avoided unless there are exceptional circumstances.

****If your proposed drainage scheme includes any of the following elements site specific construction detail plans should be supplied: pipe bed and surround; infiltrating structures; attenuating structures; manholes; catchpits/silt traps; control devices; permeable paving; headwalls.

