



**Mistletoe Farm
Horsemere Green Lane
Climping**

SuDS Operations & Maintenance Manual

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KNC1820/SUDS

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CONTENTS

1.0	INTRODUCTION.....	3
2.0	PERMEABLE PAVEMENTS	6
3.0	ATTENUATION STORAGE.....	8
4.0	FLOW CONTROL DEVICES & CHANNEL DRAIN	10

Table 1:	Operation and Maintenance Requirements - Permeable Pavements.....	7
Table 2:	Operation and Maintenance Requirements - Granular Storage & Silt Traps	8
Table 3:	Operation and Maintenance Requirements - Ditch/Swale, Pond Area, Site Frontage Ditch and Culvert	9
Table 4:	Operation and Maintenance Requirements - Flow Control Device & Drainage Channel.....	10

Appendix A	As built Information
Appendix B	Manufacturer's Information
Appendix C	Inspection Records
Appendix D	Maintenance Regime Monitoring and Amendments

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Signed: 

Date: 22nd October 2020

Revision	Description	Date	Initials
O	Initial issue	October 2020	KHN
A	Drainage layout drawing revised	25th Nov 2020	KHN

1.0 INTRODUCTION

1.1 The SuDS Philosophy

1.2 Sustainable Drainage Systems (SuDS) are a collection of water management practices that aim to align modern drainage systems with natural water processes. SuDS are designed to mimic the natural drainage regime of an area thus minimising impact on receiving watercourses. The SuDS philosophy has been applied to the proposed development to provide a natural approach to managing the surface water drainage from the site and preventing water pollution and flooding.

1.3 SuDS Maintenance

1.4 Regular inspection and maintenance is important for the effective operation of the SuDS drainage features across the development.

1.5 The following SuDS features have been designed into the development to control the surface water run-off created through the construction of roofs, parking areas and roads.

- Permeable pavements (block paving)
- Attenuation storage within the sub base of road and driveway construction
- Flow Control Devices

Surface water discharge from sections of the access road, roof areas and drives, directly to the attenuation storage areas which have been designed to store the volumes of flow. Surface water discharge from the southern area of the site will flow through a new swale/ditch and then into further granular attenuation at the northern end of the development. Along the discharge route are situated two flow control devices that will limit the discharge from each section before the final outfall into the ditch fronting the site in Horsemere Green Lane. The final discharge rate will be at

the agreed 'green field' run off. It should be noted that the existing unbound gravel driveway will remain in an unaltered state.

- 1.6 In order to ensure the continued effective operation of the SuDS features maintenance regimes have been provided for each of the above features.
- 1.7 This document has been prepared at the design stage and should be considered as part of an evolving process. Following construction as built information and drawings should be included. The post construction information should include drawings detailing the extent and location of SuDS features together with relevant manufacturer's details.
- 1.8 The following maintenance regimes should be amended/updated to suit specific manufacturer's requirements for the various components installed.
- 1.9 The following appendices have been included to allow for additional information and records to be included post construction.
 - **Appendix A** As built Information
 - **Appendix B** Manufacturer's Information
 - **Appendix C** Inspection Records
 - **Appendix D** Maintenance Regime Monitoring and Amendments
- 1.10 It should also be recognised that for a maintenance regime to continue to be appropriate and fit for purpose a constant monitoring ethos should be adopted and any corrective measures implemented to ensure that the correct maintenance regimes going forward are in place. Inspection records should be kept and used as a basis for the determining the suitability of the maintenance regimes and the areas of the development requiring attention.

- 1.11 The developer will set up a Maintenance Management Company for the site which will undertake the requirements and obligations to ensure that the SuDS facilities are adequately maintained. The obligations of the Management Company will be funded by an annual contribution from the residents of the development. This manual will form part of the brief provided to the Management Company, who will use it to calculate fees which will be paid by residents.
- 1.12 At the end of the manufacturer's recommended design life for all SuDS components they shall be replaced at the Management Company expense to the satisfaction of the Planning Authority.

2.0 PERMEABLE PAVEMENTS

- 2.1 Permeable pavements have been provided around the development for parking areas and drives. These will infiltrate water down through to the granular sub base where it will be stored and discharged at a reduced rate into the ditch/swale through 'fin drains'. The system will not rely on any infiltration through the sub-strata, all discharge volumes being calculated to be contained in the sub-base.
- 2.2 Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. Extensive experience suggests that sweeping once per year should be sufficient to maintain an acceptable infiltration rate on most sites.
- 2.3 A maintenance regime has been prepared for the development as indicated in Table 1 below.
- 2.4 Inspection reports should be kept and the maintenance regime for the pervious paving should be adjusted, if necessary, to suit ongoing site-specific circumstances as they arise.
- 2.5 A brush and suction cleaner (which can be a lorry-mounted device or a smaller precinct sweeper) should be used for regular sweeping. Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced. It is also possible to clean the surface using lightweight rotating brush cleaners combined with power spraying using hot water.
- 2.6 If the surface has clogged then a more specialist sweeper with water jetting and oscillating and rotating brushes may be required.

Table 1: Operation and Maintenance Requirements - Permeable Pavements

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance.	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
	Pervious surfaces; power wash	Once a year at the same time as the pervious paving is being cleaned.
Occasional maintenance.	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial Actions.	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required – once per year on less frequently used pavements.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required.
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).
Monitoring.	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48 hours after large storms in the first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor silt taps.	At same frequency of pervious paving inspections.

3.0 ATTENUATION STORAGE

3.1 Two forms of attenuation storage are provided.

- Storage in the open ditch/swale that is situated within the middle of the site.
- Storage in the granular sub base forming the access road and the parking court and driveways.

3.2 All discharge from roofs pass through a silt trap before being discharged directly into the granular sub base. Surface water from the carriageway and drives hardstanding areas discharges into the granular sub base either through the permeable paving or through trapped gullies that are connected to the sub base by means of 'diffusers'.

3.3 The granular storage will be wrapped in a permeable membrane which will allow the surface water to dissipate into the adjacent ground should it prove to have sufficient porosity..

3.4 A maintenance regime has been prepared for the ditch/swale, silt traps and granular storage drainage system as indicated in Tables 2 & 3 below.

Table 2: Operation and Maintenance Requirements – Granular Attenuation Storage and Silt Traps

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance.	Inspect and remove sediment from all discharge gullies	At six monthly intervals, Autumn and Spring
Remedial actions.	Inspect and clean out all silt trap manholes, sump units, channel drains and pipework.	At six monthly intervals, Autumn and Spring.
Regular maintenance.	Remove any sediment or deposits with vacuum suction.	At six monthly intervals, Autumn and Spring

Table 3: Operation and Maintenance Requirements – Ditch/Swale, Site Frontage Ditch

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance. Including Horsemere Green Lane discharge ditch	Remove litter and debris	Monthly.
	Cut grass – for spillways and access routes.	Monthly (during growing season), or as required.
	Cut grass – meadow grass in and ditch.	Half year (spring – before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect banksides, structures, pipework etc. for evidence of physical damage.	Monthly.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required.
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlets, outlet and forebay.	Annually (or as required).
Occasional maintenance.	Reseed areas of poor vegetation growth.	As required.
	Prune and trim any trees and remove cuttings.	Every 2 years, or as required.
	Remove sediment from inlets, outlets, forebay and main basin when required.	Every 5 years, or as required
Remedial actions.	Repair erosion or other damage by reseedling or re-turfing.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.
	Relevel uneven surfaces and reinstate design levels.	As required.

4.0 FLOW CONTROL DEVICES

4.1 The attenuation systems connect to flow control devices which limit the rate of discharge into the drainage network.

4.2 The flow control devices being used are:

- A bespoke orifice control chamber, SEL Environmental Series 500 '*Contraflow*' restrictor or similar, installed prior to discharge into the receiving Horsemere Green lane Ditch which will limit the final flow from the site to 2.0 lits/sec
- A bespoke orifice control chambers, SEL Environmental Series 300 '*Contraflow*' restrictor or similar, which will limit the discharge into the onsite swale/ditch to 0.9 lits/sec.
- Manufactures details can be found in **Appendix B**

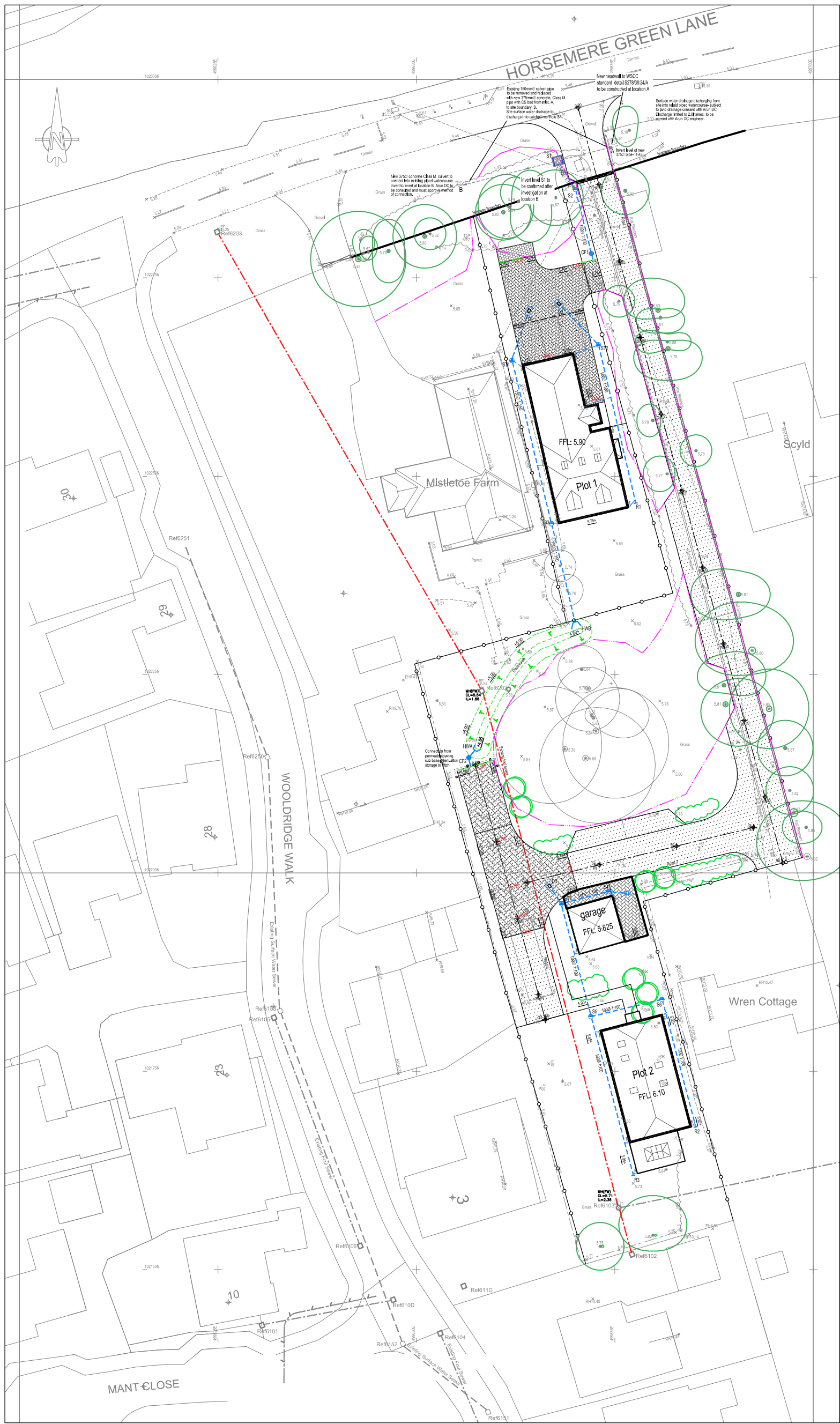
4.3 A maintenance regime has been prepared for the flow control devices as indicated in Table 4 below.

Table 4: Operation and Maintenance Requirements - Flow Control Devices and Trash Screen

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance Including trash Screen.	Inspect and identify any areas that are not operating correctly, take remedial action.	Monthly for 3 months, then annually.
	Remove any sediment and debris from flow control devices and trash screen	3 months in accordance with manufacturers recommendations
Remedial actions.	Repair/rehabilitate inlets, outlet, overflows and vents.	As required.
Monitoring.	Inspect/check all inlets, outlet, and overflows to ensure that they are in good condition and operating as designed.	Annually

Appendix A

As Built Information



- Notes:
1. All domestic drainage to be 100Ø U.N.O. Minimum gradient for 100Ø SW is 1:100 and 100Ø FW is 1:80 (at least one wc connected otherwise 1:40) and 150Ø is 1:150. Bedding for domestic drainage Class B. All pipe runs near buildings to comply with the Building Regulations 2002 Part H1.
 2. The contractor must comply with all current legislation relating to Health and Safety. The contractor/client must familiarise himself with all service companies records of existing plant locations prior to any excavation works. All existing services/sewers to be traced/surveyed. Any discrepancies to be reported to the engineer immediately.
 3. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 4. Position of soil pipes, standing wastes, wc outlets etc. are shown on the Architect's working drawings.
 5. Rainwater downpipe positions are to be checked against architect details to ensure compatibility. Rainwater pipes that pass through the building to have suitable rodding facilities.
 6. Where paths falls towards the front door use suitable linear/slot drainage system. To be connected to surface water system.
 7. Surface water drainage connected to catchpit manhole prior to discharge to sub grade attenuation.

- Legend:
- Existing foul water sewer
 - Domestic surface water drain.
 - Type 3 manhole - 450Ø
 - Type 5 silt trap inspection chamber
 - Type 6 catchpit manhole constructed on re-laid piped watercourse- subject to land drainage consent with Arun District Council
 - Controlflow flow control limiting discharge
 - Yard gully
 - Diffuser discharging to sub base attenuation
 - Formpave findrain
 - Proposed levels
 - Proposed formation levels
 - FFL 6.75 Proposed Finished Floor Level
 - 525mm high knee rail fence
 - Road Type 1 Permeable block paved access. Sub base designed to provide full attenuation storage for nil infiltration (porosity >0.40)
 - Road Type 2 Permeable block paved parking and drive. Sub base designed to provide full attenuation storage for nil infiltration (porosity >0.40)
 - Road Type 3 impermeable block paved parking and drive -Plot 2
 - Road Type 4 permeable 'no dig' car park-Plot 1
 - 30mm unbound gravel, 10-20mm stone, overlay to existing gravel drive.
 - Drainage ditch/swale
 - Protective tree fences (see Lizard Landscape, Design and Ecology drawing LLD1394-ARB-DWG-002 Rev 02 for details)

SURFACE WATER DRAINAGE SCHEDULE

REFERENCE	Cover Level (m)	Invert Level (m)	Depth to Soffit (m)	Size (mm)	Type	Cover Grade
S1	5.65	4.42/4.64 (TBC)	0.855	1200x800	6	D400
S2	5.90	4.670	1.080	450 diameter	3	B125
S3	5.75	5.116	0.484	450 diameter	3	B125
S4	5.825	5.370	0.305	450 diameter	3	B125
S5	5.95	5.450	0.400	450 diameter	3	B125
S6	5.95	5.540	0.310	450 diameter	3	B125
ST1	5.75	4.970	0.630	450 diameter	5	B125
ST2	5.75	5.100	0.550	450 diameter	5	B125
ST3	5.70	5.300	0.300	450 diameter	5	B125
CF1	6.50	5.685/5.735	0.665	SUDSO2005 Controlflow 500 Series Orifice - size 44mm, discharge 2.0lts/sec		
CF2	6.50	5.680/5.730	0.670	SUDSO1001 Controlflow 300 Series Orifice - size 33mm, discharge 0.8lts/sec		
R1	5.75	5.300	0.350		RE	B125
R2	5.95	5.620	0.230		RE	B125
R3	5.95	5.650	0.200		RE	B125
HWA	5.80	5.220	0.480		Althor Type H3C- No trash screen	
HWB	5.80	5.200	0.500		Althor Type H3C- With trash screen	
D1	5.75	5.300	0.350		710x710 SEL PVOD05101 diffuser	
D2	5.95	5.620	0.230		710x710 SEL PVOD05101 diffuser	
D3	5.95	5.650	0.200		710x710 SEL PVOD05101 diffuser	

Rev.	Date	Details	Notes
D	24.11.20	Additional notes added to converted watercourse	KN
C	24.11.20	Proposed new culvert added, discharge details amended	KN
S	11.11.20	Discharge details amended	KN
A	21.10.20	First issue	KN

Drawing Title
PRELIMINARY

Project
**MISTLETOE FARM
LITTLEHAMPTON**

Client
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Drawing Title Engineering Details Drainage Layout			
Drawn KN	Checked	Scales 1:250	Paper Size A1
Job No. KNC1820	Drawing No. 502-01	Date 10.20	
Revision D			

Appendix B

Manufacture's Information



Sudsstore Limited
Canal House
Bonsall Street
Blackburn
Lancashire
BB2 4DD
T 01254 694071

Maintenance regime for Controflow Flow Control Chambers

During Construction

Controflow Flow Control Chambers are fitted with a secondary cover. The purpose of the secondary cover is to prevent the ingress of debris during the construction phase. It should, therefore, be left in place during installation to prevent ingress of debris into the chamber. Care should be taken to ensure the secondary cover can be removed once the brickwork and cover & frame are in position.

Post Construction and prior to handover to Client

Remove the cover and secondary cover and check that the chamber is free of debris and silt. If necessary, clean all debris and silt from the Chamber.

Maintenance during Operation

Recommended inspection after a period of heavy rainfall. Remove the cover and secondary cover and carry out a visual check that the water in the chamber is clear and running freely. If the water is running freely then replace the secondary cover and replace the permanent cover. If the water is not running freely, remove the filter and wash away any debris under a running tap and ensure that the orifice is clear. Reposition the filter and replace the Covers.

Ongoing Regular Maintenance

It is recommended the chamber is inspected on a three-monthly basis as part of the wider SuDS maintenance regime.

Appendix C

Inspection Records

Appendix D

Maintenance Regime Monitoring & Amendments

Monitoring and Review Table

Revision	Revision Description	Date	Initials