

DOCUMENT CONTROL

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Proposed New Development

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1. Introduction

- 1.1. This document has been prepared by Cowan Consultancy Limited (CCL) on behalf of Herringgate UK Ltd. for the Land at Scyld, Horesemare Green Road, Littlehampton.
- 1.2. This document sets out the principles for the long term management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) installed at the residential development.
- 1.3. The purpose of this document is to ensure that the management company and/or homeowner entrusted with the inspection and maintenance of the SuDS will adopt the measures and programme set out in this document to ensure the optimum operation of the surface water drainage network. The SuDS are to be continuously maintained over the lifetime of the development to prevent the increased risk of flooding both on and off site.
- 1.4. The guidance notes here provided have been comprised of and are directly referenced from the latest technical SuDS guidance within the CIRIA C753 Report *The SuDS Manual* (2015) and other applicable guidance. This document sets out specific sections applicable to the relevant SuDS type itemising:
- a) A description of the SuDS component and its use;
 - b) The maintenance requirements and frequencies; and
 - c) The inspection requirements and frequencies.
- 1.5. The activities listed are specific to the development to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company as required. Rubbish and debris removal is also an integral part of SuDS maintenance, especially with regards to surface features and the reduction of the risks of inlet and outlet blockages.
- 1.6. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements.

1.7. All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant) and risk assessments should always be undertaken.

1.8. This maintenance and management plan is to read in conjunction with CCL drainage drawings 424955/10, 11 and 12 for the location of all SuDS on this site.

1.9. There are three categories of maintenance activities referred to in this report:

- **Regular maintenance** (including inspections and monitoring) – consisting of basic tasks done on a frequent and predictable schedule, including inspections and monitoring, silt or oil removal if required more frequently than once per year, vegetation management, rubbish and debris removal, and sweeping of surfaces. Regular maintenance/inspections of SuDS will help to:

- determine optimum future maintenance;
- establish ongoing hydraulic, water quality, amenity and biodiversity performance of the system; and
- allow for the identification of potential performance failures, such as blockage, reduced infiltration and poor water quality resulting from lack of maintenance.

- **Occasional maintenance** – comprising tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks such as sediment management/removal; and

- **Remedial maintenance** – comprising of intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by regular and adequate maintenance activities. Remedial maintenance is likely to comprise of activities such as:

- erosion repairs which can include inlets and outlets;
- reinstatement or realignment of edgings, barriers, rip-rap or other erosion control;
- infiltration surface rehabilitation;
- replacement of blocked filter materials/fabrics;
- construction stage sediment removal (although this activity should have been undertaken before the start of the maintenance contract); and
- system rehabilitation (although unlikely) immediately following a pollution event.

Remedial activities are not expected to be required for all systems, however, for the purpose of estimating whole life maintenance costs, a contingency sum of 15–20% should be added to the annual regular and occasional maintenance costs to cover the risk of these activities being required. 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.

- 1.10. During the first year of operation inspections should usually be carried out at least monthly to all types of SuDS, and after significant storm events, to ensure that the system is functioning as designed and that no damage is evident.

2. Drainage Layout and Design

SuDS are an environmentally friendly approach to managing rainfall through the use of landscape features to conceal the surface water and its surroundings. The use of SuDS components aims to: control the flow, volume and frequency of water leaving a development area; prevent pollution by intercepting silt and cleaning runoff from hard surfaces; provide attractive surroundings for the community, and; create, whenever possible, opportunities for wildlife.

Thus the surface water drainage will require regular maintenance and monitoring not only to ensure the requirements are met but first and foremost to safeguard operational effectiveness. The drainage components design and specification will outline their onsite characteristics. The main SuDS components incorporated within the development surface water drainage strategy at Land at Stubbington Lane were designed to prevent flooding and control discharged flow via underground drainage systems. There are three main drainage components incorporated within the surface water drainage strategy:

- a) Inspection chambers, silt chambers/catchpits and pipework
- b) Permeable Paving / granular storage blanket
- c) Drainage / ACO channels
- d) Hydro brake devices and chambers

- 2.1. Inspection & Silt chambers/Catch pits and pipework**– This drainage system will be used to cater for the surface water of the excess runoff of site surfaces such as the access road area and the perimeter surrounding the car parking spaces.

- Drainage will be carried via traditional inspection chambers connected to the attenuation storage system via diffuser units;
- Storage will be provided within the tanked permeable paving system incorporating storm water units to cater for 1 in 100 year storm including allowances of 40% climate change and 10% for urban creep which will discharge via flow control device along time.

2.2. Permeable Paving / Granular Storage blanket – Permeable paving is to be provided within access roads and car park spaces with a tanked waterproof boundary wall incorporating underground voided subbase material to allow a storage volume. This drainage system will be used to cater for the surface water of the site and allow for the required design storage of 1 in 100 years plus 40% climate change allowance, precluding unregulated flood water displacement. Following CIRIA's simple index approach to assess water quality the permeable paving construction is deemed to provide the required interception to metal, hydrocarbons and total suspended solids (TSS). Thus, the tanked permeable paving system will be used as the main SuDS system catering for the surface water.

- Drainage will be carried directly to the underlying access road and parking spaces makeup.
- Storage will be provided through the gravel makeup of the permeable paving filtration system and the voided subbase material beneath.

2.3. The *Drainage / Aco Channel* – This will be constructed at the site entrance, just before the slope of the main road, will be used to cater for and self-contain the any site surface water from leaving the site, especially during exceptional rainfall events, preventing added surface runoff to the main road.

- Drainage will be carried via drain pipe connected to inspection chambers with silt traps/catchpits and subsequently to the attenuation storage system;
- Storage will be provided through the incorporated voided subbase blanket attenuation and discharge in a controlled manner via hydro-brake.

3. Maintenance and Management Regime

3.1. Inspection chambers, silt chambers and drainage pipework

3.1.1. These items will require regular maintenance to ensure continuing operation to design performance standards.

3.1.2. Rubbish and debris removal should be undertaken as part of general pavement maintenance for the site.

3.1.3. Sweeping and regular gully cleaning should be carried.

3.1.4. Regular inspection and maintenance is important for the effective operation of the pavements.

3.1.5. A visual inspection of the catch pits / silt traps can be carried out on a regular basis to establish the effectiveness of the maintenance, and attain possible risks to performance.

3.1.6. Silt will need to be removed from catch pits / silt chambers at least twice a year to minimise the amount of sediments migrating to manholes.

3.1.7. Replacement of the aggregate will be necessary if the system becomes blocked with silt, monitoring will give information on possible changes.

3.1.8. Table 3.1 provides guidance on the type of operational and maintenance requirements. The list of actions is not exhaustive and some actions may not always be required.

3.1.9. Specific maintenance needs of the silt chambers / catch pits should be monitored, and maintenance schedules adjusted to best suit site requirements.

Table 3.2 – Inspection chambers, silt chambers and drainage pipes Key operation and Maintenance Requirements

Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Remove rubbish, debris and gravel	Fortnightly for 6 months then monthly, or as required
	Remove debris from the grating surface (where it may cause risks to performance)	Fortnightly for 6 months then monthly, or as required
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Biannual, or as required

<i>Occasional maintenance</i>	Brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used	Quarterly at end/beginning of each season, or as required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

3.2. Permeable Paving / Granular storage blanket

- 3.2.1.Regular inspection and maintenance is required to maintain the effective operation permeable paving require and to ensure continuing operation to design performance standards.
- 3.2.2.After construction, before hand over to the client, the pavement should be inspected for clogging, litter, weeds and water ponding.
- 3.2.3.After the handover the pavement should be inspected on regular basis, particularly during and after heavy rainfall to ascertain the effective operation and to identify any performance issues.
- 3.2.4.Silt and sediments removal should be carried out regularly to preserve and maintain pavement infiltration capacity.
- 3.2.5.Brushing and suction cleaning should be used for regular sweeping. Care should be taken whilst vacuuming to avoid the removal of jointing material.
- 3.2.6.In case of any blockage or clogging of the paving surface a specialist sweeper with water jetting and oscillating and rotating brushes may be required.
- 3.2.7.Table 3.2 provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.
- 3.2.8.Specific maintenance needs for block permeable paving should be monitored in accordance to manufacture specifications, and maintenance schedules adjusted to suit site requirements.

Table 3.3 – Permeable Paving / granular storage blanket Key operation and Maintenance Requirements

Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Annually, , after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	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	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 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

3.3 Drainage Channel / Aco Channel

- 3.3.1 Aco Channel will require regular maintenance to ensure continuing operation to design performance standards.
- 3.3.2 Rubbish and debris removal should be undertaken as part of general pavement maintenance for the site.
- 3.3.3 Sweeping and regular channel cleaning should be carried.
- 3.3.4 Regular inspection and maintenance should be carried out to drainage channels outlets, preferably at the beginning of each season. A visual inspection may also be carried out on a regular basis to establish the effectiveness of the maintenance of the drainage.

3.3.5 Occasionally silt will need to be removed from drainage channel to minimise the number of sediments migrating to manholes.

3.3.6 Parking spaces should be agitated (e.g., brushed, vacuumed, etc.) at least twice a year to ensure no vegetation of any sort is allowed to grow and develop in the joints. Ideally, this activity should be carried out in the spring and autumn seasons.

3.3.7 Table 3.2 provides guidance on the type of operational and maintenance requirements. The list of actions is not exhaustive and some actions may not always be required.

Table 3.3 – Aco Channels Key operation and Maintenance Requirements

<i>Maintenance Schedule</i>	<i>Required action</i>	<i>Typical frequency</i>
Regular maintenance	Remove rubbish, debris and gravel	Monthly, or as required
	Remove debris from the grating surface (where it may cause risks to performance)	Fortnightly for 6 months then monthly, or as required
	Inspect outlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Biannual, or as required
Occasional maintenance	Brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used	Quarterly at end/beginning of each season, or as required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

3.4 Hydrobrake Devices and Chambers

3.4.1 See below for the maintenance requirements for these items:

Table 3.4 – Hydrobrake Devices and Chambers Maintenance requirements

Maintenance Schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
Regular maintenance	Remove debris from the discharge control device surface (where it may cause risks to performance)	Monthly
	Remove sediment from silt chambers / sumps / pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and control devices	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows and discharge control device to ensure that they are in good condition and operating as designed	Annually
	Survey inside of chamber for sediment build-up and remove if necessary	Monthly for 3 months, then annually

4. References

- CIRIA C753 Report *The SuDS Manual* (2015) RP992 ISBN: 978-0-86017-759-3

In the event of concern over any matter with regards to the management and maintenance of the drainage systems please contact the Herringate UK Ltd., who is responsible for the post development Maintenance and Management Regime of the development.