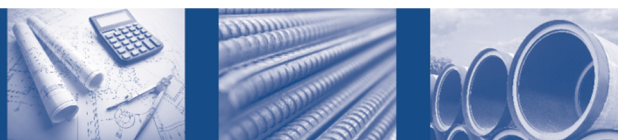


**THE HEDGEROWS
LAND OFF NYTON ROAD
EASTERGATE
WEST SUSSEX**

**SUDS MANAGEMENT &
MAINTENANCE PLAN**

**TAYLOR WIMPEY SOUTHERN
COUNTIES**

Date: 6th March 2018
Ref: AMc/18/0163/5655
Rev: A



DOCUMENT CONTROL RECORD

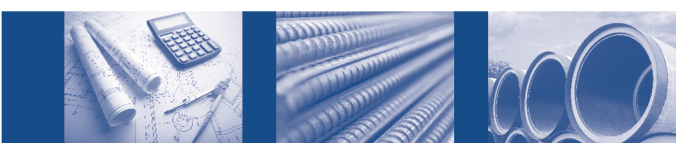
Document Issue:

Rev	Date	Issue Status	Prepared by	Checked by
-	06/03/18	First Issue	A. Mcshane	C. Pendle
A	08/03/18	Updated to include ditch maintenance	A. Mcshane	C. Pendle

References:

The SUDS manual – CIRIA C753 (2015) ISBN 9780-86017-760-9

National Planning Policy Framework (NPPF) – Communities and Local Government
Technical Guidance - Flood Risk & Coastal Change (March 2012)



1 Introduction

- 1.1 This document sets out the principles for the long term management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) installed within the development as well as the existing ditch systems associated with The Hedgerows development, Eastergate, West Sussex.
- 1.2 The purpose of this document is to ensure that the management company and /or homeowner that will be maintaining the SuDS and ditches is entrusted with an inspection and maintenance programme to ensure the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development and to prevent the increased risk of flooding both on and off site in accordance with the NPPF.
- 1.3 The principle storm water drainage strategy for the development is to utilise infiltration throughout the development ensuring that no runoff will be generated from the site.
- 1.4 This document details the SuDS structures within the treatment train and their required maintenance processes to ensure that no polluted discharge to the groundwater will take place.
- 1.5 This plan has been directly referenced from the latest technical SuDS guidance within the *CIRIA Report C753 The SuDS Manual* (2015) and other applicable guidance.
- 1.6 This document is laid out in specific sections applicable to the relevant SuDS type detailing:
 - A description of the SUDS component and its use.
 - Maintenance requirements and frequencies.
 - Inspection requirements and frequencies.
- 1.7 The activities listed are generic 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. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements.
- 1.8 This report is to read in conjunction with SUDS Management & Drainage Plan for the type and location of all SuDS systems present on this site.

2 SuDS Layout & Design

- 2.1 The installed SuDS system at this development are the responsibility of Taylor Wimpey Southern Counties and their appointed Management Company.
- 2.2 Following installation and after transfer, all SuDS are to be maintained in perpetuity by the Management Company and shall ensure that it or any contractor employed by it carries out periodic maintenance of all such SuDS in accordance with the schedules listed in this report. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.
- 2.3 In terms of water quality, the proposed surface water system offers a suitable level of mitigation in accordance with the Environment Agency pollution prevention guidance GP3, NPPF, CIRIA C753 and DEFRA guidance.
- 2.4 There are three categories of maintenance activities referred to in this report:
- **Regular maintenance** (including inspections and monitoring).
Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, inspections and sampling.
 - **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).
 - **Remedial maintenance**
Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design.
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.
- 2.5 There are a number of SuDS components with the surface water drainage system including:
- Permeable paving for development roads
 - Deep trap gullies and Beanie kerbs draining to infiltration swales
 - Permeable paving for driveways
 - Soakaway trenches to rear gardens for residential plot drainage
 - High level overflows to ditches

3 Surface Water Drainage Strategy

The surface water drainage strategy for the development and the SuDS management train is described below:

Roofs:

- Runoff from roofs discharge through downpipes from the rear of properties to linier stone filled trench soakaways. Where possible roof downpipes from the front of plots will discharge to the permeable driveway areas.
- Within housing parcel areas trench soakaways are linked via high level overflows

Drives, Parking Areas and Private Roads:

- Driveways, parking areas and sections of private road will be constructed using permeable block paving or traditional deep trapped gullies discharging into a permeable type stone sub base.
- This type of construction will provide an effective method of removing the urban pollutants prior to infiltrating

Adopted Development Roads:

- Roads within the development will be constructed and drained as followed:
 - Permeable block paving or traditional deep trapped gullies discharging into a permeable type stone sub base.
 - Standard macadam construction draining via gullies and Beanie kerbs discharging to infiltration swales.
- Both types of drainage will provide an effective method of removing the urban pollutants prior to infiltrating.
- High level overflows are included to outlying ditches on western boundaries

4 SUDS Management & Maintenance

4.1 Road Gullies & Beanie Kerbs

Road gully maintenance will comprises of the removal of large debris and litter by hand picker and sucking out the sediment / oil contents of the gully into a tanker, ensuring that the outlet is clear and then re-filling the gully pot with clean water up to the level of the outlet.

During the first year of operation each gully should be inspected every 3 months, and every 6 months thereafter for structural integrity and cleaned out as required.

4.2 Infiltration Basins and Swales

Key Maintenance Requirements:

- Grass mowing / vegetation management
- Litter / debris removal and sediment monitoring

4.3 Regular inspection and maintenance is important for the effective operation of the swales as designed.

Many of the maintenance activities for swales can be undertaken as part of landscape maintenance and, if landscape management is already required at site, should have marginal cost implications.

4.4 These activities will be carried out at intervals detailed below, and shall comprise of the following operations:

- Collection and removal of all litter/large debris from the attenuation pond, inlets, outflows, and water margins once a month.
- Monthly Inspection of the attenuation ponds to check the following, and repair as necessary:
 - Any failure in the operation of the inlet and outlet headwalls unless adopted by others in which case they will be notified of any observed defect.
 - Any damage or erosion to the perimeter edges and slopes of the attenuation ponds.

4.5 An annual check carried out by a suitably qualified person, to assess the condition and operation of the swale inlets and outflows, and the accumulation of silt/sediment. A record of maintenance visits and remedial operations shall be maintained.

- 4.6 The above operations shall (where feasible) be in conjunction with routine grounds maintenance operations to the surrounding landscape.

Infiltration Basin & Swale Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	Monthly.
	Grass cutting – for spillways and access routes.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin.	Half yearly (spring – before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlets, outlet and forebay.	Annually (or as required).
	Manage wetland plants in outlet pool – where provided.	Annually.
Occasional maintenance	Re-seed areas of poor vegetation growth.	Annually, or as required.
	Prune and trim trees and remove cuttings.	2 years, or as required.
	Remove sediment from forebay, when 50 % full and from micropools if volume reduced by > 25%.	3 – 10 years (or as required).
Remedial actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required.
	Realignment of rip-rap.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.
	Re-level uneven surfaces and reinstate design levels.	As required.
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/after large storms.
	Inspect banksides, structures, pipework etc for evidence of physical damage.	Monthly/after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check penstocks and other mechanical devices.	Half yearly.

- 4.7 In addition to regular routine items, de-silting of the swale may be required, usually on a 10-15 year cycle depending on the on-going silt level checking.
- 4.8 The desilting work will be carried out in accordance with a pre-agreed method statement. Such a method statement should be submitted in writing to the local authority and agreed in advance of the commencement of the works.

- 4.9 Prior to desilting works commencing, a suitably qualified ecologist shall be appointed to undertake an assessment of the ecological interest within the pond and its margins. In the event that the attenuation ponds develop particular ecological interest, then careful consideration will be given to the timing of this operation.
- 4.10 Sediments excavated from swales that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or landfilling.
However, consultation should take place with the environmental regulator to confirm appropriate protocols.

4.11 Permeable Block Paving

4.12 Key Maintenance Requirements:

- Sweeping
- Regular brushing and vacuuming (to be carried out by a specialist contractor)

- 4.13 Regular inspection and maintenance is important for the effective operation of permeable pavements and should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

- 4.14 Permeable block paving needs to be regularly cleaned of silt and other sediments to preserve infiltration capability and should have a minimum of three surface sweepings per year.

A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

- 4.15 Care should be taken in adjusting vacuuming equipment to avoid removal of jointing Material and any lost material should be replaced.
- 4.16 To ensure the continual optimal performance of the permeable paving, it is recommended that the following maintenance should be carried out:
The following guidelines are offered as an initial regime, but maybe either increased or decreased depending on the local environment and any external contributing factors:
- A visual inspection of the paving may be carried out on a regular basis.
This will confirm the effectiveness of the agitation maintenance due to variations between sites and allow any refinement of the regular agitation activity if necessary.

- The paving should be agitated (e.g. brushed, vacuumed, etc.) at least twice a year. This is 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.
 - The paving should be inspected after any heavy precipitation to ensure no displacement of any organic matter onto the surface of the pavement.
 - For winter maintenance, the controlled use of de-icing may be used without causing significant detrimental effects towards the permeable pavements performance. When used carefully, the use of these chlorides will not result in an increase in the chloride levels in the local ground.
 - Weed growth – when sedimentation occurs in areas of permeable paving then there is the potential for weed growth, this will typically occur where there are overhanging trees or soft landscaping slopes down on to the paving or in areas which do not receive over run from vehicles particularly frequently. Weeds can be removed from the surface through the controlled application of proprietary non-persistent contact herbicides. Those containing Glyphosate are the most suitable.
- 4.18 Glyphosate based herbicides are the most common for general-purpose use, they are most effective on grasses and perennial weeds with non-woody stems. Weeds should be sprayed when they are actively growing, in dry but not sunny conditions, so that the Glyphosate will go down to the root and kill the weed completely. Glyphosate will be neutralized upon contact with the ground, which makes it safe to plant in the area soon after treatment. It is available ready mixed or as a concentrate.
- 4.19 Depending on the amount of usage and the environment the permeable pavement has received and been exposed to, the laying course material may require either replacement or cleaning after a 25 to 30 year period. This would be evident if the infiltration rate of the paving became prolonged, allowing ponding to develop. Should this occur, the uplifting and cleaning (or replacing, depending on the costings of the activity) of the laying course may be considered. The laying course material, jointing and blocks may be reused (once cleaned), minimising costs.
- 4.20 If reconstruction is necessary, the following procedure should be followed:
1. Lift surface layer and laying course.
 2. Remove any geotextile filter layer.
 3. Inspect sub-base and remove, wash and replace if required.
 4. Renew any geotextile layer.
 5. Renew laying course, jointing material and concrete block paving.
- 4.21 Materials removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and may need to be disposed of as controlled waste. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

4.22 Driveways & Private Roads

Driveways & Private Roads will either be constructed as permeable block paving (outlined above) or constructed as an impervious surface drained via traditional deep trapped / yard gullies discharging into a permeable high-void aggregate sub-base layer beneath. This sub-base allows for filtration of pollutants from the runoff which is infiltrated to the sub strata below.

- 4.23 General yard gully and linear channel maintenance involves the removal of dead leaves, soil, litter from the gratings and sediments from the sump within the gully pot or channel. This involves the removal all protective covers and grids and the cleaning out of channels or gully pots by hand or with suitable jetting equipment.

During the first year of operation each gully and channel should be inspected every 3 months, and every 6 months thereafter for structural integrity and cleaned out as required.

4.24 Trench Soakaways

The filter trench soakaway is a linear excavation filled with stone and a perforated pipe running the length. At each end of the soakaway trench there are catchpit inspection chambers.

These catchpit chambers allow for the collection of sediments/debris from the catchpit sump and for the internal inspection / clearance of blockages of the perforated pipe if required.

- 4.25 Filter trenches require minimal maintenance, such and inspection of the catchpit manhole for accumulation of sediment or debris and cleaned out as required. It is recommended that the catchpits be inspected no less frequently than 3 monthly intervals for the first year and thereafter at 6 monthly intervals.
- 4.26 The perforated pipe that runs the length of the soakaway allows for internal CCTV / jet rod access for inspection and clearance of blockages should it be required.

Infiltration Trench Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber.	Annually.
	Cleaning of gutters and any filters on downpipes.	Annually.
	Trimming any roots that may be causing blockages.	Annually, or as required.
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs.	As required.
	Replacement of clogged geotextile.	As required.
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually.
	Check soakaway to ensure emptying is occurring.	Annually.

4.27 High Level Overflows

The key maintenance requirement for the high levels overflows and control chambers will be the inspection of the units for blockages of the orifice and silt removal from sump of chamber.

- 4.28 The orifice flow control units have no moving parts and is self-activating, requiring minimal maintenance.
- 4.29 After initial installation, it is recommended that the unit be inspected monthly for three months. Thereafter the manhole chamber and control device should be inspected at least every six months to verify the condition and operation of the unit and check for blockages within the inlet of the chamber and of the flow control.
During these inspections, accumulated silts should be removed and the sump cleaned out using a conventional sump vacuum cleaner.

5.0 Ditches

- 5.1 The existing ditch system is located on the western boundary of the development site adjacent to Northfields Lane and the rear gardens of the existing housing. The Northfield Lane ditch system forms part of the overall ditch systems within Eastergate & Westergate.
- 5.2 As adjacent and riparian land owner the ditch system and any associated culverts abutting the development will be the responsibility of Taylor Wimpey Southern Counties and their appointed Management Company.
- 5.3 Following completion of the development all ditch systems associated with the development will be maintained in perpetuity by the Management Company and shall ensure that it or any contractor employed by it carries out periodic maintenance in accordance with the schedules listed in this report or any requirements imposed by the Landscape Management Plan and environmental requirements.
- 5.4 An annual check should be carried out by a suitably qualified person, to assess the condition and operation of the ditches and culverts, and the accumulation of silt/sediment. A record of maintenance visits and remedial operations shall be maintained.
- 5.5 Any ditch clearing and desilting work will be carried out in accordance with a pre-agreed method statement. Such a method statement should be submitted in writing to the local authority and agreed in advance of the commencement of the works.
- 5.6 Prior to desilting works commencing, a suitably qualified ecologist shall be appointed to undertake an assessment of the ecological interest within the ditch and its margins. In the event that the ditch system develop particular ecological interest, then careful consideration will be given to the timing of this operation.

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