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SUDS Maintenance Proposals

for

Pentland Homes

**LAND TO THE
EAST OF HOLLOW LANE
Canterbury, Kent CT1**


November 2016

32609/R/003 rev a/JAS

APPROVAL SHEET AND FOREWORD

Hollow Lane SUDS Maintenance Proposals

Report Ref: 32609/R/003/JAS

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Introduction

It is proposed to construct 52 new dwellings on land to the east of Hollow Lane. Knapp Hicks & Partners Limited has been commissioned by Pentland Homes Ltd to prepare this report to discharge the requirements of the planning conditions.

Summary of Proposed Surface Water Drainage System

It is proposed that the surface water runoff generated by the development shall discharge to a series of SUDS elements. Sustainable Drainage Systems (SUDS) are drainage systems which are designed to imitate as closely as possible the predevelopment drainage regime i.e. where rainfall soaks into the ground and saturates the soil and vegetation before significant runoff occurs. The aim is to limit the increase in both peak rates of runoff and volume and water quality.

The site has been divided into two catchments. Catchment 1 comprises individual dwelling houses and shared private drives which each discharge to four trench soakaways. Catchment 2 includes the adopted highway and this discharges to a pair of ring soakaways located in the open space.

The SUDS components chosen for this site are summarised in the table below:-

Device	Description	Purpose
Sediment sumps	These structures retain a permanent pool of water. They reduce flow velocities which allow larger particles to settle out. They may be located above or below ground and may be contained within the treatment facility or within a separate structure. Examples are catchpit manholes and forebays to ponds.	Water quality treatment
Soakaways	Long narrow excavations filled with rubble. They can be grouped and linked together for large drainage areas including highways, and the supporting structure and backfill can be substituted for modular, geocellular units. Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge.	Disposal
Permeable pavements	A pavement suitable for pedestrian and/or vehicular traffic, whilst allowing rainwater to infiltrate through the surface and into the underlying layers. The water can then be temporarily stored prior to infiltration to the ground, re-use, or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment.	Water quality treatment and disposal

Division of Responsibilities for the SUDS

The owners of the private properties will become responsible for maintaining the drainage systems within the curtilage of their properties such that surface water does not discharge onto adjoining properties. The access road will be adopted by Kent Highways including the surface water drainage components of the highway.

The remainder of the site will be retained by the current land owner who will appoint a management company to maintain the suds components on the residue of the development.

Device	Location	Responsibility
Communal Trench Soakaways	Located within the curtilage of owner occupied properties	Management company on behalf of the site owner
	Located within the public highway	Kent Highways
Permeable Surfaces	Located within shared areas	Management company on behalf of the site owner.
Sediment sumps & hydrodynamic vortex separator	Located within public highway	Kent Highways

Timetable for Implementation

It is proposed that the development will start in the first quarter of 2017 and run until the end of the year.

SUDS Management during Construction

A number of the SUDS components on this site will be constructed at an early stage of the development which could cause some potential maintenance problems. Construction activities can generate a heavy sediment load within the surface water runoff from a site and there is also a risk of pollution from other activities such as the storage of fuels.

It is essential that the infiltration devices are protected by sediment traps located at a point upstream. It is also recommended that the permeable surfaces are laid at the end of the works

The situation can also be alleviated by maintaining good housekeeping on the site and using appropriate plant. For example by keeping stripped areas to a minimum and maintaining grass strips around development areas wherever possible.

Further advice can be obtained from Ciria document C698 Site Handbook for the Construction of SUDS (Ref 2).

Proposed SUDS Maintenance Regime

Soakaways

The trench soakaways will be constructed so that they penetrate the chalk by two metres. Overall depths therefore may reach 6 metres in places. They will be constructed with a minimum of two small diameter observation wells located at each end of the structure.

The soakaway should be inspected on an annual basis by lifting the cover to check water levels within the system.

The two biggest problems which affect the useful life of the soakaway are siltation and plant roots. The first problem will be ameliorated by the incorporation of a catch pit chamber immediately prior to the soakaway thus limiting the inflow of silt. General good housekeeping on the part of the property owner will also limit this problem. Regularly cleaning the gutters and sweeping the hardstanding areas will reduce the sediment load within the surface water discharge.

The proximity of plant roots can be an advantage as plant roots take up some of the water from the soil and also provide additional openings in the soil for the water to infiltrate. However too vigorous plant roots can intrude into the structure and cause structural damage. These plants should be controlled in the vicinity.

The table below summarises the recommended maintenance regime for soakaways on the site:-

Maintenance Schedule	Required action	Frequency
Regular maintenance	Remove sediment and debris from pre-treatment devices e.g. catch pit chambers, and floor of inspection tube or chamber	Annually.
	Clean all gutters and any filters on downpipes which discharge to the soakaway	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

Permeable Pavements

Permeable pavements provide hardstanding areas and roads suitable for vehicular traffic whilst allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored in a specially designed sub-base before discharge to a soakaway system. At this site they will be surfaced using concrete blocks designed for permeable systems.

Before handing over these pavements to the site owner they should be inspected for clogging, litter, weeds and water ponding and all failures should be rectified. After handover, the facility should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding. They should also be checked for evidence of oil spillage on each of the inspection visits.

Permeable surfaces need to be regularly cleaned of silt and other sediments so that their infiltration capacity is retained. CIRIA advise a minimum of three surface sweepings per year, as noted below, using a brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper.

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).

Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material and any lost material should be replaced.

If there is evidence of oil spillage then the blocks should be lifted so that the underlying geotextile can also be inspected to determine the extent of any pollution and to enable the relevant sections to be replaced.

Maintenance Schedule	Required action	Frequency
Regular maintenance	Brushing and vacuuming.	Three times/year as described above, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required
	Removal of weeds	As required
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
	Remedial work to any depressions or rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required
	Rehabilitation of surface and upper sub-structure if infiltration performance is reduced as a result of significant clogging.	As required
Monitoring	Initial inspection Inspect for evidence of poor operation and/or weed growth. If required take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies.	Monthly for 3 months after installation 3-monthly and 48 h after large storms Annually.
	Monitor inspection chambers	Annually

Catchpits and Hydrodynamic Vortex Separators

Catchpits should be inspected on an annual basis by lifting the cover of the inspection points to observe the condition of the base and the inlet points.

As with the soakaway chambers regular sweeping of all contributing hard surfaces will reduce the sediment load within the surface water discharge.

The table below summarises the recommended maintenance regime for catchpits on the site:-

Maintenance Schedule	Required action	Frequency
Regular maintenance	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms