

OPERATIONS AND MAINTENANCE MANUAL FOR STORMWATER DRAINAGE SYSTEM AND PERMEABLE PAVING

AT

STAPLEFORD COTTAGE, DANES HILL, WOKING, SURREY GU22 7HQ

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Barnard and Associates Ltd drawing nos: 23170-DR10, DR11, DR12, DR13, DR14, DR15



<u>1.0</u> Introduction

The purpose of the following document is to explain in layman's terms the arrangement and purpose of the stormwater drainage system and particularly the permeable paving which acts as the primary means of stormwater drainage disposal for the development.

The storm water attenuation system forms the <u>S</u>ustainable <u>u</u>rban <u>D</u>rainage <u>S</u>ystem for the development and is referred to in this document as the <u>SuDS</u> system.

Rainwater falls onto the development site and is then received by a piped drainage system which discharges into a large below ground soakaway at the rear of the site before infiltrating into the ground.

At the front of the site there is a small area of permeable paving which receives rainfall which will directly infiltrate into the ground stop

The purpose of this document is to ensure that the storm water system as installed does not fail through prolonged use with no maintenance. It is to ensure that all persons who come into contact with the SUD's system, from the owner to the operatives that undertake the work are fully aware of the design requirements for the proposed system and how each part of the system functions.

The following document is based upon the outline guidance given in Ciria C697

<u>1.1</u> Purpose of Owners Maintenance Manual

The storm water attenuation system Owners manual shall:

- a) Indicate the location of all sustainable urban drainage techniques indicated within the site area (Refer to drawing 23170-DR10 to DR15, in Appendix A).
- b) Provide a brief summary of how each technique works, their purpose and how to avoid damage to each sustainable drainage system.
- c) To explain to the Owner of the system and their sub-contractors/operatives, the maintenance requirements, to set up a maintenance plan and to tabulate a maintenance record to prove that the system is being regularly maintained in accordance with the design requirements.
- d) To explain to the Owner of the system and their sub-contractors/operatives the consequences of not carrying out the maintenance that is specified.
- e) To identify areas where certain activities are prohibited (for example stockpiling of materials, use of heavy equipment etc).
- f) Advice on what to do if future alterations are to be made to the development. (including the installation of future services that may affect the SUD's system as installed).



1.2 Drainage Proposals for Storm Water Drainage to The Residential Development

A new stormwater drainage system has been installed to serve the residential development to prevent flooding on and around the development area.

The stormwater drainage proposals consist primarily of a traditional piped system to take rainwater from the roofs of the buildings and then to discharge it into a large soakaway located to the rear of the site.

The elements can be summarised as follows and are explained in more detail below, where relevant:

- a. Permeable paving to front driveway.
- b. Traditional piped drainage inlets receiving water from rainwater pipes, gullies and channel drains.
- c. Piped system running below ground through manholes and catchpits.
- d. Storm water reception by soakaway and subsequent storage in soakaway prior to infiltration into the ground

For the layout of the system, refer to Drawing No: 23170-DR10 to DR15, Appendix A.

a) Permeable paving to front driveway

Rainfall falls directly onto the permeable paving to the front driveway and passes directly through to the underlying permeable soils.

b) Traditional rainwater inlets, gullies, rainwater pipes, channel drains

Stormwater is collected from roofs via gullies, rainwater pipes and channel drains prior to discharge into the piped below ground drainage network.

The storm what inlets have traps and sumps to collect debris and detritus before it enters the below ground drainage system.

Each inlet has a grating to assist with the prevention of detritus entering the system (leaves and the like)



c) Piped below ground drainage system with inspection chambers, manholes and catchpits

The stormwater will run through traditional piped outfalls and pass through the inspection chambers, manholes and catchpits.

Any detritus that is not prevented at source from entering the below ground drainage system will pass through large diameter catchpits at the downstream end of the system, which will further collect detritus prior to it entering the downstream outfall soakaway (see below).

d) Soakaway

A large soakaway is located at the downstream end of the drainage system within the rear garden area, discharging into the underlying ground, known as the Bagshot Bed Formation, which is overwhelmingly granular in nature with occasional cohesive horizons.

Groundwater encountered at 17.5, rising to 15.8m

The soakaway receives run-off from the upstream stormwater drainage system and stores it in a large underground vessel prior to the water infiltrating into the ground.

During localised rainfall events, the water will directly infiltrate into the ground and will not require a substantial volume of storage to cater for the stormwater.

In peak rainfall events, up to and including the 1 in 100 year event with a 40% allowance for climate change, the rate of rainfall falling on the development will be far larger than the ground can receive by infiltration.

In this instance, water will build up in the underground vessel where it will be stored while the storm passes, and then will continue to infiltrate into the ground.

The stone base is designed to accommodate the flow from such a storm.



<u>1.3</u> Level of Operation and Maintenance to Stormwater Drainage System

FIRSTLY;

NEVER dump sand, cement, soil or other loose material directly onto a Permeable Paved surface. This could block the joints or even fall into the sub-base. If you do need to store any loose material on a permeable paved surface, make sure you put down a tarpaulin or impenetrable sheet first. Ideally never store material on the permeable paving or right next to it.

MAINTENANCE CATEGORIES

There are three categories of maintenance activities and these are as follows:

- 1. **Regular maintenance** (including regular inspections and monitoring. Basic tasks carried out on a frequent and predictable schedule including vegetation management, litter and debris removal and visual inspections of drainage surfaces etc.)
- 2. **Occasional maintenance** (including tasks that are likely to be required periodically (annually) but on a much less frequent and predictable than normal routine tasks (for example silt/sediment removal)

A table of likely maintenance requirements for each SuDS component and the likely cycle period of maintenance for each component (i.e. some components will require more frequent maintenance than others dependent upon their location, for surfaces below trees which are subject to potential build up from leaves / grass cuttings etc).

- 3. **Remedial maintenance** comprises intermittent tasks that may be required to rectify faults associated with the system. Items that may be considered as remedial maintenance are as follows:
 - a) Inlet / outlet repairs, inspections and unblocking/jetting
 - b) Erosion repairs (unlikely)
 - c) Reinstatement of barriers that prevent debris entering the system or erosion control (silt traps and silt buckets in channel drains)
 - d) Construction stage sediment removal (this should have been removed prior to the operation of the system.)
 - e) System rehabilitation immediately following a pollution event should this ever occur. This should include provision for system rehabilitation downstream should this ever occur.



2.0 MAINTENANCE OF PERMEABLE PAVING AND PIPED DRAINAGE SYSTEM

<u>2.1 REGULAR MAINTENANCE</u> – Recommended to be carried out following periods of extreme rainfall incidents (where the Environment Agency issue 'amber' or 'red' incident warnings through the National press relating to damaging rain events.)

- 1. A walk over of the storm water attenuation system as defined on Drg No: 23170-DR10 to DR15 should be carried out by the owner.
- 2. The walkover should cover the visible sections of the drainage system below:
- (i) Visually inspect the rainwater pipe, gully, channel darin, manhole inlets, by raising the covers/gratings to check for blockage and excessive build-up of vegetation/cuttings etc. Remove any silt vegetation etc.

Install all necessary temporary barriers to ensure that the open manhole is suitably protected from accidental ingress or children entering the system (given the surrounding use).

- (ii) Visually inspect the surfacing to check for obvious signs of silt build up/debris/litter etc that might block the system and prevent surface water entering the stone base below the permeable paving.
- (iii) Vegetation management Regularly maintain all green areas in the form of grass cutting and vegetation management. Where possible, the grass arisings should be controlled (i.e. the cuttings removed from areas which may wash down onto the paving at the time of the next heavy rainfall).
- (iv) Visually inspect all porous paved surfacing for signs of silting up or surface water pooling on the paving.

Action - Action as required to clear away silts and debris.



2.2 OCCASIONAL MAINTENANCE (ANNUALLY) to be carried out by the owner

- 1. A walk over of the entire storm water attenuation system as defined on Drg No: 23170-DR10 to DR15 should be carried out by a member of the maintenance team.
- 2. The walkover should cover the all sections of the attenuation system defined as items:

(a) Storm drainage pipes and manholes

Inspect all of the manholes by raising the manhole covers to check for blockage and excessive build-up of sediment, vegetation and litter from ground level.

Remove any silt and debris build up from sumps of manholes.

Jet (see below) drainage pipework if debris is present to ensure pipework is free flowing.

Check that outlet sump is free of sediment/debris/vegetation and litter.

Action as required (see Action recommendations below)

If the system contains standing water (which it should not other than at intentional low points which form part of the system as silt traps) then mechanically vacuum out the water to reveal the hidden sediment level beneath.

Remove debris / silt as required by sucking out the silt trap positions first and then jetting the system down to the outlet end at the same time as the vacuum out process, to avoid jetting silt and debris downstream in to the adopted collector drainage.

(b) Catchpits

The critical element on the system, to prevent failure of the buried soakaway installations, are the catchpits at the downstream end of the stormwater collector drains.

Large diameter fully accessible catchpits are located on the downstream end of the system to intercept all debris and detritus that might collect in the stormwater system, before the storm water runs off into the downstream Soakaways which discharge the water into the ground.

If debris and detritus is not intercepted by the catchpits, the material will enter the Soakaways and could lead to long-term degradation of the performance of the Soakaways.



Action as required (see Action recommendations below)

On a 12 monthly basis, remove the inspection covers to the catchpits and remove all debris and detritus that is collected in the 300 mm deep sumps of the catchpits.

The sumps of the catchpit's will be naturally full of water even on a dry day.

The maintenance action should be undertaken after a period of dry weather.

All material including the water in the sump should be pumped out and physically removed to leave the sump clear of all debris and detritus.

(c) Permeable Paved Surfaces

The key issue with the permeable paved surface is that it does not become blocked with debris that seals the surface and prevents the rainwater that falls on it from passing to the stone subbase below.

Every twelve months or so, undertake a visual inspection to check that the voids aren't blocked with dirt or other debris. This is usually best undertaken after a period of heavy rainfall. If any voids are blocked, ponding on the surface will be apparent.

Action as required (see Action recommendations below)

If you notice ponding, the joints in that area are blocked. To clear them, either sweep the joints with a stiff brush or vacuum the contaminated aggregate out and replace it. If using an automatic suction brush, angle the brushes at 30° to avoid aggregate migration.

Any vegetation growing in the joints can be removed manually, or treated with a Glyphosate based weed killer. Glyphosate will be neutralised upon contact with the ground, so it will be safe to plant in the area soon after treatment

For winter maintenance, pure (white) rock salt is an effective and readily available de-icer. However, avoid using salts which contain an additional abrasive such as sand or grit. For heavy ice, should an abrasive be required, mix pure (white) rock salt with 6mm Priora jointing aggregate. This can be brushed safely back into the joints once thawed. (nb – Use of chlorides is highly unlikely to increase chloride levels in the local ground).

Use specialist vacuum extract equipment to remove debris and silt from paved joints between porous paved elements, where excessive debris has built up or where water is ponding on the surface.



2.3 REMEDIAL MAINTENANCE

To be carried out when required and where identified by either regular or occasional maintenance.

Remedial maintenance should be carried out by a specialist contractor and supervised by an engineer where necessary.

2.4 ACCESSING SERVICES

Should a situation arise where excavation is required into the permeable paving the following is recommended :-

The initial trench width for excavating should be related to the depth of the sub-base material.

For example, the width of the utility should be considered, plus a degree of working space. The utility installer will decide this. In addition to this figure, the overall width should be determined by the depth of the open graded material plus 20%. When removing the first block a suitable location, such as at the perimeter of the installation or where a unit exists with a larger joint width surrounding it, should be considered.

As much jointing material should be cleared as possible to reduce the additional integrity being offered by this material. Once a block has become suitably loosened, a block lifter should be used to remove it.

It may be necessary to hold the lifted block in an elevated position, whilst a second person taps the adjacent blocks with a suitable lump hammer or rubber mallet. This may be repeated for the first few units during removal.

Once the desired area of paving has been removed and carefully stacked for reuse, a suitable surfacing material - membrane, wooden boards, etc. should be placed on the surrounding paving for the laying course and sub-base materials to be separately stockpiled.

Once the utility work is complete, the pavement should be reconstructed in accordance with the manufacturers recommendations.

Waterproof membranes or geotextiles should be sliced, folded back and weighed down during the opening of the pavement. Upon reinstatement, these should be folded back into their original position and be overlaid with a new corresponding material (overlap dimension to be determined between the utility contractor and the membrane/geotextile manufacturer; consideration to bonding/welding the reinstated material should be given depending on site conditions) which has been cut to an appropriate size, before continuing with the next layer of construction.



2.5 PROHIBITED MATERIALS

NEVER dump sand, cement, soil or other loose material directly onto a Permeable Paved surface.

This could block the joints or even fall into the sub-base.

If you do need to store any loose material on a permeable paved surface, make sure you put down a tarpaulin or impenetrable sheet first.

Ideally never store material on the permeable paving or right next to it.



APPENDIX A

Barnard and Associates Ltd drawing nos:

23170-DR10 T4
23170-DR11 T4
23170-DR12 T2
23170-DR13 T5
23170-DR14 T3
23170-DR15 T2

















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	TENDER ISSUE
	Client SIGNUM SPACE
	STAPLEFORD COTTAGE WOKING GU22 7HQ
5	Title SECTIONS L-L, H-H DRAINAGE AS PROPOSED
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