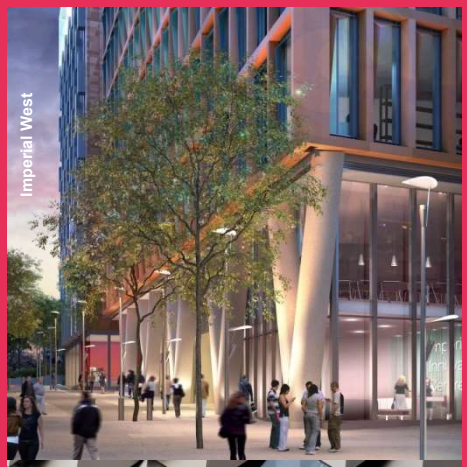


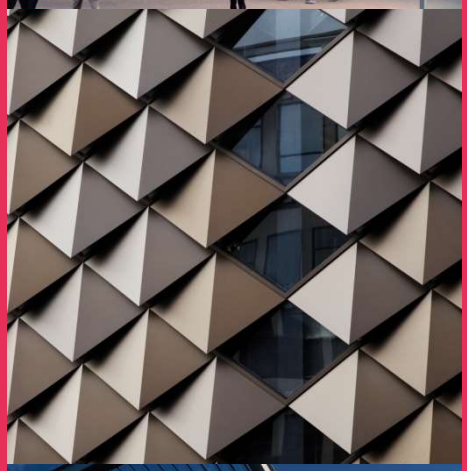


Imperial College

# Pinn River School

## SuDS Drainage Operations and Maintenance Manual

Curtins Ref: 080522-CUR-XX-XX-T-C-92001

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# Table of contents

# 1.0 Introduction

## 1.1 Project Background

Curtins Consulting Limited has been appointed by Kier to prepare a SuDS Drainage Operations and Maintenance Manual to supplement the Drainage Strategy Addendum produced by Curtins; document reference: 080522-CUR-XX-XX-T-C-92000

Particular reference is paid to the inspection, aftercare and maintenance of SuDs drainage features as part of this manual in order to demonstrate to the LLFA or adopting authority the effectiveness and longevity of the SuDs features designed within the scheme as opposed to the standard Building Regulations local and domestic drainage and/or the main discharge drainage connections to 'Sewerage Sector Guidance (SSG)' standards.

This report is based on current best practice guidance as described in the SuDS Manual, CIRIA C753.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material derivation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

## 1.2 Scope of O&M Manual

This manual is intended to give an overview of the operation and maintenance for SuDS features included with the drainage strategy and in relation to typical details only. Where proprietary products are specified by the manufacturer's instructions and recommendations, priority should be given to the manufacturer's instructions and recommendations over this document, unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and thereafter, adjusted to suit the site requirements.

# 2.0 Geocellular Units

## 2.1 Location and Description

A geocellular tank is proposed for use and is located in the south-west of the site, as shown on drainage drawing 'FS0728-CUR-XX-XX-DR-C-0500'.

Geocellular units are proprietary products and therefore manufacturer's specific recommendations should also be taken into consideration above what has been prepared in this document. Additionally, different manufacturers may have different connection types and arrangements which will need to be taken into consideration.

## 2.2 Operation

The geocellular units, along with permeable paving, are intended to attenuate the discharge from the site up to and including the 1 in 100 year plus 40% climate change event.

Access for maintenance has been provided through inspection chambers.

## 2.3 Inspection and Maintenance Regime

Regular inspection and maintenance is important for the effective operation of geocellular units as designed. As the feature is buried, a regular inspection regime is important to ensure the correct functionality of the surface water drainage network. Maintenance responsibility for the geocellular units and their surrounding areas should be placed with Kier as noted in section 1.1.

Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as car parks/service yards.

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required. | Monthly and after large storms. |
| | Check penstocks and other mechanical devices (if present). | Half yearly. |
| | Inspect ventilation cowl (if present) | Monthly and after large storms. |
| Regular maintenance\inspection | Inspect and identify any areas that are not operating correctly. If required, take remedial action. | Monthly for 3 months, then six monthly |
| | Debris removal from catchment surface (where may cause risks to performance) | Monthly |
| | Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary. | Monthly (and after large storms) |
| | Remove sediment from pre-treatment structures | Annually (or as required after heavy rainfall events) |
| Remedial actions | Repair/rehabilitation of inlets, outlet, overflows and vents. | As required. |

# 3.0 Permeable Pavements

## 3.1 Location and Description

The permeable pavement is located is proposed for use across the site, as shown on drainage drawing 'FS0728-CUR-XX-XX-DR-C-0500'.

The permeable pavement has been designed in accordance with CIRIA C753.

Permeable pavements contain proprietary products and as such, the manufacturer's recommendations should be followed where used.

## 3.2 Operation

Permeable pavements are an efficient mean of managing surface water runoff close to its source – intercepting runoff, reducing the volume and frequency of runoff, and providing a treatment medium.

The surface has been designed to be porous or to contain gaps where rain can flow through the upper construction layers into the voided stone which makes up the sub-base.

## 3.3 Inspection and Maintenance Regime

Regular inspection and maintenance is important for the effective operation of the pervious pavement. Maintenance responsibility for the pavement and its surrounding area should be placed with Kier as noted in section 1.1.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks/service yards.

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Initial inspection. | Monthly for three months after installation. |
| | Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. | 3-monthly, 48 hours after large storms in first six months. |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies. | Annually. |
| | Monitor inspection chambers. | Annually. |
| Regular maintenance/inspection | Brushing and vacuuming. | Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations. |
| Occasional maintenance | Removal of weed or management using glyphospate applied directly into the weeds by an applicator rather than spraying. | As required – one per year on less frequently used pavements. |
| | Stabilise and mow contributing and adjacent areas. | 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, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing materials. | 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). |

# 4.0 Pipes (Including Oversized)

## 4.1 Location and Description

Pipes are the main conveyance across the site with the network as shown on drainage drawing 'FS0728-CUR-XX-XX-DR-C-0500'.

Pipes are proprietary products and the materials can vary across the site and as such, where used the manufacturer's recommendations should be followed. Regardless of the product used, the pipes will be fully compliant with the Curtins' drainage specification.

## 4.2 Operation

They are intended to be dry except for during rainfall events. These have been designed to be self-cleansing for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers, manholes, rodding plates and rodding eyes.

## 4.3 Inspection and Maintenance Regime

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be draining correctly thus exposing the development to a greater level of flood risk. Maintenance responsibility for the pipes should be placed with Kier.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks/service yards.

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Initial inspection should be provided as post construction CCTV survey. | N/A |
| | Inspect for evidence of poor operation via water level in chambers. If required, take remedial action. | 3-monthly, 48 hours after large storms. |
| Occasional maintenance | Check and remove large vegetation growth near pipe runs. | 6 monthly |
| Remedial actions | Rod through poorly performing runs as initial remediation. | As required. |
| | If continued poor performance jet and CCTV survey poorly performing runs. | As required. |
| | Seek advice as to remediation techniques suitable for the type of performance issue and location. | As required If above does not improve performance. |

# 5.0 Vortex Flow Control

Typically, little maintenance is required as there are no moving parts within vortex flow control devices. Experience has shown that if blockages occur they do so at the intake and the cause on such occasions has been due to a lack of attention to engineering detail, such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. Vortex flow controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur. The smaller type conical units, below the minimum recommended size, are also supplied with roding facilities or vortex suppressor pipes as standard. Following installation of the vortex flow control it is vitally important that any extraneous material i.e. Building materials are removed from the unit and the chamber. After the system is made live, it is recommended that each unit be inspected monthly for three months and thereafter, at six monthly intervals with hose down if required. If problems are experienced, the vortex flow control supplier is to be contacted so that an investigation may be made. Vortex flow controls are typically manufactured from grade 304 Stainless Steel which has an estimated life span in excess of the design life of drainage systems.

**COSHH**

Vortex flow controls are manufactured from Stainless Steel, which is not regarded as hazardous to health and exhibits no chemical hazard when used under normal circumstances for the stated applications.

**MANUAL HANDLING**

The handling of vortex flow controls should be in accordance with current legislation and regulations:

- The Health and Safety at Work Act 1972.
- The Management of Health and Safety at Work Regulations 1992.
- The Manual Handling Operations Regulations 1992.
- All published and printed by the Health and Safety Executive.

# 6.0 Slot Drains/Channel Drains

## 6.1 Location and Description

Slot drains and channel drains are likely to be introduced to the drainage strategy following the receipt of the levels plan.

Slot drains and channel drains are proprietary products and the materials can vary across the site. As such, the manufacturer's specific recommendations should be taken into consideration above what has been prepared in this document. Regardless of the product used, the slot drains and channel drains will be fully compliant with the Curtins drainage specification.

## 6.2 Operation

Slot drains and channel drains have been designed so that they are self-cleansing where possible to reduce the regularity of maintenance on these items. Rodding and access points have been provided at the start of all runs, changes in sizes of channel and half-way points.

Access for maintenance is provided through the units themselves.

## 6.3 Inspection and Maintenance Regime

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be draining correctly, thus exposing the development to a greater level of flood risk. Maintenance responsibility for the slot drains/gulleys should be placed with Kier.

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Initial inspection should be provided as post construction CCTV survey. | N/A |
| | Inspect for evidence of poor operation via water level in gulleys/sump units. If required take remedial action. | 3-monthly, 48 hours after large storms. |
| Occasional maintenance | Check and remove large vegetation growth near slot drain/channel drain catchment areas. | 6 monthly |
| Remedial actions | Rod through poorly performing runs as initial remediation. | As required. |
| | If continued poor performance jet and CCTV survey poorly performing runs. | As required. |
| | Seek advice as to remediation techniques suitable for the type of performance issue and location. | As required If above does not improve performance. |

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