

## Operation & Maintenance Plan for Sustainable Drainage Systems

Housing Development – Cleator Moor Road, Hensingham,  
Whitehaven

Gleeson Homes & Regeneration

Ref: K38732.OM/002

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## 5 INTRODUCTION

### 5.1 BACKGROUND

R. G. Parkins & Partners Ltd (RGP) has been appointed by Gleeson Homes and Regeneration to provide an Operation and Maintenance plan for surface water drainage systems for a proposed housing development comprising 38 dwellings at Cleator Moor Road, Hensingham, Whitehaven.

In reviewing the enclosed information, reference should be made to the latest revisions of the following RGP drawings:

- K38732-10 Surface Water Catchment Plan
- K38372-11 Outline Foul and Surface Water Drainage Plan
- K38372-12 Detention Basin Details

### 5.2 SUDS COMPONENTS

The housing development at Cleator Moor Road, Hensingham, Whitehaven, utilises a series of Sustainable Drainage Systems (SuDS) as part of the overall surface water drainage strategy for the site.

- Box culverts and oversized pipes with flow control devices are to be utilised around the site to attenuate surface water.
- The majority of the site roof drainage, associated plot hardstanding and site access roads will drain via a SuDS detention basin.
- The upstream/downstream surface water sewers, including box culverts, oversized pipes and detention basin storage structures and associated flow control chambers are to be offered for adoption to United Utilities under a S104 Agreement.
- Site road drainage will be located within the carriageway, and it is proposed the access road and associated highway gullies and drainage pipework will be offered for adoption to CCC under a S38 Agreement.
- Private parking areas / driveways serving the individual dwellings of Plots 23-28 are to be served by Type C permeable paving. These areas shall be privately maintained by the property owners.

All drainage systems have been designed to provide sufficient storage for the critical duration, 1 in 100-year design storm event with a 40% allowance for the future effects of climate change.

## 6 OPERATION AND MAINTENANCE REQUIREMENTS

As with all traditional drainage systems, SuDS need to be inspected and maintained regularly to ensure that they operate correctly and efficiently. If SuDS are not properly maintained then there is a risk that the systems will become overloaded during periods of prolonged heavy rainfall, potentially resulting in localised flooding of the development. Recommendations for the SuDS maintenance activities for the privately maintained areas are detailed below.

All maintenance activities should be detailed in the Health and Safety Plan and a risk assessment should be undertaken in accordance with CDM regulations.

### 6.1 SURFACE WATER DRAINAGE COMPONENTS

#### 6.1.1 PERMEABLE BLOCK PAVING

The following section refers to recommendations in the 'Guide to the Design, Construction and Maintenance of Concrete Block Permeable Pavements', Edition 6, produced by Interpave [1] and available for download from [www.paving.org.uk](http://www.paving.org.uk). It is known that the infiltration rate of permeable block paving will decrease over time due to the build-up of detritus in the jointing material, and then eventually stabilise with age. This reduction in performance is fully accounted for in design.

Recommended maintenance is minimal – no more extensive than that for conventional block paving and less than for conventional gulley and pipe drainage. Any problems with permeable block paving should become apparent on the surface via a visual inspection, unlike the below-ground inspections needed for traditional pipe drainage. The activities outlined in Table 6.1.**Error! Reference source not found.** should be undertaken by homeowners for individual driveways and parking bays.

If the below measures are implemented as recommended then the hydraulic performance of the permeable pavement should be unaffected over its design life, 20 years. However, if the infiltration rate of the paving reduces significantly, allowing storm water to pond on the surface then it is recommended that the blocks should be uplifted and the laying course cleaned or replaced. The laying course, jointing material and permeable paving blocks may be reused, minimising costs. After the 20-year lifespan, the above procedure should be undertaken.

**Table 6.1 Permeable Paving Maintenance Activities and Schedule**

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosphate applied directly into weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements.
Remedial Actions	Remediate any landscaping which, though 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 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 3 months after installations
	Inspect for evidence of poor operation and/or weed growth- if required, take remedial action	3-6 monthly, 48 hours after large storm in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

## 6.1.2 ATTENUATION STORAGE SYSTEMS

Regular inspection and maintenance is important for the effective operation of below ground storage systems.

The box culvert and oversized pipe storage structures, associated Hydrobrake chambers and outlet pipework shall be put forward for adoption and therefore be operated and maintained by United Utilities.

The following requirements outlined in Table 6.2, refer to the recommendations in The SuDS Manual (CIRIA C753) [2].

**Table 6.2 Attenuation Storage Maintenance Activities and Schedule**

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from pre- treatment structures	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows and vents.	As required
Monitoring	Inspect / check all inlets, outlets and vents to ensure they are in good condition and operating as designed	Annually
	Inspect silt traps/flow control chambers to ensure silt collection capacity	Monthly for 3 months after installation, then every 3 months and after a significant rainfall event.
	Survey inside of storage system for sediment build up and remove if necessary	Every 5 years or as required.

## 6.1.3 DETENTION BASIN

Regular inspection and maintenance is required to ensure the effective long-term operation of detention basins. The following requirements refer to the recommendations in The SuDS Manual (CIRIA C753) [2].

The detention basin, Hydrobrake chamber and outlet pipework shall be put forward for adoption and therefore be operated and maintained by United Utilities.

**Table 6.3 Detention Basin Maintenance Activities and Schedule**

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal	Monthly
	Grass cutting	Monthly for spillway and access routes Every 6 months for all other grassed areas (spring – before nesting season, and autumn.
	Manage other vegetation and removal of nuisance plants	As required
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually as required
	Check penstocks/flow control chambers and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlets and forebays	Annually or as required
	Management of micropool planting – where provided	Annually
Occasional maintenance	Re-seed areas of poor vegetation growth	As required
	Prune and trim trees, remove cuttings.	Every 2 years, or as required.
	Remove sediment from inlets, outlets, forebays and basin when required	Every 5 years, or as required
Remedial Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required



All major surface water drainage from the development upstream and downstream of the detention pond shall be adopted and maintained by United Utilities.

In addition to the recommended maintenance requirements, Hydro International Ltd also provides guidance for the operation and maintenance of their flow control devices, a copy of which is included in Appendix A. Generally, the Hydrobrake will require little, if any maintenance and has a design life in exceedance of the upstream drainage systems. In the unlikely event that the device blocks and the flow control chamber floods, the device is fitted with a pivoting by-pass door which can be accessed and opened from ground level via a pull handle and operating steel rope. This will allow the chamber to be drained down to provide access for maintenance.

## 7 REFERENCES

- [1] Interpave, Design and Construction of Concrete Block Permeable Pavements, Edition 7, December 2018.
- [2] CIRIA, *The SuDS Manual*, Report C753, 2015.

**APPENDIX A: HYDRO INTERNATIONAL  
OPERATION AND MAINTENANCE GUIDE**

## **HYDRO-BRAKE® FLOW CONTROL MAINTENANCE AND SAFETY DATA SHEET**

### **MAINTENANCE**

Normally, little maintenance is required as there are no moving parts within the Hydro-Brake® Flow Control. 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. Hydro-Brake® 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 available with rodding facilities or vortex suppressor pipes as optional extras.

Following installation of the Hydro-Brake® Flow Control it is vitally important that any extraneous material ie. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, 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 please do not hesitate to contact the company so that an investigation may be made.

Hydro-Brake® 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**

Hydro-Brake® 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 Hydro-Brake® Flow Controls should be in accordance with current legislation and regulations:

- The Health and Safety at Work etc. Act 1974.
- The Management of Health and Safety at Work Regulations 1999 (amended 2003).
- The Manual Handling Operations Regulations 1992 (amended 2002).

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