

## Operation & Maintenance Plan for Sustainable Drainage Systems

Proposed Residential Development, Griffin Close, Frizington

Thomas Armstrong Construction and Home Group

Ref: K41128.OM/002

Version	Date	Prepared By	Checked By	Approved By
Original	28 <sup>th</sup> June 2024	C. Abram	T. Melhuish	T. Melhuish
A	22 <sup>nd</sup> October 2024	C. Abram	T. Melhuish	T. Melhuish

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## 1 INTRODUCTION

### 1.1 BACKGROUND

R. G. Parkins & Partners Ltd (RGP) has been appointed by Thomas Armstrong Construction and Home Group to provide an Operation and Maintenance plan for surface water drainage systems for a proposed residential development at Griffin Close, Frizington.

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

- K41128-10 Outline Drainage Layout
- K41128-12 Typical Drainage Details Sheet 1 of 2
- K41128-13 Typical Drainage Details Sheet 2 of 2

### 1.2 SUDS COMPONENTS

The proposed residential development at Griffin Close, Frizington utilises a Sustainable Drainage Systems (SuDS) as part of the overall surface water drainage strategy for the site.

- It is proposed that surface water runoff from roofs, driveways and the access roads shall discharge into a geocellular tank located within the shared access road/parking area at the respective low point of the site.
- A Flow control chamber will be located downstream of the geocellular tank which will restrict discharge flows to the existing offsite drainage network.
- A proprietary hydrodynamic separator is to be provided on the surface water sewer prior to discharge. This system is specifically designed to remove suspended solids, hydrocarbons and floatable debris from stormwater runoff.
- The tanks and associated pipework and inspection chambers, flow control chamber and hydrodynamic vortex separator will be privately maintained by Home Group.

All drainage systems have been designed to provide sufficient storage for the critical duration, 1 in 100-year design storm event with a 50% allowance for the future effects of climate change.

## 2 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 components become overloaded during periods of prolonged heavy rainfall potentially resulting in localised flooding within the development. Recommendations for the maintenance of the SuDS components are detailed in the following section.

As part of this process, it is recommended that inspection and maintenance records are retained by the Management Company to track the progressive performance of the SuDS over time. The inspection records should include the following:

- Sediment condition and depth
- Water observations (sheen, smell, etc.)
- Unscheduled maintenance needs
- Components that do not meet performance criteria and require immediate maintenance
- Common problem areas, solutions and general observations
- Aesthetic conditions

For Health and Safety reasons as well as practicality, SuDS systems should be maintained during periods of dry weather wherever possible. Adhering to the recommended maintenance regimes outlined below will minimise the risk of maintenance activities being required when a fault becomes apparent, usually during a rainfall event.

## 2.1 ATTENUATION STORAGE SYSTEMS & FLOW CONTROL CHAMBER

Regular inspection and maintenance is important for the effective operation of below ground storage systems. The tanks will be protected from sediment loads by the use of upstream silt traps with sumps. The highest risk of blockage and siltation is during and immediately after construction. The geocellular tanks will be fitted with access turrets to allow inspection and maintenance of the inside of the tank.

The attenuation system will connect into a flow control chamber with a Hydro-brake device limiting flows to a max. 4.0 lit/sec. 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. Hydro International Ltd provides guidance for the operation and maintenance of their flow control devices, a copy of which is included in Appendix A.

Maintenance responsibility for the attenuation systems will be placed with Home Group. The following requirements outlined in Table 6.1, refer to the recommendations in The SuDS Manual (CIRIA C753)<sup>[1]</sup>.

**Table 2.1 Attenuation Storage Maintenance Activities and Schedule**

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas upstream of the system that are not operating correctly (i.e. rainwater pipe gullies, silt traps, inspection chambers). If required, take remedial action	Monthly for first 3 months, then six monthly thereafter
	Remove debris from any upstream catchment surfaces (may cause risks to performance)	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Remove sediment from pre-treatment structures	Annually, or as required.
	Visual inspection of silt traps, access turrets and flow control chamber to ensure no obvious build-up of silt or other blockages. De-silt as required. Check to ensure there is no standing water in the chambers	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Inspect external vent pipe and associated pipework to ensure free from blockage or damage	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlets and vents. De-silt as required.	As required
Monitoring	Inspect/check all upstream drainage inlets, outlets, vents and gullies to ensure that they are in good condition and operating effectively. Inspect access turrets and de-silt inside of tank if required	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Survey inside of tank for sediment build up and remove if necessary	Every 5 years or as required.

## 2.2 HYDRODYNAMIC SEPARATOR

A proprietary hydrodynamic separator will act as an additional form of treatment to the stormwater run-off from roofs, highways and driveways. It is to be located directly upstream of the unnamed watercourse within the open space landscaped area. The hydrodynamic separator will remain private and maintenance responsibility will be placed with Home Group.

The maintenance requirements for hydrodynamic separators are fairly low due to no moving parts. The only required maintenance as informed by the manufacturer is to employ a vacuum truck to remove floatables trapped on the top and sediment captured in the sump. As the frequency of maintenance can vary significantly between sites it is recommended to check and vacuum every 6 months for the first year and determine the standard maintenance frequency from this. Most typically a maintenance frequency of once per year or following a spill in the drainage facility is adequate.



## 3 REFERENCES

- [1] CIRIA, *The SuDS Manual*, Report C753, 2015.

## **APPENDIX A: MAINTENANCE REQUIREMENTS FOR HYDRO-BRAKE**

## **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).

All published and printed by the Health and Safety Executive.

HRD-FM04/16 J/0610



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Hydro International (UK) Ltd

Stormwater Division • Shearwater House • Clevedon Hall Estate • Victoria Road • Clevedon • BS21 7RD  
Tel: 01275 878371 • Fax: 01275 874979 • [www.hydro-international.biz](http://www.hydro-international.biz)

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