

SUDS MAINTENANCE AND MANAGEMENT PLAN

SITE: FORMER GLEN DIMPLEX, STONEY LANE, WHISTON

We have been asked to prepare an outline Sustainable Drainage Systems Maintenance and Management Plan to support the proposed development at the site above. The purpose of this statement is to identify the typical requirements in accordance with CIRIA (2015) for maintenance and management of the drainage infrastructure that has been proposed (see Appendix A). The Preliminary Drainage Layout, prepared by Betts Associates, has been appended to this statement for completeness (see Appendix A for further details).

In terms of the proposed surface water management infrastructure, source control will be provided via a filter drain and an interception drain. Conveyance will be provided by a below ground pipe network, utilising oversized pipework (900mm diameter) to assist with attenuation. Stormwater storage generated in the events up to and including the 1 in 100yr plus 45% climate change allowance event will be catered for by an attenuation basin. An interception drain is also proposed along the southern site boundary, to intercept potential exceedance flows entering or leaving the site from adjacent land. The specific means of attenuation and conveyance are to be confirmed at the detailed design stage.

The proposed drainage infrastructure will be offered to United Utilities or a NAV for adoption. The adoptee should be inspecting any assets regularly, preferably during and after heavy rainfall to check effective operation.

The following section will consider the typical maintenance and management techniques recommended for the types of drainage infrastructure included within the Preliminary Drainage Layout. Regular inspection and maintenance is required to ensure the effective long-term operation of all proposed components. Maintenance responsibility for systems should be placed with a responsible organisation.

Regular inspection and maintenance of drainage systems are important for their effective and continued operation. Maintenance activities can be broadly defined as regular, occasional, and remedial maintenance. The proposed maintenance regime for the surface water drainage infrastructure should follow typical guidance for management and maintenance, guidance can also be sought from the CIRIA 753 SuDS Manual where appropriate. Guidance on the operation and maintenance requirements that may be appropriate are outlined subsequently; this is not exhaustive, and some actions may not always be required.

PIPEWORK AND MANHOLES

Below ground pipework and manholes should be routinely monitored to ensure they are operating safely and sustainably. The pipework should be inspected routinely, and any defects repaired as and when required.

FILTER DRAIN

As shown on the Preliminary Drainage Layout (Appendix A), the Filter Drain is located to the front of properties, parallel to the back of footway, and is designed to collect surface water run-off from adjacent drives and roof areas. Owing to the presence of ground contamination across the site, the Filter Drain is fully lined with an impermeable membrane; run-off passes through the surrounding granular filter media into a Terram-wrapped perforated pipe at the base of the drain before conveyance to the proposed surface water network. Maintenance activities should take care not to damage the impermeable lining. Regular and ongoing maintenance is required for the filter drain to ensure that it continues to operate to the design performance standards. Detailed specifications and frequencies should be provided for the required maintenance, along with annual costs and any potential machinery necessary to undertake maintenance. Different designs will have different operational and maintenance requirements (to be confirmed at the detailed design stage). The typical requirements set out in **Table 1** below are as recommended within The SuDS Manual.

Table 1: Recommended Maintenance Routines for Filter Drains (CIRIA, 2015)

Regular Maintenance	Frequency
Remove litter and debris	Monthly
Cut grass/vegetation on top of the filter drain and side slopes	Monthly (during growing season), or as required
Inspect inlets, outlets, control structures and pipework for blockages and physical damage, clear/repair as required	Monthly
Occasional Maintenance	Frequency
Remove sediment and debris from the surface of the filter media	As required, following inspection
Rehabilitate surface and upper filter media where clogging is identified	As required
Remedial Actions	Frequency
Repair erosion or damage to side slopes	As required
Reconstruct/replace filter media where infiltration performance has significantly reduced	As required (likely to be infrequent)
Monitoring	Frequency
Initial inspection	Monthly (for three months post-installation)
Inspect for evidence of poor operation, ponding, or weed growth – if required, take remedial action	Every 3 months (48hr following large storms for first 6 months)
Monitor silt accumulation rates and establish appropriate maintenance frequencies	Annually

INTERCEPTION DRAIN

As shown on the Preliminary Drainage Layout (Appendix A), the Interception Drain is located to the rear of proposed gardens, along the southern site boundary, and comprises a series of catch pits connected by perforated pipework laid within granular fill and wrapped in a permeable geotextile, with an impermeable membrane lining the trench. The interception drain, proposed along the southern site boundary to manage potential exceedance flows entering or leaving the site from adjacent land, will require regular and ongoing maintenance to ensure it continues to operate to the design performance standards. Detailed specifications and frequencies should be provided for the required maintenance, along with annual costs and any potential machinery necessary to undertake maintenance. Different designs will have different operational and maintenance requirements (to be confirmed at the detailed design stage). The typical requirements set out in **Table 2** below are as recommended within The SuDS Manual.

Table 2: Recommended Maintenance Routines for Interception Drain (CIRIA, 2015)

Regular Maintenance	Frequency
Remove litter and debris	Monthly
Inspect inlets, outlets and overflows for blockages, clear as required	Monthly
Inspect for evidence of physical damage along the drain alignment	Monthly
Manage vegetation along the drain corridor	Monthly (during growing season), or as required
Occasional Maintenance	Frequency
Inspect silt accumulation rates and establish appropriate removal frequencies	Every 3 months, or as required
Remove sediment from inlets and outlets	Annually, or as required
Remedial Actions	Frequency
Repair erosion or other damage along the drain	As required
Repair/rehabilitate inlets, outlets and overflows	As required
Relevel uneven sections and reinstate design levels/falls	As required

ATTENUATION BASIN

As shown on the Preliminary Drainage Layout (Appendix A), the attenuation basin is designed with a base level of 57.383 mAOD and a top of bank level of 59.383 mAOD, providing a 300mm freeboard and a temporary maximum storage volume of 1,003.09 m³. Outflow from the basin is controlled via a Hydro International HydroBrake® Optimum flow control device (Ref. S30), restricting discharge to 42.4 l/s to the private surface water sewer. Regular and ongoing maintenance is required for the attenuation basin to ensure that it continues to operate to the design performance standards. Detailed specifications and frequencies should be provided for the required maintenance, along with annual costs and any potential machinery necessary to undertake maintenance. Different designs will have different operational and maintenance requirements (to be confirmed at the detailed design stage). This will need to be designed to cater for the extreme storm event volumes up to and including the 100yr return period event with 45% allowance for climate change. The requirements set out in **Table 3** below refer to the recommendations in The SuDS Manual for maintenance of attenuation basins.

Table 3: Recommended Maintenance Routines for Attenuation Basins (CIRIA, 2015)

Regular Maintenance	Frequency
Remove litter and debris	Monthly
Manage vegetation and remove nuisance plants (inc. cutting grass for spillways/access routes)	Monthly (during growing season), or as required
Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
Inspect inlets, outlets and overflows for blockages, and clear as 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 any penstocks and other mechanical devices	Annually
Tidy all dead growth before start of growing season	Annually
Remove sediment from inlets, outlets and forebay	Annually (or as required)
Manage wetland plants in outlet pool – where provided	Annually
Occasional Maintenance	Frequency
Reseed areas of poor vegetation growth	As required
Prune and trim any trees and remove cuttings	Every 2 years, or as required
Remove sediment from inlets, outlets, forebay and main basin where required	Every 5 years, or as required (likely to be minimal where effective upstream source control is provided)
Remedial Actions	Frequency
Repair erosion or other damage by reseedling 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

HYDROBRAKE FLOW CONTROL DEVICES

As shown on the Preliminary Drainage Layout (Appendix A), a Hydro International HydroBrake® Optimum (Ref. S30, cover level 60.074 mAOD, invert level 57.585 mAOD) is proposed to control outflow from the attenuation basin, restricting discharge to 42.4 l/s. Generally, Hydrobrake devices require little maintenance and have a design life greater than that of the upstream drainage infrastructure. Should the device get blocked, then the main chamber would flood and depending on the specific Hydrobrake product being installed, most come equipped with by-pass doors (or similar) to allow the device to be accessed and drained manually to provide appropriate access for maintenance to be undertaken. In terms of management, the typical routines for maintenance are for inlets, outlets, and overflows to be inspected regularly to prevent blockages and be cleared where needed. Sediment can be removed from inlets and outlets when required and any inlets and outlets can be repaired if damage is picked up in the regular inspections.

I trust you will find the above and attached are of assistance. If you however have any queries or require further information, please do not hesitate to contact me.

Yours sincerely,

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Graduate Flood Risk Analyst
BETTS HYDRO

APPENDED

Appendix A – Preliminary Drainage Layout (Betts Associates)

APPENDIX A – PRELIMINARY DRAINAGE LAYOUT (BETTS ASSOCIATES)

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