

**LAND WEST OF YAPTON ROAD
MIDDLETON-ON-SEA,
WEST SUSSEX**

Operation and Maintenance Plan

Proposed Residential Scheme

PREPARED FOR: FRONTIER ESTATES LIMITED

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1.0 OPERATION AND MAINTENANCE PLAN

1.1 SuDS Maintenance Responsibilities

Client-employed maintenance teams will manage and maintain the long-term integrity and function of the proposed surface water drainage SuDS facilities that will fall under private ownership.

1.2 Maintenance Access

The proposed development layout provides adequate maintenance access to all surface water drainage and SuDS features (for details refer to Drawing 402.06594.00008.07.001 – Proposed Drainage Layout).

The swales and proprietary crate system are all located within or adjacent to the on-site road network and parking bays, with the filter drains requiring residential house notification. Maintenance access to these features will be readily available from the road network and parking bays for maintenance vehicles and maintenance operatives.

The main swale is located along the main on-site road network and maintenance access to the swale will be readily available from the road network with parking bays for maintenance vehicles and maintenance operatives. The proprietary crate system and discharge channel are accessible from the main access route for maintenance access.

Maintenance access to the underground piped systems linking the various SuDS features will be readily available from the access road and parking areas for maintenance operatives. Access for maintenance vehicles, jetting units, etc. will be available.

1.3 Maintenance Schedules

The following sub-sections provide recommended maintenance schedules and management plans for the various components of the surface water drainage system.

The anticipated lifetime of the SuDS facilities, their frequency of replacement, and methods for their replacement are largely dictated by the choice of installation, manufacturer, and the quality of the workmanship during construction. Where necessary, these maintenance and management schedules will be refined by the Applicant once the site is operational to suit the specific site conditions.

1.3.1 Filter Drains

A recommended operation and maintenance plan for filter drains is summarised in Table 1-1.

Table 1-1
 Typical Filter Drain Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockage, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

1.3.2 Proprietary Crate Storage

A recommended operation and maintenance plan for the proprietary crate storage is summarised in Table 1-2.

Table 1-2
 Typical Proprietary Crate Storage Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Minimum 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
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlets, overflows and vents.	As required
Monitoring	Repair/check all inlets, outlets, vents and overflows to ensure they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required

1.3.3 Swales

The proposed drainage scheme will utilise a swale as a mechanism for treatment and attenuation of surface water runoff. The anticipated maintenance and management for swales associated with the surface water drainage system is outlined in Table 1-3.

Table 1-3
 Typical Swale Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Inspections	Remove Litter and Debris.	Monthly, or as required.
	Cut grass – to retain grass height within specified design range.	Monthly (during growing season) or as required.
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required.
	Inspect inlets and outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours.	Monthly, or when required.
	Inspect vegetation coverage.	Monthly for 6 months, quarterly for 2 years, the half yearly.
	Inspect inlet and facility surface for silt accumulation, establish appropriate silt removal frequencies.	Half yearly.
Occasional Maintenance	Reseed areas of poor vegetation growth, after plant types to better suit conditions, if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area.
Remedial Actions	Repair erosion or other damage by re-turfing or reseeded.	As required.
	Relevel uneven surfaces and reinstate design levels.	As required.
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required.
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required.
	Remove and dispose of oils or petrol residues using safe standard practices.	As required.

1.3.4 Ditches

The proposed drainage scheme will utilise a ditch as a mechanism for conveyance of surface water runoff. The anticipated maintenance and management for ditches associated with the surface water drainage system in outlined in Table 1-34.

Table 6-4
 Typical Ditch Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Inspections	Remove Litter and Debris.	Monthly, or as required.
	Cut grass – to retain grass height within specified design range.	Monthly (during growing season) or as required.
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required.
	Inspect inlets and outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours.	Monthly, or when required.
	Inspect vegetation coverage.	Monthly for 6 months, quarterly for 2 years, the half yearly.
	Inspect inlet and facility surface for silt accumulation, establish appropriate silt removal frequencies.	Half yearly.
Occasional Maintenance	Reseed areas of poor vegetation growth, after plant types to better suit conditions, if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area.
Remedial Actions	Repair erosion or other damage by re-turfing or reseeded.	As required.
	Relevel uneven surfaces and reinstate design levels.	As required.
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required.
	Remove and dispose of oils or petrol residues using safe standard practices.	As required.

1.3.5 Underground Piped Systems

A recommended operation and maintenance plan for the piped drainage network is summarised in Table 1-.

Table 1-5
Typical Pipe System Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular maintenance	Ensuring drainage intakes are clear of debris/silt.	Monthly (or as required)
Occasional maintenance	Clear gully pots.	6 monthly
	Jet clean sewer lines, gully tails and kerb channels to remove grease, grit, sediment and other debris to ensure conveyance capacity is not compromised.	Every 2 years
Intermittent maintenance	CCTV survey of sewer lines to identify any defects/signs of performance degradation such as: - Cracked / deteriorating pipes; - Leaking joints/seals at manholes; - High water lines showing regular high stage in pipes (sign of lack of capacity or downstream constraint); and - Suspected infiltration or exfiltration.	Every 2 – 5 years
Remedial actions	Repair defects using suitable methods. Effective temporary repairs may be sufficient in short term until scheduled/capital improvements can be made.	As required
Monitoring	Record areas of surface ponding / intake bypassing / surcharging (photos, inundated areas, depths) during extreme storm events and investigate the reasoning for this post-storm.	As required

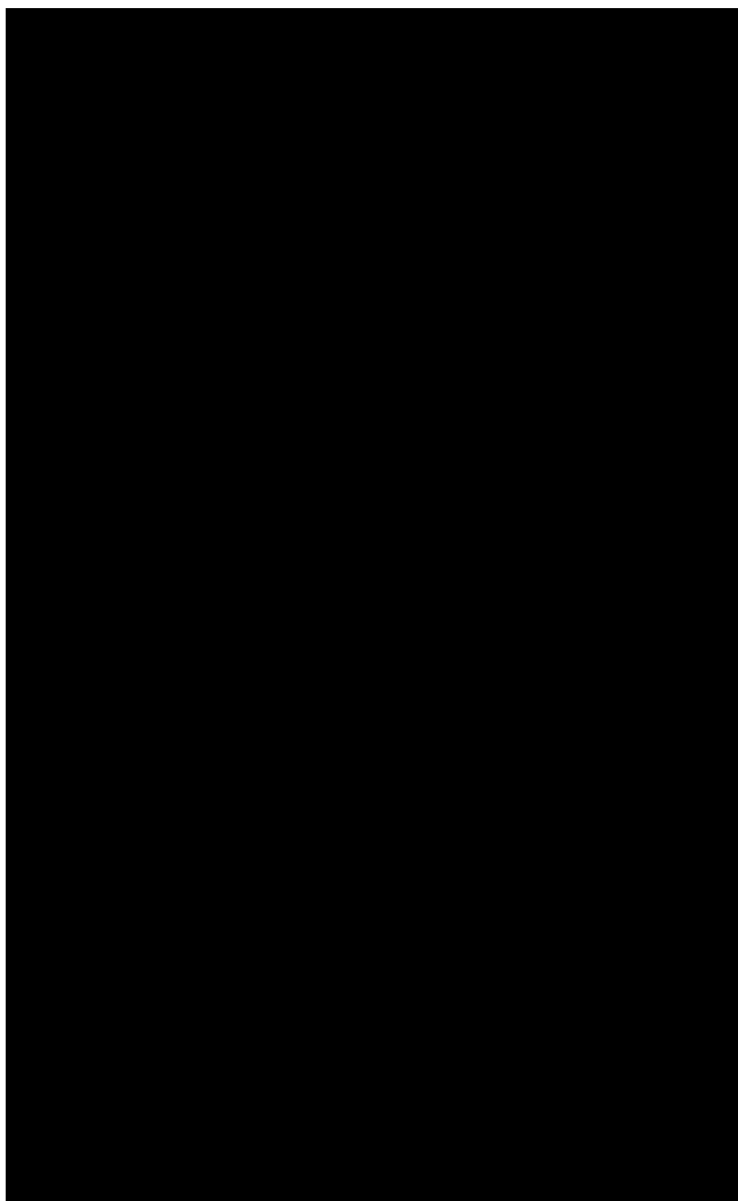
1.3.6 Hydrobrake

Minimal Maintenance is required for the integral Hydro-Brake® Flow Control. It is totally self-activating, has no moving parts and requires no power to operate. A recommended operation and maintenance plan for the Hydrobrake is summarised in Table 1-.

Table 1-6
 Typical Hydrobrake Operation and Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular maintenance	Inspection to ensure Hydrobrake is clear of debris.	3 monthly
Occasional maintenance	Clear debris in manhole housing Hydrobrake.	6 monthly
	Jet clean from downstream in accordance with standard sewer jetting procedures.	Every 2 years
Monitoring	Record any surface ponding / surcharging in area local to Hydrobrake manhole (photos, inundated areas, depths) during extreme storm events and investigate the reasoning for this post-storm.	As required

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