

Surface Water Drainage – Proposed Residential Development, 15-17 Kew Gardens, Bognor Regis, West Sussex

Management Strategy

The Proposed Surface Water Scheme

The surface water drainage system for the proposed scheme consists of a soakaway design along with the use of permeable hard surfaces. The rainwater from roofs will discharge into Storm Water Cellular storage tanks and the rainwater from hard surfaces will discharge through permeable surfaces.

The rainwater from the dwellings roofs will discharge into gutters which will discharge into downpipes which will discharge into the underground drainage system. The underground drainage system will discharge into SW Cellular storage tanks as shown on the attached drawing. The SW Cellular storage tanks will store the surface water and discharge into the existing ground.

The surrounding hard surfaces consisting of paths and patios will discharge surface water into the adjoining soft landscaped areas which will in turn filter through into the existing ground. The parking areas will be constructed with permeable paving in order for all surface water to discharge through into the existing ground.

Management

Certain elements of the surface water drainage scheme can be managed by the homeowner. These consist of general maintenance of the external gutters and downpipes and the external surfaces. The SW Cellular storage tanks require no maintenance and any works required should be carried out by professional drainage experts due to the depth and health and safety implications.

Maintenance Schedule and Record

See attached table

Specification

All gutters and downpipes can be replaced and repaired by the homeowner. All paving and external surfaces can be replaced and repaired by the homeowner. All these products are as specified on the as built drawings supplied as part of the home owner manual.

The SW Cellular storage tanks and should not be repaired or replaced by the homeowner but a specialised drainage contractor. The SW Cellular storage tanks require no maintenance as they are simply acting as a store for water to drain through the underground drainage pipes into the existing ground. These drainage systems are the responsibility of the individual owners of the properties. There is no management company as all properties are being sold as individual freehold plots. Any repairs or works required to the drainage system will be undertaken by the developer for the first 2 years of occupation and then a further 8 years will be covered under the properties 10 year Structural Warranty.

Component	Function	Design Criteria	Comments
Filter Drains	To transport and filter runoff via perforated or porous pipe in trench filled with filter material (granular material or lightweight aggregate fill). Removes silts and pollutants. Allows infiltration.	- Often designed to catch "first flush" volume of runoff, which carries most pollution. - Designs should ensure that silt is effectively intercepted prior to entry to filter drain.	The fill may be exposed at the ground surface or covered with turf, topsoil or other suitable capping. A variation on this theme is the 'treatment trench', which should be lined and discharges from a perforated or porous pipe to a storage structure, or to another SUDS feature in the management train.
Permeable Surfaces	Load bearing constructions which allow surface water to enter underlying granular layers which store, clean and convey runoff to a discharge point.	Designs should ensure that all runoff from hard surfaces enters the granular fill through the surface, rather than introducing water into the fill via gullies and piped systems. Roof water can be introduced into the granular layers via a filter device. This will ensure optimum performance, and maximum design life.	Permeable surfaces can accumulate silts, which can reduce the performance of both the infiltration surface and filter material. The use of geotextiles as an isolating layer prevents silt moving through the permeable fill and permanently affecting the structure. Geotextiles and the material above them can be removed and replaced, or rehabilitated to extend the design life of the system.
Soakaways	To provide subsurface storage, allowing attenuation of flow and gradual infiltration of water into the surrounding soil.	- Designs should ensure that silt is effectively intercepted prior to entry to soakaway. - Critical design parameters are: 1. System storage capacity. 2. Rate of infiltration into surrounding soil.	The conventional 'chamber soakaway' should include inspection tubes to allow access for the removal of debris from the floor of the inspection tube or chamber. Sediment traps can be installed upstream to protect infiltration surface inside the chamber from clogging.

Component	Regular Maintenance	Occasional (Infrequent) Maintenance	Remedial Maintenance	Monitoring
Filter Drains	• Filter removal	• Weed control (if required). The control of weeds will have to be managed carefully as weed killers may disrupt the biological action in the sub-base. Manual control or non-toxic and biodegradable weed killers should be used • Surface silt removal (due to slow accumulation)	Good design practice should ensure that silt loads are intercepted upstream of a filter drain. However, if the permeability of the system does appear to be reducing with time due to silt accumulation, then consideration should be given to system rehabilitation, including: • Removal of stone above geotextile (if present) • Clean stone • Removal of geotextile and safe disposal • Replacement of geotextile • Replacement of clean stone top layer	Regular inspections should be undertaken, particularly after significant storm events, to: • Identify areas of erosion, scour or gullies around the outfall infrastructure. • Identify locations of silt/vegetation accumulation on the surface of the filter drain • Identify any areas where damage (either vehicular or from vegetation growth) is evident
Permeable Surfaces	• Manual brushing and litter removal • The surface should be kept clear of silt and cleaned at least twice a year to keep the voids clear, using regular brush and vacuum suction cleaning. This should be undertaken at the start of spring, when general landscape tidying of winter damage is carried out, and in the autumn after leaf fall	• Weed control (if required). The control of weeds will have to be managed carefully as weed killers may disrupt the biological action in the sub-base. Manual control or non-toxic and biodegradable weed killers should be used	If infiltration capacity of the surface appears to be decreasing due to silt accumulation, then consideration should be given to system rehabilitation, including: • Removal of permeable blocks and cleaning • Removal of bedding grit and geotextile and safe disposal • Replacement of geotextile and grit bedding layer, and replacement with clean permeable blocks • Removal of accumulated silt from site (subject to toxicity test) and safe disposal	• Any inlet/outlet infrastructure should be monitored regularly, to check for blockages or silt build-up • Surface infiltration should be monitored following heavy rain for ponding. Where areas of the pavement show decreased infiltration (even after surface cleaning), they may require remedial maintenance.
• Inlets • Outlets • Storage structures • Silt traps • Flow control devices • Headwalls • Low flow channels • Overland flood routes	• Filter removal • Regular (monthly) trimming of grass adjacent to the structure • Monthly cleaning of infrastructure, removal of impeding debris, silt etc • SUDS should not ideally include working parts present, their free movement should be confirmed bi-annually, and greasing undertaken if necessary		Erosion/damage repair to structure or surrounding bank-works	Monthly inspection for evidence of erosion, damage or potential blockage risks

Filter Drains / Infiltration Trenches

Activity	Frequency (per annum)	Quantity
Litter Collect and remove from site all extraneous rubbish not arising from the contract work and detrimental to the appearance of the site, including paper, packaging materials, bottles, cans and similar debris.	Monthly	
Grass Mowing Generally, to surroundings of filter drain, keep grass at 35mm-50mm minimum and 75mm maximum. Ensure that grass cuttings are collected and disposed off well away from the system, to ensure they do not contribute to future surface clogging. Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	As required	
Weed control Hand pull or spot treat weed growth in filter drains / infiltration trenches using an approved herbicide	As required	
Monitoring Monitor accumulation of silt at inlet / outlet infrastructure. Advise Client if silt build-up is significant and take action to prevent blocking of drain. Monitor effectiveness of filter drain / infiltration trench surface, and when water does not infiltrate immediately, advise Client of possible need to rehabilitate surface layers	Monthly	
Rehabilitation Works Remove 150 – 300 mm of the 20mm – 40mm single size clean round stone and set aside on a clean, hard surface or polythene sheet. Jet wash to remove any silt for reuse. Fold in vertical geotextile sides and roll up horizontal geotextile including accumulated silt, taking care not to contaminate clean stone layer beneath. Remove silted geotextile and dispose of safely to tip. Supply and install replacement geotextile to match previous installation, fixing to edge boards as detail. Replace clean 20mm – 40mm round stone making up volume with stone to match to surrounding ground level.	As required	

Permeable Pavement

Activity	Frequency (per annum)	Quantity
Litter Collect and remove from site all extraneous rubbish not arising from the contract work and detrimental to the appearance of the site, including paper, packaging materials, bottles, cans and similar debris.	Monthly	
Grass Mowing Generally, to surroundings of permeable pavement, keep grass at 35mm-50mm minimum and 75mm maximum. Ensure that grass cuttings are collected and disposed off well away from the system, to ensure they do not contribute to future surface clogging. Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	As required	
Weed Control Hand pull or spot treat weed growth in permeable pavement surface using an approved herbicide.	As required	
Cleaning of Permeable Pavement Light brushing and removal of sweepings	Monthly general site care and as required	
Special brush and suction clean	Twice a year, firstly in Spring and secondly in Autumn after leaf fall.	
Monitoring Monitor accumulation of silt, and advise Client if additional action is required to prevent pavement surface clogging	Monthly	
Monitor effectiveness of pavement and when water does not infiltrate, advise Client of possible need for rehabilitation of surface layers	Monthly	

Permeable Pavement (cont.)

Activity	Frequency (per annum)	Quantity
Rehabilitation Works		
Lift, jet wash and stack slotted blocks for re-use.	As required	
Fold in vertical geotextile sides and roll up horizontal geotextile including accumulated silt taking care not to contaminate clean stone layer beneath.		
Remove silted 5mm grit and geotextile and dispose of safely to tip.		
Ensure existing sub-base is protected and free of contamination.		
Supply and install replacement geotextile to match previous installation fixing to edge. Restraint as necessary.		
Supply, lay and loose screed to level approximately 50mm depth of 5mm SS crushed stone to BS882 on geotextile as Spec block manufacturer's specification.		
Relay cleaned blocks ensuring tight butt joints and as manufacturer's specification. Vibrate with a vibrating plate Type DVP75/22" or similar and finish as manufacturer's specification.		