



JOSHUA HOUSE, 35 JOSHUA LANE, MIDDLETON, MANCHESTER, M24 2AY
TELEPHONE: 0161 345 1004

LAND OFF GREENHILL ROAD, MIDDLETON M24 2BB

SUDS MANAGEMENT & MAINTENANCE PLAN

The drainage at the above site has been designed in accordance with United Utilities and the government's Sustainable Urban Drainage System (SUDs) guidance documents. The drainage systems, permeable pavements and cellular storage have been designed to store, attenuate and reduce peak rainfall run-off. Please see the enclosed drainage drawing 1326-900 Drainage Layout drawing which shows the drainage systems, permeable pavement driveways and the cellular storage tank attenuation SUDs.

As discharge into the ground is not feasible at the site due to the ground conditions, the surface water drainage has been designed with attenuation provided within the drainage system in oversized pipes and manholes in the highway for storms up to 30 years plus a 40% allowance for climate change in accordance with United Utilities requirements for sewer adoption and within the site in cellular storage attenuation for storms up to 100 year plus a 45% allowance for climate change in accordance with planning policy guidance and flow rates limited by flow control devices to the minimum flow of 5.6 l/s from a minimum 100mm size flow control to prevent blockages, discharging to the public sewer adjacent to the site, subject to agreement with the Local Authority and United Utilities as recommended in the Drainage Strategy.

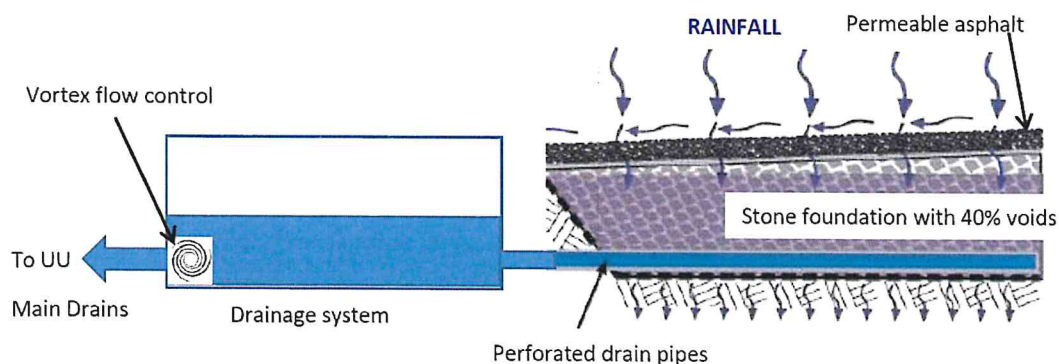


Fig 1.

Indicative Sketch of Permeable Pavement

The stone underneath the permeable pavements and the cellular storage is wrapped in geotextile membrane to prevent silt from filling the voids within the stone. Rain falling on to the permeable pavements passes down through the permeable paving into the voids within the stone foundations, and then overflows into the drainage system oversized pipes which discharge to United Utilities public sewers. The outlet flow from the site is restricted by a vortex flow control device and attenuation provided within the oversized pipes and cellular storage to prevent overloading of the UU's drainage system.

The infiltration rate of permeable pavements will decrease due to the build-up of detritus in the aggregate but will stabilise with age. However, evidence suggests that infiltration rates always remain higher than rainfall rates, so, even with little maintenance, there should be sufficient infiltration to accommodate rainfall events. It is advisable to sweep the pavement to remove debris, but this should not be any greater than is normally undertaken on traditional pavements. If the permeable pavements are damaged, they can be repaired by replacing the permeable blocks as is normally undertaken on traditional pavements.

Winter – de-icing

Use DE-ICING SALT, not ROCK SALT. The most commonly available rock salt leaves gritty residue which will clog the joints and reduce the permeability of the surface. De-icing salt does not include grit. Although more expensive, de-icing salt bags contain only salt rather than a grit-salt mixture; therefore, it can de-ice a larger area, if spread more thinly. As permeable pavements retard the formation of ice on the pavement surface, the need to use de-icing compounds is reduced.

Long term maintenance

After many years of use, if ponding/puddles appear on the pavement after rain, this indicates that there is clogging of the pores. Pressure washing & vacuum equipment can then be used to restore permeability. Permeable paving surfaces have been found to be still effective after 25 years.

Regular Maintenance Schedule

The following maintenance will be required every six months:

- Regular frequency brushing or washing of the surface to remove silt.
- Regular frequency inspection of the overflow inspection pipework to check for debris/silt.
- Clean out any debris/silt as required.
- Replacement of permeable paving, stone and geotextile membranes as specified as required (due to normal wear and tear).
- Drainage pipework inspection chambers and aco channels shall be checked for debris/silt; clean out, flush or vacuum as required.
- Remove silt from the cellular tank's upstream silt trap chamber – this can be done by vacuum tanker.

Please also refer to The SUDS Manual CIRIA C753 Table 20.15 Operation and Maintenance Requirements for pervious pavements and 21.3 Operation and Maintenance Requirements for attenuation storage tanks below:

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through 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 three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical 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, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that 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

The SUDS Management & Maintenance information will be included in the Homeowners User Guide and Scheme Maintenance Manuals.