COWSHED

Pollution Control and Water Quality

Elmridge Lane, Preston, PR3 2NY

CSH-BML-XX-XX-RP-C-0510

Tuesday, 25th July 2023

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Pollution Control and Water Quality

Water quality is ensured by the use of Filter Drains, Swale, and Pond, which cleanse the runoff of silt, phosphates, nitrates, copper, zinc, other heavy metals, and polycyclic aromatic hydrocarbons via both physical and microbial processes. This ensures a high-quality effluent discharge to the existing watercourse.

The following pollution control devices have been proposed:

Filter Drains in Type H bedding: Provide physical filtration of the effluent at the point of runoff collection. Solid-bound pollutants are removed from the effluent before the runoff reaches the Attenuation Tank.

Swale: The swale has been strategically placed within the drainage scheme where space permits. The grass in the swale slows down and filters surface water flows. Sediment is deposited while oily residues and organic matter are retained to be broken down in the top layer soil and vegetation. Topsoil and seeding with specific species of flora will be in accordance to the Landscape Architect's specification.

Treatment & Attenuation Pond: The pond is existing and will be reshaped to the appropriate depth and is the main runoff attenuation feature. The pond will also provide runoff cleansing by both physical and microbial processes. An overflow device shall be placed at the pond outlet to prevent flooding of the SuDS feature. Topsoil and seeding with specific species of flora will be in accordance to the Landscape Architect's specification.

CIRIA report C753, The SuDS Manual, says on page 567 'To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).'

Table 3 shows Table 26.2 of the SuDS Manual, which gives the pollution hazard indices for various land uses.

Table 3: Pollution hazard indices for different land use classifications

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Table 4 shows Table 26.3 of the SuDS Manual, which gives indicative SuDS mitigation indices for discharges to surface waters.

Table 4: Indicative SuDS mitigation indices for discharges to surface waters

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://tinyurl.com/qf7yulj7

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

Table 5 gives a summary analysis of the adequacy of the proposed SuDS drainage in addressing pollution control and water quality. It has been assumed, based on the cleansing properties of the pond as described in Note 3 of ***Table 4*** (SuDS Manual Table 26.3), that a catchpit will have slightly lower mitigation effect compared to a pond for small networks by removing / capturing sediments and sediment-bound pollutants.

Table 5: Mitigation versus hazard indices for proposed layouts

SuDS Drainage Layout	SuDS device/Land Use	TSS	Metals	Hydro-carbons	Remark
Filter Drains, Swale and Pond	Filter Drain	0.4	0.4	0.4	
	Pond	0.7	0.7	0.5	
	Swale	0.5	0.6	0.6	
	Total	**1.6**	**1.7**	**1.5**	**OK**, SuDS elements provide sufficient treatment.
Land Use	Roof	0.3	0.2	0.05	
	Site with heavy pollution (Allowance for a yard polluted with Bovine Faeces)	0.8	0.8	0.9	
	Total	**1.1**	**1.0**	**0.95**	