



25 November 2024

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FAO Cheryl Wellstead

Ref: 24025

Stables at Allington Lane, Allington, Hants F/24/96845
Condition #7 & #8 Surface Water Drainage Design

Dear Sirs

Further to your instructions we attended site to undertake soil permeability testing to establish if infiltration discharge of surface water runoff is possible. The site soils comprise a slightly gravelly Clay. The test hole exhibited very low infiltration. It is evident that infiltration (Tier 1) discharge of surface water from the proposed development is not feasible as 24 hour half drain time could not be met. A copy of the test results is attached.

There is a watercourse to the front of the site to which runoff from the site naturally drains.

The 400m² of hard stand around the stables will comprise unbound granular material and as such will be permeable and pass runoff into the underlying natural soils at the natural rate.

It is proposed to drain the stable roof (90m²) to shallow attenuation storage with a discharge ultimately being received into the front ditch. The attached calculation confirms that for a 1%AEP +45%CC +10%UC design storm this will require an attenuation storage capacity of 1.7m³. The proposed arrangement is shown on drawing ACC24025-01 (copy attached)

Treatment train comprises a detention basin with filter trench underdrain with emergence zone down slope of the detention basin and then grass filter strip between the emergence zone and the watercourse/ditch in the front of the site. Simple index approach calculations are attached which demonstrate that the proposed SUDS will provide the required level of mitigation index.

The natural fall of the site east to west is maintained and the natural exceedance pathway westwards to the ditch in the front of the site is maintained

The drainage will be of private status and should accord with building regulations standards.. The proposed drainage layout is shown on drawing ACC-01.

A SUDS O&M schedule is attached. The maintenance of the drainage will be undertaken by the owners.

Yours Sincerely,

Aqua Callidus Consulting Ltd

Andy Traves

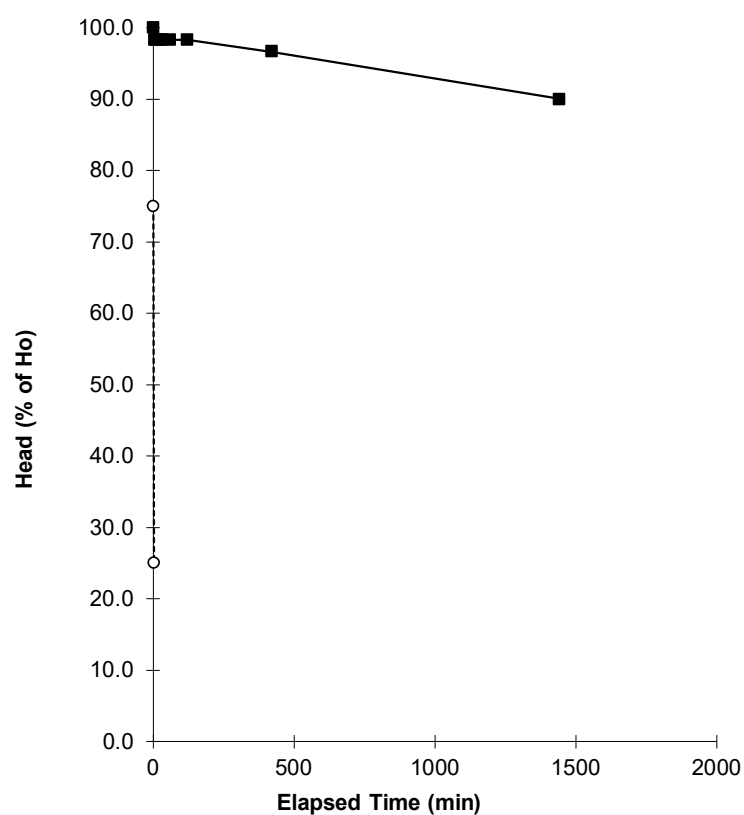
Enc. Permeability test results
 Attenuation storage calculations
 ACC24025-01
 Water quality calculations
 SUDS O&M
 DET-0100 (GOLPA grid is illustrative only)
 DET-0312 (150mm topsoil cover over granular fill)

BRE365 Field Permeability Test

Site Ref	Allington Lane Barn	project	24025
Hole Reference	TP01		
Test Number	1		
Test Date	22 October 2024		

Depth of Pit	0.65	m			
Width of Pit	0.30	m	A_p	50	0.270 m ²
Length of Pit	0.30	m	V_p	75-25	0.014 m ³
Depth of Pit Soaked	0.30	m	water used		0.027 m ³

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.350	0	100.0	0.300
0.355	5	98.3	0.295
0.355	10	98.3	0.295
0.355	20	98.3	0.295
0.355	30	98.3	0.295
0.355	60	98.3	0.295
0.355	120	98.3	0.295
0.360	420	96.7	0.290
0.380	1440	90.0	0.270



T75		75.0	%
T25	0.00	25.0	%
T75-25	####	Derived from Best Fit	
		Infiltration rate	(f)
			#VALUE! m/sec.

Comments

FAIL will not half drain in 24 hours

Project No.: 24025
Project Title: Land at Allington Lane

Detention Assessment to CIRIA C753

No infiltration

Site Location: West End
r = 0.36 (range 0.12 to 0.45)
Drained Area = 90 m²
Design storm 1 in = 100 year
Runoff volume uplift = 45 % for climate change
10 % for urban creep

Catchment ID: stables

C_v = 1.00

Technical Assessment

Base axis Length L_x = 6.00 m

Base axis Length L_y = 2.00 m

Discharge rate = 2.0 l/s

Storage depth = 0.15 m

storage porosity = 95 %

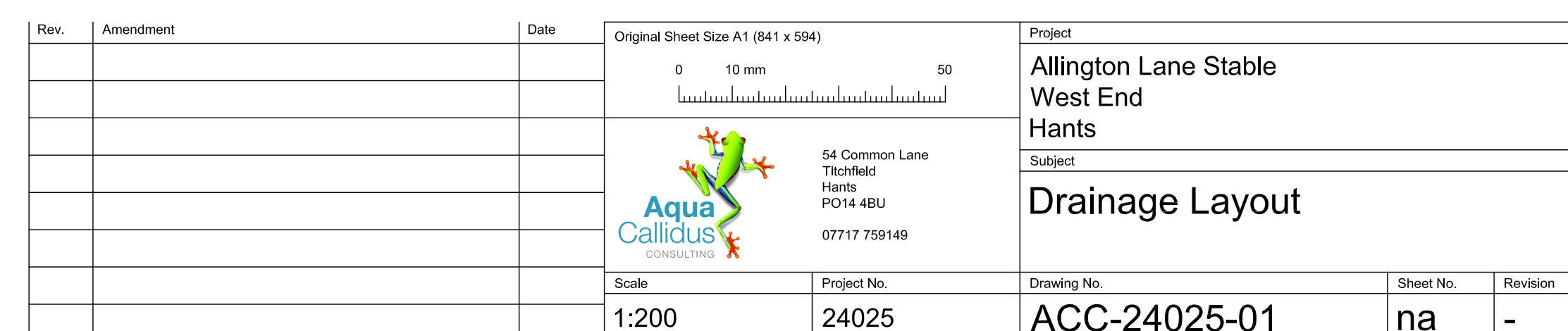
Base area = 12.0 m²

storage volume = 1.7 m³

Design volume = 1.7 m³

M5-60 Rainfall = 20 mm

Storm Duration	5 min	10 min	15 min	30 min	1 hr	2 hr	4 hr	6 hr	10 hr	24 hr
(secs)	300	600	900	1800	3600	7200	14400	21600	36000	86400
r= 0.36 Value Z1	0.36	0.51	0.62	0.79	1.00	1.22	1.48	1.67	1.90	2.42
Rainfall M5 (mm)	7.2	10.2	12.4	15.8	20.0	24.4	29.6	33.4	38.0	48.4
M100/M5 gf Value Z2	1.84	1.91	1.95	2.00	2.03	2.01	1.97	1.94	1.91	1.82
Rainfall M100 (mm)	13.3	19.5	24.2	31.5	40.6	49.1	58.4	64.9	72.4	88.2
With climate uplift (mm)	19.2	28.3	35.0	45.7	58.9	71.2	84.7	94.1	105.0	127.9
With urban creep (mm)	21.2	31.1	38.5	50.3	64.8	78.3	93.2	103.5	115.5	140.7
RUNOFF (m³)	1.9	2.8	3.5	4.5	5.8	7.0	8.4	9.3	10.4	12.7
inflow rate (l/s)	6.3	4.7	3.9	2.5	1.6	1.0	0.6	0.4	0.3	0.1
storage rate (l/s)	4.3	2.7	1.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Discharge (m³)	0.6	1.2	1.8	3.6	5.8	7.0	8.4	9.3	10.4	12.7
Req'd STORAGE (m³)	1.3	1.6	1.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Residual drain time (h)	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0



Date: 25/11/2024

Site Ref

Allington Lane Stables

SuDS Water Quality Management CIRIA C753 Ch26

Simple Index Approach

Catchment

roof

Is discharge to: SPZ1? ☐ N Drinking Water Protection Area ?

☐ N

Is site in close proximity to an area with sensitive environmental designation?

☐ N

if so how close?

m

Is an additional treatment component required due to sensitivity?

☐ Y

Land Use

roofs-non-residential

Hazard

low

TSS index	Metals index	HydroCar index
0.3	0.2	0.05

Treatments

To surface water discharge ☐ Y

Component

1 Detention basin

2 Filter drain

3 Filter strip

mitigation index

X1 N/A

Enhanced mitigation index

Residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0.5	0.5	0.6	1.00
0.4	0.4	0.4	0.50
0.4	0.4	0.5	0.50
0.9	0.9	1.05	
0	0	0	1.00
0.9	0.9	1.05	
0	0	0	

Land Use

roofs-non-residential

Hazard

low

TSS index	Metals index	HydroCar index	residual
0	0	0	

Treatments

To groundwater discharge ☐ N

Infiltration surface

1 N/A

2 N/A

Final residual pollution index

TSS MIndex	Metals MIndex	HydroCa MIndex	factor
0	0	0	1.00
0	0	0	0.50
0	0	0	

Is a groundwater risk screening required?

☐ N

Notes:

SUDS operation and maintenance - general

There are three categories on maintenance activities:

Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example). The table below summarises the likely maintenance activities required for each SUDS component and specific maintenance activities is given in the following sections.

Remedial maintenance comprises intermittent tasks that may be required to rectify faults associated with the system. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict. Remedial maintenance items can comprise items such as:

- inlet/outlet repairs
- erosion repairs
- reinstatement or realignment of edgings, barriers, rip-rap or other erosion control
- infiltration surface rehabilitation
- replacement of blocked filter fabrics
- construction stage sediment removal (although this activity should have been undertaken before the maintenance contract)
- system rehabilitation immediately following a pollution event.

O&M activity	SUDS component												
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter trench	Modular storage	Pervious pavements	Swale/bioretention/greenroofs	Filter strip	Sand filter	Pre-treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter/debris removal	■	■	■	■	□	■	■	□	■	■	■	■	■
Grass cutting	■	■	■	■	□	■	■	□	□	■	■	□	□
Wee/invasive plant control	□	□	□	□		□	□		□	□	□	□	□
Shrub management	□	□	□	□					□	□	□		□
Shoreline vegetation management	■	■	□										□
Aquatic vegetation management	■	■	□										□
Occasional maintenance													
Sediment management *	■	■	■	■	■	■	■	■	■	■	■	■	■
Vegetation/plant replacement	□	□	□	□						□	□		□
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation/repair	□	□	□	□	□	□	□	□	□	□	□	□	□
Infiltration surface reconditioning				□	□	□	□		□	□	□	□	

■ will be required

□ may be required

* sediment to be collected upstream of the main device

GENERAL MAINTENANCE

Litter/debris removal

This is an integral part of SUDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks. High litter removal frequencies may be required at high profile commercial/retail parks where aesthetics are a major driver.

Grass cutting

It is recommended that grass cutting be minimised around SUDS facilities, apart from swales and filter strips and structural embankments where a height of 100–150 mm is recommended to prevent the plants falling over, or “lodging”, when water flows across the surface. In general, allowing grass to grow tends to enhance water quality performance. Short grass around a wet system such as pond or wetland provides an ideal habitat for nuisance species such as geese; allowing the grass to grow is an effective means of discouraging them. Grass around wet pond or wetland systems should not be cut to the edge of the permanent water. Grass cutting is an activity undertaken primarily to enhance the perceived aesthetics of the facility. The frequency of cutting will tend to depend on surrounding land uses, and public requirements. Therefore, grass cutting should be done as infrequently as possible, recognising the aesthetic concerns of local residents. However, grass around inlet and outlet infrastructure should be trimmed closely to reduce risks to system performance. If a manicured, parkland effect is required, then cutting will need to be undertaken more regularly than for meadow type grass areas, which aim to maximise habitat and biodiversity potential.

Weed/invasive plant control

Weeds are generally defined as vegetation types that are unwanted in a particular area. For SUDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable. In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding should generally be required only during the first year, ie during plant establishment). However, over grassed surfaces, mowing can be an effective management measure. The use of herbicides and pesticides should be prohibited since they cause water quality deterioration. The use of fertilisers should also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

Shrub management

Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs should be selected so they can grow to their maximum natural height without pruning.

Aquatic/shoreline vegetation management

Aquatic plant aftercare in the first 1–3 years may be required to ensure establishment of planted vegetation and control nuisance weeds/invasive plants. Once established, the build-up of dead vegetation from previous seasons should be removed at convenient intervals to reduce organic silt accumulation (eg every three years and at the end of landscape contract periods).

Emergent vegetation may need to be harvested every 5–10 years to maintain flood attenuation volumes, optimise water quality treatment potential and ensure fresh growth, although this is often not required. Care should be taken to avoid nesting birds during the breeding season and to avoid great crested newt and water vole habitats. The typical window for this activity is towards the end of the growing season (September and October). As vegetation matures, plant height may also become a safety issue in residential areas.

Where emergent vegetation is managed, up to 25 per cent can be removed by cutting at 100 mm above soil level using shearing action machinery. Up to 25 per cent of submerged vegetation can be cut and raked out at any one time, using approved rakes, grabs or other techniques, depending on whether clay or waterproof membranes are present. Aquatic vegetation arisings should be stacked close to the water's edge for 48 hours to de-water and allow wildlife to return to the SUDS feature. They should then be removed to wildlife piles, compost heaps or off site before decomposition, rotting or damage to existing vegetation can occur.

Algae removal may be undertaken for aesthetic purposes during the first 3–5 years of a pond/wetland's life. The growth of algae, which is considered by some to be visually intrusive, is encouraged by nutrients introduced into the water body. This situation should settle down once upstream construction activities are complete.

Management of green waste

Appropriate methods should be implemented to dispose of green waste, including

- The development of wildlife piles
- On- or off-site composting
- Disposal to landfill

REMEDIAL MAINTENANCE

Structure rehabilitation/repair

There will come a time with most SUDS techniques when a major overhaul of the system is required to remove clogged filters, geotextiles, gravel etc. This will typically be between 10 and 25 years, depending on the technique and factors such as the type of catchment and sediment load. For example the use of geotextiles close to the surface in pervious surfaces traps the majority of sediment in a relatively easily accessible location. Reconstruction of the surface layer and bedding layer is all that is required, rather than reconstruction of the whole pavement depth.

Major overhaul is most likely to be required on techniques that rely on filtration through soils or aggregates, such as sand filters and infiltration devices. Other SUDS techniques are unlikely to need major overhaul if routine maintenance is undertaken as required (for example ponds and wetlands).

Rehabilitation activities for each SUDS component are described on the following tables.

Infiltration surface rehabilitation

In the event that grassed surface permeability has reduced, there are a number of landscape techniques that can be used to open the surface to encourage infiltration. Such activities are not commonplace and are likely to be required only in circumstances where silt has not been effectively managed upstream.

1. Scarifying to remove “thatch”. Thatch is a tightly intermingled organic layer of dead and living shoots, stems and roots, developing between the zone of green vegetation and the soil surface. Scarifying with tractor-drawn or self-propelled equipment to a depth of at least 50 mm breaks up silt deposits, removes dead grass and other organic matter and relieves compaction of the soil surface.
2. Spiking or tining the soil, using aerating equipment to encourage water percolation. This is particularly effective if followed by top dressing with a medium to fine sand, and is best undertaken when the soil is moist. Spiking or tining with tractor drawn or self-propelled equipment penetrates and perforates soil layers to a depth of at least 100 mm (at 100 mm centres) and allows the entry of air, water, nutrients and top dressing materials.
3. As a last resort, it may be necessary to remove and replace the grass and topsoil by:
 - removing accumulated silt and (subject to a toxicity test) applying to land or dispose of to landfill
 - removing damaged turf which should be composted
 - cultivating remaining topsoil to required levels
 - re turfing (using turf of a quality and appearance to match existing) or reseeded (to BS 7370: Part 3, Clause 12.6 (BSI, 1991) using seed to match existing turf) area to required levels. It may be necessary to supply and fix fully biodegradable coir blanket to protect seeded soil. Turf and seeded areas should be top dressed with fine sieved topsoil to BS 3882 (BSI, 1994) to achieve final design levels. Watering will be required to promote successful germination and/or establishment.

Water butts operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris..	Annually (or following poor performance).
Occasional maintenance	Replacement of any filters.	As required
Remedial actions	Repair of erosion damage, or damage to tank.	As required
Monitoring	Inspection of the tank for debris and sediment build up.	Annually (or following poor performance).
	Inspection of inlets, outlets and withdrawal devices.	Annually (or following poor performance).
	Inspection of areas receiving overflow, for evidence of erosion.	After extreme storms.
	Inspection of roof drain filters	Annually (or following poor performance).

Filter strips operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	Monthly (or as required).
	Grass cutting – 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).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible.	Annually.
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required.	Annually, or if bare soil is exposed over 10% or more of the filter strip area.
Remedial actions	Repair erosion or other damage by re-turfing or reseeding.	As required
	Re-level 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
Monitoring	Inspect filter strip surface to identify evidence of erosion, compaction, ponding, sedimentation and contamination (eg oils).	Half yearly.
	Check flow spreader and filter strip surface for even gradients.	Half yearly.
	Inspect gravel diaphragm trench upstream of filter strip for clogging	Half yearly.
	Inspect silt accumulation rates and establish appropriate removal frequencies.	Half yearly.

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Trenches operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming any roots that may be causing blockages	Annual (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required)
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly.
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required
	Rehabilitate infiltration or filtration surfaces.	As required
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required
	Excavate trench walls to expose clean soils if infiltration performance reduces to unacceptable levels.	As required
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	Monthly in the first year and then annually.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Pervious pavement operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required
	Removal of weed.	As required
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.	As required
	Rehabilitation of surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
Monitoring	Initial inspection.	Monthly for 3 months after installation.
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers.	Annually

Detention basin operation and maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter, debris and trash removal.	Monthly
	Grass cutting – for landscaped areas and access routes.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin.	Half yearly (spring – before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually
	Remove sediment from inlets, outlet and forebay.	Annually (or as required)
	Manage wetland plants in outlet pool – where provided.	Annually
Occasional maintenance	Re-seed areas of poor vegetation growth.	Annually, or as required.
	Prune and trim trees and remove cuttings.	As required
	Remove sediment from pre-treatment system when 50% full.	As required
Remedial actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required
	Realignment of rip-rap.	As required
	Repair/rehabilitation of inlets, outlets and overflows.	As required
	Re-level uneven surfaces and reinstate design levels.	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/ after large storms
	Inspect banksides, structures, pipework, etc for evidence of physical damage.	Monthly/ after large storms
	Inspect inlets and pre-treatment systems for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check penstocks and other mechanical devices.	Monthly

Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on-site if there is an appropriate safe and acceptable location to do so.

Surface course: 38mm GOLPA grid with 6/10mm unbound angular gravel fill

Bedding course: 25mm Sharp sand to BS 7533-3 cat' 11 of annex D

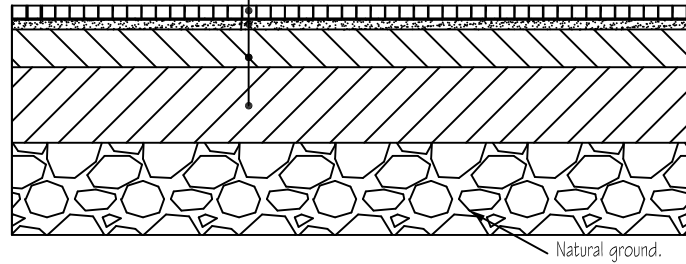
Turfex geotextile

Sub-base: 100mm 5/20mm Close Graded Aggregate (CGA)

min 200mm 10/63mm Close Graded Aggregate (CGA)
(Note minimum total CGA to be 300mm but may be more where required for hydraulic storage)

Turfex geotextile

Sub-Soil: Natural ground.

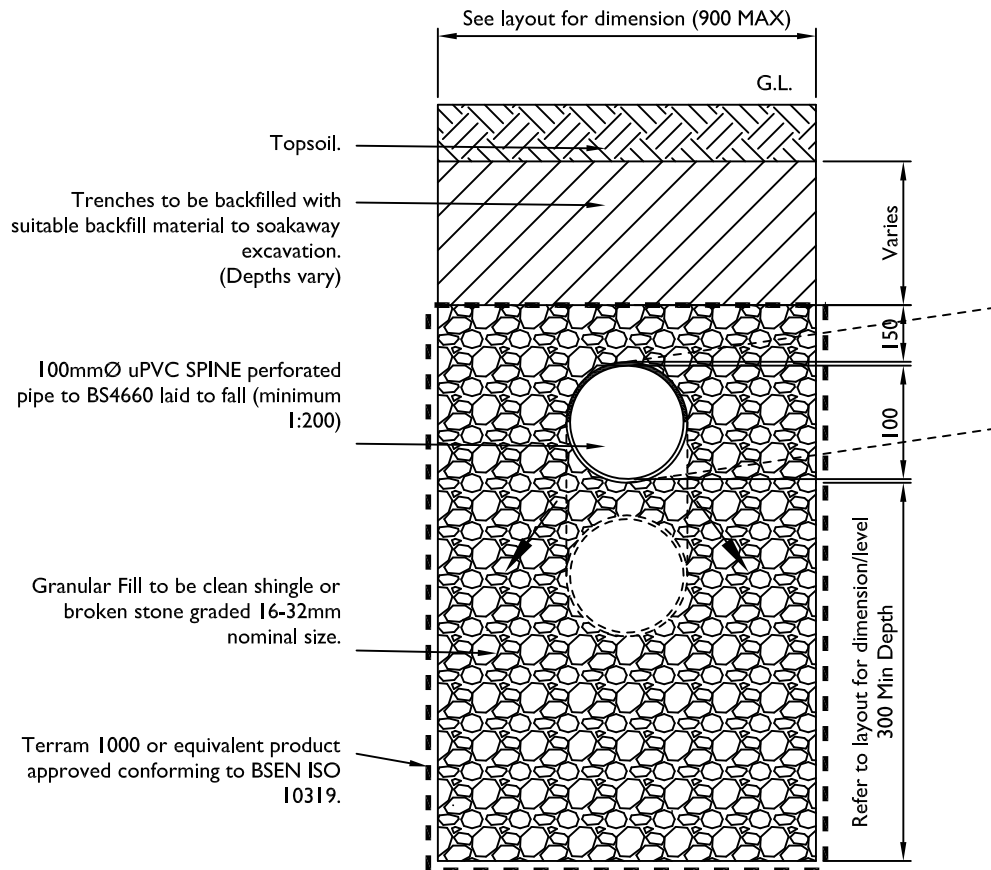


GOLPA GRAVEL SURFACED PAVEMENT
SHARED DRIVES WITH INFREQUENT USE
BY COMMERCIAL VEHICLES

NOTES

1. Any soft spots in formation to be removed and infilled with conmpacted capping or sub-base
2. Where tests indicate the existing sub-grade is frost susceptible the overall construction depth must be 450mm

Original Sheet Size A4 (297 x 210)		Project		
0 10 mm 50 				
 52 Common Lane Titchfield Hants PO14 4BU 07717 759149		Subject		
		GOLPA standard gravel pavement		
Scale	Project No.	Drawing No.	Sheet No.	Revision
As stated		DET-0100	na	-



FOUL DRAINAGE FIELD TRENCH

(TREATED FOUL EFFLUENT)

(Scale 1:20)

REFER TO DRAINAGE GA FOR LOCATION
& ARRANGEMENT.

PARALLEL TRENCHES TO BE POSITIONED
WITH A MIN 1000mm GAP.

Original Sheet Size A4 (297 x 210)

0 10 mm 50



52 Common Lane
Titchfield
Hants
PO14 4BU
07717 759149

Project

Subject

Effluent Drainage Field Trench

Scale	Project No.	Drawing No.	Sheet No.	Revision
As stated		DET-0310	na	-