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<i>Revision Record</i>					
<i>Rev.</i>	<i>Date</i>	<i>By</i>	<i>Summary of Changes</i>	<i>Chkd</i>	<i>Aprvd</i>
2	07.07.2021	RD	Updated as per ADC comments	RW	RW
3	02.01.2022	RW	Updated to include pipe maintenance and clarify site ownership	NH	RW

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1. INTRODUCTION

- 1.1 This Technical Note provides the Sustainable Drainage System (SuDS) Management and Maintenance Strategy to support the drainage design package for land at Fontwell Avenue, Eastergate (as shown in drawings 108.5009.501, 502 & 503).
- 1.2 The development is a 100% affordable housing scheme in which the site will be owned along with all properties with one landowner in perpetuity. The landowner i.e. **Sovereign Housing Association** will be retaining management of all elements.
- 1.3 The management and maintenance of any SuDS features will be the responsibility of the **Sovereign Housing Association**.

2. MAINTENANCE SCHEDULE

- 2.1 This section sets out the inspection and maintenance requirements for long term management of the developments surface water drainage strategy.

Soakaways

- 2.2 The rear garden soakaways will receive the surface water runoff from the house roof via. the rainwater pipes. A typical soakaway detail is shown in **Figure 1**. Design details are shown in drawing 108.5009.551.

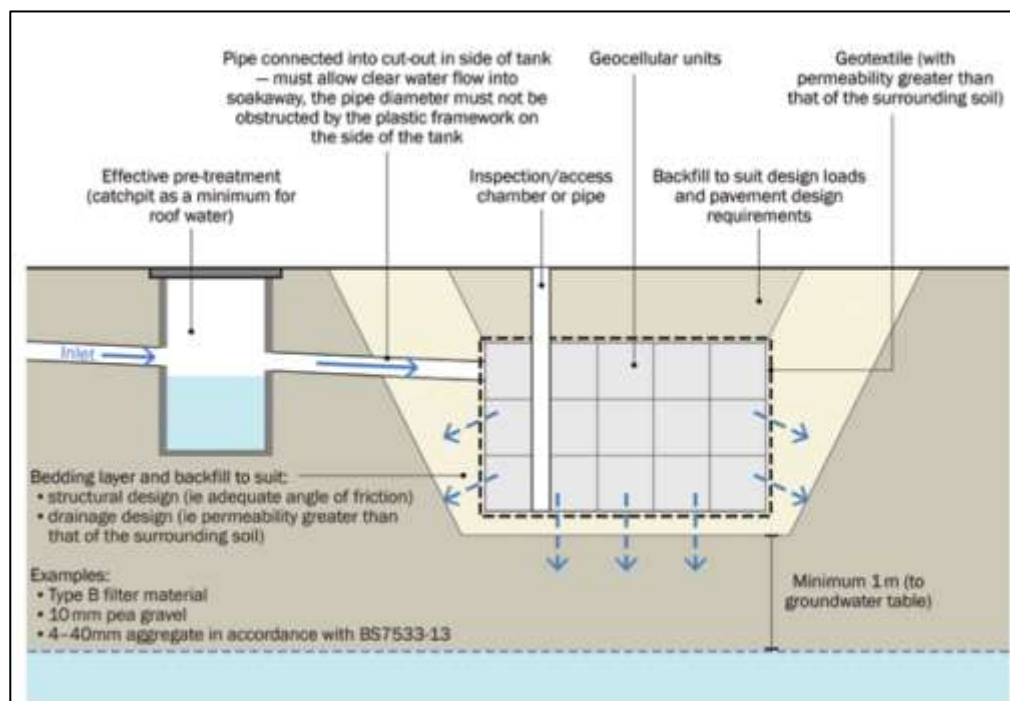


Figure 1: Typical soakaway detail

2.3 The proposed maintenance schedule for the soakaways is shown in Table 1 below.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in catchpit chambers and floor of inspection pipe/ chamber.	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from catchpit chambers and floor of inspection pipe/ chamber.	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Table 1: Proposed maintenance regime for rear garden soakaways

- 2.4 The maintenance responsibility for the rear garden soakaways would be with **Sovereign Housing Association**.
- 2.5 For the soakaways laid within communal areas or car parking areas, these are to also be maintained by **Sovereign Housing Association**.

Permeable Paving

- 2.6 The permeable pavement system designed for the proposed parking areas and private driveways is Type B (Block Paving) infiltration system, allowing for total infiltration. Footpaths and proposed access roads have been designed using a Type A (Porous Pavement) infiltration system, allowing for total infiltration. A typical total infiltration permeable pavement detail is shown in **Figure 2**. Design details are shown in drawing 108.5009.551.

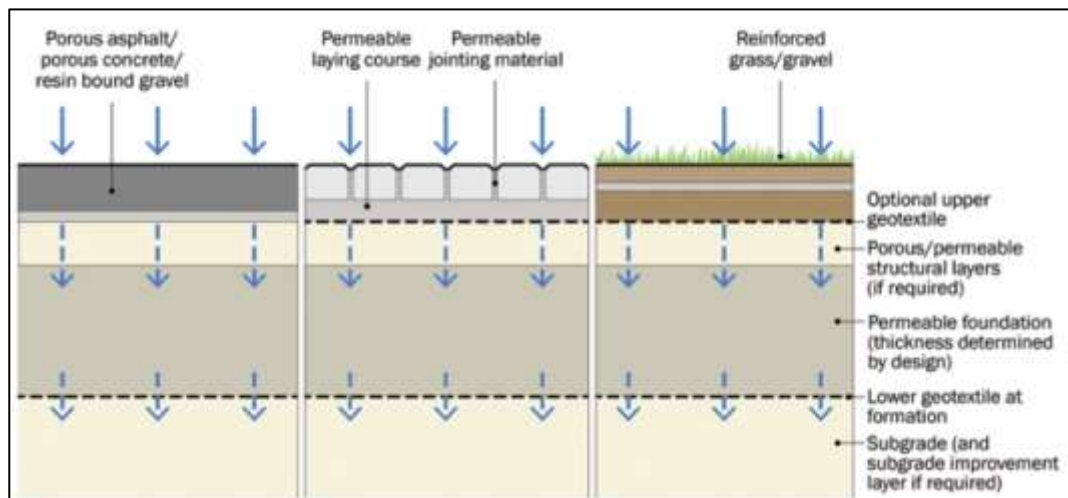


Figure 2: Typical total infiltration permeable pavement system detail

2.7 The proposed maintenance regime for the permeable pavement is shown in **Table 2** below.

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 permeable 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 glysophate applied directly onto 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 50mm 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, 48h after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers	Annually

Table 2: Proposed maintenance regime for permeable pavement

2.8 The maintenance responsibility for the permeable paving for the whole site will be with **Sovereign Housing Association**.

Infiltration Trenches

- 2.9 The infiltration trench drainage system has been proposed within grass verge areas, and in rear gardens where soakaway design parameters were unachievable. The proposed locations of the infiltration trench systems can be found in drawings 108.5009.501, 502 & 503. A typical infiltration trench system is shown below in Figure 3.

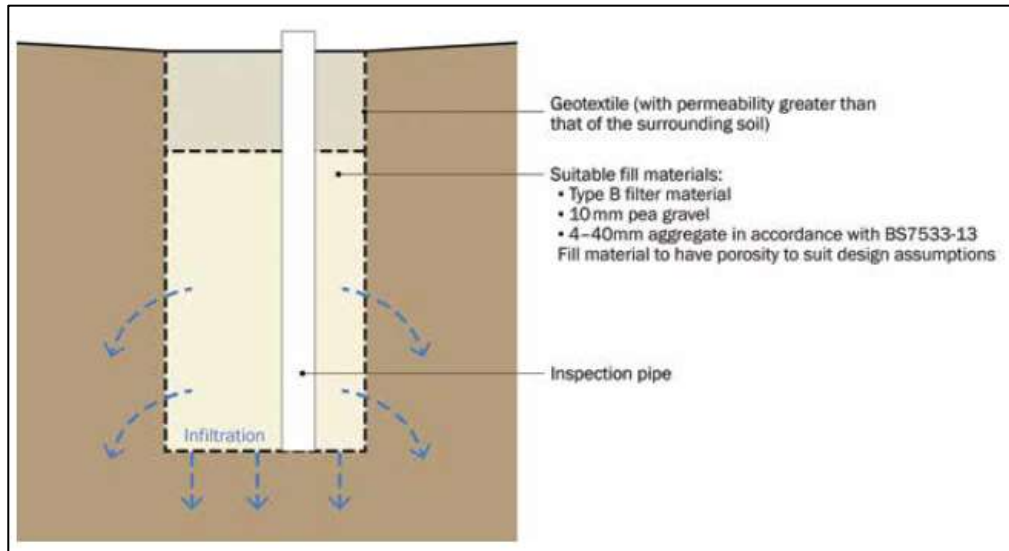


Figure 3: Typical infiltration trench system detail

- 2.10 The proposed maintenance regime for the infiltration trenches is shown in **Table 3** below.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in catchpit chambers and floor of inspection pipe/ chamber.	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from catchpit chambers and floor of inspection pipe/ chamber.	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Table 3: Proposed maintenance regime for infiltration trench systems

- 2.11 The maintenance responsibility for the infiltration trenches will be with **Sovereign Housing Association**.

Vortex Filters

- 2.12 Hydro-dynamic or vortex separators are vault structures that remove medium to large sized sediments by creating a vertical vortex. This allows the suspended solids to settle down in a sludge chamber, whilst floatable are collected at the surface.
- 2.13 The proposed Vortex filters require a regular maintenance regime. The unit should be inspected every 6 months, and the oil and floatables chamber and sludge trap emptied between 6 months and 3 years depending on pollution load.
- 2.14 The vortex separators will be maintained by **Sovereign Housing Association**
- 2.15 The design life for the proposed hydro-dynamic separator is 50 years.

Pipe Networks

- 2.16 The SuDS systems within the development are connected via various piped networks, these networks require minimal maintenance since the system is designed to filter and capture sediments to reduce the risk of blockages.
- 2.17 All pipework has a minimum diameter of 100 mm and the gradients have been selected to provide self-cleansing velocity.
- 2.18 The maintenance schedule for the piped networks should be linked in with the infiltration trench inspections, and in particular after extreme weather events, when the system should be checked for siltation.
- 2.19 The design life for the proposed pipe networks is 50 years, however, the Water Research Foundation reported that 100 years is a conservative estimate for a properly designed and installed PVC pipe. Dig-up studies on PVC pipe materials around the world report no degradation after decades of operational service.

The Management and Maintenance Strategy should be applied for the lifetime of the development.

3. WATER QUALITY

3.1 Figure 4 to Figure 6 are extracted from the SuDS Manual and demonstrate the pollution risks associated with various discharge situations.

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

Figure 4: Table 26.2 of the SuDS Manual

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	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.		

Figure 5: Table 26.3 of the SuDS Manual

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater			
Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	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 inflow concentrations relevant to the contributing drainage area.		

Figure 6: Table 26.4 of the SuDS Manual

3.2 Using the Water Quality Toolkit, all systems of surface water drainage have been assessed, the results of which are summarised in **Table 4, 5 and 6** below.

Land Use	Pollution Hazard Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	0.5	0.4	0.4
SuDS Component	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Type C Permeable Pavement	0.7	0.6	0.7
Sufficiency of water treatment	Sufficient	Sufficient	Sufficient

Table 4: Water Quality Toolkit Results – Residential Road

Land Use	Pollution Hazard Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Residential parking	0.5	0.4	0.4
SuDS Component	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Type B Permeable Pavement	0.4	0.3	0.3
Sufficiency of water treatment	Sufficient	Sufficient	Sufficient

Table 5: Water Quality Toolkit Results – Residential Parking

Land Use	Pollution Hazard Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Residential Roofing	0.2	0.2	0.05
SuDS Component	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Filter drain	0.4	0.3	0.3
Sufficiency of water treatment	Sufficient	Sufficient	Sufficient

Table 6 : Water Quality Toolkit Results – Residential Roofing

APPENDIX A

WATER QUALITY TOOLKIT RESULTS

SIMPLE INDEX APPROACH: TOOL



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1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
3. Relevant design examples are included in the SuDS Manual Appendix C.
4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
- USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Select land use type from the drop down list (or 'Other' if none applicable):

Runoff Area Land Use Description

Residential parking

Hazard Level

Low

Total Suspended Solids

0.5

Metals

0.4

Hydrocarbons

0.4

DESIGN CONDITIONS

12

If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:

Landuse Pollution Hazard Index

Low0.50.40.4

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:

SuDS Component Description

Pervious pavement (where the pavement is not designed as an infiltration component)

Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:

None

Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:

None

If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:

Total Suspended Solids

Metals

Hydrocarbons

0.7

0.6

0.7

DESIGN CONDITIONS

123

Aggregated Surface Water Pollution Mitigation Index

0.70.60.7

SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:

300 mm minimum depth of soils with good contamination attenuation potential

If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:

Total Suspended Solids

Metals

Hydrocarbons

0.4

0.3

0.3

DESIGN CONDITIONS

1234

Groundwater Protection Pollution Mitigation Index

0.40.30.3

All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate lined zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

The underlying soils must provide good contaminant attenuation potential (eg as recommended in Sniffen 2008 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	0.9	0.75	0.85

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

	Sufficiency of Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Sufficient	Sufficient	Sufficient	Sufficient

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

SIMPLE INDEX APPROACH: TOOL



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1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
3. Relevant design examples are included in the SuDS Manual Appendix C.
4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
- USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Select land use type from the drop down list (or 'Other' if none applicable):

Runoff Area Land Use Description

Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)

If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:

Hazard Level

Total Suspended Solids

Metals

Hydrocarbons

Low

0.5

0.4

0.4

DESIGN CONDITIONS

1

2

Landuse Pollution Hazard Index

Low

0.5

0.4

0.4

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:

SuDS Component Description

Pervious pavement (where the pavement is not designed as an infiltration component)

Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:

None

Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:

None

If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:

Total Suspended Solids

Metals

Hydrocarbons

0.7

0.6

0.7

DESIGN CONDITIONS

1

2

3

SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Aggregated Surface Water Pollution Mitigation Index

0.7

0.6

0.7

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:

Pervious pavement underlain by 300 mm minimum depth of soils with good contamination attenuation potential

If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:

Total Suspended Solids

Metals

Hydrocarbons

0.7

0.6

0.7

DESIGN CONDITIONS

1

2

3

4

All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate lined zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

The permeable pavement must include a suitable filtration layer provides treatment and must include a geotextile at the base separating the foundation from the sub-grade. The underlying soils must provide good contaminant attenuation potential (eg as recommended in Sniffen 2008 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater

Groundwater Protection Pollution Mitigation Index

0.7

0.6

0.7

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices			
Total Suspended Solids	Metals	Hydrocarbons	
Combined Pollution Mitigation Indices for the Runoff Area	>0.95	0.9	>0.95

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices			
Total Suspended Solids	Metals	Hydrocarbons	
Sufficient	Sufficient	Sufficient	1

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

SIMPLE INDEX APPROACH: TOOL



HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
3. Relevant design examples are included in the SuDS Manual Appendix C.
4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- DROP DOWN LIST

RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
- USER ENTRY

USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Select land use type from the drop down list (or 'Other' if none applicable):

Runoff Area Land Use Description

Residential roofing

Hazard Level

Very low

Total Suspended Solids

0.2

Pollution Hazard Indices

Metals

0.2

Hydrocarbons

0.05

DESIGN CONDITIONS

1

2

If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:

Landuse Pollution Hazard Index

Very low

0.2

0.2

0.05

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:

SuDS Component Description

Filter drain (where the trench is not designed as an infiltration component)

Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:

None

Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:

None

If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:

Total Suspended Solids

0.4

Pollution Mitigation Indices

Metals

0.4

Hydrocarbons

0.4

DESIGN CONDITIONS

1

2

3

SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B

Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

Aggregated Surface Water Pollution Mitigation Index

0.4

0.4

0.4

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification)

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:

300 mm minimum depth of soils with good contamination attenuation potential

If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:

Total Suspended Solids

0.4

Pollution Mitigation Indices

Metals

0.3

Hydrocarbons

0.3

DESIGN CONDITIONS

1

2

3

4

All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate lined zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events

The underlying soils must provide good contaminant attenuation potential (eg as recommended in Sniffer 2008 (a) and (b) / Scott Wilson (2010) or other appropriate guidance). Alternative depth and soil combinations must provide equivalent protection to the underlying groundwater

Groundwater Protection Pollution Mitigation Index

0.4

0.3

0.3

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	0.6	0.55	0.55

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

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In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

	Sufficiency of Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Sufficient	Sufficient	Sufficient	Sufficient

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England