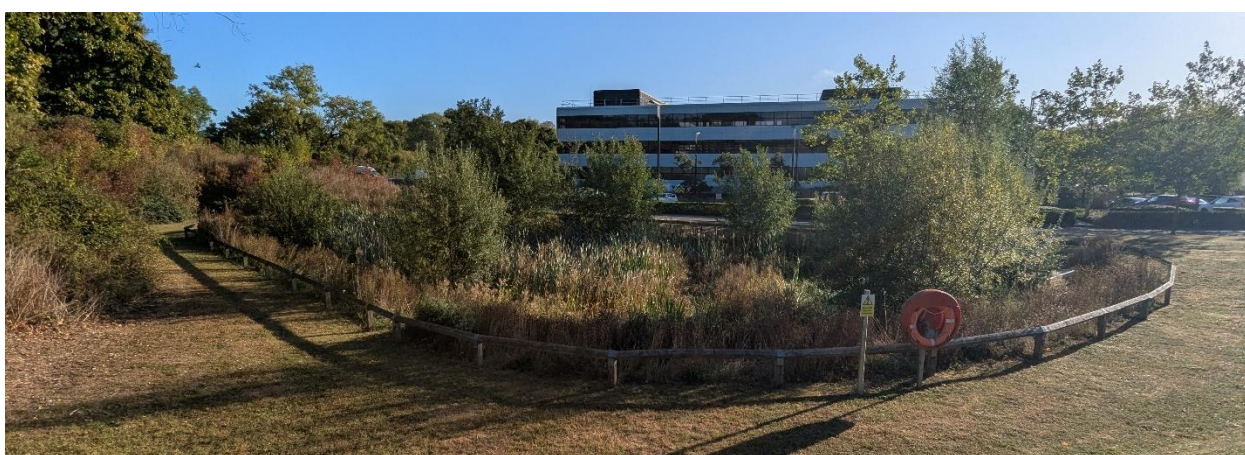


Flood Risk Guidance for Development

Warwickshire County Council as Lead Local Flood Authority



Version	Date
Version 4	January 2020
Version 5	June 2023
Version 6	October 2026

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1 POLICIES AND GUIDANCE

1.1 National Standards for Sustainable Drainage

The National Standards for Sustainable Drainage Systems (SuDS) (henceforth referred to as National Standards or just ‘the Standards’) were published in June 2025.

The Standards are available online and are not explicitly repeated here. However, this document should be read alongside them and outlines WCC’s interpretation and guidance in demonstrating compliance with them.

1.2 National Planning Policy Framework and Planning Practice Guidance

The National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance (PPG) provides the overarching national policy and guidance relating to flood risk and sustainable drainage.

The NPPF was updated in August 2026. Significant changes were made to the structure of the document, moving away from numbered paragraphs to specific referenceable policies and separating policies for plan-making and decision-making. However overall, the flood risk principles within the NPPF were broadly unchanged.

One of the more significant changes was the inclusion within NPPF policy F8 that SuDS should be designed in accordance with the National Standards for Sustainable Drainage; reference is also made to this policy elsewhere in “Adaption to Climate Change” (CC3) and “Key principles for well-designed places” (DP3).

Separately, the PPG was last updated August 2022 with further amendments regarding the flood risk Sequential Test in September 2025.

1.2.1 Town and Country Planning (Development Management Procedure) (England) Order 2015 Statutory Instrument

On 15 April 2015 the Town and Country Planning (Development Management Procedure) (England) Order 2015 came into force which, under Schedule 4, made Lead Local Flood Authorities a statutory consultee for all ‘major’ planning applications.

The definition of ‘major development’ is given within Part 1 of the above Order. This is:

- a) the winning and working of minerals or the use of land for mineral-working deposits;
- b) waste development;
- c) the provision of dwellinghouses where—
 - i. the number of dwellinghouses to be provided is 10 or more; or
 - ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
- d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- e) development carried out on a site having an area of 1 hectare or more;

Anything that does not fall into the above classifications is considered ‘minor development.’ The LLFA is only consulted on minor development at the request of the Local Planning Authority (LPA)

Under Schedule 4 of the Order, the LLFA is a statutory consultee for ‘major development with surface water drainage’ The LLFA may provide advice on relevant local flood risk matters but this is on a non-statutory basis to advise the LPAs in application of policies F4-F7 within the NPPF.

The Environment Agency is responsible for comments relating to flood risk from Main Rivers. These are typically larger rivers and within Warwickshire, include the River Alne, Anker, Arrow, Avon, Cole, Leam, Sowe, Stour, and many other tributaries of those.

Severn Trent Water (STW) is the Water & Sewerage Company covering most of Warwickshire (with Thames Water (TW) covering a small portion). STW / TW are responsible for comments relating to any of their assets. This includes sewer flooding, sewer capacity and foul water drainage.

1.3 **Strategic planning documents**

At the time of writing, there are six local planning authorities (LPAs) in Warwickshire: the County Council (for certain applications), Warwick District Council, Stratford-on-Avon District Council, Rugby Borough Council, Nuneaton & Bedworth Borough Council and North Warwickshire Borough Council.

The LPAs within Warwickshire have a number of strategic planning documents such as Local Plans, Core Strategies and Supplementary Planning Documents. Some town/parish councils within Warwickshire also have adopted Neighbourhood Development Plans. Many of these strategic planning documents contain key flood risk and sustainable drainage policies or guidance.

Table 1 below provides a high-level summary of the various local planning policies across Warwickshire.

Table 1 - Local Planning Authorities - Overarching Flooding & Drainage Policies

District or Borough	Local Plan Adopted	Relevant Flood risk and SuDS policies
North Warwickshire Borough Council	September 2021	LP30 – Built Form, LP33 – Water and Flood Risk Management
Nuneaton & Bedworth Borough Council	December 2025	NE4 – Managing flood risk and water quality
Rugby Borough Council	June 2019	SDC5 – Flood risk management SDC6 – Sustainable Drainage
Stratford District Council * Core Strategy	July 2016	CS.4 – Water environment and flood risk
Warwick District Council	Sep-17	FW1 – Reducing Flood risk FW2 – Sustainable Drainage

It should be noted that four lower-tier authorities (all except NBBC) are targeting submission of a new Local Plan to the Planning Inspectorate by the deadline of 31st December 2026. The plans are at different stages of revision therefore the LLFA always recommend undertaking a detailed review of all available national and local policies relevant to flood risk and drainage to inform any site-specific Flood Risk Assessment (FRA) or Drainage Strategy.

Local Government Reorganisation will also have an impact on Local Authority planning functions though it is assumed that any adopted Local Plan and guidance will remain extant for the area it serves until any new authority prepares and adopts a replacement.

1.4 Industry and Other Guidance

There is a wealth of information available on designing sustainable drainage systems, such as the CIRIA SuDS Manual C753; the key pieces of guidance, at the time of publication, are referenced at the end of this guide.

1.4.1 WCC Highway Design Guide

Warwickshire County Council, in their role as highways authority, have also prepared the Warwickshire Design Guide to provide direction and guidance to developers and designers when planning and delivering highway infrastructure improvements to the County Council's highway network. Part 5 of the Design Guide details the drainage and flood risk considerations that should be incorporated in to designs.

2 ORDINARY WATERCOURSES, FLOOD RISK & CLIMATE CHANGE

An understanding of the flood risk to and from a development should be obtained early in the design process to ensure new development is integrated into the natural environment and safeguarding the development over its lifetime.

2.1 Access and egress

Where the proposed primary access/egress route is shown to be within a modelled or known flood risk area (from surface water or river sources), then the developer should provide adequate information to quantify the risk to occupants and propose mitigation with reference to Defra report FD2321.

Warwickshire LLFA will highlight any concerns relating to unsafe depths of flooding and velocities of flows on primary access or egress to the Local Planning Authority and recommend that they consult with their emergency planners and/or emergency services for further assessment on the appropriateness of the development given the risk posed by flooding to the access route to the site. Further information is available in the joint Environment Agency and ADEPT guide '*Flood Risk Emergency Plans for new Development.*'

2.2 Ordinary watercourses (incl. those culverted)

It is important for any development adjacent to an ordinary watercourse to appropriately consider such watercourse during the design process, particularly from the perspective of flood risk and maintenance. Watercourses can be open features and these are usually easily observed and surveyed however they can be enclosed below-ground in culverts where these are more often poorly understood or maintained.

It is also important to ensure that adequate access is available for maintenance activities such as vegetation clearance, grass cutting, inspection of assets, dredging etc. Physical separation of activities from the watercourse also maintains bank vegetation, enriches the riparian habitat and promotes connectivity between the watercourse and its floodplain.

2.2.1 Easements

Historically, an easement of 8m has been required measured from the top of the bank (or centreline of culvert) perpendicular to the direction of flow. This remains a good guide (and is stated in a number of Local Plan policies) however it is recognised that this may not be appropriate in all instances and therefore the following should be considered:

- How large is the watercourse and what is the typical flow?
 - e.g. an ephemeral ditch may be easier to maintain than a watercourse with a significant permanent flow.
- What maintenance will need to be undertaken?
 - May it be limited to vegetation management?

- May more thorough removal of litter and sediments be needed e.g. at culvert inlets?
- How will such maintenance be undertaken?
 - Do you need to use machinery such as lawnmowers or excavators?
 - How big are they? Can they fit through access such as garden gates?
 - Is there space for the set-down of plant if it is delivered to site?

From the above therefore, a small ditch which has intermittent flow could be suitably maintained by using smaller tools and therefore smaller easement may be suitable. Alternatively, a larger watercourse or one with a deeper baseflow may need specialist or larger equipment to maintain it.

Ideally this easement should be free of all development for the reasons given above, however in some instances it may be acceptable for low-level development (such as parking areas and pavements) to encroach into this easement. This should be discussed and agreed with the LLFA at an early stage in the design process to ensure it would be appropriate. Built development, such as walls, fences and building that would impede future maintenance access to the watercourse would not be acceptable.

2.2.2 Ownership & Boundary Treatment

Of equal importance is the aspect of ownership and who is responsible for maintenance. Many times, the riparian owner is responsible but this should be considered within the ability of individuals to undertake the appropriate maintenance.

Alongside this, most property boundaries are defined by fences, walls or similar features. Fences should not be placed in easements or across watercourses, as shown in Figure 1, therefore it is important to consider how boundaries will be delineated.

2.2.3 Culverted watercourses

Culverts can have a number of detrimental impacts such as

- Increased flood risk due to lack of capacity and increased velocities
- Lack of biodiversity and aquatic habitats for nature
- Water quality failings due to a lack of sunlight
- Loss of amenity and a sense of place

Where a culvert passes through a development site, the priority should be to restore the watercourse to a more natural condition. In line with NPPF Policy F8 and as part of the early stages of the planning process the LLFA expect developers to consider the technical feasibility of de-culverting when developing their proposals for the site.

Figure 1 - A fence through a watercourse (unconsented and not acceptable; WCC 2018)



If an existing culverted watercourse must be retained within a development site, then its condition and capacity must be surveyed and modelled. This exercise should highlight any works required to ensure the structure will remain fit for purpose for the lifetime of the development and who will be responsible for its long-term maintenance.

Consideration should be given to the likely loading etc. on services or structures that are placed in proximity to the culvert; building over existing culverts will not be accepted and easements should be considered.

As for the reasons set out above, the LLFA generally oppose the construction of new culverts and will expect detailed justification. The LLFA do however recognise that there may be instances where culverting is unavoidable, such as short sections to accommodate highway access. Our preference is for a free-spanning bridge rather than a culvert, i.e. keeping a more natural riverbed and banks. If a culvert is required, its length should be minimised. Oversized box culverts sunk 150mm below bed level are preferred to round pipe sections.

2.2.4 *Land drainage consent*

If changes to a watercourse are proposed which would impact flows (on either a temporary or permanent basis), such as infilling of ditches on-site, deculverting & naturalisation, or a new culvert/constriction, then prior written consent of WCC under Section 23 of the Land Drainage Act 1991 must be obtained.

Land Drainage Consent is in addition to any planning or building regulation approvals that maybe required and the granting of planning permission does not automatically ensure the approval of Consent.

Early consultation with the LLFA is advised to discuss any requirement for Land Drainage Consent as part of the development design process. For further information on what is required and how much it costs, see the LLFA's "An introduction to Ordinary Watercourse land drainage consents" advice note, which also gives further information on consent requirements from applicants, including our position on culverting.

2.3 Hydraulic modelling

Following the publication of the 2nd National Flood Risk Assessment (NaFRA2), many ordinary watercourses now have some modelled flood extents. However, this modelling has been undertaken at a national scale with broad assumptions and the LLFA does not hold the modelling input data.

At an early stage in the design development, the applicant should consider if detailed, site-specific hydraulic modelling is required to establish suitable development zones, finished floor levels and appropriate flood resilient/resistant measures as and where necessary. Modelling may be specifically requested by the LLFA or EA on a case-by-case basis.

2.3.1 Modelling expectations

The LLFA expects the developer to instruct a suitably qualified modeller to undertake the work who should follow industry standards and latest guidance produced by the Environment Agency. Where modelling is to be undertaken, the LLFA highly recommend pre-application advice is sought to agree the scope of the exercise.

A summary report of the modelling work should be provided to the LLFA and the findings of the modelling exercise should be used within the FRA and Drainage Strategy to inform the development proposals. This includes, but is not limited to, the following:

- Appropriate and robust hydraulic models should represent the baseline and post-development conditions (along with any temporary / interim scenarios).
 - Comparisons should detail the consequence of any proposed works.
 - Outputs should show the depths, velocities and extents, for a range all events up to and including the design flood event.
- All hydraulic features such as weirs, bridges or culverts should be appropriately represented.

Any hydrological and/or hydraulic modelling report submitted to the LLFA in support of a planning application must be independently reviewed by a suitably qualified third party to ensure that the model meets the required industry standard and that the LLFA can be confident in the output from the model. The applicant can choose to use an independent consultant to do this, or the LLFA can provide a quotation to do this on their behalf.

2.4 Ground raising and changes in ground level

The LLFA do not support significantly changing the pre-development ground level to facilitate development. Changing ground levels inherently changes the way the land drains and can cause unsuitably deep open water features. This has also been known to have caused issues during and post construction with regards to level differences between development phases.

If a developer is proposing to alter existing ground levels as part of their development proposals, then the drainage strategy must demonstrate that this work will not act to negatively disrupt existing flood flow routes or floodplain and ensure that there will be no increased flood risk on or off site as a result. Flows at the interface will need to be managed.

Any ground raising in an area of known surface water flood risk should ensure level for level compensation for the volume of surface water displaced by any ground raising. This may require modelling of pre and post scheme flows.

Where levels of the proposed development are higher than that of surrounding property, irrespective of any existing drainage infrastructure, boundary treatments (such as filter drains) should be implemented to ensure overland flows, including those from gardens and incidental green spaces, do not impact the existing properties.

2.4.1 Floodplain compensation

Where compensatory storage is required, it should be provided on a level-for-level and volume-for-volume basis. Any floodplain compensation areas must:

- Be designed for the 1% AEP event plus climate change,
- Be within the site boundary or in land under control of the developer and in close proximity to the development,
- Provide details on the maintenance of the compensation area to ensure functionality for the lifetime of the development.

Where floodplain compensation is required and proposed, early discussion and agreement with the Environment Agency / Lead Local Flood Authority (as relevant) should be undertaken. Guidance on how to address floodplain compensation is provided in Appendix A3 of the CIRIA Publication C624.

3 NATIONAL STANDARDS FOR SUSTAINABLE DRAINAGE

As outlined above, the National Standards were published in June 2025 and became part of national planning policy on publication of the NPPF in August 2026; this document should be read alongside the Standards.

The below provides a WCC commentary and context including worked examples of how compliance may be demonstrated. The LLFA expect an FRA/drainage strategy report to explicitly demonstrate within separate sections, how each Standard is met.

3.1 Principles

There is nothing inherently new within the Principles set out within the National Standards and these reiterate what has been expected of good SuDS design all along.

Through these principles, the LLFA will expect.

- Early and detailed consideration of source control measures
- Space made available throughout the development for above-ground conveyance (not just around the perimeter)
- Dispersed attenuation across a development and a move away from conveying water to single attenuation features (pipe-to-pond).
- High quality, above-ground SuDS features – the Standards make no reference to below-ground attenuation and this is considered contrary to the Principles and 'SuDS Approach'.

3.2 Standard 1: Runoff Destinations

3.2.1 Priority 1: Collected for non-potable use

Severn Trent Water's area and by association, Warwickshire is classed as an area that is 'seriously water stressed' therefore evidence against Priority 1 (Collected for non-potable use) will be required. This should consider:

- Is there demand for non-potable water?
- Is there a sufficient rainwater runoff catchment to meet that demand?

3.2.2 Priority 2: Infiltration to Ground

Where infiltration is used as the runoff destination, groundwater monitoring should be undertaken to demonstrate there remains a depth of unsaturated ground beneath any infiltration feature, in line with the Standards.

Groundwater monitoring should be a minimum period of 6-months covering the winter half of the year but ideally should be undertaken for a 12-month period. For outline applications, this may be conditioned subject to early site investigations providing initial assessments on groundwater levels.

Where infiltration is used as the final runoff destination, as part of the detailed design stage, further tests may be requested taking into account the ultimate location of the infiltration feature/s.

3.2.3 Priority 3: Discharge to an above-ground surface water body

Alongside Clause 1.19, any connection to a surface water body will require evidence to demonstrate that from the point of outfall, the drainage ditch/watercourse is contiguous and connects to either the wider watercourse network or a sewer maintained by the sewerage undertaker. This is to ensure that the receiving watercourse can convey flows away from the development site.

It must also be shown that the condition of the channel or culvert is suitable for the purpose of adequately draining the development, such as ensuring it is of sufficient depth to receive flows, is free flowing and cannot be easily blocked. Evidence may include photographs of the condition of the ditch, dye tracing to prove connectivity and/or CCTV survey of any culverts.

It should also be recognised that Severn Trent Water are unable to requisition a surface water sewer to a watercourse without the necessary landowner permissions and deed of grant of easement. As such, (and in line with Clause 1.6), the developer must produce evidence to the LLFA to show that the necessary agreements are in place.

Under Clause 1.6.1 (and by association Section 14A of the Land Drainage Act 1991), the LLFA is not in a position to provide new flood risk management works for the purposes of new development.

3.2.3.1 Highways Drains

Typically, ditches adjacent to the highway are the ownership and responsibility of the adjacent landowner. If this is unclear, the developer should discuss the matter with WCC County Highways.

3.2.4 Priority 4: Discharge to a piped surface water drainage system

Where the applicant proposes to discharge into existing highway drainage (such as below-ground pipes), the developer must undertake discussions directly with WCC County Highways to agree whether this would be appropriate. They may request a condition survey of the drainage network and seek the repair of any significant defects before considering the outfall as suitable means of draining the site.

3.3 Standard 2: Everyday Rainfall

To support Standard 2, the LLFA has produced a flowchart which is available on our website separately.¹

Given the deemed criteria within this Standard, applicants may find it beneficial to undertake infiltration testing. Warwickshire is underlain predominantly by clayey,

¹ <https://api.warwickshire.gov.uk/documents/WCCC-453486374-253>

impermeable soils and geology and as such, infiltration is rarely capable of providing the final runoff destination. However, understanding actual infiltration rates may aid in demonstrating compliance against the ‘deemed criteria.’

A specific and separate plan demonstrating compliance with Standard 2 is recommended containing:

- Contributing / impermeable areas
- SuDS parameters (gradient, inlet & outlet levels, base areas)
- Infiltration test locations & results
- Any assumptions used in the calculations and any evidence/sources that may support assumptions e.g. local design codes.

It is recognised that at the outline planning stage there may not be a detailed masterplan and this feeds into uncertainty regarding total contributing area, space available for source control measures etc. It is also worth considering that for Standard 2, the deemed criteria is against **impermeable** area; whilst vegetated areas may contribute during extreme events, during everyday rainfall events these are not expected to contribute.

At an outline stage, the LLFA expect that 80% of the impermeable area will have a calculated and demonstrated interception strategy based on the features known and committed to at this stage. For the remaining 20%, an indication of how this may be provided should be provided.

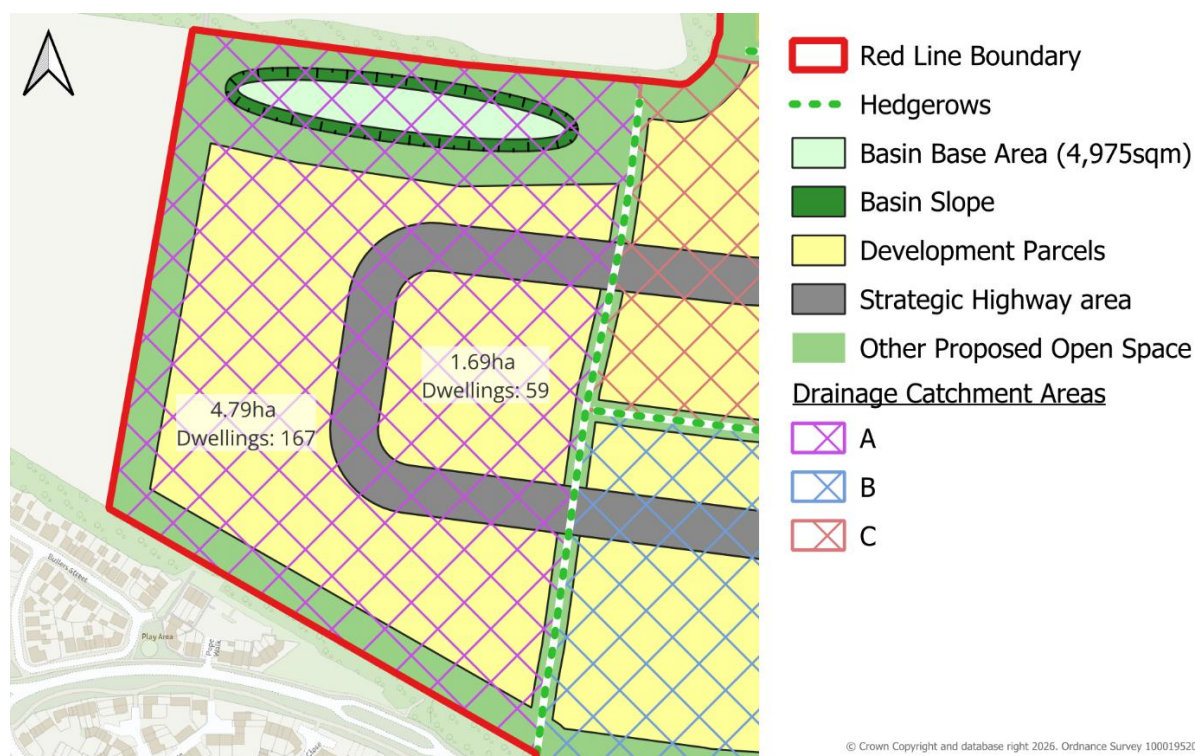
It is expected that a subsequent reserved matters application will have further details to refine any assumptions based on a detailed plot-level masterplan and in doing so demonstrate 100% compliance.

Reference is also made to Section 4 with design ideas as to how small-scale SuDS features can be integrated within development parcel.

3.3.1 *A worked example*

Figure 2 below illustrates a typical parameters plan at outline stage where approximate development parcels and strategic highway is known. The site is assumed to be greenfield, uncontaminated and either has no infiltration or testing has not been undertaken. For simplicity of this worked example, a single SuDS basin was designed as the strategic attenuation however, in line with the SuDS principles, the LLFA expect a much more dispersed system across a development.

Figure 2 - Standard 2 Worked Example Masterplan

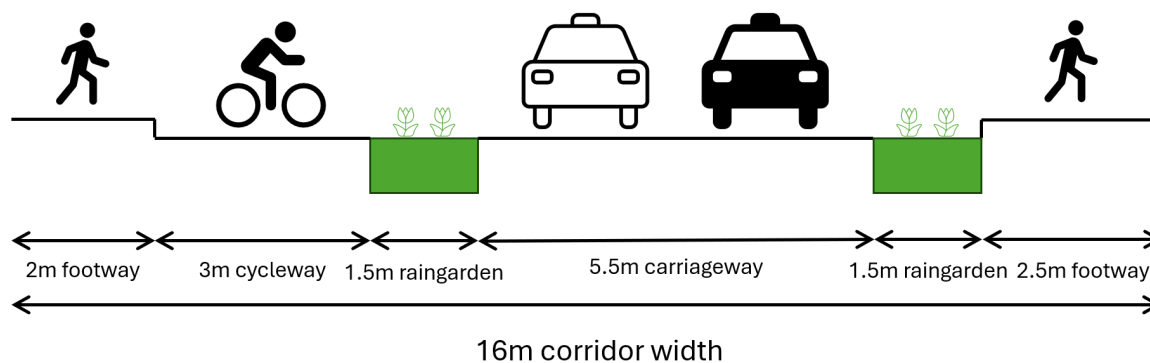


From the illustration, the areas have fed into the following example based on typical design assumptions.

A	Development Parcel Area	6.48ha
B	Development Parcel Impermeable area (e.g. at 66%, 60% + 10% creep)	4.28ha
C	Strategic Highway Area	1.35ha
D	Strategic Highway Impermeable area (81.25%, see below)	1.10ha
E	Total Impermeable Area (B + D)	5.38ha
F	80% of impermeable area to demonstrate compliance (80% of E)	4.30ha

First, let's consider the strategic highway: in this design it is envisaged as a 16m wide corridor typical of larger sites, as illustrated in Figure 3:

Figure 3 - Typical strategic highway (sometimes called "Primary Street") cross section



At this outline stage of the design, the strategic highway could be considered on a per linear metre or unit length of road where in the above example there is 13 sqm of impermeable area and this equates to 81.25% of the total area.

Bio-retention / raingarden areas are deemed compliant where the impermeable surface is up to 5x the vegetated surface. Hence in this example, there are 3 sqm of raingarden which can be deemed to drain up to 15sqm of impermeable area.

As such, at this stage of the design and with the commitment of providing raingardens, the strategic highway impermeable area can be discounted because it manages itself. The remaining area to demonstrate compliance at this stage is 3.2ha (4.30ha – 1.10ha).

We can then consider the strategic attenuation and the amount of impermeable area deemed “managed” by this basin. This is highly dependent on the infiltration rate beneath this basin as follows.

G	Basin Base Area	0.498ha
H	With no infiltration or $< 1 \times 10^{-6}$ m/s the basin can manage 5x the base area	2.49ha
I	With infiltration $> 1 \times 10^{-6}$ m/s, the basin can manage 25x the base area	12.4ha

Where infiltration is possible, a single feature may be sufficient (but may still not be in line with the Principles of the Standards). Where infiltration is not possible, additional features may be necessary.

In line with our assumptions that no infiltration occurs, we will take forward Row H in this example. The remaining area to demonstrate compliance at this stage is 0.71ha (F – D – H).

We could then consider permeable paving and provide this in driveway/parking for each dwelling. Taking masterplanning & design criteria from local design guides, we can estimate the number of dwellings, the size of parking spaces and number of spaces required. This is as follows:

J	Number of Dwellings @ typically 35 dph	226 dwellings
K	Parking space area (assumed 3m x 5m)	15 sqm
L	Permeable paving area @ conservatively 1.2 parking spaces per dwelling	0.41ha
M	If lined, the permeable paving can manage itself	0.41ha
N	If unlined, the permeable paving can manage 2x its area	0.82ha
O	If infiltration $> 1 \times 10^{-6}$ m/s, the permeable paving can manage 5x its area	2.05ha

The site is assumed to be uncontaminated therefore the permeable paving can be unlined. However, as infiltration does not occur it can only manage itself plus an up to an equivalent impermeable area; this is row N.

In total and based upon the commitments to include the strategic attenuation basin, raingardens along the strategic highway and permeable paving within parking spaces, the total area managed is 4.41ha which is greater than WCC’s 80% compliance threshold for outline applications.

D	Raingardens within the strategic highway manages this impermeable area	1.10ha
H	The basin manages 5x its base area	2.49ha
N	The permeable paving manages 2x its area	0.82ha
P	Total Area Managed (which is greater than the 80% threshold)	4.41ha
Q	Area Remaining (E – P)	0.97ha

To complete this, WCC will expect a calculated assessment of how the remaining impermeable area (row Q) could be further fleshed out at reserved matters once a plot-level masterplan has been developed. For example:

- Permeable paving: 4,800sqm (7.5% of development parcel area)
- Raingardens / swales / other detention basins: 1,940 sqm base area (3% of development parcel area).

Finally, it should be recognised that further multi-disciplinary design work would be involved in any planning application. As such there are matters that haven't been considered within this example such as the provision of a LEAP/NEAP. This would likely reduce the Development Parcel area and all follow-on areas whilst providing space for multi-functional SuDS.

3.4 Standard 3: Management of Extreme Rainfall & Flooding

Throughout this standard and in line with clause 3.34, the most up-to-date rainfall (i.e. FEH 2022) should be used in a design. Where developers' / consultants' software packages are unable to design for this, the tools available on UKSuDS.com may be beneficial but equally may not be appropriate for larger scale development with multiple SuDS features or detailed design/analysis.

When talking about flooding associated with the 1% AEP event, (clause 3.5-3.7, 3.13, 3.35-3.40), this should be read as including the appropriate allowance for climate change.

3.4.1 *Infiltration*

For discharge via soakaways, the design must use the most conservative infiltration rate measured through percolation tests conducted in the vicinity of the proposed soakaway in accordance with BRE 365 and as stated in CIRIA SuDS Manual.

On sites where infiltration is proposed as the main discharge mechanism, each soakaway should be summarised in a table with the following details:

- Cover, invert level & depth.
- Area drained
- Rainfall design event/depth incl. climate change allowance
- Infiltration rates and factors of safety used.
- Depth to recorded groundwater.

To clarify at clause 3.17 and table S3.1, the safety factors apply to the use of RP156 CIRIA methodology in the design of infiltration features. Where BRE Digest 365 is used as the design methodology, the safety factors are **not** required but equally within this methodology, infiltration through the base of a feature should be excluded.

3.4.2 *Calculation of greenfield runoff*

Early consultation with the LLFA is recommended regarding surface water discharge rates, particularly where rates proposed are non-compliant with Standard 3, on larger

developments where several surface water sub-catchments are proposed, or where other considerations arise such as if a surcharged outfall should be accounted for.

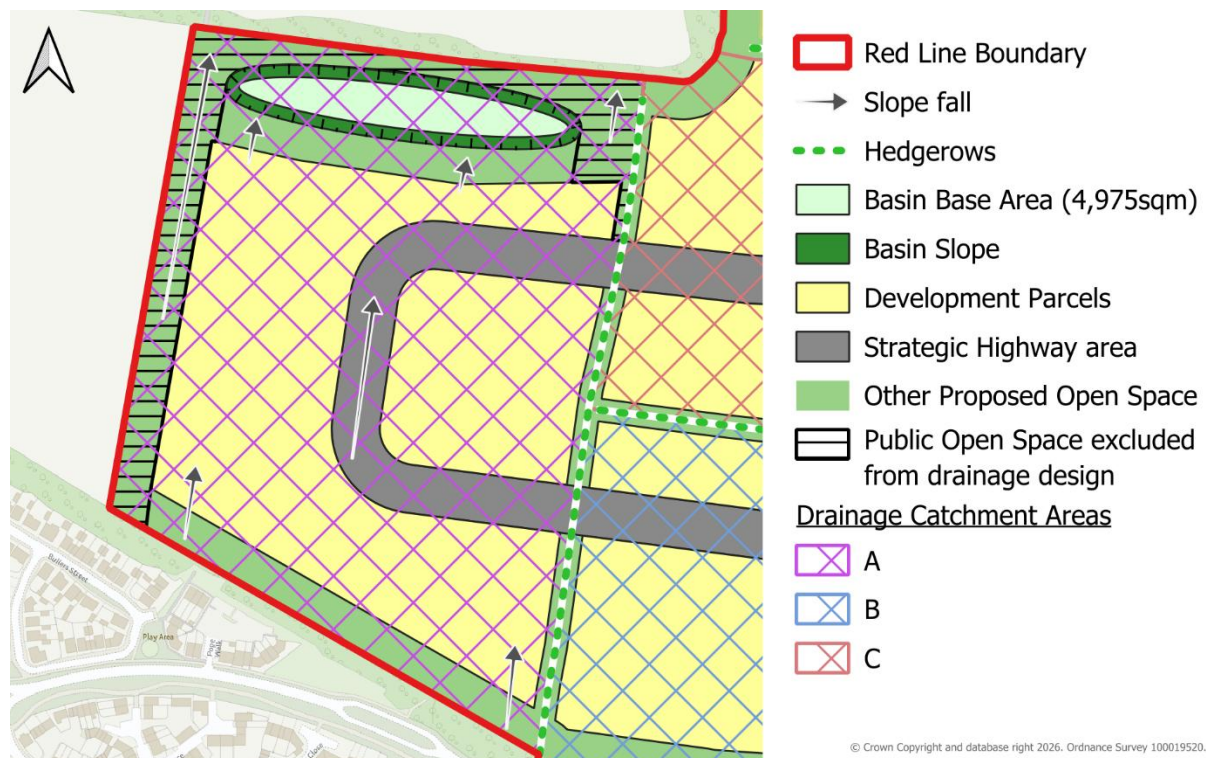
Regardless of whether another RMA indicates that a receiving water body or surface water sewer has enough capacity, the LLFA still expects developers to follow the discharge hierarchy and calculate allowable rates of runoff as stated in this guide and other policies/guidance.

As stated at clause 3.29, the entire development area should be included in the estimation of greenfield runoff rates and the design of the surface water drainage system. This is a move away from historic approaches where only impermeable area was accounted for as under certain conditions (e.g. extreme events or after prolonged drought or wet weather), permeable surface will contribute some runoff.

3.4.2.1 A worked example:

Using the same example in Standard 2 but expanded, the drainage catchment in Figure 4 shows the full area(s) of the site (whereas previously it was focused on where impermeable area will be for the purposes of “everyday” rainfall).

Figure 4 – Standard 3 Contributing Areas



This leads into the following areas:

A	Total Catchment Area	11.82ha
B	Public open space not draining to attenuation	1.56ha
C	Development Parcel Area	6.48ha
D	Strategic Highway Area	1.35ha
E	Strategic Attenuation Total Area	0.88ha
F	Remaining POS draining to Attenuation	1.55ha

The area B, which is the area of open space not drained to attenuation has been derived from reviewing the topography in the example in Figure 4:

- The topography in this example broadly falls from south to north.
- There are areas of open space on the western side and northeast corner that drain downhill but drain past (and not into) the basin, these are discounted.
- There other areas are either collected directly by the basin (immediately north of the development parcel) or will runoff into the development parcel areas (along the southern site boundary) and be collected by formal drainage systems.

Also included, in line with clause 3.32 of the Standards is the footprint area of the strategic attenuation basin. However, some software tools may include this automatically therefore it may not need to be added manually to contributing area totals. You should review your software documentation and provide appropriate justification.

From these overarching areas, they can be distilled into contributing areas based on typical design assumptions and parameters given within the FEH Catchment Descriptors.

G	Development Parcel Impermeable area (e.g. at 66%, 60% + 10% creep)	4.28ha
H	Development Parcel Remaining Area	2.20ha
I	Development parcel permeable contributing area (@47% runoff given SPRHOST for catchment)	1.03ha
J	Strategic Highway Impermeable Area	1.10ha
K	Strategic highway remaining area (raingardens)	0.25ha
L	Raingarden contributing area (@47%)	0.12ha
M	Remaining POS contributing area (@ 47%)	0.73ha
	Total area contributing to basin (E + G + I + J + L + M)	8.14ha

As such, the greenfield runoff rate for the site should be calculated based on the total contributing 8.14ha.

A consistent approach should be utilised between the calculation of greenfield runoff rate and the contributing area to a drainage design and the LLFA will push back where there is concern regarding a “double counting” of discharge rates.

3.4.3 *Phased Development Site Discharge Rates*

Where the developments will be phased then information should be provided on how the proposed discharge rate will be suitably met at each phase through a phasing plan. Such plan should consider and document:

- The maximum allowable discharge rate for that phase;
- Or
- The maximum contributing area from that phase allowed into the wider site drainage infrastructure.

WCC LLFA would expect such a plan to evolve as the application progresses, with an updated submission provided with each successive application.

3.4.4 Cross-catchment discharge

The LLFA recommend that where possible surface water should not be discharged cross catchment to a new receiving watercourse unless there is sound justification for the reasons of the cross-catchment discharge.

If a cross-catchment discharge cannot be avoided, the LLFA will require a technical justification for the reasons of the cross-catchment discharge, together with an assessment of the capacity of the receiving watercourse to ensure that the additional flows will not increase the flood risk elsewhere.

3.4.5 Designing for Exceedance

In the context of surface water drainage design, exceedance flows are considered as flood flows caused by a rainfall event greater than the design capacity of the system or by a failure of the system such as a blockage. As such exceedance can happen during 'normal' events and it is not appropriate to rely on calculations demonstrating no flooding occurring.

It is therefore important to consider how exceedance flows will pass through the development and it may be useful to disregard the drainage system entirely and instead focus on the post-development site topography. This should show how exceedance flows will not be directed toward property or flow onto third party land.

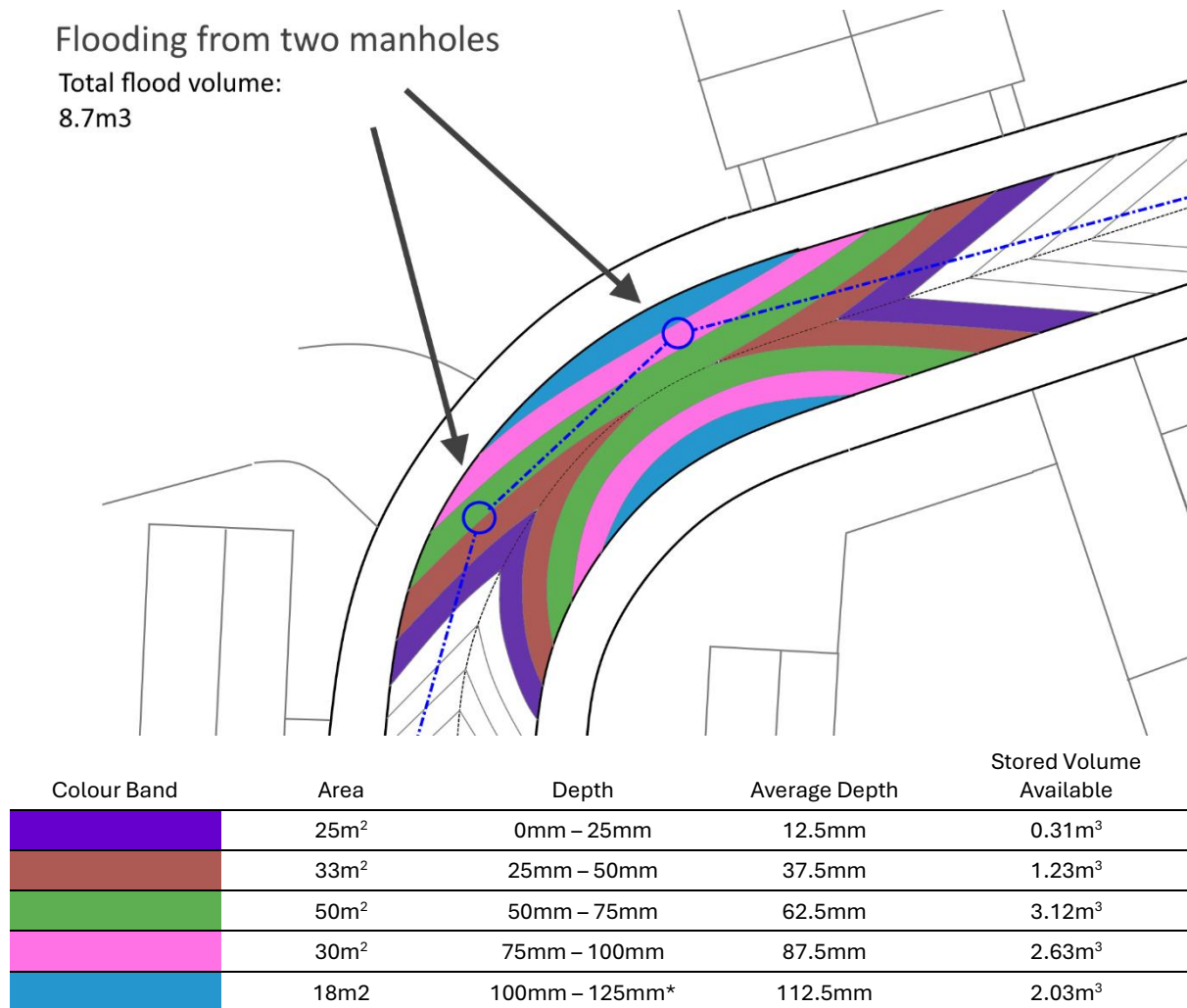
Intelligent but simple design (such as kerb heights, location of manholes etc) can help direct overland flows during an exceedance event. The volumes, depths, velocity and extent should be modelled and mapped on a topographical plan of the site.

An example sketch is shown in Figure 5 utilising the highway contours. A kerb is typically 125mm high and this sketch shows the contour area using this to calculate the total storage volume available within the highway. Such sketch demonstrates that in this location, flooding is retained within the carriageway. If flooding is extensive, the flood hazard should also be considered.

Figure 5 - Highway Contours & Flood Depths

Flooding from two manholes

Total flood volume:
8.7m³



Total available storage within carriageway = 9.34m³ which is greater than the flooded volume.

Further information on building layout, surface pathways and storage can be found in CIRIA C635 '*Designing for exceedance in urban drainage – good practice*'.

3.4.6 Overland flows from outside the development

In meeting para 3.39, the strategy should consider the use of cut-off ditches or other boundary treatments to intercept the flows and manage these as part of the development drainage proposals. Flow paths should be retained and appropriately maintained through blue/green corridors or along highways. Where flow paths are unmaintained (i.e. overland flows) no development should take place where such would be at risk of flooding.

3.4.7 Surface water drainage modelling

The standards should be underpinned by calculations and the bullet points below provide a summary of the design parameters that should be used. The drainage strategy should outline the reasons for any departure from these design parameters.

- As outlined within the software, Info Drainage's 'Quick Storage Estimate' should not be used for design and will not be accepted.

- The Standards (clause 3.34) expects the most up to date rainfall data to be used.
 - Micro Drainage calculations will now not be accepted given the age of this software and its inability to apply the most up to date rainfall.
- Volumetric Runoff Coefficients (Cv Values): 1.0 (summer & winter)
- MADD Factor / Additional Storage: 0

3.5 Standard 4: Water Quality

The drainage strategy (or other supporting documentation) should demonstrate how this Standard has been met and how the pollution risks arising from the development will be mitigated.

For most developments, the LLFA recommend applicants refer to the Simple Index Approach (SIA) as described in CIRIA SuDS Manual. When considering this approach, it is important to understand where water originates from and subsequently which features it will flow through and provide treatment, e.g. roof water may not pass through permeable paving.

It should be noted that the LLFA does not consider catch-pits, oil separators and other proprietary treatment systems as pollution management / SuDS features. Such components will only be accepted in exceptional circumstances with very high pollution risks and such proprietary features should be additional to a full SuDS treatment train (not provided instead of).

3.5.1 Sites with high risk of contaminated runoff

Where there are detailed water quality aspects of a development, this should be overseen by the Environment Agency; examples of this might include:

- A car washing facility where various cleaning products are used.
- A materials store where aggregates or materials may be washed off in runoff.
- Facilities where contaminated firefighting water should be contained.

Any materials or chemicals which might impact the contamination of runoff should be considered early in the design process and consideration should be given to provision of separate runoff collection systems, on-site treatment, discharge to public foul sewer networks or other alternative disposal methods such as tankers.

3.6 Standard 5: Amenity

The amenity standard, whilst lacking specific metrics, covers wide ranging themes regarding placemaking and integrated, high-quality design of SuDS. Where a surface water drainage strategy thoroughly implements the Principles and employs a 'SuDS Approach' throughout, then meeting the Amenity Standard should be straightforward.

Conversely, where a pipe-to-pond solution is developed later in the design and this is 'bolted on' to an already-developed site plan then achieving this standard may be challenging.

Reference is also made to Policy DP3: Key principles for well-designed places within the NPPF and in parallel, the forthcoming Design & Placemaking PPG.

As a guide, the LLFA recommend designers consider the sub-headings within the Standards (Multifunctionality, Visual amenity & landscape character, Climate resilience & adaptation, Health & Wellbeing, Education & safety) and use these as a guide to evidencing compliance against this Standard.

Other design evaluation tools may also be of benefit including:

- CIRIA Benefits of SuDS Tool (BeST): quantifies the wider economic, social and environmental benefits of SuDS, including amenity, recreation, health, climate resilience and education.
- Building with Nature Accreditation: framework that assesses how green and blue infrastructure contributes to place-making, wellbeing, water management and environmental quality.
- Building for a Healthy Life (BfHL): design assessment framework for residential development that evaluates how proposals create healthy, attractive and sustainable places, including the integration of green and blue infrastructure, public spaces and climate-resilient design.
- Healthy Streets Assessment: A place-based assessment method that evaluates how the public realm supports walking, wellbeing, comfort, safety and environmental quality.

Reference is made to Section 4 with various ideas of how small-scale SuDS can be integrated into a development.

3.7 Standard 6: Biodiversity

There is a clear preference for multifunctional SuDS features expressed in the NPPF, so that they can deliver towards many environmental gains. Features such as attenuation ponds have the potential to contribute towards biodiversity provided that habitat quality is considered in their design. Factors such as size, surrounding landscape, appropriate planting, water quality and maintenance could influence SuDS value to wildlife.

The LLFA will expect the SuDS design to be supported by a multidisciplinary team (as opposed to an individual civil engineering designer/consultant). This includes landscape architects, ecologist etc. to ensure sympathetic considerations of habitats, planting species, soil selection and landscape integration, having regard to future maintenance.

As with Standard 5, where the Principles are embedded in the design, then meeting this standard should be straightforward but may be difficult where solutions are developed later in the design process.

3.8 Standard 7: Design of drainage for construction, operation, maintenance, decommissioning and structural integrity

3.8.1 Phased Development Sites

For development sites with many phases, an explanation of how the site will adequately consider flood risk and surface water drainage, at all stages of the development will be required. This should avoid interim developed phases that are unprotected or where one small phase of the site being allowed to discharge at the calculated rate for a larger part of the entire development.

The LLFA expect the development masterplan to indicate how the surface water drainage for the entire site will be managed on a phase-by-phase basis and progress will only be allowed if adequate measures are in place for that particular phase.

3.8.2 Construction environmental management plans (CEMPs)

As part of the construction works, a Construction Environmental Management Plan or Construction Method Statement will usually be required and may be conditioned as part of a planning permission. These will be managed by the LPA but we will provide comment on these when consulted.

4 SUDS DESIGN IDEAS

The Principles within the Standards are clear that surface water drainage systems should mimic natural process and a 'SuDS Approach' features prominently in all the Standards.

Overall, we believe if the designer utilises the question “Does this water need to go below-ground or can it be kept on the surface?” to guide the design and water is retained in above-ground features, then the SuDS standards should be easily met.

The below provides specific design ideas and recommendations in meeting this.

4.1 Rainwater harvesting & Water Reuse

It is worth noting that, whilst ordinary water butts are not considered appropriate for managing “Everyday Rainfall” (Standard 2), they remain a standard choice for re-use. Applicants should consider what products are available on the market such as smart water butts to further enhance re-use.

4.2 Source Control & MicroSuDS

It is hoped that, as a result of Standard 2, designs will make much more use of source control measures across a development.

Figure 6 shows a raised landscape planting area adjacent to car parking with this planter covered in bark chippings. As shown, the chippings are falling off the planter and are gradually being conveyed into the adjacent gully which will in turn require maintenance. This could be considered a missed opportunity to incorporate bio-retention/raingardens.

Figure 6 - Missed Opportunity - Landscaping planter adjacent to car parking (WCC, 2022)



As an alternative, Figure 7 shows a bio-retention / raingarden installed as part of the Mansfield SuDS Retrofit project run by Severn Trent Water, a similar feature could have been installed in place in Figure 6.

The planter is lower than the road and as such takes direct runoff from the road surface thereby keeping the plants watered and established. The feature also traps sediment runoff and treats hydrocarbons thereby improving water quality that is passed downstream.

Figure 7 – Mansfield bio-retention / raingarden area (WCC, 2025)



The cost change may also be considered minimal as the same amount of kerbs, plants and maintenance will be required whilst overall providing much improved water infrastructure.

Elsewhere, small-scale basins could be holistically integrated into developments where space is available. shows the placement of a small-scale attenuation basin within an area of public open space and the basin has been sized and designed based on the space available and Figure 10 shows this in practice in a new development.

The following points are all worth considering in relation to the above:

- **Depths and gradients:** Shallow depths and gradients work hand-in-hand together, enabling features to be integrated into the landscape design whilst also ensuring safety.
- **Calculations:** The volume of storage may be negligible therefore calculations could be simplified demonstrating the area drained, controls and maximum water levels, working together with in-built overflows.
- **Headwalls vs underdrains:** headwalls provided could be small-scale and flush with the banks, connecting pipes of 100mm or 150mm in diameter. Alternatively,

porous medium could be installed under the basin negating the need for headwalls and for water to fill the basin via exfiltration. Some examples are shown below in Figure 10.

- **Flow controls and overflows:** given the basin itself is small and shallow, flow controls could be incorporated into inspection chambers, limiting the need for man-access and improving safety whilst making maintenance easier.
- **Adoption:** By draining multiple properties and with a defined channel through the bed of the feature, it may be adoptable under the Design and Construction Guidance, discussion is recommended with Severn Trent Water.

Figure 8 - Open space small-scale basin and cross section.

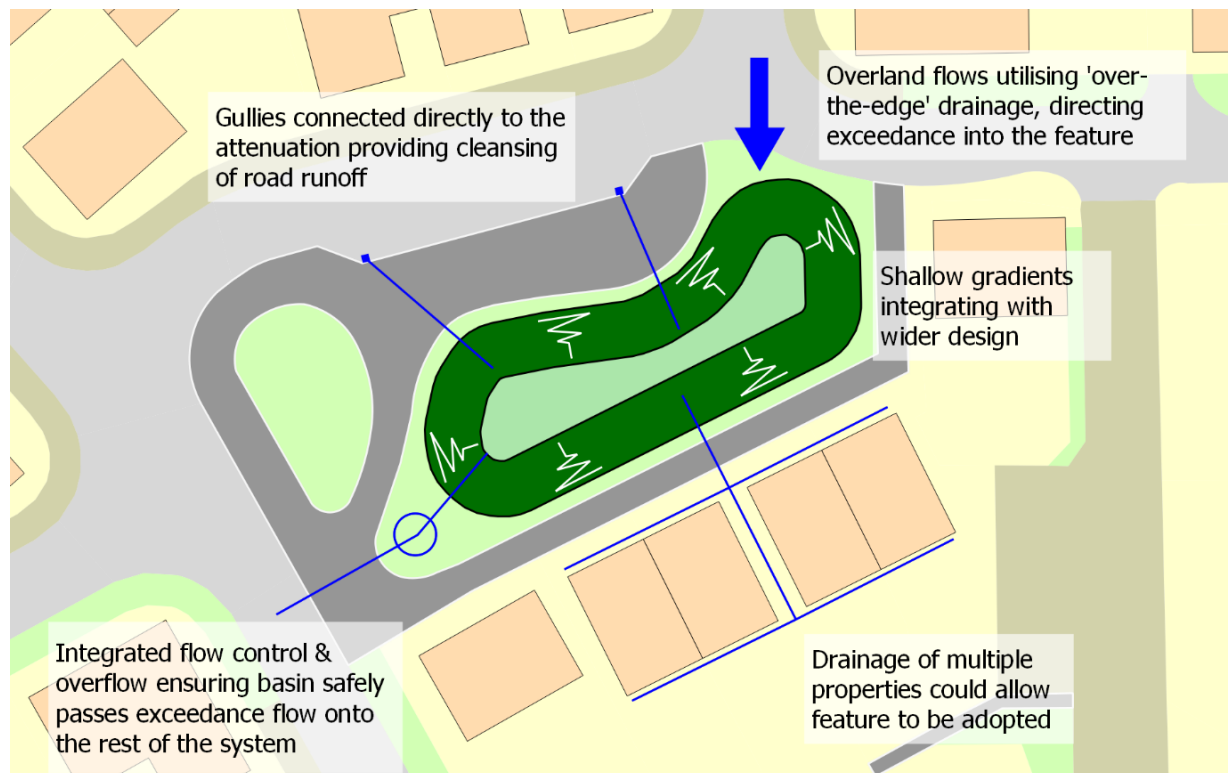


Figure 9 - Small scale SuDS feature (WCC, 2026)



Figure 10 - Small scale inlet (left) and outlet (right) features (WCC, 2023)



In a similar vein to the above, Figure 11 below shows an example of a system in the Netherlands. On the left, rainwater downpipes are directed straight into a very shallow vegetated swale / filter drain type feature. This feature conveys all runoff it to a small-scale attenuation basin and the photo on the right shows how a channel drains under pedestrian access is used to keep water close to the surface.

Figure 11 - Rainwater pipes into small-scale swale/filter drain and connection (WCC 2026)



4.3 Above-Ground Conveyance

The 'SuDS Approach' espoused by the Standards expect much more use of above-ground conveyance and a move away from below-ground piped assets.

Warwickshire has a topography of gently rolling hills which are perfectly suited to the use of such features i.e. sites are steep enough to drive hydraulic processes and provide reasonable capacity/flows whilst not being too steep to risk excessive scour.

Land-take is often cited as a reason for not including swales but in many cases such features may be over-engineered or excessively large. Consider the following:

- A 300mm diameter sewer, typical of upper to middle sections of a drainage network, laid at an average gradient of 1 in 100 has a capacity of 111l/s.
- To provide the same 111l/s capacity in an open channel would require a swale of 200mm base width and 125mm depth; rounding to 200mm depth and assuming 1 in 3 side slopes, such swale is only 1.4m wide, less than the width of a standard pavement.

It's recognised that such shallow swales may be unfeasible to drain all features into as some pipes may require a certain depth of cover. However, the use of 'over-the-edge' drainage techniques could direct surface water runoff directly into the swale and adjacent properties could be connected using rills or other similar features.

In places where sites are steep, 'check-dams' can be used to enhance the attenuation function of swales and slow the flows. Where depth is required, the swale could be supplemented with a below-ground filter-drain to connect deeper sewer pipes that cross beneath driveways or roads.

Figure 12 shows an example shallow roadside swale feature collecting surface water runoff from the adjacent carriageway and footway.

Figure 12 - Shallow swale / filter drain with check-dams (WCC 2023)



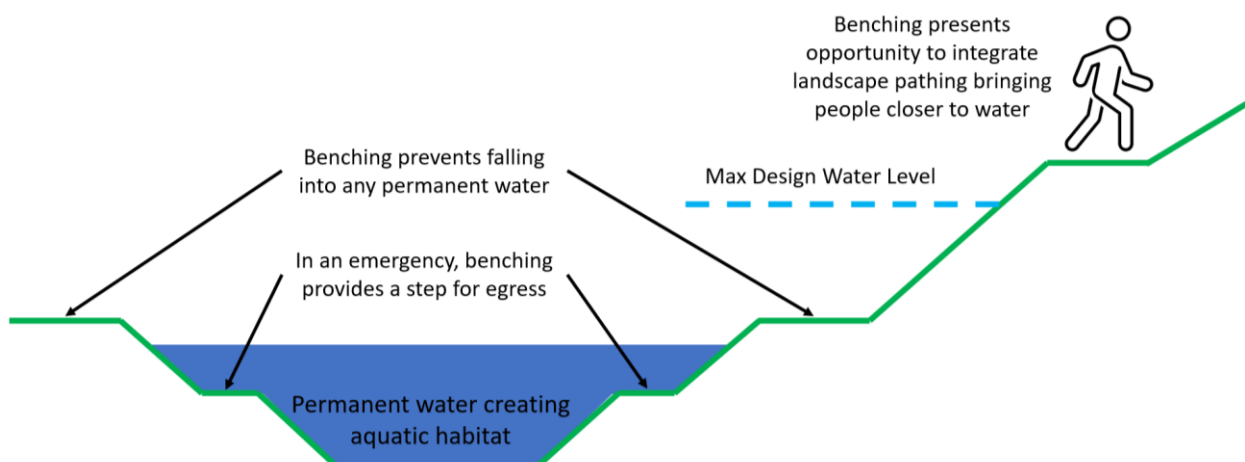
4.4 Strategic Attenuation Design

Any holistic SuDS system is likely to require provision of larger strategic attenuation features and the LLFA expect these to be above-ground to meet the National Standards.

Features should be designed in accordance with best practice to provide maximum benefit and integrated into the landscaping. As such, features should be shallow and where possible the depth of water should not exceed 1m with bank slopes of ideally 1 in 4 bank slopes and as minimum 1 in 3; very deep basins ('bomb craters') are unacceptable.

Where attenuation basins and other open water features are deeper, consideration should be given to the provision of benching as illustrated in Figure 13. The suitable width of these benches must be determined by the developer, but there is some guidance on this in Chapter 36 of the SuDS Manual.

Figure 13 - Attenuation Basin Benching



Consideration should be given to providing spaces of multiple use within well designed above ground SuDS. For example, but not limited to, open areas for sports, play or other

recreation. By taking such an approach, and through innovative design, the inclusion of multi-use spaces within SuDS can manage competing demands for space, provide additional areas for development and enhance amenity whilst still delivering their primary purpose.

4.4.1 Below-Ground Attenuation

The use of a 'SuDS Approach' is a continuing theme across the National Standards and as part of this, SuDS should mimic natural process. Man-made, below-ground attenuation does not align with a 'SuDS Approach' and to this end the Standards make no mention of below-ground attenuation.

The LLFA will therefore push back strongly against the use of below-ground attenuation and the lack of space available for above-ground features is not considered sufficient justification as this indicates that the development density is too high.

Development proposals should maximise opportunities to use SuDS measures which require no additional land take, such as green roofs, permeable surfaces etc. Attenuation beneath buildings will not be considered acceptable and an alternative strategy should be proposed.

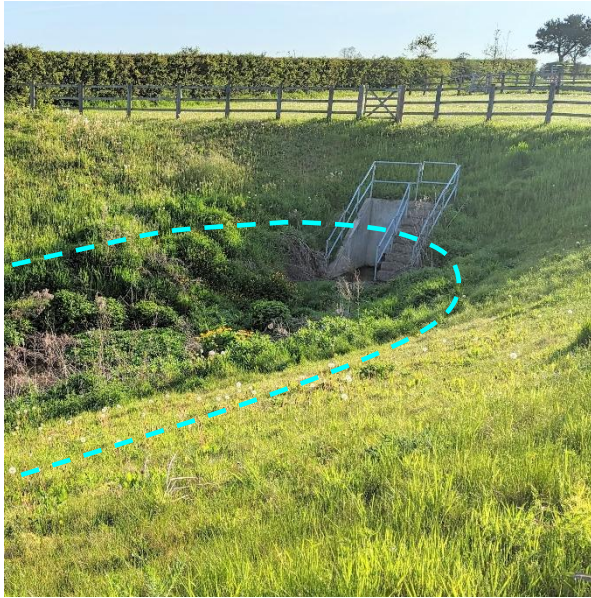
4.5 Other Design Matters

4.5.1 Inlet / Outlet Headwall Design

The LLFA recognise that in many cases, the design of headwalls is dictated by the adopting body. This should not however preclude the exploration of different inlet and outlet headwall designs.

In many cases, such headwalls are overly large and incongruous to the natural aesthetics of SuDS features. Consider the critique set out in Figure 14, instead could a bespoke headwall, such as shown in Figure 15 provide a that provides a higher degree of visual amenity and character. Alternatively, could small-scale inlets such as those above in Figure 10, be used combined with some riprap to provide a cascade as water falls into the basin?

Figure 14 – Overly Large SuDS Basin Inlet (WCC 2023)



Given the depth of the basin, this necessitates safety fencing

The headwall is ~2m tall but doesn't provide access to the top of the ~4m bank

The inlet itself is only 150mm diameter with flow controlled from an upstream basin so this could be considered overengineered

Given site topography, the maximum water depth in the basin is ~1m. The wider earthworks could be sculpted to bring people close to water.

Figure 15 - Bespoke headwall (WCC 2024)



Shallow basin has no fencing around it

Rear apron prevents vegetation growth and keeps the headwall visible to those needing to undertake maintenance

Small diameter inlet reduces the height / drop of the headwall minimising the need for guard rails

Materials and shallow profile improve visual impact, landscape character and integration.

As with large headwalls, the use of screens should be avoided and designed out in most cases. This can be achieved by designing smaller scale SuDS features and dispersing inlets via multiple smaller pipes (as compared to a concentrated larger inlet). The inclusion of screens has maintenance implications, as shown in the blockage caused by the screen shown in Figure 16; where screens are proposed the maintenance of such should be included in any plans.

Figure 16 - Culvert screen with internal blockage.



4.5.2 Freeboard

The only reference within the National Standards to freeboard is in relation to buildings, utilities and access / egress routes, however the LLFA will expect some freeboard included within all surface water SuDS design. This is to take account of residual uncertainty in the design parameters so that the risks of an exceedance event are minimised.

Historically, a blanket freeboard of 300mm has typically been provided between the highest design water level and the top of any attenuation feature (such as a basin). This requirement is also stated in CIRIA SuDS Manual.

However, there may be times where such a blunt approach may be inappropriate such as for large but shallow features. Where less than 300mm freeboard is provided, consideration should be given to the volume provided within the attenuation feature, the required volume of storage and the volume within the freeboard. For example:

- 100m³ of attenuation within a basin of 100m², fills the basin to 1m deep. The addition of 300mm freeboard provides 30m³ of residual volume.
- 100m³ of attenuation within a basin of 250m², fills the basin to 0.4m deep. The addition of 300mm freeboard provides 75m³ of residual volume.

4.6 **Site Specific Settings**

4.6.1 *Educational (and similar children's settings)*

Water provides great opportunities for learning such as the water cycle, biodiversity and habitats create or water quality and chemistry. As such, it's important that water is seen as an asset and used appropriately within the design of developments.

Therefore, the following suggestions are offered regarding integrating above-ground surface water SuDS features and these are much in line with the Principles and the 'SuDS Approach' within the Standards

- Managing at source – what can be provided beneath each Rainwater Pipe such as raingardens?
- Making conveyance fun – how can water be conveyed across a site whilst avoiding below-ground drainage?
 - Below-ground drainage typically results in deeper attenuation features therefore keeping conveyance on the surface can enable shallower depths.
- Where attenuation is required, how can this be designed to be open and remain safe for all users? For example:
 - Shallow gradients integrating naturally into landscaping.
 - Shallow depths, minimising the volume of water provided.
 - Granulated beds to ensure features drain dry and do not get muddy.
 - Protective planting to discourage entry into features.

Applicants should consider the *Health & Safety Principles for SuDS: Framework and Checklists* (CIRIA RP992) and may wish to consider completing a RoSPA (Royal Society for the Prevention of Accidents) assessment; one may be requested by the LLFA for review by the adopting authority.

4.6.1.1 The Bewdley School

The Bewdley School in Worcestershire provides good examples of integrating SuDS into an educational setting as documented in the photos below.

Figure 17 - Higher-level rainwater channel (short)



Figure 18 - Higher-level rainwater channel (long)



Figure 17 and Figure 18 show similar examples of rainwater channels above head-height. By keeping the rainwater elevated, the system retains the ability to use above-ground SuDS features whilst still providing the necessary access around the curtilage of the building. Each rainwater channel then uses different ‘active’ features to highlight water.

In one location, the rainwater downpipe shown in Figure 17 has a number of small diameter (~5mm) holes, seen in Figure 19. When it rains, this downpipe fills with rainwater which subsequently discharges like a fountain through these orifices into the raingarden below.

Figure 19 - Small orifices in rainwater pipe.



On the other side of the building, a tipping bucket and waterwheel are placed under the rainwater pipes to provide 'active' use of the water (Figure 20 & Figure 21). These drain into rills directly beneath them which conveys water to a small pond which, along with a raingarden area, forms the main attenuation (Figure 22 & Figure 23).

Given the school setting, safety was also considered during within the design; this small field is fenced off from the wider play areas and forms part of an extended teaching area adjacent to the science classrooms, hence students are only present when there is teacher supervision.

Figure 20 - Tipping bucket rainwater pipe outfall



Figure 21 - Water-wheel rainwater pipe outfall



Figure 22 – Rill conveyance to small pond at back



Figure 23 - Raingarden area



4.6.2 *Photovoltaic (Solar Farm) development sites*

Whilst it is widely considered that greenfield solar farms have negligible impact regarding surface water runoff, the LLFA do not consider this to fully hold as:

- Construction activities can lead to a removal of vegetation and compaction of the soil.
- Shading from panels can lead to varying vegetation.
- Introduction of impermeable areas (albeit small) can concentrate runoff.
- Surface water dripping from panels can lead to erosion and channelising of flows, especially prior to vegetation establishing.

Accordingly, appropriate mitigation measures are required and the LLFA would expect the developer to consider and include details relating to the following in a Drainage Strategy or Land Management Strategy:

- How can compaction be minimised and treated?
 - Should vehicles be restricted on site?
 - Should any ploughing / furrowing be undertaken after construction to break up compacted areas?
- What type of vegetation will be planted across the site? e.g. high grasses?
 - How will it be established quickly in high-risk areas to minimise erosion?
 - How will it be managed / maintained in perpetuity? E.g. grazed by livestock.
- How can panels be designed/built to aid water getting to ground?
 - Can panels have breaks in? e.g. 2x 1m panels rather than one big 2m panel.
- How will surface water be managed?
 - How can impermeable areas be minimised?
 - Where impermeable areas are required, how will runoff be attenuated and controlled?
 - Where will surface water runoff be discharged to?
 - Where infiltration is proposed, testing **must** be conducted.
 - Should cut off ditches be positioned strategically around the development to capture surface water runoff?

5 INFORMATION REQUIRED WITH PLANNING APPLICATIONS

5.1 Flood Risk Assessments

Flood Risk Assessments should be provided in line with the National Planning Policy Framework and the criteria set out in Policy F4. This should assess the risk of flooding from all sources and where relevant should provide hydraulic modelling.

Applicants are directed to **not use** the 'Check your Long-Term Flood Risk' information service and instead rely on the Flood Map for Planning which includes surface water extents. If surface water data is required outside of the Flood Map for Planning service e.g. within GIS software, it is available via data.gov.uk as the “Flood Map for Planning – Surface Water Spatial Planning” datasets.

5.2 Surface water drainage requirements

Annex C (of the NPPF) provides a list of information requirements and within this it states that, to meet policy F8 SuDS, it recommends a “Statement outlining how the national SuDS standards have been achieved for development proposals which could affect drainage on or around the development site.”

To this end, we expect a Sustainable Drainage Strategy (report) to be submitted. The Planning Practice Guidance in paragraph 059 sets out in general terms what should be included but it should also be recognised the PPG pre-dates the National Standards.

To provide suitable evidence against the National Standards, **it is highly recommended that the “SuDS Strategy Template for Major Development” proforma²** is completed alongside drainage strategy reports; such reports should provide clear headings for each Standard and evidence / justification for each clause as relevant.

To complement the proforma, Table 2 outlines information that should be submitted with a planning application as a development progresses through different stages of application.

5.2.1 Outline planning

At Outline planning stage, the LLFA will require the applicant to submit an Outline Surface Water Drainage Strategy (both in report & drawings). The strategy should demonstrate how surface water drainage has been developed hand-in-hand with the masterplan or indicative site layout to achieve well-designed places.

The Strategy should highlight how the National Standards have been integrated into the development and highlight how the remaining elements, particularly in relation to

² The proforma was developed by the EA, CIRIA and ASA, it is available here:

<https://www.planningportal.co.uk/permission/commercial-developments/understanding-and-assessing-flood-risk/sustainable-drainage-systems>

Standard 2 (everyday rainfall) will be addressed within subsequent reserved matters application(s). This includes the broad quantum of additional features that need to be integrated with the benefit of a detailed, plot-level masterplan to bring the design into compliance.

5.2.2 Full planning

At the Full planning stage proposals for surface water drainage should fully meet the National Standards. A well-developed, surface water drainage strategy (in both report & drawings) should be provided with a high level of detail and demonstrate how the Standards have been integrated into the development proposals.

5.2.3 Reserved Matters

At the Reserved Matters planning stage, a surface water drainage strategy (both in report & drawings) should be provided.

At this stage, a reserved matters application can be considered as bringing an Outline up to the level of Full planning permission and as such, the Strategy should with the benefit of a detailed plot-level masterplan, demonstrate how the recommendations made at Outline have been implemented to deliver a SuDS scheme compliant with the National Standards.

5.2.4 Discharge of Conditions

At the 'discharge of condition' stage proposals for surface water drainage should be approaching a level of detail suitable for tender or construction. Documentation should show the drainage scheme including SuDS features, specific details (e.g. standard details or cross sections) and demonstrate the performance and of the system through calculations and exceedance management respectively. Such scheme should be in line with the original planning application/permission and where significant changes are made, justification should be provided.

Table 2 - Planning Application Drainage Information Matrix

Standard	Detail	Outline	Full	Reserved Matters	Discharge of Conditions
Principles		The application of the National Standards for Sustainable Drainage should be undertaken at all stages and should be a continuous process of design and re-evaluation.			
Standard 1: Runoff Destination		Evidence of following the drainage hierarchy set out in Standard 1 to demonstrate all higher priority destinations have been used to the maximum extent practicable. Evidence may include rainwater harvesting analysis, infiltration testing results, land ownership plans demonstrating riparian ownership, STW Developer Enquiry (within 6 months date), survey plans showing levels are sufficient to allow a gravity outfall and that any surface water body (ditch) is contiguous.		Location remains in line with (or improves upon) that approved at Outline.	Technical acceptance of the outfall E.g. S106 approval, land drainage consent
Standard 2: Everyday rainfall	EITHER:	Detailed plans & calculations that represent the drainage strategy with known losses to infiltration (informed by on-site testing);	Detailed plans & calculations that represent the drainage strategy with known losses to infiltration (informed by on-site testing);		Refine drawings provided at ‘full’ or ‘reserved matters’ stages to account for the finalised surface water drainage scheme
	OR	High-level plans and summary tables outlining: - Estimated contributing area (in line with drainage strategy calculations) and quantum of SuDS features. - Compliance of known, proposed SuDS against deemed criteria and WCC’s 80% threshold for outline applications - Outstanding requirements for the next stage of design to bring forward full compliance	Detailed drawings and summary tables showing - Totals of contributing areas (based on plot level masterplans) draining to each specific feature - Deemed criteria and compliance		
Standard 3	Infiltration	Evidence (through appropriate on-site geotechnical investigations) that infiltration is an appropriate means of discharging from the site (i.e. rates are above 1x10 ⁻⁶ m/s) whilst maintaining half-drain times. A statement outlining the methodology used in the design of infiltration feature. Consideration and justification of safety factors			
	Discharge Rate & Volumes	Catchment plans and estimation of contributing area to inform discharge rates. Calculation of existing discharge rates and volumes. Proposed rates & volumes limited in line with policy and Standard 3.	Contributing areas (in plans and tables) based on proposed layout masterplan used, provide evidence of areas and pro-rata rates to calculate the overall discharge rate. Rates & volumes limited in line with policy and Standard 3.	Rates revised in line with proposed layout masterplan contributing area.	Demonstration of rates in line with those agreed previously.

Standard	Detail	Outline	Full	Reserved Matters	Discharge of Conditions
	Proposed Drainage Plans	Indicative strategies demonstrating that sufficient space has been made available for attenuation at multiple points across the development. An understanding of wider source control and conveyance features and that space for such features has been considered. Plans should be provided to allow suitable cross referencing with calculations including catchment areas.	Drainage schemes showing the location of all SuDS features including source control, conveyance and attenuation features at multiple points across the development. Evidence of contributing areas, rates and features where a development is phased. Plans should be provided to allow suitable cross referencing with calculations including catchment areas, pipe numbers, sizes, invert levels etc.	Drainage schemes showing the location of all SuDS features, in line with the principles set out within any Outline Permission drainage strategy. Plans should be provided to allow suitable cross referencing with calculations including catchment areas, pipe numbers, sizes, invert levels etc.	Detailed design plans of the proposed drainage scheme, approaching a level of design suitable for tender or construction. Plans should be provided to allow suitable cross referencing with calculations including catchment areas, pipe numbers, sizes, invert levels etc.
	Calculations (based upon the latest rainfall methodologies)	High-level calculations to demonstrate the performance of attenuation features e.g. uksuds.com's "Surface water storage volume estimation"	Detailed network level calculations representing the network, attenuation features and flow controls. Calculations should cover a range of storm durations up to and including the critical duration, for events up to the design event.		Detailed network level calculations representing the network, most SuDS features, and flow controls. Calculations should cover a range of storm durations up to and including the critical duration, for events up to the design event.
	Exceedance & Overland Flow Routing	Plans / sketches providing an indicative understanding of where water is currently routed, where it will be routed as part of the proposed development and that neither the proposed development nor existing receptors are put at increased risk	Drawings demonstrating, based on survey / levels, where water is currently routed, where it will be routed as part of the proposed development and that neither the proposed development nor existing receptors are put at increased risk	Indicative routing plans submitted at outline should be refined based upon the layout to be approved and indicative levels. Such should demonstrate where surface water runoff will be routed as part of the proposed development and that neither the proposed development nor existing receptors are put at increased risk.	Overland flow drawings should work hand-in-hand with proposed external levels across a development. Such should demonstrate how surface water runoff is routed across the development, and that neither the proposed development nor existing receptors are put at increased risk.
Standard 4: Water Quality		Provide an appropriate assessment of water quality, typically through the Simple Index Approach.			
Standard 5: Amenity		Demonstrate how a 'SuDS Approach' maximises the amenity benefits of SuDS. Consider the sub-sections within the National Standards of Multifunctionality, Visual amenity & landscape character, Climate resilience & adaptation, Health & wellbeing, and Education & safety. Various design tools could be looked at to provide evidence such as CIRIA BeST, Building with Nature, Building for a Healthy Life (BHL), Healthy Streets Assessments.			
Standard 6: Biodiversity		Demonstrate how a 'SuDS Approach' maximises the biodiversity benefits of SuDS.			

Standard	Detail	Outline	Full	Reserved Matters	Discharge of Conditions
Standard 7 Design for Construction, Operation, Maintenance & Decommissioning	Cross Sections & Standard Details	Provided dependent on the scale & nature of the application. Where relevant, an indication of groundwater levels in comparison to feature levels.	Indicative cross sections & standard details Where relevant, an indication of groundwater levels in comparison to feature levels.		Detailed cross section and standard detail drawings approaching a level of design suitable for tender or construction. Details should show all relevant levels / dimensions such as diameters, invert levels, weir levels etc. Where relevant, groundwater levels taken through detailed monitoring should be illustrated in comparison to feature levels.
	Maintenance Information	How will each feature be maintained and how does the development proposals support this e.g. easements, access ramps into features etc. Indicatively, who will be responsible for undertaking the maintenance. Suitable early consideration of maintenance against Standard 7			A detailed management and maintenance plan in line with 7.10 & 7.11 of the National Standards.

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