

Whitfield Sustainable Urban Drainage Systems 2016

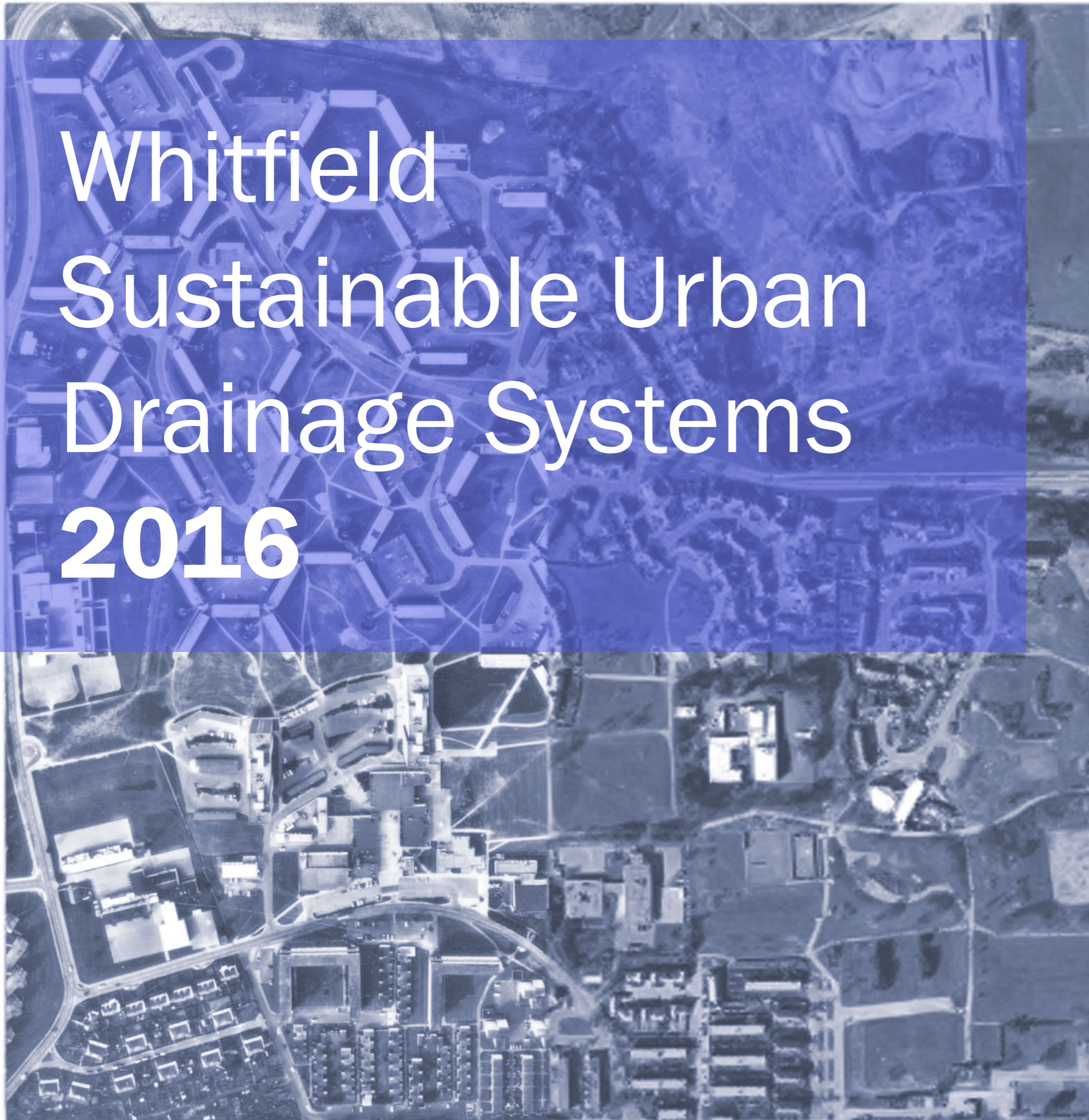




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1 Introduction

1.1 Purpose

As shown in figure 01, this guidance document sits below the [Whitfield Planning Framework \(2015\)](#) with the purpose of positively guiding the development of new housing within Whitfield in respect of surface water drainage requirements. It is not intended to replace national guidance or legislation. Rather, its purpose is to promote good practice and set the principles that the designers of sustainable urban drainage systems (SUDS) in Whitfield will be expected to meet.

The intention is to steer designers away from following a ‘standards-led’ approach by using some Dundee examples to highlight the opportunity for addressing SUDS requirements through high quality design solutions that maximise visual amenity – creating attractive and useable public open spaces.

This document has been prepared by the City Development Department at Dundee City Council. It is based on current legislation, planning policy, and technical guidance. Compliance with this guidance will serve to meet the requirements of [Scottish Planning Policy \(2014\)](#), the [Dundee Local Development Plan \(2014\)](#) and assist in the efficient processing of planning applications submitted by developers.

This guidance is not intended to replace the pre-application consultation that developers will be required to initiate with Dundee City Council and other relevant consultees. Therefore, before preparing a planning application, developers are requested to consult with: Engineers and Planning Officers at Dundee City Council; Scottish Water; and if necessary the Scottish Environmental Protection Agency (SEPA).

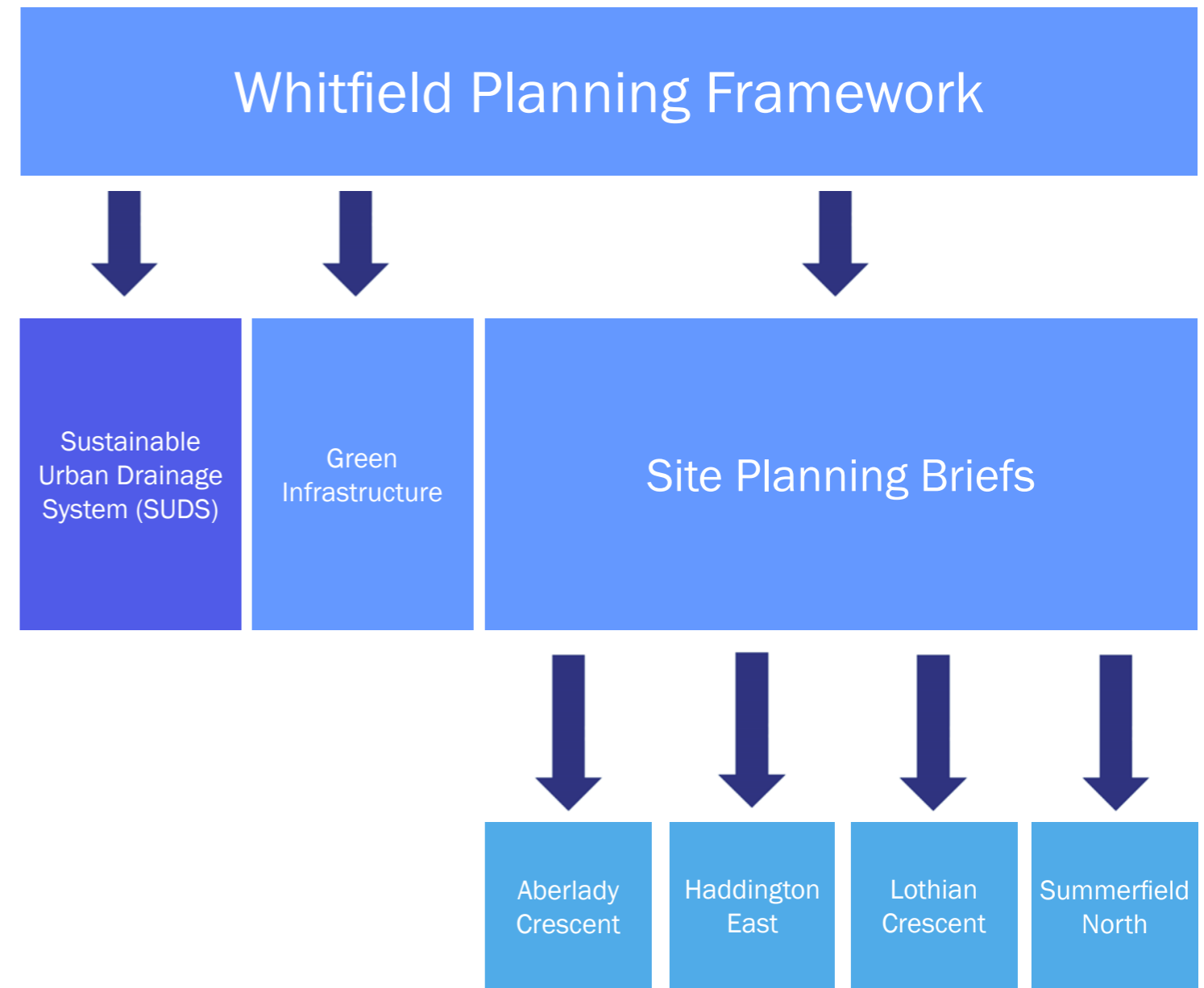


Figure 01: Diagram showing the hierarchy of documents that support the Guidance.

1.2 Background to Sustainable Urban Drainage Systems (SUDS)

Sustainable Urban Drainage Systems (SUDS) are a well-recognised method of dealing with surface water in an environmentally-friendly and economical manner, whilst meeting all legal requirements. SUDS manage surface water on site as near to the source as possible by slowing down the rate of water run-off and treating it naturally, thereby allowing the release of good quality surface water to nearby watercourses or groundwater channels.

There are four general methods of control:

- Filter strips and swales
- Filter drains and permeable surfaces
- Infiltration devices
- Basins, ponds and wetlands

SUDS work by providing storage or flow attenuation and by using the natural processes of sedimentation, filtration and biodegradation to remove pollutants.

The implementation of SUDS is an important part of the overall drainage infrastructure strategy of a given site, and will also provide the underlying basis of the landscape structure. Therefore they should have an intimate relationship with street design and the built form of a proposal. SUDS should be fully integrated into the local environmental setting and where possible offer the opportunity to improve local wildlife habitats. It is important that all development considers the relationship with SUDS as an element of drainage infrastructure as well as a leisure and visual amenity.

The overall objective is to return excess surface water to the natural water cycle with minimal adverse impact on people and the environment. This can be achieved through the attractive design of integral amenity features within the development and still provide significant ecological enhancement compared to conventional drainage options.

As SUDS infrastructure generally contains areas of open water, steep slopes and drops, designers must complete risk assessments which can often lead to attractive designs being compromised by fencing, safety features and safety signage. Whilst these are often necessary, alternative designs and a more pragmatic approach to the risk assessment can remove the need to install these features, enhancing the visual appearance of the SUDS feature.



Figure 02: Examples of SUDS throughout the city (Top: Baldrigon, Bottom: Clearwater)

1.3 Statutory & Policy Background

The requirement for SUDS to be provided within all new housing developments is contained within legislation and national policy. The diagram opposite in figure 03 gives a good overview of the planning process as a whole.

The Scottish Environment Protection Agency (SEPA) is the statutory agency responsible for protecting the water environment in Scotland under the *Water Environment and Water Services (Scotland) Act 2003* (WEWS). On that basis SEPA requires the use of effective and appropriate SUDS features in new developments, with a particular interest in controlling the rate and quality of surface water discharge to watercourses.

Scottish Water is responsible for the future maintenance and capital replacement of public SUDS under the WEWS Act. On that basis, Scottish Water now require new SUDS infrastructure to meet certain standards before the additional investment is granted.

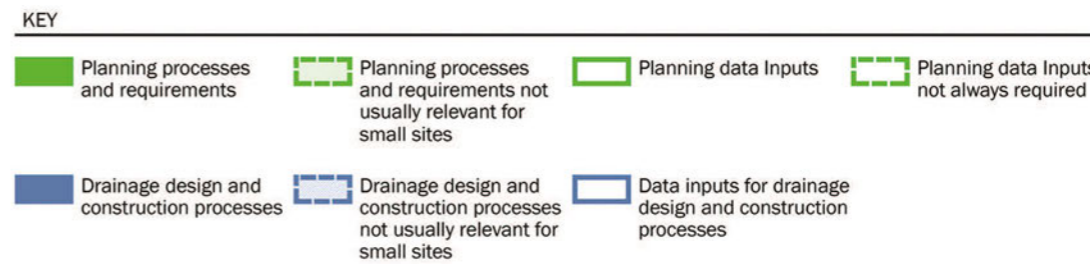
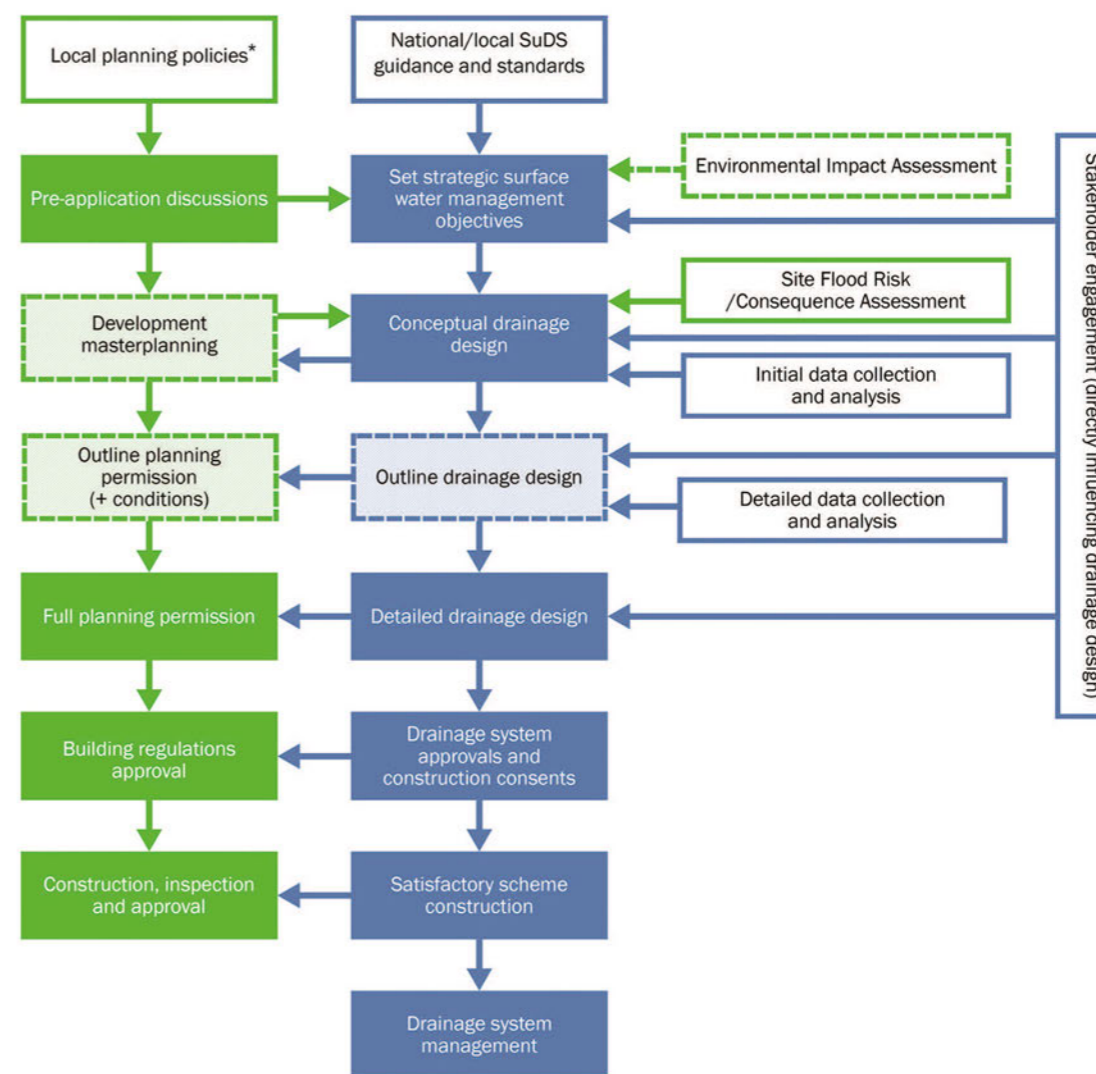
Section 7 of the *Sewerage (Scotland) Act 1968* provides the means for road authorities and Scottish Water to enter into management and maintenance agreements for surface water sewers and drains.

At a national planning policy level *Planning Advice Note (PAN) 61: Planning and Sustainable Urban Drainage Systems (2001)* gives good practice advice for planners and the development industry, complementing *The SUDS Manual C753 (2015)*. PAN 61 also recognises that SUDS aim to deal with the issues of water quantity, water quality and amenity in an integrated manner.

Developers are encouraged by PAN 61 to approach the planning authority at the earliest possible stage to explore which combination of SUDS measures are possible in the particular circumstances.

Often the design of SUDS is left until later in the design process, resulting in them being 'fitted in' to a detailed layout rather than designed as an integral part of the layout. This can often result in poor quality solutions and missed opportunities to maximise the amenity value of the infrastructure.

At a local planning policy level the *Dundee Local Development Plan (2014)* requires surface water to be treated by a Sustainable Urban Drainage scheme and encourages proposals to adopt an ecological approach to surface water management, exploiting opportunities for habitat creation or enhancement through measures such as the formulation of wetlands or ponds.



* Surface water, flood risk, urban design, water, biodiversity, climate resilience, green infrastructure

Figure 03: The drainage system design process: links with land use planning. Source: CIRIA SuDS Manual 2015

2 Whitfield Surface Water Drainage



Notwithstanding the requirement to include SUDS within all new housing developments, Dundee City Council is actively encouraging developers to consider using SUDS infrastructure to support the regeneration of Whitfield, and the principles set out in the [Whitfield Planning Framework \(2015\)](#).

Developers are asked to connect into the regional SUDS infrastructure that has already been provided by the City Council. Figure 04 gives an idea of where future SUDS might be located. This may not be possible in every case, and some systems may instead flow to watercourses or Scottish Water's public sewer. In all cases developers must consider how their SUDS proposals can use best practice design and innovative approaches to enhance the environmental setting and the needs of the current and new Whitfield community.

This section provides details of the existing Whitfield SUDS infrastructure and sets out the approach developers are expected to take when designing SUDS infrastructure in Whitfield.



Figure 04: Map showing the potential location of SUDS (based on topography and other considerations) as part of the greater drainage infrastructure of Whitfield.

2.1 Whitfield Regional SUDS Infrastructure

To remove the cost burden and to reduce the associated land take within Whitfield, Dundee City Council has installed a SUDS drainage infrastructure network incorporating a pipe system and detention basin (Figure 05). This strategic infrastructure is designed to reduce the number of levels of treatment and the volumes of attenuation required within individual development sites, and hence maximise development opportunities. The strategic pipe network leads from the centre of Whitfield to a large detention basin to the south of Drumgeith Road.

The detention basin is designed to accommodate the difference between a 1:30 year storm event and a 1:200 storm event. This provides a second stage of treatment before a controlled discharge to the Dighty Burn. Subject to SEPA requirements this still leaves a requirement for a first stage of treatment at each development site before this surface water enters the pipe network. Therefore, measures to attenuate a 1:30 storm event are required to be provided for each new development.

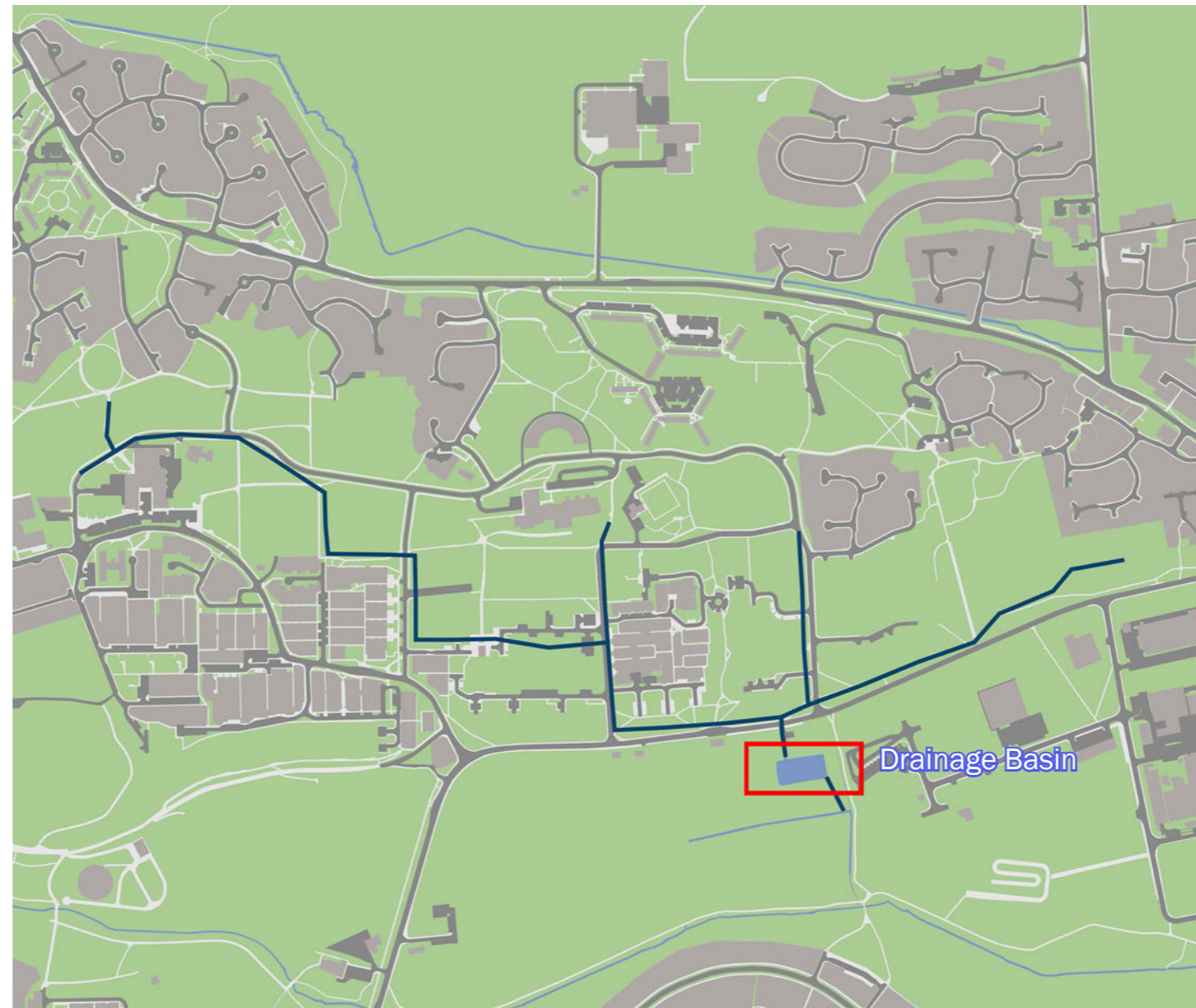


Figure 05: Map showing the path of the drainage pipe system and its connection to the detention basin.

Due to the phased development of sites it is likely that the SUDS infrastructure within early phases of development will have to accommodate later development activity. Figure 04 also illustrates the indicative location and size of SUDS features that would be necessary to support the development of future phases or zones.

Further details on the technical specification of the existing SUDS are contained later in this guidance.

2.2 Whitfield Developer Requirements

New housing developments will be required to connect into existing infrastructure and to meet the principles of the *Whitfield Planning Framework (2015)*. Developers need to fully consider the design and location of drainage infrastructure from the beginning of the planning process.

Two of the relevant key principles of the *Whitfield Planning Framework (2015)* are:

- To make Whitfield a popular place to live and an area with a positive identity; and
- To make Whitfield an area with safe and useful play and recreation spaces.

The Framework also asks that developers consider the provision of open space and landscaping within and around proposed developments.

The Council anticipates that new development can meet these principles in part through design solutions that integrate SUDS features with areas of open space, landscaping or play space. Standard approaches to SUDS infrastructure design are unlikely to create the quality of space envisaged in the Framework, and designers will have to use innovative solutions such as the dual-purpose use of SUDS features as part of the development's landscaping and open space provision.

The Council therefore expects developers to consider non-standard design solutions that take an integrated approach to provision of these elements of infrastructure. For an example of this in action, see figure 06. The following section sets out some best practice examples to illustrate the standard of design that is expected to be provided in Whitfield. However, this approach does not necessarily mean that development costs will be increased. Furthermore, experience in Dundee has shown that this approach can significantly enhance the amenity value of the development and in turn increase the value of surrounding developments.

Developers are asked to engage in pre-application discussions with Dundee City Council's Engineering Division with regards to the technical aspects of the system, and with the Neighbourhood Services Department with regards to the amenity and biodiversity value of the proposed SUDS scheme. This will ensure that drainage strategies submitted with planning applications are both technically competent and an integral and attractive addition to the landscape of the development.

Key Principle:-

Surface water drainage systems in Whitfield should be implemented using above ground SUDS features that provide attenuation of surface water, improve water quality and where possible enhance the amenity value of the area. SUDS features such as ponds and basins should be overlooked and accessible to enable monitoring for maintenance purposes, and integrated into the developers open space and landscaping requirements.



Figure 06: A good example of well-integrated, non-standard SUDS design in Ardler, Dundee.



3 Best Practice

The purpose of this section of the guidance is to use existing examples in Dundee to illustrate the type of SUDS infrastructure that is to be encouraged within Whitfield. It is intended to demonstrate to the designers that it is possible to go beyond the minimum required standards to create SUDS infrastructure that is both functional and visually attractive.

All of the examples illustrated are maintained by either Dundee City Council or Scottish Water.

There is also brief discussion of the importance of the details in the design and how this can improve the long term performance of the system.

3.1 Examples in Dundee

The *Whitfield Planning Framework (2015)* asks developers to provide landscaping and public open spaces as part of their development proposals. Recent developments in Dundee have shown that it is possible to combine SUDS water features with high quality landscaping to create attractive public spaces.

Dundee City Council asks that developers and their design teams consider non-standard solutions that will create SUDS features that form attractive public amenities. Designers should also consider the dual-purpose use of these features as recreational areas to help address open space requirements within development sites.

3.1.1 Ardlar Village Pond

Maintained by Dundee City Council, this acts as a regional detention pond with controlled discharge to a nearby watercourse. This forms an attractive SUDS feature with extensive planting around the water's edge as shown in figure 07.

The pond promotes wildlife in the area and is a popular feature which can have a positive impact on the health and wellbeing of residents as well as providing scenic views from the adjacent housing. Rain water runoff from the Ardlar development is attenuated in the pond and provides a level of treatment before discharging at a controlled rate to a nearby watercourse.

Figures 08 and 09 below offer some examples of how a pond schematic and details might look, and have been taken from the [The SUDS Manual C753 \(2015\)](#) and [Sewers for Scotland \(Scottish Water\)](#) guidance documents.



Figure 07: View towards the Ardlar Village Pond from the southeast.

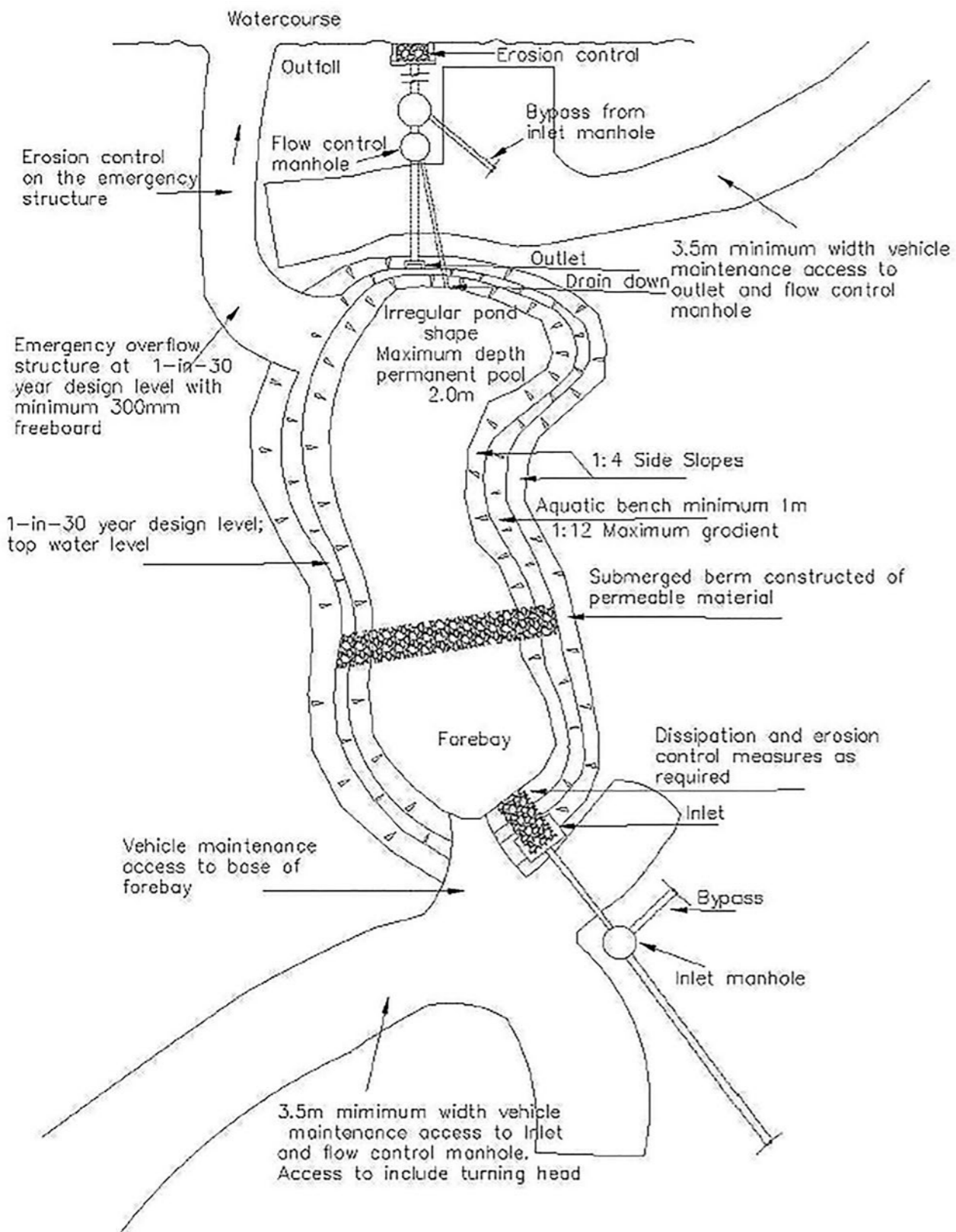


Figure 08: Example of a pond layout. Source: *Sewers for Scotland 3rd Edition (Scottish Water)*

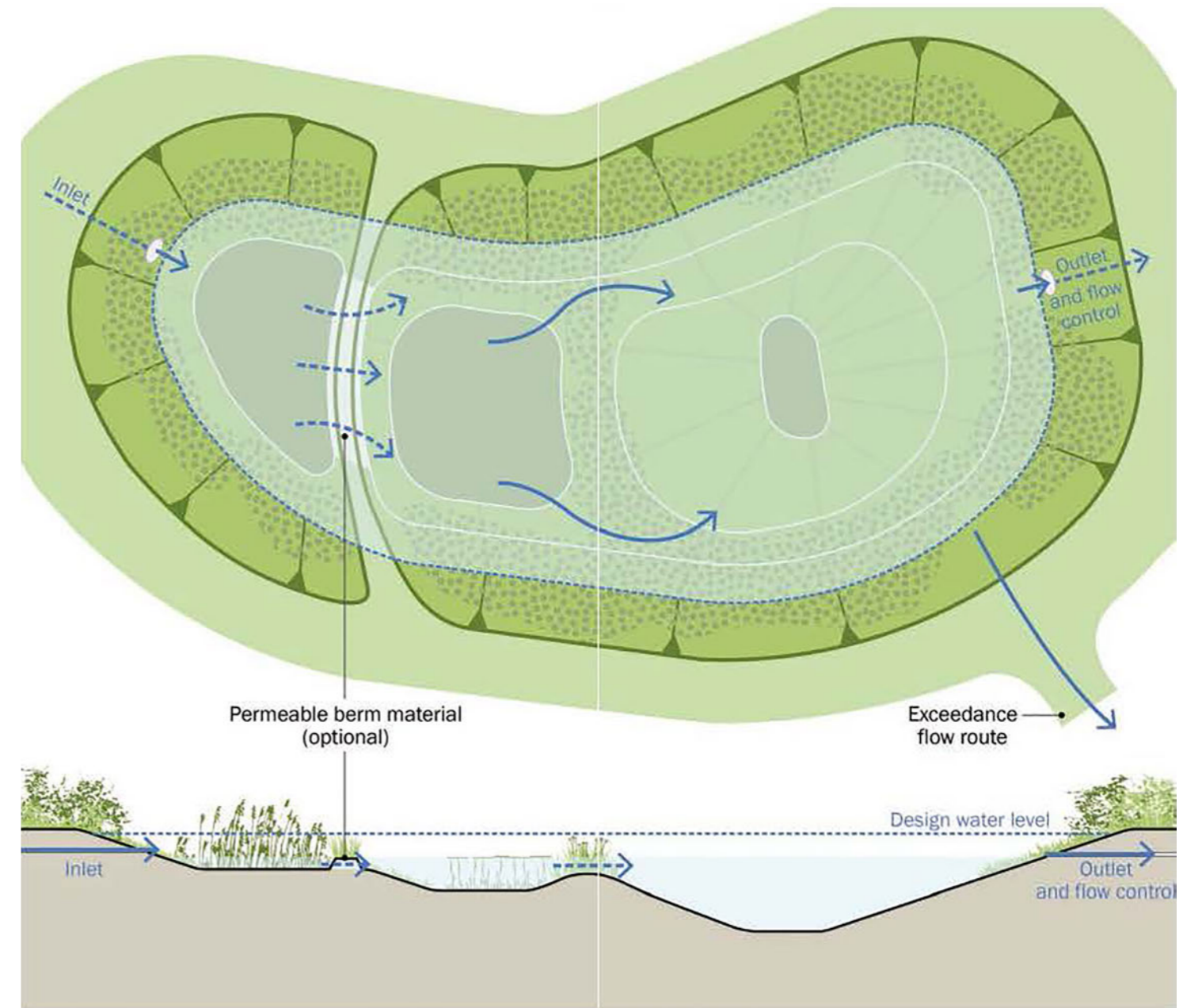


Figure 09: Diagram showing typical pond details. Source: *The SUDS Manual C753 (2015)*

3.1.2 Ardlar Village Basin & Recreational Area

An example of this type of SUDS is also located within the Ardlar regeneration area. This dual-purpose use approach is positively encouraged in Whitfield, as it meets the need to provide public open space as well as attractive SUDS infrastructure.

The Design Risk Assessment (DRA) for the basin in Ardlar identified no requirement for fencing or barrier planting mainly due to its location, the shallow side slopes and the absence of a permanent body of water. This area promotes two different uses: the provision of flood storage during storm weather and a recreational area during dry conditions.

Rain water runoff from the Ardlar development is attenuated in the basin and provides a degree of treatment before discharging at a controlled rate into an existing public sewer.



Figure 10: Established SUDS basin in Ardlar



3.1.3 Baldragon Phase 4 Pond

This example comprises a detention pond that has been landscaped around the waters edge. The planting is yet to fully establish itself around the pond, but in the long term it will form an attractive landscaped feature, with the potential for the surrounding grass area to be made accessible to the public.

This pond is designed in accordance with Scottish Water's *Sewers for Scotland 2nd Edition (2007)* document. The Design Risk Assessment for this basin identified the need for fencing and barrier planting mainly due to the proximity of a children's play park (figure 11). The fencing has been set back from the pond to give a more natural appearance whilst also providing adequate access around the pond for maintenance purposes.

The pond promotes wildlife in the area and whilst also being a popular feature which promotes the health and wellbeing of residents as well as providing scenic views from the adjacent housing. Rainwater runoff from the housing development is attenuated in the pond and provides a level of treatment before discharging at a controlled rate to the public sewer and ultimately to a nearby watercourse.



Figure 11: View towards the Baldragon Phase 4 Pond.

3.2 Detailed Design Features

The purpose of this section is to highlight that the detailed design of SUDS infrastructure can have an impact on the long-term performance of the system. What can initially appear to be a relatively simple issue can result in localised flooding and damage to the SUDS infrastructure and adjoining land and property over an extended period of time.



Figure 12: Examples of some roadside SUDS details.
Source: [SUDS For Roads \(SEPA\)](#)

3.2.1 Swales

Figure 13 shows an established length of swale with shallow side slopes and slightly longer grass provided in the bottom as required to help remove sediment and pollutants. A swale should be of a suitable length, and as such distances of less than 20 metres are not normally supported.

Figure 14 gives an idea of how the technical details of both wet and dry swales might look and is taken from CIRIA's [The SUDS Manual C753 \(2015\)](#).

Although not shown in the diagrams, a swale must have an overflow incorporated to allow rain water to discharge to the surface water sewer once the swale reaches capacity.

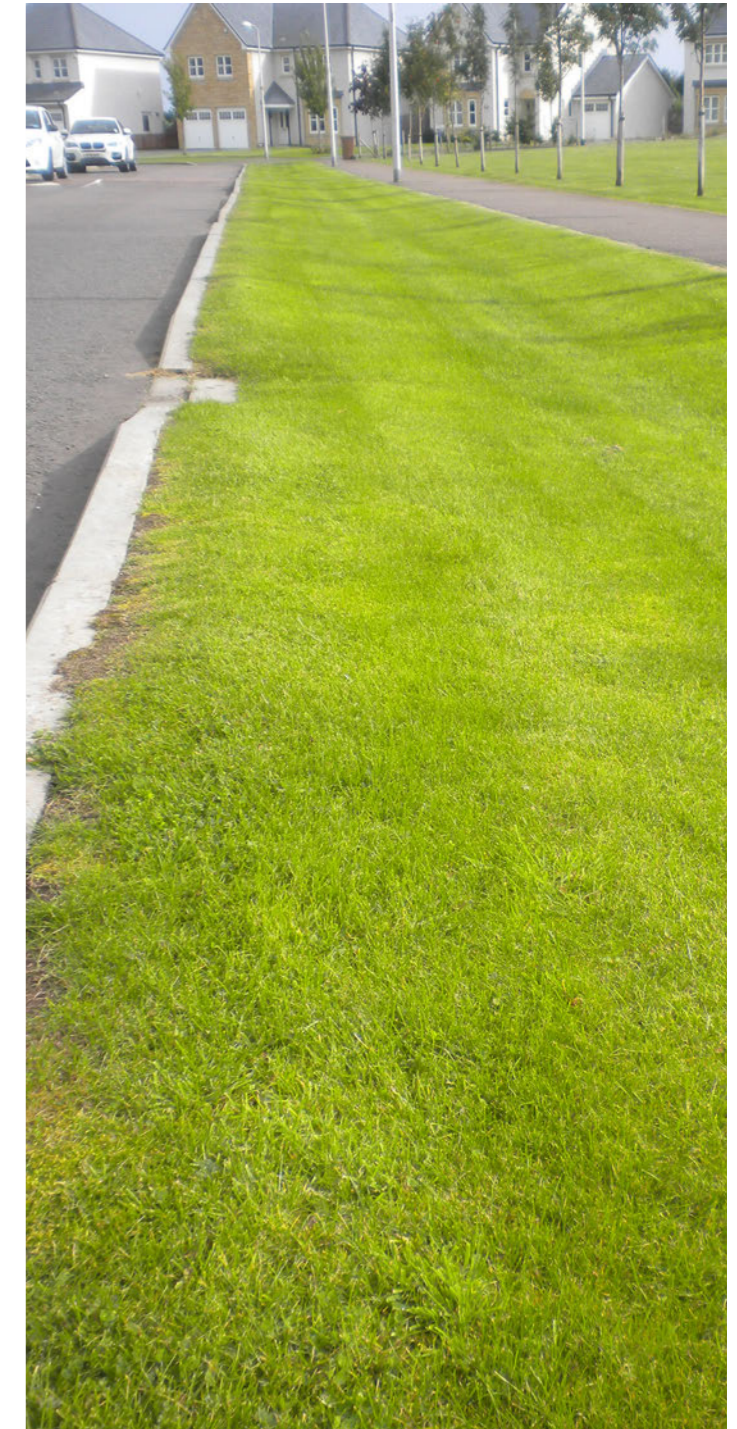


Figure 13: View of an established swale in Lawers Drive, Panmurefield Village.

3.2.2 Offlets

Figure 15 shows a good example of how a concrete slab should be installed on the swale side of an offlet. Without the slab, grass growth around the flush kerb can form a small upstand which reduces the amount of rain water entering the swale and increases the risk of ponding on the carriageway. The slab also provides an area of hardstanding which allows the offlet to be cleared easily. If lack of maintenance does allow a small quantity of sediment to build up at this offlet, it will result in a blockage being located within the swale but will still allow rain water to run off the carriageway into the swale.

Figure 16 demonstrates how inefficient layouts can be improved to allow better movement of water through a SUDS feature such as a swale, and is taken from [*The SUDS Manual C753 \(2015\)*](#).



Figure 14: Example of a swale offlet.



4 Whitfield Technical Guidance

4.1 Site Surface Water Design Criteria

It is vitally important that the SUDS strategy for each site is developed at an early stage and is agreed in principle with Dundee City Council prior to a housing layout being prepared.

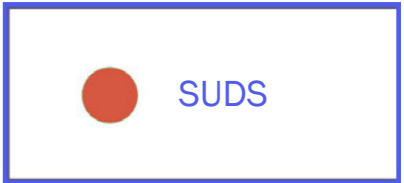
Dundee City Council currently accept only swales, basins, and ponds for adoption and the full details of any SUDS proposals must be agreed during the planning application stage. Note that a swale should be of a suitable length, with distances of less than 20 metres not normally being supported.

The surface water drainage shall be designed in accordance with the most current edition of Scottish Water's [*Sewers for Scotland*](#) document.

Notwithstanding the above, the following hydraulic design criteria shall be followed for development in Whitfield:

- When connecting to either the existing Whitfield SUDS Surface Water Sewer or the existing Whitfield Spine Road Surface Sewer, SUDS must be used to attenuate a 1:30 year storm event (plus an allowance of 30% for climate change) within the site with a discharge rate restricted to no more than 2l/s/ha.
- An overflow shall be provided from each site to allow rainfall from a 1:200 year storm event (plus an allowance of 30% for climate change) to overspill and be conveyed through the existing surface water sewers to the regional detention basin downstream. The maximum discharge rate from a site during a 1:200 year storm event (plus an allowance of 30% for climate change) is to be agreed with Dundee City Council at the pre-application stage of the proposal.
- When connecting the surface water system directly to a watercourse (for example, sites to the north east of Whitfield which will likely discharge to the Whitfield Burn), SUDS must be used to attenuate a 1:200 year storm event (plus an allowance of 30% for climate change) before discharging to the watercourse at a controlled rate which shall be agreed with Dundee City Council at the pre-application stage.
- Designers must note that two levels of treatment will be required if discharging to a watercourse. The discharge rate into a watercourse shall generally be restricted to the equivalent 1:2 year storm event at a greenfield runoff rate. A Flood Risk Assessment (FRA) must also be submitted during the planning application stage when discharging surface water to a watercourse to demonstrate there is no increase to flood risk. Further advice is contained within PAN 69: Planning and Building Standards Advice on Flooding.
- Checks shall be made for the 1:100 year storm event and 1:200 year storm event (plus an allowance of 30% for climate change and an additional allowance of 10% for additional paved areas) to ensure that properties on and off site are protected against flooding during these scenarios.

4.2 Indicative Location & Size of SUDS Features



The map in figure 17 illustrates the indicative location and size of site-specific SUDS features that would be necessary to support future development phases or zones. The exact size and location will be agreed at pre-planning application stage.

If developers are only developing a small part of a development zone they may be required to reserve capacity for future developments on the remainder of the development site. Again this would be agreed with DCC at pre-planning application stage.

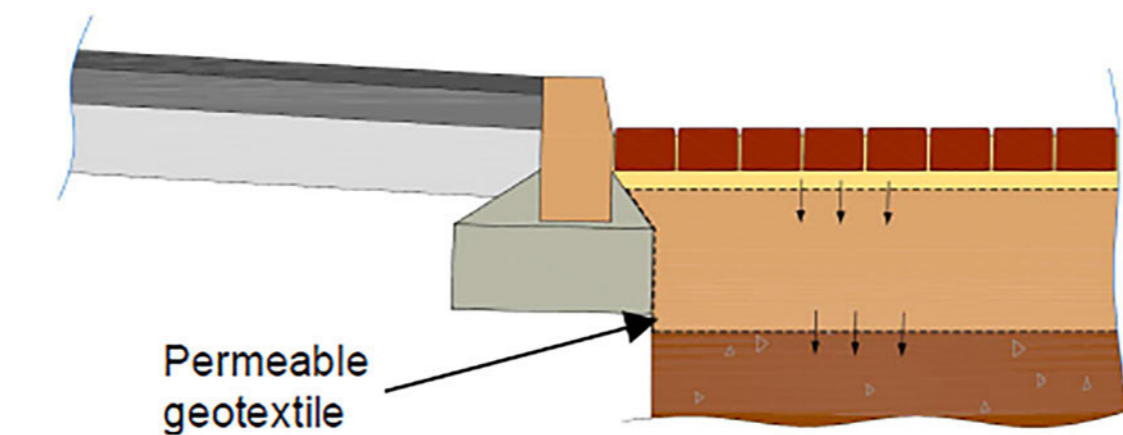


Figure 15: Map showing the potential location of SUDS (based on topography and other considerations) as part of the greater drainage infrastructure of Whitfield.

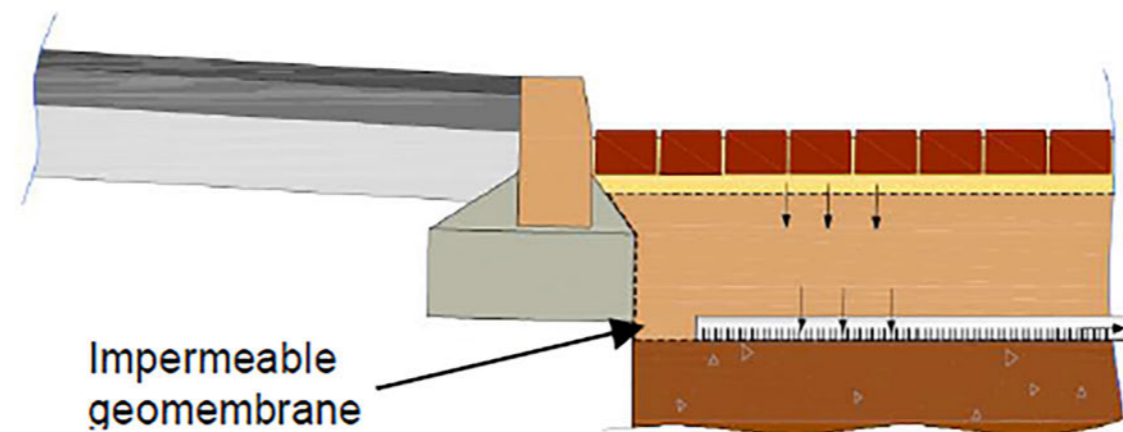
4.3 Individual Housing Plot Surface Water Drainage Criteria

Individual house plots can incorporate 'in curtilage' source control SUDS in the form of permeable paving and soakaway disconnection manholes where appropriate. Some examples of permeable paving details are given in figure 18 opposite. Where such SUDS are to connect to the surface water drainage system their design must comply with the most current edition of Scottish Water's *Sewers For Scotland* document. As stated in Section 7, maintenance schedules associated with any 'in curtilage' source control SUDS should be submitted as part of the initial planning application. These should include details of the maintenance of the SUDS infrastructure within individual housing plots.

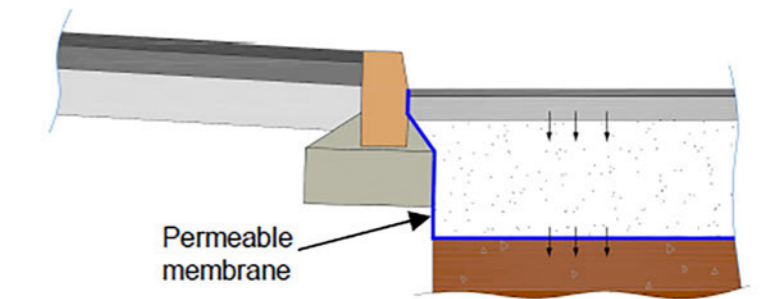
Any other source control proposals may be agreed with Dundee City Council and Scottish Water during the pre-planning application stage.



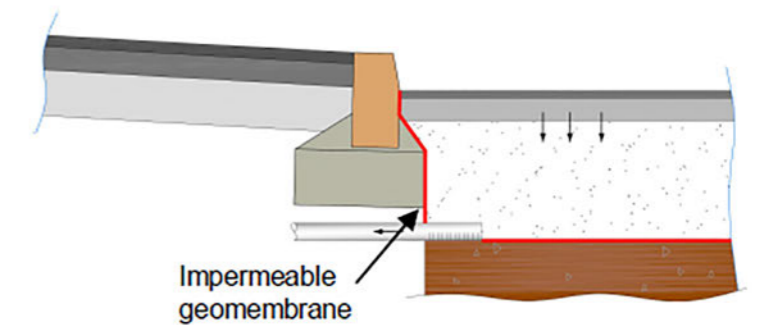
Indicative Section (With Infiltration)



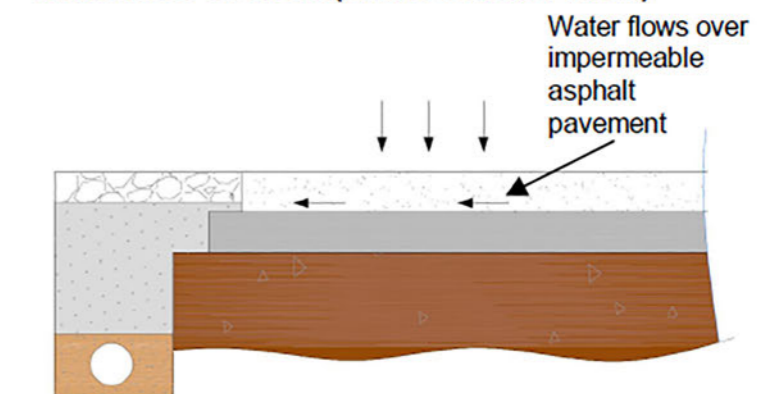
Indicative Section (Without Infiltration)



Indicative Section (With Infiltration)



Indicative Section (Without Infiltration)



Indicative Section Showing Flow Through Porous Surface across Impermeable Binder and Base

Figure 16: Diagrams showing some typical details used in permeable paving solutions. Source: *SUDS for Roads (SEPA)*

4.4 SEPA Consultation

[SEPA](#) shall be consulted during the pre-application stage with regards to water quality and surface water treatment provision.

Where a Flood Risk Assessment (FRA) is required, [SEPA](#) shall be consulted in order to agree the flood modelling flow rates and to review the final assessment.

Section 5 of this guidance makes reference to some relevant documentation currently available from [SEPA](#) on water treatment and flood risk.

Further information can be found on the [SEPA website](#).

4.5 Construction Runoff

Surface water management should also be considered during the construction phase. Construction run-off from each site is to be managed to ensure that there is no increase to the risk of flooding on- or off-site and to ensure that the water quality in the surrounding watercourses is maintained. This is a legal requirement under General Binding Rule 10 of the [Water Environment \(Controlled Activities\)\(Scotland\) Regulations 2011](#).



Figure 17: A swale under construction. Source: [The SUDS Manual C753 \(2015\)](#)



5 Balancing Good Design & Technical Requirements

Designing SUDS infrastructure to fit within Whitfield will be a complex process given the local topography and the brownfield nature of the development sites. Standard design solutions may be more straightforward to design and implement, yet these will likely fail to maximise the opportunities outlined in this guidance.

A particular issue with standard design solutions and recommendations from Design Risk Assessments (DRAs) can be the need to include unattractive safety measures such as perimeter fencing and signage.

To aid designers, and to suggest ways to avoid the use of standard design solutions, this section of the guidance includes a list of sources of additional written advice and then sets out some simple ways of reducing risk through design.



Figure 18: View towards the Baldragon Pond.

5.1 Additional Sources of SUDS Design Advice

There are numerous items of legislation, regulations, and design guidance documents available for SUDS. Below is a list which includes some of the documents which can be applied to SUDS design in Whitfield:

- [*Scottish Planning Policy \(2014\)*](#)
- [*PAN 61: Planning and Sustainable Urban Drainage Systems \(2001\)*](#)
- [*PAN 69: Planning and Building Standards Advice on Flooding \(2004\)*](#)
- [*The Water Environment \(Controlled Activities\) \(Scotland\) Regulations 2011 \(The CAR Regulations\)*](#) and associated Practical Guide prepared by SEPA.
- [*The SUDS Manual C753 \(2015\)*](#) published by CIRIA
- Current edition of [*Sewers For Scotland*](#) (currently 3rd Edition)
- [*SUDS For Roads \(2015\)*](#)
- [*Sustainable Drainage Systems \(2013\)*](#) published by RSPB & WWT
- [*Development and Flood Risk C624 \(2004\)*](#)
- [*Drainage Assessment – A Guide For Scotland \(2005\)*](#)
- [*Sustainable Urban Drainage Systems \(SUDS or SUD Systems\) – Regulatory Method \(WAT-RM-08\) \(2017\)*](#) published by SEPA.
- [*Technical Flood Risk Guidance For Stakeholders \(SS-NFR-P-002\) \(2015\)*](#) published by SEPA
- [*SEPA Standing Advice For Planning Authorities And Developers On Development Management Consultants - SEPA Land Use Planning System Guidance Note 8 \(2012\)*](#)
- [*Site Handbook for the Construction of SUDS \(C698\) \(2007\)*](#)

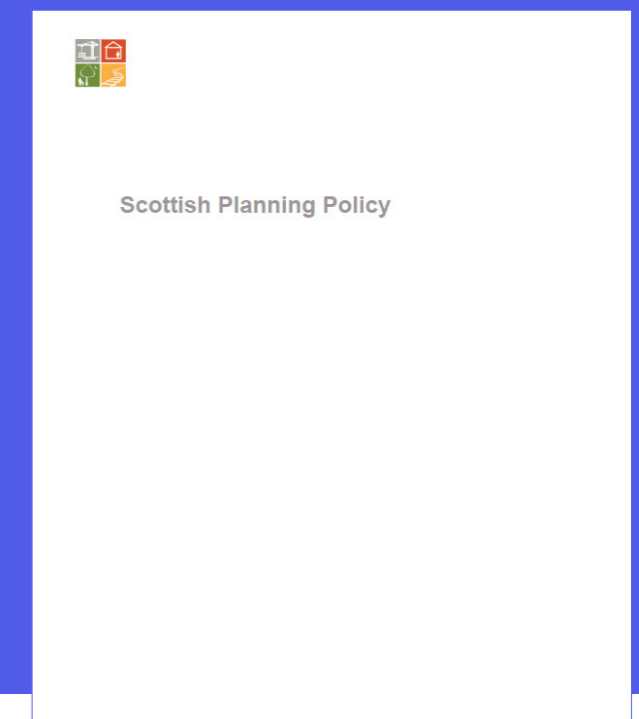
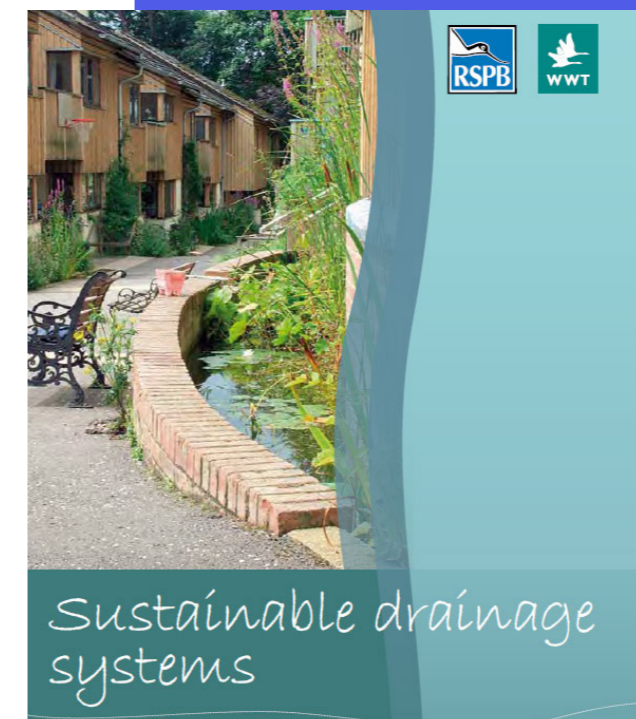
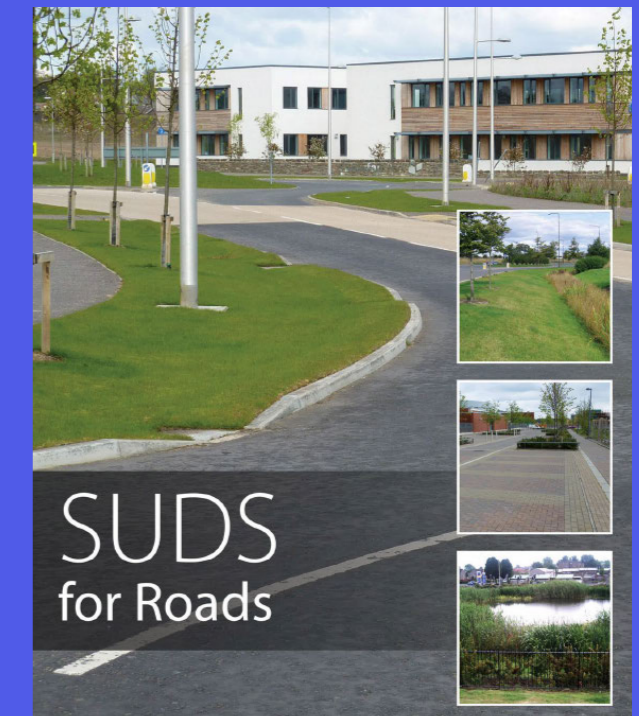


Figure 19: Some examples of other relevant guidance documents available to developers.

5.2 Risk Reduction Through Design

SUDS – particularly open ponds and wetlands – are often perceived as posing a risk of drowning. A key part of the SUDS design process is the developer’s Design Risk Assessment (DRA), and this can result in perimeter fencing and warning signs that can have a prominent and unsightly appearance in what are otherwise attractive amenity areas.

Careful design can help to minimise or design out risks so that SUDS features pose little or no health and safety risk, and therefore reduce the need for fencing and signage. In particular the following points should be given consideration when designing SUDS features:

- The avoidance of large deep ponds;
- Shallow side slopes to any SUDS features, reducing the need for perimeter fencing or signage;
- Incorporation of shallow shelves in the design of ponds, again reducing the need for perimeter fencing or signage;
- The avoidance of significant changes in level within any basins which are to serve a dual-purpose use as recreational areas, making them more useable play spaces.
- Children’s playparks can be located away from SUDS features that contain permanent water, also reducing the need for perimeter fencing or signage; and
- The provision of appropriate plant species can be used to create a hostile vegetative barrier around any SUDS features with permanent water – although this may still require temporary fencing until the planting has reached a suitable height and depth.

All of the above measures are subject to the requirements determined by the developer’s Design Risk Assessment (DRA). Designers are encouraged to seek design solutions that remove the need for permanent perimeter fencing and signage.



Figure 20: Examples of perimeter fencing around a detention basin and pond. From top to bottom: Fithieburn and Longhaugh.

6 Maintenance

Poor design and maintenance of SUDS infrastructure can result in the system failing to perform to the required standards. Impacts are likely to include localised flooding and damage to the SUDS infrastructure and adjoining land and property.

Given the nature of the development in Whitfield it is likely that the housing development will take place in a phased manner, over several years with several developers. This could potentially leave a legacy of varying design and maintenance requirements.

The purpose of this section is to highlight the need for developers to produce a maintenance schedule and ensure that a nominated person or body is responsible. This should be prepared alongside the drainage strategy at the outset of the design process.

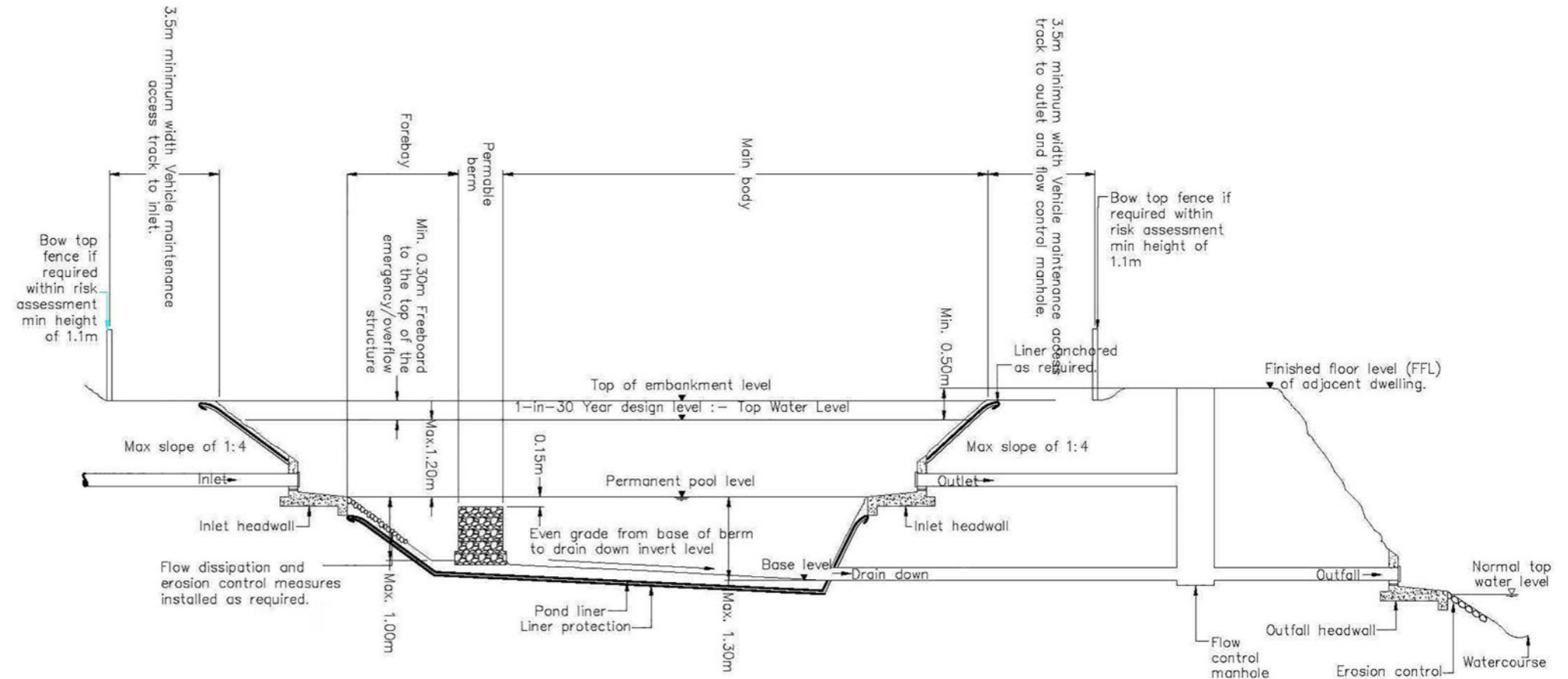


Figure 21: Cross-section of a pond showing recommended clearances for maintenance purposes. Source: *Sewers for Scotland 3rd Edition (Scottish Water)*



6.1 Maintenance Responsibility

Where a SUDS feature collects water from curtilage(s) and road(s), maintenance responsibility for any SUDS features will lie jointly with Dundee City Council and Scottish Water. The developer must agree the principles of the maintenance responsibilities with both Dundee City Council and Scottish Water during the pre-application stage, and where necessary a formal agreement between the two organisations will be put in place once the planning application process has concluded.

It must be emphasised that where a formal agreement for joint maintenance is to be put in place, each site will be examined on its own merits during the pre-application stage with regard to adoption and vesting responsibilities. Any drainage infrastructure which Dundee City Council will become responsible for maintaining shall be included within the Roads Construction Consent application under the [Roads \(Scotland\) Act 1984](#).

There may be some occasions when only Scottish Water will vest SUDS systems and this will be confirmed by Scottish Water during the planning application stage. Please note that planning permission may not be granted without written confirmation that Scottish Water will vest the system.

If the SUDS feature is collecting adopted road water only (for example, a swale) then maintenance responsibility for the feature will lie wholly with Dundee City Council and will be confirmed during the pre-application stage.

Before Dundee City Council formally accepts its agreed maintenance duties, the developer shall follow the requirements of the Road Construction Consent process.

Scottish Water's vesting process includes the issue of a Vesting Certificate. The developer will remain responsible for all costs associated with defects and hard blockages in the drainage system which is to be vested with Scottish Water until the end of the 2 year guarantee period which starts from the issue of the Vesting Certificate. Full details of Scottish Water's vesting process can be found in the current edition of Scottish Water's [Sewers for Scotland](#) document.

Any 'in curtilage' source control SUDS will become the responsibility of Scottish Water or the property owner. The developer shall clearly establish the ownership and maintenance of any such SUDS which connect to the public drainage system during the planning application stage. This will involve discussions with Scottish Water and compliance with the most current edition of Scottish Water's [Sewers for Scotland](#) document.

6.2 Maintenance Schedule & Design Risk Assessments

During the planning application stage a maintenance schedule for any SUDS features must be submitted that clearly identifies the frequency of inspections and any regular maintenance work which is to be completed. The maintenance schedule shall also identify who will be responsible for the maintenance work. This is preferred to be a perpetuity body.

Guidance on SUDS operation and maintenance requirements can be found in current SUDS documentation including the current edition of Scottish Water's *Sewers for Scotland* document, *The SUDS Manual C753 (2015)*, and *SUDS for Roads (2015)*.

SUDS features such as ponds and basins should be accessible to enable monitoring for maintenance purposes and integrated into the developers open space and movement requirements.

A Design Risk Assessment (DRA) must also be submitted during the planning application stage, which includes maintenance-related health and safety residual risks. Section 7 of this guidance contains further details of documentation to be submitted at the planning application stage.

| Maintenance schedule | Required action | Typical frequency |
|----------------------|---|--|
| Regular inspections | Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability | Annually and after severe storms |
| | Inspect soil substrate for evidence of erosion channels and identify any sediment sources | Annually and after severe storms |
| | Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system | Annually and after severe storms |
| | Inspect underside of roof for evidence of leakage | Annually and after severe storms |
| Regular maintenance | Remove debris and litter to prevent clogging of inlet drains and interference with plant growth | Six monthly and annually or as required |
| | During establishment (ie year one), replace dead plants as required | Monthly (but usually responsibility of manufacturer) |
| | Post establishment, replace dead plants as required (where > 5% of coverage) | Annually (in autumn) |
| | Remove fallen leaves and debris from deciduous plant foliage | Six monthly or as required |
| | Remove nuisance and invasive vegetation, including weeds | Six monthly or as required |
| | Mow grasses, prune shrubs and manage other planting (if appropriate) as required -- clippings should be removed and not allowed to accumulate | Six monthly or as required |
| Remedial actions | If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled | As required |
| | If drain inlet has settled, cracked or moved, investigate and repair as appropriate | As required |

Figure 22: Example of a maintenance schedule for green roofs.
Source: The SUDS Manual C753 (2015)



7 Planning Application Requirements

The purpose of this section is to set out the drainage related information that Dundee City Council requires to be submitted with planning applications for development in Whitfield.

Developers and their design teams are expected to consider SUDS design at the start of the development process rather than attempting to fit a SUDS into detailed development layout plans. Experience has shown that the latter approach can cause avoidable delays to the submission and the assessment of planning applications, and a reduction in the quality of the overall design of the development.

Applicants should note that the failure to provide the following information when requested during the assessment of an application for planning permission may lead to refusal of permission.

It is good practice that the following drainage documentation should accompany an application for planning permission:

- Drainage Statement/Drainage Impact Assessment which gives an overview of the drainage design for the development. The Drainage Statement/Drainage Impact Assessment can also incorporate some of the documentation below.
- Drawing showing plan view of drainage layout proposals (final approved drainage layout drawing to be submitted in AutoCAD format).
- Drawing showing long sections through proposed drainage.
- Drawing showing typical drainage details including manholes etc.
- Surface Water drainage design calculations including Microdrainage drainage design files where available. These should be accompanied by signed/completed “Sustainable Drainage Design Compliance” and “Sustainable Drainage Design - Independent Check” Certificates
- Drawing showing landscaping proposals for any SUDS features.
- Surface water drainage Design Risk Assessment.
- Surface water drainage Maintenance Schedule including any maintenance associated with individual ‘in curtilage’ source control SUDS.
- Confirmation of proposed ownership/maintenance responsibility to be confirmed on a signed/completed “Confirmation of Future Maintenance of Sustainable Drainage Apparatus” Certificate for the surface water drainage system components.
- Where the surface water drainage system is to connect to an existing Public Sewer, evidence of Scottish Water Technical Approval/Approval To Connect along with the maximum permissible discharge rate.
- SEPA comments on surface water drainage proposals in relation to water quality and treatment levels.
- Where infiltration is being considered, a Ground Investigation Report detailing the site ground conditions and porosity test results.
- Where appropriate, a Flood Risk Assessment accompanied with signed/completed “Flood Risk Assessment Compliance” and Flood Risk Assessment - Independent Check” Certificates.
- Any other documentation requested by DCC relating to the surface water drainage system and flood risk.

Where a site is to discharge surface water directly into an existing watercourse a Flood Risk Assessment (FRA) must also be submitted with the planning application.



8 SUDS Outcomes

Guide...

- The development of new housing and their associated surface water drainage requirements.

Create...

- New habitats for local wildlife to occupy.
- New SUDS basins that connect to the existing drainage infrastructure.

Highlight...

- Opportunities to create new SUDS infrastructure.
- Opportunities to enhance existing SUDS infrastructure.
- Opportunities to address SUDS requirements through high quality design.
- The benefits of detailed design in relation to the long-term performance of SUDS infrastructure.

Enhance...

- The biodiversity and overall quality of local wildlife habitats.
- The local character and identity of Whitfield.
- The local environmental setting.

Ensure...

- That adequate maintenance is provided for all SUDS infrastructure.
- That SUDS are integrated into the design of all new housing developments.

Improve...

- The environment for local residents.
- The economic status of the area by making Whitfield a more attractive place to live and work.
- The health and wellbeing of local residents.

Encourage...

- Developers to participate in pre-application discussions with the council.
- The design of SUDS with dual-purpose uses.
- Designers to incorporate SUDS within high quality open space and landscape provision.
- Designers to consider non-standard design solutions.