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WATER ASSESSMENT AND DRAINAGE ASSESSMENT GUIDE

A guidance document for developers, planners and others involved in water and drainage

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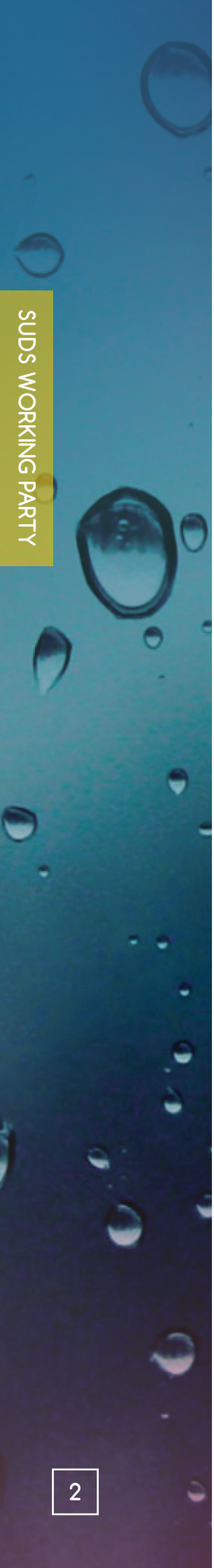

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FOREWORD

This document is produced by the Sustainable Urban Drainage Scottish Working Party (SUDSWP): a multi-stakeholder group established to promote the use of sustainable drainage in Scotland.

Members of the SUDSWP represent the following groups

- Scottish Environment Protection Agency (SEPA)
- Scottish Water
- The Scottish Government
  - Planning and Architecture Division
  - Building Standards Division
  - Transport Scotland
- Homes for Scotland
- Scottish Enterprise
- Society of Chief Officers for Transportation in Scotland (SCOTS)
- Royal Incorporation of Architects in Scotland (RIAS)
- Landscape Institute Scotland (LIS)
- Heads of Planning Scotland (HOPS)

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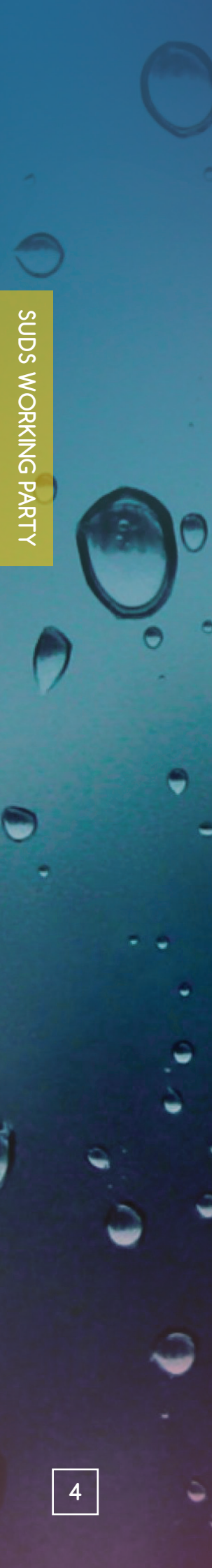

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CONTENTS

1

INTRODUCTION, PURPOSE AND BACKGROUND

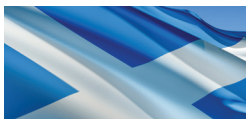
This guidance is produced on behalf of the Sustainable Urban Drainage Scottish Working Party (SUDSWP) and supersedes the previous guidance "Drainage Assessment: A Guide for Scotland"[1]. This document includes water supply advice and is intended to help guide those involved in the installation of water and drainage infrastructure (both new and retrofitting) through the necessary stages to obtain relevant permissions and comply with standards and policies.

The target audience of this guidance are primarily those involved in the design and management of water infrastructure in addition to planners. It provides advice on the steps, processes and stakeholder engagement usually required before permission to construct new water supply and drainage systems can be granted. This guidance, however, does not attempt to provide comprehensive coverage of all aspects of drainage and water infrastructure design, nor to advise on design of a development.

This document primarily aims to assist the applicant with advice on the procedures for a range of water and drainage matters that require assessment to gain the relevant permissions to proceed with any development. It also provides support to local authority planners particularly in relation to Development Planning. It is important to understand the process and complete forms properly as this will expedite the application. This guidance helps with this understanding, for example, timings and response periods, and what each relevant authority will be expecting.

This guidance takes account of European Directives *Water Framework Directive*[2] and the *Floods Directive*[3] as transposed into Scots Law in addition to considering climate change and the need for adaptation and mitigation measures[4].

The role of planning has long been understood however the importance of multi-stakeholder cooperation and partnership working will become increasingly paramount if we are to ensure long-term sustainable water management. Hence, for development work to take place, water supply and a satisfactory means of disposing of both surface and foul water must be provided. These are material planning considerations and without adequate provisions, permission for the development may be delayed and/or refused.



While we recognise that the basic requirement for a developer is to obtain an effective drainage system for the site the opportunity exists for an approach which meets the demands of the developer and also gives due consideration to other fundamental aspects of the water cycle. This includes flood risk management, environmental protection and the potential for the delivery of

increased biodiversity. Recognising that all of these issues are fundamental to the delivery of good development will be to the benefit of the planners, the developers and most importantly the occupants/users of the development. It will lead to the creation of successful, sustainable and liveable spaces and places that are functional, i.e. the sites are capable of delivering the services that the built environment needs, including drainage all in line with a modern planning approach.

As part of this, government policy advocates the use of multi-functional SuDS (Sustainable Urban Drainage Systems or Sustainable Drainage Systems) and green infrastructure. This guidance highlights how to achieve the use of these approaches.

Fully informed decisions on the management of the water cycle should be underpinned by appropriate technical input. This provides the opportunity to create developments that are more resilient to factors like climate change as well as being cost-effective for developers.

"This is simply a guide for anyone that is involved in installing water related infrastructure who needs to understand the steps and processes and stakeholders involved."

Authorities often receive inadequate applications which results in weeks of delay as the necessary details are sought. When the applicant engages early with the relevant stakeholders and authorities, it can save delays and considerable expense. We encourage applicants to discuss their proposals with all relevant parties at the earliest stage to expedite the process.

The process may appear to be cumbersome initially, but should be straightforward for smaller developments. Often, larger developments require more deliberation and there can be many co-planning assessments, for example an environmental statement and environmental impact assessment. Typically, the larger the development, the greater the potential risk to the environment and increased awareness of environmental impact from flooding etc.

We expect the applicant to have some knowledge of the process and become familiar with the role of each authority. We strongly recommend discussing the proposal with each authority collectively at an early stage.

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[1] Drainage Assessment – a Guide for Scotland; produced by SUDSWP (2005) – now superseded by this document

[2] European Commission (2000) *Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000: Establishing a Framework for Community Action in the Field of Water Policy. Official Journal 22nd December 327/1* European Commission, Brussels

[3] European Commission (2007) Directive 2007/60/EC The EU Floods Directive European Commission, Brussels

[4] http://www.climatexchange.org.uk/

2

INTRODUCING THE APPROVALS PROCESS

The process towards receiving all approvals for completing a development can be complex. Figure 2.1 does not include every action and is a deliberately simple model of the steps required. It provides an indication of the requirements to confirm the disposal of wastewater, management of surface water and supply of water. A more detailed approach can be found from individual stakeholder websites.

In practice, the level of detail that needs to be provided in a planning submission is normally expected to be commensurate with the scale and nature of the development proposals. Exact details will vary so early consultation with the planning authority is to be recommended in most cases.

In addition, lead-in time and pre-application effort tends to be less for smaller developments, whilst larger developments with a greater potential for environmental impact usually require significant master planning and impact assessments that can involve substantial effort and expense.

All regulatory parties including the local authorities, SEPA (in relation to water quality) and Scottish Water encourage discussion at an early stage to make the approvals process smoother. It is recommended that potential applicants consult with these authorities as soon as the overall shape and nature of the proposed development has been identified. Face to face meetings with the authorities are often a very efficient and valuable format for discussing potential issues, although it is recognised that such meetings may not be strictly necessary in all circumstances.

Figure 2.1 outlines the staged requirements for an applicant to set the context for this guidance. Each chapter provides support for the applicant by:

- **Chapter 3** – introduces water and drainage assessments providing an indication of what information is required
- **Chapter 4** – shows a summary of the roles and responsibilities of the various stakeholders, which is expanded in Appendix 1
- **Chapter 5** – focusses on water supply and the requirements for proposed development
- **Chapter 6** – focuses on wastewater requirements including the need for treatment
- **Chapter 7** – discusses surface water arrangements and general aspects about SuDS
- **Chapter 8** – goes into more detail about hydraulic aspects of SuDS and managing exceedance flows
- **Chapter 9** – provides a series of checklists related to the various stakeholders

Preliminary Stage
Discussion with relevant authority

↓

Submission of Pre-Development Enquiry Form
Establish if a water impact survey is required
Establish if a drainage impact assessment is required

↓

Drainage Design
Outline solutions need to be considered at the early stages of the overall design and the scheme developed in more detail as development plans progress

↓

Agreement of SuDS
Prior to planning approval
Includes all revelant parties: SEPA, LA, Scottish Water, others as appropriate

↓

Water Supply Design
Outline of water supply arrangements

↓

Adoption and Maintenance
Discussion with relevant authority

↓

Formal Approvals
Planning permission; SEPA authorisation
Reimbursement cost contribution (water and drainage)

↓

Constuction Inspections
Building Standards; SEPA; Scottish Water as appropriate

↓

Completion of Development
Maintenance period and land transfers

↓

Adoption/Vesting Process
Final maintenance (de-silting,etc.) prior to handover

↓

Long-Term Stewardship
Maintenance programme specifying what will be delivered and by whom. To include specific programme dates

Figure 2.1 Flowchart of application and construction process

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WHAT ARE WATER ASSESSMENTS AND DRAINAGE ASSESSMENTS?

Water Assessments and Drainage Assessments help to identify sustainable methods for the following objectives:

- Supplying water;
- Disposing of waste water;
- Draining surface water; and
- Managing surface water flooding

Present the outcomes of these assessments in reports along with any applicable supporting information.

The reports should demonstrate that predicted growth or proposed development is sustainable and that appropriate infrastructure is in place to allow the above objectives to be met without having a detrimental effect on the environment.

The majority of development proposals will usually require that the above objectives are met before construction can commence. Consider these issues together at all stages of the planning system to ensure that growth and new development is sustainable (Figure 3.1).

Sustainable development means ensuring that the environment can:

- Provide water for potable supply;
- Accept discharges of surface water and treated waste water without any detrimental impact;
- Support any additional infrastructure required to deliver the above; and
- Support growth without any increase in flood risk

When preparing a water or drainage assessment, it is important to engage with key stakeholders to discuss the details of what is likely to be required before securing the necessary approvals. Doing this will save time overall as opinions and experience are shared to the benefit of all involved.

Water Assessments and Drainage Assessments tend to be required to support site-specific development and are normally commissioned by private organisations. They are distinct from Surface Water Management Plans and Strategic Flood Risk Assessments, which have a regional focus and commissioned by local authorities.

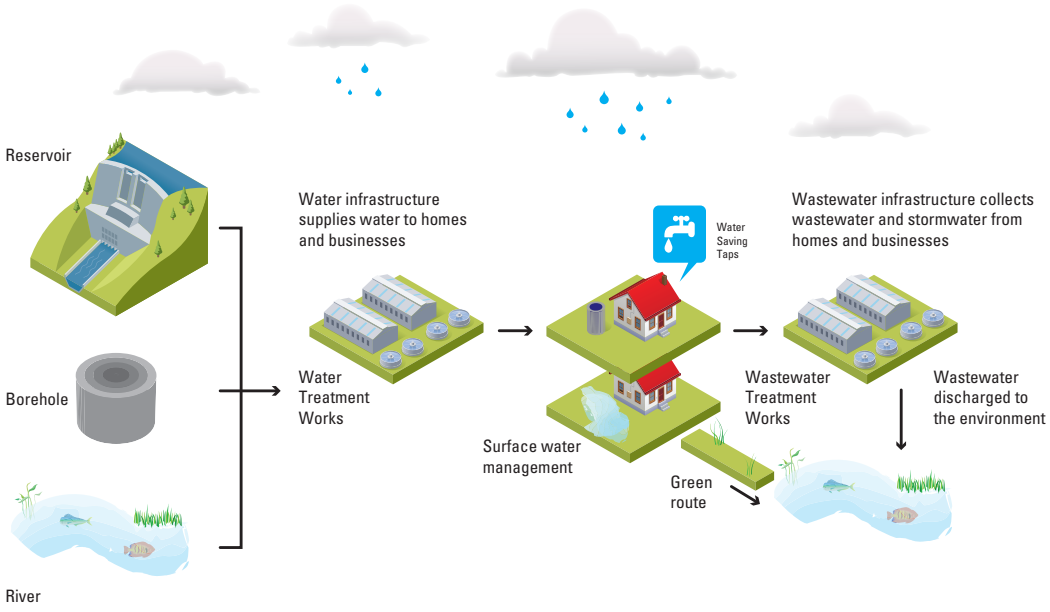

Figure 3.1. Example of the water environment and infrastructure components.

3.1. What should Water Assessments and Drainage Assessments contain?

Water and drainage assessments are likely to require:

- A number of different technical assessments[5] to be carried out e.g. potable water supply, waste water disposal options, or how additional surface water runoff from the new development will be sustainably managed;
- Multi-disciplinary input to undertake the assessments and make proposals for the sustainable management of water; and/or
- Consultation with a number of different authorities responsible for the regulation of development and water infrastructure e.g. local authority planners, roads engineers, flood risk officers and building standards surveyors, in addition to representatives from Scottish Water, and SEPA

The results of these assessments are normally provided in a report which contain all relevant supporting information. Section 5 to 8 and Figure 2.1 outlines the typical information required for these assessments[6]:

[5] For details see Sections 5 and 6

[6] It is not practicable to provide an exhaustive list of all potential requirements here as each assessment will be bespoke to and will need to consider the specific requirements of each individual development. The list provided however is intended to represent the typical requirements in most cases.

3.2. Development Planning Stage - planning for predicted growth within a local authority district

Local Planning Authorities have a responsibility to consider water and drainage needs for potential future development to inform strategic and local development plans. This is done in consultation with SEPA and Scottish Water. They assess whether sufficient infrastructure is in place and information available to sustainably deliver the water requirements of planned growth and development. The Local Planning Authority therefore needs to address questions such as:

- Is there enough water in the environment to supply projected growth levels without having a detrimental effect? (often termed 'environmental capacity for water supply'). *This assessment should take into account current and estimated future demand whilst also considering climate change;*
- Is the existing water supply infrastructure sufficient to supply projected growth levels?
- Can the water environment cope with more waste water disposal resulting from increased growth projections without a detrimental effect? *The environmental capacity assessment for waste water disposal should take into account the current and estimated future capacity, and climate change.* These assessments should be in-line with SEPA's River Basin Management Plans [7]
- Is the existing waste water infrastructure sufficient to meet projected growth levels? *This assessment should take into account current and estimated future loading of the sewer system, climate change and urban creep* [8]
- Can projected growth be accommodated without increasing flood risk (including to and from the development) whilst taking into account climate change and urban creep
- Are there other constraints such as *SSSI* [9] *or Tree Preservation Orders? Other examples could be areas of archaeological importance or locations with contaminated land.*
- Can surface water drainage be provided using surface arrangements that maximise the "pipe-free" system and avoid underground storage?
- What and where are the main constraints for enabling future growth? For example:
  - Environmental constraints (water quality and quantity);
  - Infrastructure constraints; and
  - Flood risk constraints?

[7] River Basin Management Plan – see Section 4; Roles and Responsibilities for SEPA.
[8] 'Urban Creep' refers to the gradual expansion of built-up areas over time. Also referred to as 'Urban Sprawl'
[9] Sites of Special Scientific Interest

- What are the likely impacts of climate change? *The above considerations should also take into account potential constraints that may arise due to climate change. Particular consideration should be given to those constraints that are likely to be more susceptible to climate change, such as potable water supply and flood risk.*
- What opportunities are there to mitigate these constraints, for example:
  - Can the location of development be changed to areas where there is more environmental or infrastructure capacity?
  - Can plans be put in place to manage and reduce water use and demand?
  - Can plans be put in place to manage and reduce surface water flood risk?
  - Can plans be put into place to decrease demand on waste water networks and treatments works? and
  - Are there opportunities for measures with multiple benefits? For example, capturing rain water for re-use can:
    - Decrease demand on mains water;
    - Reduce surface water going into the sewer creating more capacity;
    - Reduce the amount of runoff on the surface water reducing surface water flood risk, and
    - Help to be more adaptable to climate change
- What regional flood risk assessments or surface water management plans have been carried out and what are the implications and/or recommendations?

3.3. Development management stage - for a particular proposed development –

Those wishing to secure planning permission for site-specific developments will usually need to undertake Water Assessments and Drainage Assessments to demonstrate that water and drainage provisions can be provided and that sustainability has been taken into account. It is recommended that the applicant reviews the Local Development Plan to inform a specific application/ development. The applicant undertakes these assessments and normally needs to include:

- A summary of any consultation with relevant authorities;
- Details of how potable water will be supplied (and any supporting information);
- Measures to reduce water use in the development;
- Details of how waste water will be treated and disposed (and any supporting information);

- Details of how surface water will be drained, treated and managed. This assessment should consider the "*6 qualities of successful places*"[10] and solutions should where possible use surface arrangements and avoid piped systems and underground storage;
- Details of how drainage exceedance[11]/surface water flooding will be managed. These solutions may use roads, public open space or playing fields for flow conveyance or storage as appropriate;
- Arrangements for the long-term management and maintenance of drainage assets including SuDS (Sustainable Drainage Systems);
- Consideration of any flood risk assessments or surface water management plans that may have been carried out;
- An acknowledgement of who is responsible for determining if the proposals for managing water are acceptable, see Section 3 - Roles and Responsibilities;
- Adaptation plans for future circumstances, e.g. climate change and urban creep; and
- A summary of the approval process, e.g. the requirement to secure relevant consents from SEPA, Scottish Water, or the Local Authority. Section 3 includes further details of this

3.4. Who should the assessments be submitted to?

Submit Water Assessments and Drainage Assessments along with full details of the planning proposals to the planning authority at the relevant stage in the planning process as outlined in Figure 2.1.

The assessments may be used to support consultation with different authorities such as regulators or infrastructure providers. This can provide information to assist in gaining the required permissions / authorisations. For example, it may help get a roads construction consent, an abstraction or discharge licence from SEPA, or requirements for connecting to Scottish Water infrastructure.

3.5. Who should undertake the assessments?

The local planning authority will usually complete the assessments to inform strategic or local development plans. The local authority (flood protection authority) may also carry out a regional strategic flood risk assessment and/or surface water management plan which may in turn be used to inform the drainage assessment.

It is the responsibility of the individual developer to undertake appropriate assessments for specific planning applications. Whether it is the local authority or developer which carries out the assessment it is important that input is provided by the necessary specialists who may include landscape architects, architects and engineers.

[10] 6 qualities of successful places are; distinctive, safe and pleasant, easy to move around, welcoming, adaptable, and resource efficient – see Creating Places, http://www.gov.scot/Publications/2013/06/9811

[11] 'Drainage Exceedance' refers to the surface water flows that occur when drainage system no longer has the capacity to carry or receive surface water

3.6. Who should be consulted?

It is likely that consultation will be required with a number of different authorities and departments to agree the level of detail in the Water and/or Drainage Assessment. For example, consulting with local authority planners, roads engineers, flood risk officers and building standards surveyors in addition to Scottish Water and SEPA staff.

It is advisable to engage with staff from these departments at the earliest possible stage in the process of formulating development plans, and certainly before submitting any planning application. Informal conversations can be beneficial to discuss initial ideas or concepts although provide sufficient information about outline development plans at more formal stakeholder meetings. Face-to-face meetings with multiple stakeholders may not be required for all development proposals although are strongly recommended for larger or more complicated plans.

Early stakeholder engagement provides an opportunity to share important local knowledge throughout the development team. This process helps to identify issues to address before submitting the planning application. Timely stakeholder engagement, therefore, reduces the risk of encountering unforeseen obstacles at a later stage in the planning process.

Local authority planners, Scottish Water and SEPA are stakeholders involved for development planning while additional stakeholders including roads authority, flood risk and building standards will be involved for development management.

3.7. Proportionate approach

Individual assessments should be commensurate with the scale and nature of the proposed development and the risk and magnitude of the associated environmental impacts. The following represent typical considerations:

- The stage in the land use planning process (i.e. is planning permission 'in principle' or 'in detail' being sought?) and the considerations required by regulators and planners for the different stages;
- The scale of growth requirements for regional assessments or the scale and nature of a site-specific development;
- The capacity of existing infrastructure to supply water, dispose of waste water, and manage surface water;
- The capacity of the environment to provide water for use, accept discharges and drain surface water without detrimental effects on the environment;
- The flood risk to, and as a result of, the proposed development

4

ROLES AND RESPONSIBILITIES

Each of the authorities noted in table 4.1 and 4.2 has a range of roles. For example, Scottish Water has a statutory duty to supply potable water and to dispose of waste water. It also has an obligation to accept surface water discharges from drainage systems (e.g. those serving residential properties), although it sets conditions before agreeing to accept new storm drainage from road surfaces.

The roads authority has the responsibility to drain and maintain public roads and other public areas, such as pedestrian and civic realm spaces. These areas often contain large amounts of impermeable surfaces (e.g. concrete pavements) and the provision of adequate drainage in these areas can be critical especially during more intense rainfall events.

Local authorities have flood protection and mitigation duties and often liaise with their respective roads authorities in order to deliver more comprehensive flood alleviation solutions.

SEPA is a statutory consultee in the planning process and will provide the planning authority with its views on those aspects of the development proposal that are within its remit including abstractions from and discharges to the water environment. In relation to surface water flooding SEPA does not expect to be routinely consulted on issues of surface water drainage and exceedance of surface water drainage systems as these are matters for the local authority to consider in conjunction with Scottish Water. Where technical assessment indicates that there is a pre-existing risk of pluvial flooding, and that those issues are particularly complex, SEPA may be consulted in this regard.

The final decision on planning approval usually rests with the local planning authority. Occasionally, however, the decision may be delegated to the Scottish Government if the planning authority's initial decision was contrary to SEPA advice, if reason for the objection cannot be resolved, or in the event that the applicant lodges a formal appeal. In these circumstances, a Public Inquiry may be called in order to resolve the matter.

As part of their responsibilities as public bodies in Scotland, Scottish Water, local authorities, SEPA and central government all have a duty under the *Nature Conservation (Scotland) Act 2004* to enhance biodiversity. This should be taken into account during the design of new surface water drainage systems in order to help these public bodies meet their biodiversity responsibilities.

Establishing a dedicated foul water system encourages a well managed approach to controlling pollution through to the sewage works and to final discharge to the water

environment. Provision to install separate surface water systems is made under the *Sewerage (Scotland) Act 1968* as amended. This relies on agreement being reached between Scottish Water and the Local Authority following a request by the latter to discharge road drainage into a Scottish Water surface water system. New surface water discharges to combined systems are now generally not acceptable to Scottish Water.

The brief summary above shows that roles and responsibilities are usually clearly defined, but not always straightforward to those new to the process. Appendix 1 aims to clarify what the responsibilities and roles of the various stakeholders are in the delivery of water and drainage infrastructure.

Table 4.1 - Summarising scope, responsibilities and liaison with planning authority

Activity	Scope/ Responsibility	Planning Authority and Infrastructure Authority Liaison
Planning Permission	Overall planning permission for development	Local Authority Planning Department does not approve water or drainage infrastructure but will require assurances that this will be adequately installed as described below.

Table 4.2 - Summarising scope and responsibilities for approving authorities.

Infrastructure Activity	Scope/ Responsibility	Approving Authority	Comments and Planning Authority Liaison
Water Supply *Note; Once completed, all in-curtilage infrastructure is the responsibility of the occupier/owner.*	Public	Scottish Water	Beyond curtilage of property. Liaison required with planning authority.
		Scottish Fire & Rescue Service	To ensure effective location of fire hydrants.
	Private	Local Authority - Environmental Health	To ensure a wholesome supply of drinking water. Liaison required with planning authority.
		SEPA	Abstraction authorisation. Independent of planning permission. Granting of planning permission does not guarantee abstraction authorisation and vice versa.
		Scottish Fire & Rescue Service	To ensure effective location of fire hydrants.
Drainage - Foul *Note; Once completed, all in-curtilage infrastructure is the responsibility of the occupier/owner.*	Public	Scottish Water	Beyond curtilage of property. Liaison required with planning authority.
		Local Authority - Building Standards	Within curtilage/property. To obtain Building Warrant.
	Private	Local Authority - Building Standards	Within curtilage/property and beyond to discharge point where a SEPA discharge authorisation will be required. To obtain Building Warrant.
		SEPA	Discharge authorisation is independent of planning permission or building warrant approval. Granting of planning permission or building warrant approval does not guarantee discharge authorisation and vice versa.

Table 4.2 - Summarising scope and responsibilities for approving authorities continued

Infrastructure Activity	Scope/ Responsibility	Approving Authority	Comments and Planning Authority Liaison
Drainage - Surface Water *(not including exceedance conditions)* *Note; Once completed, all in-curtilage infrastructure is the responsibility of the occupier/owner.*	Public	Scottish Water	For drainage (i.e. catchment area) from curtilage, but using infrastructure beyond the curtilage. Also see shared conditions below.
		Local Authority - Roads Authority	For drainage from public roads, footpaths and other adopted areas of hardstanding/paving. Also see shared conditions below.
		Transport Scotland	For drainage from trunk roads and motorways.
		Shared conditions - responsibilities shared between Scottish Water and Roads Authority	Where an agreement is in place to share responsibilities and where curtilage runoff and roads, etc. runoff drain to the same shared drainage network.
		Local Authority - Building Standards	To obtain building warrant.
		SEPA	Discharge authorisation. Independent of planning permission.
	Private	Local Authority - Building Standards	To ensure adequate provisions for installation and to obtain building warrant. Liaison with planning authority and SEPA required.
		SEPA	Discharge authorisation is independent of planning permission and building warrant approval.
	Public/private	It is also feasible to share private curtilage drainage with road, etc drainage through a local arrangement. Liaison with planning authority required.	

Table 4.2 - Summarising scope and responsibilities for approving authorities continued

Infrastructure Activity	Scope/ Responsibility	Approving Authority	Comments and Planning Authority Liaison
Drainage exceedance – surface water *Note; Once completed, all in-curtilage infrastructure is the responsibility of the occupier/owner.*	Public	Local authority - planning authority	Flood conveyance routes and receptors will need to be indicated, which may be examined by the flood risk department as advisors to planners. Flooding to properties and sensitive receptors to be avoided.
		Local Authority - Roads Authority	Roads Construction Consent will require indicative conveyance routes and that flooding of properties and sensitive receptors is avoided.
		Local Authority - Building Standards	Requirement that flooding will not be a threat to occupants of buildings and includes the adequacy of exceedance measures.
		Scottish Water	Check required for 1:200 (0.5% AEP) + climate change condition to demonstrate flow paths and flood plains and the effects of flooding. Also to ensure emergency vehicle access.
	Private	Local authority - planning authority	Flood conveyance routes and receptors will need to be indicated, which may be examined by flood risk department as advisors to planners. Flooding to properties and sensitive receptors to be avoided.
		Local Authority - Building Standards	Requirement that flooding will not be a threat to occupants of buildings and includes the adequacy of exceedance measures.

5

WATER SUPPLY

5.1. Development Planning - planning for predicted growth within a local authority district

When considering regional development plans, planning authorities take account of regional and strategic water resources and the needs of prospective developments and sustainable growth.

Such considerations may include:

- Is there enough water in the environment to supply projected growth levels? The environmental capacity for water supply should consider the current and estimated future capacity taking into account climate change;
- Is the existing water supply infrastructure sufficient to cater for projected future growth?
- Are there other constraints e.g. landscape, habitat and biodiversity considerations?
- What are the main environmental and infrastructure constraints that may hinder future growth with regard to water quality and quantity and where are these located?
- What potential constraints may arise due to climate change and are there some areas within the district that are more sensitive to climate change? and
- What opportunities are there for mitigating these constraints, e.g. can the location of a development be changed to areas where there is more environmental or infrastructure capacity? Can plans be put in place to manage and reduce water use and demand? Are there opportunities for measures with multiple benefits e.g. capturing rain water for re-use?

5.2. Development Planning – requirements for site-specific developments

There are two main options for supplying potable water to a development:

1. Connection to a Scottish Water network; or
2. Provision of a private system that is not part of Scottish Water's network.

Determine the potable supply option at an early stage as different approval processes are required for the different options. The completion of a Pre-Development Enquiry and a Water Impact Assessment, which may include a flow and pressure test, will generally be necessary and completion of the relevant Scottish Water Application form will be required[12]. For a private water supply, contact the local environmental health service within the local authority. Authorisation from SEPA will be necessary for abstractions from the water environment. SEPA's Practical Guide [13] gives useful information on the type of authorisation that is required. This document is updated from time to time and the reader should ensure that the most recent version is being used. In addition Building Control will need to be satisfied that water supply installations are satisfactory.

Building Standard 3.27 describes the following mandatory requirement which applies to dwellings:

"Every building must be designed and constructed in such a way that sanitary facilities with water efficient fittings which are designed for the prevention of undue consumption of water are installed." [14]

Measures to reduce water use can minimise the impact on the water environment. For example, appliances and fittings can be provided with devices that reduce the use of water, such as spray taps, or rainwater collection and re-use systems for flushing toilets (also known as 'grey-water recycling').

Rainwater harvesting captures rain water at or close to the location upon which rainfall lands. This is normally from a building roof or perhaps areas of hardstanding, such as driveways, car parks or playgrounds. The rain water is gathered and stored on-site and then used locally. Uses are typically for irrigation (of gardens), or toilet flushing and other non-potable uses but can be for water supply subject to proper treatment.

Rainwater harvesting systems have many benefits that help to fulfil sustainable development by reducing the load on water supply networks and equipment and in some instances reducing overall energy consumption. For example, when used for flushing toilets, harvested water will consume less energy than standard mains supply, which would have been treated and pumped before reaching the property.

[12] Scottish Water application forms available at;
http://www.scottishwater.co.uk/you-and-your-home/connecting-your-property/connections-applications-forms
[13] A Practical Guide to the (Controlled Activities) Regulations, SEPA
http://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf
[14] Scottish Building Standards – Domestic Handbook, Section 3 Environment
http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech

Section 3.6.7 of the *Scottish Building Standards Domestic Handbook* [13] provides introductory guidance and British Standard BS8515:2009[15] provides recognised standards and guidance for design of rainwater harvesting systems. *CIRIA's SuDS Manual (2015)*[16] also contains good guidance on this.

Connecting new development to an established Scottish Water supply is normally the preferred option in order to minimise the impact on the water environment and ensure a reliable and clean potable supply.

If the alternative of a private water supply system is proposed, the applicant will usually be required to demonstrate to the planning authority why connection to a Scottish Water supply cannot be achieved at "reasonable cost". Sections 5.3 and 5.4 provide further information on these options.

5.3. Connections to a Scottish Water Network

When considering a public water supply, approach Scottish Water in the first instance. Scottish Water recognises four distinct areas of its water supply and treatment service (Figure 5.1 below). It is advisable for applicants to be aware of these distinct areas, including parts 1 – 4, when entering into discussions with Scottish Water regarding new supply connections.

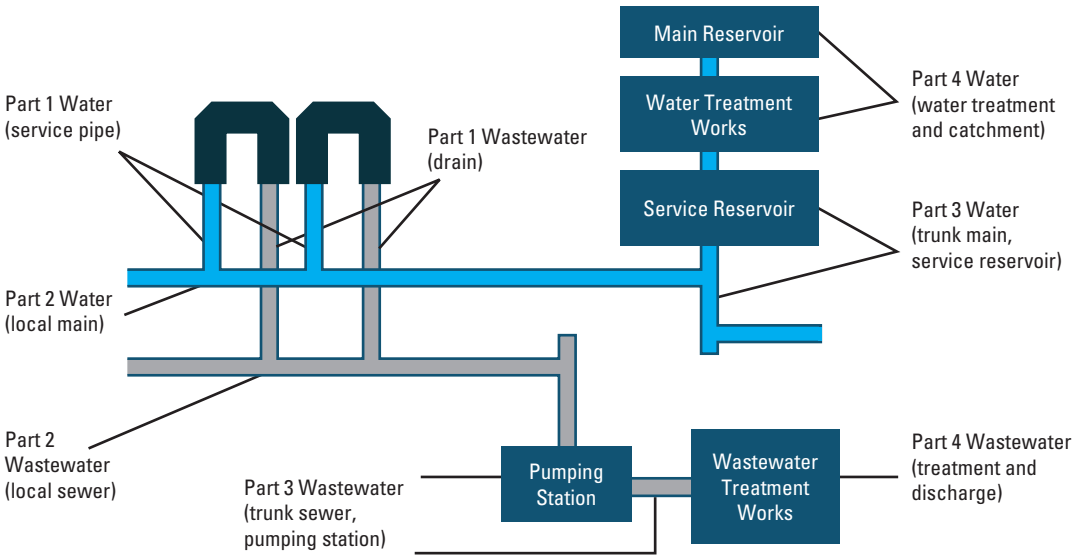

Figure 5.1 – Pictorial representation of water and waste water assets; parts 1 - 4[17]

[15] British Standard BS8515:2009 Rainwater Harvesting Systems – Code of Practice.
[16] The SuDS Manual (2015) , Construction Industry Research & Information Association, London
[17] Guide for obtaining water and wastewater services, Scottish Water

For new potable connections, Scottish Water will require the applicant to complete one of two different forms, depending on the size/type of development:

Form WC1, *'Water Connection Application'*[18] is to be used for the following types of development:

- Housing units;
- Site accommodation;
- Student accommodation; and
- Building water.

Form WF1, *'Application for New Water Mains to Serve Housing Developments'*[18] is to be used to supply new residential areas. Scottish Water advises that prior to completing Form WF1 a *'Pre-Development Enquiry Form'* should be submitted.

Both cases require the details of the applicant and the site to be submitted, including its location, any planning reference, existing land use and construction details. For housing development connections details should also include a Road Construction Consent drawing, a soil investigation report and fire authority approval. Other details will vary depending on circumstances. Full details and guidance are contained with each form.

Scottish Water generally requires the developer to make an initial assessment of water supply needs for any proposal as part of preliminary discussions. This will require completed Water Connection Application Forms which can be obtained using this link - Scottish Water Application Forms.[19]

Scottish Water's document *Water for Scotland*[20] is "A Technical Specification for Developers in Scotland" and gives detail of standards for what Scottish Water will vest (adopt). This document is updated from time to time and the most recent edition should be used.

5.4. Private Supply

Where the applicant demonstrates to the planning authority that connection to a Scottish Water supply network cannot be achieved 'at reasonable cost', a private water supply can be considered as an alternative.

For private water supply systems the main considerations are:

- What source of water will be used and what is the associated legislation?
- What type of water quality treatment and maintenance will be provided?

[18] Scottish Water Application Forms website - http://www.scottishwater.co.uk/you-and-your-home/connecting-your-property/connections-applications-forms
[19] Scottish Water Application Forms website - http://www.scottishwater.co.uk/business/Connections/Connecting-your-property/Connections-Applications-Forms

- Could the development affect an existing water supply? and
- What are the applicants' legal requirements?

These considerations are discussed in more detail below.

What source of water can be used and what is the associated legislation?

To minimise the impact on the environment the following sources of water are listed in order of preference when connection to a Scottish Water network is not practicable:

1. Groundwater;
2. Loch; and
3. River

In general, water resources are diminished each time water is abstracted from the environment. The greater the volume of abstraction, the greater the risk to the environment. Thus the degree of regulation imposed by SEPA (and explained in SEPA's *"Practical Guide"*[21]) increases with increasing abstraction volume as shown in table 5.1.

Authorisation			
General Binding Rules	**Registration**	**Simple Licence**	**Complex licence**
Abstractions <10m3/day	Abstractions ≥10 and ≤50m3/day	Abstractions >50 and ≤2000m3/day	Abstractions >2000m3/day

Table 5.1 – Levels of authorisation for abstraction

[20] Water for Scotland 3rd edition - http://www.scottishwater.co.uk/business/connections/connecting-your-property/sewers-for-scotland-and-suds/water-for-scotland-v3

[21] Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended http://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf

Applicants should consult SEPA's *"Practical Guide"* [21] to confirm that no other conditions apply, for example that abstractions from lochs are returned, treated, to the same water body or whether storage ponds are fed solely by field drains. Where the proposed abstraction volume is large relative to the volume available within the source, SEPA may request that the applicant undertakes an impact assessment that examines the likely consequences of the proposal.

Applicants will also need to confirm with the local authority Environmental Health Service (as regulators of wholesome supply of private drinking water supplies) that the supply and treatment meet The Private Water Supplies (Scotland) Regulations.[22]

Finally, details of the requirements for water efficient fittings can be found in Mandatory Building Standard 3.27, within the Domestic Technical Handbook.[23]

What type of treatment and maintenance should be provided?

There are different types of treatment systems available for a potable water supply and the method chosen will depend on the type of development (e.g. industrial, commercial or residential) and the scale of development (e.g. one house or many houses). In addition the quality of the water will vary depending on the source and additional treatment may be required to meet drinking water quality standards.

Applicants should discuss treatment requirements with the local authority Environmental Health Service. The Drinking Water Quality Regulator [24] also provides good information and advice.

Different types of treatment systems require different maintenance and all maintenance should be carried out as per the manufactures' instructions. Lack of maintenance can lead to ineffective treatment of water and drinking water standards not being met.

Could the development affect an existing private supply?

Developments including those expected in more rural locations such as wind farms, hydro schemes and agricultural buildings could involve the source or infrastructure of an existing private water supply being affected by the construction of new access roads or bridges, borrow pits, base installation, piling/ foundation works or other general construction activities. Sources such as springs, boreholes and watercourses can all be affected by several factors due to their individual susceptibilities leading to pollution, change in water quality parameters, diversion, reduction in flow rate or even drying up. Local authorities have powers under the Water (Scotland) Act 1980 and the Housing (Scotland) Act 1987/2006 to take enforcement action where a house is not provided with an adequate and wholesome water supply.

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[22] http://www.legislation.gov.uk/ssi/2006/209/contents/made
[23] Scottish Building Standards – Domestic Handbook, Section 3 Environment
http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech
[24] http://www.dwqr.org.uk/

6

TREATMENT AND DISPOSAL OF WASTE WATER

6.1. Development Planning - planning for predicted growth within a Local Authority District

When considering regional development plans, planning authorities will take account of regional and strategic waste water capacity and the needs of prospective developments.

Such considerations may include:

- Can the water environment cope with more waste water disposal resulting from increased growth projections without having a detrimental effect? *The environmental capacity for waste water disposal takes into account current and estimated future capacity and climate change.*
- Is the existing waste water infrastructure sufficient to meet projected growth levels? *This takes into account current and future loading of the sewer system, climate change and urban creep.*
- Are there other constraints e.g. landscape, habitat and biodiversity considerations?
- What are the main environmental and infrastructure constraints to future growth and where are these located?
- Are there any flood risk constraints to the treatment and disposal of waste water?
- What are the potential constraints due to climate change and are there some areas of the district that are more sensitive to climate change?
- What opportunities are there for mitigating these constraints? For example:
  - Can the location of a development be changed to areas where there is more environmental or infrastructure capacity?
  - Can a plan be included to manage and reduce water use and thus waste water treatment?
  - Can plans be included to manage and reduce surface water flood risk?
  - Can plans be included to decrease demand on waste water networks and treatments works?
  - Are there opportunities for measures that create multiple benefits? Capturing rain water for use can decrease demand on mains water, reduce surface water going into the sewer creating more capacity and reduce the amount of runoff on the surface water reducing flood risk and be more adaptable to climate change.

6.2. Development Management – requirements for site-specific developments

There are two main options for the treatment and disposal of waste water from a development:

1. Connection to a Scottish Water sewer; or
2. Provision of a private system that is not part of Scottish Water's network.

Connecting new development to an established Scottish Water sewer is normally the preferred option in order to minimise the impact on the water environment and ensure a reliable treatment service. The ownership and maintenance responsibilities of this option are clear.

If the alternative of a private treatment system is proposed, the applicant will usually be required to demonstrate to the planning authority why connection to a Scottish Water sewer cannot be achieved at "reasonable cost". Further information on these options is given below.

6.3. Connections to a Scottish Water Network

As with all Scottish Water assets, consent will be required before any new connection can be permitted. There are two stages to the consent process:

- **Stage 1** confirms the proposed development type i.e. is the development domestic or non-domestic? This is important as domestic sewage is more straightforward to predict in terms of anticipated flows and loads to the treatment works. For non-domestic developments anticipated sewer loading is more difficult to estimate and should be discussed with Scottish Water.
- **Stage 2** identifies if there is an existing Scottish Water sewer into which the new development could connect or does sewage infrastructure need to be extended to the development site.

If a Scottish Water sewer asset is located close by, the applicant will need to complete Scottish Water's Pre-Development Enquiry Form[25] to ensure a smoother process to connect to the public network. The applicant may also need to undertake a *Drainage Impact Assessment*[26] and a Sewer Connection Application for situations where there is a Scottish Water sewer nearby.

[25] http://www.scottishwater.co.uk/assets/business/files/connections%20documents/waterconnectionapp_pde_v16.pdf

[26] A Drainage Impact Assessment is specific to a particular proposed development and should report what difference the presence of future development may make to the pre-development situation. This is normally required by Scottish Water and can be requested by local authorities.

Where there is no existing Scottish Water sewer nearby, the applicant will need to complete a Pre-Development Enquiry form in addition to An Application for New Sewers to Serve Housing Developments. Both forms are available at this link: Scottish Water Application Forms. There are charges for each situation and Scottish Water will confirm these upon receipt of the application.[27]

The ability for Scottish Water to install a new sewer generally depends on the size of the development and the distance to connect to the existing sewer network. SEPA and the planning authority may expect a new connection to an existing Scottish Water network to be made if the new development is close to a settlement, if the settlement is greater than 2,000 population, or if the new development has been identified within the local plan.

The developer will be expected to make a contribution – either full or in part – to any new connection, depending on circumstances. In the event that the applicant is able to demonstrate that a new connection to an existing sewer is impracticable, then the disposal of waste water could be secured through a private arrangement see Section 5.4 below.

6.4. Private Systems (not connected to a Scottish Water System)

To minimise environmental impact, waste water should preferably be disposed of to a Scottish Water system. Where this is not possible at "reasonable cost", private waste water treatment systems can be provided.

For private waste water systems the main considerations are:

- What type of treatment to provide?
- Where to discharge the effluent after treatment?
- Long term maintenance requirements of the treatment system? and
- The applicants' legal requirements.

Further information on all these aspects can be found in Pollution Prevention Guide (PPG) 4 – *Treatment and disposal of sewage where no foul sewer is available*, which you can select from this link PPG 4 [28].

[27] For Scottish Water's current Scheme of Charges Document call their customer helpline on 0845 601 8855.
[28] http://www.sepa.org.uk/media/60099/ppg-4-treatment-and-disposal-of-sewage-where-no-foul-sewer-is-available.pdf

What type of treatment to provide?

There are many types of treatment systems available and the method chosen depends on:

- The type of development (e.g. industrial, commercial or residential),
- The scale of development (e.g. one house or many houses) and
- The treated effluent discharge location, e.g. is the receiving water environment particularly sensitive or does the water environment have an enhanced capacity for accepting effluent without detrimental effect.

The different stages of treatment for waste water are termed:

- Primary - solids removal and settlement;
- Secondary - biological treatment; and
- Tertiary - additional treatment, for example enhanced biological treatment, phosphorus removal.

Clearly, it is important to ensure adequate treatment before effluent is discharged to the environment and it is strongly advised that a suitably qualified and experienced person and/or manufacturer oversee this process.

Potential discharge locations for treated effluent

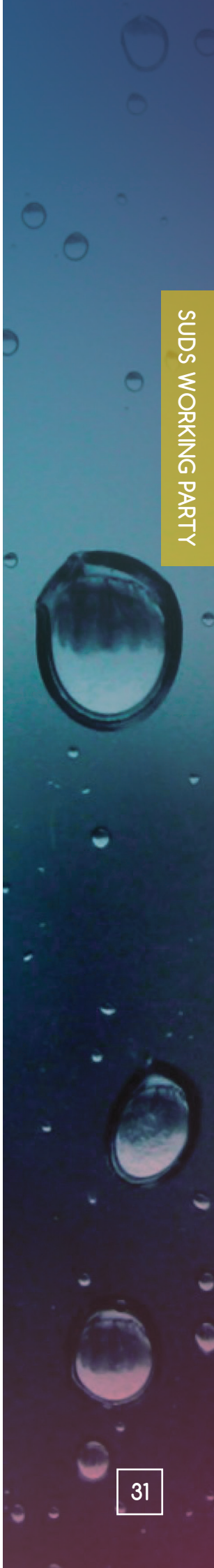
To minimise impact on the environment the following discharge locations are listed below when discharge to a Scottish Water network is not possible. Discharge to land is the preferred option

1. Discharge to land including soakaways;
2. Discharge to river;
3. Discharge to coastal waters; and
4. Discharge to freshwater loch

There are many considerations for discharging to these different locations. For example, when discharging to land, the type of soil, the depth to groundwater, aquifer type and the amount of land available are important factors to determine if this is possible. Discharging to rivers, lochs and coastal waters depends on environmental sensitivity and the effluent may require more stringent standards of treatment.

Long term maintenance requirements of the treatment system

Different types of treatment system require different maintenance and careful consideration is required in order to select the most appropriate solution for the proposed development. All maintenance should be carried out as per the manufactures' instructions. Lack of maintenance will lead to ineffective treatment of waste water which can pollute the environment.



Legal requirements

Effluent discharge requires Controlled Activities Regulations, or 'CAR', authorisation from SEPA and pre-application discussion with SEPA is recommended. The type of authorisation and the cost of applying for authorisation depends on the amount of waste water being treated and the type of treatment system proposed. SEPA may check any design calculations to ensure that the treatment intended is adequate and that the discharge location is suitable. The 'responsible person' is normally legally responsible for the system and is required to meet the authorisation conditions and ensure that the design is appropriate. CAR licences are generally granted with conditions to be maintained. These will generally include limits of discharge for suspended solids (SS) and biochemical oxygen demand (BOD) as well as other determinants as appropriate.

The 'responsible person' will be the license holder. If there are concerns about the discharge, SEPA will contact the licence holder and may prosecute for failing to meet the licence conditions.

The licence application will require details of, for example, soil permeability if discharge is to ground via a soakaway or similar. The applicant may also have to prove that there is adequate dilution in the receiving waterbody. SEPA will also consider downstream users as part of its licence determination.

SEPA's Practical Guide to CAR gives clear and straightforward guidance on applying for authorisation. A waste water licence application will fall under the pollution control regime and very small discharges (i.e. discharges of less than a population equivalent of 15 or less) may not require a full licence but would need to be registered with SEPA.

All private treatment systems will need to accord with Building Regulations, Mandatory Standard 3.8 - see Domestic (and Non-Domestic) Technical Handbook – which states:

"Every private waste water treatment plant or septic tank serving a building must be designed and constructed in such a way that it will ensure the safe temporary storage and treatment of waste water prior to discharge".[29]

Typically, it is the duty of local authority building standards surveyors to ensure that this is the case.

[29] Scottish Building Standards – Domestic Handbook, Section 3 Environment
http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech

7

SURFACE WATER AND SUDS GENERAL CONSIDERATIONS

7.1. Surface Water – An Overview

Surface water is generated by rainfall that lands on impermeable or saturated surfaces and results in "runoff" from those areas. For open green spaces rainfall will infiltrate into the soil at a rate dependent on the characteristics of the soil until the soil becomes saturated. During intense or prolonged rainfall, runoff will inevitably be generated in large amounts. If unmanaged this can result in flooding so care must be taken to ensure that runoff is managed to avoid flooding properties and other sensitive locations. During extreme events eliminating flooding may be unlikely, therefore managing runoff by designing flow routes becomes an important matter to ensure that water is efficiently conveyed and results in flooding only in those areas within which water can safely be accommodated, for example open spaces, or football parks. Underground storage is an alternative receptor but should normally only be considered when surface areas are not available.

Topography is a critical consideration in successful surface water management and accurate terrain detail must be used to understand where runoff will flow and may be routed. For larger developments, modelling is performed to improve understanding of where flooding may be generated using detailed survey information or digital terrain data, for example LiDAR[30].

For new developments, surface water will generally require a dedicated sewer network but may use existing surface networks where suitable connection and capacity allows. It is most unlikely that Scottish Water will allow surface water discharges into their combined sewer networks. The ultimate receptor of any surface water system will be to the water environment so treatment using Sustainable Drainage Systems (SuDS) will be necessary for most situations.

7.2. Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) manage surface water (that is not collected at source for re-use) from new developments prior to discharging the water to the environment or to a surface sewer system.

SuDS aim to control surface water run off close to where the rain falls and should mimic natural drainage as closely as possible. SuDS provide opportunities, in line with other planning polices and legislative requirements, to:

[30] A remote sensing technology used to generate digital ground elevation data.

- Avoid increases in flood risk and can reduce flood risk overall;
- Remove pollutants from run-off; and
- Combine water management with green spaces with attendant benefits for amenity, recreation and wildlife.

If a sustainable and cost-effective system for draining surface water is to be created it is important that it is considered at the earliest possible stage in the design and layout of the development. Engagement with relevant stakeholders should also be undertaken as early as possible in the process.

One of the first considerations is to determine if the SuDS (and where appropriate components associated with flood exceedance flows – see Section 8) will be owned and maintained by public authorities (which is preferred) or by private arrangement. This is a key decision as SuDS ownership determines different standards and approvals which can often be fairly strict resulting in different design requirements.

The applicant must ensure that all surface water drainage including SuDS and flood management measures meet all requirements and gain any necessary approvals. This may include Building Standards, SPP[31], Sewers for Scotland[31] and CAR[33].

The main stages that are required are:

- Design SuDS (and drainage exceedance) and identify management and maintenance arrangements;
- Obtain approval for design through the planning authority who will coordinate responses from various authorities, (which may include Roads Authority (Road Construction Consent), Flood Protection Authority, Scottish Water, Building Control and SEPA. Where appropriate, it will be necessary to provide "letters of approval" to the planning authority, e.g. Scottish Water if the intention is that Scottish Water will vest the asset;
- Construct SuDS (and exceedance in accordance with approved design);
- Obtain approval of design and final constructed SuDS (i.e. through the local authority building standards); and
- Long term maintenance and operation.

[31] Scottish Planning Policy, Scottish Government, Edinburgh http://www.gov.scot/Publications/2014/06/5823
[32] Sewers for Scotland, Scottish Water – this document is updated occasionally and checks should be made to ensure the most recent version is being used
[33] Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended

7.3. Publically and Privately Owned SuDS

A primary consideration and preference of the Scottish Government and SEPA is that the long-term ownership of SuDS lies with a body that will exist in perpetuity. Logically this will be Scottish Water or the local authority, although other bodies may be feasible, for example the Forestry Commission. Table 7.1 provides an overview of the type of area being drained, potential stakeholders to own and maintain and who may grant various approvals.

Public ownership means that the management and maintenance of SuDS is more likely to be continuous. Whilst it is fully recognised that private maintenance arrangements can be successfully delivered, there is inherently a greater risk of an interruption in the continual management and maintenance of SuDS if, for example, it is necessary to hand over the duty of care from one company to another. In some past cases, the maintenance arrangement has become unclear, e.g. where contractors have changed or ceased, leaving long periods without maintenance resulting occasionally with sites becoming "orphaned".

Where SuDS are not publically maintained there is a risk that long-term management and ownership can become vague or informal and the performance of the drainage system impaired. For example, a basin in a residential area may be viewed as shared open space and the land-use unwittingly changed by residents to an informal play park with obvious drainage function risks that may then result in flooding. It is therefore important for a clear and formal understanding of who has ownership and management responsibilities and that this understanding is suitably recorded. This could be within the deeds of properties that drain to the location and a notice at the site. Information boards (rather than warning signs) can also usefully explain the function of the site to ensure that the community can understand what the system is. This will help to promote better local care and reduce the chances of misuse.

It may be useful to include a telephone number on the sign and if it is thought that maintenance is required the contact, who may be an agent acting on behalf of residents, can be called and actions processed.

A privately owned SuDS arrangement that is with building/land owners, is less preferable compared to public ownership as the duty of care can become interrupted as described above.

Table 7.1 – Publicly and privately owned SuDS and responsibilities

SuDS Ownership	Drainage area/asset	Long term ownership and maintenance	Responsible for approval of design and construction and any authorisation required from
Public	Within property curtilages	Home owner / premises owner / Occupier	Local authority building standards (responsible to ensure adequate design)
	Drainage of curtilages but beyond the curtilage boundary (for 2 or more dwellings)*	Scottish Water	Scottish Water (responsible to ensure all aspects are designed appropriately; water quantity, water quality, amenity and biodiversity)
	Roads, footpaths and other public realm areas*	Local roads authority (assuming Road Construction Consent approved)	Local roads authority via Roads Construction Consent (responsible to ensure all aspects are designed appropriately; water quantity, water quality, amenity and biodiversity)
Private	Area within property curtilage	Premises owner/ occupier	Building standards departments (responsible to ensure adequate design)
	Areas outwith property curtilages	Developer/appointed agent/shared between residents	Building standards departments (responsible to ensure adequate design)

** Drainage areas outwith curtilages may have long term ownership and maintenance shared by various bodies through discussion and agreement.*

The responsibilities of drainage exceedance may vary depending on the exceedance route, for example, if the exceedance route is overland flow across open park land or perhaps via a road. It will generally be for the local flood authority to consider the design and advise the planning authority accordingly. Good design and management will consider if maintenance is to be carried out and should also consider water quality, amenity and biodiversity.

7.4. General SuDS design

It is recommended that the applicant considers the design of surface water drainage together with other constraints and opportunities in a holistic manner using a multi-disciplinary team including engineers, landscape architects and architects. Further detail on the hydraulic design of SuDS and exceedance routes is provided in Section 8. SuDS designs should consider the location of houses and road layouts in conjunction with drainage conveyance and exceedance routes so that sustainable drainage is integrated into the development as a whole:

- Surface water drainage design should mimic as closely as possible the 'natural' drainage system and complement the topography of the site and surroundings;
- The surface water drainage design should contribute to place-making and the blue-green (water-vegetated) corridors of the site and surroundings; and
- It is important to consider the permeability of soils as part of the SuDS design. Approvals, for example from the roads authority, (via Roads Construction Consent) building control and Scottish Water, will often require evidence of ground/site investigations prior to design sign-off.

There are three main considerations that should be taken into account when considering the design of SuDS:

- Water quality – the impact that the surface water runoff may have on the environment including the possible remobilisation of pollutants during a flood;
- Water quantity or flood risk – the change that the development may have on surface water flood risk elsewhere including the loss of floodplain storage if a bund is used around SuDS; and
- Amenity and biodiversity - the attractiveness of the design and the ability of the SuDS to enhance the biodiversity of the site and its environs.

7.5. Contamination Risk

Surface water runoff causes pollution through scavenging contaminants on hard surfaces. For example, oils and toxic metals from road surfaces, faecal matter from pavements (dogs) and roofs (birds), or pesticides from weed spraying.

The pollution from an individual element will not normally cause a problem, for example,

- one car on a road = individually minor pollution

however,

- a large car park drained to a water course = collectively significant

Prior to SuDS, surface water was either routed to the water environment directly via a surface water sewer, or to the combined sewer network, where combined sewer overflows spilled contamination into receiving water bodies.

With the introduction of SuDS in the late 1990s, the practice of discharging to the surface water sewer without treatment was discouraged and since 2006 this practice has become illegal for new developments with few exceptions.

General Binding Rule 10 of the *Controlled Activities Regulations*[34] states that;

- **During construction:**
  - ***"Developments are drained by a SUD system or equivalent systems equipped to avoid pollution of the water environment"***

and,

- **Following construction**
  - ***"Developments are drained by a SUD system equipped to avoid pollution of the water environment"***

SuDS must be adequate for the purpose and capable of managing the diffuse pollution that results from surface runoff. There are many examples of guidance on how this may be done including CIRIA's *SuDS Manual*[35] and *SuDS for Roads*[36]. This manual is periodically updated and so the applicant should check for the latest version before commencing a design.

1. For most developments[37] a CAR licence from SEPA to discharge surface water is not necessary however the General Binding Rules are mandatory making SuDS a legal requirement with two exceptions: If the development is a single dwelling; or
2. Where the discharge is direct to coastal water

Coastal water excludes estuaries which are considered "transitional" water, often with reduced SuDS requirements. Coastal waters that are considered sensitive, for example, bathing waters or shellfish areas, may require additional measures of protection. Consult SEPA if in doubt about whether the discharge is to coastal waters.

[34] *The Water Environment (Controlled Activities) (Scotland) Regulations* as amended, include general binding rules as part of the authorisation process regulated by SEPA.
[35] The SuDS Manual, CIRIA 2015 – This manual may be updated occasionally and the reader should ensure the most recent version is being used.
[36] SuDS for Roads, SUDS Working Party and Society of Chief Officers for Transportation in Scotland http://scots.sharepoint.apptix.net/roads/General%20Publications/Forms/AllItems.aspx?RootFolder=%2froads%2fGeneral%20Publications%2fSuDS%20for%20Roads&View={53441DF3%2d0B24%2d4FD6%2d9FC3%2d0E7170AA6B11}
[37] Very large developments, for example more than 1,000 houses (residential) or more than 1,000 car parking spaces (retail) or high risk developments such as industrial estates will require a CAR licence - see SEPA's Practical Guide.

Discharging surface runoff into the combined sewer is only acceptable in exceptional circumstances and the necessary approval from Scottish Water will be needed together with a robust case proving why a more sustainable alternative cannot be delivered. The prospect of this occurring for a new development may become most unlikely although for locations where a suitable discharge point is not accessible, for example the centre of a large urbanised area with no watercourse, the combined sewer may be seen as the better option at reasonable cost. In this unlikely situation surface water storage will be required. Confirm with Scottish Water the size of storage and flow control and whether any treatment should be applied prior to connection.

SuDS are a legal requirement for new developments draining to the water environment. Previous misunderstanding or misconception has seen various circumstances as reasons not to install SuDS, which include:

- Contaminated land
- Soils of low permeability, e.g. heavy clay
- Steep slopes
- Locations of high rainfall
- Very tight locations including where the building is the complete footprint of the site
- High water table

While these circumstances may make it more difficult to install effective SuDS they are not considered exceptions. Refer to the CIRIA *SuDS Manual*[38] for more details.

7.6. A Multi-Functional Approach

SuDS serving a standalone function is not recognised as best practice and the value gained for a development by including multi-functional elements makes good sense and can offer economic efficiencies [39]. For example:

- SuDS pond as an appealing water feature and focal point may also form part of open space under a planning requirement;
- Rain gardens that drain the roads can also form "build-outs" as traffic calming measures.

Many other situations can be considered for the multiple use of the same space that SuDS may occupy and a multi-disciplinary design team can design appealing development features by, for example, incorporating green networks to improve biodiversity. Addressing climate change and considering the qualities of successful places[40] should be

[38] The SuDS Manual CRIA (2015)
[39] The Benefits of SUDS Tool (BeST) from CIRIA is an economic tool to evaluate how much benefit can be derived from various functionalities. Available from CIRIA's website.
[40] 6 qualities of successful places are; distinctive, safe and pleasant, easy to move around, welcoming, adaptable, and resource efficient – see *Creating Places*, http://www.gov.scot/Publications/2013/06/9811

included within the design layout as early as possible as part of any planning and master-planning process.

It is therefore very important to undertake early engagement with key stakeholders to share knowledge and experience. Benefits of multi-functional assets and innovative solutions are more likely to be realised the earlier such efforts are made.

7.7. Layout of SuDS

The applicant should consider the risk of pollution in the overall design of the SuDS. Selecting the appropriate SuDS can help to manage and mitigate the impact of accidents and spills. Avoid where possible concentrating SuDS at one downstream location.

The approach of applying an appropriate number of "levels of treatment" to a development should take account of the spatial arrangement of SuDS. The applicant should examine how these levels are distributed across a development to encourage amenity and minimise risk. It is recognised this may be compromised in some situations, but this avenue should be fully explored at the design stage.

The concept of Pollution Indices has been introduced in more recent guides, e.g. CIRIA's *SuDS Manual* (2015)[41]. The applicant should discuss with SEPA whether this concept is appropriate on a site-specific basis.

Additionally, the applicant should consider the treatment capability of each SuDS component. The types and source of pollution that may arise will vary from catchment to catchment. For example, an office car park will normally receive small amounts of contamination over a wide area if there are limited vehicle movements over a relatively large area. By comparison, a lorry turning circle for a busy warehouse where activity is greater with increased contamination results in concentrated pollution at a very local level. Each scenario requires different approaches to manage the risk and treatment may be better (depending on the source of the contaminant) by using, for example,

- Filtration, absorption and adsorption in the aerated soils of a filter strip; or
- Exposure to sunlight and oxygen on wetland plant surfaces.

[41] The SuDS Manual (2015), CIRIA, London

The correct SuDS for the specific circumstance in the right place will help create a sustainable solution.

The consideration of pre-treatment and source control are discussed in the following sections.

SuDS requirements for a particular land use, e.g. residential, commercial, industrial, can be determined by referring to CIRIA's *SuDS Manual* (2015)[41]. SEPA's Regulatory Method RM-08 gives guidance on expected SuDS details - this guidance is periodically updated so the applicant should check for updates on SEPA's website at http://www.sepa.org.uk/regulations/water/pollution-control/pollution-control-guidance/.

7.8. Pre-Treatment of Surface Water Runoff

Generally pre-treatment components such as road gullies and vortex separators can make a useful contribution towards water quality if maintained properly. The applicant should consider their inclusion and discuss with SEPA before design begins. SEPA's WAT-RM-08 document may also be helpful.

7.9. Source Control

Source control can deliver very effective and sustainable surface water management. This is where rainfall, and therefore runoff, is managed on or below the surface where rainfall lands or immediately adjacent to this surface. This includes but is not restricted to rain gardens, bio-retention areas, green roofs, permeable surfaces, filter strips, roadside swales and filter trenches.

Capturing rainfall across a wide area, or over a long length means that flows and contaminants are not taken to a more central point, for example a downstream basin. This would otherwise result in greater concentrations of pollution over a smaller area. Where source control is used, peak flows are reduced by capturing and attenuating runoff "at source" and allowing a slow release to the downstream system and thus "mimicking natural drainage" – the SuDS philosophy.

The suitability of source control depends on several things, not least the party which is intending to become responsible for the system so early consultation with the adopting authority as to what is acceptable is recommended. For example, some roads authorities will accept gullies discharging to swales, others may not.

[42] Sewers for Scotland, Scottish Water – this document received occasional updates and the reader should check that the most recent version is being used.

Sewers for Scotland[42] emphasises the need and benefits of source control further.

7.10. Building Standards

Permission to build is granted by the Building Standards section of the local authority and the technical delivery must comply with the mandatory *Building Standards*. The Building Standards Technical Handbook advises how to comply with the mandatory standards and Section 3 of the Technical Handbook includes advice on flooding, water and drainage. Building Standard 3.6 relates to surface water and states that:

"Every building, and hard surface within the curtilage of a building, must be designed and constructed with a surface water drainage system that will:

a) Ensure the disposal of surface water without threatening the building and the health and safety of the people in or around the building, and

b) Have facilities for the separation and removal of silt, grit and pollutants."[43]

This means that the applicant must control pollution from the site or curtilage of the property.

The guidance within the handbook advises that surface water discharges from the development or curtilage should be to a:

- Storage container with an overflow discharging to any of the 4 following options, or;
- SuDS complying with building standards;
- Soakaway complying with building standards;
- Public sewer (which may also include SuDS); or
- Watercourse with authorisation from SEPA.

The applicant will need to present details as to how this will be achieved as part of the building warrant application process and allow for inspections during and after construction in order to obtain completion certificate acceptance.

The so called "'5 metre rule' is a guide to the distance that a building's foundation (and also a property boundary) must be from any soakaway[44]. This distance depends on particular geological aspects and may be reduced or extended. When using soakaways,

[43] Scottish Building Standards – Domestic Handbook, Section 3 Environment http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech
[44] Scottish Building Standards – Domestic Handbook, Section 3 Environment http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech

the applicant will need to confirm to the building standards officer that the distance is suitable. For infiltration systems this may not apply, but will need to be considered. An example may be where permeable paving abuts a building wall, which may in effect be equal to a grassed surface abutting a building wall.

Where a SuDS is not intended (or subsequently fails) to be vested by Scottish Water, it should be considered under the building standards system. Where this occurs the SuDS may be the responsibility of the developer or occupiers of the development. Other SuDS as part of the drainage network, for example a permeable surface in a private car park, may also be included within the building warrant.

7.11. Runoff from Road Surfaces

For many developments the catchment of the road and footpath network is a significant proportion of the overall surface water catchment and is therefore a critical consideration for water quality and flood risk.

A Road Construction Consent (RCC) in accordance with Section 21 of *The Roads (Scotland) Act 1984* will be necessary where it is intended that surfaces should be adopted by the roads authority.

When a road is adopted, runoff and drainage become the responsibility of the roads authority.

RCC is a legislative process that extends beyond the asphaltic areas making road design considerations critical to SuDS approval. An RCC will be granted if the required standards (design and construction) are satisfactorily met, however these standards may vary between authorities. For example, certain details of under-drained swales or dry swales[45] may be acceptable to some authorities but not to others.

Many roads authorities have endorsed the National Roads Development Guide[46] which includes drainage and SuDS and seeks to provide standards and guidance across Scotland. Early engagement with the relevant roads authority is advised to ensure that an understanding of the RCC process is understood and that the local standards will be met.

Other non-adopted roads and thereby drainage systems will remain private but will still require maintenance. It will be important to confirm who will be responsible for the long-

[45] Swales with integrated filter drain
[46] Society of Chief Officers for Transportation in Scotland – National Roads Development Guide http:/localapps.pkc.gov.uk/internet/flashmag/councils/nationalroadsguide/roadsfeb2014.pdf

term maintenance of the road and footpaths.

Car parking can also make a significant contribution to flood risk and poor water quality. Often car parks will include permeable surfaces and will be within the ownership of for example a supermarket. The roads authority is most unlikely to adopt a car park in this situation, however smaller areas, perhaps within a residential area, or a local shopping area may be considered by the roads authority. Designers will need to decide whether they want the roads authority to adopt these locations and whether the use of permeable paving is to be used. *The Society of Chief Officers for Transportation in Scotland (SCOTS)* have stated that permeable paving will not be used for trafficked roads across Scotland. This has clear implications for the RCC process. Thus permeable may be considered for car parking locally and non-adopted roads but may not be acceptable under an RCC.

Sharing surface water drainage infrastructure, for example between Scottish Water and a roads authority makes good economic sense instead of separate surface water systems for road drainage and for other surface water drainage. *The Sewerage (Scotland) Act 1968* as amended allows for this[47].

Additional information is available from Scottish Water and the relevant roads authority. The National Roads Development Guide [48] provides information about the Technical Approval process and SuDS for Roads [49] provides useful additional information.

[47] Section 7 of Sewerage (Scotland) Act 1968 as amended allows for a Roads Authority and Scottish Water to share drainage by agreement.
[48] Society of Chief Officers for Transportation in Scotland – National Roads Development Guide http://localapps.pkc.gov.uk/internet/flashmag/councils/nationalroadsguide/roadsfeb2014.pdf
[49] SUDS for Roads, SUDS Working Party & Society of Chief Officers for Transportation in Scotland available at; http://scots.sharepoint.apptix.net/roads/General%20Publications/Forms/AllItems.aspx?RootFolder=%2froads%2fGeneral%20Publications%2fSuDS%20for%20Roads&View={53441DF3%2d0B24%2d4FD6%2d9FC3%2d0E7170AA6B11}

8

SUDS – HYDRAULIC DESIGN CONSIDERATIONS

8.1. SuDS – General Hydraulic Design

Surface water management measures should manage flood risk on-site and have a neutral or beneficial effect on flood risk off site. New developments may need to maintain 'greenfield' outfall rates, and often need to provide additional surface water storage to achieve this.

In order to maintain the status quo, additional storage for the surface water runoff volume over and above that generated by the undeveloped site is normally required for a range of return period storm events. These typically include the 50% Annual Exceedance Probability, or AEP (1 in 2 year), the 3.33% AEP (1 in 30 year), and the 0.5% AEP (1 in 200 year) plus climate change event.

The provision of additional surface water storage volume in this way normally provides the dual benefits of managing flood risk to the site itself and avoiding an increase in flood risk in adjacent and downstream areas.

Surface water drainage and surface water exceedance systems should be able to mimic and maintain the greenfield characteristics of the site particularly at the point where water is discharged. This typically involves establishing the routes that surface water normally takes when flowing through an undeveloped site, the areas in which water can be stored, and how fast the runoff usually leaves the site.

This runoff rate is commonly referred to as the 'greenfield' runoff rate and is normally expressed as litres per second per hectare (l/s/ha) and calculated for a range of storm events from the 50%, 1 in 2 year to the 0.5%, 1 in 200 year return period events. Infrastructure and buildings should generally be designed to be flood free from surface water flooding in rainfall events where the annual probability of occurrence is greater than 0.5% (1:200 years)[50].

These greenfield runoff rates determine how quickly storm water can be permitted to leave a new development in order to ensure that flood risk elsewhere is not increased. Once this 'permissible discharge rate' is known, the provision of additional surface water storage required within the new development can be estimated.

There are several on-line tools available that allow calculation of greenfield runoff rates[51]. Some local authorities can provide greenfield runoff rates, however, it is recommended that specialist advice is sought in the design of surface water drainage systems.

[50] Scottish Planning Policy (2014), Section 263, p59, The Scottish Government, Edinburgh
[51] www.uksuds.com

It is important to understand that flood risk to the new development needs to be considered in addition to the flood risk created by the new development. The Scottish Planning Policy (2014)[52] discusses the flood risk issues for new development and the expected considerations in more detail.

8.2. SuDS - Attenuation Storage Design

New development on greenfield land usually results in an increase in both the volume and rate of surface water runoff generated across the new impermeable surfaces. In order to maintain the status quo in terms of surface water flood risk, the storm water runoff volume from the developed site should be restricted to the volume of runoff that would leave the undeveloped site (i.e. the greenfield runoff *volume*).

It is acknowledged, however, that this is technically difficult to achieve and therefore compliance with a range of restrictions concerning the volume of runoff generated by new development is often required. These restrictions are described in the section below on Runoff Volume and Greenfield Runoff (Permissible Discharge) Rates. The process is also summarised in Figure 8.1.

Interception

Where possible, infiltration or other techniques should be used to try to achieve zero discharge to receiving waters or sewer systems for rainfall depths of up to 5mm (or greater if technically achievable).

Runoff Volume and Greenfield Run-Off Rates

The difference in runoff volume pre- and post-development for the 1 in 200 year six hour event (i.e. the additional runoff generated) should ideally be managed by way of infiltration. It is recognised, however, that this is often difficult due to ground conditions. If infiltration to ground is not feasible, the additional runoff generated should be discharged from the site at flow rates below 2l/s/ha[53]. The pre-development (i.e. greenfield) volume can be discharged at equivalent greenfield rates for events up to and including the 0.5% (1 in 200 year event) (Figure 8.1).

An alternative approach that avoids the requirement to make a comparison between pre- and post-development runoff volume is to ensure that the limiting discharge rate for any return period up to and including the 0.5% (1 in 200 year) event shall not be greater than the mean annual peak rate of runoff for the greenfield site (i.e. $QBAR_{rural}$), or 2l/s/ha, whichever is greater[54].

[52] Scottish Planning Policy (2014), Sections 254 – 268, The Scottish Government, Edinburgh http://www.gov.scot/Topics/Built-Environment/planning/Policy
[53] Note that the *minimum* discharge rate for any new development site is set at 5l/s.
[54] Note that the *minimum* discharge rate for any new development site is set at 5l/s.

There are several methods that can be used to estimate greenfield runoff rates in order to determine the permissible discharge rate for a new development. Detailed guidance is provided in other publically available documents, for example, CIRIA's SuDS Manual (2015)[55].

The calculation of permissible discharge rates and pre- and post-development runoff volumes should consider the total footprint of the new impermeable area associated with the new development, rather than the total area of the development site itself.

Climate Change

When calculating how much attenuation storage is required it will be necessary to make an appropriate allowance for the anticipated impact of climate change on rainfall intensity over the lifetime of the proposed development. Climate change is expected to increase rainfall intensity with changes expected to become more pronounced over time.

As such, it is recommended that applicants should contact the relevant local authority to determine individual requirements for climate change and rainfall intensity and to seek advice on an appropriate design lifetime for the new development.

Estimating Attenuation Storage Volume

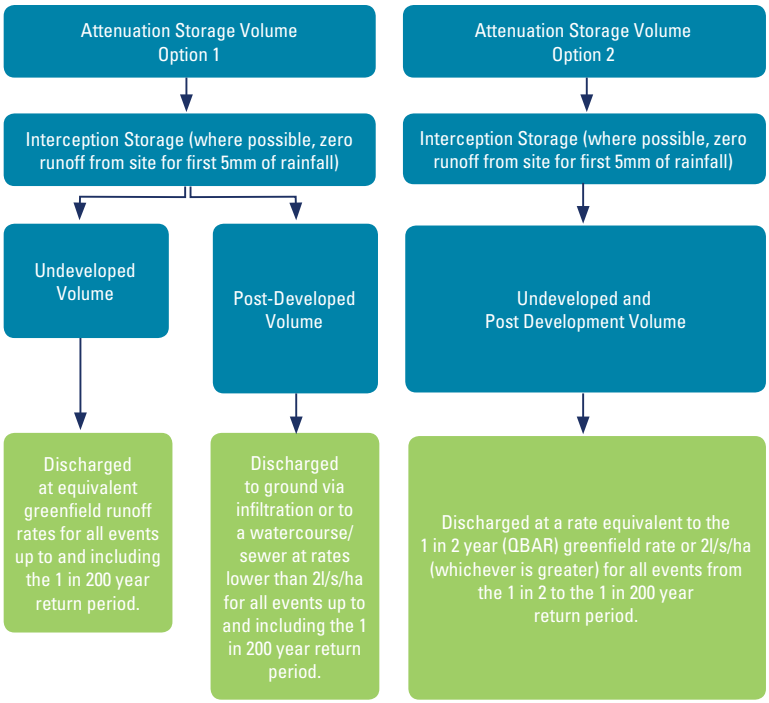


Figure 8.1. General procedure for attenuation storage volume design.

It is recommended that specialist software is used to progress the design of new drainage schemes in detail although there are equations available that can be used to provide an initial indication of the volume of attenuation storage that is likely to be required. The additional runoff volume from a development site compared to the Greenfield equivalent

[55] The SuDS Manual (2015) – Construction Industry Research and Information Association.

can be estimated using the procedure outlined CIRIA's SuDS Manual (2015)[56]. The general procedure for attenuation storage volume design is outlined in Figure 8.1.

8.3. Designing for Exceedance

New surface water drainage systems are designed to accommodate a finite volume of water for design standards (AEP or return period). The design standard that new drainage systems are required to meet usually depends upon the vesting authority. Scottish Water will vest SuDS if the design ensures the development is free from surface water flooding up to the 3.33% (1 in 30 year) rainfall event and the design meets Scottish Water standards[57]. These standards are periodically updated and the applicant should check that the correct version is being used. Some other authorities have their own standards which vary locally and can be higher.

Storm events that overwhelm the design capacity of surface water drainage systems are referred to as 'exceedance events'. These events would normally be expected to cause the drainage system to flood and for the resultant 'exceedance flows' to be conveyed and stored above ground until capacity within the drainage system is restored after the storm event has passed.

The management of exceedance flows is an integral part of the overall design of sustainable drainage. Open space in the development can provide multi-functional use to manage exceedance. Simple measures such as raised kerbs or road tables (road humps) may be enough to divert exceedance flows to other areas capable of temporarily storing water, thus avoiding property flooding. For example this may include green space, car parks, roads and other public areas. This approach helps to ensure that there are no adverse impacts to infrastructure or buildings during events that exceed the design capacity of the surface water drainage system (for storms up to the 0.5% AEP or 1 in 200 year return period, including an appropriate allowance for climate change). It is important that these measures are understood and maintained to provide flood protection through the lifetime of the development and care should be taken to ensure there is appropriate access for emergency services. The local authority should be contacted for details of access requirements for emergency vehicles and personnel.

It is recommended that designs should also account for the possibility of surface water flowing onto the site from adjacent areas. Both the additional rate and volume of surface water input from surrounding areas should be considered.

CIRIA guidance C635 – *Designing for Exceedance in Urban Drainage Systems* [58] provides useful guidance on this. CIRIA report C738 [59] contains recent examples of managing exceedance.

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[57] Sewers for Scotland, 3rd Edition, Scottish Water http://www.scottishwater.co.uk/you-and-your-home/connecting-your-property/sewers-for-scotland-and-suds. These standards are periodically updated and the applicant should check that the correct version is being used.

[58] *Designing for Exceedance in Urban Drainage Systems*, C635, (2006) Construction Industry, Research & Information Association, London

[59] *Managing Urban Flooding from Heavy Rainfall – Encouraging the Uptake of Designing for Exceedance, C738* (2013) Construction Industry Research & Information Association, London

9

CHECKLIST

Table 9.1 provides a checklist of the key requirements that apply to water and drainage assessments. This checklist is intended to be as straightforward as possible without being over detailed, but may not include all requirements for all steps. In time, requirements and processes will change and the applicant is encouraged to check with each stakeholder as appropriate. Therefore the following should be considered a guidance without being absolute and the order in which each item in the checklist appears is not necessarily an indication of priority or the order in which processes should be performed.

Table 9.1 – Checklist for water and drainage assessments

Stakeholder	Process	Checklist	Comment
Scottish Water **Domestic**	Pre-development enquiry Form	■ Location plan ■ Calculations	Charges may apply
	Water Connection Application	■ As above ■ Fire authority approval (if applicable) ■ Soil investigation report (if applicable) ■ Wayleave permission ■ Sprinkler system schematic ■ Internal plumbing schematic (for flatted development)	Charges will apply for: ■ Application fee ■ Connection charge ■ Charges/property ▪ Infrastructure ▪ Building water
	Application for new water mains to serve housing developement	■ Water layout proposal ■ Approved roads construction consent drawing ■ Soil investigation report (all cases) ■ Booster station details (if applicable) ■ Sprinkler system schematic ■ Fire authority approval	Charges will apply for: ■ Inspection/ connection ■ Charges/property ▪ Infrastructure ▪ Building water
	Sewer Connection Application	■ Site location plan ■ Drainage layout proposal ■ Risk assessment and method statement ■ Flow control device calculations (if applicable) ■ Deed of servitude (if applicable)	Charges will apply for: ■ Application fee ■ Inspection/ Connection ■ Infrastructure charge/ property
	Application for new sewers to serve housing development	■ Site location plan ■ Drainage layout proposal ■ Construction detail drawings ■ Longitudinal section drawings ■ Calculations ■ Manhole schedules ■ Soil investigations (if applicable) ■ Mechanical and electrical (if applicable) ■ SUDS risk assessment ■ Risk assessment and method statement	Charges will apply for: ■ Inspection/ connection ■ Charges/property; ▪ Infrastructure Includes wastewater and surface water

Stakeholder	Process	Checklist	Comment
Scottish Water **Non Domestic**	Varies	■ Discuss with Scottish Water	The nature of non-domestic discharges can vary enormously and discussion with Scottish Water is advised.
SEPA	Discharge Authorisation	■ NGRs and location plan showing layout and discharge points ■ Details of site including layout ■ Details of all properties ■ Details of treatment system if appropriate	See SEPA's Practical Guide to CAR
	Abstraction authorisation	■ NGRs and location plan showing layout and discharge points ■ Details of site including properties/population to be served ■ Nature of abstraction, e.g. water supply for development type	See SEPA's Practical Guide to CAR
	Other authorisations as appropriate	■ Consider need for abstraction & discharge authorisations	
Local Authority	Roads department	Refer to relevant local authority and the details of their Road Construction Consenting process.	
	Environmental health	■ Indicative layout proposal ■ Construction details & drawings ■ Hydro-geological investigation report ■ Flow calculations ■ Microbiological and chemical analyses ■ Specification/ design/ location of storage & treatment equipment ■ Risk assessment ■ Method statement (as necessary) ■ Management/ maintenance plan ■ Emergency Plan	Use an accredited laboratory for water samples analyses
	Planning department	Refer to relevant local authority	
	Building Standards	■ Site location plan ■ Drainage layout proposal ■ Construction detail drawings ■ Longitudinal section drawings ■ Calculations ■ Manhole schedules ■ Soil investigations (if applicable) ■ Mechanical and electrical (if applicable) ■ SuDS risk assessment ■ Risk assessment and method statement	For in-curtilage and SuDS not vested in Scottish Water, SuDS and associated drainage will form part of the building warrant process.

ROLES AND RESPONSIBILITIES

Applicants – Developers or Agents

It is expected that the applicant will have some knowledge of water supply and drainage and the requirements to obtain these services for the proposed development. Understanding the process and effort to achieve success will help the applicant in the process.

The applicant should become familiar with the process and the various authorities and what each authority's role is. Discussing the proposal with each authority collectively at an early stage is encouraged. Applicants are advised to review available information on the relevant authority's website.

SEPA

SEPA is Scotland's main environmental regulator and in the context of water and drainage assessments has particular relevance for abstractions from, and discharges to the water environment.

SEPA is a statutory consultee in the land use planning process and comments on development planning and development management. SEPA aims to protect and enhance the water environment via the inclusion of strategies and policies. SEPA recognises that the land use planning system is a key process and will engage in this to meet the objectives of the River Basin Management Plans[60] and Flood Risk Management Strategies[61].

As a statutory consultee in the land use planning process, SEPA considers environmental matters including biodiversity and habitat. More specifically, for water and flood risk, SEPA provides advice to:

- Ensure water quality is maintained or improved and advise if any authorisations are required as part of the development, e.g. authorisation to abstract water for water supply or disposal of waste water. The person carrying out the activity will require to hold or apply for an authorisation, which may be Scottish Water or a private individual.
- Ensure that the development is not at risk of flooding (including surface water flood risk) and does not increase flood risk elsewhere.
- Consider if the development may reduce flood risk.

With respect to surface water flood risk, SEPA would expect planning authorities to

[60] River Basin Management Plan – where an overall regard to the wider catchment of a river is made rather than at a more local level. SEPA produce the RBMPs on a cyclical basis.
[61] Flood risk management strategies – SEPA has a role to oversee the delivery of flood risk management and does this at a strategic level to allow for more detailed delivery at a local authority (flood risk authority) scale.

ensure appropriate assessment of surface water flood risk in consultation with their Flood Officers and Scottish Water (who can clarify surface water drainage and flooding constraints from the sewerage system). The surface water hazard map may provide a starting point in the technical assessment of surface water management solutions however SEPA does not expect the surface water hazard map to be used as a basis for consultation with SEPA. Surface water flooding can be managed in many developments by engineering interventions. Scottish Planning Policy (SPP [62]) states that surface water drainage measures should have a neutral or better effect on risk of flooding both on and off site, taking into account the rain falling on the site and run-off from adjacent areas. In the assessment of management solutions, due regard should be given to any pluvial hazard. Where the technical assessment indicates that there is a pre-existing risk of pluvial flooding, and that those flooding issues are particularly complex, SEPA may be consulted in this regard.

Scottish Water

Scottish Water provides homes and businesses with a safe and reliable supply of high quality drinking water and treats waste water and returns it to the natural environment without having a detrimental effect.

Scottish Water will vest (or adopt) water supply and sewer networks infrastructure that comply with their design and construction standards. Their guidance for developers, *Water for Scotland* and *Sewers for Scotland* set the standards. Various updates occur from time to time so always use the current edition. If any water supply network or sewer network and related infrastructure, including SuDS, does not meet the standards set in either *Water for Scotland* or *Sewers for Scotland* there is no obligation for Scottish Water to vest.

Scottish Water vest drainage networks from beyond the curtilage of the property. Under exceptional circumstances where special permission is necessary, including a wayleave written into the title deeds, vesting may be undertaken within the curtilage. The affected land is restricted to ensure future access for maintenance / renewal.

Generally, this will mean that foul drainage and surface water drainage from any property including any hardstanding areas within the curtilage, may be connected to the Scottish Water network which may, in turn, include SuDS. Applicants should complete the Pre-Development Enquiry Form if intending to connect to a public water supply and/or the public sewer network. Scottish Water is not required to accept road drainage but may do so through agreement with the roads authority.

Scottish Water has additional useful guidance for asset vesting at http://www.scottishwater.co.uk/business/connections/connecting-your-property/asset-vesting.

[62] Scottish Planning Policy, Scottish Government, Edinburgh http://www.gov.scot/Topics/Built-Environment/planning/Policy

Planning – Local Authority

The local planning authority grants permission for any new development. The planning process caters for SEPA, Scottish Water and other statutory consultees to consider any relevant planning applications. It is the role of the planning officer to consider and compile information for the planning committee, which will permit or refuse planning permission accordingly.

The planning officer should consult colleagues in other departments to consider aspects of a planning application including context and design. This often requires specialised knowledge, for example SuDS and biodiversity, or flooding and open space, and advice may be sought from statutory and other consultees including Road Development Control Engineers.

It is generally expected that the level of detail in the information provided by the applicant should be commensurate with the scale and nature of the proposed development.

For example, a new road where the new development works exceed 1 Ha will require the planning officer to examine whether a particular development will be likely to have significant effects on the environment. In making this consideration a screening process is carried out and an Environmental Impact Assessment (EIA) may be required. If the road is a new motorway, express road or where an existing two lane road is widened to 4 lanes, all for a length of more than 10km, an EIA will automatically be required. This requires the applicant to carry out a formal EIA in line with the appropriate legislation[63].

Local authority planners will need adequate details about the proposal to comply with the planning process. This will not include all infrastructure requirements that may for example be expressly required by Scottish Water, e.g. sewer layout and water demand. In this case a letter from Scottish Water to the planning authority stating that the proposals are adequate will normally be enough to satisfy the planning process. Similarly, the roads authority may notify their planning colleagues that an applicant's proposals are adequate for a Road Construction Consent.

For smaller developments sufficient details must still be submitted. If the information submitted is insufficient, the application becomes indeterminate resulting in delays to the process.

Planning – Scottish Government, Planning and Architecture Division

The Scottish Government's Planners oversee the planning process at a strategic and legislative level. The planning process can be very involved, especially for large developments. Normal planning applications will generally not involve the Scottish Government, who may employ an independent Reporter as arbitrators for contentious situations or where there are conflicts of professional opinion.

[63] The Environmental Impact Assessment (Scotland) Regulations 1999

Planning advice is also written by Scottish Government planners for local authority planners to inform preparation of development plans and development management decisions.

On line planning advice on flood risk is available on the Scottish Government's website[64]. This advice is updated from time to time and the reader should ensure that the most up to date version is being used. The advice supersedes earlier Planning Advice Notes.

The Scottish Government's Designing Streets includes national policy and guidance on SuDS and surface water drainage. Useful information is included in the Designing Streets Toolbox and in particular the Materials Resource which includes case studies on how SuDS can effectively integrated into street design see Creating Places Scotland.

Also the *National Roads Development Guide*[65] (NRDG – also see *Roads Authority – Local Authority* below), referred to by the Government, has become local policy in many local authorities' guidance.

Roads Authority – Local Authority

An important aspect of road construction is water management and drainage. This is for the longevity of the construction (road pavement and other structures) and for road safety. It is essential to remove water from the paved surface and avoid water ingress to paved sub-base and other structure foundations for road safety and for the asset's durability. The removal, conveyance and discharge of road runoff must be carefully considered. This does not however exclude the use of permeable surfaces (or permeable paving) as a SuDS option,

The roads authority ensures that water is managed on, around and from the road surface and associated structures. In addition roads authorities as part of local flood risk management generally want SuDS included in development proposals. In addition roads authorities will be aware that exceedance flow routing can often utilise the road network as suitable conveyance which will need careful consideration.

The development management process is important. Forums (including the roads authority, flood prevention authority and Scottish Water) discuss where SuDS can be located to allow vesting into the public body. This is a critical process that must occur to ensure the future success and long-term management of SuDS in Scotland.

New roads require a *Road Construction Consent* for the entire road and its related Infrastructure in compliance with *The Roads (Scotland) Act*. Where housing is constructed a Road Bond as set out in *The Security for Private Road Works (Scotland)* Regulations is required. Road Bonds cannot be required by local authorities for housing associations or for consenting industrial roads.

[64] Online planning advice on flood risk, Scottish Government - http://www.gov.scot/Topics/Built-Environment/planning/Policy/Subject-Policies/natural-resilient-place/Flood-Drainage/Floodrisk-advice

[65] The National Roads Development Guide - Society of Chief Officers for Transportation in Scotland

One of the largest sources of urban diffuse pollution is from road surfaces. Contaminants from vehicles (hydrocarbons and toxic metals), vehicle loads as well as incidental and accidental spillages and deposits will all end up on the paved surface and will inevitably run into, or be washed by rainfall into, the road drainage system.

It is unacceptable for surface water from new road developments to discharge to the water environment without being treated by a SuDS unless the discharge is direct to coastal waters (and not estuaries or transitional waters). For discharges to coastal water SEPA can still require additional measures of protection if there are sensitive bathing water or shellfish areas.

Road drainage standards vary in technical detail depending on which roads authority is responsible but the National Roads Development Guide (NRDG) published by *Society of Chief Officers for Transportation in Scotland* (SCOTS) aims to achieve consistency across Scotland. Contacting the relevant roads authority is advised in the first instance. Also see SuDS for Roads[66] guidance.

Technical approval to connect to any Scottish Water asset is required. In most cases it will not be acceptable to connect to the combined sewer as Scottish Water has a strategy to remove surface water from combined sewers. Scottish Water is normally reluctant to accept new surface water flows unless it is demonstrated that all alternative options have been considered and the network has capacity. The NRDG also sets out a schedule that requires an indication of who the adopting authority is and a SuDS proposal is also required prior to Roads Construction Consent.

For all surface water discharges to coastal waters, the GBR does not automatically require SUDS, though discharges still have to comply with the GBR's 'no pollution' requirement. SEPA may promote SUDS for these developments through its planning response and in certain high risk situations SEPA may require SUDS for surface water discharges to coastal waters.

Transport Scotland manages Scotland's trunk road and motorway networks – see below.

Roads – Transport Scotland

Transport Scotland is the national Transport Agency for Scotland and delivers strategic road, rail, water, and air transport services. They seek to deliver a safe, efficient, cost-effective and sustainable transport system for the benefit of the people of Scotland,

[66]SUDS for Roads available at;
http://scots.sharepoint.apptix.net/roads/General%20Publications/Forms/AllItems.aspx?RootFolder=%2froads%2fGeneral%20Publications%2fSuDS%20for%2Roads&View={53441DF3%2d0B24%2d4FD6%2d9FC3%2d0E7170AA6B11}

and work in close partnership with organisations such as SEPA and Local Authorities to integrate Flood Risk Management Planning into service delivery. In particular Transport Scotland is directly responsible for managing and maintaining trunk roads in Scotland and have contracts in place with contracting organisations to deliver this work in accordance with such standards as the Design Manual for Roads and Bridges (DMRB). Key challenges for Scotland's transport infrastructure include the identification of roads and railway lines at greatest risk of flooding or damage due to erosion or landslips. The location and design of new developments must take account this into account.

Building Standards – Local Authority

As part of permission to construct, and aside from road construction, a building warrant is required which is separate from planning permission and is related to technical detail of construction or installation. The building standards surveyors within the local authority inspect proposals to ensure that design and construction details comply with the required standards. For water and drainage requirements, but excluding road drainage which will be approved through the RCC, the relevant details are explained within sections 3 and 7 of the domestic and non-domestic technical handbooks – see below - which in turn relate to the *Building (Scotland) Regulations 2004*.

Section 3 - Environment, explains the standards and requirements to design and construct wastewater (foul sewer) and surface water drainage. It stipulates the requirements for a range of developments; from a large development within an existing sewered area to a single dwelling with no sewer network in the area. As an overview, section 3.6, surface water, states that every building and associated hard surface must "have facilities for the separation and removal of silt, grit and pollutants." Section 3 also discusses SuDS and soakaways.

Section 7 - Sustainability, explains standards of sustainability that can be "awarded" to buildings. The basic and required level is Bronze, with Silver and Gold achievable depending on the amount of sustainability included within the building. For example the amount of carbon dioxide emissions that a building may have when compared to a reference level set in 2010. This includes the use of water saving devices that may be installed in the building.

The Building Standards Surveyor will consider applications and confirm if the application meets the required level before issuing a Building Warrant which must be received before building works commence. A completion certificate will be issued once the completed building meets the required standards.

Building Standards -Scottish Government, Building Standards Division

The Building Standards Division (BSD) of the Scottish Government sets the requirements that local authority building standards officer (the verifier) uses. Occasionally updates are managed by the BSD who also release research and development commissions to gain overall improvement as other standards and technologies change.

Environmental Health – Local Authority

For water supplies that are not provided by Scottish Water, i.e. private water supplies, the responsibility for regulating these supplies rests with the local authority, environmental health service. This includes sampling, monitoring, informal and formal enforcement, grants and prosecution.

Contact the relevant environmental health service for specific information on the regulation of private water supplies and more detailed guidance. For specific information on the regulation of private water supplies and detailed guidance contact The Drinking Water Quality Regulator.

Drinking Water Quality Regulator

To support the local authority role the Drinking Water Quality Regulator has an overarching role in developing / reviewing strategy, conducting research and managing the legal standards that apply to water quality and has produced technical guidance for users of private water supplies.[67]

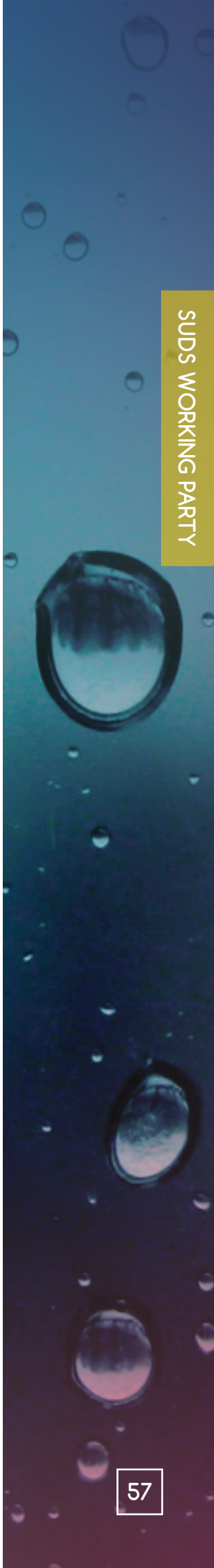
Flood Protection Authority (Flood Risk) – Local Authority

The flood prevention authority is the flood risk department within the local authority and plays a key role in the overall flood risk management across the local authority's jurisdiction.

Under the *Flood Risk Management Act* local authorities are required to provide a general overview of flood risk and, in flood prone areas, have the powers to deliver flood management to reduce the risk of flooding. *Local Flood Risk Management Plans* establish a framework for liaison with *Surface Water Management Plans* (SWMPs) providing a more specific plan relevant to particular locations within the local authority's area. These plans are for priority locations as identified by SEPA and where appropriate at the discretion of the local authority.

The flood prevention authority also has a key role regarding new development and normally supports the planning authority with specialist knowledge on flood risk. This involves review of submitted proposals and associated flood risk material to uphold the requirements of the act. As part of its duties the local authority establishes and maintains a register of SuDS and other flood risk management assets in their area.

[67] Drinking Water Quality Regulator for Scotland
http://dwqr.scot/private-supply/technical-guidance-and-information/



LIST OF USEFUL INFORMATION (INCLUDING WEBSITES)

1. BRE Digest 365 – Building Research Establishment http://www.bre.co.uk/
2. British Standard BS8515:2009 - Rainwater harvesting systems; Code of Practice http://shop.bsigroup.com/ProductDetail/?pid=000000000030260364
3. Building Standards - Technical Handbook – Domestic http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/techbooks/techhandbooks
4. Building Standards - Technical Handbook – Non-domestic http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/techbooks/techhandbooks
5. Control of Water Pollution from Construction Sites – CIRIA C532 www.CIRIA.org
6. Designing for Exceedance in Urban Drainage – CIRIA C635 (2006) www.CIRIA.org
7. Design Manual for Roads and Bridges – Transport Scotland http://www.transportscotland.gov.uk/road/design-trunk-roads
8. Dewatering underground ducts and chambers – SEPA PPG20 http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides/all_ppgs.aspx
9. Engineering in the Water Environment Good Practice Guide – Intakes and Outfalls - SEPA; WAT-SG-28 http://www.sepa.org.uk/regulations/water/engineering/engineering-guidance/ Climate X Change Scotland website - http://www.climatexchange.org.uk/
10. Flood estimation handbook – Centre for Ecology and Hydrology http://www.ceh.ac.uk/services/flood-estimation-handbook
11. Flows and Loads (4) - Sizing Criteria, Treatment Capacity for Sewage Treatment Systems Code of Practice, British Water http://www.britishwater.co.uk/Publications/codes-of-practise.aspx
12. Green Infrastructure – Design and Placemaking - http://www.gov.scot/Publications/2011/11/04140525/0
13. Multiple Benefits of SuDS – CIRIA – (2015) TBC www.CIRIA.org
14. Ponds, Pools and Lochans – SEPA 2000 http://www.sepa.org.uk/media/151336/ponds_pools_lochans.pdf
15. Private Water Supplies: Technical Manual – Drinking Water Quality Regulator http://www.dwqr.org.uk/private-supply/technical-guidance-and-information/technical-manual/
16. Regulatory Method 08 – Sustainable Urban Drainage Systems – WAT-RM-08 – SEPA http://www.sepa.org.uk/regulations/water/pollution-control/pollution-control-guidance/

17. Scottish Water Connections Applications Forms - http://www.scottishwater.co.uk/business/connections/connecting-your-property/connections-applications-forms
18. Sewers for Scotland 3rd Edition – A Technical Specification for the Design and Construction of Sewerage Infrastructure http://www.scottishwater.co.uk/business/connections/connecting-your-property/sewers-for-scotland-and-suds
19. SuDS for Roads – SCOTS/SUDSWP (2010) http://scots.sharepoint.apptix.net/roads/General%20Publications/Forms/AllItems.aspx?RootFolder=%2froads%2fGeneral%20Publications%2fSuDS%20for%20Roads&View={53441DF3%2d0B24%2d4FD6%2d9FC3%2d0E7170AA6B11}
20. SEPA Advice for Developers - http://www.sepa.org.uk/environment/land/planning/advice-for-developers/
21. Treatment and disposal of sewage where no foul sewer is available – SEPA – PPG4 http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides/all_ppgs.aspx
22. The National Roads Development Guide – Society of Chief Officers for Transportation in Scotland http://localapps.pkc.gov.uk/internet/flashmag/councils/nationalroadsguide/roadsfeb2014.pdf
23. The SuDS Manual – CIRIA update (2015) http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx
24. UK Climate Projections 2009 http://ukclimateprojections.metoffice.gov.uk/
25. Water for Scotland 3rd Edition - A Technical Specification for Developers in Scotland, Scottish Water http://www.scottishwater.co.uk/business/connections/connecting-your-property/sewers-for-scotland-and-suds/water-for-scotland-v3
26. Working at construction and demolition sites – SEPA PPG6 http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides/all_ppgs.aspx
27. Works and maintenance in or near water – SEPA PPG5 http://www.netregs.org.uk/library_of_topics/pollution_prevention_guides/all_ppgs.aspx

LEGISLATION AND POLICY REFERENCES

Legislation

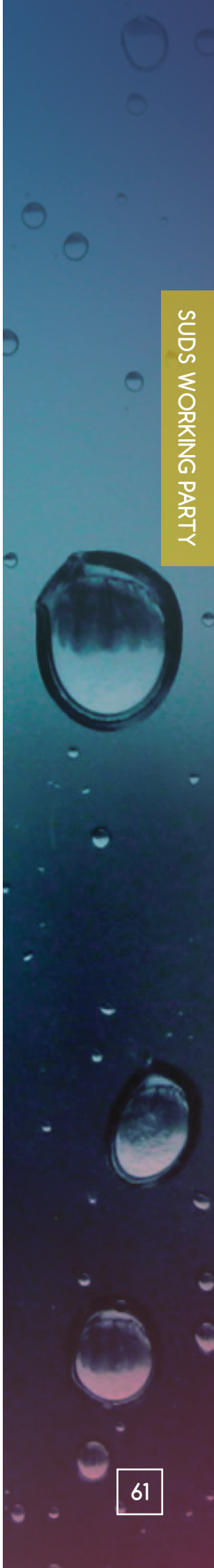
1. Building (Scotland) Regulations 2004
2. Climate Change (Scotland) Act (2009)
3. Drinking Water Directive (Council Directive 98/83/EC) 1998
4. Environmental Impact Assessment (Scotland) Regulations 1999
5. Floods Directive 2006 (Directive 2007/60/EC)
6. Flood Risk Management (Scotland) Act 2009
7. Housing (Scotland) Act 1987 – Tolerable Standard, Closing and Demolition Order
8. Housing (Scotland) Act 2006 – Repairing Standard, Work Notice
9. Planning etc. (Scotland) Act 2006
10. Private Water Supplies (Scotland) Regulations 2006
    http://www.legislation.gov.uk/ssi/2006/209/contents/made
11. Provision of Water and Sewerage Services (Reasonable Costs) (Scotland) Regulations 2011
12. Roads (Scotland) Act 1984
13. Scottish Planning Policy 2014
14. Sewerage (Scotland) Act 1968
15. Town and Country Planning (Scotland) Act (1997)
16. Water Environment and Water Services (Scotland) Act 2003
17. Water Environment (Controlled Activities Regulations) (Scotland) Act 2011
18. Water Framework Directive 2000 (Directive 2000/60/EC)
19. Water Industry (Scotland) Act 2002
20. Water (Scotland) Act 1980

Relevant Policies

1. Creating Places - http://www.gov.scot/Publications/2013/06/9811

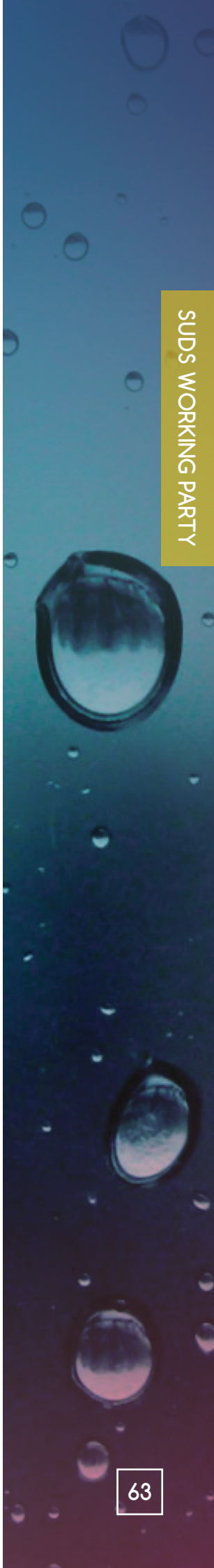
2. Designing Streets (part of document is policy) - http://www.gov.scot Publications/2010/03/22120652/0

3. Scottish Planning Policy - http://www.gov.scot/Publications/2014/06/5823



GLOSSARY

AEP	Annual Exceedance Probability
BRE	Buildings Research Establishment
CAR	The Water Environment (Controlled Activities) (Scotland) Regulations
CIRIA	Construction Industry research and Information association
DMRB	Design Manual for Roads and Bridges
FRMS	Flood risk management strategy
LA	Local Authority
LFRMP	Local flood risk management plan
LPA	Local Planning Authority
RCC	Road Construction Consent
SCOTS	Society of Chief Officers for Transportation in Scotland
SEPA	Scottish Environment Protection Agency
SuDS or SuD systems	Sustainable urban drainage systems
SUDSWP	Sustainable Urban Drainage Scottish Working Party
SWMP	Surface water management plan



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