Flood and Water Management Supplementary Planning Document

Version for Planning Committee October 2012

Growing the right way for a bigger, better Peterborough

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1 Introduction

1.1 Background

1.1.1 This supplementary planning document (SPD) focuses on managing flood risk and the water environment in new developments in Peterborough. In order to reduce the likelihood and consequences of flooding, it is necessary that water bodies and a site's drainage network and watercourses are both well designed and managed and that development is located in a safe environment. The city council, a Lead Local Flood Authority under the Flood and Water Management Act (2010), takes these issues very seriously.

1.1.2 It is predicted that climate change will bring more frequent short duration, high intensity rainfall and more frequent periods of long-duration rainfall, meaning both river and surface water flooding are likely to be an increasing problem. Firm application of national and local planning policy should mean risks can be managed allowing sustainable development to continue.

1.1.3 Under the Water Framework Directive water environments must also be protected and improved with regards to water quality, water habitats and biodiversity.

1.1.4 Once adopted, the SPD will form part of the city council's Local Development Framework (LDF), supplementing flood related policies found in the Peterborough Core Strategy and the Peterborough Planning Policies DPD.

1.1.5 Developers should initially consider the advice provided in this SPD. Thereafter, the city council offers a pre-application service for which there will be a charge. Further information on this service can be found on the city council's planning web pages[1].

1.1.6 To ensure that Peterborough has a consistent, locally specific approach to flood risk management, the SPD should be used by:

[1]http://www.peterborough.gov.uk/planning_and_building/making_a_planning_application/step_1_pre-application_advice.aspx

- Developers when selecting new sites for development
- Developers when preparing the brief for their design team to ensure drainage and water management schemes are sustainably designed
- Consultants when carrying out site specific Flood Risk Assessments
- Design teams preparing masterplans, landscape and surface water drainage schemes
- Development management officers when determining delegated planning applications, making recommendations to Committee and drawing up S106 obligations that include contributions for Sustainable Drainage Systems (SuDS)

1.1.7 Applicants and all water management related partners should be able to use this guidance to ensure Peterborough has a consistent, locally specific approach to flood risk management.

1.2 How to use this supplementary planning document

1.2.1 This SPD is set within the context of a water and flood risk management hierarchy to help developers and decision makers understand flood and water management and to embed it in decision making at all levels of the planning process.

1.2.2 As part of the site selection process for all new developments, developers must first assess the flood risk potential of a site, examining all sources of flood risk. Next, if the site is appropriate for development in principle, the site layout should be planned in a way that minimises flood risk as much as possible and prevents the deterioration of the water environment. This can be done by making appropriate use of site remediation, sustainable drainage systems, public open space and existing water features, as part of planning land uses and site layouts. Finally, flood risk mitigation measures may be considered. See flow chart in Figure 1-1 below.

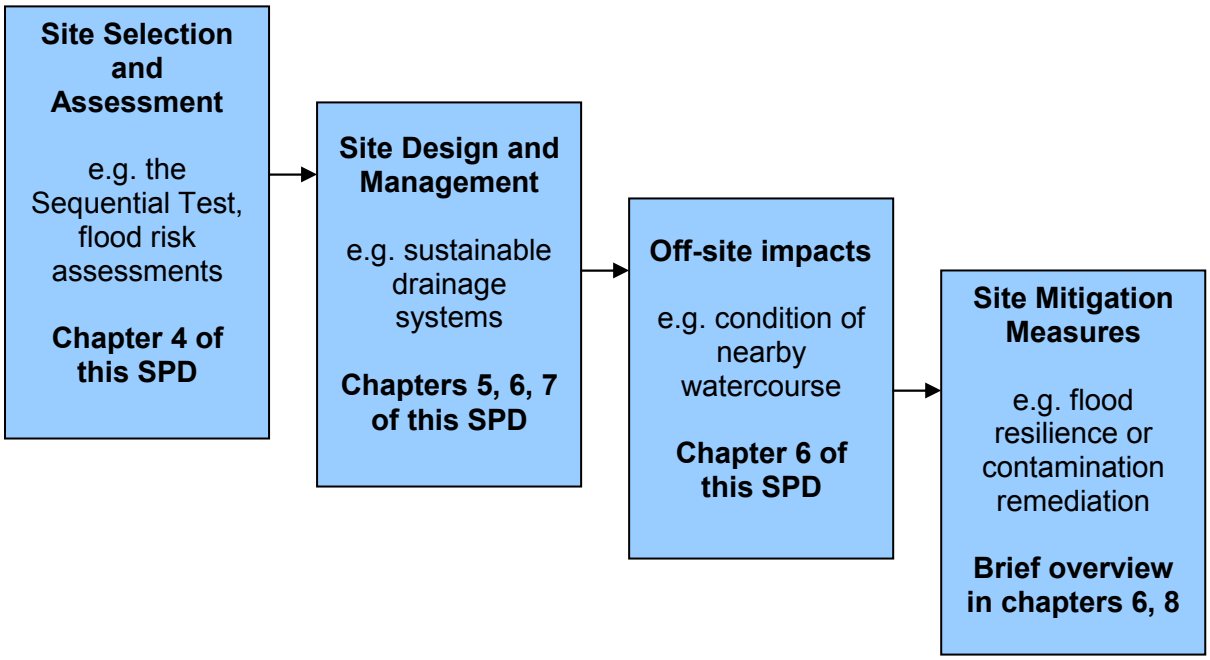


Figure 1-1: Flow chart demonstrating the contents of this Supplementary Planning Document

1.2.3 The design of water features and drainage systems is dependant on other constraints such as site contamination levels. This SPD does not provide detailed information on mitigation topics such as flood resilience or groundwater remediation measures (step four in the above flow chart). However, references are made throughout to assist with consideration of these issues.

2 Setting the scene

2.1 Legislation, policy and guidance

2.1.1 Flood and water management in Peterborough is influenced by legislation, national and local policy, local technical studies and local information. Figure 2-1 below attempts to capture those key elements, and the rest of this chapter gives some brief commentary on the most important ones.

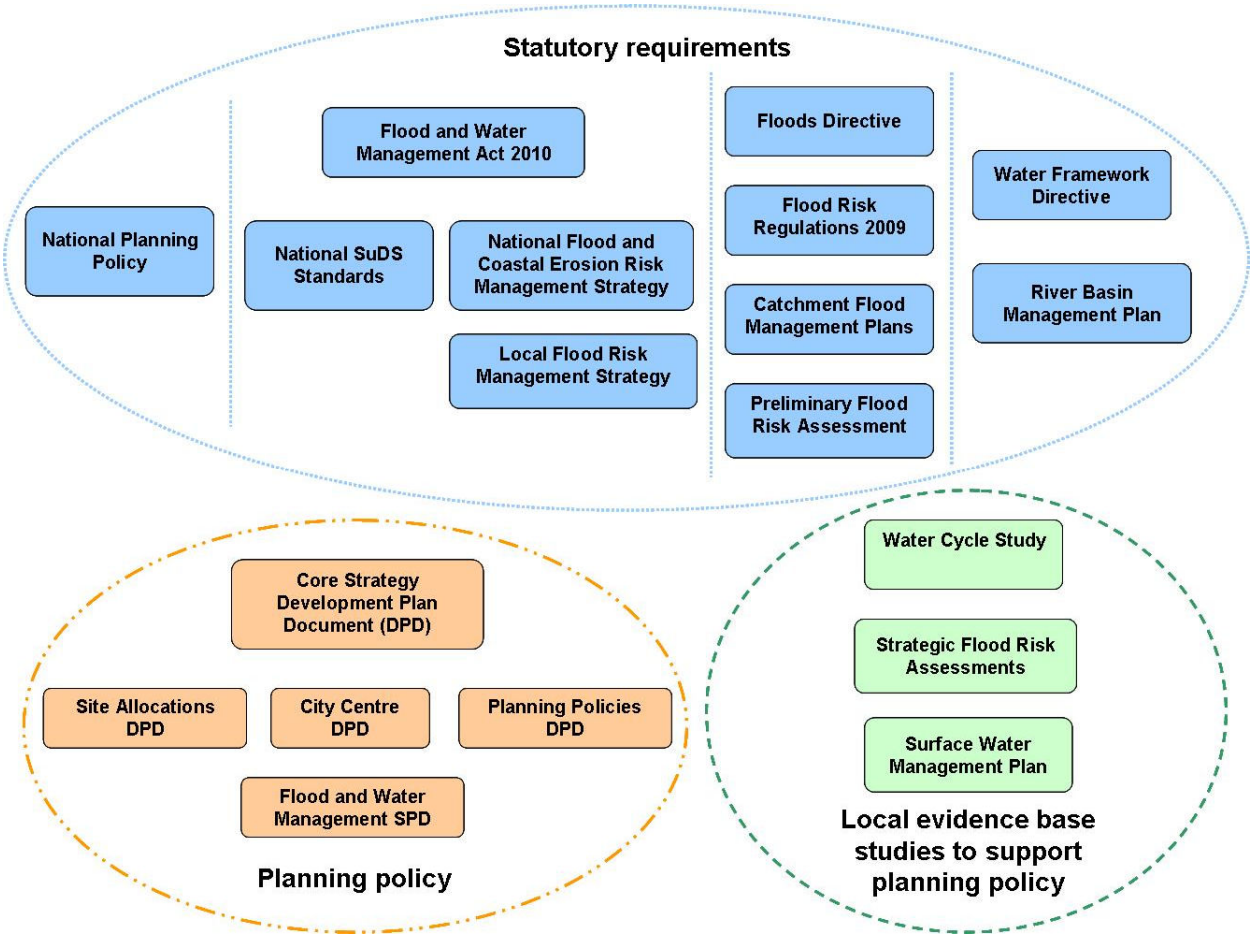


Figure 2-1: Linkages between relevant flood risk management documents and legislation

2.2 European context

The Floods Directive

2.2.1 The EU Floods Directive (2007/60/EC) came into force due to a need for EU countries to better understand and gather accurate data about the risks from surface water flooding. In the UK the directive came into force via the Flood Risk Regulations (2009) which in turn sets the requirement for Preliminary Flood Risk Assessments (PFRA) to be produced by all unitary and county councils. Peterborough's PFRA is discussed below under the heading on Local Background.

The Water Framework Directive

2.2.2 The Water Framework Directive – 2000/60/EC (WFD) is a piece of EU legislation that came into force in December 2000 and was enacted into UK law in December 2003. The legislation requires member states to make plans to protect and improve the water environment. It applies to all surface freshwater bodies, including lakes, streams, rivers and canals; transitional bodies such as estuaries; groundwaters; and coastal waters out to one mile from low water. There are four main aims of WFD, these are:

- To improve and protect inland and coastal waters drive wiser
- Sustainable use of water as a natural resource
- Create better habitats for wildlife that lives in and around water
- Create a better quality of life for everyone

2.2.3 The Directive requires Member States to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least 'good ecological status' for all water bodies by 2015. Good ecological status is the objective the water body to have biological, chemical and structural characteristics similar to those expected under nearly undisturbed conditions. Where this is not possible to achieve by 2015 and subject to criteria set out in the Directive, aim to achieve good ecological status by 2021 or 2027;
- Meet the requirements of the Water Framework Directive Protected Areas;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants;
- Contribute to mitigating the effects of floods or droughts.

2.2.4 River Basin Management Plans produced by the Environment Agency detail the pressures facing the water environment and what actions need to be taken in order for the WFD Directive to be met in each area. The Anglian River Basin Management Plan[2] covers Peterborough.

2.3 National context

Flood and Water Management Act 2010

2.3.1 The Flood and Water Management Act (FWMA) places the responsibility for co-ordinating 'local flood risk' management on the county or unitary authority,

[2] See Link: http://www.environment-agency.gov.uk/cy/ymchwil/cynllunio/124725.aspx

making them a Lead Local Flood Authority (LLFA). In this context, the act uses the term 'local flood risk' to mean flood risk from:

- surface runoff,
- groundwater and
- ordinary watercourses.

2.3.2 Peterborough City Council is a LLFA. The FWMA contains a range of different duties for LLFAs, including the need to prepare a Local Flood Risk Management Strategy and to maintain a register of significant flood prevention assets.

2.3.3 The Act also seeks to encourage the uptake of sustainable drainage systems (SuDS) by agreeing new approaches to the management of drainage systems and providing for LLFAs to adopt SuDS for new developments and redevelopments. In this regard, the city council intends to establish a SuDS Approving Body, which will review, approve and adopt drainage strategies and systems associated with/provided by new developments alongside the current planning approval system.

2.3.4 Schedule 3 of the FWMA, which introduces the need for SuDS Approving Bodies, is expected to be enacted in October 2013[3]. 'National SuDS Standards' prepared by the Department of the Environment, Food and Rural Affairs (Defra) will confirm the national requirements to which a drainage system must be built in order to be suitable for approval and adoption. Local guidance is also being prepared by many councils to supplement these standards.

National planning policy

2.3.5 Section 10 of the National Planning Policy Framework (NPPF) sets out the government's intention that planning should proactively help mitigation of, and adaption to, climate change, including management of water and flood risk.

2.3.6 The NPPF states that both Local Plans and planning applications decisions should ensure that flood risk is not increased and that development should only be considered appropriate in flood risk areas where it can be demonstrated that:

[3] As of the time of writing.

- a site specific flood risk assessment has been undertaken which follows the Sequential Test, and if required, the Exception Test; and
- within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
- development is appropriately flood resilient and resistant, including safe access and escape routes where required; and
- that any residual risk can be safely managed, including by emergency planning; and
- the site gives priority to the use of sustainable drainage systems

2.3.7 Government has produced *Technical Guidance to the National Planning Policy Framework (March 2012)* which covers flood risk. This guidance provides some of the information that is needed in order to undertake a Sequential Test for development, including:

- Clarification of the aim of the test,
- Explanation of each of the flood zone classifications,
- Explanation of the land use vulnerability classifications, and
- Guidance on how to take climate change into account within a site specific flood risk assessment.

2.4 Local context

The Environment Agency and Catchment Flood Management Plans

2.4.1 The Environment Agency has prepared catchment based guidance to ensure that Main Rivers and their respective flood risk have been considered as part of the wider river system in which they function. Catchment Flood Management Plans (CFMPs) discuss the management of flood risk for up to 100 years in the future by taking into account factors such as climate change, future development and changes in land management. As well as informing councils' planning policy and local flood management practises, the CFMPs will be part of the mechanism for reporting into the EU Floods Directive. The relevant CFMPs for Peterborough are the River Nene, River Welland and River Ouse and these can all be accessed on the Environment Agency's Catchment Flood Management Plan[4] web pages.

The role of Peterborough City Council

2.4.2 In addition to becoming a Lead Local Flood Authority, Peterborough City Council also continues its previous role in managing highway drainage. The city council works with a wide range of other water and risk management partners in order to deliver its aims and duties in a co-ordinated way. Developing relevant planning policy and co-ordinating management procedures are important parts of reducing flood risk and ensuring that developments are appropriately drained.

[4] http://www.environment-agency.gov.uk/research/planning/33586.aspx

Local flood risk sources in Peterborough

2.4.3 Flood risk in Peterborough occurs from a variety of sources. These include:

- Main rivers (18 of the watercourses in Peterborough, of a variety of sizes, have been classified as main river)
- Ordinary watercourses (see glossary)
- Surface runoff
- Groundwater (high water table)
- Reservoirs
- The sewerage network – sewers, rising mains and pumping stations

2.4.4 Landscape and flood risk characteristics vary across Peterborough. Notably the Fens area to the east varies from the rest of Peterborough because it is managed by Internal Drainage Boards (IDBs). In the 17th century the Fens were drained and IDBs now continuously manage the water levels in these areas. Without such management, the Fens would once again flood over.

Peterborough Water Cycle Study (2010)

2.4.5 The detailed Water Cycle Study for Peterborough (2010)[5] sets out a range of recommendations. Linked to some of those recommendations, guidance in this SPD is provided on:

- Removal of surface water from combined sewers
- Use of SuDS including the incorporation of green roofs, permeable pavements, swales and attenuation schemes
- Rapid surface water discharge from sites adjacent to the River Nene to avoid peak fluvial levels coinciding with peak surface water runoff volumes

2.4.6 The specific sewerage network options highlighted in the Study apply predominantly to the foul sewer system although these may have some impact where combined systems or cross connections are present.

2.4.7 A **developer checklist** sets out related issues and is available online within Appendix I of the Water Cycle Study[5]. This checklist aims to ensure that planning applications are accompanied by information on relevant water issues.

Peterborough Strategic Flood Risk Assessment(s)

2.4.8 A Strategic Flood Risk Assessment (SFRA) provides the essential information on flood risk, allowing local planning authorities to understand the risk across the authority area. This allows for the sequential test (see chapter 4) to be properly applied. SFRAs produced for Peterborough are available online on the city council's web library of water management documents[5]. The SFRAs provide breach and hazard mapping information for Peterborough that may

[5] http://www.peterborough.gov.uk/environment/flood_and_water_management/developers__landowners/water_management_documents.aspx

be useful to developers in undertaking site specific flood risk assessments (FRAs).

2.4.9 The Level 2 SFRA (2010) recommends further exploration into Peterborough's different drainage and flood risk management subcatchments. This is suggested to assist understanding about the downstream and cumulative impacts of flood risk management and surface water drainage systems. Development across the city could be considered holistically by accounting for the variations in local constraints, catchment response, strategic opportunities and wider benefits. This SPD explains how the city council would like to continue developing its understanding about these subcatchments, making information available to developers to assist them with understanding site characteristics.

Peterborough City Council Suite of Sustainable Drainage Guides

2.4.10 The city council will have a suite of guides to assist partners and customers with understanding Peterborough's sustainable drainage procedures once the Schedule 3 of the Flood and Water Management Act 2010 has commenced. The guides will help customers by providing information on aspects of SuDS and the SuDS Approval Board (SAB). This will include what SuDS are, what SuDS will work in Peterborough and a guide to the SAB including adoption. The guides will be aimed at a range of audiences from individual homeowners and school children to developers' design consultants and experienced engineers. The guides will be published on the city council's SuDS web pages[6].

Peterborough Preliminary Flood Risk Assessment (2011)

2.4.11 The Peterborough Preliminary Flood Risk Assessment (PFRA) is a statutory document completed under the European Floods Directive. The PFRA process is aimed at providing a high level overview of flood risk from local flood sources, including surface runoff, groundwater, ordinary watercourses and public sewers. It is not concerned with flooding from main rivers or the sea.

2.4.12 The Peterborough PFRA report of June 2011 confirms (based on the evidence collected) that there is no 'Flood Risk Area' of national significance within Peterborough's administrative area. However, the PFRA does not assess whether there are flood risks of local significance.

Local Flood Risk Management Strategy

2.4.13 The city council is starting work on developing its Local Flood Risk Management Strategy (which is one of its duties under the FWMA). It will largely be focused on tackling issues related to flood risk in existing areas of Peterborough, rather than addressing risks as part of new developments.

[6] http://www.peterborough.gov.uk/suds

Local Planning Policy

2.4.14 The city council's local planning policy[7], officially known as the Local Development Framework (LDF), includes:

- An adopted *Core Strategy (February 2011)* that sets the type and amount of development that will be accommodated in Peterborough up until 2026.
- An adopted *Site Allocations Development Plan Document (April 2011)* which identifies sites for development to meet the vision of the Core Strategy.
- An adopted *Planning Policies Development Plan Document (December, 2012)* which provides detailed policy to assist in the determination of planning applications.
- The emerging *City Centre Development Plan Document*, which identify sites for development and regeneration specifically within the city centre area.

2.4.15 This SPD provides detailed guidance to help implement policy CS22 of the Core Strategy and policy PP16 of the Planning Policies DPD. The document also supports and cross references policy PP20 due to the important links between site contamination and site drainage. These three policies are as follows:

Core Strategy policy CS22 - Flood Risk

"The allocation of sites for development and the granting or refusal of planning permission on such sites and any other site will be informed by:

- The Peterborough Level 1 SFRA (2008)*
- The Peterborough Level 2 SFRA (2009)*
- The sequential test and if necessary the exception test; and an appropriately detailed site specific flood risk assessment.

(* Or any equivalent subsequent assessment)
Development in Flood Zones 2 and 3 will only be permitted following the successful completion of a sequential test, exception test if necessary, suitable demonstration of meeting an identified need, and through the submission of a site specific flood risk assessment demonstrating appropriate flood risk management measures and a positive approach to reducing flood risk overall.

No development will be permitted in rapid inundation zones[8], or areas not defended to an acceptable standard, other than in exceptional circumstances, unless the proposed development is classified as a water compatible use or essential infrastructure (subject to the exception test). In Zone 3a, residential development will only be permitted where the site consists of previously developed land.

[7] http://www.peterborough.gov.uk/planning_and_building/planning_policy.aspx
[8] See the glossary in chapter eight of this SPD for a definition.

All appropriate development should employ sustainable drainage systems (SuDS) to manage surface water run-off where technically feasible and appropriate to that part of the catchment. SuDS will be expected for all developments where run off or flash floods may threaten the integrity of any international or European site of nature conservation importance. Where such a threat exists and SuDS are not feasible, development will not be permitted. Long-term management and maintenance of SuDS should be agreed early on in the process. Economic constraints will not be accepted as a justification for non-inclusion of SuDS.

Where appropriate, development should help achieve the flood management goals from the River Nene and River Welland Catchment Flood Management Plans (CFMP)."

Planning Policies Development Plan Document policy PP16 - The Landscaping and Biodiversity Implications of Development

For any proposed development with potential landscaping and/or biodiversity implications, the city council will requires the submission of a site survey report with the planning application, identifying the landscape and biodiversity features of values on and adjoining the site. The layout and design of the development should be informed by and respond to the results of the survey.

Planning permission for the development will only be granted if the proposal makes provision for:

(a) the retention and protection of trees and other natural features that make a signification contribution to the landscape or biodiversity values of the local environment, provided that this can be done without unduly compromising the achievement of a good design solution for site; and

(b) new landscaping for the sites as an integral part of the development, with new tree, shrub and hedgerow planting suitable for the location, including wildlife habitat creation; and

(c) the protection and management of existing and new landscape, ecological and geological features during and after any construction, including the replacement of any trees or plants introduced as part of the development scheme which die, are removed or become seriously damaged or diseased; and

(d) the protection and, where necessary and feasible, the enhancement of water quality and habitat of any aquatic environment in or adjoining the site. For riverside development, this includes the need to consider options for riverbank naturalisation (see Flood and Water Management SPD for further guidance)."

The city council will requires all major developments which involved building facades incorporating in excess of 60 per cent reflective glass to include measures which reduce the probability of bird strike.

For significant landscaping proposals, the council will requires submission of management and maintenance specifications to accompany the landscaping scheme.

Planning Policies Development Plan Document policy PP20 – Development on Land Affected by Contamination

All new development must take into account the potential environmental impacts on people, buildings, land, air and water arising from development itself and any former use of the site, including, in particular, adverse effects arising from pollution.

Where development is proposed on a site which is known or has the potential to be affected by contamination, a preliminary risk assessment should be undertaken by the developer and submitted to the city council as the first stage in assessing the risk.

Planning permission will only be granted for development if the city council is satisfied that the site is suitable for its new use, taking account of ground conditions, pollution arising from previous uses and any proposals for land remediation. If it cannot be established that the site can be safely and viably developed with no significant impacts on future users or ground and surface waters, planning permission will be refused.

3 Consultation with water and flood risk partners

3.1 Partners and areas of interest

3.1.1 The city council recognises the importance of sharing expertise and information to be able to deliver effective and timely decisions. Flood risk should be factored into the earliest stages of applications and decisions.

3.1.2

Table 3-1 below presents a list of consultees and the relevant water related topics on which either the city council or the developer may need to consult them.

3.1.3 The following organisations will be statutory consultees for the SuDS Approving Body decision: Environment Agency, Peterborough's local water and sewerage company (Anglian Water), local Internal Drainage Boards and the Highways Agency. The exact consultation requirements have not been established yet but will be agreed between the partners and published well ahead of the commencement of Schedule 3 of the Flood and Water Management Act 2010. This is anticipated being October 2013.

Drainage authorities in fenland areas

3.1.4 A large proportion of Peterborough is part of the Fen landscape and is specially managed to ensure that the area retains its significant agricultural, leisure and residential functions. The management is generally undertaken by Internal Drainage Boards (IDBs). IDBs are a type of operating authority which is established in areas of special drainage needs in England and Wales with permissive powers to undertake work to manage water levels within drainage districts.

3.1.5 There are four fenland drainage authorities within the area of Peterborough City Council: North Level District IDB, Welland and Deeping IDB, Whittlesey and District IDB and the Middle Level Commissioners. The areas of each authority are illustrated in appendix A. Middle Level Commissioners is not technically an Internal Drainage Board but a Statutory Corporate. For ease of reference the Middle Level Commissioners have however agreed that the term IDB may be used loosely throughout this document to refer to all of the relevant drainage authorities.

Environment Agency

3.1.6 The Environment Agency is non departmental public body and has responsibilities for protecting and enhancing the environment as a whole (air, land and water), and contributing to the government's aim of achieving sustainable developing in England and Wales. The Environment Agency manages flood risk from main rivers, but also has a strategic overview role across all types of flooding.

3.1.7 The Environment Agency has produced a list which details when the Environment Agency needs to be consulted on specific issues. This consultation guide[9] is available on their website.

3.1.8 A flood risk consultation matrix[10] has also been specifically created to demonstrate in more detail the scenarios for which the Environment Agency has applicable standing advice. This is aimed at Local Authorities but could be of use to developer teams. For the larger, more complex developments, standing advice is not sufficient and the Environment Agency should be consulted on the development application with an accompanying FRA. For

[9] http://cdn.environment-agency.gov.uk/geho1211bvwv-e-e.pdf
[10] http://www.environment-agency.gov.uk/static/documents/Business/FRSA_LPA_v_3.1.pdf

some development types the city council makes its decision without advice from the Agency.

Water and sewerage provider

3.1.9 As the water and sewerage company in Peterborough, Anglian Water Services Limited has the responsibility to effectually drain their area and maintain foul, surface and combined public sewers. When flows are proposed to public sewers, Anglian Water need to ensure that the public system has capacity to accept these flows. This is therefore assessed when a developer applies for a sewer connection. The Flood and Water Management Act 2010 will remove a developer's right to connect to the public sewer, with the decision being made instead by the SuDS Approving Body, to which Anglian Water will be an important consultee.

3.2 Pre-application advice

3.2.1 Many of Peterborough's water management partners provide a pre-application advice service. There may be a charge for this service.

3.3 Contact information

3.3.1 Table 3-1 provides an overview of the principal organisations which may need to be consulted during the development of a planning application. This list is not exhaustive.

3.3.2 Contact information and links for partner organisations are included on the city council's water management web pages.

Table 3-1: A simplified table of partner organisations with which it would be useful to consult during preparation of the water related elements of a planning application.

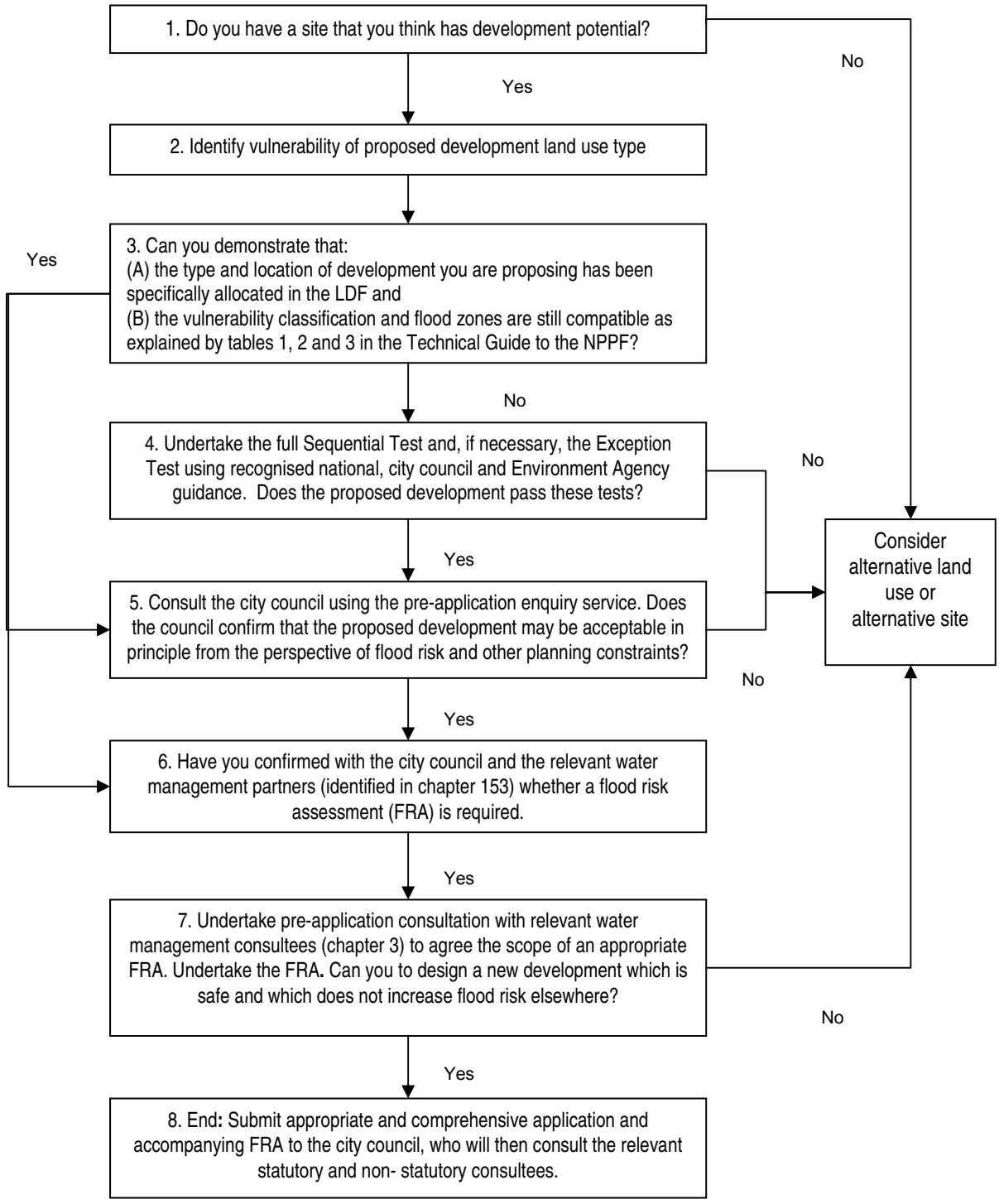
Organisation	Flood risk	Drainage	Water contamination	Water habitat (WFD, biodiversity, water quality)
Environment Agency	The Environment Agency should be consulted on any development on land of one hectare or more and any development requiring Environmental Impact Assessment. They are also consulted on specifically water related issues as detailed below:			
	All major and residential minor development sites within Flood Zones 2 or 3, sites within Flood Zone 1 that have been previously identified as having drainage issues and sites within 20m of a Main River. However please see section 3.1.6 for more details.		Where risk exists that pollution of controlled waters (includes groundwater) may occur or may have occurred in the past.	Where the city council thinks there may be a risk of deterioration in WFD potential of freshwater systems
Fen Drainage Authorities (IDBs)	the Fens or where development may affect or use an IDB managed watercourse – see section 0 and appendix A			
Anglian Water	Foul and/or surface water flood risk	Connection to surface water sewers or regarding foul discharge		
Peterborough City Council – through the pre-application service or the application process	Surface water risk - Drainage Team Residual risk - Emergency Planning Team	Site drainage - Drainage Team Highway drainage – Drainage Team and Highway Control	Risk to human health and property – Strategic Regulatory Services	Biodiversity, wildlife, WFD - Natural Environment Team
English Heritage	Where flood risk, drainage or contamination may affect a listed building, a conservation area or a Scheduled Ancient Monument.			
Natural England	Development is within or affecting a County Wildlife Site, SSSI, RAMSAR, SAC, SPA or protected species			
Wildlife Trust				Within or affecting a County Wildlife site, protected species or urban wildlife.
Cambridge and Peterborough Local	Where residual flood risk exists on larger sites or those with			

Organisation	Flood risk	Drainage	Water contamination	Water habitat (WFD, biodiversity, water quality)
Resilience Forum (includes Emergency Services)	vulnerable users			
Other organisations	Other organisations may need to be consulted depending on issues arising on site.			

4 Guidance on site selection for sites within flood zones

(to assist implementation of Core Strategy policy CS22)

4.1 Introduction



4.1.1 The aim of this chapter is to give advice to developers and decision makers on how to address flood risk in the planning process and implement the first three paragraphs of Core Strategy policy CS22. The preceding flow chart sets out **the steps a developer should take**. This chapter applies to all scales of development. Explanatory notes are also provided, where necessary, for each of the steps. Please note, the guidance here should be read in conjunction with national planning policy.

4.1.2 The notes in sections 4.2 to 4.8 explain what is meant and/or required by various stages in the flow chart.

4.2 Step 2 explanatory notes – site vulnerability

4.2.1 Identify how 'vulnerable' the proposed development is using the vulnerability classification in table 2 of the Technical Guide to the National Planning Policy Framework (2012)[11]. This is important because different types of development are acceptable in different flood risk situations. In simple terms, the more vulnerable the development type is, the more important it is to locate it in areas of the lowest possible flood risk.

4.3 Step 3 explanatory notes – need for Sequential Test

4.3.1 If the site has been specifically allocated in the city council's local development plan (i.e. the LDF) for the same land use type that is now being proposed, then an assessment of flood risk, at a strategic level, has already been done. This will have included assessing the site, against other alternative sites, as part of a 'sequential test' approach to flood risk.

4.3.2 However, despite passing part (A) of step three, there is a small chance that there has been a material change in the flood zoning of the development site since the adoption of the relevant part of the LDF. The site must therefore also pass part (B). For example, the site may have moved, in whole or part, from one Flood Zone category to another. If this has occurred, and the site has moved to a higher risk zone (e.g. from Zone 1 to Zone 2), it will be necessary to demonstrate that the proposed development passes the Sequential Test (see below).

4.3.3 The Flood Zones are the starting point for the Sequential Test. To check whether there has been a change in Flood Zones, please contact the Environment Agency. Zones 2 and 3 are shown on the online Environment Agency Flood Map[12], with Flood Zone 1 being all the land falling outside Zones 2 and 3. The Flood Zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences. Peterborough's SFRA sets out which areas of Peterborough are protected by formal flood defences and assesses the hazard associated with the failure of these defences. This information should inform the Sequential Test and if necessary, the Exception Test – see section 2.4.8 for more details on the SFRA.

[11] http://www.communities.gov.uk/documents/planningandbuilding/pdf/2115548.pdf
[12] http://www.environment-agency.gov.uk/homeandleisure/37837.aspx

4.3.4 If 'yes' can be answered to step three, parts (A) and (B), then move to step five (optional) or six.

4.3.5 If it is not possible to answer 'yes' at step three, step four must be completed.

4.4 Step 4 explanatory notes – passing the relevant tests

Sequential Test

4.4.1 If the site is within Flood Zone 2 or 3 the Sequential Test should be undertaken following the process as discussed in the NPPF[13] and set out in the agreed Sequential Test Process note[14].

4.4.2 Using the table below, developers are required to check whether the vulnerability classification of the proposed land use is appropriate to the flood zone in which the site is located. Table 4-1, taken from the NPPF Technical Guide[15] also shows when an Exception Test will be required.

4.4.3 However, this table cannot be taken as the final answer to whether or not a development is appropriate; the Sequential Test (and the Exception Test, where necessary) must be completed in full. For example, if a 'more vulnerable' development is proposed to be located on a site in Zone 2 (and hence receive a ✓ using the table below) it will then be necessary to compare this to other reasonably available similar sites within lower risk areas (i.e. in Zone 1 in this example).

Table 4-1: Flood risk vulnerability and flood zone compatibility
(source: Technical Guide to the National Planning Policy Framework, March 2012)

Flood risk vulnerability classification	Essential infrastructure*	Water compatible*	Highly vulnerable*	More vulnerable*	Less vulnerable*
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a	Exception Test required	✓	**x**	Exception Test required	✓
Zone 3b 'functional flood plain'	Exception Test required	✓	**x**	**x**	**x**

Key: ✓= Development may be appropriate **x** = Development should not be permitted

4.4.4 For the comparison of reasonable available sites within the city centre the area of search will be Peterborough's city centre boundary. For regional

[13] http://www.communities.gov.uk/publications/planningandbuilding/nppf
[14] http://www.environment-agency.gov.uk/static/documents/Business/SequentialTestProcess_v3.1.pdf
[15] http://www.communities.gov.uk/publications/planningandbuilding/nppftechnicalguidance

infrastructure the area of search will be the East of England, Northamptonshire and Lincolnshire. For all other sites the **area of search** is the Peterborough Unitary Authority area.

4.4.5 The definition of the **functional floodplain** is land where water has to be stored in times of flood. It includes the land which would flood with an annual probability of 4% (1 in 25) and the associated water conveyance routes and flood storage areas (sometimes referred to as washlands). The annual probability has been formally agreed for Peterborough by Peterborough City Council and the Environment Agency, as recommended by national policy.

4.4.6 When designing a site layout, it is important that a **sequential approach** to flood risk is also used **within the site**, i.e. locating development in the areas of lowest flood risk within the site boundary.

Exception Test

4.4.7 As shown in Table 4-1, the **Exception Test** can be applied in a number of instances. Application of the Exception Test ensures that new developments which are needed in medium or high flood risk areas will only occur where flood risk is clearly outweighed by other sustainability factors and the development will be safe for its lifetime, taking climate change into account. For the Exception Test to be passed:

- it must be demonstrated that the development provides wider sustainability benefits to the community[16] that outweigh flood risk, informed by a SFRA where one has been prepared; and
- a flood risk assessment must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

4.4.8 Peterborough City Council advises the use of the outcomes set within the Greater Peterborough Partnership *Sustainable Community Strategy 2008-21* as the framework for demonstrating whether or not **wider sustainability benefits** can outweigh flood risk. There are sixteen outcomes (listed on page 11 and 12 of the Strategy) against which the development should be scored. These outcomes are those that Peterborough wishes to see delivered in order to benefit its communities. The Sustainable Community Strategy has been adopted by the city council and its partners as the overarching and guiding plan for Peterborough.

4.5 Step 5 explanatory notes – consultation

4.5.1 The city council offers a pre-application service that covers planning applications and drainage information (and in future SuDS applications). Further information on this service can be found on the city council's pre-application advice web page[17].

[16] http://www.gpp-peterborough.org.uk/documents/SustainableCommunityStrategy_003.pdf
[17] http://www.peterborough.gov.uk/planning_and_building/making_a_planning_application/step_1_pre-application_advice.aspx

4.6 Step 6 explanatory notes – need for flood risk assessment

4.6.1 National planning policy should be the first indicator of whether or not a site requires a FRA. Paragraph 103, footnote 20, of the National Planning Policy Framework[18] provides detail of this.

> A site specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1, all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to local planning authority by the Environment Agency); and where proposed development, or a change of use to a more vulnerable class, may be subject to other sources of flooding.
>
> A flood risk assessment may also be required for some specific situations:
>
> - If the site may be at risk from the breach of a local defence (even the site is actually in flood zone 1). See section 4.6.2 for more information.
> - Where the site is intended to drain to the catchment or assets of a drainage authority who requires an FRA
> - Where the site's drainage system meets the criteria of the Middle Level Commissioners as listed in section 4.6.3.

4.6.2 In areas of Peterborough that are defended the residual risk of breaching of the defence can mean that areas in Flood Zone 1 could actually be at risk of flooding. While the recognised Flood Zones maps show the areas that would be at risk if there were no defences, the failure of such structures can produce different results. The pressure the water may be under at the time of breach and the pathway that it is forced to take may not be same as if it were naturally overtopping the river banks. For this reason a flood risk assessment may sometimes be required for sites proposing people-based uses in defended areas that are actually within Flood Zone 1. If this situation applies **breach modelling** is also likely to be required as part of the planning process since this would enable determination of the actual risk to a site (see section 5.1.5). Please seek advice from the Environment Agency or the city council if further explanation is required on this point.

4.6.3 A large part of Peterborough is fenland. Since management practises in this area vary, there are some scenarios not listed by the NPPF, where an **FRA could be required within the Fens**. Development meeting the following criteria is required to submit an FRA to the Middle Level Commissioners:

- Development being either within or adjacent to a drain/watercourse, and/or other flood defence structure within the area of the IDBs overseen by Middle Level Commissioners.
- Development being within the channel of any ordinary watercourse within the Commissioner's area
- Where a direct discharge of surface water or treated effluent is proposed into the Middle Level Commissioners catchment.

[18] http://www.communities.gov.uk/publications/planningandbuilding/nppf

- For any development affecting more than one watercourse in the Commissioner's area and having possible strategic implications in an area of known flood risk.
- Development being within the maintenance access strips provided under the Commissioners' Byelaws.
- Any other application that, in the opinion of the Middle Level Commissioners' Chief Engineer, has material drainage implications.

4.6.4 The requirement for FRA should not be confused with the requirement to consult the Environment Agency on certain types of planning application and FRA. Chapter 3 provides more information about when the Environment Agency should be consulted. For clarity, the requirement for site specific FRA where the Agency does not want to be consulted on applications is in practise much simpler, as the FRA need consist only of the basic information listed under step 7 (4.7.3).

4.6.5 Flood risk assessments that the Environment Agency will not be consulted upon will be reviewed by the city council. For householder development this could be as simple as ensuring the development is being designed with an understanding of how the floor levels should relate to flood event levels. For most development this is likely to be as part of agreeing an appropriate drainage strategy for the site.

4.6.6 Please note that passing the Sequential Test does not remove the need for FRA.

4.7 Steps 7 and 8 explanatory notes – content of flood risk assessment

4.7.1 Flood risk, site design and emergency access and aggress can affect the value of land, the cost of developing it and the cost of its future management and use. They should be considered, as part of the FRA, as early as possible in preparing development proposals.

Basic FRA for smaller application sites

4.7.2 A very simple FRA is required for the following types of development:

- Householder development and alterations in Flood Zones 2 and 3
- Non-residential extensions with a footprint of less than 250 square metres in Flood Zones 2 and 3
- Development of less than 1 hectare in Flood Zones 2 and 3
- Any change of use that results in the developments vulnerability class becoming higher risk (e.g. water compatible to less vulnerable or less vulnerable to more vulnerable)

4.7.3 The requirement for FRA consists only of the completion of a simple flood risk table which must be completed and submitted along with supporting evidence, as part of the planning application. The relevant tables can be found in the Environment Agency's online flood risk assessment guidance by following the links from the relevant development type and Flood Zone.

Full FRA for other sites

4.7.4 The text box below sets out the requirements of a formal site specific flood risk assessment.

Flood risk assessments (FRAs) should:

a) take a **'whole system**' approach to drainage to ensure site discharge does not cause problems further along in the drainage sub-catchment/can be safely catered for downstream of the site;
b) **be proportionate** to the risk and appropriate to the scale, nature and location of the development;
c) consider the risk of **flooding arising from the development** in addition to the risk of flooding to the development. This includes considering how the ability of water to soak into the ground may change after development;
d) take the impacts of **climate change** into account;
e) be undertaken **as early as possible** in the particular planning process, by a competent person, to avoid abortive work raising landowner expectations where land is unsuitable for development;
f) consider both the potential adverse and beneficial **effects of flood risk management infrastructure** including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;
g) consider the **vulnerability of occupiers and users** of the development, taking account of the Sequential Test and Exception Tests and the vulnerability classification, including arrangements for safe access;
h) consider and quantify the **different types of flooding** (whether from natural or human sources and including joint and cumulative effects). The city council will expect links to be made to the management of surface water as described in chapter 6. Information to assist with the identification of risk is available from the city council;
i) identify relevant **flood risk reduction measures** for all sources of flood risk,
j) consider the effects of a range of flooding events including the **impacts of extreme events** on people, property, the natural and historic environments and river processes;
k) include assessment of the **'residual' (remaining) risk** after risk reduction measures have been taken into account and demonstrate that this risk is acceptable for the particular development or land use. Further guidance on this is given in chapter 5;
l) be supported by appropriate **evidence data** and information, including historical information on previous events.

4.7.5 It should be noted that even if the development passes the Sequential Test and Exception Test (where necessary), there may be other material planning considerations that would render the development inappropriate. Likewise, if it is not possible to design a new development which is safe and which does not increase flood risk elsewhere, then it is unlikely that development will be permitted. Therefore pre-application discussions with the city council and other flood risk consultees are encouraged as soon as possible in the process.

4.8 Step 9 explanatory notes – submission

4.8.1 Once all these issues have been satisfactorily addressed, then a planning application, supported by a FRA where necessary, can be submitted. This will be formally reviewed by the city council and its partners in line with the information supplied in chapter 3. All partner comments are taken into consideration in the final decision.

4.9 Conclusions – responsibilities

4.9.1 **Landowners have the primary responsibility for safeguarding** their land and other property against natural hazards such as flooding. This applies during the construction period as much as it does when properties are sold or rented out. Individual property owners and users are also responsible for managing the drainage of their land in such a way as to prevent, as far as is reasonably practicable, adverse impacts on neighbouring land.

4.9.2 Developers proposing development in areas of flood risk have certain responsibilities as set out in the box below.

Those proposing development in areas of flood risk are responsible for:

- demonstrating that the proposed development is consistent with national and local planning policy (please refer to chapter 2);
- undertaking sufficient consultation with the flood risk consultees (chapter 3);
- providing a FRA, as part of the planning process, which meets the requirements of section 234.7.4;
- drawing up and building site designs that reduce flood risk to the development and elsewhere by incorporating appropriate flood management measures (chapter 5), including the use of sustainable drainage systems (chapter 6).
- ensuring that any necessary flood risk management measures are sufficiently funded to ensure that the site can be developed and occupied safely throughout its proposed lifetime;
- identifying opportunities to reduce flood risk, enhance biodiversity and amenity, protect the historic environment and seek collective solutions to managing flood risk (discussed throughout this document).

5 Managing and mitigating risk

5.1 Measures to control flood risk

5.1.1 This chapter covers ways of controlling and managing risk through site design to ensure that developments will be safe. The information in this chapter is intended for use only after it has been demonstrated that flood risk has been avoided as much as possible and the site and location are appropriate for the chosen type of development. Site specific flood risk assessments and the Exception Test must **detail how a site will be made safe** and this information will assist with this requirement.

5.1.2 It should be noted that the city council's overarching planning policy, within the Core Strategy, does not support residential development in Flood Zone 3a unless the site consists of previously development land. The city council believes that without a site providing the benefits that regeneration, for example, of previously developed city centre land can bring, it is very unlikely that residential development could be safe and sustainable in this location throughout its lifetime.

5.1.3 When undertaking a flood risk assessment or the Exception Test developers are strongly encouraged to work closely with the Environment Agency, the city council and Peterborough's emergency services partners (see chapter 3). Partners must agree that developments are safe and that flood risk management partners would be able to respond quickly and appropriately to any incidents.

Modelling

5.1.4 The following flood related factors can influence the design of new developments and should be considered in the site's FRA: flood source and mechanism, predicted flood level, duration, frequency, velocity of flood waters, depth and amount of warning time.

5.1.5 Some high level modelling of breaches and overtopping was undertaken for the Lower Nene as part of the Strategic Flood Risk Assessment Level 2 and this may be of use. However, developers may need to undertake more detailed modelling for their sites to be able to accurately demonstrate the timings, velocity and depth of water inundation to their site. This could be particularly important where a defended site is proposed for people-based uses.

Climate Change information

5.1.6 For general guidance on how to take climate change into account in flood risk assessments please refer to paragraphs 11 to15 of the Technical Guide to the National Planning Policy Framework[19].

[19] http://www.communities.gov.uk/publications/planningandbuilding/nppftechnicalguidance

Site layout

5.1.7 The inclusion of good quality **green infrastructure** has the potential to significantly increase the profile and profitability of developments. Low lying ground can be designed to maximise benefits by providing flood conveyance and storage as well as recreation, amenity and environmental purposes. Where public areas are subject to flooding easy access to higher ground should be provided. Structures, such as benches, provided within the low lying areas should be flood resistant in design and firmly attached to the ground.

5.1.8 The use of sustainable drainage systems which are designed to cater for **exceedance events** is important in reducing the risk of surface water flooding on site. Chapter 6 provides more information on the design of drainage systems and exceedance events are covered in section 0.

5.1.9 Short-term or employment related **car parking** may be appropriate in areas subject to flood risk provided that flood warnings and signs are in place. The ability of people to move their cars within the warning time should be considered (hence the unacceptability of long term and residential car parking where residents may be away from the area for long periods of time). Car parks should ideally not be subject to flood depths in excess of 300m depth since vehicles can be moved by water of this depth and may cause obstruction and/or injury.

Raising floor levels

5.1.10 Where it is not possible to avoid flood risk or minimise it through site layout, raising floor levels above the flood level is a possible option to manage flood risk to new developments. This could include the placing of parking (see section 5.1.11) or other flood compatible uses at ground level with more vulnerable uses at higher levels may be appropriate in certain situations. Ensuring that safe access and escape will always be available to upper floors will be an essential part of design and of the ongoing maintenance and legal agreements for the development.

5.1.11 Single storey residential development is generally more vulnerable to flood damage as occupants do not have the opportunity to retreat to higher floor levels. For this reason single storey housing in risk areas must provide safe refuge about the flood level.

Modification of ground levels and floodplain compensation

5.1.12 Any proposals to modify ground levels will need to demonstrate in the FRA that there is no increase in flood risk to the development itself or to any existing buildings in any location. Where land on site is raised above the level of the floodplain to protect properties, compensatory land must be returned to the floodplain. This is to ensure that new flood risk is not created elsewhere in an unknown or unplanned for location. For undefended sites floodplain compensation must be both ‘level for level’ and ‘volume for volume’. This applies, for example, in Peterborough city centre. Direct (onsite or opposite bank) flood compensation is preferable since it is easier and cheaper to ensure it functions correctly. If off-site flood compensation is to be considered developers should liaise with the city council to understand whether storage sites are available that could protect multiple developments and potentially

lead to shared costs. For example the reason that the Thorpe Meadows site is safeguarded in the Peterborough Site Allocations DPD is in case the location should require further investigation as a potential compensation site to protect the city centre against the risk of future (long-term) flooding. *CIRIA's report C624 entitled 'Development and Flood Risk - Guidance for the Construction Industry (2004)*' provides detailed advice on floodplain compensation.

5.1.13 In defended areas compensation need not normally be provided to the same extent. This applies, for example, to areas to the east of Peterborough in the Fens. Developers should however assess the risks to the area and undertake mitigating action should the raising of land have the potential to create additional flood risk elsewhere (particularly to life). Consultation should be undertaken with flood risk partners to determine what type of compensation land or other mitigating actions would be appropriate.

New defences

5.1.14 The construction of new flood risk defences to enable development to take place needs to be very carefully considered with the Environment Agency and the city council. New defences create new residual risks that can take significant investment to fully understand and plan for. The Environment Agency is also not obliged to maintain defences and could potentially reprioritise or reduce expenditure in this area. Where defences are required maintenance agreements will need to be reached through section 106 of the Town and Country Planning Act 1990 or section 30 of the Anglian Water Authority Act 1977. The latter can be used by the Environment Agency to adopt flood defences directly.

5.2 Managing the residual risk

5.2.1 Residual risks are those remaining after the sequential approach has been applied to the layout of the different site uses and after specific measures have been taken to control the flood risk. At this stage management measures are no longer about reducing the risk, but planning for it. Management of the residual risk must therefore be the very last stage of designing and planning a site where all options for removing and reducing risk have already been addressed.

5.2.2 This document only provides an overview of residual risk related management measures. For more detailed information readers are encouraged to read *C688 - Flood resilience and resistance for critical infrastructure (CIRIA, 2010)* or refer to the Environment Agency's website[20].

5.2.3 Where flood defence and drainage infrastructure has been put in place there will be risks associated with both its failure and with the occurrence of flood events more significant than the design level of the defence or system. These are residual risks which can be managed. The costs of managing residual risk may be low compared to the damage avoided.

[20] http://www.environment-agency.gov.uk/research/planning/116801.aspx

5.2.4 Different types of **measures to manage residual risk** include:

- Developer contributions towards publically funded flood alleviation scheme
- Designing sustainable drainage systems so that storm events which exceed the design standard are properly planned for and the exceedance routes are known and appropriate (requirement explained in section 0)
- Incorporating flood resistance measures into building design
- Incorporating flood resilience measures into building design
- Flood warning and evacuation plans

5.2.5 **Flood resistance** stops water from entering a building and can be referred to as dry proofing. Measures include doorway flood barriers and airbrick covers. The effectiveness of flood resistance products depends upon the occupier understanding the features, putting them in place correctly when required and carrying out any needed maintenance. Water pressure and carried debris can also damage buildings and result in breaching of barriers. As a result these measures should be used with caution and accompanied by resilience measures.

5.2.6 **Flood resilient construction** accepts that water will enter the building but thorough careful design minimises the damage to allow the re-occupancy of the building as soon as possible. Resilient construction can be achieved more consistently than resistance measures and is less likely to encourage occupiers to remain in buildings that could be inundated by rapidly rising water levels. Under this heading, the use of water resistant fixtures and materials for floors and walls may be appropriate along with the siting of sockets, cables and electric appliances at higher than normal levels.

5.2.7 **Flood resilience** also includes information based actions and planning such as:

- The use of **clear signage** within a development to explain residual risks or required responses such as on access doors, in car parks or on riverside walkways
- Ensuring that appropriate **flood insurance** is in place for buildings and contents. Further information and links about flood insurance are available on both the city council[21] and Environment Agency[22] websites.
- Businesses developing and maintaining **business continuity plans**. The city council encourages business continuity planning across all risk areas and can be contacted for further advice.
- Preparing and acting on **flood warning and evacuation plans**. These plans are an essential part of managing residual risk and advice should be taken from the Cambridge and Peterborough Local Resilience Forum[23] during preparation. Particular attention should be given to communicating warnings to and the evacuation of vulnerable people.

[21] http://www.peterborough.gov.uk/water
[22] http://www.environment-agency.gov.uk/homeandleisure/floods/31654.aspx
[23] http://www.cambridgeshire.gov.uk/policing/cemt/council_responsibility/forum/default.htm

5.2.8 **Evacuation plans must include dry access and egress routes** wherever possible. Any variation in this, particularly the consideration of on-site refuge must be agreed by partners from the Local Resilience Forum. In this situation the city council will seek to organise a technical meeting with the Environment Agency's development and flood risk officer and flood risk management officers from Cambridgeshire's Fire and Rescue Service and the Police Force in order to agree whether the development's strategy for access, egress and refuge is appropriate.

5.2.9 The areas of Peterborough covered by the **Environment Agency's flood warning scheme** can be viewed on the Agency's online map. While this scheme provides prompt telephone calls and SMS text messages to registered individuals, it is dependant on residents signing up to the scheme. Developers must also bear in mind that warning areas may not be extended to cover new development areas. The Environment Agency's scheme also only covers flooding from main rivers. Flooding from rainfall, surface runoff and groundwater often occur much more quickly, making warning more difficult. No local or national warning system currently exists for these more localised mechanisms and developers will need to consider this in ensuring developments will be safe.

6 Guidance on surface water flooding and sustainable drainage systems

(to assist implementation of Core Strategy policy CS22)

6.1 Introduction

This chapter applies from the point of adoption of this document. It is intended to:

- raise awareness of issues that may need to be discussed as part of pre-application planning discussions.
- ensure that the consideration given by a planning decision to surface water and drainage is appropriate to prevent developments that have gained planning permission from being unable, at a later stage, to obtain sustainable drainage approval[15]; and
- bridge the medium term gap in policy and guidance before government introduces a need for all developments to have sustainable drainage systems approval
- be applicable to all development using or having the potential for sustainable drainage systems. While the bulk of the chapter is aimed at major development, minor development and minerals and waste management sites, section also specifically applies to householder development. All requirements will be considered by the council in proportion to the scale, nature and location of the site. Further advice on this can be provided by the council as part of the pre-application service.

Section 6.2 below provides further explanation of the role of this planning policy document in the context of the Flood and Water Management Act 2010.

6.1.1 Designing site layouts to ensure that drainage systems minimise local flood risk and are sustainable in the long term is an important part of the wider flood risk management strategy for a new development. This chapter therefore sets out what elements of drainage need to be considered to create a 'sustainable' system.

6.1.2 The expected increase in intense rainstorms (as a predicted result of climate change) and the nature of traditional drainage[24] means that the likelihood of surface water flooding will increase over time in Peterborough, with or without development. Loss of permeable (porous) ground as part of development could increase surface runoff flow rates and potentially increase the risk. Therefore the city council requires the drainage systems for all scales of development to be 'sustainable'. In this context the city council defines this as minimising flood risk, improving water quality, bringing wider benefits other than just site drainage (improved local environment and biodiversity and safe public amenity) and being maintainable over the long-term.

6.1.3 Retrofitting of sustainable drainage systems (SuDS) particularly in the urban area is also something that the city council and its partners are looking to promote where possible.

6.2 The overlap between the planning system and the Flood and Water Management Act 2010

6.2.1 The Flood and Water Management Act 2010 creates a significant change in the way that development gets approval prior to construction. When fully commenced (anticipated in 2013), it will put in place a system that allows developers to build SuDS knowing that they can be adopted by the city council in the same way that, for example, roads currently are. The Act sets out a system of approval whereby drainage strategies for sites should be submitted for review to a body known as the SuDS Approving Body (in Peterborough this will be the city council). If the drainage strategy is approved, the city council will then inspect the construction of the SuDS as they are built, with a view to ultimately adopting a safe and fully functioning system. If approval is not given for the drainage strategy then development is not allowed to start on site, regardless of whether or not the site has planning permission.

6.2.2 The relevant sections of the Act are expected to be enacted during 2013 following the release by Defra of finalised National Standards. SuDS Approving Bodies must use these standards to determine whether drainage

[24] Public sewers are not generally designed to cater for more significant rainfall events than those of an annual probability of 3.33% (1 in 30). Larger, less common events are likely to result in surface run-off and sewer surcharging when the rainfall is very intense, as sewers cannot cope with those volumes of water in such a small period of time. It should be noted though that the drainage systems maintained by Internal Drainage Boards have a higher design standard, able to cope with a rain event of around 1.3% to 1% (1in 75 to 1 in 100) depending on the specific drainage authority.

[25] At the time of adoption of this SPD, Defra have indicated that developers will be able to subject application for sustainable drainage approval at a different time to applications for planning permission. The city council is keen to prevent this from creating a situation where an abortive planning permission is gained because the agreed designs cannot meet the standards required for sustainable drainage approval.

strategies meet requirements and, if they do, such strategies should be approved. The National Standards are expected to leave some design elements open to local interpretation. For further information about the commencement of the SuDS provisions in the Act refer to Defra's website[26].

6.2.3 Defra may choose to phase the requirement for development to obtain SuDS approval. In this case major development may need this specific approval straight away but minor development may not require it until perhaps 2014 or 2015. This policy document aims to ensure a higher level of consistency across these enactment periods.

6.2.4 As confirmed in the NPPF, flood risk is a very important consideration in the determination of planning applications. There are often significant interactions between different sources of flooding and in some locations surface water flooding may also present a much greater risk to the development overall than risk from main rivers. For these reason the consideration of surface water flood risk and hence drainage cannot be removed from the planning process, just because of the requirement for sustainable drainage approval. For planning permission the city council must be content that the development will not increase risk from any sources of flooding and that an appropriate and long lasting drainage system can be designed. The SuDS Approving Body is however looking for more detail about how the system will function, its construction and how it will be maintained.

6.2.5 By using this guidance to assist with the designing of sites for planning permission, both the city council and developers can enable a much smoother transition to the new drainage regime and help to prevent conflicting planning and drainage approvals.

6.2.6 Note about the use of planning conditions:

If it is decided by the city council during the planning process that any elements drainage will be left to a planning condition the same information will be required to discharge that condition as would have been required as part of the original process. However, elements such as contamination and site permeability must still be explored as part of the application process to ensure that any significant constraints to site development and drainage are known about before potentially undeliverable site layouts are agreed.

[26] http://www.defra.gov.uk/environment/flooding/legislation/

6.3 How to use this chapter

6.3.1 The flow chart in Figure 6-1 below shows the route for preparing a sustainable drainage strategy. The information is applicable whether drainage is being considered as part of planning or whether the development site specifically requires SuDS approval and a SAB application is therefore required. The flow chart is principally relevant to major developments, minor developments and minerals and waste management sites.

Minerals and waste management sites

6.3.2 Minerals and waste management sites have to consider drainage as an integral part of site design. While site design may be further complicated by contamination-related issues, the principles of, and processes in, this chapter still apply.

Information for householder development

6.3.3 A simple drainage statement should accompany a householder planning application explaining where the site's surface water will go. There may, for example, be local options for connecting to an existing SuDS system instead of a piped sewer. If the city council highlights that there may be capacity issues in the area the statement will need to consider simple measures to reduce the quantity and flow rate of water discharged. Advice can be sought from the council's drainage team.

The process

6.3.4 This chapter should be referred to as early in the site design process as is possible. The city council recommends the consideration of site drainage begins as soon as a site with development potential has been identified; steps 1-4 of chapter 4 have been carried out; and it can be demonstrated that the Sequential Test, and if required the Exception Test, have been passed. The flowchart in Figure 6-1 starts at this point.

Step A:
Use the council's pre-application enquiry service which provides specific advice on drainage as well as all other areas of planning. As well as discussing overarching flood risk issues and the content of any flood risk assessment, the following should be considered at this stage:

- Which water management organisations is it necessary to consult with?.
- Is there contamination on site which could affect site design and layout and types of sustainable drainage components used?
- How can the site meet national and local sustainable drainage standards?

Step B:
Consult with relevant water management partners to:

- agree FRA scope (if required). The FRA will need to cover all sources of flood risk.
- agree site discharge points for drainage;
- obtain any data needed in order to prepare ther FRA and drainage strategy.

Start to prepare your drainage strategy and, if required, your FRA.

Step C
Check which water management subcatchment the site is in and its specific characteristics. Bear these in mind as site drainage is designed so that any constraints can be mitigated against and advantage can be taken of any opportunities.

Work up your drainage strategy in tandem with your site layout and highway designs. This will help avoid abortive work in any one area.

Step D: Identify what information, including any supporting tests, is needed as part of the application?

Step E: Build the standard sustainable drainage design principles into the site's layout and drainage strategy.

Step F: Establish the site's discharge requirements before adding detail to the designs.

Step G: Design systems to incorporate appropriate protection of water quality, habitat and biodiversity.

Step H: Demonstrate that site features are accessible, of amenity value and safe.

Step I:
Ensure that the required management and maintenance of all site features has been clearly set out. Get initial agreements in place to cover management funding for the lifetime of the development.

Step J:
Does your site require SuDS approval? If yes, you have two submission options.

No

Submit your planning application including your drainage strategy with the required supporting information.

Yes

The city council recommends that the SuDS application is submitted at the same time as the planning application and FRA as this will ensure a more efficient process for development.

For further information about the procedure for getting SuDS approval and about the benefits of submitting a combined application visit the city council's SuDS web page.

Once both planning permission, and SuDS approval if relevant, have been granted construction may start on site, but you may need additional permissions for certain elements of work if you will be carrying out works affecting a watercourse. Please refer to chapter 7.

Figure 6-1: Flowchart showing the process of preparing a drainage strategy for a development site

6.4 Step A explanatory notes – council pre-application advice.

6.4.1 The city council has a pre-application enquiry service which based on information supplied by the developer provides advice on obtaining sustainable drainage approval and obtaining planning permission. To find out more about this service please visit the city council's pre-application advice[27] web page.

6.5 Step B explanatory notes – drainage subcatchment

6.5.1 When water draining from a site leaves the development, the water may flow through a variety of watercourses or surface water sewers before reaching its destination in the Nene, Welland or Ouse main rivers. The rate and quality of flow can therefore easily affect locations downstream. For this reason a drainage strategy must take a **catchment or subcatchment-based approach** and consider the route and impacts of flows after they leave a development site. Two examples of how this could affect a drainage strategy would be:

- if the post-site flow route takes water into a designated wildlife site and hence the water quality of the discharge might be particularly important
- if the post-site flow route takes water past properties that would be expected to flood if flow rates increased. Detailed consideration may be required to determine appropriate discharge rates in this case.

6.5.2 The city council is keen to understand more about the local catchments and make this information available to help those planning drainage schemes. Maps of Peterborough's subcatchments and some of the different characteristics of, and variations between, the subcatchments are therefore available online within the city council's water management web pages. It is intended that the information will be updated as more information becomes available. Web links are also included to valuable data sets such as the British Geological Society's SuDS Infiltration Maps.

6.5.3 **Different subcatchments have very different characteristics** and it will also be useful at any early stage to scope out the types of constraints and opportunities that may exist in the area around the site. Examples could be very permeable soil which would allow site infiltration, or significant numbers of combined sewers and hence limited sewer capacity in the area.

6.6 Step C: Consult with partners

6.6.1 There are a range of water and risk management organisations operating in Peterborough. They are used to working with developers on planning applications and working with other partners to resolve water management

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27 http://www.peterborough.gov.uk/planning_and_building/making_a_planning_application/step_1_pre-application_advice.aspx

issues that arise. All of the partners listed in chapter 163 are keen to work together to consider the differing requirements demonstrated both by the flood and water management units and this chapter. It is in everyone's interest for the design of the site and its drainage strategy to go as smoothly as possible.

6.7 Step D: Submission and evidence requirements

Submission and evidence requirements

(a) Developers must submit with their planning application enough information to explain how it is proposed to drain the site without increasing surface water flood risk.

(b) Site drainage strategies should be undertaken alongside the site's flood risk assessment and submitted as part of the planning application.

(c) **Ground conditions** must be understood at an early stage and in order to reduce abortive work on the developer's part, preferably before drainage designs are commenced. The presence of land contamination may influence whether infiltration is appropriate and therefore dictate the most appropriate discharge method.

(d) Subject to contamination results, **soakage tests** to a minimum of BRE365 (BRE [1991] Digest 365 – Soakaway Design Building Research Establishment) will be required to help determine the scope for infiltration on site. In the Fens, some of the drainage authorities have their own standards for such testing. Several soakage tests may be necessary to provide a reasonable understanding of possibilities for infiltration across the whole site. The results of the tests must accompany the planning application.

(e) In certain areas where there are assets of historical interest, work may be required to ensure that site drainage does not impact negatively on **buried archaeological deposits.**

6.7.1 Site drainage is a key part of flood risk management and must be clearly discussed within a site FRA. It is therefore strongly encouraged that site drainage strategies (whether for planning approval or SAB approval) are undertaken **alongside the FRA and the rest of the planning application**. If consultants are being used, it is also likely to be more cost efficient and result in better cross linkages for the same consultants to undertake both the drainage strategy and FRA. If drainage designs are submitted to the city council at the same times as the planning application, the process of receiving planning permission (and sustainable drainage approval when relevant) will be much more efficient. This significantly reduces the risk of abortive work being carried out at the expense of the developer through the site and highway design stages.

6.7.2 **Ground conditions** such as instability or contamination can have a significant effect on the design of a site drainage system. For this reason test ing should be carried out before the initial planning application submission so that it can be established whether the results will affect flood risk management, drainage or site design. Increases in or the spread of **contamination** must be avoided. Should contamination be a potential issue,

policy 20 in the Planning Policies Development Plan Document must be followed and further advice should also be sought from the Environment Agency.

6.7.3 In the Fen areas of Peterborough, some of the drainage authorities have their own standards for **soakage testing.** If the site is within this area and it is proposed to drain into an IDB watercourse please contact the drainage authority for more information.

6.7.4 In the vicinity of the Flag Fen Archaeology Park (a Scheduled Monument) the planning application must include information about the impacts of site drainage on the **buried archaeological deposits**. This is likely to involve an assessment of groundwater and consideration through the drainage strategy of whether groundwater recharge would be possible for the benefit of the deposits. If it is proposed to develop within the fenland catchment of the North Level District Internal Drainage Board pre-application consultation s strongly recommended with the English Heritage, the city council and the IDB.

6.8 Step E: Design principles

Design principles

(a) A complete sustainable drainage system should meet all parts of **SuDS treatment train**. This is to ensure that the system functions exactly as it should and achieves the intended benefits.

(b) The number of **treatment stages** within a drainage system must be appropriate to the uses onsite.

(c) The **full range of SuDS techniques** must be considered for all sites with the most appropriate technique(s) taken forward.

(d) All drainage strategies must demonstrate **flow paths and exceedance routes, mimic natural drainage paths,** and include appropriate mitigation measures.

(e) Allowances for **climate change** must be factored into designs.

(f) There should be appropriate **storage** incorporated within the drainage system to allow for rain events up to a 1% annual probability (1 in 100) and an allowance for climate change.

(g) Where applicable, previously **culverted watercourses should be opened up** to create more natural drainage and reduce the likelihood of bottlenecks/blockages that can occur and cause flooding in localised areas

(h) The **ease of maintenance** is an essential part of the design of sustainable drainage system

(i) The use of **permeable** surfaces, both green and paved depending on the intended land use, is encouraged.

6.8.1 The layout and design of SuDS and other flood risk management measures must be considered at the beginning of the development process using the design principles set out in this document. A key element to successful SuDS is integrating the design into the development master plan/site layout at an early stage, while also considering how SuDS will be maintained. Good SuDS design also requires early and effective consultation with all parties that are

involved in the approval process including the city council, the Environment Agency and relevant stakeholders identified in chapter 3.

What is sustainable drainage?

6.8.2 Sustainable drainage means managing rainwater (including snow and other precipitation) with the aim of[28]:

- reducing damage from flooding
- improving water quality
- protecting and improving the environment
- protecting health and safety
- ensuring the stability and durability of drainage system

The primary function of SuDS is to provide effective drainage. SuDS replicate as closely as possible the natural drainage of the site before development. This reduces the risk of flooding downstream that could otherwise be caused when surface water with an increased flow rate drains to a sewer of limited capacity; helps to replenish groundwater; and removes pollutants gathered during runoff.

6.8.3 **Management train and treatment stages**

6.8.4 *Figure 6-2*Different types of sustainable drainage components should be used in series throughout a development site in order to most effectively achieve the intended benefits of having SuDS. Figure 6-1 illustrates the hierarchy of use, known as the **SuDS management train** that should be followed when planning the drainage strategy. The benefits discussed in sections **Error! Reference source not found.** and **Error! Reference source not found.** are more likely to be achieved if the management train is followed.

[28] Definition taken from Schedule 3, para 2, Flood and Water Management Act 2010.

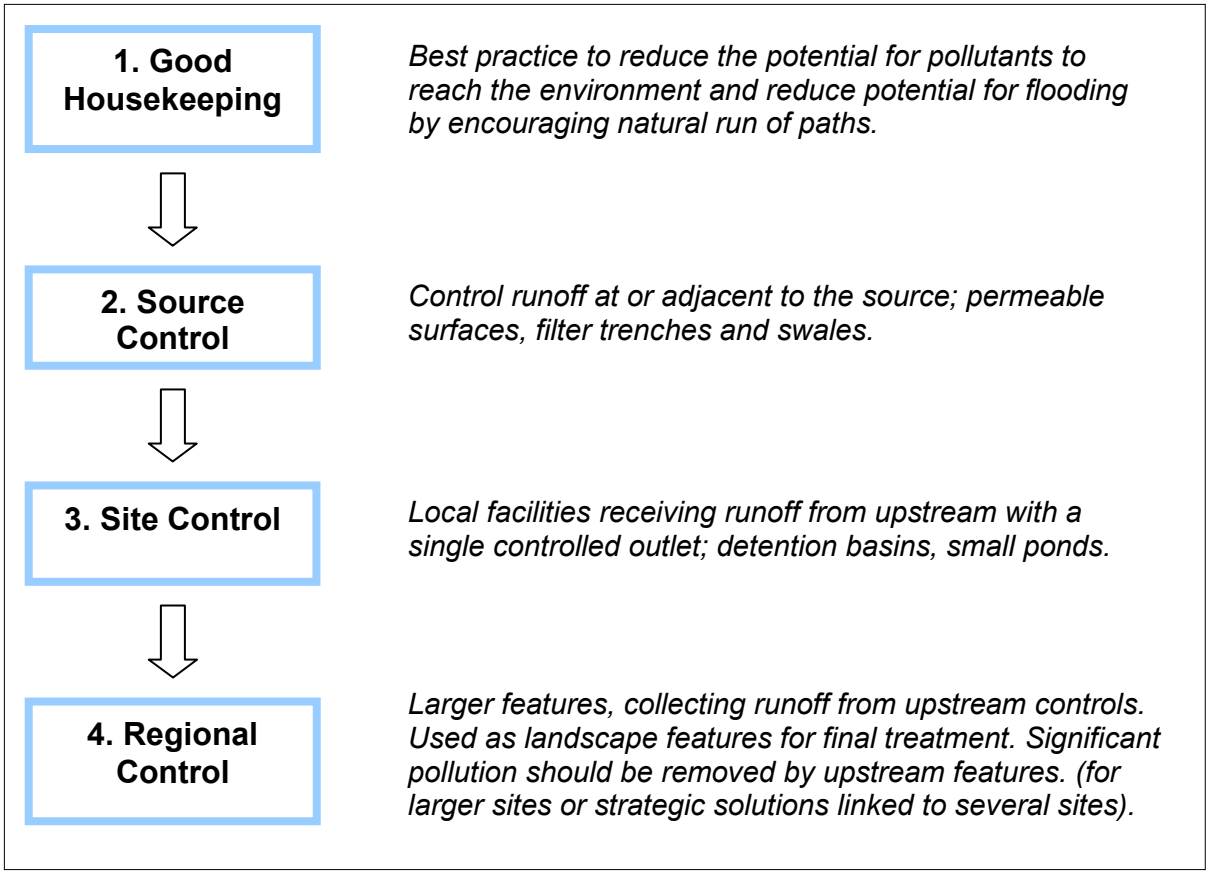


Figure 6-2: SuDS management train

6.8.5 There are a **wide range of sustainable drainage components available** each using slightly different techniques to manage water. It is likely therefore that there will be a technique and component suitable for each site. Bear in mind that it is still possible to included traditional or piped methods within sustainable drainage systems. The overall design just needs to ensure that the different components do work well together to achieve the end aims of sustainable drainage. Appendix B provides further detail about the SuDS management train, different types of SuDS components which can be used and the characteristics of each component. In addition, detailed information on SuDS components and design can also be found in the CIRIA SuDS manual[29].

6.8.6 Different land uses result in differing qualities of water leaving a site. For water running off a petrol station may be considerably more polluted than water from a residential roof. Each time water runs through a particular SuDS component the flow will be treated in some way to help reduce pollution – this is called a treatment stage. More **treatment stages** are required for more polluting land uses. Table 6-1 below shows how many treatment stages are

[29] CIRIA, C697 The SUDS manual, 2007

required for different land uses. Examples of appropriate treatment train combinations can be found in *The SuDS manual*[30].

Table 6-1: Number of treatment stages required for different land uses

Runoff catchment characteristic	Number of treatment stages required
Roofs only	1
Residential roads, parking areas, commercial zones	2
Refuse collection, industrial areas, loading bays, lorry parks, highways	3

Designing SuDS features

6.8.7 An **exceedance route** is a flow route that water will take over the land when the capacity of the drainage system (sewer or watercourse) is exceeded. In most cases this is a rain event with an annual probability of less than 3.33% (1 in 30). It is crucial to effective flood risk management that exceedance routes are understood so that unexpected residual risks are not created. If flow routes are know they can be directed (through site design) to areas of less vulnerability. The city council and emergency services can also be prepared with appropriate responses. The preferred option is for exceedance routes to flow to open space where surface flooding for short periods of time can be acceptable. Layout and landscaping should route water away from vulnerable property and avoid creating hazards to access and egress routes.

6.8.8 A well designed surface water drainage system should ensure that there is **no residual risk of property flooding** during events that are well in excess of the capacity of the medium to which the site is discharging. No flooding of property should occur as a result of a storm of 1% annual probability (1 in 100). Much more detailed information can be obtained from *Designing for exceedance in urban drainage*[31].

6.8.9 It is important that sufficient **storage** is incorporated within all drainage systems to allow for rain events up to a 1% annual probability (1 in 100) and an allowance for climate change. Storage provided through water re-use methods like rain water harvesting is not usually counted towards the provision of on-site storage for surface water balancing. This is because there may be times where the water is not re-used as planned (e.g. for watering gardens or flushing toilets) and therefore storage will not be available for each new rain event. Rainwater harvesting is however recognised as very good practice for reducing the use of drinking water. The city council recognises that on new developments where other options for reducing surface water discharge are limited, water re-use is a better option than unattenuated discharge.

6.8.10 The **culverting** of watercourses is not generally supported by the city council. Culverting removes floodplain storage from a watercourse and can increase

[30] CIRIA, C697 - The SUDS manual, 2007.
[31] CIRIA, C635 Designing for exceedance in urban drainage, 2006

the risk of flooding upstream when bottlenecks or blockages occur. The need for improved green infrastructure corridors and the requirement for water environments to be improved under the Water Framework Directive are two other drivers for ensuring a natural environment around channels, ditches and dykes. Any loss of access to the watercourse can also be a serious problem for the city council and riparian owners who need to maintain the watercourse.

6.8.11 The **ease of maintenance** is an essential part of the design of sustainable drainage system. As well as allowing for access, drainage designers should consider what kind of equipment would be required, e.g. to mow or remove sediment from a drainage system, and how often a certain types of SuDS component might need maintaining.

Special design rules for permeable paving

6.8.12 It is recognised that some parts of Peterborough have clay-based soils and so infiltration may be not be possible to the same degree as in other areas of the country. However, there is variation in soil type across Peterborough meaning that in some areas the soil may be more permeable. Soakage tests will help to confirm the situation onsite. Regardless of whether the ground can be a significant discharge point for the site, some water can usually be taken up by green areas ad the presence of grass and larger vegetation will aid this. For this reason and the general importance of green infrastructure the use of **permeable** surfaces, both green and paved, is encouraged.

6.8.13 A **permeable area** allows rain water to drain into the ground rather than run over a surface. There are certain rules relating to the provision of permeable areas. If an area of proposed hard standing at the front of a dwelling house exceeds five square metres, it is required to be permeable (made of porous materials) or provision made to direct runoff water from the hard surface to a permeable or porous area or surface within the curtilage of the dwelling (part F of the General Permitted Development Order. (http://www.legislation.gov.uk/uksi/2008/2362/pdfs/uksi_20082362_en.pdf)

6.8.14 Under Parts 8, 32, 41 and 42 of the 2010 amendments to the General Permitted Development Order, it is possible for Warehouses/Industrial, Schools, Offices and Shops/Retail to implement certain floor areas of hard standing without planning permission. Please refer to the 2010 amendments: http://www.legislation.gov.uk/uksi/2010/654/contents/made.

6.9 Step F: Discharge requirements

Discharge requirements

(a) Drainage strategies must demonstrate adequate consideration of each stage of the Building Regulations **rainwater drainage hierarchy** before moving to the next discharge option.

(b) New surface water connections to the **combined or foul systems** will not be permitted;

(c) If the site is brownfield, options for use of SuDS must still be demonstrated ahead of discharge to **existing surface water sewer connections**

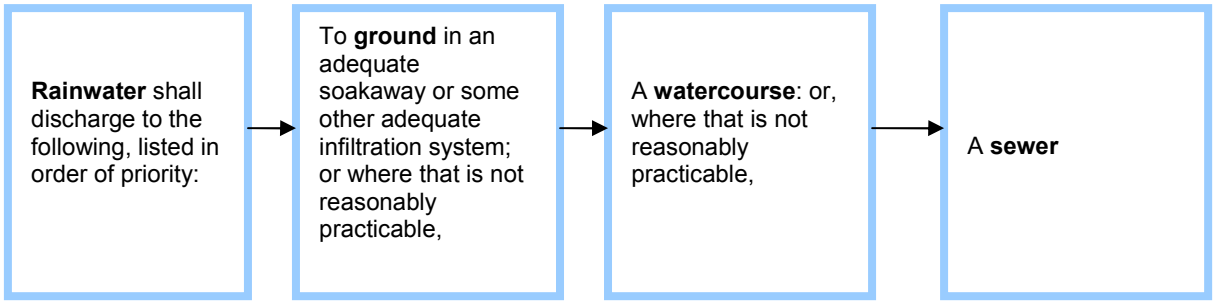
(d) If the site is **brownfield and in an area of combined sewers,** the council and partners will seek betterment. It is expected through regeneration that surface water will be removed from the combined system and will be managed in line with the rainwater drainage hierarchy (see Figure 6-3). Alongside source control measures, sites will be expected to consider the full range of SuDS techniques. Since unattenuated discharge to sewers will not normally be permitted, sites finding little potential for many of the SuDS measures, will be expected to also consider on-site water re-use and recycling measures before final discharge; and

(e) If the site is greenfield, the design of SuDS must take into account **original greenfield drainage** patterns and the rate of runoff must be no greater than the greenfield rate unless the adopting body is prepared to accept a different flow rates.

(f) If an application site is **adjoining a watercourse**, once infiltration opportunities have been maximised it will be expected that any remaining flows from the development will drain to this watercourse;

(g) Where a development will be discharging into an **Internal Drainage Board watercourse** or into the River Nene there are some specific circumstances where the council may allow a reduced level of attenuation prior to discharge to the watercourse. Source control and treatment of the 'first flush' of surface water will however still be required.

6.9.1 The Buildings Regulations 2010 Part H3 (2002 edition incorporating 2010 amendments)[32] provides a **rainwater discharge hierarchy**, shown below, that must be followed. As this demonstrates, discharge of surface water from new developments to a sewer should only be considered as a last resort:



[32] http://www.planningportal.gov.uk/buildingregulations/approveddocuments/parth/approved

Figure 6-3: Rainwater drainage hierarchy

6.9.2 There will be **no new surface water connections to the combined or foul systems**. Where sewers take rainwater as well as foul, this puts significant pressure on the network in the event of heavy downpours. In an environment where urbanisation has increased the amount of surface runoff entering the sewers, the risk of both foul and surface water flooding is increased as capacity in the system is reduced.

6.9.3 The city council aims, where possible and appropriate, to reverse existing situations where surface water enters **combined sewers**. This measure applies to brownfield redevelopment sites where surface water has historically drained into combined and foul sewers. A map of the location of combined sewers in Peterborough can be found on the city council's water management[33] web pages. The city council and the local water company is seeking, through regeneration, to remove surface water discharging to combined sewers, leaving these to transport just foul water from existing and future developments. This work would be part of a partner project, ensuring suitable alternatives are explored.

6.9.4 **Discharge with reduced attenuation** of surface water may be appropriate to the River Nene from riverside sites, although source control for pollution management is still required. It is recognised that for riverside sites slowing down the discharge of water to the River Nene through the normally required attenuation measures might not be the preferred approach for wider flood risk management. In the event of large river flows coming down the River Nene from storms in Northampton, it might be better if Peterborough's surface water is removed from the system before these higher flows arrive. The city council is willing to consider this as an option for riverside sites subject to the developer undertaking modelling to justify that flood risk from the River Nene will not be increased under certain rainfall conditions if rapid discharge is allowed. If developers wish to pursue this route they should jointly contact the city council's Flood and Water Management Officer and the Environment Agency to discuss what modelling work is required. This could be considered if an application site is within an area managed by an Internal Drainage Board and the IDB is in favour of this proposal.

33 http://www.peterborough.gov.uk/environment/flood_and_water_management/developers__landowners/water_management_documents.aspx

6.10 Step G: Water quality, biodiversity and habitat requirements

Water quality, biodiversity and habitat requirements

(a) Opportunities to protect wildlife habitat or increase biodiversity on site should be taken ensuring that the wildlife requirements are fully compatible with the flood risk and drainage needs of the site.

(b) All schemes must prevent deterioration of, or preferably enhance, water quality by reducing the risk of diffuse pollution in compliance with chapter 8. Where the ecological status of the affected water body is below 'good' or where biodiversity is particularly susceptible to change, a larger number of treatment stages might be required.

(c) In designing infiltration systems, the depth of the water table must be appropriate for local peak groundwater levels, ensuring that no direct discharge to groundwater occurs from the SuDS.

6.10.1 The city council recognises that not all types of SuDS provide ecological benefits. However, the applicant is required to show that where practicable, the SuDS scheme will **benefit water habitats and biodiversity**.

6.10.2 As part of its role as the SuDS Approving Body, the city council is producing guidance to cover a range of different elements of the SuDS processes. The specially designed guides will cover information about the selection and/or encouragement of appropriate native planting and wildlife. These guides will be available on the city council's water management web pages. High level biodiversity information is also available in the document *Integrating Biodiversity and Development; guidance notes for developers*. This document covers a variety of ways to incorporate biodiversity into development and is available from the planning pages of the city council's website.

6.10.3 Chapter 8 provides more details guidance on the importance of protecting and enhancing water environments to meet the Water Framework Directive.

6.10.4 The **maximum acceptable depth** for infiltration SuDS is 2.0 m below ground level, with a minimum of 1.2 metres clearance between the base of infiltration SuDS and peak seasonal groundwater levels. Deep bore and other deep soakaways present risks where aquifer yield may support or already supports abstraction. Deep soakaways increase the risk of groundwater pollution and direct discharge is not supported by WFD. If the surface of an infiltration system is too close to the water table, a rise in water levels during particularly wet periods could cause groundwater to enter the infiltration system, reducing the amount of storage available. Groundwater entering the infiltration system would also result in direct discharge from that infiltration system into groundwater, which may contravene permitting requirements and environmental legislation.

6.11 Step H: Health and safety, access and amenity requirements

Health and safety, access and amenity requirements

(a) All SuDS schemes must be designed to ensure that the health and safety of people and animals is not put at risk. The environment created by SuDS must be a safe one. One of the council's SuDS objectives is to move away from the use of barriers by schemes being designed to be inherently safe. A **health and safety statement/risk assessment** must be submitted with all schemes to demonstrate that this principal has been applied;

(b) If an application site adjoins a watercourse, development must be **set back** from it by a distance that allows appropriate access for maintenance or where relevant by the distance dictated in the byelaws of the responsible water management partner.

(c) Schemes should consider how the site and incorporated **green infrastructure** can connect to the Peterborough Green Grid; and

(d) All drainage schemes should have a **positive impact on the landscape,** create good quality spaces and where possible provide amenity value for residents

6.11.1 The Royal Society for the prevention of accidents (RoPSA) provides more detail guidance about safety around inland water sites. Their guidance is due to updated during 2013 to include more relevant references to sustainable drainage designs. Visit their website for further information and to read S*afety at inland water sites, 2010.*

6.11.2 An example of design that improves safety without the need for barriers is ensuring that the sides of SuDS features such as ponds and swales have very **gently sloping sides**. If a young children or elderly person can walk in they should be able to walk straight out again.

6.11.3 **Signage** can be an important accompaniment to larger SuDS features, but must not be used as a replacement for appropriate design. Those potentially at risk may not be able to understand the sign.

6.11.4 **Visibility** of and around the feature is also important, not only so that visitors are aware of the features, but also for the purposes of passive or active surveillance.

6.11.5 There must be appropriate space between the edge of a watercourse and development to allow for **access and the use of equipment** to maintain a watercourse. Even if maintenance of certain types is not envisaged initially consideration must be given to the long term situation. The required distance will vary according to the specific watercourse characteristics and any prescribed information contained within the byelaws of Peterborough's water management partners, see chapter 7.

6.11.6 Section 8.7.3 explains why **set back is also important for wildlife**, creating increased room for water based habitats and allowing wildlife access between habitats.

6.11.7 The inclusion of **green infrastructure** in development is of significant benefit in improving on-site drainage due to the increased interception and infiltration of water. SuDS can also provide an amenity for the local community when incorporated as part of well designed green infrastructure and provide opportunities to improve local biodiversity.

6.11.8 Further information about green infrastructure and *Peterborough's Green Grid Strategy* is available from the city council. The aim of the Strategy is to ensure that residents, visitors and wildlife have access to a complete network of open space for leisure, access and habitat.

6.11.9 The *Peterborough Trees and Woodlands Strategy (2012)* [34] provides information that could be useful when including trees within site design

6.12 Step I: Adoption and maintenance

Adoption and maintenance

(a) All sites must have made provision for the **properly funded** management and maintenance of the sustainable drainage systems for the lifetime of the development

6.12.1 Until Schedule 3 of the Flood and Water Management Act is enacted, the responsibility for the **future maintenance** of drainage systems lies with the developer and hence it is possible that management companies will need to be established. The city council is however keen to support developers in finding alternative adoption arrangements. Where site discharge would naturally flow into the catchment of an Internal Drainage Board, discussions about adoption by the IDB would also be supported by the city council. The water and sewerage provider in Peterborough will also consider adoption of certain systems and developers may wish to enter discussions on this matter. Finally the city council also has the power to voluntarily adopt sustainable systems, with a commuted sum for maintenance, and hence developers may also wish to hold discussions with the Drainage Team about this option.

6.12.2 Once Schedule 3 is commenced the city council will become the approval and principal adoption body for surface water drainage systems. This should provide an increased level of certainty to developers about the intended procedures and pathways for their site drainage once construction has completed. It is expected that Defra will also confirm how the maintenance of

[34] http://www.peterborough.gov.uk/environment/trees_and_hedges/trees_and_woodlands_strategy.aspx

on-site drainage systems should be funded in future. For further information and the latest updates please visit the Defra website[35].

[35] http://www.defra.gov.uk/environment/flooding/legislation/

7 Specific consents

7.1 When is consent required for works affecting watercourses?

7.1.1 If it is proposed to undertake **construction within the locality of, including over, under and within, a watercourse** a specific consent is needed from one of Peterborough's water management partners. This consent is not included within planning permission but may be sought at the same time.

7.1.2 The type of consent required and the distance from the watercourse for which it is needed depends on what area of Peterborough the site is in and the classification of the watercourse.

7.1.3 Consenting requirements may lead to **changes in design** or layout and hence developers are advised to contact the relevant partners (illustrated in section 3 and below) early in the design process to ensure a smooth path through the planning process.

7.1.4 Works that are in, over, under or within 9 metres of the top of the bank of a **main river** require Flood Defence Consent from the Environment Agency. Where the channel is embanked, consent is required for works 9 metres from the landward toe of the raised embankment.

7.1.5 **Ordinary watercourse consent** is required for works affecting the flow of an ordinary watercourse, i.e. any ditch, dyke or channel carrying water which is not designated as a main river. This consent will be required from Peterborough City Council unless the site is in an area managed by an Internal Drainage Board, in which case the IDB will manage the consent application.

7.1.6 To support the many provisions of the Land Drainage Act 1991, organisations managing ordinary watercourses are able to have **land drainage byelaws** setting out clearly the required practises in their area of management. The distance from a watercourse, for which permission needs to be sought for works, varies between organisations. Table 7-1 below sets out these distances for each organisation and indicates where copies of the byelaws are available online.

7.1.7 In general land drainage byelaws will cover issues such as those listed below. However, for a full list of the situations covered by byelaws or advice on how to gain approval please refer to the relevant organisation.

- Control of introduction of water into watercourses
- Control of sluices
- Diversion of stopping up of watercourses
- Obstructions within a certain distance of the watercourse
- Fishing
- Repairs
- Dredging
- Mooring of vessels
- Navigation of vessels

Table 7-1: The different types of consents required and when they are applicable

Watercourse type	Consent required	Byelaw distance from watercourse	Organisation	Related legislation	Where to access the byelaws or relevant information
Main river	Flood defence	Within 9 metres	Environment Agency	Water Resources Act 1991	Contact the local Environment Agency office.
Ordinary watercourse	Land drainage byelaw	Within 20 metres	Middle Level Commissioners	Land Drainage Act 1991	http://www.middlelevel.gov.uk/docs/Byelaws/mlc.pdf
		Within 9 metres	North Level District IDB		http://www.northlevelidb.org/administration/byelaws
		Within 7 metres	Peterborough City Council		http://www.peterborough.gov.uk/pdf/PCCLandDrainageByelaws.pdf
		Within 9 metres	Welland and Deeping IDB		http://www.wellandidb.org.uk/byelaws
		With metres	Whittlesey and District		Contact http://www.wcidb.org.uk/
	Land drainage ordinary watercourse	Within channel or affecting flow	Depends on site location	Land Drainage Act 1991 and Flood and Water Management 2010	http://www.peterborough.gov.uk/water

8 Guidance on water quality and aquatic environments

(to assist implementation of Planning Policies DPD policy PP16 and support Core Strategy DPD policy 12)

8.1 Context

8.1.1 This chapter provides guidance to assist implementation of point (d) of policy PP16 -The Landscaping and Biodiversity Implications of Development (see section 2.4.14 for the policy text). Part (d) has been driven by the Water Framework Directive – 2000/60/EC (WFD). Chapter 2 introduces the aims and requirements of this Directive.

8.2 Requirements of the Water Framework Directive

8.2.1 An important element of the WFD is the requirement for member states to aim to achieve 'good ecological status' in all surface freshwater bodies by 2015. This objective relates to the water body having biological, chemical and structural characteristics similar to those expected in nearly undisturbed conditions.

8.2.2 The Directive also sets out the need for there to be '**no deterioration**' in the ecological potential of the water environment. Development proposals affecting the water environment may impact the biological, hydromorphological, physicochemical and/or chemical quality elements. Impacts leading either to deterioration in the status of a water body or to the water body being unable to achieve its WFD objectives are unlikely to be permitted. New activities and schemes **must be assessed** to identify if they will:

- cause deterioration, or
- lead to failures to achieve ecological objectives.

8.2.3 For surface waters, 'good ecological status' is a statement of overall status, made up of ecological and chemical components. This is illustrated in Figure 8-1 below. A range of elements are measured in each water body, such as priority substances (e.g. lead) and physical structure (hydromorphology). Classification is produced based on a 'one out, all out' principle, so that the poorest individual element result sets the overall status. For groundwater good status has a qualitative component and a chemical component.

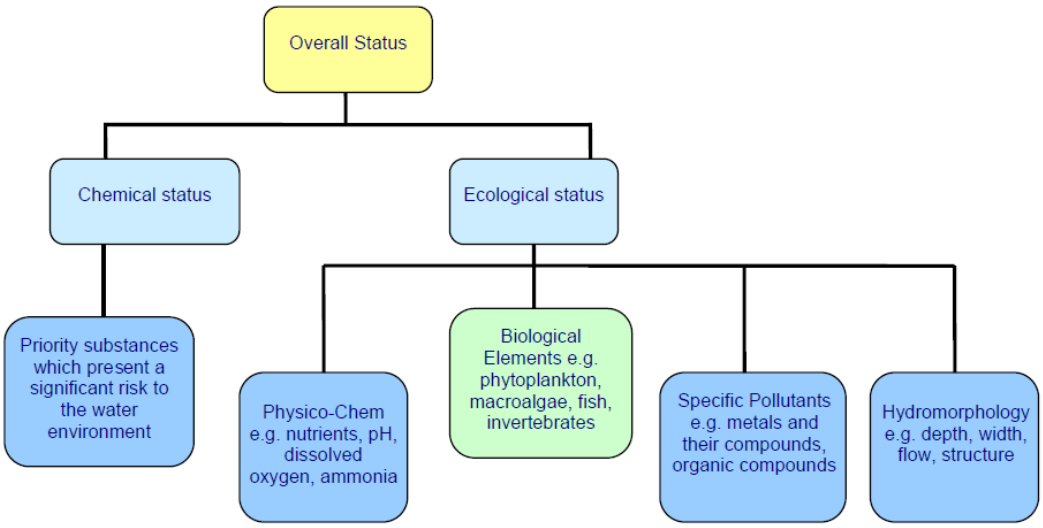


Figure 8-1: Elements making up the WFD status of a water body

8.2.4 The **Anglian River Basin Management Plan**, produced by the Environment Agency details pressures facing the water environment and actions that need to be taken by all partners in order to meet the requirements of the directive in the Anglian region.

8.2.5 The Water Framework Directive **applies to all waters** including inland surface waters, groundwater and transitional and coastal waters independent of size and characteristics.

8.2.6 Every river has a defined catchment area within which changes can affect the watercourse. However the reporting mechanism used in River Basin Management Plans is based upon a single river line within each catchment. The river line is an over simplified representation purely for larger scale reporting and provides an average for the catchment. This means that the potential or status of an individual watercourse could in fact be better or worse than indicated by the related water body status. Developers proposing large or industrial developments are strongly encouraged to liaise with the Environment Agency at any early stage in the planning process to gain further local information.

8.2.7 Information about locally reported water bodies is provided in Table 8-1 below.

8.2.8 Natural rivers with, for example, meandering courses and native vegetation tend to create good habitats for wildlife and may have a higher ecological status than a modified or artificial watercourse. The majority of watercourses in Peterborough are, however, not in their natural state. Modifications such as channel straightening or dredging have taken place over centuries for reasons such as transport, urbanisation, land drainage and flood defence. In mostc ases in Peterborough the rivers still serve these important purposes and hence channels cannot just be returned to a more natural state. Such watercourses have been designated as **heavily modified or artificial water bodies** by the WFD and are given the alternative objective of **'good ecological potential'**. This is the best ecology possible without compromising the use of the water body for which it has been designated. There are actions

that can be taken to help increase the ecological potential of these heavily modified or artificial watercourses, as discussed in section 8.7.6.

8.2.9 Table 8-1 illustrates the status of the locally reported watercourses. In the event that measures to improve a heavily modified or an artificial watercourse cannot easily be taken without affecting the important role that the watercourse plays, the legislation recognises this and water bodies may not require further assessment on a specific topic.

*T*able 8-1: *A summary of the classification of the locally reported water bodies within Peterborough. This should be taken only as an indicator. Further consultation with the Environment Agency is encouraged.*

Water body (or group of)	Water body reporting ID	Hydromo-rphology designation	2009 Ecological Potential	2009 Chemical Status	2015 Predicted Ecological Status / Potential	2015 Predicted Chemical Status	Priority
Welland (western boundary of Peterborough)	GB105031 050580	Heavily modified	Poor	Good	Poor	Good	High
Welland (north west boundary of Peterborough)	GB105031 050600	Heavily modified	Moderate	Good	Moderate	Good	Medium
Welland (north and east of Peterborough)	GB105031 050680	Artificial	Moderate	Good	Moderate	Good	High
Maxey Cut (WFD reference is Welland near Peakirk)	GB105031 050590	Heavily modified	Moderate	Assessment not required	Moderate	Assessment not required	Medium
Folly River	GB105031 050560	Heavily modified	Moderate	Assessment not required	Moderate	Assessment not required	Medium
Werrington Brook and Marholm Brook	GB105031 050540	Heavily modified	Moderate	Assessment not required	Moderate	Assessment not required	Medium
Brook Drain	GB105031 050570	Heavily modified	Moderate	Assessment not required	Moderate	Assessment not required	Medium
Southorpe Brook	GB105032 050370	Not designated as heavily modified or artificial	Moderate	Assessment not required	Moderate	Assessment not required	Medium

Water body (or group of)	Water body reporting ID	Hydromo-rphology designation	2009 Ecological Potential	2009 Chemical Status	2015 Predicted Ecological Status / Potential	2015 Predicted Chemical Status	Priority
Wittering Brook	GB105032050360	Not designated as heavily modified or artificial	Good	Assessment not required	Good	Assessment not required	Medium
River Nene (through Peterborough)	GB105032050381	Heavily modified	Moderate	Fail	Moderate	Fail	Medium
Morton's Leam and the Counter Drain	GB105032050382	Artificial	Moderate	Fail	Moderate	Good	High
Kings Dyke (WFD ref: Old River Nene)	GB70510037	Heavily modified	Good	Assessment not required	Good	Assessment not required	Medium
River Nene Old Course (WFD Ref: Middle Level Navigations)	GB70510035	Artificial	Good	Assessment not required	Good	Assessment not required	Medium
Stanground Lode	GB105032050340	Heavily modified	Moderate	Good	Moderate	Good	Medium

8.2.10 Most development near a river or watercourse will have the potential to impact on the water quality and, in turn, on the biodiversity of the water body.

8.2.11 There are other benefits to Peterborough of improved water quality, other than ecological ones. These include reducing the damage caused to people and property by flood waters and reducing the impacts of pollution on waterlogged archaeology. The latter is a potentially relevant issue in Fen areas.

8.3 Assessment of the impacts

8.3.1 The Environment Agency and the city council have a duty to ensure that WFD requirements are met by new development. They will therefore screen the development, during the planning process, based on three issues in this order of importance:

- **Causing harm** - Does the development have the potential to cause deterioration in the WFD status of a water body?
- **Preventing restoration** - Does the development prevent future improvement to the water body and therefore prevent it from reaching good ecological status/potential?
- **Taking positive action** – Are there opportunities for development to assist with improving the ecological status of water bodies and meeting WFD objectives.

8.3.2 Development which may require a WFD assessment includes, but is not limited to:

- Development within 20 metres of a watercourse where changes are proposed to the channel or bank form or where the long term management of the watercourse would be affected
- Development requiring EIA for reasons linked to the water environment.
- New water infrastructure
- Developments on contaminated land

8.3.3 In the event that a development in Peterborough requires a Water Framework Directive assessment, guidance is provided in Appendix C as to what would be expected. The Environment Agency may be able to provide additional guidance. Should future formal national guidance be released in this area then it will supersede the information in Appendix C. No WFD assessments have been required or undertaken in Peterborough as of 2012.

8.4 How do people and development influence the WFD status of rivers?

8.4.1 The following development-related factors can influence the WFD status of rivers:

a) **Water supply, demand and abstraction**
b) **Wastewater discharge**
c) **Site drainage**
d) **Location of development or works, in relation to water bodies**
e) **Land contamination**
f) **Highway provision**
g) **Minerals and waste planning**
h) **Tourism, recreation and navigation**
i) **Community engagement**

8.4.2 The city council is keen that local policy supports the implementation of the European Directive and that development in Peterborough does not compromise, but rather aids, achievement of WFD requirements. The following section gives further explanation of how development affects the WFD status of watercourses so that this can be borne in mind by developers and planners in both planning decisions and future policy.

8.5 Water supply, demand, abstraction and wastewater discharge

8.5.1 If the water supply or wastewater discharge needs of any future development are likely to cause deterioration in WFD status, the city council and

developers will need to take this into consideration and **manage or determine impacts** accordingly. In some cases the city council and its partners may require an appraisal to be carried out to indicate how the works as a whole will affect the WFD status of the watercourse. When the control and monitoring of such water related issues need to be addressed in the planning process the city council takes advice from the Environment Agency, local Internal Drainage Boards and the local water and sewerage provider.

8.5.2 The supply of drinking water to Peterborough involves abstraction from the Nene. When water is removed from a river it can reduce water quality due to reduced dilution of pollutants. Regulations/ Standards are in place between the Environment Agency and the water company to ensure that most of the time water levels within the river are maintained at an appropriate level for fish and other wildlife. However, in drought periods or with increasing demand water companies may need to apply for a permit to increase abstraction, and hence reduce river levels.

8.5.3 New development also leads to an increase in demand for sewerage services and hence increased discharge flows from sewage treatment works (STW). Sewage effluent is collected and directed to the closest STW. For urban Peterborough this is at the Flag Fen and hence the impact of additional flows is likely to be some distance from the development site. It is important therefore that these are not forgotten as wastewater impacts can still be significant. Further information is provided in the Water Cycle Study and the Wastewater addendum.

8.5.4 If the local water and sewerage company reaches a point where it needs to apply for a permit for increased discharge flows from a STW, it is likely that the water quality limits will be tightened. This will be intended to aid achievement of the water quality objectives of the receiving water body under the WFD. The Counter Drain, into which the treated effluent from Flag Fen ST W is discharged, currently has a chemical status of 'poor' and hence is far from reaching 'good' by 2015. Where consent limits are not achievable in terms of sustainability or scope for extending the treatment works, planning issues may arise and strategies for foul drainage and treatment should be investigated. Core Strategy policy CS12 (Infrastructure) requires that there is **sufficient infrastructure capacity to support new development.** This may require the phasing of development in line with infrastructure provision, in order to avoid environmental damage / WFD non-compliance.

8.6 Site drainage

8.6.1 Decisions made about how to drain a site need to consider the impacts on the **downstream water environment**, both in terms of flood risk and water quality. The Water Framework Directive does not allow for any deterioration in the downstream environment as well as in water bodies that are adjacent to or part of the site. An example of when deterioration could occur is if surface runoff, e.g. from construction, resulted in an increase in sediment being carried into the watercourse and then downstream within the catchment.

8.6.2 Where sewers are combined, taking both surface water and foul, heavy rainstorms leading to increases in the surface water flows can result in foul flooding. To reduce the likelihood of this causing damage, combined sewer overflows (CSOs) exist in certain locations. When the capacity of the sewer is reached, spills will result from the CSO into watercourses to reduce the

pressure in the system. The connection of surface water and highway drainage to combined sewers therefore increases the risk of flooding and pollution from CSOs and STW storm discharges. The transfer and treatment of this surface water is not normally sustainable. **Increases in flows should therefore normally be avoided upstream of CSOs**. Where this is not possible, if development will lead to an increase in population of more than ten percent in the wastewater catchment upstream of a CSO, the impact of growth should be assessed using Urban Pollution Manual (UPM) techniques to determine the mitigation required. Developers will be advised by Anglian Water and/or the council if there are CSO(s) near their site. Where the impact on the CSO is expected to be an issue, this should be included in the site's EIA or WFD assessment.

8.6.3 In order to reduce the frequency and duration of spills from CSOs, it is important to ensure that opportunities to **divert surface water and highway drainage from combined sewers** are fully explored.

8.6.4 As water runs over land it picks up pollutants and transports them ultimately into watercourses. Runoff from roads can contain heavy metals and hydrocarbons and run-off from farmland is more likely to contain nitrates and sediment. The impacts of this diffuse pollution can have serious implications for water quality and the WFD. Improving the quality of discharge from sites is one of the key aims of sustainable drainage systems, as discussed in section 6.10. By filtering runoff and slowing down flows **SuDS can significantly reduce the impacts of pollution** through mechanisms such as infiltration, filtration and evapotranspiration. SuDS can also create habitat for wildlife, which may help to improve the ecological potential of nearby waterbodies.

8.6.5 Management of **surface water flows during construction** is very important in order to prevent construction debris entering nearby watercourses.

8.6.6 In the long term, drainage related issues for many sites will be dealt with by the SuDs Approving Body (SAB) as part of Defra's intended SuDS approval process that will run alongside the planning process. The water quality of site drainage will therefore also become a potential SAB issue as well as a planning consideration.

8.7 Development location

8.7.1 Since the Water Framework Directive applies to all water bodies the location of development within Peterborough is not specifically relevant. However, the development's position within a catchment or its proximity to a watercourse can be relevant.

8.7.2 Location within a catchment will affect how many different watercourses the site drainage could impact on and whether or not the development could be a driver for improvement opportunities for a specific watercourse.

8.7.3 Proximity to a watercourse is relevant where, for example, development or engineering works could affect the ability of a water management partner to access, maintain or improve the water body, or where it could affect the flow in a watercourse. **Riverside development must therefore be set back a reasonable distance from the waters edge**, allowing a corridor between the two environments. While this corridor is crucial for access for maintenance, it is also the most effective means of ensuring there is potential for habitat and

ecological benefits. Appropriate form and landscaping of the riverbanks can then be fulfilled through good design. The distance of 'set back' may vary depending on the size of the watercourse, the type of maintenance that is required and the organisation responsible for maintenance. The distance will therefore be determined on a case by case basis with developers bearing in mind the need for access and green infrastructure.

8.7.4 Special consent is required from Peterborough's water management partners for development that takes place inside or within a certain distance of a watercourse. Chapter 7 explains what consents are needed, under what legislation and from which organisation. As well as the development or engineering works having the potential to affect flood risk, works (such as river straightening, dredging, putting in physical structures and impoundments and hard engineering) also all have the potential to cause deterioration and prevent WFD objectives being met. These works therefore require a level of WFD assessment.

8.7.5 Riverside development is likely to want to make the most of the river to enhance the aesthetics of the location. When landscaping measures are carried out these should be co-ordinated with the Environment Agency and other relevant partners in case methods would also provide ecological benefits or to help facilitate a locally desired partner project. **Naturalisation and improvement of river banks** and the surrounds of water environments has the most direct and measurable impact on water bodies and their status. Where hard surfaces or bank edges currently exist softening and planting the banks can make a significant contribution to biodiversity; creating and improving habitats for native species. It is recognised that there is significant scope in Peterborough for such improvements to be made and hence part (d) of policy PP14 in the Planning Policies DPD specifically addresses this issue.

8.7.6 Where a watercourse must still serve a function for which it has been modified or was originally created, naturalisation and habitat measures may need to be more subtle since they must not, for example, increase flood risk. This could be the case in Peterborough with some of the **watercourses in fenland areas** which are managed by an Internal Drainage Board. Smaller changes such as the installation of fish passes alongside pumping stations or bank-side planting can be particularly valuable to improve the habitat for native species.

8.7.7 The Environment Agency's online mitigation manual[36] provides examples of methods currently used (where appropriate to individual sites) to bring about river naturalisation and improve the ecological potential of Main Rivers.

8.8 Highways

8.8.1 There are several ways in which highways can interact negatively with water bodies. Construction waste and discharge points for highway drainage are important as discussed in section 8.6. Three other examples are also given here:

[36] http://evidence.environment-agency.gov.uk/FCERM/en/SC060065.aspx

- Where a bridge crosses a watercourse or a road runs down towards a river surface water exceedance flows may lead water to run off these surfaces directly into a water body, taking heavy metals and hydrocarbons with it.
- The design of new bridges may require river edges to be strengthened and hardened on both sides potentially cutting off a wildlife corridor.
- Culverting of a watercourse under a carriageway causes a loss of morphological diversity and habitat continuity which may interrupt the migration routes of animals. The newt tunnels installed at Hampton in Peterborough are a very good example of how action has been taken to mitigate such an impact.

8.9 Land Contamination

8.9.1 Groundwater beneath development sites can provide base flow to surface waters. **Ground conditions on brownfield land potentially affected by contamination** should therefore be investigated prior to decisions being made about site layout and design of drainage systems.

8.9.2 If there is potential for land contamination on site then this can have effects on more areas than just drainage and water environments. Policy PP20 in the Planning Policies Development Plan Document therefore requires that on sites with the potential to be affected by contamination a **preliminary assessment** should be carried out prior to a planning decision being made. This will identify if additional measures and investigations need be carried out before development should commence. Pre-application advice can be sought from the city council and the Environment Agency to ensure a smoother planning application process.

8.9.3 Planning conditions can usually control pollution during construction, but this are not appropriate for land contamination, which should be addressed in principle **prior to development decisions**. This is discussed in policy PP20 of the Planning Policies DPD.

8.9.4 Soakaways and other infiltration based sustainable drainage systems (SuDS) should not be constructed within contaminated ground. **Non-infiltration based SuDs** should be considered as an alternative. Section 6.10.4 provides further information on appropriate infiltration depths to prevent groundwater contamination.

8.9.5 Developers seeking further guidance about land contamination should visit http://www.environment-agency.gov.uk/research/planning/33706.aspx and refer to any guidance produced by government or by nationally recognised planning and/or contamination based organisations. The following Environment Agency documents may be of use:

- Risk management framework provided in CLR11 'model procedures for management of land contamination'; and
- EA's 'Guiding Principles for Land Contamination' for the type of information required in order to assess risks to controlled waters from the site.

8.10 Minerals and waste planning

8.10.1 Developers should address site restoration options for minerals and waste sites at an early stage. The options for restoration can be an important factor in both the viability and suitability of a site for mineral extraction.

8.10.2 The restoration of minerals and waste sites to water habitats can:

- Offer opportunities to assist with creating areas for flood storage or with meeting water supply objectives. These must be incorporated within restoration schemes where there is a demonstrated need for them.
- Provide opportunities for biodiversity improvements
- Reduce the risks of pollution and enable natural groundwater flows to be maintained
- Offer local amenity benefits

8.10.3 Landfill sites have to have stringent controls in place to ensure contaminants are contained, controlled and treated. Leachate from a landfill site will be controlled separately from surface water to ensure no contamination occurs. Other types of waste sites where there is the potential for surface water contamination need to be controlled through ensuring appropriate sealed drainage systems are in place. Without these measures or in the case of spills significant pollution could result causing a deterioration of water quality and the ecological potential of the watercourse.

8.11 Tourism, recreation and navigation

8.11.1 The use of water bodies for leisure can bring both positive and negative impacts. Through enjoyment visitors can become more aware of how pleasant water environments can be and often watercourses and lakes, for example, might be improved aesthetically to encourage increased visitor interest. Where aesthetics favour natural presentation, measures may increase ecological potential. Conversely, trampling, litter and polluting emissions from boats may cause deterioration in the quality of an aquatic environment. Development wishing to make use of water bodies for leisure and recreation will need to consider the impacts of the specific uses. There is a risk that the insertion of structures and physical modifications to the watercourse, for example to facilitate boating, could potentially cause deterioration and therefore be non-compliant with the WFD.

8.12 Community engagement

8.12.1 Waterside development that encourages communities and companies to interact positively with their environment will be encouraged and commended. Informed and interested communities can do a lot to protect water resources that are important to them. This is demonstrated locally by the Peterborough RiverCare groups which have been established locally with help from Anglian Water. Such groups may carry out very beneficial works on a voluntary basis

such as undertaking wildlife surveys or removing litter or non-native invasive species from watercourses. Local people may also be able to help implement some WFD mitigation measures.

9 Implementation and monitoring

9.1 Delivery partners

9.1.1 Those that will help to deliver this SPD and put flood risk and water management policies into action are:

- Peterborough City Council
- Applicants and their agents
- The Environment Agency
- Anglian Water
- North Level District Internal Drainage Board
- Middle Level Commissioners
- Welland and Deeping Internal Drainage Board
- Whittlesey and District Internal Drainage Board

9.1.2 Appropriate indicators and targets have been identified to monitor the effectiveness of Core Strategy policy CS22 and Planning Policies policy PP14, which are set out in Table 9-1 below. An additional indicator has been developed on surface water flows into sewers. The results of annual monitoring will identify which policies are succeeding, and which need revising or replacing because they are not achieving the intended effect.

Table 9-1: Indicators and targets for this supplementary planning document

Indicator	Target
Number of brownfield developments reducing surface water flows into sewers.	All developments should minimise surface water discharge to the public sewer.
Number of planning permissions granted contrary to advice from the Environment Agency on WFD and water quality grounds and which adversely affect a waterbody's potential to achieve statutory WFD targets.	WFD assessments undertaken where detriment is possible and no planning permissions granted contrary to the advice of the Environment Agency.
Number of planning permissions granted contrary to advice from the Environment Agency on flood risk grounds	No planning permissions granted contrary to the advice of the Environment Agency.
Number of planning permissions granted contrary to the advice of any of Peterborough's water management partners	No planning permissions granted contrary to the advice of Peterborough's water management partner organisations
Number of new dwellings in flood zones 3b.	No dwellings in 3b.
The number of new dwellings on Greenfield sites in flood risk zones 3a and 3b.	None in 3a and 3b.
Number of permissions that are contrary to the SuDS guidance contained in this SPD.	None contrary to the SuDS guidance.

10 Glossary and acronyms

10.1 Glossary

Abstraction of water – the process of taking water from any source. Most abstracted water is treated to produce drinking water or used for irrigation.

Amenity - a general term used to describe the tangible and intangible benefits or features associated with a property or location that contribute to its character, comfort, convenience or attractiveness.

Annual flood Probability - The estimated probability of a flood of given magnitude occurring or being exceeded in any year. Expressed as, for example, 1-in-100 chance or 1 per cent.

Attenuation / detention of water – the process of slowing down the rate of flow usually to reduce peak flow downstream.

Biodiversity – all species of life on earth including plants and animals and the ecosystem of which they are all part.

Breach mapping – Mapping undertaken to show the extent of flooding resulting from a breach in defences. The likelihood of breaching is not considered. There are two types of breach modelling normally undertaken to assist with the preparation of site emergency plans. The first shows the maximum extend of one or more breaches. This information is required by the Environment Agency and is included in Peterborough's Strategic Flood Risk Assessment FRA Level 2. The second type of modelling involves modelling the spread of flood water from a breach over time so that the gradual impact on a development site can be assessed. This type of mapping does not exist centrally for Peterborough and developers in defended areas may need to undertake this modelling as carrying out the Flood Risk Assessment. The parameters, location and boundary condition of breach modelling should always be agreed with the Environment Agency before work begins.

Catchment – an area that serves a river with rainwater, this is every part of the land where the rainfall drains to a single watercourse is in the same catchment

Combined sewers – A sewer which carries foul sewage and surface runoff I the same pipe

Conveyance – movement of water from one location to another

Cross connections – any possible connection between a public surface water sewer and a foul sewer that could cause contamination

Defra – Department for Environment, Food and Rural Affairs

Discharge – Rate of flow of water.

Ecology – The study of environmental systems, particularly the relations of organisms to one another and to their physical surroundings.

Exceedance flow – Excess flow that emerges on the surface once the conveyance/carrying capacity of a drainage system is exceeded.

Exceedance routes – The route that exceedance flows take across the land

First flush – The initial runoff from a site/catchment following the start of a rainfall event. As runoff travels over a catchment it will collect pollutants and the "first flush" portion of the flow may be the most contaminated as a result. This is especially the case for intense storms and in small or more uniform catchments. In larger or more complex catchments pollution wash-off may contamination runoff throughout a rainfall event.

Flood and Water Management Unit – an area of Peterborough identified as having similar flood risk and drainage characteristics

Floodplain - Area of land that borders a watercourse, an estuary or the sea, over which water flows in time of flood, or would flow but for the presence of flood defences where they exist.

Flood storage - The temporary storage of excess runoff or river flow in ponds, basins, reservoirs or on the floodplain during a flood event.

Flood zones – The national flood zones as mapped by the Environment Agency cover all watercourses with a catchment greater than 3 km^2 i.e. they cover some ordinary watercourses as well as all main rivers.

Functional floodplain – Land where water has to be stored in times of flood. This includes the land which would flood with an annual probability of 4% (1 in 25), as agreed between Peterborough City Council and the Environment Agency, and water conveyance routes and flood storage areas (sometimes referred to as washlands).

Greenfield land – land which has not been developed before, other than for agriculture or forestry buildings or buildings associated with parks, recreation grounds and allotments.

Green Infrastructure – a network of protected sites, nature reserves, green spaces, waterways and greenway linkages (including parks, sports grounds, cemeteries, school grounds, allotments, commons, historic parks and gardens and woodland). It offers opportunities to provide for a number of functions, including recreation and wildlife as well as landscape enhancement.

Green roof – a roof purposely covered in vegetation to retain, attenuate and treat water run-off and to contribute to local biodiversity

Hazard modelling – Modelling undertaken to demonstrate the hazard rating and 'hazard to people' classification of the failure and/or overtopping of defences. The velocity and depth of flooding is calculated and from this the hazard rating determined. Flood hazard ratings can be interpreted to provide 'hazard to people' classifications. Advice on this and modelling parameter should be sought from the Environment Agency.

Infiltration – the soaking of water into the ground.

Internal Drainage Board – a type of operating authority which is established in areas of special drainage needs in England and Wales with permissive powers to undertake work to manage water levels within drainage districts. Middle Level Commissioners is not technically an Internal Drainage Board although it undertakes many of the same roles.

Local Development Framework - the collective term for the whole package of planning documents which are produced by a local planning authority to provide the planning framework for its area.

Local Resilience Forum – a multi-agency partnership made up of representatives from local public services, including the blue-light emergency services, local authorities, the NHS, the Environment Agency and other partners.

Main rivers - watercourses designated as such on statutory main river maps held by the Environment Agency and Defra and can include any structure or appliance for controlling or regulating the flow of water in or out of a channel. The EA has permissive powers to carry out maintenance and improvement works on these rivers.

Ordinary watercourse - An Ordinary Watercourse is defined as any watercourse not identified as a main river on maps held by the Environment Agency and Defra.

Padholme Catchment – a catchment of Peterborough which drains to Padholme Drain, a main river.

Peak fluvial flow – the maximum flow rate of water in a river during a particular period

Permeable surface - A surface that is formed of material that is itself water resistance but, by virtue of voids formed through the surface, allows infiltration of water to the sub-base – for example, concrete block paving.

Rapid Inundation Zone – In Peterborough the eastern part of the unitary authority is currently protected by defences along the River Nene. A rapid inundation zone is an area which is at risk of rapid flooding should a flood defence structure be breached or overtopped. The zones at highest risk of rapid inundation are typically located close behind the defences. N.B the EA no longer use this term widely but the Core Strategy and PPS25 make use of this term. Hazard and breach mapping are now used to better define the residual risk of a site. The SFRA Level 2 contains hazard mapping for the Nene.

Residual risk – the risk that remains after all risk avoidance, reduction and mitigation measures have been implemented

Runoff - Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable or saturated, or if rainfall is particularly intense.

Sustainable drainage systems – a sequence of management practises and control structures often referred to as SuDS, designed to drain water in a more sustainable manner than some convention techniques. Typically these are used to attenuate run-off from sites.

10.2 Acronyms

DEFRA – Department for Environment, Food and Rural Affairs

FRA – Flood Risk Assessment

FWMA – Flood and Water Management Act (2010)

IDB – Internal Drainage Board

LDF – Local Development Framework

LLFA – Lead Local Flood Authority

NPPF – National Planning Policy Framework

PFRA – Preliminary Flood Risk Assessment

PPS – Planning Policy Statement

SAB – Sustainable Drainage Systems Approving Body

SFRA – Strategic Flood Risk Assessment

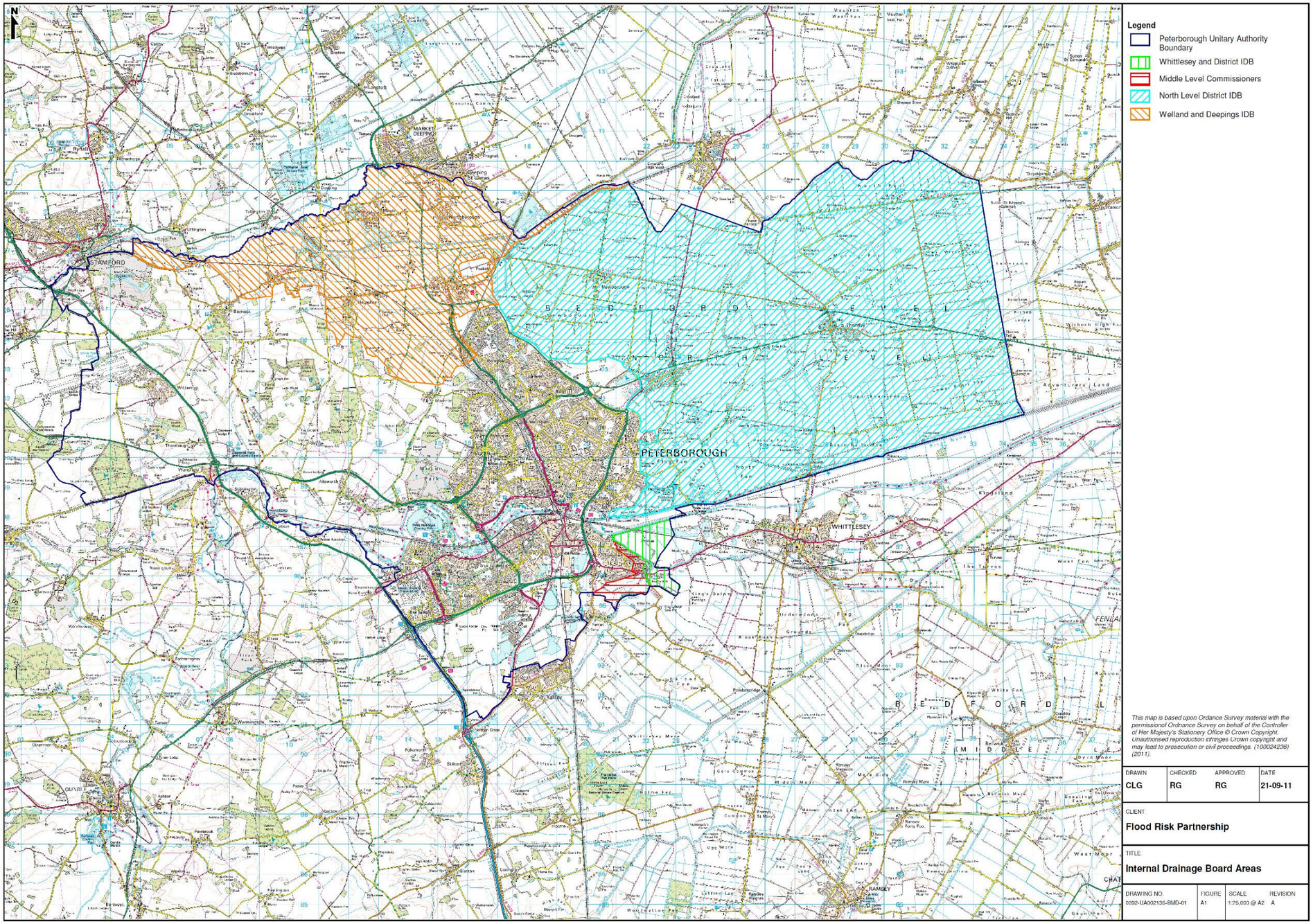
SPD – Supplementary Planning Document

SuDS – Sustainable Drainage Systems

SWMP – Surface Water Management Plan

WFD – Water Framework Directive

Appendix A - Internal Drainage Board areas



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Appendix B - Using Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS)

A range of different SuDS approaches exist and these can and should be used in combination to suit the circumstances of different development sites. The **SuDS management train** is discussed in section 6.8.4 of the Flood and Water Management SPD and further information is provided below.

Table B.1: Broad categories for how SuDS are used across a development. Source: National SuDS Working Group (2004) Interim Code of Practice for Sustainable Drainage Systems.

SuDS approach (stage in management train)	**Description**
Prevention	This involves the prevention of significant run-off or pollution through the sensitive design and management of development sites. Preventative measures include limiting the extent of hard surfaces, rainwater harvesting and sweeping roads and car parks to remove pollutants.
Source Control	The control of run-off at or close to its source, through the use of SuDS including permeable paving or green roofs, can limit negative impacts associated with run-off. Source control can be for quantity (flow control) and quality purposes.
Site Control	SuDS approaches used within or local to a site, for example within an industrial estate. Run off from upstream within the site is directed into SuDS components that encourage infiltration, attenuation, storage and passive treatment of polluted run-off.
Regional Control	Run-off from several sites, for example an industrial estate, retail park and housing development, can be directed into a pond or wetland site where it can filter into the ground which also enables its pollution load to be lessened. (NB the term 'regional' should not be confused with administrative regions, which are much larger).

Drainage control functions of SuDS

SuDS components perform one or more of control functions which help to address the flood risk, water quality and water resource challenges associated with conventional drainage.

Infiltration components allow water to drain into the soil in order that the quantity of surface run- and the quantity of water reaching watercourses can be reduced; polluted run-off can be treated as part of the infiltration process; and groundwater sources can be recharged (as long as there is no chance of contamination).

Detention and attenuation components lessen the speed at which the water is conveyed and usually reduce the quantity of run-off downstream. By providing passive treatment, these SuDS components can also improve water quality.

Treatment components improve water quality through sedimentation; filtration; biodegradation; adsorption; volatilisation; precipitation, nitrification and/or the absorption of pollutants by plants.

SuDS components

Table B.2 provides information about a range of different SuDS components. Often the components may perform several of the four SuDS functions described earlier.

Table B.2: Overview of different types of SuDS components

Drainage component	Description
Basins, ponds and wetlands	These devices, which are a key technique for site and regional control, receive and store surface run-off from other SuDS schemes within the surrounding area. They offer the benefits of attenuating the flow of surface water, providing a storage function, and improving water quality through filtration, sedimentation and biodegradation (for example, through the use of reed beds). Ponds and wetland, which usually retain water (in contrast to basins which are usually dry), can act as a wildlife habitat (for pollution tolerant species) and a focus for recreation activities.
Filter drains	Often linear drains filled with permeable material, these are a form of source control that can be used to improve the quality of water directed into them. They can also help to attenuate flow of run-off before it reaches a sewer or watercourse.
Filter strips	These are generally sloping areas of land, planted with grass and /or shrubs, and usually lie between a hard surface and a water body such as a stream or lake. Surface run-off is directed through the filter strip, thereby attenuating the flow, allowing for infiltration and the removal of pollutants. Filter strips and drains can be used in individual developments or as an element of a SuDS approach covering a larger site.
Green roofs	Roofs covered by turf can intercept rainwater at source, thus reducing run-off rates. They can also provide a treatment function by absorbing pollutants. Moreover, green roofs can encourage biodiversity.
Infiltration trenches and soakaways	Where ground conditions are suitable, infiltration devices such as trenches or soakaways in urban parks can be used to facilitate the absorption of run-off generated across a development site. In doing so, they also improve water quality via filtration and by encouraging the breakdown of organic matter.
Permeable surfaces	Permeable surfaces act as a form of source control and can be used in urban areas for car parks and pavements. They are made from materials that allow infiltration, and also help to filter out pollutants and aid the biodegradation of organic matter.
Rainwater harvesting	Rainwater harvesting, such as collecting run-off from roofs in water butts, can provide water for non-potable uses such as flushing toilets and watering vegetated areas. It is a preventative measure as run-off volumes are directly reduced.

Drainage component	Description
Swales	Swales are a form of source control. They consist of grass verges or channels designed to convey rainwater run-off allowing for infiltration, attenuation of flow and a reduction in sediment load and pollution levels.

Overview of the characteristics of different SuDS components

Table B.3 below can be used to help identify which SuDS components might be useful as part of a site's overall drainage system. The table sets out:

- different types of SuDS components
- where the components can fit in the SuDS management train
- how the components store and remove water
- whether the components can improve water quality
- the environmental benefits including aesthetics, amenity and ecology

Table B. 3 SuDS components and their characteristics (adapted from the CIRIA SuDS Manual table 1.7)

SuDS component	Management train suitability						Water quantity				Water quality	Environmental benefits		
	Prevention	Conveyance	Pre-treatment	Source control	Site control	Regional control	Conveyance	Detention	Infiltration	Water harvesting	Water quality improvements processes	Aesthetics	Amenity	Ecology
Water butts, site layout & manage-ment	✓	◊		✓			◊	◊	✓	◊	◊	◊	◊	◊
Permeable pavements	✓			✓	◊			✓	✓	◊	✓	◊	◊	◊
Filter drain		✓		✓	◊		✓	✓			✓			
Filter strips			✓	✓			◊	◊	◊		✓	◊	◊	◊
Swales		✓		✓	✓		✓	✓	◊		✓	◊	◊	◊
Ponds					✓	✓		✓	◊	✓	✓	✓	✓	✓
Wetlands		◊			✓	✓	◊	✓		✓	✓	✓	✓	✓

SuDS component	Management train suitability						Water quantity				Water quality	Environmental benefits		
	Prevention	Conveyance	Pre-treatment	Source control	Site control	Regional control	Conveyance	Detention	Infiltration	Water harvesting	Water quality improvements processes	Aesthetics	Amenity	Ecology
Detention basin					✓	✓		✓			✓	◊	◊	◊
Soakaways				✓					✓		✓			
Infiltration trenches		◊		✓	✓		◊	✓	✓		✓			
Infiltration basins					✓	✓		✓	✓		✓	◊	◊	◊
Green roofs	✓		✓	✓				✓			✓	✓	◊	✓
Bioretention areas				✓	✓			✓	✓		✓	✓	✓	✓
Sand filters			✓		✓	◊		✓	◊		✓			
Silt removal devices			✓								✓			
Pipes, subsurface storage		✓			✓		✓	✓			◊			

✓ = High/primary process◊ = Some opportunities subject to design

For more details on water quality and pollutant removal mechanisms in SuDS please refer to the CIRIA SUDS manual[37], section 1.3.4 and table 1.7.

[37] http://www.ciria.org/SERVICE/Home/core/orders/product.aspx?catid=2&prodid=155

Appendix C - Water Framework Directive Assessment Guidance

Introduction

At pre-application stage the city council will make applicants aware of the need to consider impacts on water bodies from the construction of structures in or near channel or from proposed changes to water quality, habitat and/or biodiversity.

If a development site requires Environmental Impact Assessment (EIA), applicants should include the impacts in this assessment, using information obtained from the Anglian River Basin Management Plan or directly from the Agency about the status of potentially affected water bodies.

If a development does not require EIA but has the potential to impact on water bodies then applicants should refer to the Environment Agency. A separate assessment might be required.

Overview of process for assessing impacts on water bodies

If a separate WFD assessment is required the process below for assessing impacts on water bodies, should be followed. The process is derived from European Commission guidance and includes:

- **Preliminary assessment** – including data gathering (water body and proposed development) and identification of impacts on water bodies;
- **Detailed assessment** – including options to avoid impacts on water bodies, mitigation to reduce impacts and opportunities to contribute to betterment.
- **Justification** is required where new modifications led to deterioration of a water body or failure to meet WFD objectives (WFD Article 4.7).

Preliminary assessment

The preliminary assessment of potential impacts on water bodies should follow these stages:

- ***development impacts*** – how development would impact on water quality elements and thresholds that trigger detailed assessment;
- ***cumulative impacts*** – how the proposed development together with existing physical modifications might lead to deterioration;
- ***sensitive water habitat*** – how development would affect water habitat including protected areas;

Where the water body already has a status less than ‘good’ the assessment needs to include information on:

- ***the risk of preventing improvement*** – whether the proposed development would prevent implementation of any measures in the RBMP;
- ***improving water bodies*** – other practical opportunities to improve the water body as part of the proposed development.

Detailed assessment

A detailed assessment should have the following stages:

1. **Deterioration assessment** – should consider impacts from development, including physical modifications, on:
    a. water quantity and flow, river continuity and groundwater connectivity;
    b. biological elements (flora and fauna);
    c. recognize where permits, licences or consents that we issue will deal with other impacts including the risk of water pollution.

2. **Ability to achieve good status** – should consider whether the proposed development will prevent implementation of measures in the first RBMPs to achieve good status or good potential as appropriate.

3. **Impacts on other water bodies** – should consider whether or not proposed development would permanently prevent a different water body from the one in which it is located from achieving good status or good potential as appropriate. Consider opportunities to improve status.

4. **Other EC legislation** – the outcome of Detailed Assessment must give the same level of protection as any other EC legislation that applies, to that water body through the designation of protected areas. These include Natura 2000 sites, Bathing Waters, Shellfish Waters, Freshwater Fish Directive reaches and Drinking Water Protected Areas.

Justification

Where the detailed assessment shows that physical modification would lead to unavoidable deterioration then it will only be acceptable if a justification under WFD Article 4.7 can be provided. Such circumstances should be discussed with PCC and the Environment Agency given the limited scope to achieve this under WFD legislation.