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1. Introduction

1.1 Chesterfield Borough and Bolsover and North East Derbyshire District Councils are considering if they should prepare a Water Cycle Study to inform their Local Development Framework (LDF) Core Strategies. The purpose of this note is to consider guidance relating to the preparation of Water Cycle Studies and how this relates to the process of preparing the authorities' LDFs. The note will also consider evidence that is readily available. It is intended to form the basis of discussion with the water authorities, the Environment Agency and English Nature and act as a Scoping/Initial Outline Document for the authorities. This will contribute to the authorities' Core Strategy evidence bases. Map 1 shows the Study Area.

1.2 Water is a critical element of infrastructure. Consideration needs to be given to provision of clean water for drinking and washing, safe disposal of waste water and protection from flooding. Flooding has been addressed at a strategic level in the Strategic Flood Risk Assessment (2009)[1], so whilst this is mentioned, this note concentrates on water provision and disposal.

2. Background

2.1 Severn Trent is the supplier of water for the three authorities, which lie within the East Midlands Resource Zone as identified in the water company's draft Water Resources Management Plan (WRMP)[2]. It also provides sewerage services for the south and west of North East Derbyshire District and the south of Bolsover District. However, Yorkshire Water is responsible for sewerage services for Chesterfield Borough, in North East Derbyshire District north of Clay Cross and for the northern part of Bolsover District. The company has produced a Final WRMP.

2.2 The authorities have consulted the Environment Agency, Severn Trent and Yorkshire Water and English Nature through Core Strategy consultation (Regulation 25) and as part of the Strategic Housing Land Availability Assessment (SHLAA)[3]. A meeting between the three authorities and representatives from Severn Trent and Yorkshire water authorities and the Environment Agency took place on March 15th 2010 to discuss the Water Cycle Study.

3. Purpose of a Water Cycle Study

3.1 The purpose of a Water Cycle Study is to identify tensions between growth proposals and environmental requirements and identify potential solutions to addressing them.

[1] Chesterfield Borough Council, Bolsover District Council and North East Derbyshire Strategic Flood Risk Assessment, March 2009, Faber Maunsell/Aecom
[2] Severn Trent draft Water Resources Management Plan
[3] Strategic Housing Land Availability Assessments 2009, CBC, BDC, NEDDC

3.2 Details of when a Water Cycle Study might be needed and how one should be prepared are available on the Environment Agency's web site. This suggests that a Water Cycle Study helps to plan for water by:

- bringing together all parties' and stakeholders' existing knowledge, understanding and skills;
- bringing together all water and planning evidence under a single framework;
- understanding the environmental and physical constraints to development;
- working alongside green infrastructure planning to identify opportunities for more sustainable planning and
- identifying water cycle planning policies and a Water Cycle Study to help all partners plan for a sustainable future water environment.

3.3 The Environment Agency guidance defines a Water Cycle Study as:

- a method for determining what sustainable water infrastructure is required and where and when it is needed;
- a risk based approach ensuring that town and country planning makes best use of environmental capacity and opportunities and adapts to environmental constraints;
- a way for all stakeholders to have their say, preventing any unexpected obstacles to growth;
- the process that brings together all the available knowledge and information to help make better, more integrated, risk based planning decisions and
- a way of ensuring compliance with the Regulators' Compliance Code[4] to ensure that risk assessment precedes and informs all aspects of their approaches to regulatory activity.

4. When a Water Cycle Study might be required

4.1 The Environment Agency guidance suggests that a Study is required if:

- the development area is a proposed eco-town;
- it is a condition of growth point status and
- it is a requirement of the Regional Plan for the East Midlands or Core Strategy.

4.2 The first two categories above do not apply to the three authorities. In respect of the third point, the Regional Plan for the East Midlands was revoked by the Secretary of State for Communities and Local Government on 6th July 2010. Former Policy 32 of the Regional Plan required that water related issues are taken into account at an early stage in the process of identifying land for development and in the phasing and implementation of development. It suggested that a Water Cycle Study is an example of a

[4] The Regulators' Compliance Code, 2007, Department for Business, Innovation and Skills (formerly Department for Business Enterprise and Regulatory Reform)

means by which this could be achieved but did not require that one should be prepared and used as evidence to inform a Core Strategy.

4.3 Environment Agency guidance suggests that a Study is recommended if any of the following conditions are met:

- the scale of growth proposed by regional or local planning is sufficient when compared to the existing urban development. As a guide, a 5% increase in new development during the time horizon of the Core Strategy is considered to be significant;
- the Environment Agency or other partners raise doubts about the environmental capacity of the water cycle to cope with proposed development;
- the water companies identify that there are constraints over funding or putting new infrastructure in place to meet the development framework.

4.4 The authorities' current housing requirements as a % of the total dwelling stock are as follows:-

	No. dwellings (March '09)	No. required 2026	% increase
BDC	33,879	7,320	21.6%
CBC	48,517	6,800	14.02%
NEDDC	44,196	6,572	14.9%

4.5 This indicates that if Environment Agency guidance is to be adhered to, a Water Cycle Study is recommended for the three authorities. It should be noted that now that the Regional Plan has been revoked the three authorities may review their housing targets.

5. Stages in carrying out a Water Cycle Study

5.1 Environment Agency guidance identifies the following stages in carrying out a Study:-

Scoping Study
- Identify issues to be considered
- Identify need for and scope of outline study

Outline Study
- Environmental constraints analysis
- Infrastructure constraints analysis
- Sustainability Assessment

Detailed Study
- Identify infrastructure required
- Identify when it is required

- Sustainability Check
- Identify how infrastructure will be funded and implemented

Each stage should determine the extent to which subsequent stages are required and their likely content.

6. Scoping and Outline Studies

6.1 The Environment Agency advises that a Scoping Study should be carried out at an early stage in the development of the Core Strategy. Water related issues will have to be considered as part of infrastructure delivery during the preparation of the Core Strategies and the following advice from the Environment Agency is relevant.

6.2 The purpose of a Scoping Study as advised on the Environment Agency website is to:

- set up a Water Cycle Study Steering Group, confirm the relevant partners and their responsibilities;
- define the study area;
- identify what studies have already been carried out and what data is available;
- confirm development scenarios and planning data;
- identify the objectives of the Water Cycle Study and identify which plans and strategies it will be used to inform and draw from;
- identify if further work is needed to inform strategic planning decisions;
- agree a project scope and project plan for further work if needed;
- identify sources of funding for future phases of work if needed, and
- assess the flexibility of development plans regarding location and other options.

6.3 The purpose of an Outline Study as advised by the Environment Agency is to:-

- identify environmental risks and constraints
- identify if environmental resources can cope with further development
- identify if the development would overload the existing infrastructure
- identify if major new systems are needed to allow development
- help pinpoint if there is water cycle capacity for new development without needing to build major new infrastructure
- provide the evidence base for the local planning authority's (LPA's) Core Strategy
- provide an outline water cycle strategy agreed by all partners where appropriate

6.4 The Environment Agency suggests that a consultant will be required to carry out these Studies. However, at a meeting of the relevant bodies it was considered that there is substantial information already available to inform a Scoping and an Initial Outline Study.

6.5 The work to inform the authorities' LDFs is therefore progressing as follows:-

Purpose	**How this has been dealt with as part of the evidence base**
Set up a Water Cycle Steering Group, confirm the relevant partners, their responsibilities and requirements	A representative from each of the three authorities, together with a representative from each of the Environment Agency, Severn Trent Water and Yorkshire Water met on March 15th 2010. It was agreed that the local authorities would continue to liaise with Environment Agency and water authorities in respect of their Preferred Strategies and Allocation DPDs.
Define the Study Area	The study area comprises the borough of Chesterfield and the two districts of Bolsover and North East Derbyshire.
Identify what studies have already been carried out	Green Infrastructure Plans for Chesterfield Borough and Bolsover and North East Derbyshire Districts. Sustainability Appraisals relating to Issues and Options for Chesterfield Borough and Bolsover and North East Derbyshire Districts. Joint Strategic Flood Risk Assessment. Strategic Housing Land Availability Assessments for Chesterfield Borough and Bolsover and North East Derbyshire Districts.
Confirm development scenarios, environmental capacity and key constraints for development	Development scenarios have been investigated and commented upon by relevant stakeholders at the Issues and Options stage of the Core Strategy process. Bolsover District has consulted on a revised Preferred Strategy. The Sustainability Appraisal process has informed or will inform each stage.
Identify the objectives of a Water Cycle Study and which plans and strategies will be used to inform it.	The objectives of a Water Cycle Study are identified in the Water Cycle Study Guidance document.

	They are that: • urban development only occurs within environmental constraints, • urban development occurs in the most sustainable locations, • water cycle infrastructure is in place before development, and • opportunities for more sustainable infrastructure options have been realised. Government and water authorities' guidance, including Water Resource Management Plans (WRMPs), have been referred to in preparing this initial document.
Identify knowledge gaps and if further work is needed to inform strategic planning decisions	The following documents and processes have outlined where further work may be needed to inform strategic planning decisions made in the process of preparing the Core Strategy: • Affordable Housing Viability Assessments • Infrastructure Delivery Plans • Core Strategy Preferred Strategy Consultation.
Agree a project plan for further work	It has been agreed that this document should be regarded as a Scoping/Initial Outline Study. A decision on preparing a more detailed Outline and/or a Detailed Study will be taken by individual authorities at appropriate stages of their Local Development Framework preparation.

7. Planning Policy Context

Planning Policy Statement 1(PPS1) Delivering Sustainable Development and the Supplement to PPS1: Planning and Climate Change

7.1 PPS1 requires that planning authorities prepare development plans that ensure that development takes account of sustainable principles. Planning authorities should identify land for development that meets development requirements and takes into account the need for infrastructure and avoids flood risk. PPS1 specifically requires local authorities to promote the

sustainable use of water resources and the use of sustainable drainage systems in the management of run off.

7.2 The Supplement advises local authorities to take into account the capacity of existing and potential infrastructure including water supply and sewerage when considering future locations for development. They should also have regard to risks from flooding and climate change.

Planning Policy Statement 12 (PPS12) Creating Strong, Safe and Prosperous Communities through Local Spatial Planning

7.3 PPS12 states that Core Strategies should be supported by evidence of what physical, social and green infrastructure is needed to enable the amount of development proposed for an area, taking account of its type and distribution. This evidence should cover who will provide the infrastructure and when it will be provided. The Core Strategy should draw on and, at the same time, influence strategies and investment plans of other organisations.

Planning Policy Statement 25 (PPS25) Development and Flood Risk (2006)

7.4 Flood risk should be taken into account at all stages in the planning process to avoid inappropriate development in areas of risk of flooding, and to direct development away from areas at highest risk. A partnership approach is advocated making the best use of the knowledge of agencies such the Environment Agency and other operating authorities.

7.5 PPS25 requires that a sequential approach to the location of new development is required at a site level to minimise risk by directing the most vulnerable development to areas of low flood risk, give priority to the use of SuDS and ensure that all new development in flood risk areas is appropriately flood resilient and resistant, including safe access and escape routes where required and that any residual risk can be safely managed.

East Midlands Regional Plan (March 2009)

7.6 Whilst the East Midlands Regional Plan has been revoked, there is no reason why the good practice recommendation that the various agencies should work together to ensure a coordinated approach to planning for future water supply, waste water treatment and water quality should not continue to be followed. The Environment Agency holds information on the extent of vulnerable groundwater, source protection zones and nitrate vulnerable zones that can inform the preparation of Local Development Frameworks. Also an independent study entitled Spatial Review of Water Supply and Quality in the East Midlands[5] that considered the impact of the proposed level of development and its phasing on the public water supply, the capacity of existing and planned sewerage treatment infrastructure to accept discharge is

[5] Spatial Review of Water Supply and Quality in the East Midlands, Aug 2006, Ove Arup and Partners Ltd.

still relevant. However, as it is based on water authorities' Water Resource Management Plans prepared in 2004, it is becoming increasingly out of date.

8. Water Related Legislation

Water Framework Directive

8.1 This Directive sets out a requirement to achieve good ecological status in rivers, estuaries and coastal waters, together with good status of groundwater by at least 2027.

Habitats Directive

8.2 This Directive recognises that as people make increasing demands on the environment, wildlife habitats will come under more and more pressure. The European Directives therefore created a network of protected areas of national and international importance. They are called Natura 2000 sites and include Habitats Directive Special Areas of Conservation (SACs).

Urban Wastewater Treatment Directive

8.3 This Directive regulates the collection and treatment of waste water from residential properties and industry. Under this Directive receiving waters can be designated as 'sensitive' where additional levels of treatment are required.

Nitrates Directive

8.4 This Directive aims to reduce water pollution caused by nitrogen from agricultural sources and to prevent such pollution occurring in the future. It requires Defra and the Welsh Assembly to identify surface and ground waters that are, or could be, high in nitrate from agricultural sources. Nitrogen is one of the nutrients that can affect plant growth. Surface waters also have to be identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals and the use of water. Once an area of water has been identified, all land draining to it is designated as a Nitrate Vulnerable Zone, where farmers must observe an action programme of measures that include restricting the timing and application of fertilisers and manure and keeping accurate records.

Ground Water Directive

8.5 This Directive prevents toxic substances such as pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide from entering ground water. Less toxic substances such as sewage or trade effluent can be discharged to ground water under permit, but must not cause pollution.

Floods Directive

8.6 This Directive requires European Union Member States to carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015.

Floods and Water Management Bill

8.7 The draft Flood and Water Management Bill was published for consultation in April 2009. It is designed to improve how the UK prepares for and responds to flood emergencies and better protects water supplies during drought and will implement the main recommendations made in the Pitt Report[6] into the summer 2007 floods.

Private Water Supply Regulations (2008)

8.8 The European Council Directive 98/83/EC on the quality of water intended for human consumption sets new and revised standards for drinking water quality and specifies new monitoring (sampling and analysis) requirements. The Private Water Supplies Regulations 2008 will apply the Directive to private supplies in England from December 2009. Private supplies are fit to drink when they meet the standards prescribed in the Directive.

8.9 There are 199 properties using a private water supply (i.e. a supply not provided by Yorkshire Water or Severn Trent Water) in the North East Derbyshire District. 117 are supplies to single dwellings, which are in the main exempt from the legislation. This leaves 82 properties using a shared supply or serving commercial activities which fall under the provisions of the new regulations. These supplies are either springs, wells or boreholes.

8.10 The new duties placed on local authorities from December 2009 include risk assessment (involves physical examination of catchment area and the supply from source to tap, and an assessment of the underlying geology and soil leaching potential), monitoring, investigations and remedial action, authorisations and improvement notices, work in default, restriction notices, records of private supplies and Private Distribution Systems.

9. Relevant plans and publications

Water Resources Strategy for England and Wales (Environment Agency 2009)

9.1 The Environment Agency deals with all aspects of water such as managing abstraction, flood risk and water quality and is able to look at the water environment in its entirety.

9.2 This Strategy sets out how the Environment Agency believes water resources should be managed to 2050 and beyond to ensure that there is

enough water for people and the environment. It identifies actions believed to be necessary, in particular those needed in relation to the challenges of growth and climate change.

9.3 The report recognises the importance of working with others. It points out that, as the climate warms, rainfall patterns will change and groundwater

[6] The Pitt Review – Learning Lessons from the 2007 floods, 2008

supplies will be hit. Treatment plants, pumping stations, and sewers may no longer be adequate and ecology will need to be allowed to adapt.

9.4 The Environment Agency sets out the following actions:-

Climate Change –

- Enable habitats to better adapt
- Allow the way we protect the environment to adapt to climate change
- Reduce pressure on the environment
- Encourage options resilient to climate change
- Protect water supply infrastructure better
- Reduce green house gas emissions from water usage
- Improve understanding

Improvements to abstraction -

- Protect conservation sites that depend on water
- Ensure licensing issues are resolved
- Improve environmental resilience where possible
- Safeguard resources through effective catchment management
- Reduce treatment and energy costs for users
- Improve understanding of the relationship between the water environment and ecology

Managing water resource -

- Support development where the environment can cope
- Allow a targeted approach where stress on water resources is greatest
- Ensure water is used efficiently by homeowners, agriculture and businesses
- Further reduce leakage
- Ensure that reliable options for resource development are offered
- Allocate water resources more effectively in future

Valuing water -

- Promote incentives that reduce demand
- Allow water companies to address affordability issues with customers
- Allow people to use water more efficiently
- Provide better information on efficiency
- Communicate more effectively so that people can make informed choices
- Increase investment in technology

A Better Water Environment -

Action B2 requires sustainable drainage schemes to be incorporated into new developments.

Sustainable Planning and Management of Water Resources -

Action C3 suggests that where new development is planned in areas where resources are under pressure, measures should be included that support water neutrality and developers should be required to produce water cycle studies where housing developments are proposed.

It is also suggested that efficiency standards that are tighter than building regulations could be introduced.

A Regional Action Plan for Midlands Region (December 2009), Environment Agency

9.5 Water resources in parts of the Midlands Region are already stressed. By 2017 the population of the East Midlands will have increased by over 10%; this action plan shows how this will be dealt with.

9.6 In many parts of the Midlands no more water is available for abstraction during low flows. There are a number of areas where existing abstractions are causing significant environmental damage. The Environment Agency wishes to make these abstractions sustainable. It wants to make the best use of the water that is available. In the Midlands Region, 34% of the catchments are over-abstracted or over licensed at low flows. 36 designated conservation sites are at risk from, or are being damaged by, too much abstraction.

9.7 The Action Plan notes that Severn Trent's draft Water Resource Management Plan (WRMP) demonstrated that there is enough water in its area to meet current and likely future demands over the next few years. However the Agency believes that over the next 30 years there will be increased pressure due to growth in population and development and the impact of climate change. Thus in the longer term the Severn Trent Region could be facing stress. (The Action Plan has a longer time frame than the WRMP and both documents need to be taken into consideration. Also the WRMP has now been finalised (see 9.11 below)).

9.8 The Action Plan identifies six priorities for the Midlands:

- Increase the number of agricultural high-flow storage reservoirs in over abstracted catchments
- An increase in abstractor groups to facilitate licence trading
- Allow people to make informed decisions over water usage
- An increase in household metering
- An increase in schemes using a combination of groundwater and surface water sources
- Restore sustainable abstraction

9.9 The Action Plan includes a number of objectives and actions, some of which are relevant to local authorities as follows:

Objective	**Action**
Adapting to and mitigating climate change	New and existing buildings should be more water efficient. The highest possible standards should be expected in new development. Where appropriate water neutrality will be promoted for inclusion in development policies.
Ensure ecology is more resilient to climate change through reducing abstraction	Maintain and improve habitat connectivity. Increase areas of wetlands.
Ensure resilience of supplies and critical infrastructure to reduce the impact of climate change	Complete Water Cycle Studies early in the planning process. The Environment Agency will work with local authorities to advise where and when WCSs are necessary and where water efficiency measures should be targeted. It will also provide advice to developers, including on specific local issues, to ensure that the appropriate infrastructure is taken into account when planning permission is granted for development.

9.10 The Environment Agency also wishes to feed into green infrastructure strategies to allow adaptation to climate change. It wants to work with others to ensure implementation/retrofit of green infrastructure, in particular Sustainable Drainage Systems (SuDS). It also wants to work with local authorities to overcome the barriers associated with adoption of green infrastructure, specifically funding, design and liability of long term maintenance. In addition it will work with Natural England to promote good environmental infrastructure planning in responding to LDFs. It also recognises the need to work with water companies to increase the contribution to the planning process so that appropriate infrastructure is in place before development is completed. It wants to implement a 'twin track approach', resource development and demand management through LDFs.

Severn Trent Water Resources Management Plan (WRMP) (June 2010)

9.11 The Severn Trent WRMP sets out the water company's 25 year Strategy for maintaining the balance between the supply of and demand for water. The overall aim is to define how demand will be met in an efficient and sustainable way whilst complying with environmental legislation and regulatory requirements.

9.12 The Study Area is predominantly supplied by the Severn Trent East Midlands Water Resource Zone (EMZ6) that covers Derbyshire, Leicestershire and Nottinghamshire. The main source of water for the Zone is the reservoirs in and close to the Peak District, although groundwater abstraction also takes place from aquifers below Nottingham, Mansfield, Worksop and Newark. The nature of the grid means that it is possible to move water around the area relatively easily. This strategic approach to water supply management means that any demand centre resulting from Core Strategy development predictions in the Study Area could be supplied by water from across the whole Water Resource Zone. Also Severn Trent's latest business plan has identified strategic reinforcements in areas where there is sufficient detail in LDF housing growth numbers to enable hydraulic impact to be assessed.

9.13 In the 1999 WRMP, Severn Trent proposed a scheme to improve the deployable output of the EMZ6 during AMP3 (2000-2005) and AMP4 (2005-2010) by using groundwater abstracted in Birmingham to support river abstractions in the River Trent. With this scheme in place the Zone demand/supply balance maintains a level of confidence of around 80% during the early years of AMP5. However, the projected supply/demand for this Zone is shown to worsen from 2015 onwards. Decline in confidence in the projected supply/demand balance for the East Midlands Zone reflects the climate change impact on deployable output. At the end of AMP6 (2019/20) the supply shortfall is around 35Ml/d. By the end of the Plan period (2034/35), the supply shortfall is around 65Ml/d and the confidence level reduces to 50%.

9.14 The following issues have been taken into account in Severn Trent's forecast:-

Growth in demand – Severn Trent's long term strategy (post 2015) takes account of housing growth rates shown in the East Midlands Regional Plan. However up to 2014/15 the water authority is projecting housing growth rates of 23,000per annum (based on recent historic activity) rather than the 30,000 per annum set out the Regional Plan. It has estimated that that the proposed growth represents an increase of over 30% in the annual rate of new connections to the supply system.

Climate Change - By 2035, Severn Trent is anticipating a 144 Ml/d loss of deployable output due to climate change. However it should be noted that in the EMZ6 the impact of climate change is not as great as in other parts of the Region.

Future Water Quality - It is anticipated that 20Ml/d of deployable output will be lost as a result of rising nitrate concentrations. Longer term uncertainty can be managed through the five yearly WRMP and Business Plan process and longer term risks associated with the contamination and deterioration of raw water resources can be reduced by proactive catchment management.

Planning for Future Risks and uncertainties – Severn Trent has a strategy of ensuring that the amount of additional water it has available to act as a buffer

(target headroom) gives it 80% confidence that it can meet targets levels up to 2020. The impact of climate change is recognised as an uncertainty, so beyond 2020 the confidence level reduces linearly to 50% in 2035.

Restoring Sustainable Abstraction - The Environment Agency has a work programme 'Restoring Sustainable Abstraction' to address its concerns that at some locations licensed abstraction of water could be contributing to environmental damage of rivers and wetlands. The outcome of this work could result in the Environment Agency requiring Severn Trent to reduce the amount of water they abstract from the environment.

Drought plan - Severn Trent needs plans to cope with what can be a significant shortage of water in those years affected by drought. It has published a Drought Plan which sets out how it will manage resources and supply systems in dry years, to maintain serviced to customers at as high a level as is possible.

*Mains deterioration and the impact of leakage*_– If mains are replaced over AMP5 at the rate needed to maintain serviceability, leakage would still rise by 22 Ml/d due to leakage increases from customer supply pipes. Modelling has shown that additional mains renewal is needed in AMP5 and AMP6 for the leakage benefits that will be delivered between AMP7-9. In its final 2009 determination, Ofwat made no allowance in price limits for that element of AMP5 mains renewal investment that the authority proposed would deliver AMP 6 and 7 leakage benefits. The authority believes that pressure management in AMP5 to prevent leakage deterioration will help, but an increase in mains renewal investment in AMP6 will be required if the 25 year target is to be achieved.

9.15 Within its area, Severn Trent operates a water supply system that utilises a mix of surface water reservoirs, direct river abstractions and groundwater sources to meet a demand of 2000 Ml/d. It can transfer water through a strategic treated water transfer grid to ensure a supply to customers throughout the Severn Trent Region.

9.16 However there are some parts of the area where deployable output is locked up and cannot be fully deployed to other parts of the system. Severn Trent outlines a number of activities to ensure a long term, sustainable balance between supply and demand for water. To maintain supply to 2015 the authority proposes the following measures:-

- reduce demand through driving leakage down and setting a new leakage target of 453 Ml/d by 2015. This is to be achieved through active leakage control and pressure management. In the long term the aim is to reduce the leakage target to a low level of 409 Ml/d by 2035.

- reduce demand by accelerating household metering; this is hoped to achieve reductions by about 1.5Ml/d by 2015. A policy of compulsory metering when a property changes occupier will be piloted in EMZ6.

- get the most value out of existing water resources by improving the connectivity of the network. For example, Severn Trent proposes to increase the capacity of the Derwent Valley Aqueduct which will enable it to move more water from the north of the region, where there is a surplus, to the south that has a deficit. This should provide around 60Ml/d of additional water in the south.

- Reduce demand by increasing water efficiency activities to achieve target savings of 16Ml/d during AMP5.

- increase water efficiency by asking that domestic and commercial partners install water efficient equipment and provide education about water consumption. This could reduce demand by 2 Ml/d.

- whilst there will be no new sources of water in the 2010 to 2015 period, in the longer term the need to develop new water resource schemes has been identified that will deliver around 125Ml/d of new supply capability.

9.17 The water authority recognises that the most significant risk to the long term supply/demand balance is the impact of climate change; scenario testing shows that the deployable output capability could be reduced by up to 115Ml/d by 2020. Other recognised uncertainties are:

- the future of the Environment Agency's National Environment Programme

- the Environment Agency's CAMS

- the impacts of the Water Framework Directive.

9.18 The Strategy for the EMZ6 is to strengthen strategic distribution links so that sustainable use of existing water resources can be maximized. A key component is to introduce a scheme to duplicate a section of the Derwent Valley Aqueduct to increase its capacity to deploy water from a number of existing treatment works. This aqueduct connects treatment works north of the River Trent (including Ogston) with the southern half of the EMZ. There is adequate raw water storage in the EMZ to support increased production which could be deployed with additional Derwent Valley capacity. The scheme is intended to increase the capacity of the aqueduct from Kings Corner near Derby to Hallgates Reservoir in Leicestershire.

9.19 The Strategy also focuses on continuing leakage reduction and water efficiency activity in order to reduce demand for water. The policy of compulsorily metering unmeasured households on change of occupier in order to accelerate the rate of meter usage within EMZ6 should help to achieve this.

9.20 Severn Trent completed a review of its resource zones in May 2010. It proposes fifteen rather than six zones. This is because the current structure

may mask some localised supply/demand risks and there is concern that the six zones do not fully meet the Environment Agency's definition of a WRZ. Under the review the three Districts would become part of a geographically larger zone that excludes Nottinghamshire but includes counties to the south such as Gloucestershire and Warwickshire. The implications of this are not yet clear but it is assumed that the benefits of the Strategy to the three Districts will still apply.

Severn Trent Final Business Plan (April 2009)

9.21 This indicates how the authority intends to progress between 2010/11 and 2014/15. The Strategy is based on eight key strategic intentions:-

1. Providing a continuous supply of water
2. Dealing effectively with waste water
3. Responding to customers' needs
4. Minimizing the company's carbon footprint
5. Having the lowest possible charges
6. Having the right skills to deliver
7. Maintaining investor confidence
8. Promoting an effective regulatory regime.

9.22 It is noted that the authority is working with the Environment Agency to develop its environmental programme. For instance, the Environment Agency wishes to see a zero target for pollutions and in response to this the Plan includes improvements to reduce the number of pollution incidents by nearly 100 a year.

Yorkshire Water Final Water Resource Management Plan (WRMP) (2009)

9.23 The Yorkshire Water WRMP sets out how Yorkshire's water will be supplied until 2035. It has been prepared in accordance with the Environment Agency's planning guidelines and incorporates future pressures on supply and demand driven by predicted changes to the climate. It also incorporates future changes to Yorkshire's population, housing, future water use and metering trends.

9.24 Yorkshire Water's future plans are relevant in so far as it has an agreement with Severn Trent Water to abstract 21,550 ML a year from the Derwent Valley Reservoirs in Derbyshire. This water is used to supply part of Sheffield. The amount that can be taken by both authorities is set out in operating guidelines based on the principal that Yorkshire Water is entitled to 24.1% of the available water. The minimum supply rate is 35 Ml/d. However, there is provision in the agreement to modify these rules and this was carried out in 1995/96 and 2003. In the event of serious drought in Severn Trent's area, Yorkshire Water could assist by taking a reduced supply from the Derwent Valley Reservoirs.

Yorkshire Water Final Business Plan (2009)

9.25 Between 2010 and 2015 the authority proposes spending £1.9m on upgrading water and sewage facilities. Five capital investment schemes of over £1m for sewerage alone are indicated in the Study Area.

9.26 The Plan has 10 priorities:

1. Ensure there is never a need for water supply restrictions
2. Delivering the very best drinking water quality
3. Stopping sewers flooding homes and business
4. Providing a customer experience second to none
5. Reducing leakage significantly
6. Mitigating the carbon footprint and adapting to climate change
7. Going beyond environmental compliances
8. Providing tailored services for customers
9. Providing the lowest possible prices
10. Delivering attractive returns for investors.

Catchment Abstraction Management Strategies (CAMS)

9.27 The Environment Agency is responsible for managing water resources in England and Wales. One of the ways that this is done is through licensing water abstraction. CAMS are prepared to:

- inform the public on water resources and licensing practice
- provide a consistent approach to local water resources management
- help to balance the needs of water-users and the environment.

9.28 CAMS are six year plans that record how water resources are going to be managed in the area. They classify resource availability by Water Resource Management Unit as follows:-

Water available – water likely to be available at all flows including low flows; restrictions may apply.

No water available – no water available for further licensing at low flows, although water may be available at higher flows with appropriate restrictions.

Over licensed – current actual abstraction is resulting in no water available at low flows. If existing licences were used to their full allocation they would have the potential to cause unacceptable environmental impact at low flows. Water may be available at high flows with appropriate restrictions.

Over abstracted – existing abstraction is causing unacceptable environmental impact at low flows. Water may still be available at high flows with appropriate restrictions.

9.29 The CAMS covering the WRZ6 are as follows:-

Derbyshire Derwent CAMS (2006)

The Derbyshire Derwent CAMS is of high conservation value with several sites included as protected European Habitats and Bird Directives and many Sites of Special Scientific Interest (SSSIs). It concluded that the River Derwent is 'over licensed' with too great a proportion of the flow having been licensed for abstraction at all but light flows. However, in combination, licenses within the catchment are not fully utilised suggesting that license holders are authorised to abstract a greater volume of water than typically required. Whilst some abstractions may be allowed where these involve a net loss of resources from the catchment they will only be issued subject to a 'hands off flow' restriction which affects the reliability of any license issued. These restrictions would render a license unusable for at least 72% of the time during an average year.

Also through the CAMS process, the Environment Agency has identified a number of resource recovery strategies as a means of seeking to improve the resource status of the Derwent.

Water Resource Management Unit 4 of this CAMS covers the River Amber and Ogston Reservoir. The reservoir itself is a SSSI and the Unit contains a further SSSI and other important Nature Conservation sites. The surface water resources support a number of large industrial abstractions, whilst the ground water supports 36 small abstractions for agricultural purposes.

The resource assessment of 'water available' has been amended to 'no water available' because any surplus is required to meet flow objectives and abstraction demands further downstream on the River Derwent.

Idle and Torne CAMS (2007) –

This covers part of Bolsover district, including land to the east of Bolsover, Barlborough, Clowne, Whitwell, Creswell, Elmton, Whaley, Scarcliffe, Whaley Thorns and Langwith Junction.

The Idle and Torne CAMS area stretches from central Nottinghamshire to southern Yorkshire. It covers an area of approximately 1300 square kilometres with a landscape varying from the wooded Dukeries in the south to Hatfield and Thorne Moors and the valuable agricultural environment of the Isle of Axholme in the north.

The dominant land use is arable agriculture. Large areas in the north of the catchment are supported by a comprehensive system of land drainage to maintain their agricultural quality. Due to their low-lying situation these areas are also protected from flooding from the River Trent by extensive flood defences.

The above influences have seriously impacted wetland biodiversity in some areas of the catchment.

The Idle and Torne CAMS has highlighted pressure on water resources. The CAMS has concluded that the middle to lower reaches of both the River Idle and River Torne, together with the Sherwood Sandstone aquifer which underlies the catchments, are 'over licensed' and 'over abstracted'. This means that too great a proportion of the flow and groundwater resource has been licensed for abstraction.

The balance between the needs of the environment and those of important abstractions for public water supply, industry and agriculture must be improved.

Humber River Basin Management Plan (HRBMP) (2009)

9.30 The Study Area is also part of the Humber River Basin. The Environment Agency's Management Plan, prepared under the Water Framework Directive, is the first of a series of 6 year plans that focus on the protection, improvement and sustainable use of the water environment.

9.31 By 2015, 14% of surface waters (rivers, lakes, estuaries and coastal waters) in the river basin are going to improve for at least one biological, chemical or physical element. This includes an improvement of 2,258km of the river network in relation to fish, phosphate, specific pollutants and other elements.

9.32 The Plan summarises information about the status of water in different parts of the HRBD and points to the part that local authorities can play in implementing this plan. The Environment Agency wishes to work with local authorities to ensure that all relevant actions are identified, prioritised, resourced and implemented. Measures include:-

Use of SuDS;

Promotion of water efficiency (possibly through a WCS);

Ensuring that local authorities, Local Development Documents (LDDs) take into account the objectives of the HRBMP;

Reducing the physical impacts of urban development in artificial or heavily modified waters to help waters reach good ecological potential;

Preparing Surface Water Management Plans.

Surface Water Management Plans (SWMPs)

9.33 In August 2009, the Government ranked all local authorities according to the estimated number of properties at risk of surface water flooding from severe rainfall. 77 authorities were advised that they would be awarded grants to carry out SWMPs. Whilst none of the three authorities was included, Chesterfield is ranked 157th with 2,100 properties at risk, Staveley 572nd

with 480 properties at risk and Clay Cross/North Wingfield 622nd with 420 properties at risk.

10. Water Supply

10.1 The water authorities' management and investment plans indicate that, whilst future water supplies will need to be carefully managed, there is sufficient flexibility within the water supply network to cater for the future needs of the three authorities. Consultation takes place with the water authorities at key stages of the LDF process and therefore any potential problems are likely to be identified at an early stage. It should be noted that with the revocation of the regional plan the three authorities may review their respective housing targets.

10.2 The local authorities also consult on their respective SHLAAs. No potential capacity issues have been identified, apart from the need for minor reinforcement works that can be dealt with in the normal way via developer contributions.

11. Waste Water Disposal

North East Derbyshire District Council

11.1 Severn Trent Water provides the sewerage services as far north as Clay Cross and Yorkshire Water covers the northern part of the District (See Map 2).

11.2 Severn Trent does not anticipate any particular issues with waste water systems, although the key to future performance is the effective management of surface water run off. The company expects surface water on new development to be managed sustainably in line with the Government's new water strategy entitled 'Future Water'[7] which sets out a vision for more effective management of surface water to deal with the dual pressures of climate change and housing development. Severn Trent would not expect surface water to be conveyed to the foul or combined sewerage system and, where possible, they would support the removal of surface water already connected to the foul or combined sewer.

11.3 Any improvement work that needs to be carried out due to domestic growth at Severn Trent's sewage treatment works would be funded by the company through its regulatory growth framework. Any off site enhancement work would be expected to be funded by the developer through the requisition procedures in the Water Industry Act 1991.

11.4 Yorkshire Water has only made provision in its Asset Management Plan 2010-2015 for sites allocated in the North East Derbyshire Local Plan (2005) and therefore may not have sewerage capacity beyond that. Generally there will be capacity on brownfield sites where foul and surface water flows from

[7] Future Water – The Government's Water Strategy for England, February 2008, Department for Environment, Food and Rural Affairs

the new site are no greater than the existing discharge rates. On greenfield sites, the company would expect all surface water to be kept out of the public sewer network.

11.5 The company has provided comments in relation to the Strategic Housing Land Availability Assessment (SHLAA) in respect of a number of waste water treatment works in the District. It is understood that there are capacity problems at the following waste water treatment works (WWTWs):-

WWTW	Serving
Limited capacity (only Local Plan, committed sites and brown field sites that do not increase flows) at:	
Old Whittington	Grassmoor, Calow, Wingerworth
Danesmoor (part lies within Severn Trent area)	Clay Cross
Tupton	Tupton, North Wingfield
Renishaw	Renishaw
Woodhouse Mill	Eckington, Killamarsh

NB: This WWTW may be undergoing a series of investments between 2010 and 2015 to meet the Water Framework Directive which will include an allowance for future growth.

No additional capacity at:	
Dronfield	Dronfield
Williamthorpe	Holmewood
Temple Normanton	Temple Normanton

NB: Any development discharging into the above 3 WWTWs will need to be phased to coordinate with the provision of new infrastructure. Sites that are progressed in advance of this would require investment from the developer.

Bolsover District Council

11.6 Yorkshire Water provides services for most of Barlborough and Bolsover town, all of Doe Lea, Bramley Vale and Glapwell, Stanfree, Shuttlewood, and a very small part of Clowne. The remaining settlements in the District are served by Severn Trent for sewage.

11.7 The WWTW at Bolsover is close to capacity and any development over and above existing Local Plan allocations and commitments will have to be phased or other arrangements made in consultation with Yorkshire Water to allow for the necessary infrastructure.

11.8 There are potential capacity issues in respect of at least three other WWTWs in the District at Scarcliffe, Carr Vale and Shuttlewood. The Council intends to commission further work to inform its Core Strategy.

Chesterfield Borough Council

11.9 In respect of water supply, Severn Trent have been consulted on the Borough's strategic development proposals and they have not identified any potential capacity issues, apart from minor reinforcement works that might be required which can be dealt with in the normal way via developer contributions.

11.10 In respect of water treatment and sewerage, Yorkshire Water has stated that there may be long-term capacity issues at Staveley Waste Water Treatment works. At present there is capacity for an extra 1500 dwellings (this capacity includes areas of Bolsover).

NB: It should be noted that Utility companies are reluctant to commit investment to provide additional capacity until there is a reasonable level of development confidence (e.g. a developer enquiring about a particular site). Just because a LPA allocates areas for long-term strategic development does not mean Utility companies will automatically upgrade services and facilities

12. Environmental Constraints and Opportunities

12.1 In Chesterfield Borough, Bolsover and North East Derbyshire Districts the following environmental issues are of relevance to a Water Cycle Study:-

Strategic Flood Risk Assessment

12.2 A Strategic Flood Risk Assessment was carried out on behalf of all three authorities by Faber Maunsell and completed in March 2009.

12.3 The Assessment concluded that in the Study Area there are many different types of flood risk present including rivers, groundwater (notably springs and aquifers), land drainage (low lying areas and runoff from steeply sloping areas), overland flow, sewerage and other artificial sources (such as reservoirs, canals and failure from assets).

12.4 Rivers are the main source of flooding in the Study Area. This is due to a combination of insufficient channel capacity and the fact that the affected properties are usually on low lying land in the rivers' natural flood plains.The River Rother poses the greatest risk in both Chesterfield and North East Derbyshire. Areas where assets are at potential risk of breach are Derby Road (St Augustines), the Holland Road (Old Whittington) areas and at Slitting Mill Farm upstream of Eckington from the River Rother and the Rother-Hipper confluence up stream of Station Bridge from Rivers Rother and Hipper. Assets around Dronfield should be regularly maintained and if necessary upgraded to prevent localised flooding. In Bolsover, the River Doe Lea poses the greatest flood risk. Increased flooding due to asset failure is low. There is a potential risk of breach at Pinxton adjacent to the Bolsover

District Council boundary which is protected by flood embankments to a 1 in 100 year standard of protection along the right bank of the River Erewash.

12.5 The June 2007 flooding was generally caused by surface water runoff and the surcharging of sewers during heavy and/or prolonged rainfall.

12.6 The Assessment includes a number of policy recommendations to be taken forward into the Core Strategy to underpin future development. These are included at Appendix 1.

Chesterfield Canal

12.7 The Canal meanders through the Study Area and is navigable for much of its length, including a five mile stretch in Derbyshire between Chesterfield and Staveley. Whilst it has significant economic development potential, the Canal is an important heritage, recreation and wildlife conservation feature. It is host to a number of rare species of plants and animals and provides a wide range of wetland habitats; much of its length is a Site of Special Scientific Interest.

Local Wildlife Sites

12.8 The following number of sites for each authority was listed in the Derbyshire Wildlife Sites Register in March 2009.

BDC – 110
CBC - 29
NEDDC - 196

Sites of Special Scientific Interest (SSSIs)

12.9 The authorities contain the following SSSIs:

CBC – None

BDC – 6 sites

Teversal- Pleasley Railway (part)

Ginny Springs

Dovedale Wood (part)
Creswell Crags (part)

Hollin Hill & Markland Grips

Crabtree Wood

In addition the site of Pleasley Vale Railway runs adjacent to the district/county boundary (but it is on the Nottinghamshire side).

NEDDC - 7 sites

Harewood Grange Stream Section, 5.8ha (edge of the Peak District National Park)

Moss Valley 26.1ha

Moss Valley Meadows 17.87ha

Moss Valley Woods 17.88ha

Ogston Reservoir 95.91ha

Fall Hill Quarry 4.11ha

Duckmanton Railway Cutting 3.8ha

12.10 Ogston Reservoir is particularly important in the Study Area, not only for water supply but also for biodiversity and amenity (Ogston is a SSSI). Water from the reservoir is treated at the nearby Ogston Water Treatment Works from where water is pumped to Higham Service Reservoir which supplies areas in North East Derbyshire, Chesterfield and Sheffield. Also, compensation water is released into the River Amber to regulate flow.

12.11 Ogston Reservoir has a direct catchment of 26.7 square kilometers comprising the headwaters of the River Amber and Carr Brook. In addition, Ogston can receive either water pumped from the River Derwent via Ambergate Pumping Station or via a gravity piped supply from Carsington Reservoir. The latter two options cannot be utilised together. Ogston Reservoir has 220 acres of open water (770,000 square metres) and holds 6,180,000 cubic meters of water.

13. Summary and Actions

Summary

13.1 At this stage in the preparation of the three authorities' Core Strategies it is concluded that:-

- The Management and Business Plans of the water authorities do not anticipate problems relating to the supply of water in the Study Area. However it is noted that Severn Trent, the main supplier of water, will need to implement efficiency measures, including leakage reductions, to ensure a reliable future supply.
- It is already known that sewage disposal is likely to be problematic in relation to at least four waste water treatment works in Bolsover District and this has prompted further investigation. Sewage disposal could also be a problem in the Staveley area of Chesterfield. Chesterfield Borough and North East Derbyshire District will consider if a Detailed

Water Cycle Study is required when their Core Strategy Preferred Strategies have been developed.

13.2 The following table, indicating the ways in which the requirements of the Water Cycle Study are being taken into account in preparing the authorities' Core Strategies, is based on the former East Midlands Regional Plan. The table is considered to continue to provide a useful checklist of the partnership work that is taking place.

Requirements of a Water Cycle Study	**How these have been taken into account in preparing the authorities' Core Strategies**
Take water related issues into account at an early stage in the process of identifying land for development and in the phasing and implementation of development.	Water related issues have been taken into account at an early stage in the process of identifying the direction for growth in the Core Strategy through the following evidence based studies:- Green Infrastructure Plans SFRA Sustainability Appraisals into Issues and Options and Preferred Strategies.
Ensure timely provision of appropriate additional infrastructure for water supply and waste water treatment to cater for the levels of development provided for in the Regional Plan, whilst meeting surface and groundwater quality standards and avoiding adverse impacts on designated sites of nature conservation of international importance.	This will be achieved through the Infrastructure Delivery Plan. Green Infrastructure Plans have been prepared by all three authorities and this will ensure that designated sites of nature conservation of international importance are protected from harm. Timely infrastructure delivery will be monitored through the Annual Monitoring Report process.
Assess the scope for reducing leakage of public water supply from current levels.	Severn Trent and Yorkshire Water are responsible for reducing leakages and this is taken into account in their Resource Management Plans.
Promote improvements in water efficiency in new development and in regeneration to achieve a regional target of 25% (equivalent to an average saving of about 35 litres per person per day).	Preparation of the Core Strategies will consider the inclusion of policies that promote the efficient use of water.
Reduce unsustainable abstraction from watercourses and aquifers to sustainable levels.	The Severn Trent WRMP makes provision to increase supply to meet the growth of the Housing Market Area up to 2026 without the need to add any unsustainable abstraction from watercourses and aquifers.

Protect and improve water quality and reduce risk of pollution especially to vulnerable groundwater.	Preparation of the Core Strategies will consider the inclusion of policies that seek to protect vulnerable ground water.
Make provision for the development of new water resources where this represents the most sustainable solution to meeting identified water resource requirements, taking account of predictions of future climate change.	Continued liaison with the water authorities and the Environment Agency should ensure that this is achieved.
Use SuDs wherever practicable to help mitigate diffuse pollution and support groundwater recharge. These will be required where development is upstream of a designated nature conservation site of international importance or to improve water quality, where the need is demonstrated through water cycle studies.	Preparation of the Core Strategies will consider the inclusion of policies relating to SuDs.
Support water conservation measures such as winter storage reservoirs on agricultural land.	Continued liaison with the water authorities and the Environment Agency should ensure that this is achieved.
Ensure that sewage treatment capacity is sufficient to meet the needs of development and that, where necessary improvements are in place so that development does not compromise the quality of discharged effluent.	The authorities will consider further work, such as the preparation of detailed water cycle studies, where sewage treatment capacity is considered to be insufficient to meet development needs.

Actions

13.3 A meeting of interested parties took place on 15th March 2010. Representatives from Chesterfield Borough, Bolsover and North East Derbyshire Districts, Severn Trent Water, Yorkshire Water and the Environment Agency attended. It was agreed that:

- Liaison will continue to take place at critical points in the preparation of the local authorities' LDFs,
- The authorities will indicate the strategic distribution of development likely to be included in their Core Strategies,
- The water companies and the Environment Agency will respond to the authorities' consultations,

- Out of the three authorities Bolsover District appeared to be the district where a more detailed Outline Water Cycle Study would be most appropriate,

- The three authorities will decide independently if and at what stage a Detailed Water Cycle Study is required, taking into account the advice of the water companies and the Environment Agency.

The following policies should be given consideration for inclusion in the Core Strategy:-

The three local authorities should ensure that all new homes delivered through the Core Strategy should be water efficient (i.e. a minimum of Code for Sustainable Homes Level 3/4, 105 l/p/d). This should include the requirement for rainwater harvesting and grey water recycling. (n.b. Bolsover District Council's Core Strategy: Revised Preferred Options document (March 2010) includes Policy 18: Sustainable Construction, Renewable Energy and Energy Conservation that requires at least Code for Sustainable Homes Level 3).

The authorities' Core Strategies should include policies to support the water companies' water efficient activities as set out in WRMPs.

Policies in Core Strategies for new development should require the use of SuDS that mimic natural drainage rather than using traditional piped systems.

Policies in Core Strategies should require that, where feasible, culverted water courses should be opened up to provide natural channels. (This would be in line with national policy, the requirements of the Humber RBMP and the SFRA).

Appendix A

STRATEGIC FLOOD RISK ASSESSMENT (SFRA)
Extract from the Executive Summary

ES6 Planning Policy Recommendations

ES6.1 In consultation with the Environment Agency (EA) and the local planning authorities (LPAs), the SFRA has developed a suite of specific spatial planning recommendations that should underpin all future development.

ES6.2 POLICY RECOMMENDATION 1 - The Need for a Flood Risk Assessment

The Council may require the submission of an appropriate site specific Flood Risk Assessment from the developer in connection with any application for planning permission.

ES6.3 POLICY RECOMMENDATION 2 - Development in areas deemed to be at Low Probability of flooding, (Flood Zone 1)

The LPA's SFRA has classified all land within one or other of the four Flood Zones described in the SFRA. This classification does not remove the need for site specific FRAs.

ES6.4 POLICY RECOMMENDATION 3 - Development in areas deemed to be at Medium to High Probability of flooding (Flood Zones 2 and 3a)

Developments within the natural floodplain of a river or stream are inherently at risk of flooding and can also increase flood risks to others, not only by increasing surface water runoff rates but by obstructing or diverting flood flows and reducing flood storage. Planning permission should only be granted where specific criteria are met.

ES6.5 POLICY RECOMMENDATION 4 - Development involving building in areas identified as Functional Floodplain (Flood Zone 3b)

Development involving building in areas identified as Functional Floodplain in the SFRA will only be permitted in exceptional circumstances. Specific brownfield sites can be designated as Flood Zone 3a (high risk) and not part of the functional flood plain if agreed between the EA and the LPA.

ES6.6 POLICY RECOMMENDATION 5 - Sustainable Drainage Systems (SuDS)

The LPA should require developers to demonstrate that their surface water drainage proposals, particularly for large sites, are appropriate and adequate for the development and will not increase the flood risk

to land and property either upstream or downstream of the development site. The Council considers that Sustainable Drainage Systems (SuDS) are a desirable means of achieving this and encourages their use by developers.
Planning permission for sites without SuDS will not usually be granted unless the developer can provide sufficient justification as to why SuDS are inappropriate, unfeasible or unnecessary at the proposed development site.

ES6.7 POLICY RECOMMENDATION 6 - Culverting of Open Watercourses

LPAs and the EA should generally oppose the culverting of open watercourses because of the adverse ecological effects, potentially increased flood risk and other consequences that are likely to arise. Where practical in connection with the development proposals, LPAs should seek to have existing culverted watercourses restored to open channels, using planning conditions or S106 legal agreements.

ES6.8 POLICY RECOMMENDATION 7 - Climate Change

All new developments should take account of climate change in terms of both river flows and surface water run-off. River flows should be assumed to increase by up to 20% in 100 years and peak rainfall intensity by up to 30% depending on the lifetime of the development. Current guidance defines development lifetimes of 30 years for retail, 60 years for commercial/industry and 100 years for residential.

ES6.9 POLICY RECOMMENDATION 8 – Afforestation

Afforestation outside floodplains is beneficial and can reduce runoff and flood risk if undertaken in a sustainable manner. Opportunities for afforestation away from the immediate areas of watercourses should be considered, taken up and implemented wherever practical. Deforestation and other significant tree loss should be avoided, especially clear felling.

ES6.10POLICY RECOMMENDATION 9 - Increased Impermeability

Increases in impermeable area requiring planning permission will not normally be permitted unless it can be demonstrated that the run-off from these areas will not be increased. This could be achieved by the following:

- Sustainable drainage techniques such as permeable pavements and infiltration;
- Underground storage and flow control.

ES6.11POLICY RECOMMENDATION 10 - Runoff Rates

The LPAs should seek the maximum possible reduction in run off rates:-

- For sites currently draining direct to sewer or watercourse and proposes to use the same outlet(s), a minimum of 30% reduction in peak discharge is required. Indirect drainage via the highway is not included in the calculation of existing flow.
- For sites not currently drained or to be drained to alternative outlets, peak discharge to be restricted to a maximum of 5 litres per second per hectare

ES6.12 Robust Council policy is essential to ensure that the planning recommendations can be imposed consistently at the planning application stage. This is essential to achieve future sustainability within each LPA area with respect to flood risk management.

Appendix B

GLOSSARY

Asset Management Plan (AMP) is a tactical plan for managing an organisation's infrastructure and other assets to deliver an agreed standard of service.

Catchment Abstraction Management Strategies (CAMS) are strategies for management of water resources at a local level.

Core Strategy is the key compulsory Local Development Document specified in UK planning law. It sets out the long-term spatial vision and strategic policies of the local planning authority area.

Deployable Output is the maximum demand that can be met over the course of a year from the indigenous groundwater, river and reservoir sources of a Water Resource Zone, plus and minus the water transferred into and out of the Zone, subject to all operating constraints.

A **Directive** is a legislative act of the European Union which requires member states to achieve a particular result without dictating the means of achieving the result.

Green Infrastructure describes a network of green spaces designed to meet the environmental, social and economic need of a community.

Grid Surface Water Zone (SWZ) is the largest of the three zones that make up the Yorkshire Water Region.

A **Local Development Document (LDD)** forms part of the Local Development Framework.

A **Local Development Framework (LDF)** is a folder of Local Development Documents that outlines how the planning of an area will be managed.

Natura 2000 is a European network of protected sites which represent areas of the highest value for natural habitats and species of plants and animals which are rare, endangered or vulnerable.

Planning Policy Statement (PPS) is a central government policy guidance note.

A **Special Area of Conservation (SAC)** is included in the Natura 2000 network and supports rare, endangered or vulnerable habitats or species of plants or animals.

Strategic Housing Land Availability Assessment (SHLAA) is an assessment of land availability in a local authority that informs the Local Development Framework in accordance with government guidance.

Sites of Special Scientific Interest (SSSIs) are the best UK sites for wildlife and geology designated under the Wildlife and Countryside Act (1981).

Sustainable Drainage Systems (SuDS) try to replicate natural drainage systems by using low environmental impact solutions.

Water Resource Zone (WRZ) is the largest possible zone in which all resources can be shared and hence the zone in which all public water supply customers experience the same risk of supply failure from a resource shortfall.