Chapter Five – Flood risk

A time of policy change

Since the phase 1 Water Cycle Study for Bedford Borough and Mid Beds was published in February 2009 there have been a number of important policy and legislative changes with respect to local flood risk management. These changes have been brought above to improve the way that local flood risk is managed in England and Wales.

First, the Flood and Water Management Act (2010), which implemented many of the recommendations from Sir Michael Pitt's review of the summer 2007 flooding, sets out new roles and responsibilities for upper tier and county authorities (called 'Lead Local Flood Authorities') to manage local flood risk from surface runoff, groundwater and ordinary watercourses. A key part of the Act was ensuring that a partnership approach is adopted to manage local flood risk.

Alongside the Act the Flood Risk Regulations came into force in December 2009, which set out a process for Lead Local Flood Authorities to understand local flood risk across their area and prepare detailed flood maps and a Flood Risk Management Plan in the areas most vulnerable to flooding.

This chapter provides an overview of how these policy changes impact on planning authorities and developers.

In addition, the Great Ouse Catchment Flood Management Plan was published by the Environment Agency in January 2011. Its purpose is to 'establish flood risk management policies that will deliver sustainable flood risk management for the long term.' This chapter summarises the policies of the CFMP within the study area, and identifies which policies affect which allocated developments.

The Flood and Water Management Act 2010

The Act aims to improve the management of water resources and create a more comprehensive and risk based regime for managing the risk of flooding from all sources. The Act states that its purpose is to "make provision about water, including provision about the management of risks in connection with flooding and coastal erosion." The key features of the Act are that it:

- Gives the Environment Agency an overview role of flood and coastal erosion risk management and gives them responsibility for fluvial (including main rivers and coastal rivers), coastal and reservoir flood risk;
- Gives Unitary Authorities and County Councils a Lead Local Flood Authority (LLFA) role, allocating responsibility for managing local flood risks – surface runoff, groundwater and ordinary watercourses. Although the LLFA will not assess risk from the those identified above as the responsibility of the Environment Agency, if there is interaction between sources, it must be considered as a joint risk by the LLFA.

A key implication for County Councils and Unitary Authorities is the introduction of the Lead Local Flood Authority (LLFA) role, which enhances their responsibilities so that they lead the co-ordination of flood risk management in their areas. As a LLFA, Bedford Borough and Central Bedfordshire will take on these new powers and responsibilities. These include:

- A requirement to develop, maintain, apply and monitor a strategy for local flood risk management for the county;
- The management of local flood risk, which includes surface runoff, groundwater and ordinary watercourses;
- Leading the co-ordination of local flood risk management, bringing together all relevant bodies to help manage local flood risk;
- Upon becoming aware of a flood, the LLFA must, to the extent is considers necessary or appropriate, investigate which authority has flood risk management responsibilities and whether that authority has or is proposing to exercise those functions;
- Maintaining a register of structures or features which are considered to significantly affect flood risk and record ownership and state of repair;
- Powers to do works to manage flood risks from surface runoff and groundwater (powers to do works on ordinary watercourses remain with either district authority or IDB);
- Powers to designate structures and features that affect flooding;
- The approval, adoption and maintenance of sustainable drainage systems (SUDS); and
- Contributing towards achievement of sustainable development.

Implementation of the Act

The implementation of the Act is being progressed using a staged approach through commencement orders. To date two commencement orders have been issued which have implemented:

- The definitions within the Act;
- Provisions requiring the Environment Agency and LLFAs to develop strategies for risk management;
- Provisions assisting Internal Drainage Boards to operate through consortia;
- Power to request information;
- LA investigations in response to flooding incident;
- Duty to maintain a flood asset register;
- Miscellaneous provisions relating to local authorities, IDBs and Regional Flood; and
- Regional Flood and Coastal Committees (RFCC).

Flood Risk Regulations 2009

The Flood Risk Regulations came in to force on 10th December 2009. Its purpose is to transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law and to implement its provisions. The regulations outline the roles and responsibilities of the various authorities consistent with the Flood and Water Management Act 2010 and provide for the delivery of the outputs required by the directive. The Regulations:

- Give responsibility to the Environment Agency to prepare Directive deliverables: preliminary flood risk assessments, flood risk maps and hazard maps and flood risk management plans - for flood risk from the sea, main rivers and reservoirs;
- Give responsibility to LLFAs to do the same for all other forms of flooding (excluding sewer flooding), including surface runoff, groundwater and ordinary watercourses;
- Require preliminary flood risk assessments (PFRA) to be prepared before 22 December 2011, with LLFAs completing their PFRA reports in Spring 2011;
- Require areas of significant risk to be identifies on the basis of the preliminary flood risk assessments;
- Require flood risk maps and hazard maps for the identified areas of significant flood risk before 22 December 2013;
- Require flood risk management plans to be prepared for the areas of significant flood risk before 22 December 2015; and
- Require engagement with the public and relevant authorities in the production of Directive deliverables.

The first step of the Flood Risk Regulations (2009) is the PFRA. The PFRA is a high level screening exercise to identify areas of most significant flood risk across Europe. There are four key steps which must be undertaken as part of the PFRA:

- Assessment of past floods - the PFRA should assess past floods which has harmful consequences for human health, economic activity or the environment, or could have harmful consequences if they were to occur now;
- Assessment of future floods - the PFRA should assess the possible harmful consequences of future floods, and must take into account topography, watercourses, floodplains, defences, populated areas, economic centres and the impacts of climate change;
- Identification of 'flood risk areas' - the PFRA should identify 'flood risk areas', which are locations considered to be most significantly at risk of flooding – the Environment Agency has defined criteria for identifying 'flood risk areas' and has provided 'indicative flood risk areas' on a national basis which should be used by LLFAs when undertaking their PFRAs; and
- Preliminary assessment report - all of the information above should be captured in the preliminary assessment report, which is sent to the Environment Agency for publication.

In 'Flood Risk Areas' , both the Environment Agency and LLFAs will need to produce flood risk maps, hazard maps and flood risk management plans for their respective sources of flooding. The flood risk management plans must include objectives for managing flood risk and proposed measures for achieving those objectives, much like the requirements of the Local Flood Risk Management Strategy.

Impact of Flood and Water Management Act 2010

Aspect of new legislation	Will it impact local planning authorities?	Will it impact developers?	Description of impact
Flood and Water Management Act			
Strategy Develop, maintain, apply and monitor a Strategy for local flood risk management of the area.	✓ ✓	✓ ✓	Authorities will need to ensure that Development Plan Documents (DPDs) are consistent with the local flood risk management strategy. DPDs may need to be reviewed and updated as the Strategy is developed. Developers will subsequently need to ensure they act in a consistent manner with revised DPDs
Co-operation & Arrangements Authorities must co-operate with each other in exercising functions under both the Act and the Regulations.	✓	✗	
Power to Request Information LLFAs and the Environment Agency may request a person to provide information in connection with the authority's risk management functions.	✗	✗	
Duty to Maintain a Register Establish and maintain a register of structures, including ownership which are believed to have a significant effect on a local flood risk.	✓	✓	Information contained in the 'asset register' could provide useful information on structures which could affect local flood risk both within and downstream of a development site. This can be useful, particularly for developers, when identifying undertaking their Flood Risk Assessments and drainage masterplans
Investigations Upon becoming aware of a flood, the LLFA must, to the extent is considers necessary or appropriate, investigate which authority has flood risk management responsibilities and whether that authority has or is proposing to exercise those functions	✗	✗	

Impact of Flood and Water Management Act 2010

Aspect of new legislation	Will it impact local planning authorities?	Will it impact developers?	Description of impact
Sustainable Development In exercising its risk management functions, LLFAs must contribute towards achievement of sustainable development.	✓✓	✓✓	LLFAs must ensure that when exercising a flood and coastal erosion risk management function it aims to make a contribution towards sustainable development
Designation of Features LLFAs have powers to designate structures and features that affect flooding, to overcome the risk of a person altering or removing a structure or feature (that, for example, may be on private land and is relied on for flood risk management) without consent.	✓	✓	Where a feature has been designated it may not be altered or removed without consent. Therefore designated features which affect drainage within or downstream of a development site will need to be considered as part of developers Flood Risk Assessments and drainage masterplans
Sustainable Drainage LLFAs must establish a SuDS Approval Body (SAB), having a range of responsibilities including: • The approval of proposed drainage systems in new and redevelopments; • Determining the drainage application aspect of planning permission; • Adopting and maintaining SuDS which serve more than one property, where they have been approved; • Designating SuDS on private property as features that affect flood risk and, on the same register, detailing all approved SuDS structures and features; • Approving surface water drainage systems (the right for new developments to connect their surface water drainage to the public sewerage system is conditional upon this); • Applications may be 'free-standing' where planning permission is not required or as a 'combined application' with planning permission; • A non-performance bond may be required from the developer as a deposit.	✓✓	✓✓	The Act has removed the 'automatic right to connect' surface water drainage to the public sewer network. Any connection of surface water to surface water or combined sewers will be dependant on the drainage system being approved by the SUDS Approval Body (SAB) as meeting the national SUDS standards Developers drainage designs will need to be consistent with the national SUDS standards to ensure they are acceptable to the SAB The authorities will need to ensure they work closely with their SAB teams to ensure developers planning applications are aligned with the national SUDS standards prior to adoption.

Impact of Flood Risk Regulations 2009

Aspect of new legislation	Will it impact local planning authorities?	Will it impact developers?	Description of impact
Flood Risk Regulations			
Preliminary Flood Risk Assessment (PFRA) Prepare a PFRA in relation to flooding in the LLFA's area. The LLFA is not required to include information about flooding from the sea, Main Rivers and reservoirs unless the authority thinks that it may affect flooding from another source.	✓	✓	The information gathered as part of the PFRA will provide useful information to inform the authorities and developers including: ▪ Locations of historical flooding ▪ Locations of potential future floods - this analysis is typically based on outputs from computer modelling (e.g. Environment Agency's national surface water maps) and can be used to identity areas more vulnerable to local flood risk. This can be used to inform where development sites may be vulnerable to local flood risk
Identify 'flood risk areas' A LLFA must determine whether, in its opinion, there is a significant flood risk in its area, and identify the part of the area affected by the risk (the "flood risk area"). Flood risk from sources including Main Rivers, the sea and reservoirs do not need to be taken into account unless the authority thinks that it may affect flooding from another source.	✗	✗	There are no 'Flood Risk Areas' in Bedford Borough and Central Bedfordshire as defined by Defra under the guidance of EU. This definition is beyond the control of this document; therefore these stages of the Flood Risk Regulations will not need to be undertaken (NB: Regulations operate on a six yearly cycle so in future reviews 'Flood Risk Areas' may be identified)
Prepare flood hazard maps and flood risk maps A LLFA must prepare, in relation to each 'flood risk area' a flood hazard map and a flood risk map. The Environment Agency must review flood hazard maps and flood risk maps and may recommend modifications.	✗	✗	
Prepare flood risk management plans A LLFA must prepare a flood risk management plan for each 'flood risk area' The Environment Agency must review a flood risk management plan prepared under this regulation and may recommend modifications. The LLFA must consult the authorities that may be affected by the plan, and the public regarding the content of the flood risk management plan and have regard for guidance issued by the EA.	✗	✗	

Great Ouse CFMP

The Great Ouse CFMP has recently been published by the Environment Agency. A summary report of the CFMP is available to download at http://www.environment-agency.gov.uk/research/planning/114303.aspx.

The detailed WCS does not seek to repeat information contained in the CFMP; rather it identifies the key policy intentions and directions specifically related to spatial planning.

CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

- the Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- planning and local authorities who can use the plan to inform spatial planning activities and emergency planning;
- Internal Drainage Boards (IDBs), water companies and other utilities to help plan their activities in the wider context of the catchment;
- transportation planners;
- land owners, farmers and land managers that manage and operate land for agriculture, conservation and amenity purposes; and
- the public and businesses to enhance their understanding of flood risk and how it will be managed. CFMPs aim to promote more sustainable approaches to managing flood risk. The policies identified in the CFMP will be delivered through a combination of different approaches. Together with our partners, we will implement these approaches through a range of delivery plans, projects and actions.

The CFMP identifies key policies and actions for each subunit within the wider plan. The following pages identify those policies that are most relevant to development planning for each subunit

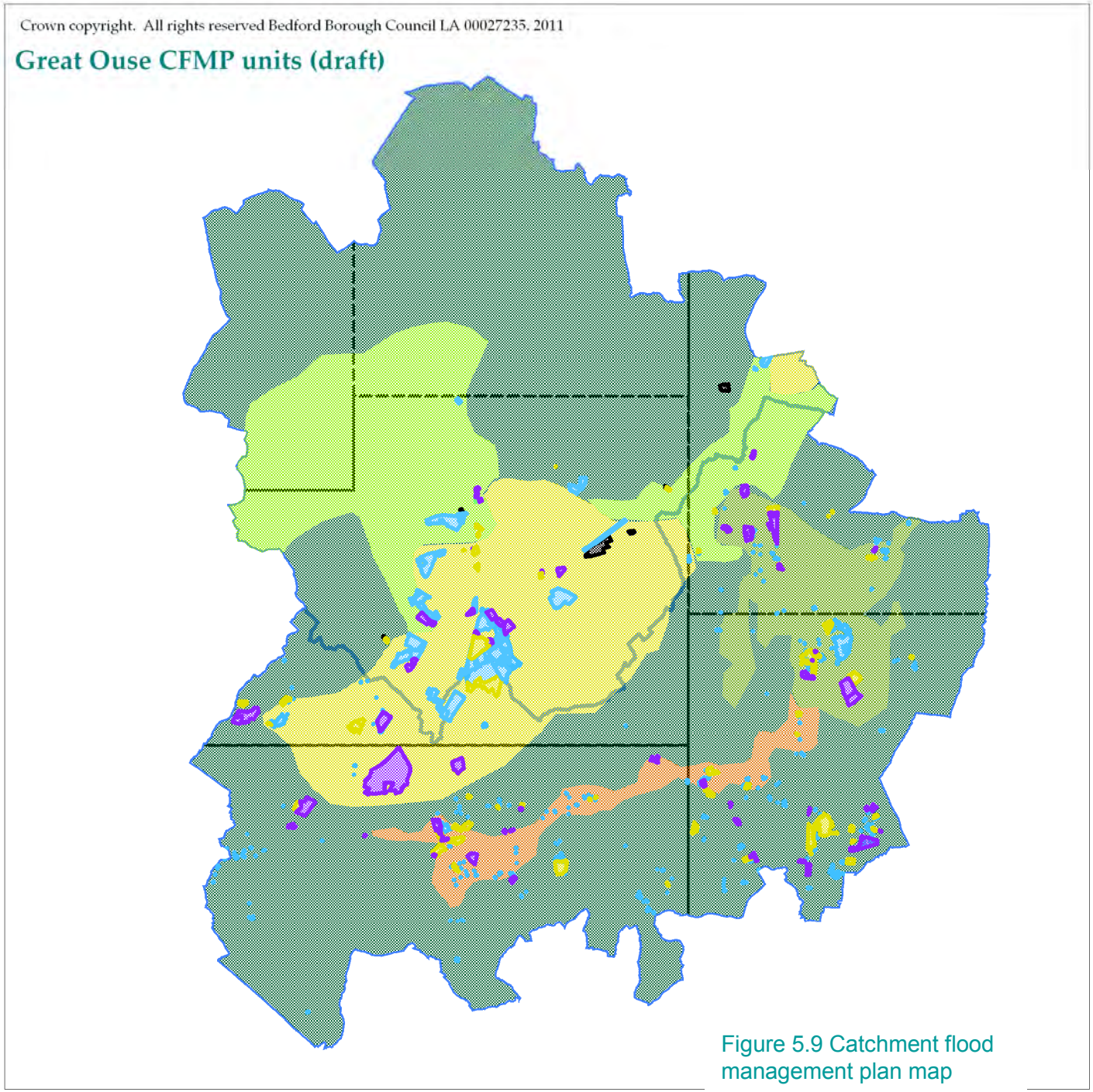

Figure 5.9 Catchment flood management plan map

CFMP Sub Area 1: Bedford Ouse Rural and Eastern Rivers

This CFMP sub-area covers parts of the north-east, south-west and south of the WCS study area.

Key policies related to spatial planning area:

- Continue with current levels of flood risk management on ordinary watercourses (including Award Drains) in this sub-area.
- Ensure any policies within the Local Development Framework, or any revisions, are in line with the CFMP policy.
- Specific action to Bedford Ouse rural - Consider developing Surface Water Management Plans.

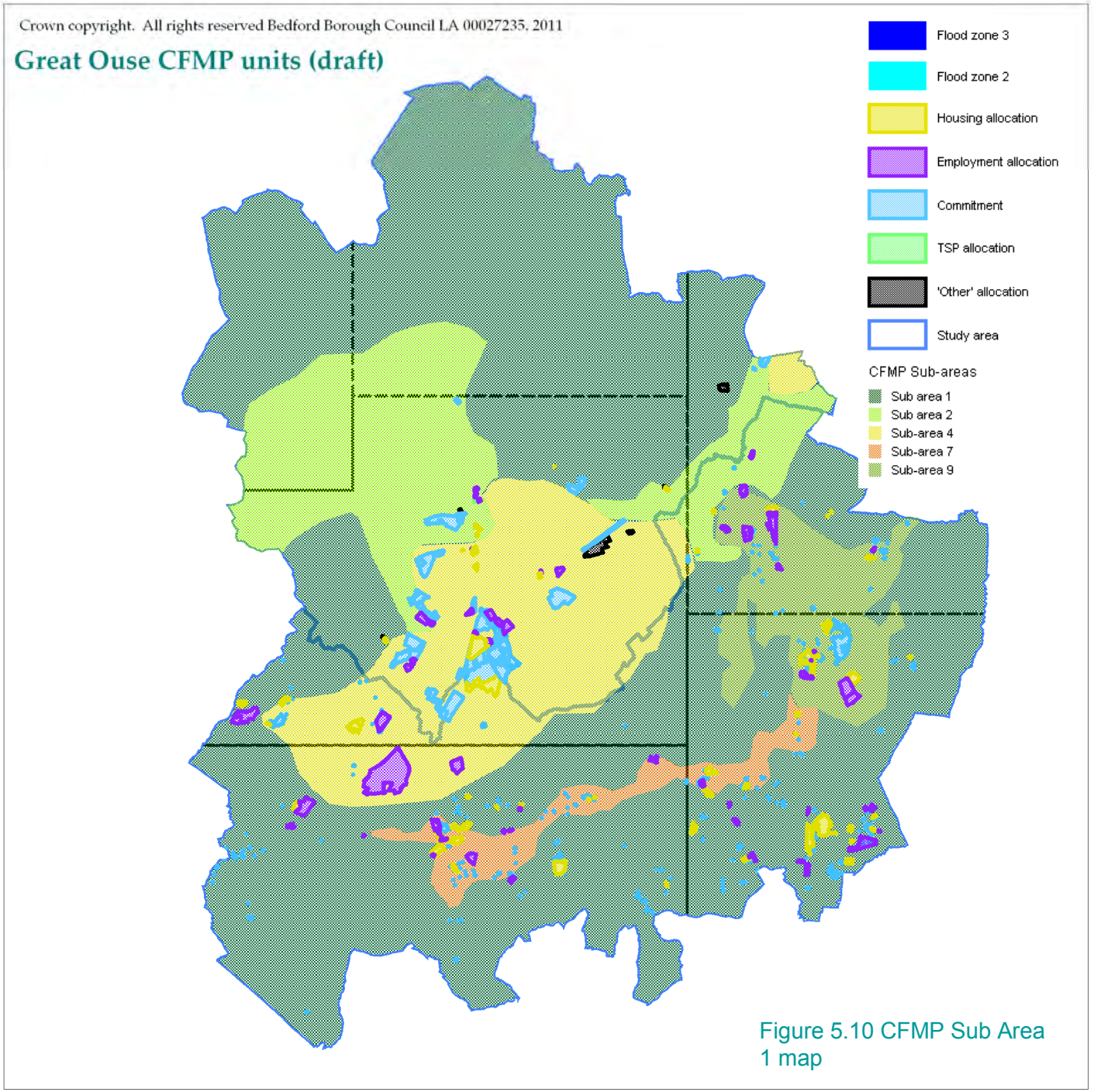

Figure 5.10 CFMP Sub Area 1 map

Great Ouse CFMP

CFMP Sub Area 2: Clipstone and the Great Ouse River Corridor – this CFMP sub-area covers parts of the north and east of the WCS study area. Within this sub-area the key policy direction is to maximise the use of the flood plain to benefit locations elsewhere in the catchment.

Specific policies related to spatial planning include:

- Encourage planners to locate the new development outside the flood plain. The flood plain should be maintained as an asset to make space for water.
- Specific action for Great Ouse river corridor - Investigate developing a strategic flood storage study to consider creating/developing storage within the Great Ouse corridor (NB: findings of the strategic flood storage study may influence the location and design of new developments).

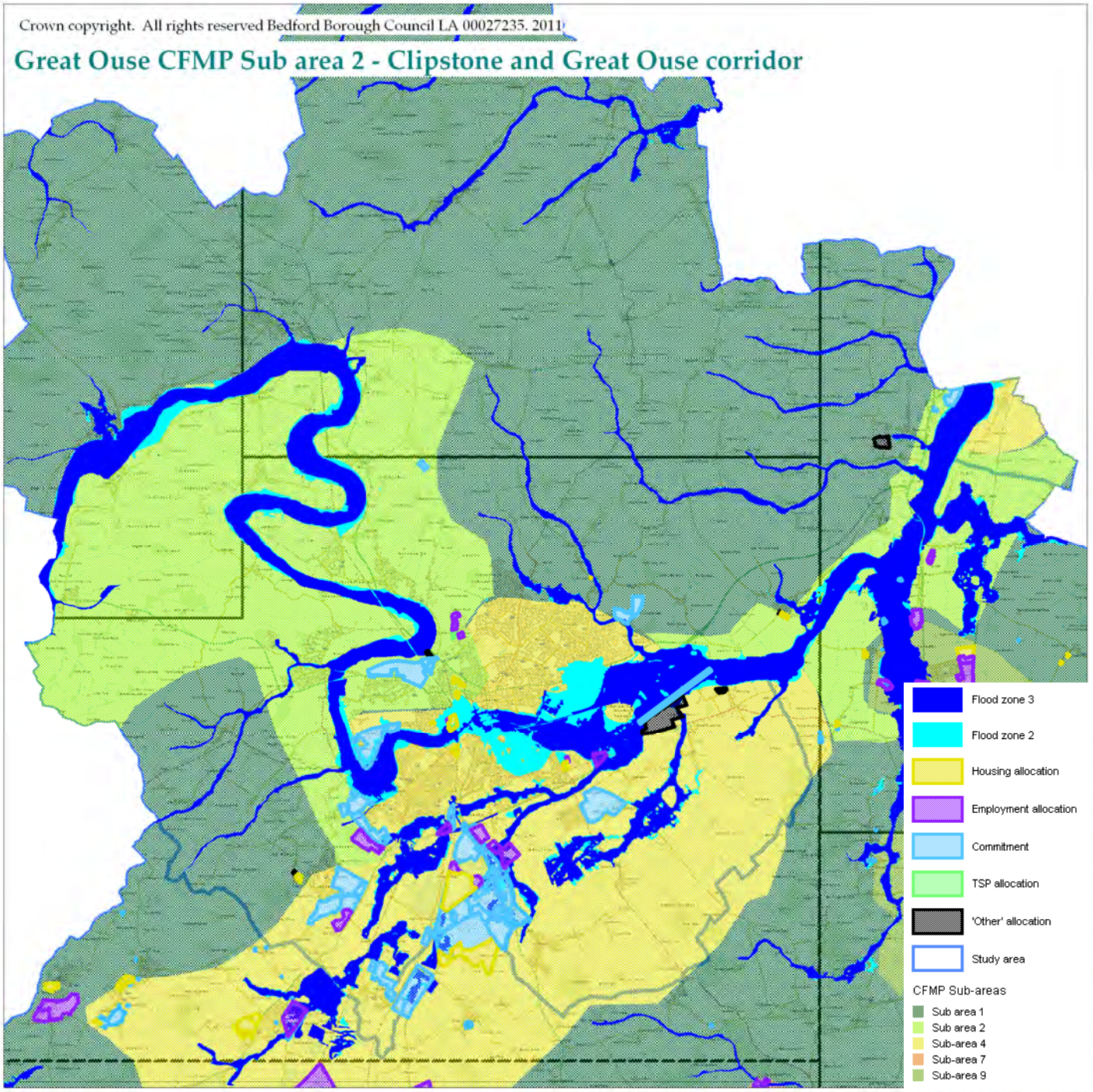

Figure 5.11 CFMP Sub Area 2 map

Great Ouse CFMP

CFMP Sub Area 4: St Neots/Little Paxton, Bedford/Kempston – this CFMP sub-area covers Bedford/Kempston in the WCS study area. The key policy direction in this sub-area is to seek reduction in flood risk by storing water on the flood plains upstream of these communities. Surface water flooding within Bedford/Kempston is also identified as a specific flood risk issue.

Specific policies related to spatial planning include

- Investigate flood storage to manage flood risk within this sub-area through upstream storage.
- Ensure any policies within the Local Development Framework, or any revisions, are in line with the CFMP policy
- Specific action to Bedford/Kempston - Consider developing a Surface Water Management Plan for Bedford/Kempston.

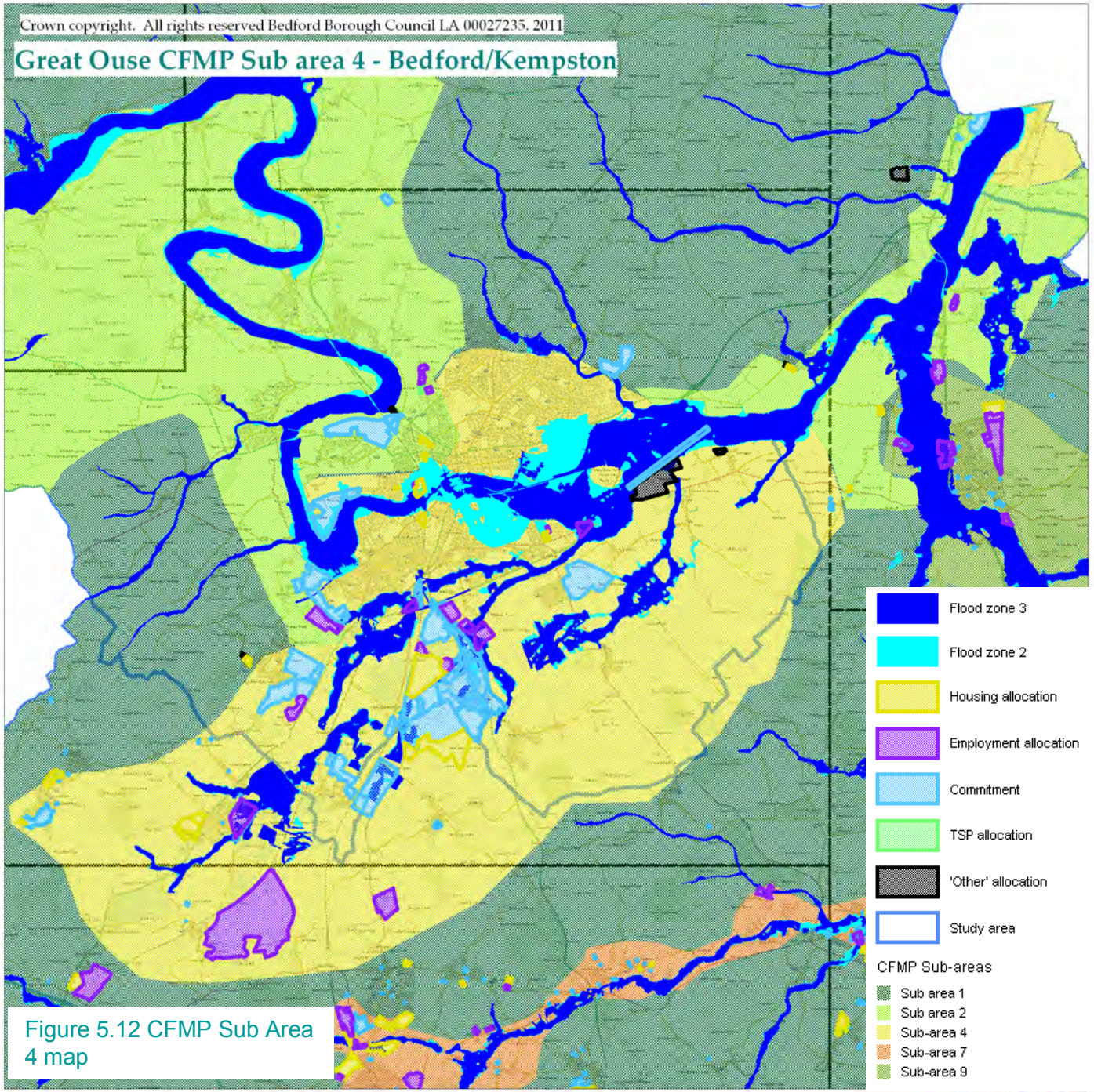

Figure 5.12 CFMP Sub Area 4 map

Great Ouse CFMP

CFMP Sub Area 7: Towcester, Shefford/the Flit Corridor, Alconbury/Alconbury Weston, Huntingdon/Brampton and Hitchin – this CFMP sub-area covers Shefford and the Flit Corridor in the WCS study area.

Specific policies related to spatial planning include:

- As the risks are currently managed appropriately, and flooding is not expected to increase significantly, the current level of flood risk will be maintained.
- Specific action to Shefford/Flit corridor - Consider developing a Surface Water Management Plan.

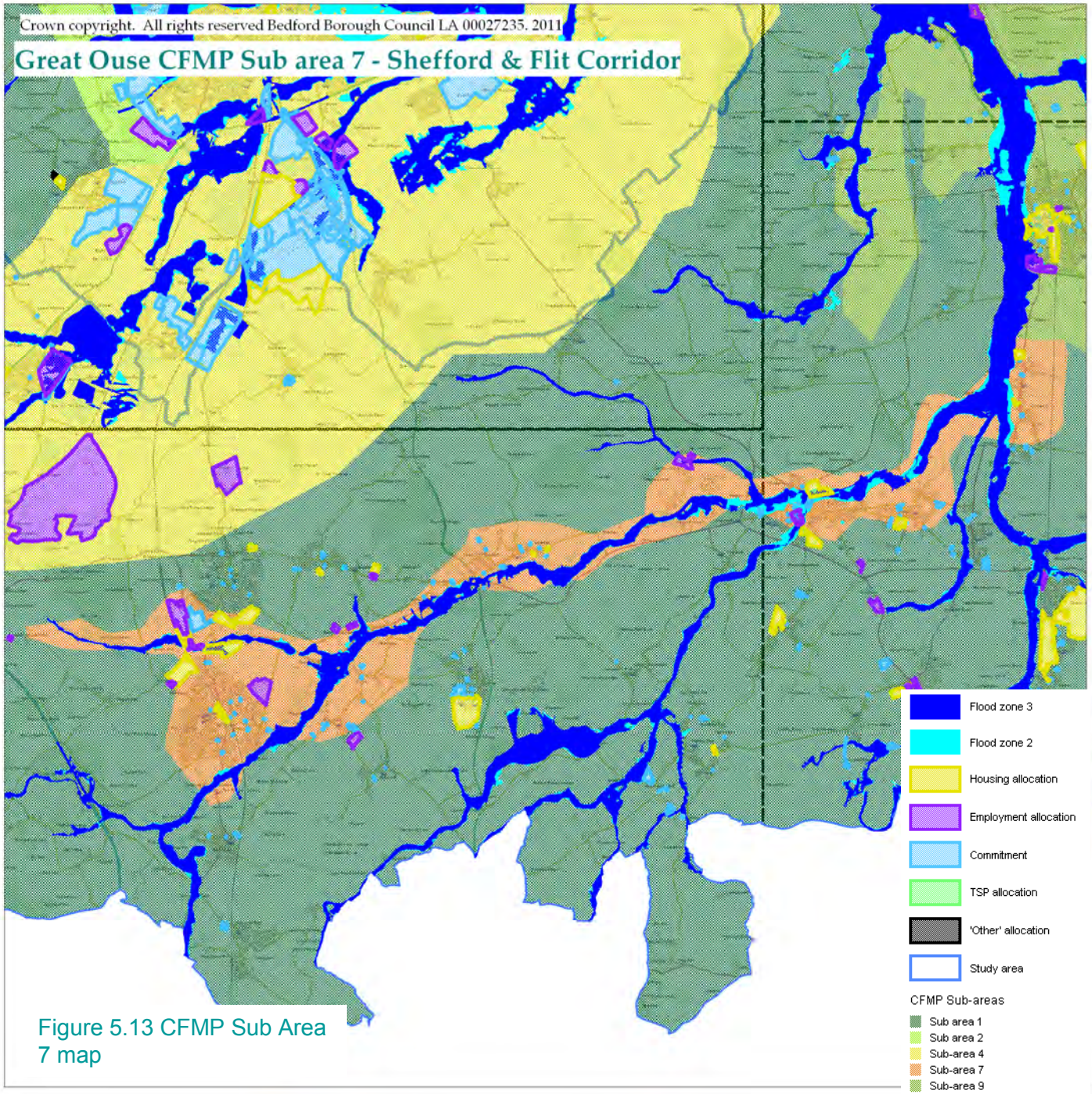

Figure 5.13 CFMP Sub Area 7 map

Great Ouse CFMP

CFMP Sub Area 9: Bury St Edmunds and Biggleswade/Sandy/Blunham: this sub-area is considered to represent an area of low to moderate flood risk, where the existing risk is generally being managed effectively. Specific policies related to spatial planning include:

- Continue with current levels of flood risk management measures on all ordinary watercourses.
- Consider developing a Surface Water Management Plan.

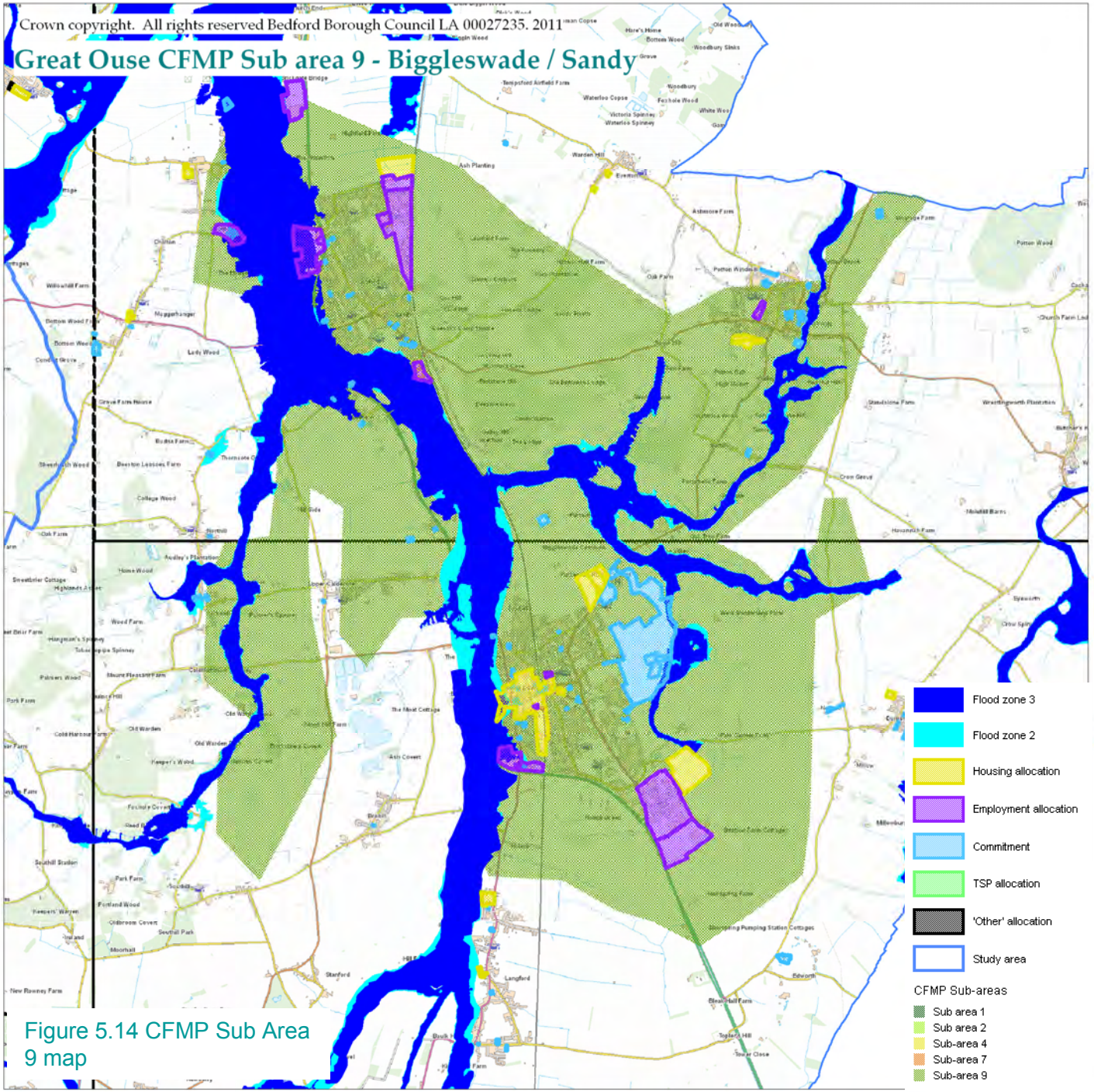

Figure 5.14 CFMP Sub Area 9 map

Local Flood risk management process

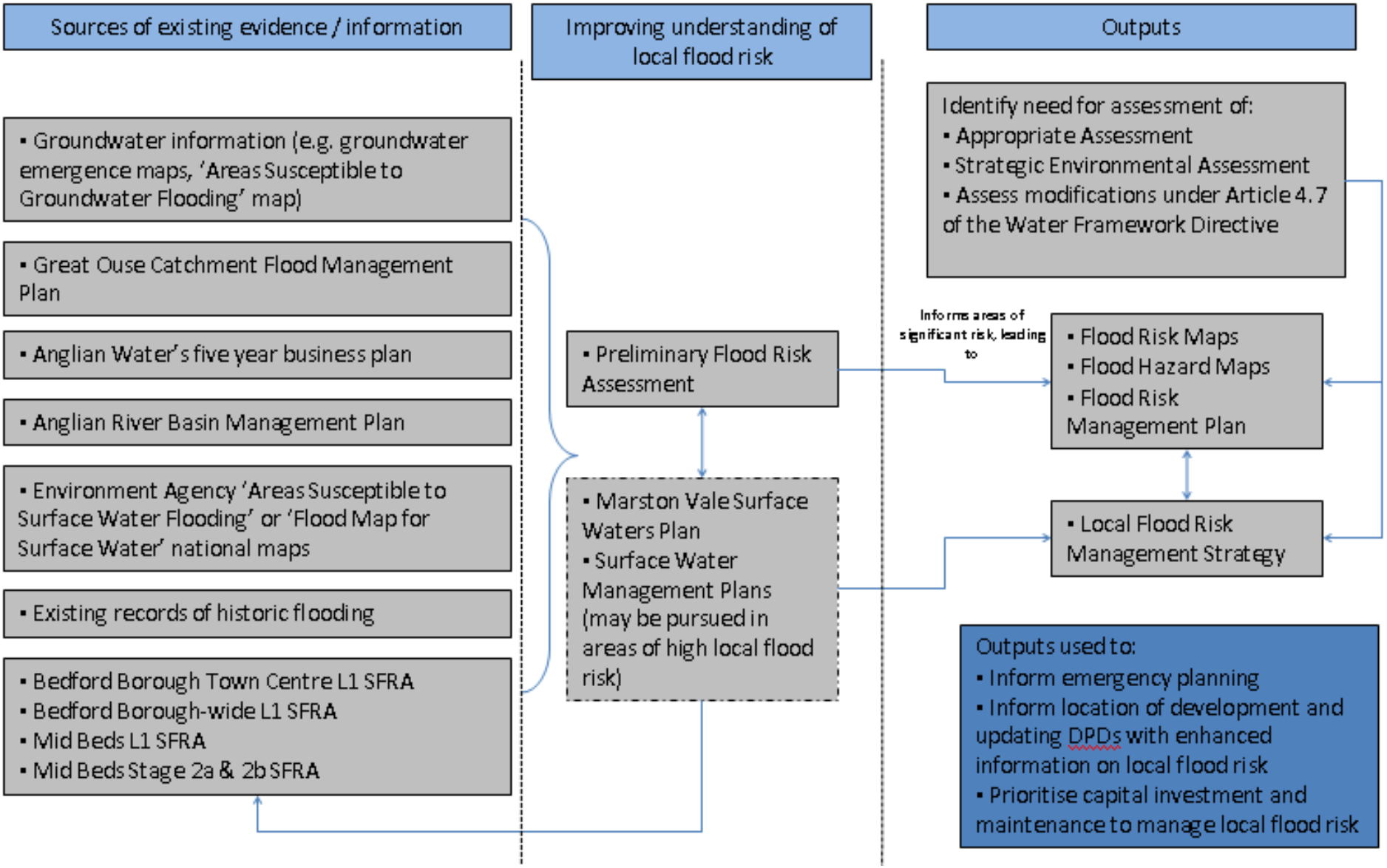

Figure 5.15 Local flood Risk Management Process

Surface water management policies for new developments

One of the original objectives of this detailed water cycle study was to develop site specific policies for the sites being allocated in both authorities site allocations DPDs.

The phase 1 study identified strategic principles and provided strategic guidance on the type of drainage systems that are appropriate for different geology and waterbody types across the study area. To progress this strategic guidance into more detailed guidance for strategic sites requires a detailed understanding of surface water flood risk in the study area.

Prior to the implementation of the FWMA and the FRR, there was no statutory requirement to assess local surface water flood risk, and the water cycle study was expected to undertake this assessment and to base our recommendations on this assessment. Since the implementation of the FWMA and FRR, the responsibility for undertaking this assessment has been adopted by lead local flood authorities, and this is currently underway in the preparation of the PFRA and further deliverables to meet the requirements of the FRR.

The Environment Agency, in their consultation response to the scope of this WCS, identified that it was no longer appropriate for the water cycle study to undertake this assessment. Therefore, it has not been possible to provide more detailed guidance for allocated sites. The FWMA requires SAB approval of drainage systems for new and redeveloped sites to be obtained before construction can commence. It also requires that the proposed drainage system meets the new National Standards for design, construction, operation and maintenance of SuDS.

The National Standards have not yet been published; however the SABs has been inaugurated in name but not in function. In the absence of these standards we recommend that developers be required to develop drainage strategies as part of their Flood Risk Assessments that meet the requirements of the SUDS Manual. This is consistent with the conclusions of the outline WCS, and further detail can be found here:

Bedford Borough and Mid Beds District Outline Water Cycle Strategy

We have undertaken a specific feasibility assessment of using a proposed waterway in Marston Vale for surface water management from new developments, and the results can be found in Appendix B.

The Environment Agency, Defra and LG group have developed an elearning portal which provides further advice to stakeholders on the new roles and responsibilities following the implementation of the FWMA, which provides clear guidance to the SUDS approval Body (LLFA), the planner, and the urban designer amongst others. It also provides a summary of the proposed future National Standards required for surface drainage systems.

The portal is available at http://learning.environment-agency.gov.uk/courses/FCRM/capacity/SuDS/topic_78.html

Chapter six - Conclusions

Wastewater and water quality

The implementation of the Water Framework Directive, and the application the WFD standards may require significantly tighter wastewater treatment works consent or permit conditions in a number of locations. These have been identified in Chapter 3. We have estimated if and when proposed new development in each WwTW catchment would require a new permit and provided indicative permit standards. There are some locations where the indicative consent is tighter than can be achieved with conventional wastewater treatment technology, and in these there is a risk that development may lead to a failure of WFD standards. This risk of failure can be reduced through planning and development control by:

- ensuring that sustainable drainage systems contain treatment components designed to ensure that they function effectively to treat surface water drainage. If development is to be allocated, despite concerns about deterioration and ability to achieve good status, it is essential that all the water quality of runoff from developments to watercourses should be controlled using well designed sustainable drainage systems that have considered water quality treatment. In addition, the biodiversity benefits of providing additional green blue space for the management of surface water ensuring addition space, combined with green infrastructure master planning of SUEs could enhance the ecological status of water bodies and partially offset the impact of additional treated effluent;

- ensuring developments are designed to high standards of water efficiency, and demand management is promoted through these developments. This will reduce the volume of foul discharge created from new developments and partially mitigate the additional volume being discharged from the WwTW; and

- ensuring that no surface drainage is permitted to discharge into foul or combined systems. If new development requires upgrade of existing drainage systems, the opportunity should be taken to review the operation of any intermittent discharges or storm tanks on the relevant section of drainage network, and seek to reduce the operation of storm discharges.

Additionally, where a waterbody is not in good hydromorphological status, development could be used as an opportunity for river restoration and habitat improvements, and the opportunities for this should be further examined.

Where additional wastewater treatment infrastructure is required we have identified the lead in time for the funding and provision of that infrastructure. The study has also identified where additional wastewater network infrastructure is required, and the likely time to fund and deliver this infrastructure. This information should be used by planners and development control officers to ensure that housing is not permitted in advance of wastewater treatment and wastewater network infrastructure capacity.

Water resources

The Final WRMP09 produced by AWS provides a plan for addressing future supply-demand balances in the Anglian region. A significant proportion of the region is served by the Ruthamford WRZ. Although UU predict over 240,000 new houses will be built in the WRZ between 2006 and 2035, the WRMP identifies that there is enough security in existing supplies and through existing demand management measures to enable resources to suffice until 2019/20, only after then will further actions be required. AWS have identified that this deficit from 2021 onwards can mostly (75%) be provided by increasing supply sources.

The proportion of new houses to be built in Bedford Borough and Central Bedfordshire north area over the timeframe of the WRMP represents a small proportion of the total number of new houses anticipated within the WRZ. This coupled with a positive supply-demand balance until 2019/20 means it is therefore not necessary to recommend stringent water efficiency measures for new houses at the present time. It is however recommended that policy makers remain mindful that in the short to medium term there are many uncertainties surrounding factors which may impact upon water supply such as the Water Framework Directive and changes in Building Regulations which may require policy to be updated.

It should also be noted that the number of new dwellings within the WCS area over the planning period will be a small proportion of the total housing stock and thus a small proportion of overall demand. However due to the long term uncertainties over climate change within the Anglian region beyond the planning period it would be unwise to miss opportunities that are available now for introducing more stringent water efficiency standards which may prove to be of great cost-benefit in the future. (…cont.)

The study has also identified where additional water supply infrastructure is required, and the likely time to fund and deliver this infrastructure. This information should be used by planners and development control officers to ensure that housing is not permitted in advance of water supply infrastructure capacity.

Our advice regarding activities to improve water efficiency can be found in the demand management action plan in Appendix C

Flood Risk and Surface Water Management conclusions

Since the publication of the outline WCS in 2009 there has been significant legislative changes with respect to local flood risk management. It is recognised that on a national scale understanding of local flood risk is still less well advanced than for other sources of flooding (e.g. Main Rivers). Understanding of local flood risk is however, rapidly advancing through the production of national surface water flood maps (e.g. Environment Agency's 'Flood Map for Surface Water'). In addition the Marston Vale Surface Waters Plan provides a detailed assessment of surface water flood risk within the Marston Vale area. It is anticipated that the existing plan will be updated following the completion of the PFRAs.

The PFRA which is currently being completed for Bedford Borough and Central Bedfordshire will provide an enhanced understanding of known historical local flooding and potential future local flooding. This can be used to inform locations where local flood risks are greatest and hence may require more detailed assessments through Surface Water Management Plans, for example. The authorities and developers should be cognisant of the findings of the PFRA as it will identify areas more vulnerable to local flooding, which may influence the location, layout and design of new and re-developments.

The implementation of the Flood and Water Management Act remains uncertain, but elements of the Act will directly impact or provide useful information to inform spatial planning and developer-led Flood Risk Assessments. These will need to be considered as the Local Flood Risk Management Strategy is developed by Bedford Borough and Central Bedfordshire.

Glossary

Annual Exceedance Probability – Used in this report to refer to flood risk and flood defence standard of protection. A standard of protection to the 1 in 100 year event means that the location has a 1% chance (1 in 100) of flooding in any year, this is the 1% Annual Exceedance Probability (AEP). This does not mean that if the location floods in one year, it will definitely not flood again for the next 99 years, or that if it has not flooded for the previous 99 years, that it will definitely flood this year.

Annual Monitoring Report (AMR) - Assesses the implementation of the Local Development Scheme and the extent to which policies in Local Development Documents are being successfully implemented.

Appropriate Assessment – Required by the Habitats Directive (92/43/EEC) for all plans or projects which, either alone or in combination with other plans or projects, would be likely to have a significant effect on a European classified conservation site, and are not directly connected with the management of the site for nature conservation. Its purpose is to assess the implications of a proposal in respect to the site's conservation objectives. The assessment process is not specified by the regulations but is usually an iterative process at a level dependent on the location, size and significance of the proposed plan or project. English Nature can advise on whether a plan or project is likely to have a significant effect and thus require assessment.

Area Action Plans – Development Plan Documents that provide a planning framework for areas of change and areas of conservation.

Areas of Outstanding Natural Beauty (AONB) - Were brought into being by the same legislation as National Parks - the National Parks and Access to the Countryside Act of 1949. They are fine landscapes, of great variety in character and extent. The criteria for designation is their outstanding natural beauty. Many AONBs also fulfil a recreational role but, unlike national parks, this is not a designation criteria. The Countryside Agency and the Countryside Council for Wales are responsible for designating AONBs and advising Government on policies for their protection.

Asset Management Plan (AMP) - a plan for managing an water companies' infrastructure and other assets in order to deliver an agreed standard of service. The Asset Management Plans are submitted to Ofwat every 5 years and forms the basis by which water rates are set. These plans identify the timescales and levels of investment required to maintain and upgrade the serviceability of the assets.

Biodiversity Action Plans (BAPs) – The UK initiative, in response to the Rio Summit in 1992, to conserve and enhance biodiversity. The plan combines new and existing conservation initiatives with the emphasis on a partnership approach and seeks to promote public awareness.

BREEAM - The Building Research Establishment Environmental Assessment Method. A method for assessing the environmental sustainability of a new building. The BREEAM has been superseded by the Code for Sustainable homes for residential developments, but is still in common usage for non-residential developments.

Catchment Abstraction Management Strategy (CAMS) – a strategy to assess how much water can be abstracted to meet its many economic uses – agriculture, industry, and drinking water supply – while leaving sufficient water in the environment to meet ecological needs.

Catchment Flood Management Plan (CFMP) – A strategic planning tool through which the Environment Agency seeks to work with other key decision-makers within a river catchment, to identify and agree policies for sustainable flood risk management.

Code for Sustainable Homes – the Code for Sustainable Homes - a new national standard for sustainable design and construction of new homes—was launched in December 2006. The code measures the sustainability of a new home against a range of sustainability criteria. The code sets minimum standards for energy and water use in new properties, and give homebuyers more information about the environmental impact of their new home.

Combined Sewer Overflow (CSO) - Combined sewer overflow is the discharge of untreated wastewater from a sewer system that carries both sewage and storm water (a combined sewerage system) during a rainfall event. The increased flow caused by the storm water runoff exceeds the sewerage system's capacity and the sewage is forced to overflow into streams and rivers through CSO outfalls.

Communities and Local Government (CLG) - Communities and Local Government is the government department responsible for policy on local government, housing, urban regeneration, planning and fire and rescue. They have responsibility for all race equality and community cohesion related issues in England and for building regulations, fire safety and some housing issues in England and Wales. The rest of their work applies only to England. (http://www.communities.gov.uk/corporate/about/)

Core Strategy - The Development Plan Document which sets the long-term spatial planning vision and objectives for the area. It contains a set of strategic policies that are required to deliver the vision including the broad approach to development.

Critical Drainage Areas - The Town and Country Planning (General Development Procedure) (Amendment) (No. 2) (England) Order 2006 introduces the concept of Critical Drainage areas as "an area within Flood Zone 1 which has critical drainage problems and which has been notified… [to]…the local planning authority by the Environment Agency".

Development Plan - As set out in Section 38(6) of the Planning and Compulsory Purchase Act (2004), an authority's development plan consists of the relevant Regional Spatial Strategy (or the Spatial Development Strategy in London) and the Development Plan Documents contained within its Local Development Framework.

Development Plan Documents (DPDs) - Spatial planning documents within the Council's Local Development Framework which set out policies for development and the use of land. Together with the Regional Spatial Strategy they form the development plan for the area. They are subject to independent examination. They are required to include a core strategy and a site allocations document, and may include area action plans if required; other DPDs may also be included, e.g. development control policies.

Dry Weather Flow (DWF) – The flow received or discharged by a wastewater treatment works in dry weather. Dry weather flow is regulated variable that is consented by the Environment Agency in a wastewater treatments works' consent to discharge under the Water Resource Act 1911.

DEFRA - Department of Environment, Food and Rural Affairs Development.

Environment Agency - The leading public body for protecting and improving the environment in England and Wales. Flood management and defence are a statutory responsibility of the Environment Agency; it is consulted by local planning authorities on applications for development in flood risk areas, and also provides advice and support to those proposing developments and undertaking Flood Risk Assessments. The Environment Agency reports to DEFRA.

Environment Agency Flood Zones - Nationally consistent delineation of 'high' and 'medium' flood risk, published on a quarterly basis by the Environment Agency.

Flood Estimation Handbook - The latest hydrological approach for the estimate of flood flows in the UK.

Flood Risk Assessment – A site specific investigation usually carried out by the site developers to be submitted as part of their planning applications. It assesses both current flood risk to the site and the impact of development of the site to flood risk in the area.

Freshwater Fish Directive - The EC Directive on Freshwater Fish is designed to protect and improve the quality of rivers and lakes to encourage healthy fish populations. In 2013, this directive will be repealed. Waters currently designated as Fish Directive waters will become protected areas under the Water Framework Directive.

Future Water - The Government's new water strategy for England, Future Water was published 7 February 2008. This strategy sets out the Government's long-term vision for water and the framework for water management in England. (http://www.defra.gov.uk/Environment/water/strategy/index.htm)

Green infrastructure – green infrastructure is the physical environment within and between our cities, towns and villages. It is a network of multi-functional open spaces, including formal parks, gardens, woodlands, green corridors, waterways, street trees, and open countryside.

Good Ecological Status (GES) – The Water Framework Directive (more formally the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies (including marine waters up to kilometer from shore) by 2015. It is a framework in the sense that it prescribes steps to reach the common goal rather than adopting the more traditional limit value approach. Good ecological status is defined by each member state, and is set at a level lower than a theoretical reference point of pristine conditions, i.e. in the absence of anthropogenic influence.

Habitats Regulation Assessment - An assessment of the potential effects of planning policies on European nature conservation sites, which lie within and outside the Borough

Infrastructure – The basic physical systems of a community's population, including roads, utilities, water, sewage, etc. These systems are considered essential for enabling productivity in the economy. Developing infrastructure often requires large initial investment, but the economies of scale tend to be significant. Water services infrastructure refers to infrastructure that provides clean water, urban drainage and wastewater services.

Inset appointment - An inset appointment is made when an existing water and/or sewerage undertaker is replaced by another as the supplier of water and/or sewerage services for one or more customers within a specified geographical area.

Local Authority or Local Planning Authority (LA or LPA) – the local authority or council that is empowered by law to exercise planning functions. Often the local borough or district council. National parks and the Broads authority are also considered to be local planning authorities. County councils are the authority for waste and minerals matters.

Local Development Documents (LDDs) – the collective term for Development Plan Documents and Supplementary Planning Documents.

Local Development Framework (LDF) - The name for the portfolio of Local Development Documents. It consists of the Local Development Scheme, a Statement of Community Involvement, Development Plan Documents, Supplementary Planning Documents, and the Annual Monitoring Report.

Local Development Scheme (LDS) - Sets out the programme for preparing Local Development Documents. All authorities must submit a Scheme to the Secretary of State for approval within six months of commencement of the 2004 Act (thus all authorities should now have submitted an LDS). LDSs are subject to review.

'Making Space for Water' (DEFRA 2004) - The Government's new evolving strategy to manage the risks from flooding and coastal erosion by employing an integrated portfolio of approaches, so as to: a) reduce the threat to people and their property; b) deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles, and c) secure efficient and reliable funding mechanisms that deliver the levels of investment required.

Mean Trophic Rank (MTR) - The Mean Trophic Rank has been developed for England and Wales to implement the EC Urban Waste Water Directive: it is used to assess the impact of point sources on the river. It is based on the combination of species at a site and, for each species, its indicator value and its abundance.

Minimum Residual Flow (MRF) - The flow set at a river gauging station to protect downstream uses. When flow falls below this level controlled abstractions are required to cease.

National Environment Programme (NEP) - A key component of a periodic review is the National Environment Programme (NEP). The NEP is a list of environmental improvement schemes that ensure that water companies meet European and national targets related to water.

Ofwat – The Water Services Regulation Authority (Ofwat) is the body responsible for economic regulation of the privatised water and sewerage industry in England and Wales. Ofwat is primarily responsible for setting limits on the prices charged for water and sewerage services, taking into account proposed capital investment schemes (such as building new wastewater treatment works) and expected operational efficiency gains.

Per capita consumption (PCC) – The typical or average amount of a substance used by one person per day. Used in this study with reference to domestic water consumption.

Periodic Review (PR) – Every five years Ofwat sets the price limits that water companies can charge their customers for the supply of water and the treatment of waste water for the following five years. This Periodic Review determines how much water companies can spend on maintaining their services as well as improving them. The next periodic review is in 2014 and called PR14..

Planning Policy Statements (PPS) - The Government has updated its planning advice contained within Planning Policy Guidance Notes (PPGs) with the publication of new style Planning Policy Statements (PPSs), which set out its policy for a range of topics.

Pollutants – A substance or condition that contaminates air, water, or soil. Pollutants can be artificial substances, such as pesticides and PCBs, or naturally occurring substances, such as oil or carbon dioxide, that occur in harmful concentrations in a given environment

Previously Developed (Brownfield) Land - Land which is or was occupied by a building (excluding those used for agriculture and forestry). It also includes land within the curtilage of the building, for example a house and its garden would be considered to be previously developed land. Land used for mineral working and not subject to restoration proposals can also be regarded as Brownfield land.

QMED – The median annual maximum flood flow.

Regional Spatial Strategy (RSS) - Sets out the region's policies in relation to the development and use of land and forms part of the development plan for local planning authorities.

River Basin Management Plan (RBMP) – A strategic tool introduced by the Water Framework Directive (2000/60/EC) which integrates the management of land and water within a river basin (river catchment or group of catchments). The river basin may cover several political areas.

River Quality Objective (RQO) – agreed by Government as targets for all rivers in England and Wales when the water industry was privatised in 1989. The targets specify the water quality needed in rivers if we are to be able to rely on them for water supplies, recreation and conservation.

Sensitive Areas (Eutrophic) (SAe) – Surface waters must be designated as Sensitive Areas under the Urban Waste water Treatment Directive (UWWTD) if they are eutrophic or if they may become eutrophic in the future if protective action is not taken (Annex II A(a)). Discharges to Sensitive Areas Eutrophic require more stringent treatment for nitrogen and/or phosphorus.

Sites of Importance for Nature Conservation (SINCs) - is a designation used in many parts of the United Kingdom to protect areas of importance for wildlife at a county.

Site of Special Scientific Interest (SSSI) – a site identified under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) as an area of special interest by reason of any of its flora, fauna, geological or physiographical features (basically, plants, animals, and natural features relating to the Earth's structure).

Source Protection Zones (SPZs) – The Environment Agency has defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied to a groundwater source. (http://www.environment-agency.gov.uk/maps/info/groundwater/?version=1&lang=_e)

Special Protection Area (SPA) - A Special Protection Area or SPA is a designation under the European Union Directive on the Conservation of Wild Birds. Under the Directive, Member States of the European Union (EU) have a duty to safeguard the habitats of migratory birds and certain particularly threatened birds. Together with Special Areas of Conservation (SACs), the SPAs form a network of protected sites across the EU, called Natura 2000.

Statement of Community Involvement (SCI) - Sets out the standards which authorities will achieve with regard to involving local communities in the preparation of local development documents and development control decisions. It is subject to independent examination.

Strategic Direction Statement – 25 year strategic plan prepared by a water company and regulated by Ofwat. The companies' strategic direction statements were first developed as part of the 2009 price review process to provide a 25 year context for the companies' five-year business plans.

Strategic Environmental Assessment (SEA) - A generic term used to describe environmental assessment as applied to policies, plans and programmes. The European 'SEA Directive' (2001/42/EC) requires a formal 'environmental assessment of certain plans and programmes, including those in the field of planning and land use'.

Strategic Flood Risk Assessment (SFRA) – a Level 1 SFRA is a district-wide assessment of flood risk, usually carried out by a local authority to inform the preparation of its Local Development Documents (LDDs) and to provide the information necessary for applying the Sequential Test in planning development. A Level 2 SFRA is a more detailed assessment produced where the Exception Test is required for a potential development site, or to assist in evaluating windfall planning applications.

Strategic Housing Land Availability Assessment (SHLAA) - A SHLAA is an assessment of the potential of a borough to accommodate housing development over a period of 15 years from the date of adoption of the LDF Core Strategy. The SHLAA forms part of the evidence base for the emerging Local Development Framework (LDF), and inform the identification of potential new housing sites to be allocated in the LDF.

Super Output Areas (SOA) – a new national geography created by the Office for National Statistics (ONS) for collecting, aggregating and reporting statistics.

Supplementary Planning Documents (SPDs) - Provide supplementary information in respect of the policies in Development Plan Documents. They do not form part of the Development Plan and are not subject to independent statutory examination, but are normally subject to public consultation.

Surface water management plans (SWMP) - Recent government policy development has promoted the production of surface water management plans (SWMPs). SWMPs will look at existing problems and inform planning decisions for new development. In the case of existing problems, SWMPs are particularly appropriate in situations where the causes of flooding are unclear or complex. In the case of new developments, SWMPs are a useful tool in areas of high growth where they can support a 'masterplan' approach to development to secure optimal outcomes

Sustainability Appraisal (SA) - Tool for appraising policies to ensure they reflect sustainable development objectives (i.e. social, environmental and economic factors) and required in the 2004 Act to be undertaken for all local development documents. It incorporates Strategic Environmental Assessment.

Sustainable Development – "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development, 1987).

Sustainable Drainage Systems (SUDS) – Surface water drainage systems which manage runoff in a more sustainable way than conventional drainage, through improved methods of managing flow rates, protecting or enhancing water quality and encouraging groundwater recharge. A variety of types are available and can be chosen as appropriate for the location and needs of the development, and many have added benefits such as enhancement of the environmental setting, provision of habitat for wildlife and amenity value for the community.

The Sequential Test - Informed by a Strategic Flood Risk Assessment, a planning authority applies the Sequential Test to demonstrate that there are no reasonably available sites in areas with less risk of flooding that would be appropriate to the type of development or land use proposed.

UK Climate Impacts Programme (UKCIP) -UKCIP02 is a government funded programme which helps organisations to adapt to inevitable climate change. UKCIP publishes climate change scenarios on behalf of the Government.

Wastewater Treatment Works (WwTW) - Sewage treatment, or domestic wastewater treatment, is the process of removing contaminants from wastewater and household sewage, both runoff (effluents) and domestic. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce an environmentally-safe fluid waste stream (or treated effluent) and a solid waste (or treated sludge) suitable for disposal or reuse (usually as farm fertilizer).

Water Framework Directive (WFD) – a European Union directive which commits member states to making all water bodies (surface, estuarine and groundwater) of good qualitative and quantitative status by 2015.

Water neutrality - If a development is to be 'water neutral' then the total demand for water should be the same after the new development is built, as it was before. That is, the new demand for water should be offset in the existing community by making existing homes and buildings in the area more water efficient. (http://www.environment-agency.gov.uk/research/library/publications/40737.aspx)

Water resource zone – a geographical area defined by the water supply/demand balance in the region such that all customers within it receive the same level of service in terms of reliability of water supply.

Water Resource Management Plans (WRMP) - Water companies in England and Wales have a statutory duty to prepare, consult, publish and maintain a water resources management plan under new sections of the Water Industry Act 1991, brought in by the Water Act of 2003. Water resource management plans show how the water companies intend to supply your water over the next 25 years. In doing so, they need to take into account population changes, climate change and protecting the environment from unnecessary damage caused by taking too much water for use.

Water Resources Management Units (WRMU) – hydrological unit used to manage and assess the environmental implications of abstraction in the Environment Agency's Catchment Abstraction Management Strategies

Water resource zone – a geographical area defined by the water supply/demand balance in the region such that all customers within it receive the same level of service in terms of reliability of water supply.

Water stress - Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of freshwater resources in terms of quantity (e.g. aquifer overexploitation or dry rivers) and quality (eutrophication, organic matter pollution, and saline intrusion).

Water Treatment Works (WTW) - Water treatment describes those processes used to make water more acceptable for a desired end-use. In this report WTW is used to describe water company owned assets that provide drinking water for everyday use through the water companies water supply network.