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Huntingdonshire Outline Water Cycle Strategy

Prepared for

Huntingdonshire District Council

April 2009

Huntingdonshire DISTRICT COUNCIL

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Huntingdonshire Outline Water Cycle Strategy

Huntingdonshire District Council

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Executive Summary

1 Executive Summary

1.1 Purpose

1.1.1.1 This Huntingdonshire Outline Water Cycle Strategy (WCS) was initially commissioned by Huntingdonshire District Council (HDC) in 2008 to inform and provide supporting evidence in relation to the suitability of the Local Development Framework documents that HDC has subsequently submitted to the Secretary of State for anticipated growth in Huntingdonshire to 2026, in so far as the water cycle and associated impacts on the environment are concerned. With the passage of time the stakeholder's views on a number of issues raised in the main body of this report have changed. Rather than fully update the whole report, it was agreed that this executive summary would be amended to reflect the Stakeholder's views on the actions required going forward as of March 2010, including where there is a need for a more detailed Water Cycle Strategy to confirm the investment in infrastructure and environmental improvements required to support the long-term stewardship of the water environment in conjunction with sustainable development.

1.1.1.2 The study objective can be summarised as 'to develop a strategy that all partner organisations can sign up to for delivering improved water infrastructure in conjunction with housing and employment growth to ensure that it is sustainable and the planned development of Huntingdonshire does not have a detrimental impact on the water environment'.

1.1.1.3 The initial study outputs were important in informing the Core Strategy and site allocation plans and set out how infrastructure and environmental improvements can be integrated into the proposed development.

1.2 Scope

1.2.1.1 The study commenced with a review of the catchments within Huntingdonshire and the issues reported by key stakeholders to confirm the scope of the study for the outline water cycle strategy.

1.2.1.2 The vast majority of Huntingdonshire falls within the Great Ouse catchment, with Yaxley, Farcet, and the 'north west finger' to Chesterton and Stibbington falling into the Nene catchment.

1.2.1.3 A number of WCSs have been undertaken, but these have focused mainly on Bedfordshire, Cambridge, Peterborough and parts of the fens, so there is a need to undertake a WCS focused on Huntingdonshire. WCSs for East Cambs, Kings Lynn and the Great Ouse fens to the north of Huntingdonshire had not been undertaken at the time this study commenced. For the purposes of this WCS a buffer zone of 5km was applied to the boundary of Huntingdonshire District.

1.2.1.4 Proposed development within the Nene catchment is modest and would have to fit in with WCSs already undertaken. Accordingly, no further WCS was proposed for the Nene catchment area, though a review of the implications of the existing WCSs on opportunities for both development and environmental improvement has been undertaken and incorporated into the Outline Strategy for Huntingdonshire.

1.3 Stakeholders

1.3.1.1 A number of stakeholders have been actively engaged in the preparation of this Outline Water Cycle Strategy for Huntingdonshire and a Steering Group comprising HDC, Anglian Water, the Environment Agency, Cambridge County Council and a representative from Faber Maunsell AECOM is meeting monthly. The purpose of the Steering Group is to ensure all key stakeholders are engaged, contribute data, air their views and buy in to the proposals contained in the final Huntingdonshire Outline Water Cycle Strategy Report.

1.3.1.2 Anglian Water is generally responsible for the operation and maintenance of water supply and waste water treatment/disposal to acceptable standards within Huntingdonshire, though Cambridge Water is responsible for water supply in certain areas where smaller scale

development is planned, e.g. St Ives and Ramsey. The Environment Agency has responsibility for ensuring abstraction is controlled, flood risk managed and water quality improved, so that healthy and diverse ecosystems, water sports and recreation can be sustained.

1.4 Flood risk

1.4.1.1 The first stage of the water cycle strategy is to consider the appropriateness of proposed land use in relation to flood risk and impact on the water environment. HDC has commissioned an updated Strategic Flood Risk Assessment (SFRA) to take into consideration the proposed growth within Huntingdonshire and the effects of climate change. As this updated SFRA is not due until spring 2010, this study has considered land use based on the previous SFRA and the advice that any changes to the currently identified flood plain are minor and not significant to the areas where growth is anticipated by HDC.

1.4.1.2 The Flood and Water Management Bill will be the main vehicle for taking forward any changes in legislation needed to improve arrangements for surface water drainage. The Bill proposes that lead accountability for ensuring satisfactory arrangements are in place to manage local flood risk will lie as a legal duty with County and Unitary Authorities.

1.4.1.3 The East of England suffers from the highest number of thunderstorms and these are predicted to increase in frequency and intensity due to climate change. This will increase the risk of flash flooding. Sustainable urban drainage systems (SUDS) will need to be considered at a more strategic level to ensure that localised overland flows do not cause damage to property or risk to lives.

1.4.1.4 The St Ives and Hemingford Flood Alleviation Scheme was developed and constructed in response to flood events in 1998, 2000 and 2003. The scheme included improvement of existing flood defences and construction of new defences, to provide a 100 year protection standard to 1823 existing residential properties.

1.4.1.5 A flood alleviation scheme to protect 115 existing properties in St Neots commenced in February 2009. The scheme includes raising the embankment alongside the river and raising a section of Cross Hall Road.

1.5 Water resource

1.5.1.1 The ability to supply water to Huntingdonshire was the second consideration, particularly as the East of England is one of the driest parts of the country and Anglian Water has identified Huntingdonshire as being in water deficit.

1.5.1.2 Anglian Water's Strategic Direction Statement 2010 – 2035 recognises:

- the need to increase the resilience and reliability of both the water and waste water services;
- secure and conserve water resources;
- anticipate and invest for growth in the region;
- improve the environment in the region;
- mitigate and adapt to climate change impacts;
- improve AW's efficiency and flexibility; and
- keep bills at current affordability.

1.5.1.3 In its draft Water Resources Management Plan (2008), AW sets out its Company priorities and planning strategy for the 25 year period 2010-2035. In this document, after consideration of metering, leakage reduction, sustainable drainage and water efficiency measures, AW identifies the need to secure 200 megalitres per day (Ml/d) of additional water supply to the region by 2025 and 300 Ml/d of additional water supply to the region by 2035. This compares with the current maximum resources available of 1,800 Ml/d.

1.5.1.4 The current extension to Wing Water Treatment Works will address only the short term need, with the regional water supply deficit predicted to increase from 2011. The long term strategy as it affects Huntingdonshire is for proposals for groundwater development to be implemented. Should there be requirement for development of further water resources the possibilities of aquifer recharge and water transfer from outside the district may need to be considered.

1.5.1.5 As the need for increase in water supply has already been established, AW is currently developing proposals that will address Huntingdonshire's needs within those of the wider region, which will then be taken forward for approval of funding. Given the importance of the

region to the national growth strategy, AW are confident this issue will not be a barrier to the long term growth within the region.

1.5.1.6 The document includes details of the development areas and numbers. However, the requirements to service these sites with water will be considered under the Detailed Water Cycle Strategy once the preferred development areas have been identified.

1.6 Environmental issues and opportunities for improvement

1.6.1.1 The ability of the receiving water courses to accept the discharges from agriculture, industry and waste water treatment facilities was the next consideration, particularly as there are a number of Sites of Specific Scientific Interest (SSSI) and Special Areas of Conservation (SAC) within Huntingdonshire. Implementation of the Habitats Directive and the Water Framework Directive also impact upon the strategy. The outline water cycle strategy also informs the opportunities for improvement of the water environment within HDC's Environmental Improvement Plan.

1.6.1.2 A study of the Ouse Washes entitled 'Integrated modelling of rivers and washlands to meet conservation objectives – a case study' assessed the risk posed by water supply abstractions and waste water discharges in the upstream catchment. The assessment demonstrated that the water supply abstractions are not likely to have a significant impact on conservation features. In addition, the waste water discharges were shown to have little impact on nitrogen levels, which are predominantly impacted by agricultural inputs. It was found that the waste water discharges in the Ouse catchment do cause phosphorous levels to exceed the ecohydrological prescription levels set for the ditch flora. At the time of the study the data indicated a current annual average total phosphorus (TP) level of 0.29 mg/l. This compares with a target value for TP of 0.11 mg/l to meet the RE3 river quality requirements set by the EA.

1.6.1.3 It is considered likely that the Environment Agency and other stakeholders will expect all sources of phosphorus pollution to be addressed and for measures to be implemented to reduce the quantity discharged to water courses.

1.6.1.4 Anglian Water is already addressing this issue and their improvement programme is currently focused on the larger waste water treatment facilities where the cost benefit is greatest. However, environmental issues have not been taken into full consideration during the current review and negotiation of discharge consents at four WwTWs in Huntingdonshire. These consents will be subjected to further reviews to ensure that the new discharges will not cause deterioration in water quality and will not prevent the downstream rivers / water bodies from achieving all relevant river targets.

1.6.1.5 Further reviews may also be required to ensure compliance with any change in legislation or, as in the case of St Neots, the discharge volume and other consent parameters to accommodate the full extent of proposed growth. Revisions to discharge consents will be sought by the EA during AMP5 (2010 to 2015) for Brampton WwTW, St Ives WwTW, Great Gidding WwTW, Somersham WwTW and Upwood WwTW.

1.6.1.6 Anglian Water has not identified any overriding constraint to proposed growth, but there may be infrastructure costs associated with meeting any revision to discharge consent.

1.6.1.7 The Environment Agency needs to implement an education programme that includes advising farmers of the need to change their current ground fertilisation practices.

1.6.1.8 A number of environmental improvement projects have already been set in motion, including The Great Fen Project, which aims to restore over 3,000 hectares of fenland habitat by connecting Woodwalton Fen and Holme Fen to create conservation benefits for wildlife, along with appropriate facilities for local visitors and tourists.

1.6.1.9 HDC's Environmental Strategy promotes early involvement in master planning processes to ensure satisfactory provision of both open space for recreation and green space for biodiversity enhancement, with appropriate links to suitable water bodies.

1.6.1.10 A water quality assessment for the East of England RSS is due to be available in final report status by the end of March 2010. AWS have advised that the report will indicat that the level of growth will not result in achievement of WFD being any more difficult than would be the case without growth.

1.7 Water supply

1.7.1.1 Having established that whilst there are environmental issues, there are no overriding environmental constraints to proposed growth, the study then focused on the water supply network.

1.7.1.2 Anglian Water has undertaken modelling within the region to assess the adequacy of the water supply network, including it's resilience during local repair. The need for some reinforcement of the network within the region has been identified, but this would not prevent any of the proposed growth within Huntingdonshire.

1.8 Waste water networks and treatment

1.8.1.1 The waste water networks are particularly constrained through the town centres, where the impacts of climate change and new development on ageing combined sewers will need to be carefully evaluated within a detailed water cycle strategy study.

1.8.1.2 New waste water mains are anticipated to accommodate the areas identified for major growth and to reduce overflows from combined sewers.

1.8.1.3 AW is reviewing the impact of climate change on their facilities and will be determining any actions necessary to secure the long-term sustainable performance of their assets.

1.8.1.4 It is currently anticipated that the detailed water cycle strategy will need to assess the resilience of AWS facilities to flooding, particularly WwTW, based on AWS potential layouts for any future extension works, compared to flood zone mapping, with potential mitigation measures identified.

1.8.1.5 The issues identified within each area, requiring further study, are as follows:

1.8.2 St Neots

1.8.2.1 AWS are currently reporting that the WwTW is at the limit of its flow capacity, though they are expecting some flow headroom to become available as a result of reduced per capita consumption of water and also reduced occupancy in existing properties served. There is thought to be a significant infiltration issue within the existing sewer network that will need to be progressively rectified in line with anticipated growth during the prior AMP period, to ensure that planned growth is not constrained. For the full extent of proposed growth at St Neots a strategic waste water main and further increase in current discharge consent is envisaged beyond the one currently negotiated, which may necessitate expansion of the WwTW facilities on the edge of functional floodplain. AWS and the EA have been working on an environmental capacity project that looks at the increased flood risk from greater WwTW flows and adopts a traffic light approach to assess the impact, with St Neots WwTW being indicated at status green. A catchment-wide approach will be required to ensure compliance with the Habitats Directive, so it is possible that the EA would seek tightening of the sanitary limits when the further consent is negotiated to accommodate the full extent of proposed growth, with associated process changes, spatial requirements and approval of cost implications.

1.8.2.2 The effects of climate change will place the current WwTW into zone 3 flood risk with the boundary to the WwTW becoming the edge of functional flood plain.

1.8.2.3 The detailed requirements should be confirmed by undertaking a detailed water cycle strategy study for St Neots. Given the extent of growth, probable changes to sanitary limits and the impact of climate change, a new WwTW might be one of the options considered within the detailed water cycle strategy study.

1.8.3 Huntingdon

1.8.3.1 The proposed full scale of development to the west of Huntingdon may require a new rising main as there are capacity constraints in the existing rising main at the railway and at the river crossing (Huntingdon WwTW is located at Godmanchester). The alternative would be to route flows to Alconbury WwTW, but this WwTW has modest capacity and there are environmental constraints in the receiving watercourse.

1.8.3.2 When reduced occupancy and water efficiency measures are taken into consideration, AWS is not expecting a revised DWF consent to be required for Huntingdon WwTW until post 2031.

1.8.3.3 The detailed requirements should be confirmed by undertaking a detailed water cycle strategy study for Huntingdon.

1.8.4 St Ives

1.8.4.1 It is anticipated that when AW rerun their infrastructure model they will identify issues associated with development to the south of St Ives, as the WwTW is located to the north of the town. Most of the existing combined sewers in the St Ives town centre were replaced and enlarged in the early 1990s with the exception of Market Hill and part of West Street which remain to be improved. Problems exist in the Pig Lane catchment in St Audrey Lane and Pig Lane in times of heavy rainfall. It is understood that there is ingress of surface water to the foul sewer which may well restrict developments to the west. The growth allocated to this catchment is higher in the Core Strategy than AWS prediction,

1.8.4.2 The EA has raised environmental capacity (Water Framework Directive) and increased flood risk issues in the receiving watercourse and options for overcoming this and the anticipated network issues will need to be considered within a detailed water cycle strategy study.

1.8.5 Ramsey

1.8.5.1 The Ramsey WwTW site is constrained, so any significant development would trigger the need for a new WwTW at great expense. AWS expects some headroom to become available as a result of reduced per capita consumption of water and also reduced occupancy in the properties served. Based on AWS growth prediction for the catchment, the level of growth is expected to be able to be accommodated without a revision to flow consent until post 2031. Given the constraints, Ramsey WwTWi should be included within a detailed water cycle strategy study.

1.8.6 Sawtry

1.8.6.1 Whilst there is adequate volumetric capacity at Sawtry WwTW, it would be prudent to consider the potential for any environmental damage to the nearby Habitats site, Woodwalton Fen, and the potential implications on the Great Fen Project within a detailed water cycle strategy study.

1.8.7 Brampton

1.8.7.1 AWS is expecting a revised DWF consent to be required sometime in AMP6. Brampton WwTW is flagged as red in terms of increased flood risk due to WwTW flow. In order to accommodate the quantum of development proposed within the Core Strategy, alternative solutions for wastewater disposal should be considered within a detailed water cycle strategy study

1.8.8 Great Gidding, Somersham and Upwood

1.8.8.1 The EA has identified environmental issues at these WwTW locations that should be considered within a detailed water cycle strategy study.

1.8.8.2 AWS expects a revised DWF consent to be required for Upwood WwTW to accommodate anticipated growth before 2031. The impact of the proposed level of development on nearby Habitats site, Woodwalton Fen, and Great Fen Project need to be assessed to ensure the proposed AMP5 WFD scheme for P-removal (1 mg/l AA) affords sufficient protection.

1.8.8.3 AWS do not expect revised DWF consents to be required for Great Gidding WwTW or Somersham WwTW. None-the-less, the EA need to be assured that additional growth will not compromise the improvements predicted by AMP5 WFD P-removal schemes at both WwTWs and the AMP5 BOD scheme at Somersham WwTW.

1.8.9 Yaxley

1.8.9.1 The Yaxley area has been considered in the WCS commissioned by Opportunity Peterborough and Peterborough Council, because the Yaxley sewer system drains to Peterborough (Flag Fen) WwTW.

1.8.9.2 Improvement schemes have recently been implemented to address sewer flooding issues.

1.8.9.3 The extent to which development can be accommodated at Yaxley rather than the other areas served by Flag Fen WwTW, will be dependent upon the restrictions identified by the relevant stakeholders.

Introduction

2 Introduction

2.1 Background

2.1.1.1 The Government has announced that 3 million new homes will be built by 2020, an average of 240,000 new homes a year. Regional spatial strategies are currently determining how these 3 million new homes will be spread across the country, and at what rate they will be built. Further growth is also anticipated and the regional spatial strategies will be developed to 2031, however, it is too early to predict the outcome of these further studies. In the interim, HDC need to plan for growth up to 2026 and this document has been prepared to inform and provide supporting evidence in relation to the suitability of the Local Development Framework documents that HDC will submit to the Secretary of State.

2.1.1.2 Within the East of England Plan, May 2008 (RSS14), the Cambridge Sub-region provides a strategic approach to planning for Cambridge and its surrounding market towns. The Cambridge sub-region comprises Cambridge and the surrounding area as far as and including the market towns of Chatteris, Ely, Haverhill, Huntingdon, Newmarket, Royston, St Neots, St Ives and Saffron Walden.

2.1.1.3 The continued economic success of the Cambridge sub-region, focused on education, research and knowledge-based industry, is of significance to the wider region and nationally. The previous Regional Spatial Strategy (RPG6) and the Cambridgeshire and Peterborough Structure Plan 2003 aimed to provide for a sustainable pattern of development to accommodate necessary growth in the sub-region, with a better balance between employment and housing focused on Cambridge and the surrounding area.

2.1.1.4 The East of England Plan has defined the need for 98,300 new houses in Cambridgeshire and Peterborough by 2021, of which 73,300 will be in Cambridgeshire. More specifically, a target of 11,200 new homes for Huntingdonshire between 2001 and 2021 has been set. This target has already been substantially met with 8,500 homes already built or committed. Longer-term aspirations indicate that an additional 2,750 homes will be needed between 2021 and 2026. Furthermore, at least 13,000 of the target 75,000 new jobs for the Cambridgeshire sub-region are anticipated to be met in Huntingdonshire. The local authority boundaries are indicated in figure 2.1.

2.1.1.5 The East of England is the driest part of the country. Accordingly, a Water Cycle Strategy, carried out in light of these housing and employment projections and considering the need for water supply, waste water collection and treatment, land drainage, and flood risk, is considered an essential instrument for sustainable growth and development in Huntingdonshire.

2.1.1.6 Delivering the level of infrastructure needed to ensure such development will be sustainable, however, will not be achieved without a full appreciation of the issues relating to deliverability and finance; including the potential role of delivery mechanisms. The Huntingdonshire District Council (HDC) commissioned EDAW AECOM, supported by Faber Maunsell AECOM, to undertake an in-depth study into the various physical and social infrastructure needs arising from the Core Strategy – the Local Investment Framework (LIF). In parallel, HDC also commissioned this Outline Water Cycle Strategy, so that water cycle issues could be taken into consideration during the development of the LIF.

2.1.1.7 The purpose of the LIF and the Outline Water Cycle Strategy is to assist HDC in taking forward the Huntingdonshire Local Development Framework.

Figure 2.1: Authorities in the East of England (from East of England Plan, May 2008)

2.2 The Water Cycle

2.2.1.1 The Water Cycle is typically represented in Figure 2.2. Though under different circumstances the various elements are given more or less importance and the methods used to deal with these may vary, the Water Cycle itself is essentially immutable. Rain falls, it runs and collects, flowing downstream, it evaporates, condenses and returns to rain. During this process part of the water is abstracted and distributed for use by society, and part of this is collected and restored following treatment in waste water treatment plants. Therefore, there is a significant amount of infrastructure associated with the interaction of water and development. Houses, employment sites, hospitals, and social facilities all require the provision of clean water, the removal of waste water, and protection from flooding. The impact of new developments on existing communities and the Water Cycle must therefore be assessed and mitigated.

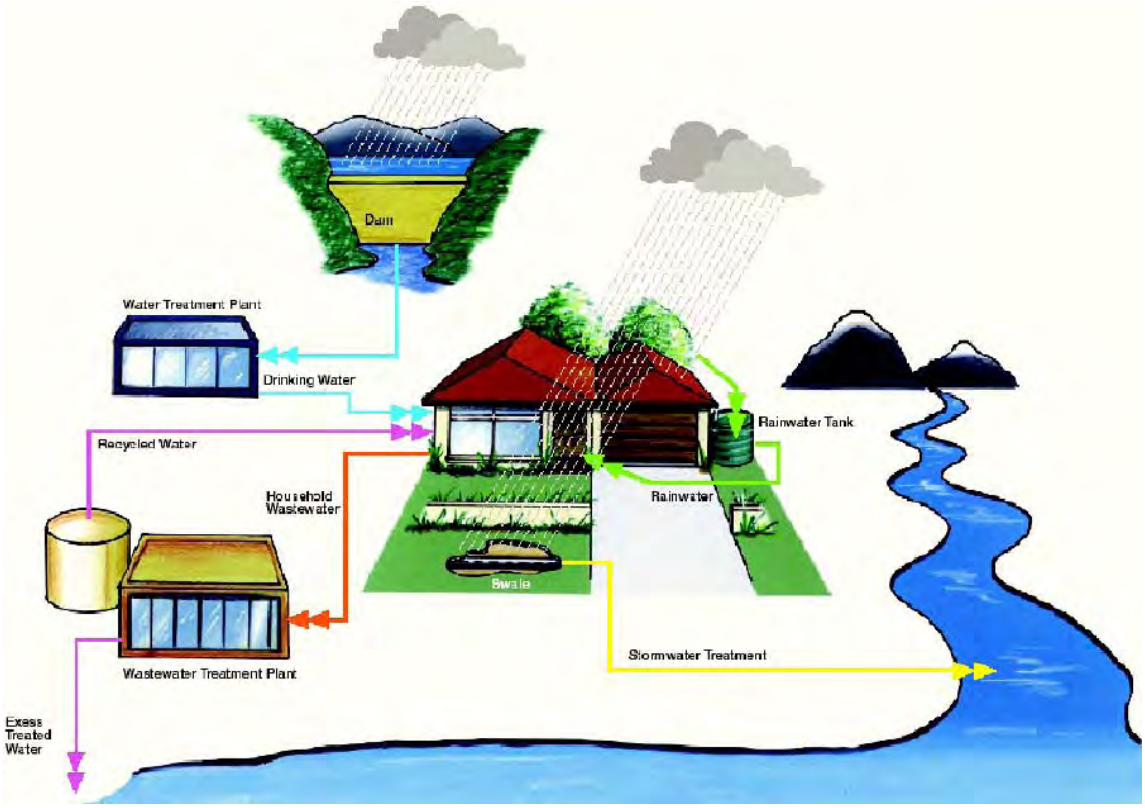

Figure 2.2: The Integrated Water Cycle (from the Parliament of Australia website)[1]

2.2.1.2 The infrastructure associated with the Water Cycle is referred to as Water Services Infrastructure (WSI) by the Environment Agency and is defined as:

- licensed water resource systems for abstraction from rivers, reservoirs, and aquifers;
- raw water storage reservoirs and inter-basin transfer schemes;
- raw water abstraction and water treatment works;
- treated water reservoirs, transfer pipelines, and pumping stations to local areas of demand;
- local water supply distribution pipelines;
- modified channels and structures to control surface water runoff in urban areas;
- rainwater collection systems and storm water storage tanks;
- waste water collection systems and treatment works; and
- receiving watercourses.

2.2.1.3 The WSI is needed to support new development. However, in the past it has not generally been integrated into the planning process. Policy statements in regional planning documents, such as WAT1 and WAT2 within the East of England Plan, are ensuring that WSI is considered early on and as an integral part of the planning process for new developments. Policy statements are addressed in more detail in the next section of this report.

2.2.1.4 The Water Cycle Strategy process has been developed to provide a coordinated holistic approach to the planning of WSI that will support and enable sustainable development in areas of significant growth. The Environment Agency has prepared Water Cycle Strategy Guidance for local authorities and is promoting them as best practice, supported by DEFRA, Communities and Local Government, a number of major water companies and other stakeholders in the Government's Sustainable Communities growth agenda.

2.2.1.5 The first stage of this commission was for Faber Maunsell to discuss and agree the scope for the Outline Water Cycle Strategy.

2.2.1.6 The vast majority of Huntingdonshire falls within the Great Ouse catchment with the 'north west finger' to Chesterton and Stibbington falling into the Nene catchment.

[1] 'Issues encountered in advancing Australia's water recycling schemes', http://www.aph.gov.au

2.2.1.7 A number of WCSs have been undertaken, but these focused mainly on Bedfordshire, Cambridge, Peterborough and parts of the fens, WCSs for East Cambs, Kings Lynn and the Great Ouse fens to the north of Huntingdonshire had not been undertaken. Accordingly, the need to undertake a WCS focused on Huntingdonshire was established.

2.2.1.8 For the purposes of this WCS a buffer zone of 5km should be applied to the boundary of Huntingdonshire District.

2.2.1.9 Proposed development within the Nene catchment is modest and would have to fit in with WCSs already undertaken. Accordingly, no further WCS is proposed for the Nene catchment area, though a review of the implications of the existing WCSs on opportunities for both development and environmental improvement should be undertaken and incorporated into the Study for Huntingdonshire.

2.2.1.10 In terms of management of risk to the Core Strategy, the initial focus should be related to the locations where the majority of proposed growth in Huntingdonshire is planned, i.e. At St Neots, Brampton, Huntingdon and Godmanchester, all of which fall within the Great Ouse catchment area. Smaller scale developments are also planned at St Ives, Fenstanton and elsewhere within the Great Ouse catchment.

2.2.1.11 Anglian Water is generally responsible for the operation and maintenance of water supply and waste water treatment/disposal to acceptable standards within Huntingdonshire, though Cambridge Water is responsible for water supply in certain areas where smaller scale development is planned, e.g. St Ives and Fenstanton. The Environment Agency has responsibility for ensuring abstraction is controlled, flood risk managed and water quality improved, so that healthy and diverse ecosystems, water sports and recreation can be sustained.

2.2.1.12 Development at Sawtry has the most direct influence on the Great Fen Project, but all of the developments have the potential to have at least some influence on areas managed by the Internal Drainage Boards, or to influence water quality at SSSIs or SACs.

2.2.1.13 These interests all need to be represented so that agreement can be reached regarding the sustainability of the water cycle within Huntingdonshire and the measures needed to accommodate the proposed growth. A steering group has been set up, comprising Huntingdonshire District Council (HDC), the Environment Agency (EA), Anglian Water (AW), Cambridgeshire County Council, and a representative of Faber Maunsell, meeting on a monthly basis, with the Internal Drainage Boards (IDBs) and Natural England included within the wider consultation process.

2.2.1.14 An updated Strategic Flood Risk Assessment (SFRA) has been commissioned by HDC to take into account current assessments for climate change and may therefore alter the extent of flood zones within Huntingdonshire. The flood zones affect the extent and type of development that should be permitted, so the SFRA needs to take into account surface water flooding issues, HDC's core strategy and land-use proposals.

2.2.1.15 The issues that need to be addressed by the Water Cycle Strategy are as follows:

- this is one of the driest parts of the UK;
- heavy prolonged periods of rainfall are experienced in this part of the UK, which causes flooding during winter and sometimes summer;
- climate change will have an impact on discharge to the sea and river levels. Hence there will be a need to deal with changes in pumping requirements, siltation, storage capacity and embankments to control flooding;
- climate change will influence the maximum flow rate and potentially impact on existing flood alleviation systems and/or require the introduction of further flood alleviation measures;
- potential for increase in flash flooding caused by rapid run off from hard surfaces as more urban areas are developed;
- the number of properties within the flood plain exposed to a high risk of flooding should be reduced;
- the protection of Scheduled Ancient Monuments and other cultural heritage features;
- potential need for changes in land use due to the frequency and depth of flooding events;
- provisions should be made with regards to the elderly and socially disadvantaged so they are affected the least by flooding events;

- assess flooding warning systems that are in place;
- the need to protect and enhance the Sites of Specific Scientific Interest (SSSI), nature conservation and biodiversity;
- implications of upstream development (Bedford and Milton Keynes) and measures to protect the Ouse Washes from further deterioration;
- consideration of the Great Fen project, which should increase storage capacity of surface water and hence help to reduce flooding;
- management of the floodplain for environmental benefit;
- need for a current Strategic Flood Risk Assessment (SFRA);
- implementation of the Water Framework Directive and opportunities to improve water quality;
- need to ensure water remains fit for recreational and navigation purposes;
- regulation of abstraction from and discharges to rivers and lakes;
- restoration of sites affected by unsustainable abstraction;
- increased use of water with increased abstraction and increased discharge from waste water treatment works, taking sustainability initiatives into account;
- need for strategic approach to Sustainable Water Use and Drainage;
- identification of priorities for strategic studies, actions or projects to be undertaken, and by whom; and
- need to develop and obtain agreement to complementary policies for long term management of flood risk and the water cycle, consistent with the proposed development of Huntingdonshire.

2.2.1.16 This is a key study for the development of Huntingdonshire for both spatial and water utility planning. It will require close cooperation and liaison with the key stakeholder groups and it is essential that they all work in partnership. The project scope is therefore defined as:

- set up a steering group;
- review existing baseline evidence considering climate change for water and waste water infrastructure planning;
- identify the scope of any additional work required to progress the WCS for Huntingdonshire;
- assess the environmental capacity for growth with regards to water resources, receiving water courses and any measures required to enable growth;
- the impacts and environmental constraints relating to the proposed net growth in the area of study up to 2026 need to be considered, along with the potential scope for further future growth (growth partially offset by decline due to ageing of existing population and reduction in average number of people per household);
- details need to be provided regarding strategic water cycle based constraints and infrastructure proposals required to support growth;
- estimate high level costs of strategic and key infrastructure and associated developer contributions;
- provide a program for key strategic water services infrastructure, incorporating environmental standards and mitigation options;
- provide guidance on water efficiency measures and their application;
- project Management including project plan, reporting and regular review meetings;
- consultation with key consultees;
- data collection and collation, working closely with the Councils, Environment Agency, Internal Drainage Boards, Anglian Water, Cambridge Water and other key stakeholders to review existing plans and development of water cycle strategy;
- review of previous Water Cycle Studies to inform the Huntingdonshire WCS;
- provide a strategic overview of water infrastructure requirements to highlight areas of development constraints or development opportunities; and
- production of report to describe each work area and the preferred water cycle strategy.

2.2.1.17 It was anticipated from the outset that the run-off from all new developments will need to be attenuated, that a phased programme of waste water treatment improvements will be necessary and that agricultural land use will continue to dominate the catchment, with the implications of this on water quality needing to be addressed during the period to 2026.

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Relevant Policy and Guidance

3 Relevant Policy and Guidance

3.1 Government Policy

3.1.1.1 Government Policy has introduced a strong sustainability aspect to the growth and development agenda. As a result a number of key guidance and policy documents have been developed at various levels to aid and support the planning authorities in achieving this objective.

3.2 National Level

3.2.1.1 A number of national Planning Policy Statements has been produced by the Department for Communities and Local Government. Most relevant of these to this study are PPS1, concerning sustainable development, and PPS25, concerning developments and flood risk.

3.2.1.2 The DEFRA document, Future Water, discusses many issues of direct relevance to the Water Cycle.

3.2.1.3 The Flood and Water Management Bill (now issued in draft form) is being developed following the Pitt Review, commissioned as a result of the flooding emergency of 2007 and will be the main vehicle for taking forward any changes in legislation needed to improve arrangements for surface water drainage. The Bill proposes that lead accountability for ensuring satisfactory arrangements are in place to manage local flood risk will lie as a legal duty with County and Unitary Authorities. Flexibility exists for local authorities to decide amongst themselves what the most appropriate arrangements are for their area. Aspects of the new proposals such as preparing surface water management plans, developing asset registers, investigating flooding incidents, managing surface runoff, groundwater and minor water courses could be delegated to the district level with local agreement.

3.3 Regional Level

3.3.1.1 The existing regional policy for Huntingdonshire is the East of England Plan (Regional Spatial Strategy RSS14), which is identified within the Cambridgeshire Sub-Region. The main aim of these documents is the setting down of a roadmap to integrated and sustainable development at a regional level in the medium to long term.

POLICY H1: Regional Housing Provision 2001 to 2021 (East of England Plan, May 2008)
'Through managing the supply of land for housing in accordance with PPS3, their Local Development Documents, and in determining planning applications local planning authorities should facilitate the delivery of at least 508,000 net additional dwellings over the period 2001 to 2021. Taking account of completions of 105,550 between 2001 and 2006 the minimum regional housing target 2006 to 2021 is 402,540. District allocations should be regarded as minimum targets to be achieved, rather than ceilings which should not be exceeded.

Local planning authorities should plan for delivery of housing for at least 15 years from the date of adoption of the relevant development plan documents. In doing so they should assume that the average annual rate of provision after 2021 will be the same as the rates in this policy for 2006 to 2021 or 2001 to 2021, whichever is the higher.

When bringing forward land for housing they should take account of:

- *the spatial strategy (Policies SS1 to SS9);*
- *the need for co-ordination and consistency of approach between neighbouring authorities; and*
- *co-ordination of development with necessary transport and other infrastructure provision, including provision for adequate water supply and waste water treatment, as provided for under Policy WAT 2.'*

3.3.1.2 Policy statements in regional planning documents, such as WAT1 and WAT2 within the East of England Plan, are ensuring that water service infrastructure is considered early on and as an integral part of the planning process for new developments.

POLICY WAT1: Water Efficiency
The Government will work with the Environment Agency, water companies, OFWAT, and regional stakeholders to ensure that development in the spatial strategy is matched with improvements in water efficiency delivered through a progressive, year on year, reduction in per capita consumption rates. Savings will be monitored against the per capita per day consumption target set out in the Regional Assembly's monitoring framework.'

POLICY WAT2: Water Infrastructure
'The Environment Agency and water companies should work with OFWAT, EERA and the neighbouring regional assemblies, local authorities, delivery agencies and others to ensure timely provision of the appropriate additional infrastructure for water supply and waste water treatment to cater for the levels of development provided through this plan, whilst meeting surface and groundwater quality standards, and avoiding adverse impact on sites of European or international importance for wildlife.

A co-ordinated approach to plan making should be developed through a programme of water cycle and river cycle studies to address the issues of water supply, water quality, waste water treatment and flood risk in receiving water courses relating to development proposed in this RSS.

Complementing this approach, Local Development Documents should plan to site new development so as to maximise the potential of existing water/waste water treatment infrastructure and minimise the need for new/improved infrastructure.'

3.3.1.3 The requirement for a progressive and integrated approach to development and population growth is underpinned by an increasing awareness of the need for sustainable development. As highlighted by the Integrated Water Management Policy (WAT3) of the East of England Plan. The interrelationship of development, amenity, and community growth with all aspects of the Water Cycle is being increasingly realised and new policies reflect the need for an integrated and informed procedure to deliver large scale development in the most sustainable fashion.

POLICY WAT3: Integrated Water Management
'Local planning authorities should work with partners to ensure their plans, policies, programmes and proposals take account of the environmental consequences of river basin management plans, catchment abstraction management strategies, groundwater vulnerability maps, groundwater source protection zone maps, proposals for water abstraction and storage and the need to avoid adverse impacts on sites of European importance for wildlife. The Environment Agency and water industry should work with local authorities and other partners to develop an integrated approach to the management of the water environment.'

3.3.1.4 Local Development Framework documents submitted to the Secretary of State without sufficient evidence of this strategic approach to the provision of infrastructure carry a risk of being judged unsound. New planning processes are being developed to support a more efficient approach to major developments.

3.3.1.5 The East of England Regional Assembly will actively pursue arrangements for the establishment of effective co-operation with authorities from neighbouring regions on cross-border issues which require inter-regional co-ordination, specifically with regard to the Wash, Thames Estuary and such important landscape and biodiversity initiatives as the Chilterns Management Strategy, and more widely in relation to the potential impacts of climate change, water transfer and waste management.

3.3.1.6 The East of England plan is pointing the way for future development with regard to the water cycle and environmental issues.

POLICY ENV4: Agriculture, Land and Soils
'In their plans, policies, programmes and proposals planning authorities and other agencies should:
- *promote and encourage the expansion of agri-environment schemes to:*
  - *increase the landscape, historic and wildlife value of farmland in accordance with regional priorities set out in other policies of this RSS;*
  - *maintain and enhance the resilience and quality of soils;*

- *increase public access;*
- *reduce diffuse pollution;*

- *include policies that respond to the changes taking place in agriculture to address issues such as climate change and consumer demands for higher standards of animal welfare and food safety and the implications of resultant development in the countryside;*
- *encourage the sustainable use of soil resources and, where soil and land have been degraded, maximise opportunities for restoration to beneficial after-uses including agriculture, woodland, amenity and habitat creation schemes in accordance with regional priorities set out in other policies of this RSS;*
- *encourage more sustainable use of water resources through winter storage schemes and new wetland creation.'*

Policy ENV9: water supply, management and drainage (draft East of England Plan, Dec.2004)
'New development will be located, designed and its implementation planned in such a way to allow for sustainable provision of water supply and enable timely investment in sewage treatment and discharge systems to maintain the required standard of water quality.
Local authorities will:

- *in preparing local development documents, take account of the Environment Agency's Regional Water Resources Strategy, catchment abstraction management strategies, groundwater vulnerability maps and groundwater source protection zone maps. The protection of water resources and provision for water abstraction should take into account environmental constraints • ensure that rates of development do not exceed the capacity of existing water supply systems or, where relevant, proceed ahead of essential planned improvements that will increase the supply*
- *maintain ongoing liaison with the Environment Agency, water companies and sewage statutory undertakers in order to ensure timely and sustainable provision of infrastructure for the supply of water and sewage treatment and discharge systems, particularly in connection with major new development*
- *require the introduction of water conservation measures and sustainable drainage solutions. Local planning authorities should produce detailed supplementary planning guidance to implement water conservation and sustainable drainage solutions*
- *encourage the provision of on-farm winter storage facilities for water, where that does not conflict with other planning policies, for use in summer and to provide a resource for wildlife and recreation.*

All relevant agencies and developers should include water conservation measures in new development and promote public awareness of the need to reduce water consumption.

The East of England Regional Assembly and the Environment Agency will work with the water industry and neighbouring regional planning bodies, including the Greater London Authority, to formulate a sustainable long-term policy relating to inter-regional water provision.'

3.4 Local Level

3.4.1.1 The Cambridgeshire and Peterborough Structure Plan was put in place as a strategic framework for land use planning in Cambridgeshire and Peterborough up to 2016. The Plan was adopted in October 2003. After the approval of the East of England Plan in May 2008 all but 13 of the policies in the Plan have been superseded.

3.4.1.2 As a result of legislation introduced in 2004 a Local Development Framework (LDF) will replace the Huntingdonshire Local Plan in setting out policies for the area.

3.4.1.3 Furthermore, in June 2008 Huntingdonshire District Council officially launched a five year environment strategy for Huntingdonshire – A Plan for Our Environment; Growing Awareness. This is the starting point for a variety of initiatives that will help to safeguard Huntingdonshire's unique environment for years to come.

3.4.1.4 Important planning documents at local level are the water companies' Water Resources Management Plans (WRMP) which lay down the water companies' strategies and plans for the next 25 years. Draft versions of the WRMPs are currently available for public consultation. These documents are due to be finalised by the end of 2009 and will cover the period from 2010 to 2035.

3.4.1.5 In its draft WRMP Anglian Water identified the seven main challenges expected over the next 25 years. These are:

- housing and population growth;
- climate change;
- environmental pressures;
- customer expectations;
- innovation;
- employment; and
- water industry structure.

3.4.1.6 Important guidance is also contained within Catchment Abstraction Management Strategy (CAMS) documents produced by the Environment Agency. These provide resource assessments and availability status, licensing strategy and how proposed developments within the area of the CAMS will be addressed.

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Development and Planning

4 Development and Planning

4.1 Regional Planning

4.1.1.1 The Government introduced new requirements for the consideration of spatial development planning in the Planning and Compulsory Purchase Act (2004).

4.1.1.2 The East of England's Regional Spatial Strategy (The East of England Plan - RSS14) and the Cambridgeshire and Peterborough Structure Plan (2003) highlight the importance of Huntingdonshire in meeting the Government's housing development targets. Whilst Huntingdonshire is predominantly rural in character, it has four settlements with market town status, namely St. Neots, Huntingdon, St. Ives and Ramsey, due to the range of facilities and employment opportunities they offer.

4.1.1.3 The (minimum) target of 11,200 homes set by the RSS for Huntingdonshire between 2001 and 2021 has already been substantially met with 8,500 homes already built or committed. Longer-term aspirations indicate that an additional 2,750 homes will be needed between 2021 and 2026. Furthermore, at least 13,000 of the target of 75,000 new jobs for the Cambridgeshire sub-region are anticipated to be met in Huntingdonshire.

4.2 Local Development Framework

4.2.1.1 The Local Development Framework (LDF) is the emerging development plan for Huntingdonshire. The LDF, once adopted, will replace the adopted Huntingdonshire Local Plan (1995) and Local Plan Alteration (2002). The LDF will set out the strategy for the way in which land is used and will guide new development in the District for the period up to 2026.

4.2.1.2 The LDF comprises a portfolio of local development documents, of which the Core Strategy is of particular importance.

4.3 Core Strategy

4.3.1.1 The Core Strategy sets the planning framework for Huntingdonshire up to 2026. It shows where most new housing, business and shopping will be built and how the Council would like to manage this change. It is the first part of the Local Development Framework and will be followed by other, more detailed, documents. The Examination in Public was held in March/April 2009. The Inspectors' Report is expected to be published in September 2009.

4.3.1.2 The Core Strategy includes:

- a vision of how Huntingdonshire will develop as a place to meet the needs of the people who live and work here;
- objectives for the area to achieve the vision, to help guide and manage development and lessen any unpleasant effects;
- a spatial strategy to identify areas of significant change putting most growth where people can easily get to shops, jobs and other facilities;
- how and when the necessary infrastructure, such as new roads, sewage, water, schools and other services, will be provided to support new development;
- a framework for more detailed policies in other Local Development Framework documents;
- details of how it will be monitored and implemented.

4.4 Local Investment Framework

4.4.1.1 Huntingdonshire District Council (HDC) commissioned EDAW AECOM, supported by Faber Maunsell AECOM, to undertake an in-depth study into the various physical and social infrastructure needs arising from the Preferred Options Core Strategy – the Local Investment Framework (LIF). In parallel, HDC also commissioned this Outline Water Cycle Strategy, so that water cycle issues could be taken into consideration during the development of the LIF.

4.5 Housing Growth

4.5.1.1 The recent LIF studies have confirmed five broad areas for growth, corresponding to the market towns of Huntingdon, St Neots, St Ives and Ramsey, along with the key service centres of Yaxley and Sawtry, as shown in Figure 4.1.

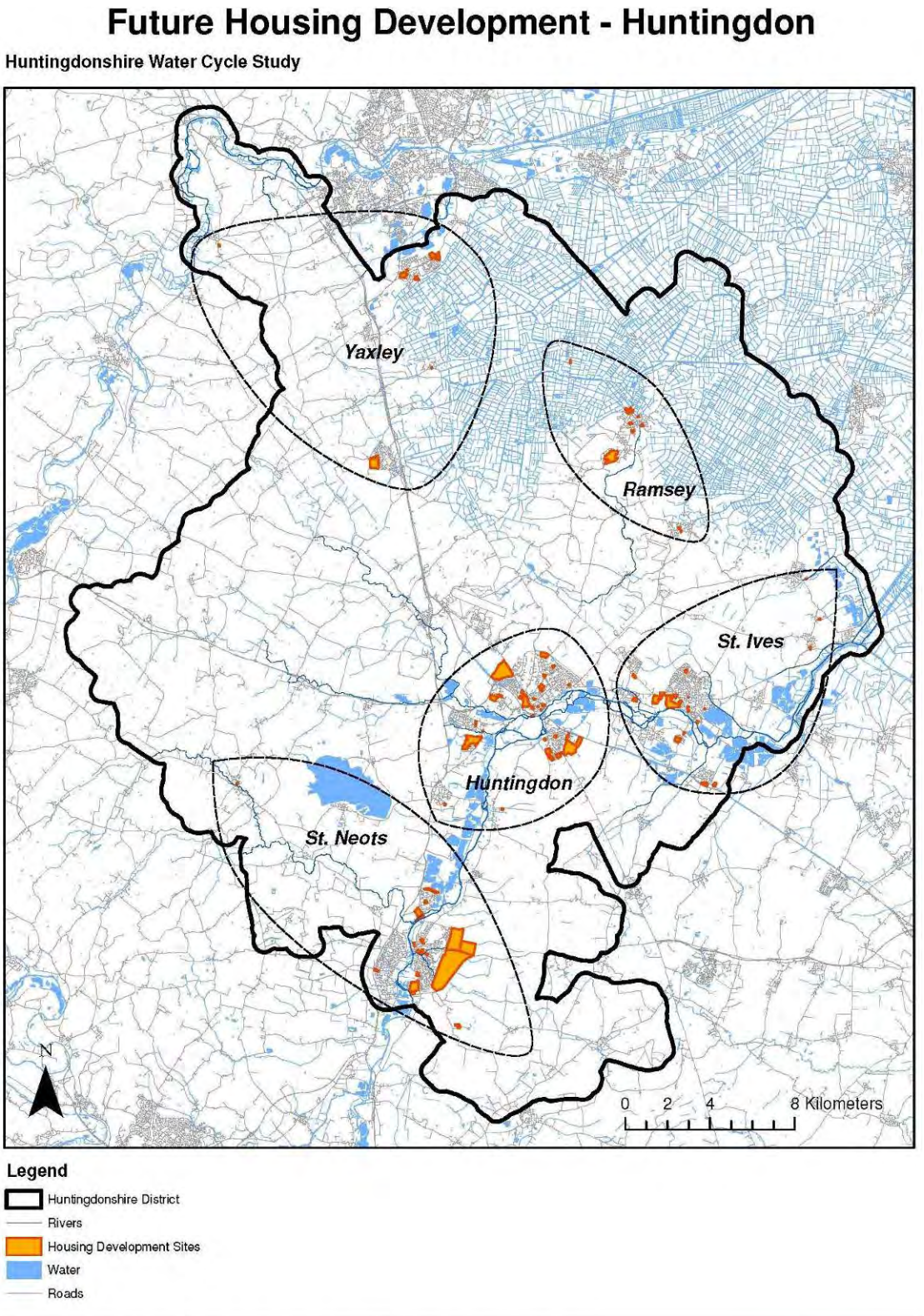

Figure 4.1: The Five Major Development Areas Identified in the Local Investment Framework

4.5.1.2 The LIF studies also confirmed that the scale of proposed housing development within Huntingdonshire could exceed the minimum RRS targets for growth up to 2026. The base number of new housing units identified in each of the five areas is summarised in Table 4.1. In addition, options for further growth at St Neots, consisting of an additional 850 residential units by 2026 and a further 950 residential units beyond 2026 have also been considered

Table 4.1: Estimated Base Housing Projections for the Strategy Areas

Key New Development Area	Total Number of Units (completions, commitments & CS allocations)					
	2001-2006	2006-2011	2011-2016	2016-2021	2021-2026	Total
Huntingdon Area	-	937	1,321	1,207	235	3,736
St Neots Area	-	1,409	2,208	1,246	180	5,043
St Ives Area	-	376	569	275	30	1,250
Ramsey	-	107	328	65	0	500
Yaxley and Sawtry	-	306	128	0	0	434
Other small aggregate sites	-	407	156	0	0	563
Total	2,460	3,578	4,710	2,793	445	13,986

4.5.1.3 As a result of natural change, migration, changing household sizes and the provision of new housing, the total population of Huntingdonshire is projected to increase by between 11,600 and 13,900 people.

4.6 Huntingdon

4.6.1.1 The LDF strategy areas considered within the Huntingdon area are shown in Figure 4.2. The codes on the map correspond to the names as listed in Table 4.2.

Table 4.2: List of Areas Considered within the Huntingdon Area, with Total Number of Units Forecast to 2022

Code	Address	Total units by 2022
Commitments (allocations and extant permissions)		
HUN1	Off Kings Ripton Rd	43
HUN3	Hinchingbrooke Parkway	97
HUN2	R/o Forensic Lab	17
GOD1	London Rd Godmanchester	149
HUN4	Northbridge (Ermine St.)	1057
GOD2	Wigmore Farm	82
HUN5	Brookside	47
HUN6	Springfields School	56
HUN7	Coneygear Court (Moorhouse Rd)	56
HUN8	Ullswater	114
BRA1	Manor Farm Brampton	15
HUN9	151 High St	16
HUN10	Saunders Garage	19
HUN11	Model Laundry	24
HUN12	2/2A Sapley Rd	14
HUN13	Library Site	110
BRA2	32 High St Brampton	12
BUC1	Cranfield Way Buckden	10
OFF1	New Rd Offord Cluny	9
Core Strategy Areas		
H1	Gas depot	22
H3	HWAAP	400
H4	Bus Garage	60
H13	Fire Station	35
H14	Newton's Court	12
H17	Regional College	120
G8	Bearscroft Farm	650
G3	Corpus Christi	20
G4	Earning St	20
G9	Clyde Farm	50
B11	RAF Brampton	400

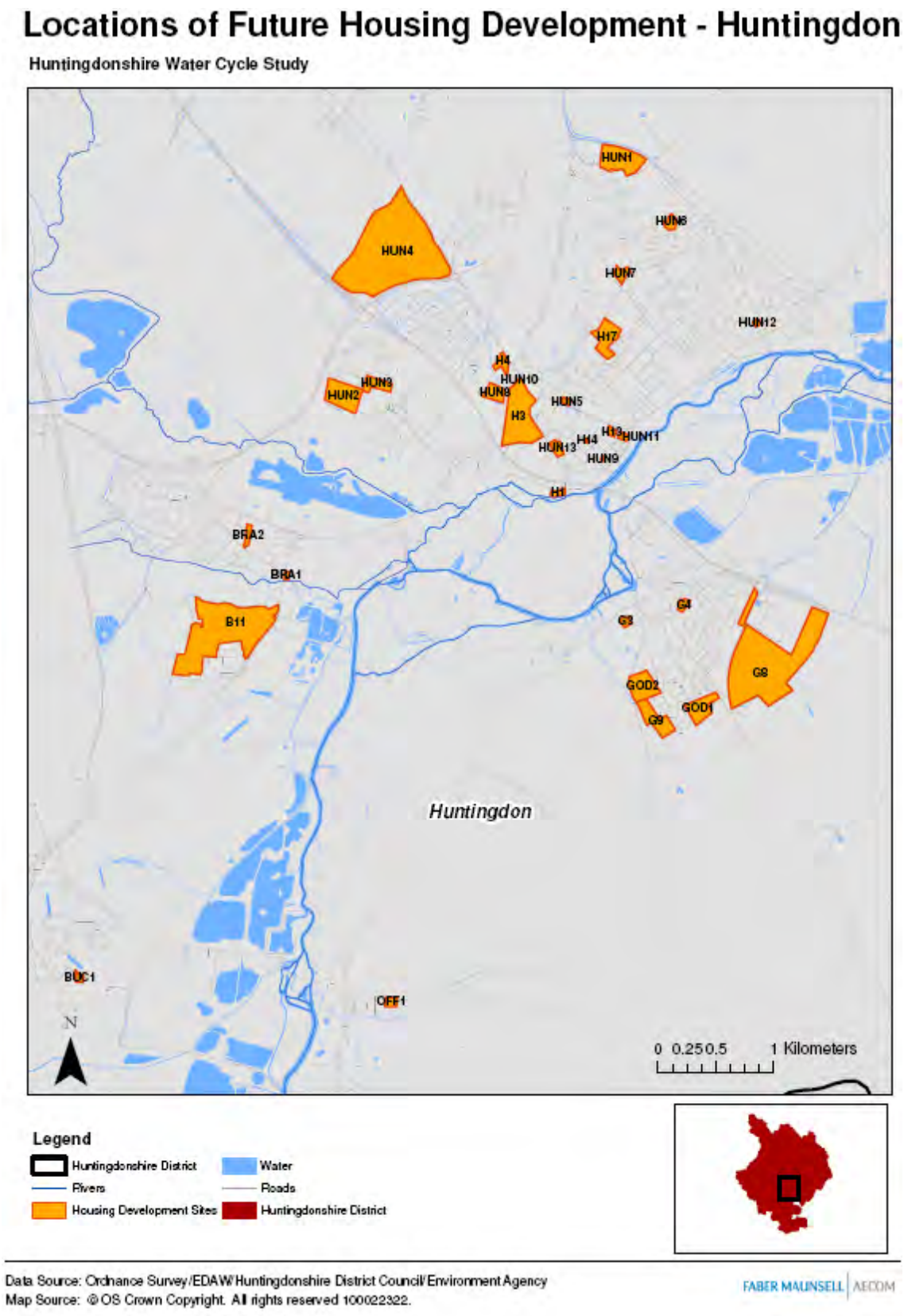

Figure 4.2: Housing Developments in the Huntingdon Area

4.6.1.2 A total of 3,736 housing units are forecast for the Huntingdon area between 2007 and 2022, averaging 234 units per year. A synthetic view of when these developments will happen is shown in Figure 4.3. It can be appreciated how the Core Strategy sites will develop at a later stage, from 2013, while the current commitments will conclude by 2012, with the exception of the large Northbridge site (HUN4) which will be developed until 2021. It is expected that all housing developments will be concluded before 2022.

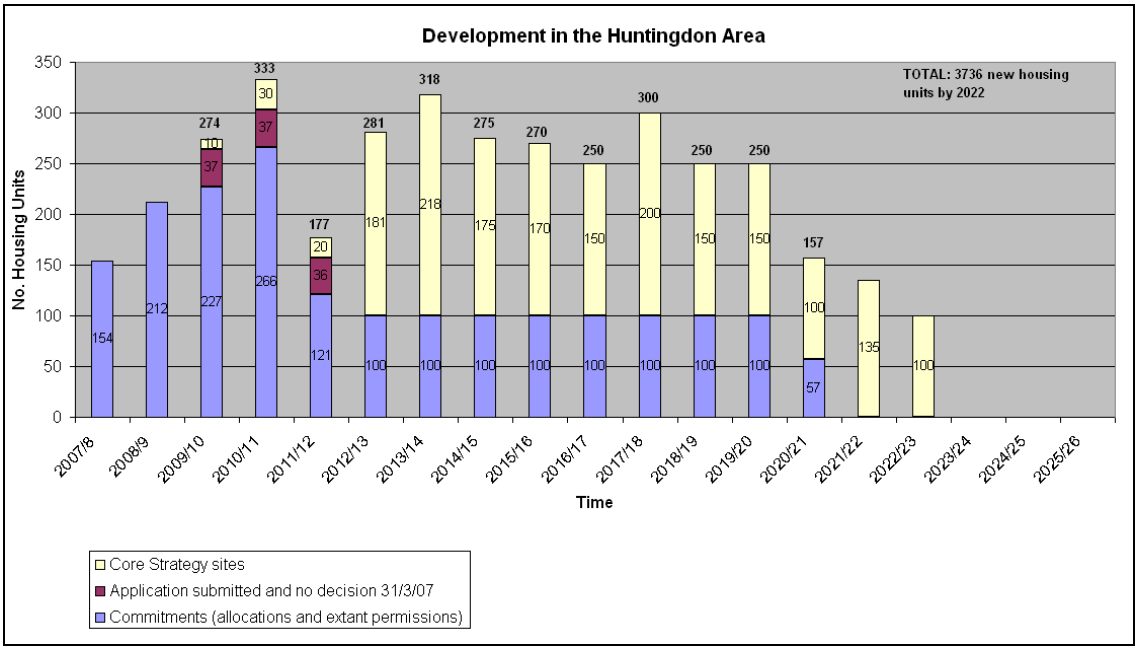

Figure 4.3: Summary of Housing Developments in Huntingdon

4.7 St Neots

4.7.1.1 The LDF strategy areas for the St Neots area are shown in Figure 4.4. The codes on the map correspond to the names as listed in table 4.3. There are currently two different projections for development at St Neots. The Core Strategy figure forecast a total of 5043 housing units in and around St Neots by 2022. This projection takes into account extant development commitments and Core Strategy areas.

4.7.1.2 An additional growth option considers full capacity development at the site south of Cambridge Road (SN7), between 2021 and 2026, to deliver a further 850 residential units.

4.7.1.3 A further site to the east of St Neots (SN6) has been identified for development of 950 residential units, though this site has not been included in the final Core Strategy documents or figure 4.4, as development is proposed after 2026.

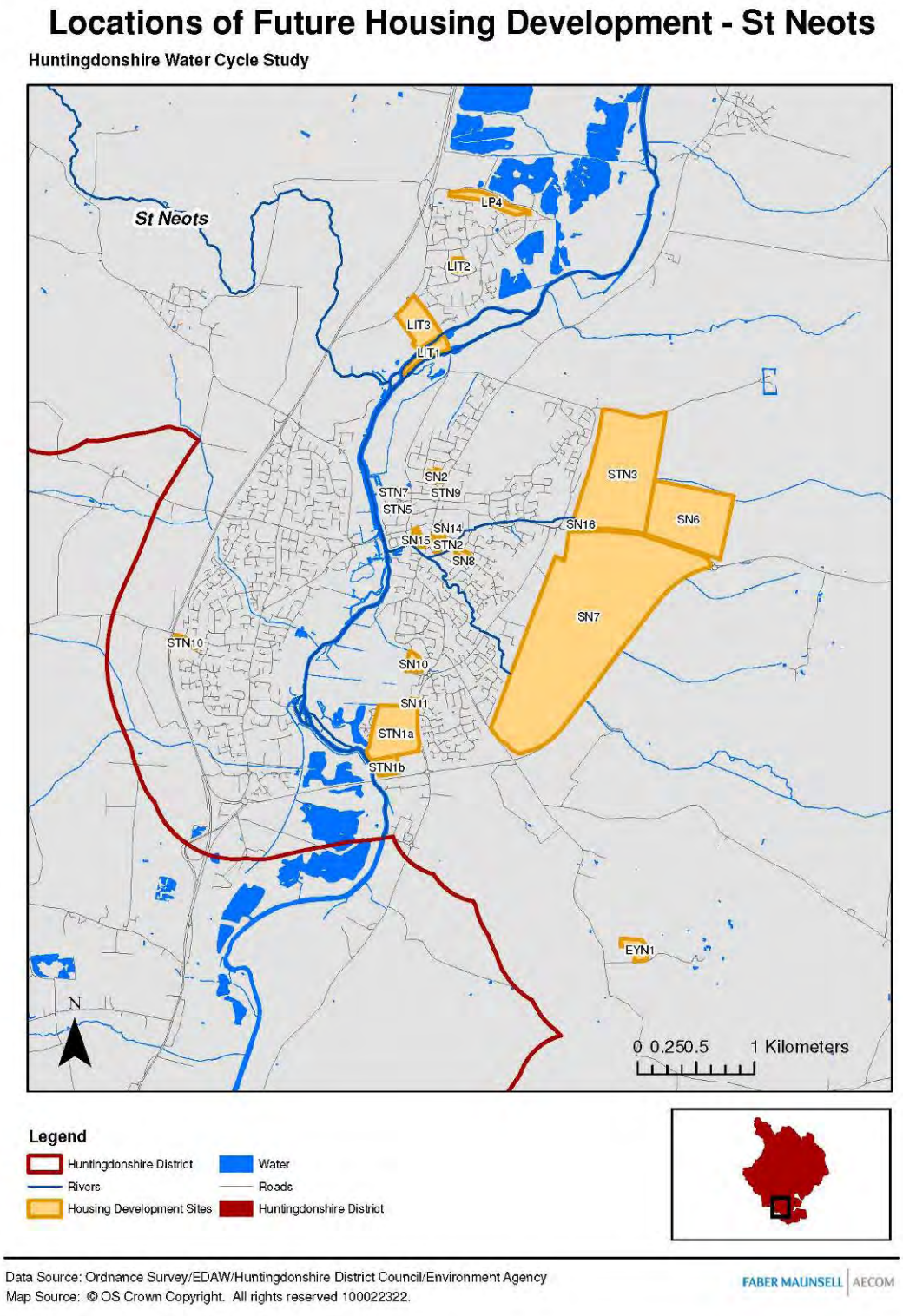

Figure 4.4: Development Sites in the St Neots Area

4.7.1.4 Taking into account the Core Strategy figures, St Neots can expect development at an average rate of 336 units per annum. A synthetic graph of the developments at St Neots over time is shown in Figure 4.5. It is quite clear that Core Strategy sites and Mixed Commitment and Core Strategy sites dominate the developments right up to 2022. On the other hand, sites with commitments and extant planning permission are quite important initially, though to a lesser extent than Core Strategy sites. This would seem to indicate that development at St Neots was identified by the Core Strategy rather than by local developers. This has been confirmed by

HDC, as they are keen to see development of an Eco Quarter at St Neots. In the Huntingdon, on the other hand, the Core Strategy developments only begin to dominate after existing commitments are concluded.

Table 4.3: List of Areas within the St Neots Area, with Total Number of Units Forecast to 2026

Code	Address	Total units by 2026
Commitments (applications and extant permissions)		
LIT2	Bydand Lane	52
LIT3	Riverside Mill LP	426
LIT1	Island Site LP	62
STN1a&b	Barford Road	270
STN10	Bushmead Road	68
STN2	Church St	43
STN4	Windmill Row	21
STN5	West St	23
STN7	Youth Centre	27
STN9	42 Huntingdon St	24
KIM1	Allotments Kimbolton	13
EYN1	Abbotsley Golf Club	9
Application Submitted and no Decision 31/03/02007		
UDF1	College	55
Mixed Commitment and Core Strategy Site		
STN3	Loves Farm (1250 + 100 + 750)	2100
Core Strategy Areas		
SN7	Cambridge Road South (CS figure)	1480
SN2	Huntingdon Street	45
SN8	Sandfields Road	15
SN10	Alfred Hall Memorial Field	85
SN11	Land Adjacent to St Neots Leisure Centre	15
SN14	Harrisons Garage	55
SN15	St Mary's Urban Village	45
SN16	Loves Farm	85
LP4	Paxton Pits	25

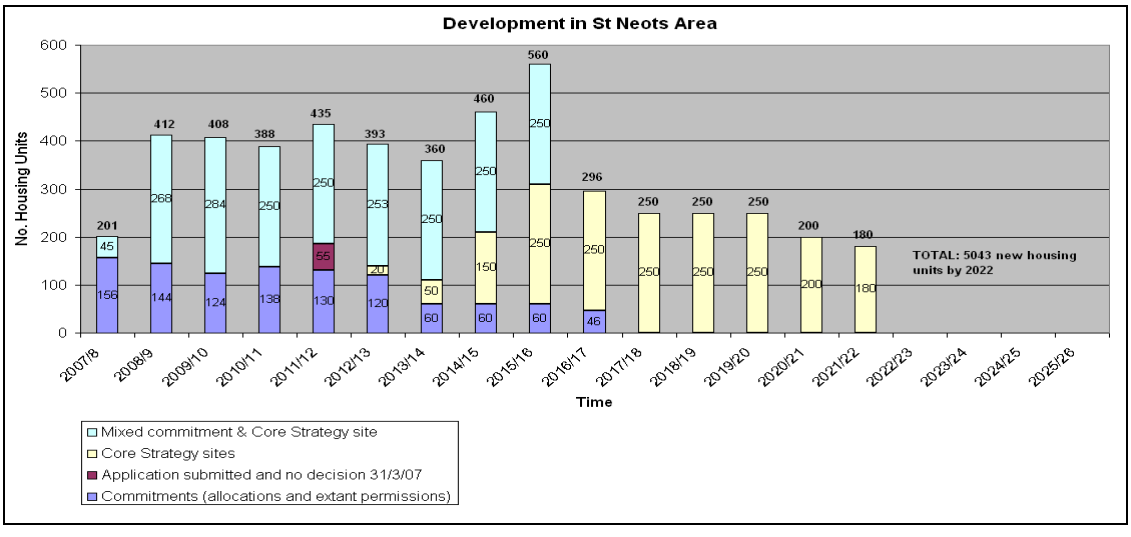

Figure 4.5: Summary of Housing Developments in St Neots

4.8 St Ives

4.8.1.1 The LDF strategy sites for the St Ives area are shown in Figure 4.6. The codes on the map correspond to the names as listed in Table 4.4.

Table 4.4: List of Areas within the St Ives area, with Total Number of Units Forecast to 2022

Code	Address	Total Units by 2026
Commitments (applications and extant permissions)		
HOU1	Houghton Grange	90
STI1	Nth Houghton Rd	97
STI2	Golf Course	109
STI3	Lynhurst	12
HOU2	The Elms	22
STI4	Needingworth Rd	10
STI5	West St	11
STI6	Ramsey Rd	16
STI7	23 North Rd	22
STI8	Burleigh Rd	56
WYT1	Top Farm Wyton	11
COL1	Manor Farm Colne	15
BLU1	Rectory Rd Bluntisham	14
SOM1	Station Approach Somersham	15
Mixed commitment and Core Strategy Site		
HEM1	London Rd	155
Core Strategy Areas		
SI2	South of New Road	40
SI3	Fire Station & Clinic	30
SI4	Football Club	45
SI18	Golf Course	380
F1	Cambridge Rd Fenstanton	60
F3	Ivy Nursery Fenstanton	40

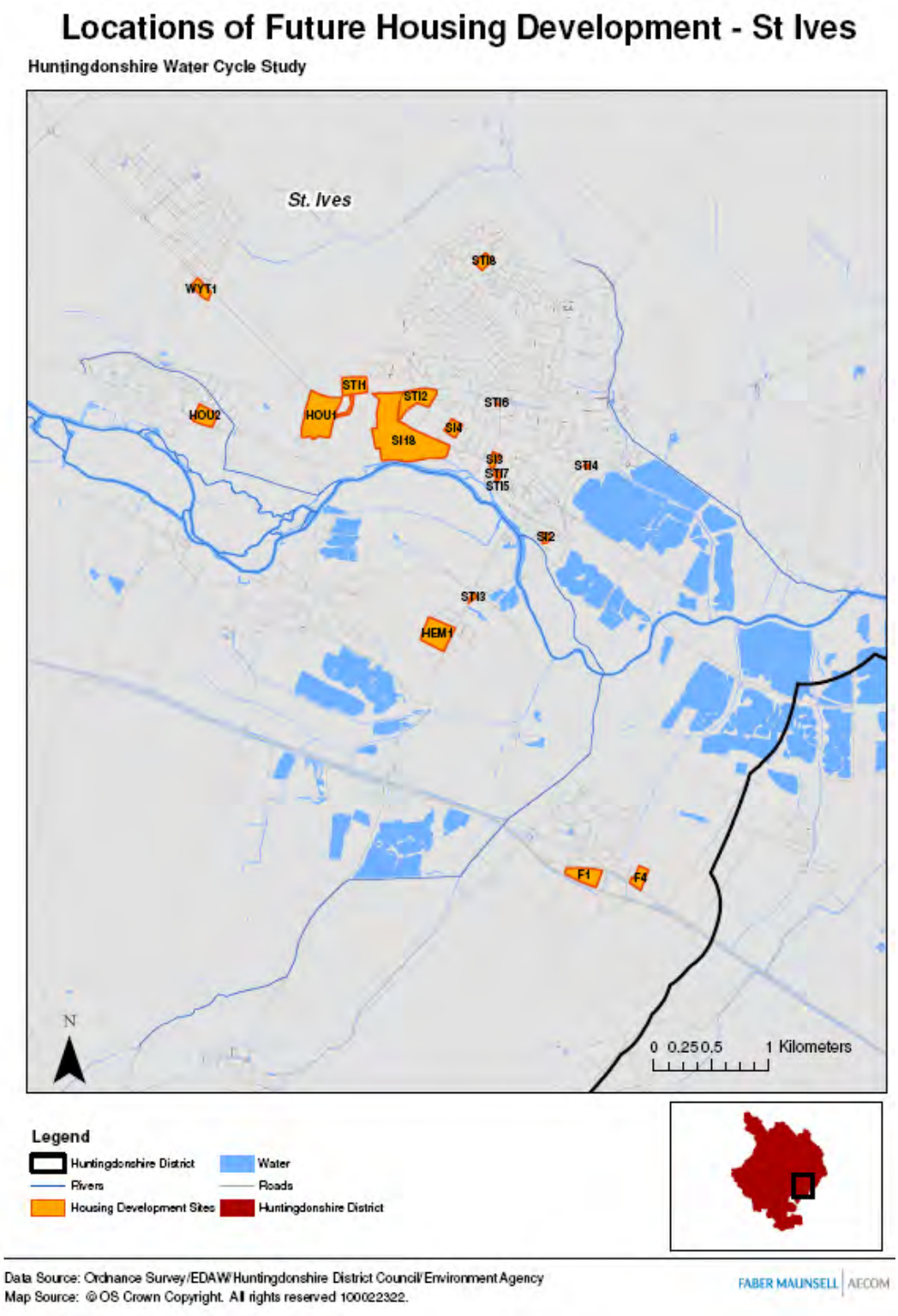

Figure 4.6: Development Sites in the St Ives Area

4.8.1.2 A total of 1250 new housing units are forecast for the St Ives areas according to the Core Strategy. Of these, 500 are already committed, 155 are awaiting planning permission, and 595 have been identified as necessary by the Core Strategy. A summary of the developments at St Ives in time is shown in Figure 4.7. As in Huntingdon, the Core Strategy sites become important once the committed sites have been developed.

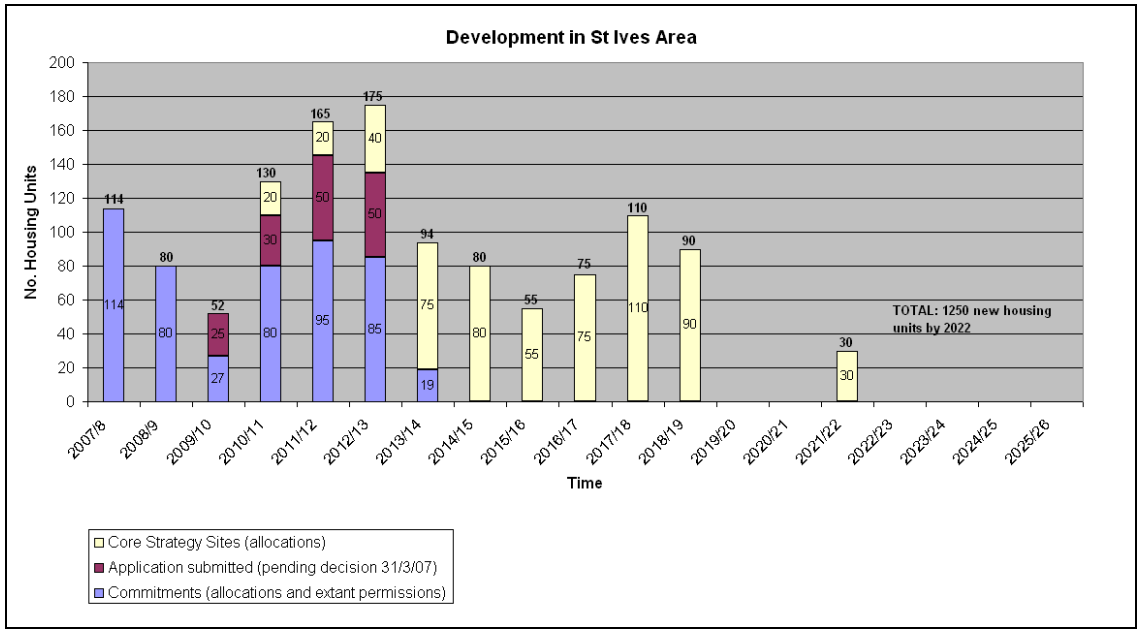

Figure 4.7: Summary of Housing Developments in St Ives

4.9 Ramsey

4.9.1.1 The LDF strategy sites for the Ramsey area are shown in Figure 4.6. The codes on the map correspond to the names as listed in Table 4.5.

Table 4.5: List of Sites in the Ramsey Area with Total Number of Units Forecast to 2017

Code	Address	Total Units by 2017
Commitments (applications and extant permissions)		
RAM1	Whytefield Rd	35
RSM1	Herne Rd	15
RAM2	Bury Rd	19
RAM3	Newtown Rd	15
WAR1	Woodlands Warboys	17
WAR2	64 High St Warboys	14
Core Strategy Areas		
R2	Upwood Hill House	35
R5	North Biggin Lane	80
R6	South Field Lane	150
R11	RAF Upwood	100
R19	Golf Club	20

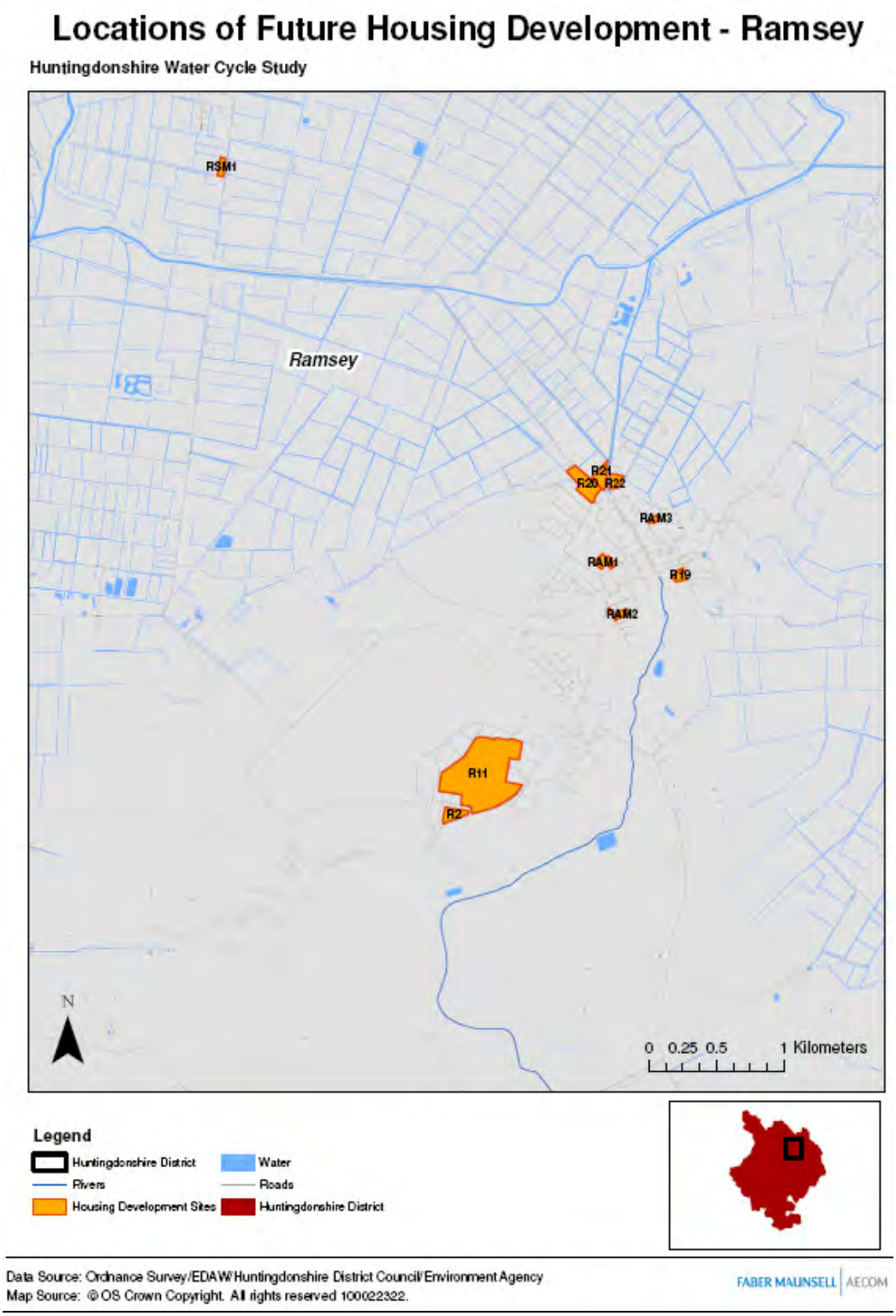

Figure 4.8: Development Sites in the Ramsey Area

4.9.1.2 A total of 500 new housing units are forecast for the Ramsey area, according to the Core Strategy. Of these, 115 are already committed, and 385 have been identified as necessary by the Core Strategy. All the developments are forecast to be completed by 2017, resulting in an average annual development of 50 units. A summary of the developments at Ramsey in time is shown in Figure 4.9. The Core Strategy sites will only begin being developed once the extant commitments are completed.

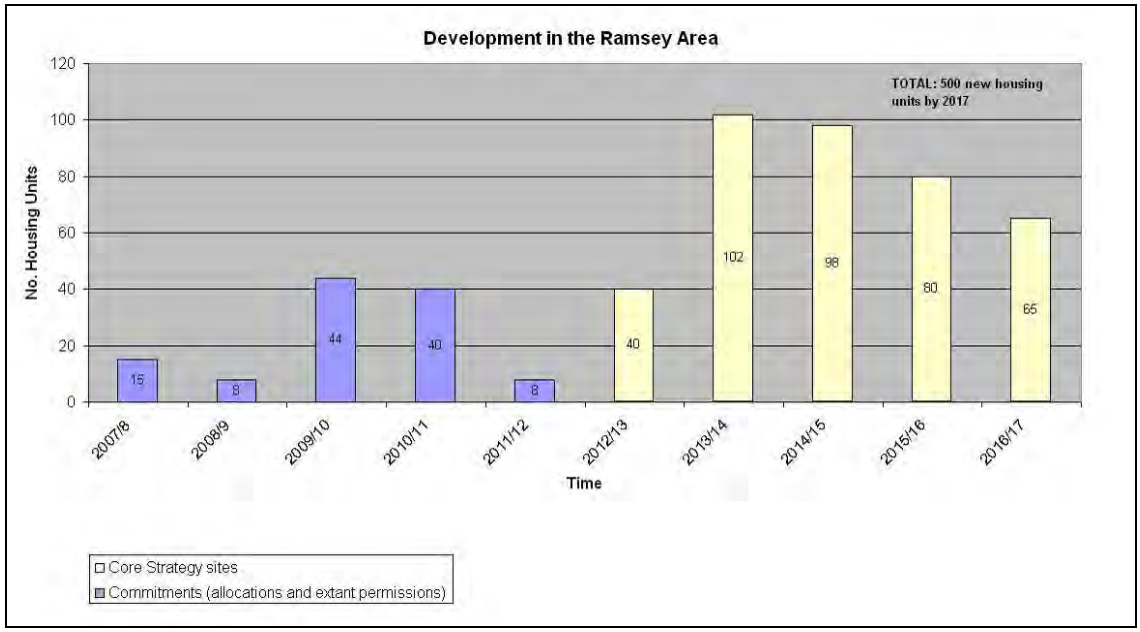

Figure 4.9: Summary of Housing Developments in St Ives

4.10 Yaxley and Sawtry

4.10.1.1 The LDF strategy sites for the Yaxley and Sawtry area are shown in Figure 4.10. The codes on the map correspond to the names as listed in Table 4.6.

Table 4.6: Development Sites in the Yaxley Area (the Sawtry sites fall outside of the map area)

Code	Address	Total Units by 2026
Commitments (applications and extant permissions)		
YAX1	Nth Broadway Yaxley	34
YAX2	Nth Manor Farm Yaxley	8
YAX3	212 Broadway Yaxley	20
YAX4	Main St Yaxley	7
SAW1	Granary Sawtry	0
HOL1	Church St Holme	0
ELT1	Overend Elton	18
WAN1	Ship End Wansford	10
Core Strategy Sites		
SAW3	South Gidding Lane Sawtry	0
Y4	Coal Yard Yaxley	0
Y7	Snowcap Mushrooms	0

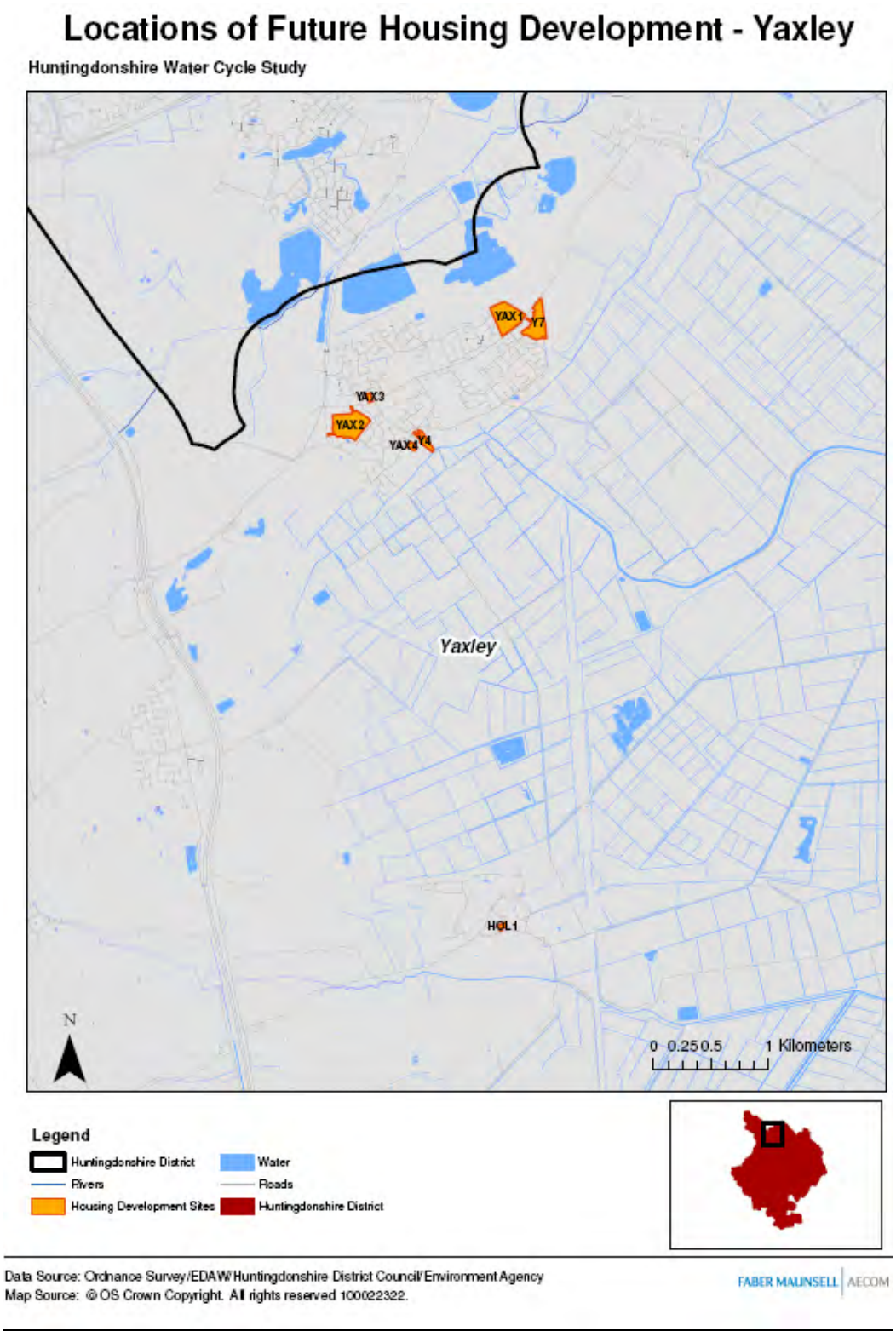

Figure 4.10: Development Sites in the Yaxley Area

4.11 Employment Growth

4.11.1.1 The scale of proposed employment growth is summarised in the table below. This table was used to establish approximate employment population growth estimates and associated impacts.

Table 4.7: Scale of Proposed Employment Growth

Location	to 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Area (ha)
Central Hunts com.	24.6										24.6
Brampton		1.5	1.5	1.5	2						6.5
West of Town Centre		1.2	1.2								2.4
Washingley Road	5	6	6	6	6	4					33
Hinchingbrooke (x2)						1.5	1.6				3.1
Godmanchester						1.5	2.5	3			7
South Hunts com.	8.9										8.9
St Neots North				2	2	2					6
St Neots South						4	4	4	4	3	19
North Hunts com.	3.3										3.3
Ramsey	2										2
Yaxley		1	1								2
Totals	43.8	9.7	9.7	9.5	10	13	8.1	7	4	3	117.8
Com. = existing comments			High quality				Mixed				4 part mixed / high quality

4.12 Global Recession

4.12.1.1 It has become evident during the writing of this report that the global recession and banking crisis, the reduced availability of mortgage credit, falling or stagnated land and property values and a host of other factors have affected the rate at which new housing developments are being completed. The residential development and employment growth trajectories are therefore likely to be affected (lowered) by the current market conditions, particularly in the early stages of the period under consideration.

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Flood Risk Management

5 Flood Risk Management

5.1 Introduction

5.1.1.1 As stated in Future Water, the Government's water strategy for England until 2030, there is an ongoing challenge of defending homes and businesses from flooding and making them more resilient to flooding when it occurs.

5.1.1.2 The Government committed to Making Space for Water, a holistic approach to managing flood and coastal erosion risks in England over the next 20 years, in 2004. Following the 2007 summer floods, the Prime Minister asked Sir Michael Pitt to lead an independent review looking at flood risk management, the emergency response and the initial moves towards recovery. The Government has agreed with the urgent recommendations of the interim report, the Pitt Report, and is considering its interim conclusions.

5.1.1.3 However, flood risk is likely to worsen. The Future Flooding report found that flood damages could increase in real terms by between 2 and 20 times by the 2080s, due to a combination of climate change, primarily through changes in storm patterns and sea levels, and increased wealth in flood risk areas putting more assets in harm's way.

5.1.1.4 The Government's vision for the future, as set out in Making Space for Water, is summarised in the box below.

Vision for 2030

Flood and coastal erosion risk management which contributes to sustainable development, combining the delivery of social and environmental benefits with the protection of economic assets

An understanding of the future risks of river and coastal flooding fully embedded into the spatial planning system, including planning for new settlements and other new developments

Consistent and holistic management of urban flood risk, with strategic planning, partnerships of responsible bodies and clear understanding of various flood risk responsibilities

Public understanding of the risks we face and the actions we can take to help manage flood and coastal erosion risk

Community resilience to flooding from improved development planning, emergency planning and response, and resilience of homes, buildings, services and utilities

5.1.1.5 The Department for Communities and Local Government (DCLG) has already strengthened the policy on development and flood risk through Planning Policy Statement 25 (PPS25) – Development and Flood Risk. This document sets out national planning policy regarding development and flood risk. This aims to ensure that flood risk, and the increase in flood risk due to climate change, is taken into account at all stages of the planning process. PPS25 requires local planning authorities to set out planning strategies that help to deliver sustainable development by appraising, managing and reducing the risk of flooding.

5.1.1.6 Under PPS25 Local Planning Authorities are required to:

- safeguard land from development that is required for current and future flood management, e.g. Conveyance and storage of flood water and flood defences;
- reduce flood risk to and from new development through location, layout and design, incorporating sustainable drainage systems (SUDS); and
- and use opportunities offered by new development to reduce the causes and impacts of flooding, e.g. Surface water management plans; making the most of the benefits of green infrastructure for flood storage, conveyance and SUDS; re-creating the functional floodplain; and set back defences.

5.1.1.7 The Flood and Water Management Bill will propose that satisfactory arrangements are in place to manage local flood risk. The bill will propose that accountability will lie as a legal duty with County and Unitary Authorities.

5.1.1.8 In addition, the Environment Agency is now a statutory consultee for planning applications in flood risk areas, and developments in other areas that might affect flood risk.

5.1.1.9 At a regional level, the East of England Plan – Regional Spatial Strategy 14 (RSS14) indicates the importance of development and flood risk in Policy SS14.

POLICY SS14: Development and Flood Risk

Coastal and river flood risk is a significant factor in the East of the England. The priority is to defend existing properties from flooding, and where possible locate new development in locations with little or no risk of flooding. Local development plan documents will:

- promote the use of Strategic Flood Risk Assessments to guide development away from floodplains, areas at risk or likely to be at risk in future from flooding, or where development would increase the risk of flooding elsewhere;
- include policies to protect flood plains and land liable to tidal or coastal flooding from development, based on the Environment Agency's Indicative Floodplain Maps, supplemented where necessary by historical and modelled flood data (e.g. Section 105 Maps) and indications as to other areas which could be at risk in future (including proposals for 'managed retreat' where appropriate);
- require that all developments and, where subject to planning control, all land uses (including agricultural activities and changes to drainage in existing settlements) should not add to the risk of flooding elsewhere and should reduce flooding pressures by using appropriate sustainable drainage systems; and
- only propose development in floodplains, areas at flood risk or at risk of flooding in future, or where development would increase the risk of flooding elsewhere, where land at lower risk of flooding is not available, where there is a significant overriding need for the development, and the risk can be fully mitigated by design or engineering measures.

5.1.1.10 A Strategic Flood Risk Assessment (SFRA) has been undertaken and is in the process of being updated to take into consideration the proposed growth within Huntingdonshire and the effects of climate change. Until the updated SFRA is issued (due spring 2010), this study has considered land use based on the SFRA undertaken in 2004.

5.2 Catchment Description

5.2.1.1 The vast majority of Huntingdonshire falls within the Great Ouse catchment, with Yaxley, Farcet, and the 'north west finger' to Chesterton and Stibbington falling into the Nene catchment. The extent of the rivers and their catchments within the East of England Region are shown in Figure 5.1.

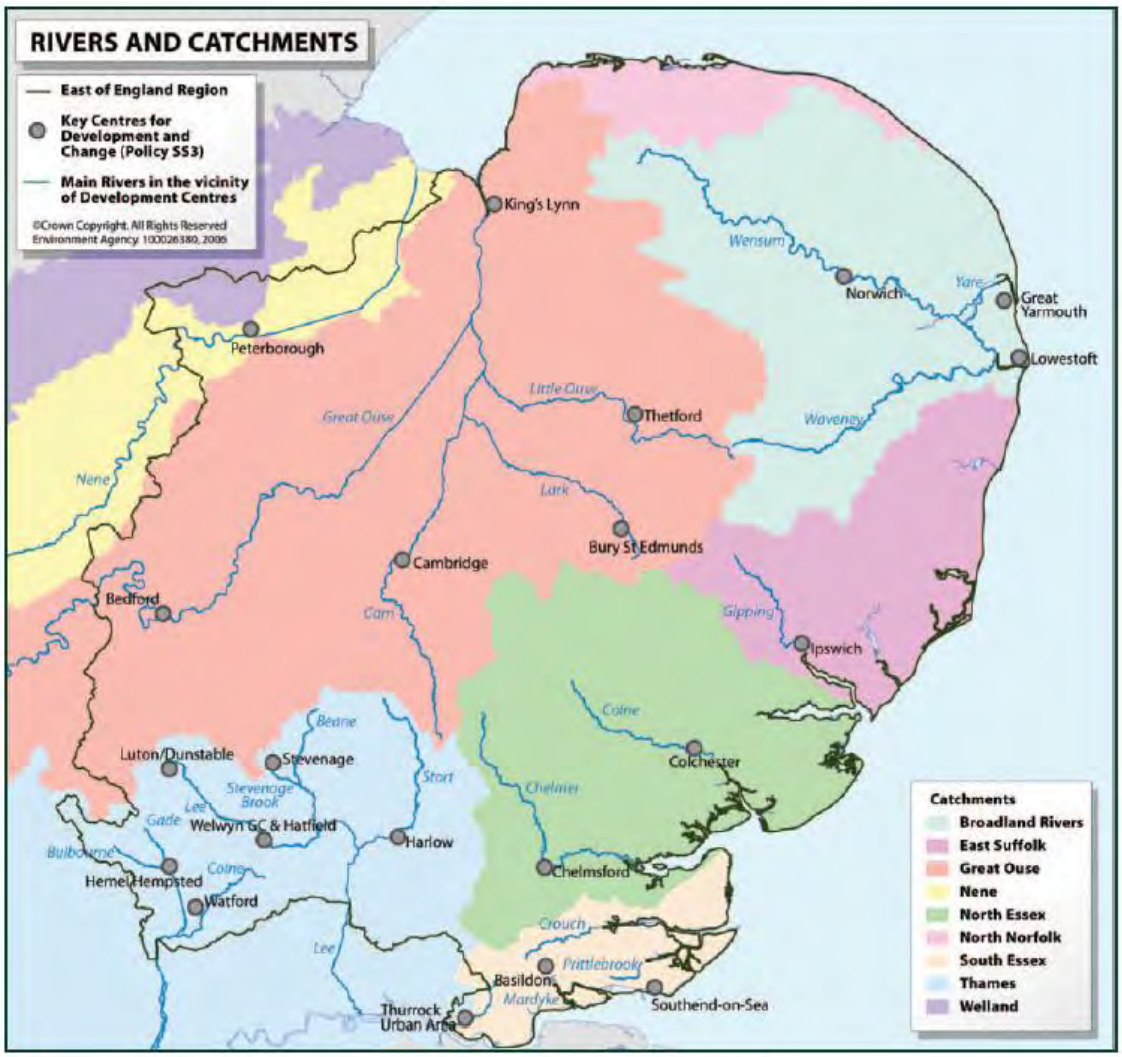

Figure 5.1: Rivers and Catchments in the East of England (from East of England Plan)

5.2.1.2 The Great Ouse catchment covers an area of 8,587km². The River Great Ouse is the primary river system; it starts in Northamptonshire near Brackley and then passes through Buckingham, Newport Pagnell, Bedford, St Neots, Brampton, Huntingdon, Godmanchester, St Ives and Earith before it crosses the Fens and flows into The Wash. The main tributaries include the rivers: Tove, Ouzel, Ivel, Cam, Lark, Wissey and the Little Ouse. The catchment area is largely rural; it supports traditional industries such as manufacturing, tourism, and agriculture. However, research and technology, finance and service sectors are becoming more important. The main towns are Milton Keynes, Bedford, Cambridge and King's Lynn. The main features of the Great Ouse catchment are shown in Figure 5.2.

Figure 5.2: The Great Ouse Catchment (from EA - Great Ouse CFMP)

5.2.1.3 Most of the watercourses within the Great Ouse catchment have been heavily modified for flood defence, navigation, or land drainage purposes.

5.2.1.4 The Environment Agency (EA) Anglian Region Central Area, based in Brampton, and Northern Area, based in Lincoln, are responsible for the operation and maintenance of the Main River flood defence assets and the flood warning on the Great Ouse and Nene respectively.

5.2.1.5 The responsibility for the minor watercourses and flood defence assets lies with different organisations, e.g. Landowners, Parish Councils, District Council, Anglian Water, IDBs and the EA. The District Council is directly responsible for more than 18 watercourses defined as Awarded Watercourses or Awards.

5.2.1.6 Huntingdonshire District is surrounded by six neighbouring planning authority areas; namely East Cambridgeshire, South Cambridgeshire, Mid Bedfordshire, North Bedfordshire, East Northamptonshire, Peterborough and Fenland. The area is under pressure for more development. There is a need to provide more space for housing as well as for business growth in urban and rural areas. The SFRA is an instrument to help assign development to areas where there will not be an increase in flood risk, and for this reason it is referred to largely in this report. It is noted that new development within Huntingdonshire is focused on expansion of existing settlements, particularly the primary market towns.

5.2.1.7 The Great Ouse catchment is mainly rural with 65% of the land managed as arable. Approximately 44% of the agricultural land in the catchment is Grade 1 and 2 (excellent to good quality).

5.2.1.8 Due to the size of the Great Ouse catchment, it is subdivided into smaller, more homogeneous, sub-catchments:

- the Bedford Ouse;
- the Fens;
- the Southern Rivers; and
- the North-West Norfolk Rivers

5.2.1.9 Huntingdonshire lies within the sub-catchments of the Bedford Ouse and the Fens, except for the North-West finger which falls into the Nene Catchment, as previously mentioned.

5.2.2 Bedford Ouse Catchment

5.2.2.1 The Bedford Ouse catchment is described as Bedfordshire and Cambridgeshire Claylands. It is characterised by a gently undulating topography and plateau areas, divided by broad shallow valleys.

5.2.2.2 Within Huntingdonshire, the main watercourses of the Bedford Ouse catchment are the Great Ouse and its tributaries, the River Kym at St Neots, the Alconbury Brook, the Ellington Brook and the Brampton Brook at Huntingdon, the West Brook/Hall Green Brook at St Ives.

5.2.2.3 A number of Internal Drainage Boards (IDBs) operate within the catchment. The IDBs are important stakeholders in flood risk management. Of particular interest to this study is the Alconbury and Ellington IDB, which is a member of the Bedford Group of IDBs, just west of Huntingdon as shown in Figure 5.3.

5.2.3 Old Bedford including Middle Level Catchment

5.2.3.1 This Catchment comprises an area of approximately 921 km^2, with major urban areas including Whittlesey, March, Ramsey and Chatteris. The local area comprises the Ouse Washes and the Middle Level River Systems.

5.2.3.2 The Ouse Washes (32km from Earith to Denver) were created in the 17th Century to provide storage of floodwater from the Bedford Ouse catchment – so preventing the surrounding Middle and South Levels from flooding. As one of the few remaining areas of Washland, the seasonally flooded Ouse Washes support nationally and internationally important numbers of wintering and breeding wetland birds. The site is also important for a range of aquatic plants and invertebrates.

5.2.3.3 The Middle Level and part of the South Level which dominate the area are crossed by numerous manmade drainage channels. There are no significant principal aquifers within the catchment.

5.2.3.4 The Middle Level, 60 per cent of which is fenland and below sea level, is administered for the most part by the Middle Level Commissioners with a two tier system by which the sub-catchments are administered by local IDBs. The IDBs of the Middle Level with rateable areas within Huntingdonshire are:

- Benwick;
- Bluntisham;
- Conington & Holme;
- Holmewood & District;
- Ramsey 1st;
- Ramsey 4th;
- Ramsey 5th;
- Ramsey, Upwood and Great Raveley;
- Sawtry;
- Sutton and Mepal;
- Warboys, Somersham and Pidley;
- Whittlesey; and
- Woodwalton.

5.2.3.5 These are highlighted in Figure 5.3 along with the other IDB of interest, the Alconbury & Ellington IDB of the Bedford Group, and the Core Strategy development sites. In this way it is possible to identify directly which IDB areas are affected by projected developments in Huntingdonshire.

5.2.3.6 The economy of this rural area is dependent on agriculture due to the creation of some of the most productive soils for arable farming in the UK by historic draining of the Fens.

5.2.4 General Overview of Huntingdonshire

5.2.4.1 Several parts of the study area are at risk of flooding. Development upstream of these areas has the potential to exacerbate the existing risk. However, there is also the opportunity to incorporate flood risk mitigation as part of the development proposals and so reduce flood risk to the existing properties. It is therefore important to understand where these areas of flood risk are in relation to the development sites. There are two principle sources of flood risk information, the EA Flood Zone Maps and the SFRA Flood Risk Maps.

5.2.4.2 A detailed Water Cycle Strategy can help the local planning authority by:

- providing an indication of the amount of storage that will be required for new developments so that flood risk is not increased downstream;
- providing an indication of the allowable run off from new development so that flood risk will not be increased downstream;
- identifying areas where discharge from storage is likely to increase flood risk downstream and evaluating the cumulative effect of discharge from multiple development sites;
- identifying opportunities for strategic flood risk mitigation that could reduce flood risk to existing development;
- identifying areas where development is likely to restrict future options for reducing flood risk downstream;
- identifying areas or WwTW where an increase in discharge consent will be required and an assessment of the flood risk impacts associated with this; and
- to provide a better understanding of the management required to protect or improve the environmental and recreational qualities of the Washes, Fenland, SSSIs and SACs.

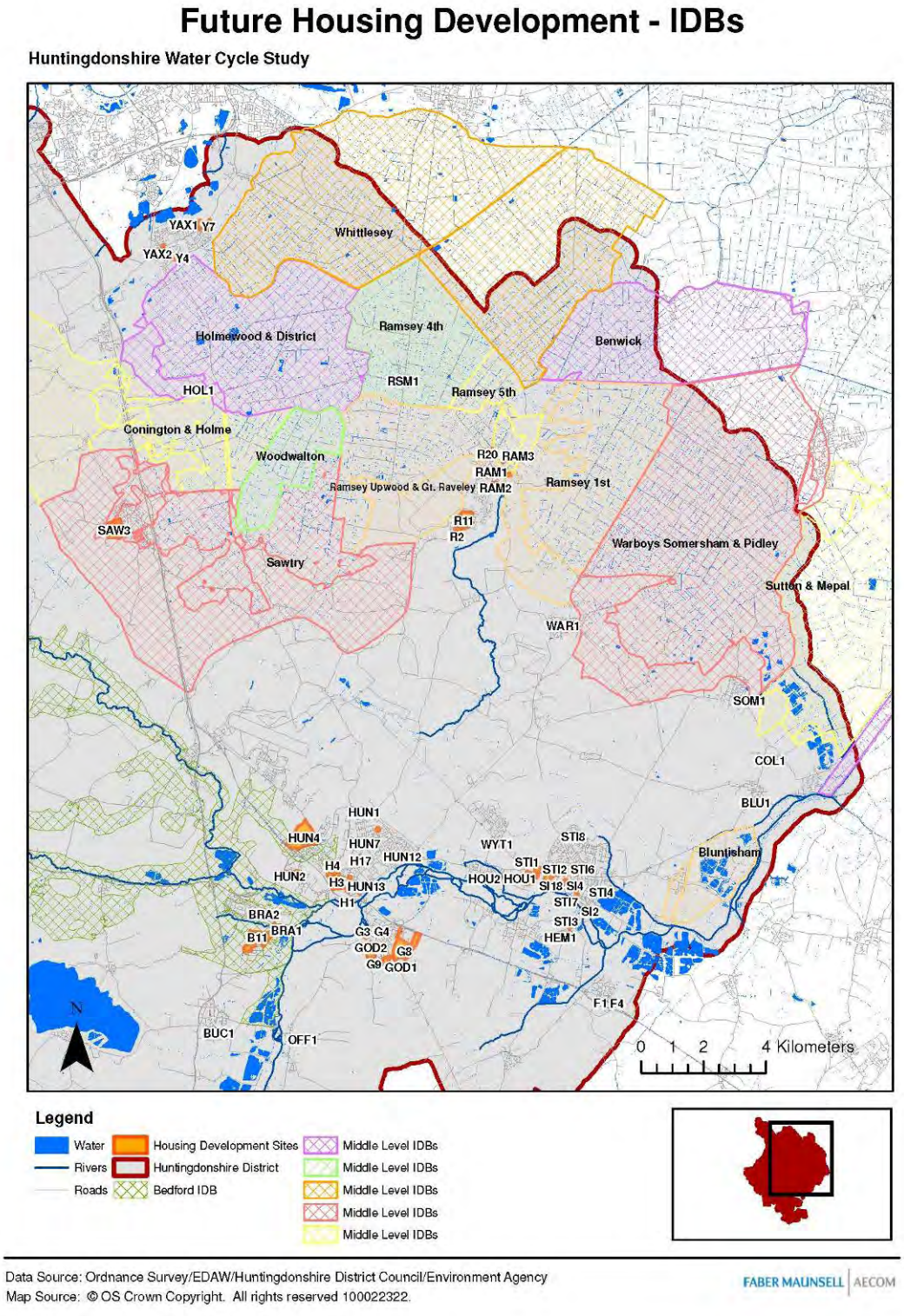

Figure 5.3: IDBs in Huntingdonshire in Relation to Development Sites

5.3 Strategic Flood Risk Assessment

5.3.1.1 HDC has commissioned an updated Strategic Flood Risk Assessment (SFRA) to take into consideration the proposed growth within Huntingdonshire and the effects of climate change. Until this updated SFRA is issued (due spring 2010), this study has considered land use based on the 2004 SFRA, and the advice that any changes to the currently identified flood plain are minor and not significant to the areas where growth is anticipated by HDC.

5.3.1.2 The SFRA for Huntingdonshire was undertaken in 2004 to provide a detailed and robust assessment of the extent and nature of the risk of flooding in Huntingdonshire and its implications for land use planning. The principal output from the 2004 study is a set of maps which subdivide the District into Flood Risk Zones in accordance with the definitions given in PPG 25. These maps were intended to give HDC sufficient information so as to have an overall view of flood risk areas for strategic planning purposes. The new maps within the updated SFRA should be used when they become available.

5.3.1.3 The risk of flooding from five principal sources was assessed, the sources are:

- EA Main Rivers (River Great Ouse and Tributaries and River Nene, plus Bury Brook);
- Middle Level Commissioners' high level carriers;
- Internal Drainage Boards' low level systems;
- Ordinary Watercourses (including Awarded Watercourses); and
- Surface water runoff

5.3.1.4 The assessment has shown that in some parts of the District there is a significant difference between the extent of Zone 3 (annual risk of flooding greater than 1%) and the extent of the Indicative Flood Maps produced by the Environment Agency. This is because the SFRA data takes into account flood defences while the EA's maps do not. It is anticipated that over time the differences between the data will be reduced.

5.3.1.5 It is assumed that all potential development sites will be covered by the updated SFRA, and its results should be considered in a detailed WCS, as flood zones affect the extent and type of development that should be permitted.

5.4 Existing Flood Risk

5.4.1.1 Existing flood risk has been assessed based on the 2004 Huntingdonshire SFRA, which takes into account existing flood defences and possible future effects of climate change to 2054. Proposed employment development areas are not designated in the 2004 SFRA, and as such this assessment of flood risk focuses on proposed housing development areas only. Employment development areas will be directed towards existing employment locations. For an assessment of site specific employment development opportunities, and for the most up to date assessment of housing development areas, the reader should refer to the updated SFRA which is due spring 2010.

5.4.1.2 The EA divides land into four flood zones according to its probability of flooding from rivers or the sea, as listed in Table 5.1. The flood zones produced for the SFRA are significantly different from those seen in the EA maps. The differences are due to the following:

- the 2004 SFRA flood zones show flood risk taking account of flood defences, the EA zones do not take account of defences;
- the 2004 SFRA was produced under the superseded Planning Policy Guidance 25 (PPG25) where a functional floodplain (Zone 3b) was defined as land that would flood with an annual probability of 1 in 10 (10%), not 1 in 20 (5%) as defined by the EA. The current guidance, PPS25, is in line with the EA's definition and will be appreciated in the updated SFRA of 2010. Furthermore, the EA does not distinguish between flood zone 3a and flood zone 3b in its maps of Huntingdonshire;
- the 2004 SFRA flood zones include current flood zone 3a and the predicted increased flood zone 3a due to climate change. The EA flood zones to not show effects of climate change;
- differences in mapping method. Where hydraulic model results exist, these have been used for both the EA flood zones and the 2004 SFRA flood zones. However, where there are no hydraulic models of the river system the EA use the results of the national JFLOW modelling exercise and evidence of historic flooding to define the flood zones. In comparison, the 2004 SFRA uses flood extents based on engineering judgement. The 2004 SFRA flood zones are often significantly smaller than the EA flood zones.

Table 5.1: EA Flood Zone Definitions

Flood Zone	Probability
1 (Low Probability)	Less than 1 in 1000 (<0.1%) annual probability of river or sea flooding in any one year
2 (Medium Probability)	Between 1 in 100 and 1 in 1000 annual probability of river flooding (1% to 0.1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% to 0.1%) in any one year.
3a (High Probability)	A greater than 1 in 100 annual probability of river flooding (>1%) or a greater than 1 in 200 annual probability of sea flooding (>0.5%) in any one year.
3b (Functional Floodplain)	Land that would flood with an annual probability of 1 in 20 (5%) or greater in any one year or is designed to flood in an extreme (0.1%) flood.

5.4.1.3 In those cases where sites are affected by Flood Zone 2 or Flood Zone 3, reference is to be made to the PPS25 flood vulnerability classification for infrastructure and developments, as listed in Table 5.2.

Table 5.2: Flood Vulnerability Classification (from PPS25, Table D.2)

Essential Infrastructure	▪ essential transport infrastructure (including mass evacuation routes) that has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	▪ police stations, ambulance stations, fire stations, command centres and telecommunications installations required to be operational during flooding; ▪ emergency dispersal points; ▪ basement dwellings; ▪ caravans, mobile homes and park homes intended for permanent residential use; and ▪ installations requiring hazardous substances consent.
More Vulnerable	▪ hospitals; ▪ residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels; ▪ buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels; ▪ non–residential uses for health services, nurseries and educational establishments; ▪ landfill and sites used for waste management facilities for hazardous waste; and ▪ sites used for holiday or short-let caravans and camping, **subject to a specific warning and evacuation plan**.
Less Vulnerable	▪ buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non–residential institutions not included in 'more vulnerable'; and assembly and leisure; ▪ land and buildings used for agriculture and forestry; ▪ waste treatment (except landfill and hazardous waste facilities); ▪ minerals working and processing (except for sand and gravel working); ▪ water treatment plants; and ▪ waste water treatment plants (if adequate pollution control measures are in place).
Water-compatible Development	▪ flood control infrastructure; ▪ water transmission infrastructure and pumping stations; ▪ sewage transmission infrastructure and pumping stations; ▪ sand and gravel workings; ▪ docks, marinas and wharves; ▪ navigation facilities; ▪ MOD defence installations; ▪ ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; ▪ water-based recreation (excluding sleeping accommodation);

	▪ lifeguard and coastguard stations; ▪ amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms; and ▪ essential ancillary sleeping or residential accommodation for staff required by uses in this category, **subject to a specific warning and evacuation plan**.

5.4.1.4 Several parts of Huntingdonshire are at risk of flooding. These are here examined in more detail.

5.4.2 Existing Flood Risk at Huntingdon

5.4.2.1 According to the 2004 SFRA, the majority of the proposed housing development areas in Huntingdon fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers and sea. All uses of land are appropriate in this zone.

5.4.2.2 The following exceptions are located in zones of higher flood risk:

- RAF Brampton (B11). The northern fringe of the site lies within current Flood Zone 3a;
- Manor Farm, Brampton (BRA1). The southern part of the site lies within current Flood Zone 3b;
- Earning Street, Godmanchester (G4). The entire site lies within current Flood Zone 3a;
- Gas Depot, Huntingdon (H1). The southern part of the site lies within current Flood Zone 3a;
- Model Laundry, Huntingdon (HUN11). The majority of the site lies within current Flood Zone 3a;
- Northbridge, Ermine Street, Huntingdon (HUN4). The western part of the site lies within current Flood Zone 3a; and
- Corpus Christi, Godmanchester (G3). The northern fringe of the site lies within future Flood Zone 3a (2054).

5.4.2.3 Development in Flood Zone 3 should be limited to water compatible and less vulnerable development as described in PPS25 Table D.2 (see Table 5.2). If, following the application of the sequential test, it is shown that there is no other site available for development at lower flood risk, then more vulnerable development or essential infrastructure may be allowable, however the exception test must be passed in order for this to happen. Highly vulnerable development should not be allowed at these sites.

5.4.2.4 The flood risk should be reassessed following the release of the forthcoming updated Huntingdonshire SFRA. Where required, site specific Flood Risk Assessments should assess the vulnerability to flooding from various sources including from surface water, rivers, sea, land, groundwater, sewers, reservoirs, canals and artificial sources. The site specific FRAs should also cover the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off. An allowance for the effects of climate change should be made in run-off calculations

5.4.2.5 During the drafting of the Core Strategy the EA was consulted regarding proposed developments in Huntingdonshire, given its important role, especially since the publishing of PPS25. The EA stresses the fact that growth in Huntingdonshire, as elsewhere, will need to be as sustainable as possible. The EA wants to see a minimum of 25% saving on current water use, no homes located in areas of unacceptable environmental risk and no new buildings in the flood plain without an approved PPS25 compliant flood risk assessment.

5.4.2.6 With regard to development at Huntingdon town the EA concluded that no strategic issues apply other than the need to avoid areas of flood plain. However, Brampton is likely to encounter problems expanding to the north-west due to the flood plain. Of further consideration would be the proximity of the diverted A14 close to the south of Brampton.

5.4.2.7 Godmanchester – no strategic issues apply here other than the proximity of the diverted A14. However a flood defence improvement feasibility study is being considered.

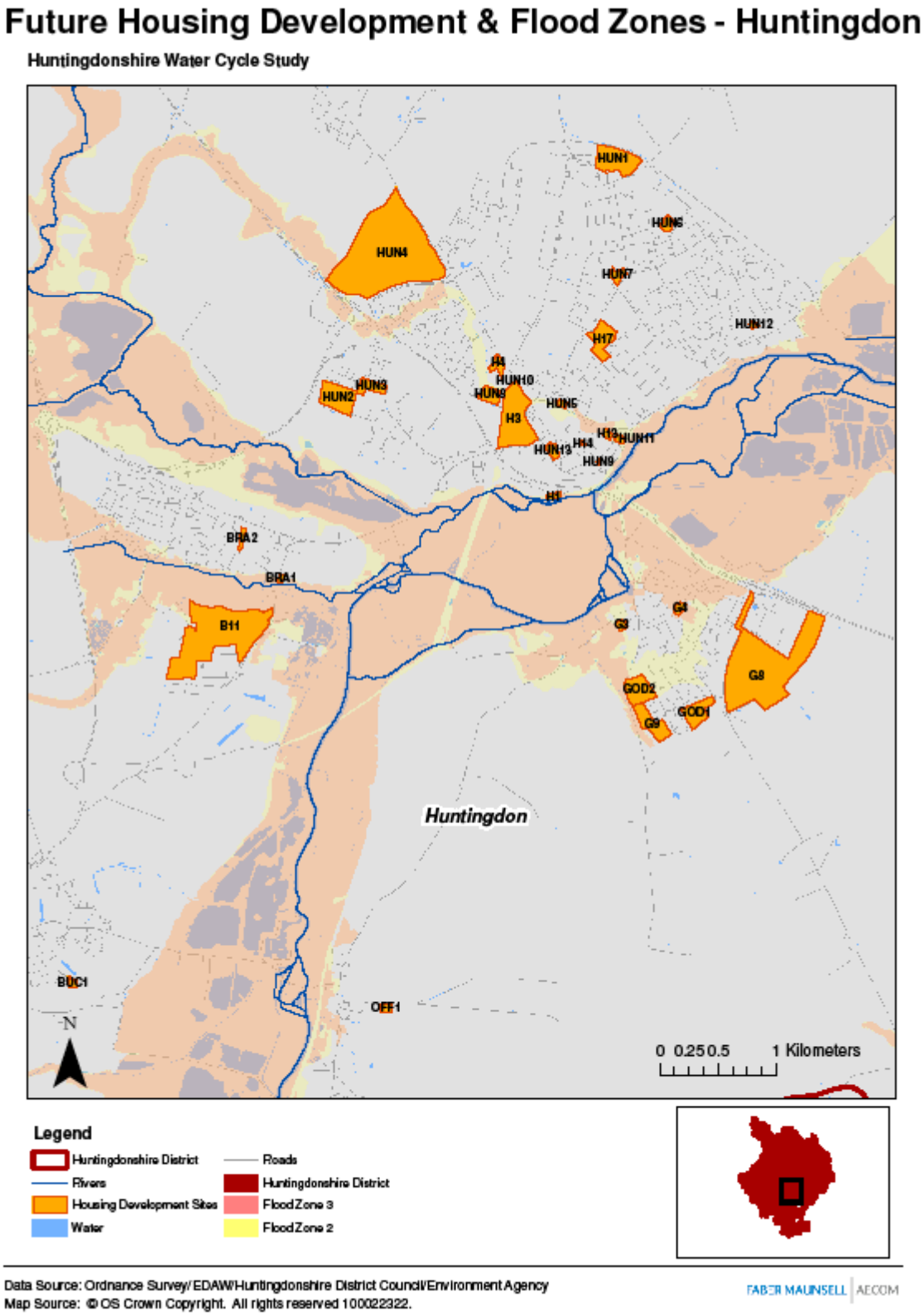

Figure 5.4: EA Flood Risk Map for Huntingdon with Core Strategy Developments

5.4.3 Existing Flood Risk at St Neots

5.4.3.1 According to the 2004 SFRA, a small number of the proposed housing development areas in St Neots fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers and sea. All uses of land are appropriate in this zone.

5.4.3.2 The following sites are located in zones of higher flood risk:

- Riverside Mill, Little Paxton (LIT3). A very small part at the south of this site lies within current Flood Zone 3b;
- Island Site, Little Paxton (LIT1). The entire site lies within current Flood Zone 3b;
- Loves Farm, large (STN3). This site has a brook, and associated current Flood Zone 3a, flowing through its southern part;
- Loves Farm, small (SN16). The entire site lies within current Flood Zone 3a;
- South of Cambridge Road (SN7). Two land drains, and associated current Flood Zone 3a, flow through the middle of the site;
- Sandfields Road (SN8). Half of the site lies within current Flood Zone 3a;
- Church Street (STN2). The southern part of the site lies just inside the current Flood Zone 3a;
- Windmill Row (STN4). The southern part of the site lies just inside the current Flood Zone 3a;
- St Mary's Urban Village (SN15). The southern part of the site lies just inside the current Flood Zone 3a;
- Youth Centre (STN7). The entire site lies within the current Flood Zone 3a;
- Barford Road, south (STN1b). The western quarter of this site lies within current Flood Zone 3b, next to this, a quarter of the site lies within the future Flood Zone 3a (2054);
- Barford Road, north (STN1a). A small area in the western quarter of site lies within current Flood Zone 3b, the remainder of the west of the site lies within current Flood Zone 3a, next to this, a quarter of the site lies in the future Flood Zone 3a (2054);
- Alfred Hall Memorial Field (SN10). The entire site lies within current Flood Zone 3a. South and eastern borders lie within the future Flood Zone 3a (2054); and
- Huntingdon Street (SN2). The northern part of the site lies within the future Flood Zone 3a (2054).

5.4.3.3 It is understood from HDC that the east of St Neots drains through Fox Brook , Hen Brook and another drain south of Eynesbury to the River Great Ouse. All of these watercourses cause flooding in the town centre or locally. Proposed developments to the east of St. Neots will therefore need to consider appropriate SUDS.

5.4.3.4 Development in Flood Zone 3 should be limited to water compatible and less vulnerable development as described in PPS25 Table D.2 (see Table 5.2). If, following the application of the sequential test, it is shown that there is no other site available for development at lower flood risk, then more vulnerable development or essential infrastructure may be allowable, however the exception test must be passed in order for this to happen. Highly vulnerable development should not be allowed at these sites.

5.4.3.5 The flood risk should be reassessed following the release of the forthcoming updated Huntingdonshire SFRA. Where required, site specific Flood Risk Assessments should assess the vulnerability to flooding from various sources including from surface water, rivers, sea, land, groundwater, sewers, reservoirs, canals and artificial sources. The site specific FRAs should also cover the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off. An allowance for the effects of climate change should be made in run-off calculations.

5.4.3.6 During the drafting of the Core Strategy the EA was consulted regarding proposed developments in Huntingdonshire, given its important role, especially since the publishing of PPS25. The EA stresses the fact that growth in Huntingdonshire, as elsewhere, will need to be as sustainable as possible. The EA wants to see a minimum of 25% saving on current water use, no homes located in areas of unacceptable environmental risk and no new buildings in the flood plain without an approved PPS25 compliant flood risk assessment.

5.4.3.7 With regard to development at St Neots the EA concluded that whilst the numbers of proposed units are large, there are no strategic issues affecting expansion to the east, where flood plain is limited. There are also areas outside of the flood plain within the current extent of St Neots where infill development could take place.

5.4.3.8 A flood alleviation scheme to protect 115 existing properties in St. Neots commenced in February 2009. The scheme includes raising the embankment alongside the river and raising a section of Cross Hall Road.

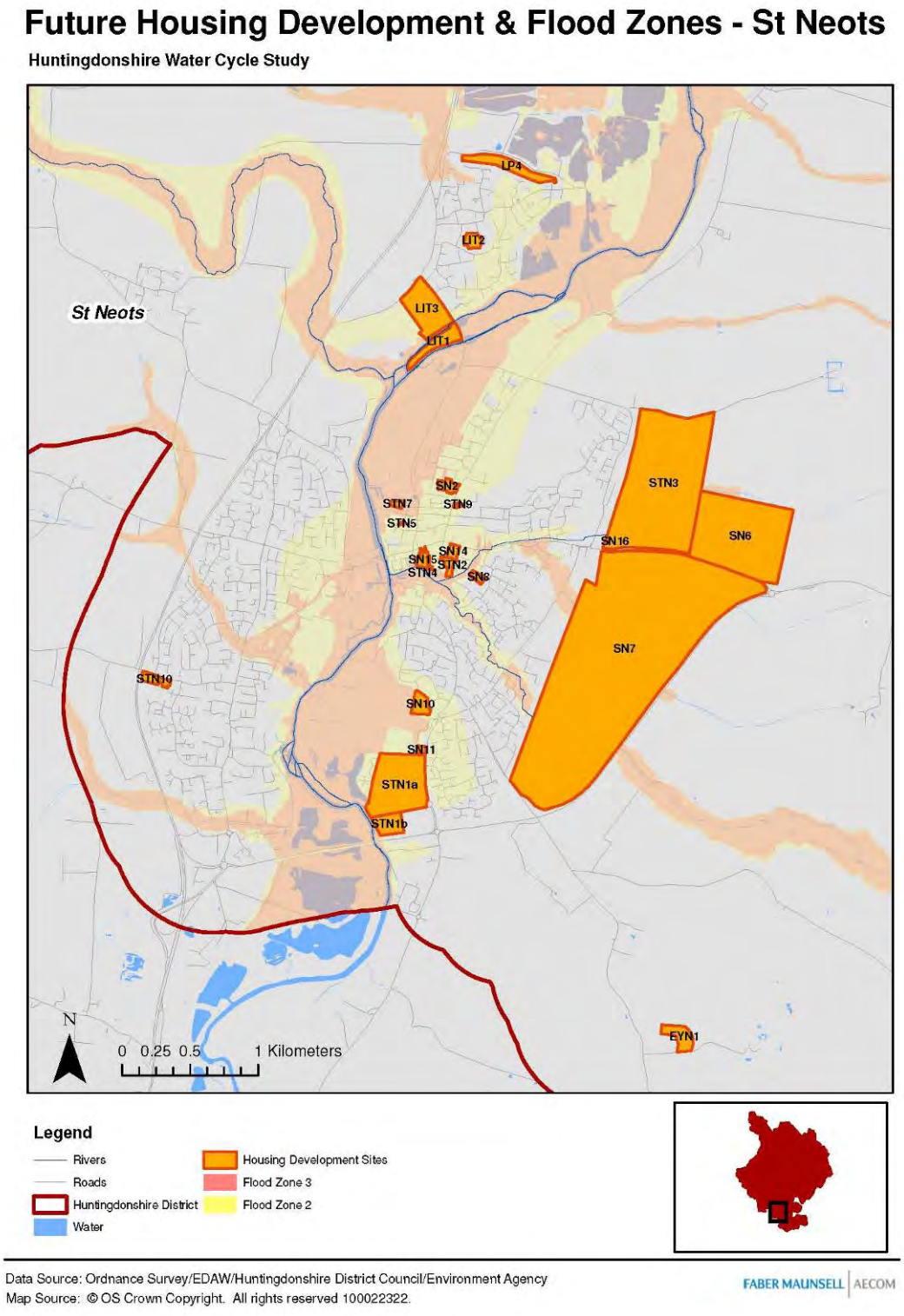

Figure 5.5: EA Flood Risk Map for St Neots with Core Strategy Developments

5.4.4 Existing Flood Risk at St Ives

5.4.4.1 This area benefits from recently completed flood defences. The St Ives and Hemingford Flood Alleviation Scheme was developed in response to three significant recent flood events, namely Easter 1998, October 2000 and January 2003. For each event the theoretical chance of occurrence in any one year was 1 in 35, 1 in 10 and 1 in 10 respectively.

5.4.4.2 The Scheme combined improvement of existing flood defences and the construction of new defences as appropriate. The finished Scheme provides a 100 year protection standard (1% probability of flooding in any one year) throughout the defended area. 1,771 residential properties received improved flood protection from the scheme. A further 52 properties which do not actually flood now benefit from having their accesses defended to a higher standard of flood protection (Environment Agency Opening Ceremony Publication).

5.4.4.3 Local residents have complained to HDC about surface water flooding in the St Audrey Lane area, but these complaints had not been relayed to AW and therefore did not appear on their system. AW has carried out some remedial work on the existing sewers, but now has proposals for up-rating the system. HDC also advise that surface water flooding problems exist in the Pig Lane area.

5.4.4.4 According to flood mapping provided to us by the EA (which takes into account the St. Ives and Hemingford Flood Alleviation Scheme), the majority of the proposed housing development areas in St Ives fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers and sea. All uses of land are appropriate in this zone.

5.4.4.5 A number of areas are indicated to be located in zones of higher flood risk:

- Fire Station and Clinic (SI3). The entire site lies within current Flood Zone 3a.
- No.23 North Road (ST17). The entire site lies within current Flood Zone 3a.
- West Street (ST15). The entire site lies within current Flood Zone 3a.
- Lynhurst (ST13). The entire site lies within current Flood Zone 3a.
- London Road (HEM1). The entire site lies within current Flood Zone 3a.
- Golf Course (SI18). A small area of southern part of site is just in future Flood Zone 3a (2054)
- Needing worth Road (ST14). Half of the site lies within current Flood Zone 3a, the rest of the site lies within future Flood Zone 3a (2054).
- South of New Road (S12). The site is bordered on three sides by future Flood Zone 3a (2054).

5.4.4.6 Development in Flood Zone 3 should be limited to water compatible and less vulnerable development as described in PPS25 Table D.2 (see Table 5.2). If, following the application of the sequential test, it is shown that there is no other site available for development at lower flood risk, then more vulnerable development or essential infrastructure may be allowable, however the exception test must be passed in order for this to happen. Highly vulnerable development should not be allowed at these sites.

5.4.4.7 The flood risk should be reassessed following the release of the forthcoming updated Huntingdonshire SFRA. Where required, site specific Flood Risk Assessments should assess the vulnerability to flooding from various sources including from surface water, rivers, sea, land, groundwater, sewers, reservoirs, canals and artificial sources. The site specific FRAs should also cover the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off. An allowance for the effects of climate change should be made in run-off calculations.

5.4.4.8 During the drafting of the Core Strategy the EA was consulted regarding proposed developments in Huntingdonshire, given its important role, especially since the publishing of PPS25. The EA stresses the fact that growth in Huntingdonshire, as elsewhere, will need to be as sustainable as possible. The EA wants to see a minimum of 25% saving on current water use, no homes located in areas of unacceptable environmental risk and no new buildings in the flood plain without an approved PPS25 compliant flood risk assessment.

5.4.4.9 With regard to development at St Ives the EA concluded that the natural expansion direction from town planning perspectives would be to the east, with the regeneration of the existing industrial area located there. However, this part of the town is bordered by flood plain which would be an effective barrier to further eastward expansion unless major earthworks to relocate the flood volume were undertaken. Such a course of action might trigger betterment of the existing developments within flood plain nearby. Mixed use expansion towards the north and south-west should not encounter any strategic issues.

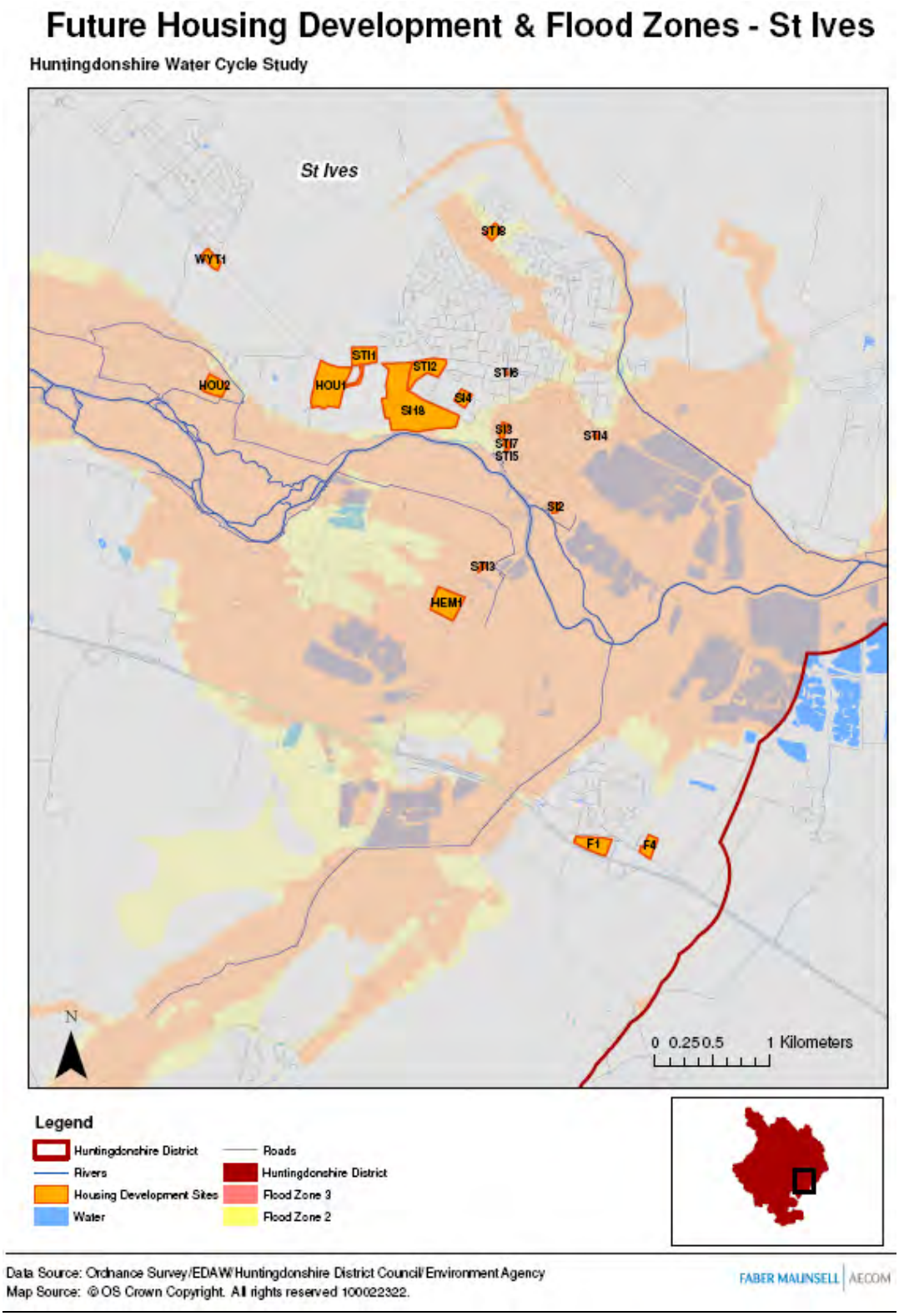

Figure 5.6: EA Flood Risk Map for St Ives with Core Strategy Developments

5.4.5 Existing Flood Risk at Ramsey

5.4.5.1 According to the 2004 SFRA all of the proposed housing development areas in Ramsey fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers. All uses of land are appropriate in this zone.

5.4.5.2 The flood risk should be reassessed following the release of the forthcoming updated Huntingdonshire SFRA. Where required, site specific Flood Risk Assessments should assess the vulnerability to flooding from various sources including from surface water, rivers, sea, land,

groundwater, sewers, reservoirs, canals and artificial sources. The site specific FRAs should also cover the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off. An allowance for the effects of climate change should be made in run-off calculations.

5.4.5.3 During the drafting of the Core Strategy the EA was consulted regarding proposed developments in Huntingdonshire, given its important role, especially since the publishing of PPS25. The EA stresses the fact that growth in Huntingdonshire, as elsewhere, will need to be as sustainable as possible. The EA wants to see a minimum of 25% saving on current water use, no homes located in areas of unacceptable environmental risk and no new buildings in the flood plain without an approved PPS25 compliant flood risk assessment.

5.4.5.4 With regard to development at Ramsey the EA was primarily concerned with the proximity of the Great Fen Project. Also of concern was the location of the developments within the Middle Level. All of the Middle Level area is dependent on artificial pumped drainage to evacuate excess rainfall.

5.4.6 Existing Flood Risk at Yaxley and Sawtry

5.4.6.1 According to the 2004 SFRA all of the proposed housing development areas in Yaxley and Sawtry fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers and sea. All uses of land are appropriate in this zone.

5.4.6.2 A problem exists with surface water flooding in Mere Way, with a dispute between HDC and AW over ownership of a surface water balancing pond.

5.4.6.3 The flood risk should be reassessed following the release of the forthcoming updated Huntingdonshire SFRA. Where required, site specific Flood Risk Assessments should assess the vulnerability to flooding from various sources including from surface water, rivers, sea, land, groundwater, sewers, reservoirs, canals and artificial sources. The site specific FRAs should also cover the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off. An allowance for the effects of climate change should be made in run-off calculations.

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5.4.6.5 With regard to development at Yaxley and Sawtry the EA was primarily concerned with the proximity of the Great Fen Project. Also of concern was the location of the developments within the Middle Level. All of the Middle Level area is dependent on artificial pumped drainage to evacuate excess rainfall.

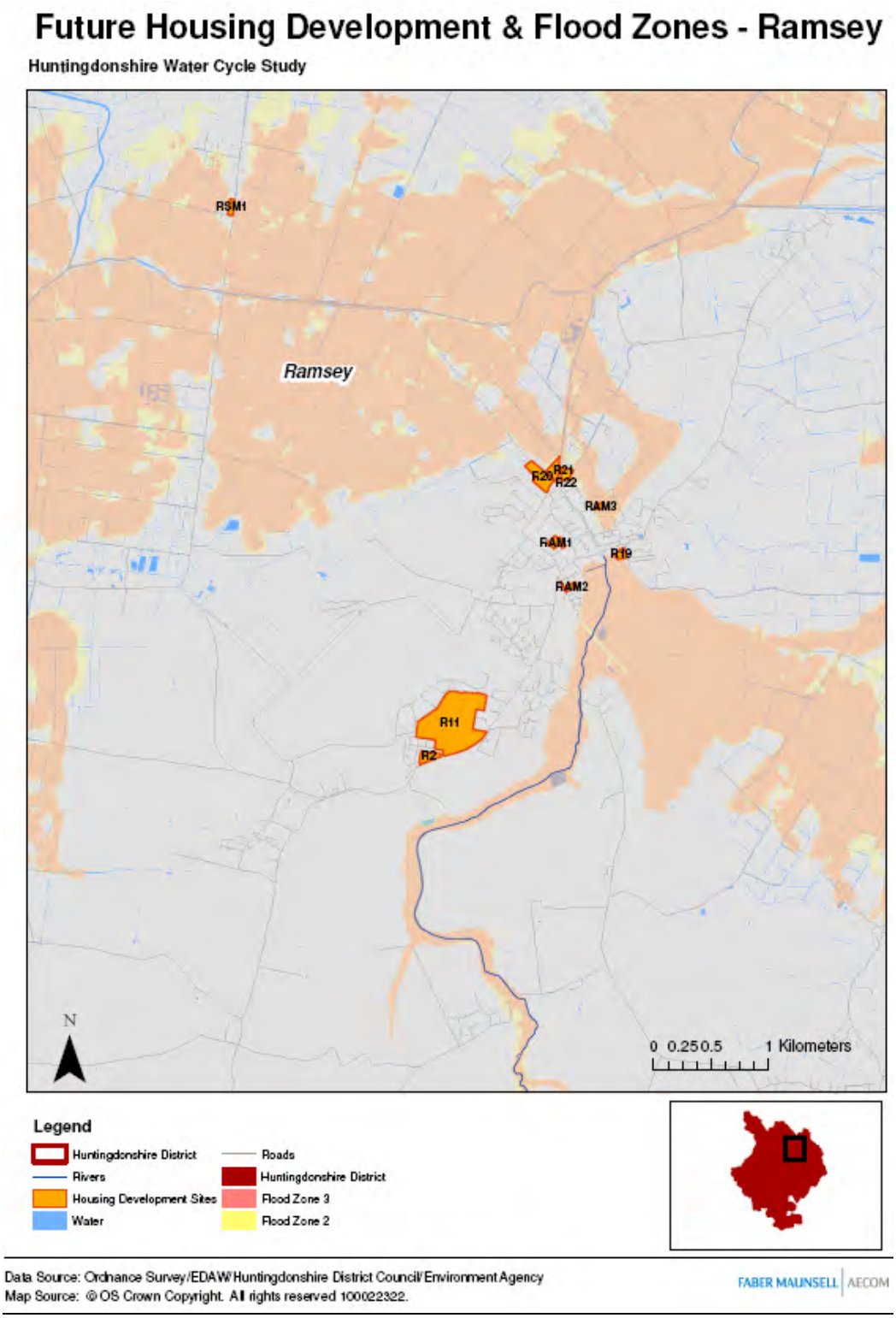

Figure 5.7: EA Flood Risk Map for Ramsey with Core Strategy Developments

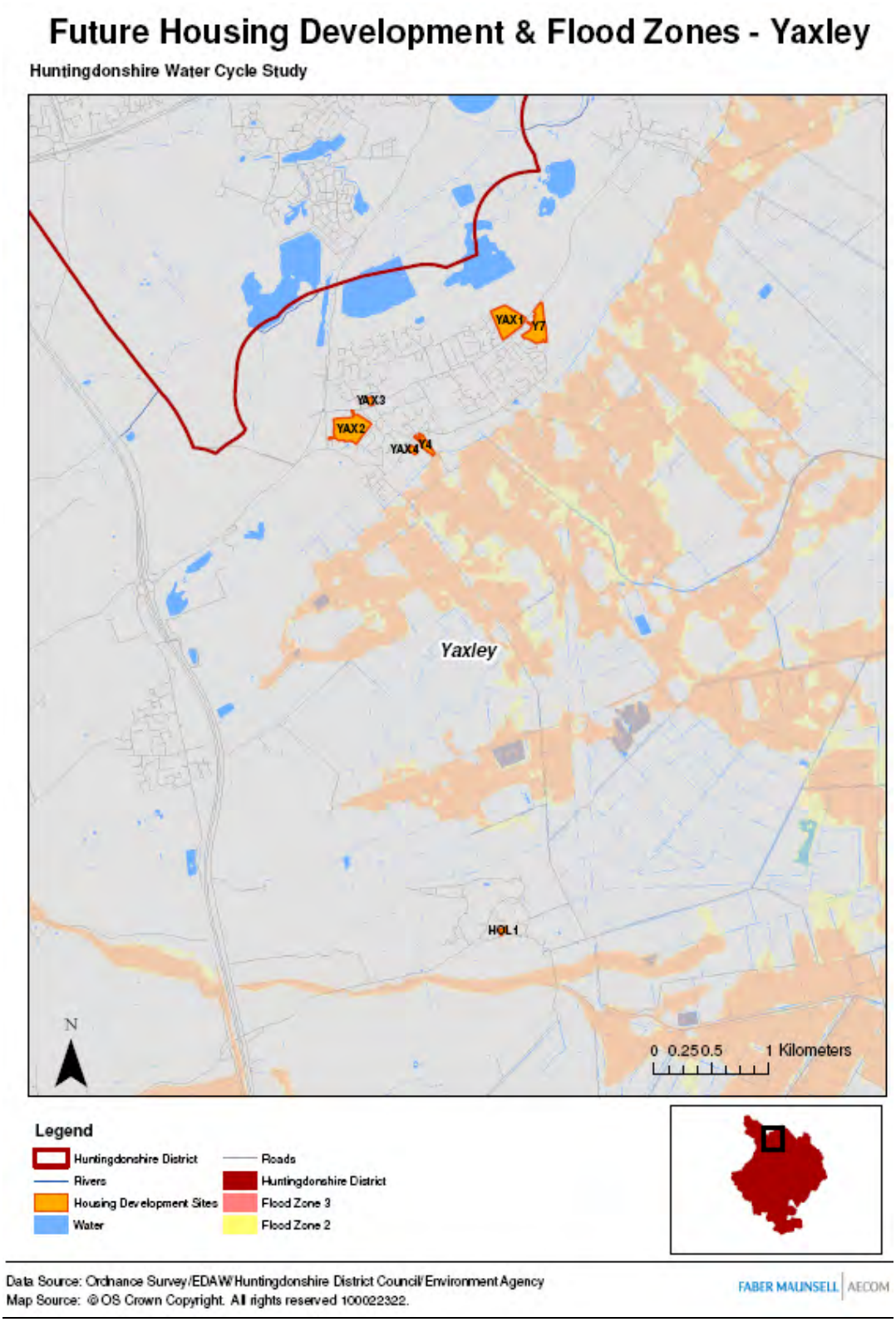

Figure 5.8: EA Flood Risk Map for Yaxley with Core Strategy Developments

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Water Resources and Supply

6 Water Resources and Supply

6.1.1.1 According to the Environment Agency's report identifying areas of water stress (January 2007) there is less water per person in many parts of England than in most Mediterranean countries, and parts of the South East have less water per person than the Sudan or Syria. In some parts of England the density of the population, combined with a significant or growing demand for water, places real stress on the environment.

6.1.1.2 More particularly, the East of England is the driest region in England, and one of the fastest growing. Water resources are limited and there are already supply-demand issues in parts of the region. In some catchments abstraction is not reliable during dry winters and, under predicted scenarios for climate change, more frequent drought conditions are expected, leading to increased pressure on resources.

6.1.1.3 The EA's final water stress classification map, by water company areas of competence, is shown in Figure 6.1.

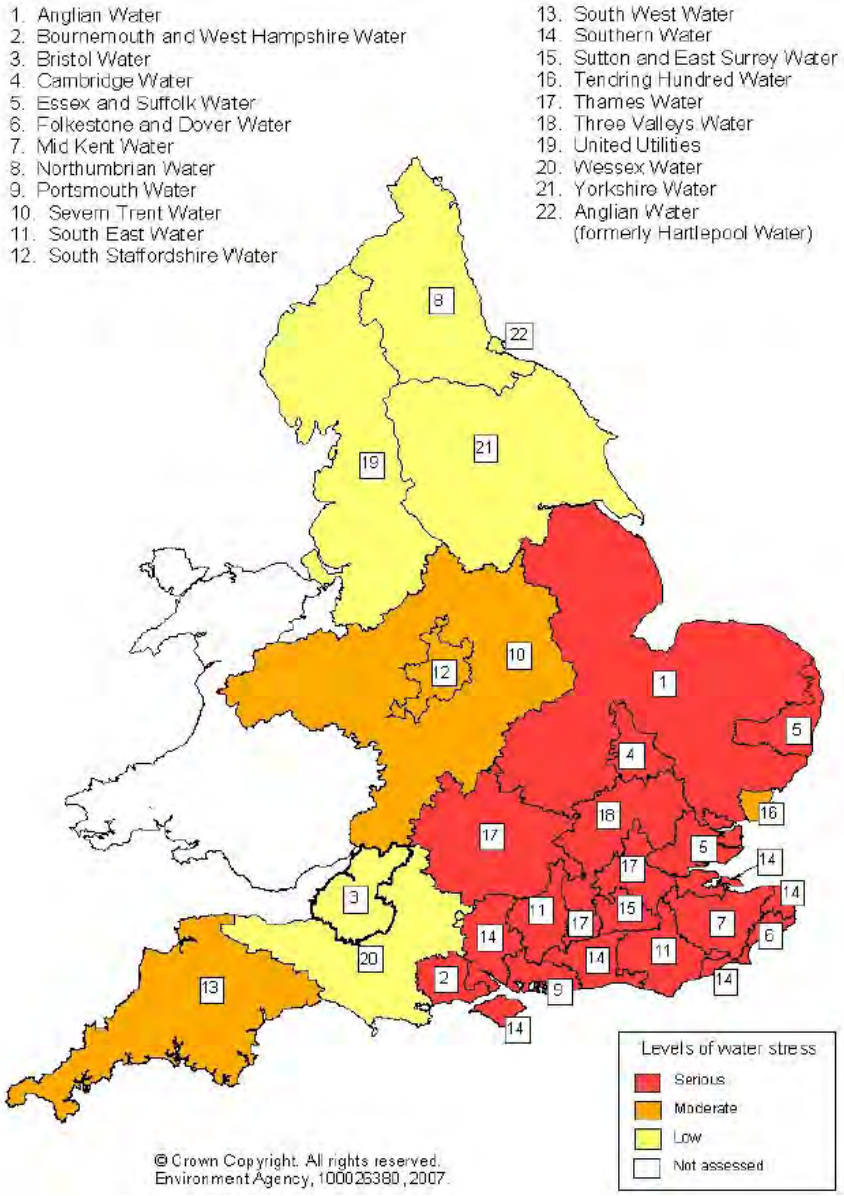

Figure 6.1: Water Stress Area Classification Map (EA, Areas of water stress – final classification, December 2007)

6.2 Management and Planning

6.2.1.1 Figure 6.1 indicates that overall, the Anglian Water controlled area is regarded as having serious water stress. The Cambridge Water Company area, in common with the remainder of SE England, is also regarded as being in serious water stress, now and in the future. The management and planning of water resources is therefore an important factor for proposed growth.

6.2.1.2 This document includes details of the development areas and numbers. However, the requirements to service these sites with water will be considered under the Detailed Water Cycle Strategy once the preferred development areas have been identified.

6.2.1.3 The Environment Agency manages water resources at a local level through the use of Catchment Abstraction Management Strategies (CAMS). The aim of a CAMS is to ensure that the water resources of the area are managed in a sustainable manner for the future, with due regard for the needs of the environment, abstractors, and other water users. Huntingdonshire lies mostly within the Old Bedford including Middle Level CAMS area, to the north and east, and the Upper Ouse and Bedford Ouse CAMS area to the south and west. The northwest finger of Huntingdonshire protrudes into the Nene CAMS area.

6.2.1.4 Within the CAMS system, the Environment Agency's assessment of the availability of water resources is based on the relative balance between committed and available resources. A classification system which states the perceived resource availability status has been developed and indicates:

- the relative balance between the environmental requirements for water and how much is licensed for abstraction;
- whether water is available for further abstraction; and
- areas where abstraction needs to be reduced.

6.2.1.5 The categories of resource availability status are shown in Table 6.1. The classification is based on an assessment of a river system's ecological sensitivity to abstraction related flow reduction. This classification can be used to help assess the potential for additional water resources abstraction.

Table 6.1: Resource Availability Status Categories (from EA, CAMS Documents)

Indicative Resources Availability Status	Licence Availability	Colour Coding for Illustration on Maps
Water available	Water is likely to be available at all flows including low flows. Restrictions may apply	Blue
No water available	No water available for further licensing at low flows. Water may be available at high flows with appropriate restrictions	Yellow
Over-licensed	Current actual abstraction is such that no water is available at low flows. If existing licences were to be used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows with appropriate restrictions.	Orange
Over abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows with appropriate restriction.	Red

6.3 The Upper Ouse and Bedford Ouse CAMS

6.3.1.1 The Upper Ouse and Bedford Ouse CAMS area covers 3000km^2 and is defined by the Ouse catchment, and that of a number of its tributaries, from its source, near Brackley, down as far as Earith. It includes the major towns of Milton Keynes and Bedford. The south of Huntingdonshire, including St Neots, Huntingdon and St Ives are contained within this CAMS area.

6.3.1.2 The long-term average rainfall in this catchment varies from 670mm per annum in the west to 540mm in the fenland areas in the east. Generally, the amount of rainfall in each month is fairly constant throughout the year. In summer, however, evapotranspiration exceeds rainfall giving a net loss from the catchment.

6.3.1.3 Anglian Water (AW) is the only water supply company to make surface water abstractions in the catchment. In addition, individual householders may abstract up to 20 cubic metres per day from inland waters for their domestic use if they have a right of access to a surface water or groundwater source (either access to the river or to a local well or borehole). Public Water Supply surface water abstractions by AW make up approximately 75.5% of the water licensed for abstraction from the catchment. There are three water companies who abstract groundwater from the Chalk and Greensand aquifers of the catchment, Veolia Water Central, Anglian Water (AW) and the Cambridge Water Company (CWC). There are 19 groundwater boreholes operating for public water supply in these areas and, though they are outside of Huntingdonshire, the water abstracted does undoubtedly supply the district given the nature of the distribution systems of the two companies operating in the district, AW and CWC. In addition, individual householders abstract from wells or boreholes for their own domestic use.

6.3.1.4 Given the size of the CAMS area, the EA has subdivided into ten Water Resource Management Units (WRMUs). The WRMUs are numbered from downstream, WRMU1 – Lower Ouse, to upstream, WRMU10 – Upper Ouse, as each unit needs to take into account the downstream water users. The WRMUs of interest to Huntingdonshire are WRMU1-Lower Ouse, WRMU4-Bedford Ouse, WRMU2-Alconbury Brook, and WRMU3-River Kym. These are shown in Figure 6.2.

6.3.1.5 Each of these four WRMUs has been assessed as No Water Available in the EA's indicative resource availability status (code yellow). In WRMU1 and WRMU4 this status is maintained by significant treated effluent discharges from Bedford waste water treatment works (WwTW) and Milton Keynes WwTW (upstream of WRMU1 and WRMU4). These upstream discharges result in far higher summer flows below the discharge points than would occur naturally.

6.3.1.6 With specific regard to WRMU1 and WRMU4, the flow duration curve at Earith showed that the ecological river flow objective and the fully licensed scenario curves run very close for flows below Q37 (i.e. The flow in a river which is exceeded on average 37% of the time). Because of this, the only water available for new consumptive abstraction will be for flows above Q37. Therefore, the sustainability process requires that future management of these WRMUs maintain the current resource availability status of No Water Available. The policy will allow water to be abstracted for high flows, with due regard to Q37 at Earith.

6.3.1.7 With regard to WRMU2 and WRMU3, discharge waters primarily maintain the status within these units. There are generally no low flow (typically summer conditions) water resources available. Water will be generally available during periods of high flow (typically winter conditions) and abstractors are encouraged to store water in reservoirs for summer use. Maintaining the current resource availability status for these two WRMUs will protect the ecological river flow objective and may give benefits further downstream, protecting the delicately balanced WRMU1.

6.3.1.8 Anglian Water (AW) abstracts from the River Great Ouse to fill Grafham Water. Abstraction from WRMU 4 is controlled by a licence that permits a variable rate of abstraction that is dependent on the measured flows in the river. This licence was granted in 1968 to follow the provisions of the Great Ouse Water Act 1961. The EA and AW subsequently reached an agreement in 1992 to ensure the protection of that licence, while allowing 'new' licences to be issued upstream of the abstraction point. Since 1992 all such licences have contained a clause that is linked to the AW licence, which prevents the derogation of it and safeguards public water supply. (N.B. This clause does not protect flows/affect abstractions downstream). The clause affects abstraction licences between 5 and 20 megalitres per annum (Ml/a) from all watercourses upstream of the AW abstraction point. The condition states that abstraction must cease when:

> '*Flow upstream of the intake is equal to or less than 2.9 cubic metres per second, or such other flow being not greater than the above figure as may be notified to the licence holder by the Environment Agency OR when 'control level' is reached on Great Ouse upstream of the intake*'

6.3.1.9 The 'control level' to which the latter part of the condition refers is based on a series of reservoir operational control curves.

Legend

- Grand Union Canal in the CAMS area
- Main Rivers in the CAMS area

River Assessment Points

- Over Abstracted
- Over Licensed
- No Water Available
- No Water Available WRMU
- Over Licensed WRMU
- Over Abstracted WRMU
- Woburn Sands GWMU draining to Cam & Ely Ouse CAMS
- Woburn Sands GWMU draining to Thames Region

Figure 6.2: Water Resource Management Units for Sustainability Appraisal in the Upper Ouse and Bedford Ouse CAMS Area

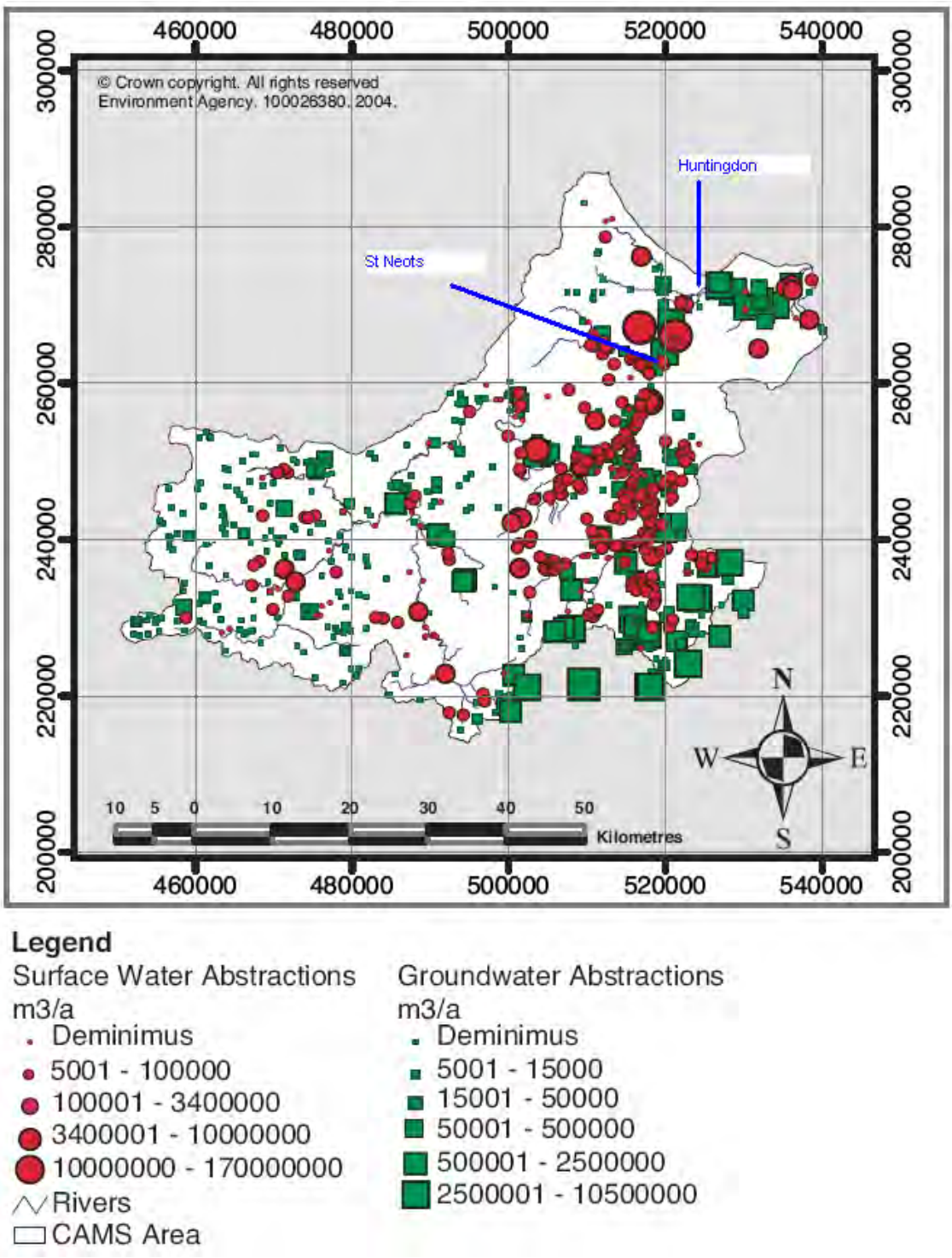

Figure 6.3: Licensed Abstractions in Upper Ouse and Bedford Ouse CAMS Area (from EA CAMS)

6.4 The Old Bedford including Middle Level CAMS

6.4.1.1 The Old Bedford and Middle Level CAMS area covers the north of Huntingdonshire from just north of Huntingdon. The development areas which fall into this CAMS are Ramsey, Yaxley and Sawtry areas, along with the smaller development sites at Somersham and Colne which are part of the St Ives area.

6.4.1.2 The average (1965-2002) rainfall for the area is 520mm per annum, compared to the long-term UK average (1971-2000) of 1125mm per annum.

6.4.1.3 There are currently 372 surface and groundwater abstraction licences in the CAMS area. However, the majority of these (341) are held for spray irrigation. In fact there are no public

water supply licences within this CAMS area. Water for public use is imported from outside the catchment.

6.5 The Nene CAMS

6.5.1.1 The northwest finger of Huntingdonshire falls into the River Nene catchment and, therefore, the EA's River Nene CAMS area. The catchment is divided into three WRMUs west of Peterborough, while the area east of Peterborough (Nene Washes) is not assessed. These are shown in Figure 6.4. All the WRMUs in the Nene CAMS area are classified as *Over Abstracted*.

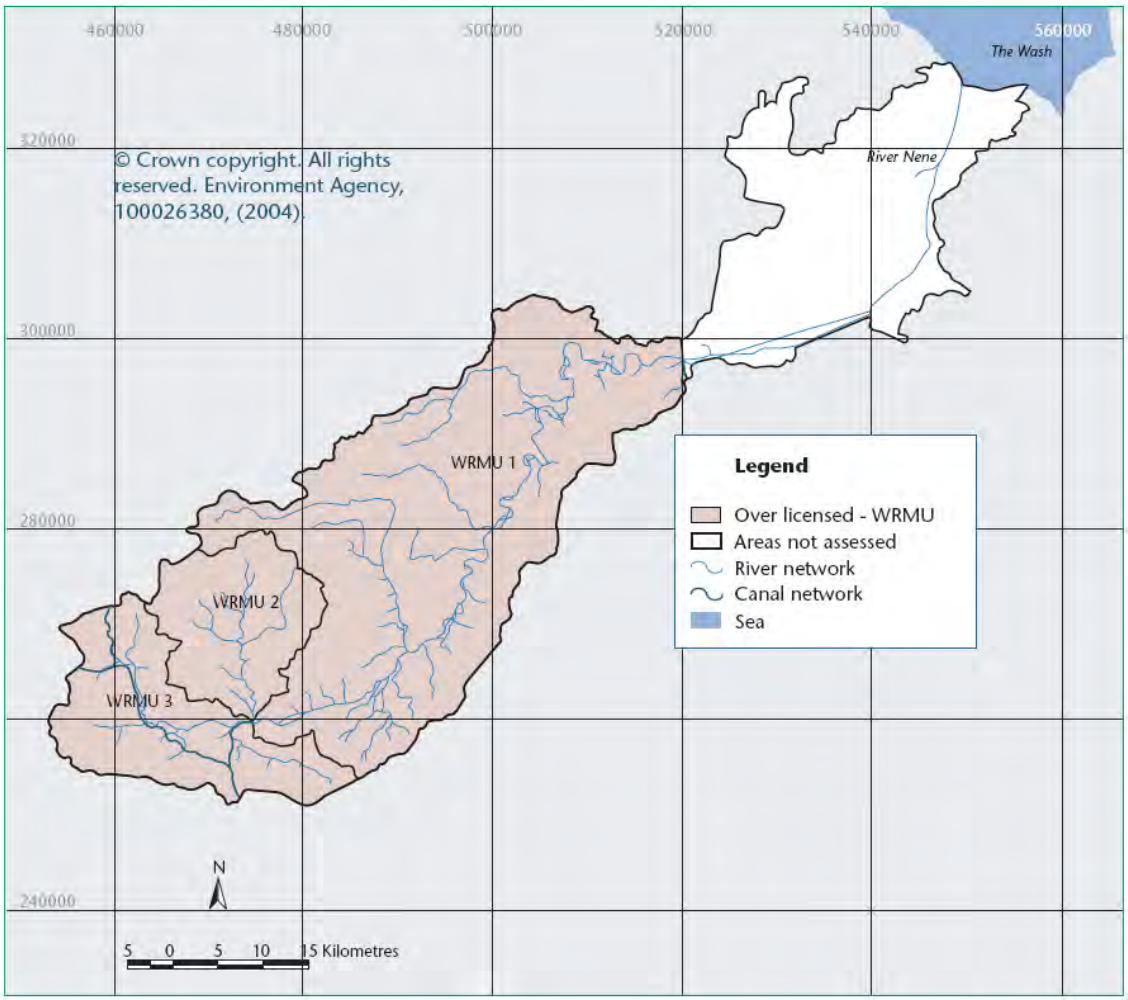

Figure 6.4: WRMUs within the Nene CAMS Area (from the EA)

6.5.1.2 Of interest to Huntingdonshire is WRMU1. There are 99 abstraction licences in WRMU1, one of which is the major AW abstraction used to fill the Rutland Water Reservoir in the Welland catchment, within Huntingdonshire, which is the largest abstraction licence of the entire CAMS area.

6.5.1.3 Rutland Water Reservoir is operated in conjunction with the company's other major reservoirs:

- Pitsford Reservoir within the Nene catchment
- Grafham Reservoir within the Upper Ouse and Bedford Ouse catchment

6.5.1.4 This group of reservoirs is referred to as the 'Ruthamford' supply system. The strategic operation of these reservoirs allows AW a flexible and robust means of providing a secure water supply to major urban areas within the Ruthamford area.

6.5.1.5 Furthermore, the lower Nene is an important water source for a number of demands and unlicensed transfers, particularly to the Middle Level.

6.6 Water Efficiency

6.6.1.1 Huntingdonshire is located in the driest region of the country, with an average rainfall of less than 570mm per year. This is only two thirds of the national average. In an average year only a quarter of the rainfall eventually becomes available as a water resource, due mainly to evaporation and use by plants.

6.6.1.2 The region's main natural water resources are the rivers and groundwater, which are supplemented by artificial or inter-seasonal storage in reservoirs.

6.6.1.3 Domestic water consumption has risen year on year for the last 30 years. The extensive housing growth for Huntingdonshire will place significant further pressure on water supplies. The Environment Agency has suggested that a 25% reduction in water consumption at all new properties and an 8% reduction at all existing properties (achieved against a 2006 baseline figure) would be required to avoid the need to develop major new water storage resources. However, AW highlights that, though desirable, reductions in per capita consumption are not an alternative to the development of a winter storage reservoir in its water-supply region. Both consumption reduction and resource management are needed as part of a twin-track strategy for managing the supply-demand balance.

6.6.1.4 The Government stated, in 2003, that 20–30% water efficiency savings, with respect to per capita consumption, would be feasible for the proposed new Sustainable Community developments and that this would be crucial for the effective management of water resources.

6.6.1.5 Evidence from AW suggests that water metering is effective in reducing water consumption, with 157 litres per person per day consumed in un-metered households compared with 142 litres per person per day in metered households, as reported in OFWAT's June Return 2008 (JR08).

6.6.1.6 The amendment to Building Regulations Part G, effective as of 1st October 2009, will further impose stricter controls on new development, requiring that water efficiency for new-build properties to which the amendment applies must not exceed 125 l per person per day. The Code for Sustainable Homes sets a target for all new homes to be constructed with a water supply to level 3 (105 litres per person per day) and some demonstration projects are already being taken forward to achieve compliance with level 5 of the Code (80 litres per person per day).

6.6.1.7 HDC and the EA will seek to reduce demand for water through the active promotion of greater water efficiency initiatives, by both businesses and individuals. Where cost beneficial, AW will also promote demand management. It is also possible that incentives will be provided to ensure efficient water use. This will be achieved through methods described within the National, Regional and Local Water Resources Strategies which include:

- supporting the use of water efficient domestic appliances and encouraging developers and house builders to install low or dual flush toilets, spray taps and low flow showers;
- 'greywater' recycling schemes, achieved in safe and hygienic manner;
- encouraging water companies to consider, and implement as appropriate, all legal opportunities to install meters, including the metering of all new homes;
- continuing leakage management programmes by water companies;
- encouraging sustainable drainage systems to control surface water runoff. This involves moving away from traditional drainage systems to softer engineering solutions. The benefits include reduced flood risk, improved water quality and increased groundwater recharge. Water can also be collected and reused for non-potable purposes; and
- helping schools and businesses to use water wisely through carrying out water audits.

6.6.1.8 The Code for Sustainable Homes recognises that to achieve a level 5 potable water supply (80 litres per person per day), approximately 30% of the overall water requirement to the home (105 litres per person per day) would need to be provided from non-potable sources such as rainwater harvesting or grey water recycling systems.

6.6.1.9 Demonstration projects have identified cost and public health issues associated with both rainwater harvesting and grey water recycling systems. These issues will need to be overcome in a sustainable manner before they become mainstream building practice.

6.7 Water Companies

6.7.1.1 The water supply for Huntingdonshire is provided by Anglian Water (AW) in the west and the Cambridge Water Company (CWC) in the east. The areas of competence of the two companies within Huntingdonshire are indicatively shown in Figure 6.5.

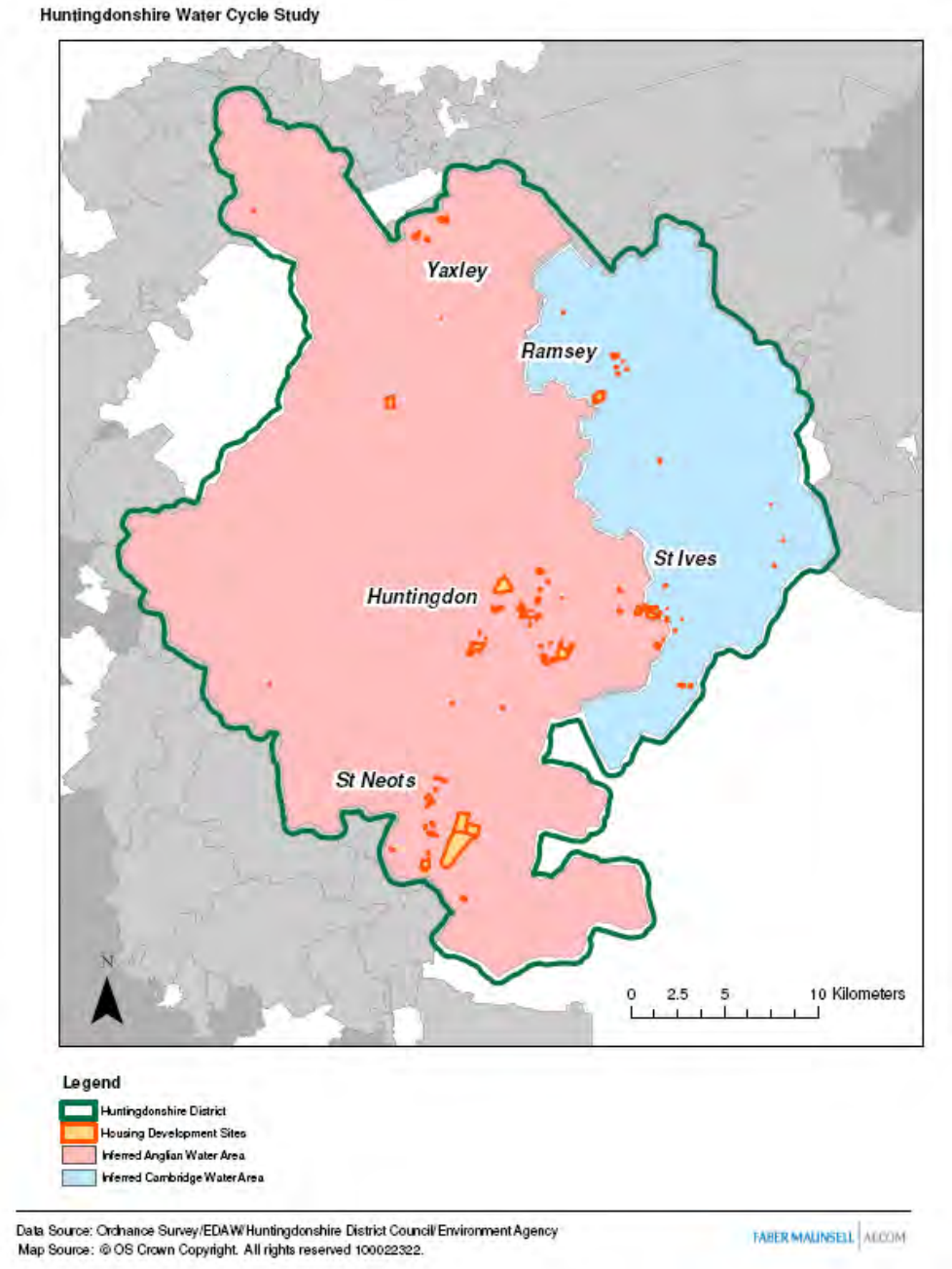

Figure 6.5: Areas of Competence of AW (pink) and CWC (blue) within Huntingdonshire

6.7.1.2 Strategic plans for meeting future demand over a 25-year period will be detailed in the respective Water Resources Management Plans (WRMP) of AW and CWC. These documents will set out the short, medium, and long term plans of AW and CWC for meeting future demand in their respective areas of supply. These plans were open to consultation in late 2008 and should be approved in 2009. Once approved, the 2009 WRMPs will inform the water companies' submissions to OFWAT for the AMP5 (2010-15) funding review.

6.7.1.3 Water companies are now required by OFWAT to include an allowance for climate change, water efficiency targets and other uncertainties within their peak headroom calculations. Therefore, these factors can be expected to have been taken into account within the new WRMP09. Following formal submittal of WRMPs in 2009, OFWAT has reduced water resources investment driven principally by company assessments of the impact of climate

change. OFWAT is suggesting that the water companies recalibrate their plans after the government publishes the UKCP09 climate change forecasts in spring 2010. This is possibly due to OFWAT's awareness of the short-term effects of the current economic downturn on family budgets, hence prioritising 'value for the costumer', compared to the long-term effects of climate-change which can be tackled in subsequent 5-year investment periods.

6.7.1.4 The new WRMPs are not yet published during the writing of this report. However, the draft WRMP were available for consultation and they have been used within this study.

6.8 Anglian Water Area

6.8.1.1 The AW water supply area is identified as an area of serious stress by the Environment Agency (see Figure 6.1). Anglian Water divides its supply area into 12 water resource zones (WRZ), each one of which is further divided into planning zones (PZ). The WRZs are based on the existing water supply system and represent the largest area in which water resources can be shared. They are defined by the aggregation of smaller areas that are used in the planning and management of AW assets.

6.8.1.2 Huntingdonshire falls into WRZ11-Ruthamford. Specifically, the parts of the district supplied by AW contain all of PZ71-Huntingdon, and parts of PZ80-Oundle and PZ81-Peterborough. As far as the Core Strategy development sites are concerned, the latter of these two is the more important as it affects the Key Service Centre of Yaxley and Sawtry. In AW's draft Water Resources Management Plan, PZ80 and PZ81 are identified as having a surplus, while PZ71 is identified as having a deficit greater than 7.5 Ml/d, as shown in Figure 6.6

6.8.2 Levels of Service

6.8.2.1 The level of service that AW is to provide to its customers for the security of water supplies is defined by the following:

- restriction of the use of hosepipes not more than one in 10 years;
- use of Drought Orders to enforce restriction on non-essential uses and secure raw water resources not more than one in 40 years; and
- imposition of the use of standpipes not more than one in 100 years.

6.8.2.2 In its draft Water Resources Management Plan (2008), AW sets out its Company priorities and planning strategy for the 25 year period 2010-2035. In this document, after consideration of metering, leakage reduction, sustainable drainage and water efficiency measures, AW identifies the need to secure 200 megalitres per day (Ml/d) of additional water supply to the region by 2025 and 300 Ml/d of additional water supply to the region by 2035. This compares with the current maximum resources available of 1,800 Ml/d.

6.8.2.3 Within Huntingdonshire the net population growth of approximately 13,900 would represent less than 1% of the proposed requirement for regional increase in water resource, so the water resource issues should be addressed more fully by the Water Cycle Strategies for the larger population growth areas.

6.8.3 The Ruthamford Water Resource Zone (WRZ11)

6.8.3.1 The Ruthamford WRZ is named after the integrated water resources and supply system formed by the use of Rutland Water, Grafham Water, and Pitsford reservoirs. The zone also includes the smaller surface water sourceworks at Ravensthorpe reservoir and on the Bedford Ouse, and the groundwater sources abstracting from the Woburn Sands aquifer. The supply system in the zone is characterised by long strategic trunk mains connecting large treated water storage reservoirs. The yield of the water resources system is founded on the large clay catchments with high winter runoff and a significant proportion of water returned to rivers from the large towns in the upstream catchments. With the exception of Ravensthorpe and its satellite at Hollowell all reservoirs are filled by pumping from rivers (surface water abstraction).

6.8.3.2 The Ruthamford system is a net exporter of water with bulk supplies to Veolia Water Central (VWC) and to Severn Trent Water (STW). It has been seen that the large integrated water supply and water resources system in the Ruthamford zone can be managed to accommodate temporal surpluses and deficits in the supply-demand balance within and outside the zone.

6.8.3.3 The environmental concerns in the zone have arisen from the management of surface water resources in the large European-designated wetland conservation sites of The Wash, Nene Washes, Ouse Washes and Rutland Water SPAs. The Habitats Directive review of consents

has been progressed to confirm that there is no significant risk to The Wash and the Ouse and Nene Washes. In Dempsey & Codling et al (2005) it was demonstrated that water supply abstractions are not likely to have a significant impact on the conservation zones of the Ouse and Nene Washes.

6.8.3.4 The Ruthamford WRZ is forecast to have a surplus available against target headroom at the start of the next planning period (2010) as a result of investment in additional output from Rutland Water's WTW during the AMP4 period. However, it is forecast that a deficit will develop by 2020 (end of the AMP6 period). The analysis of target deficits is complex as there is good connection between PZs in the WRZ and so surpluses and deficits can be shared. However, there are bottlenecks in the system. Anglian Water has reflected these in their allocation of the peak and average deployable outputs between the 21 PZs of the zone. The detailed analysis shows that 15 of the PZs are projected to have headroom deficits against dry year average and/or critical peak period forecasts by the end of the planning period, including Huntingdon.

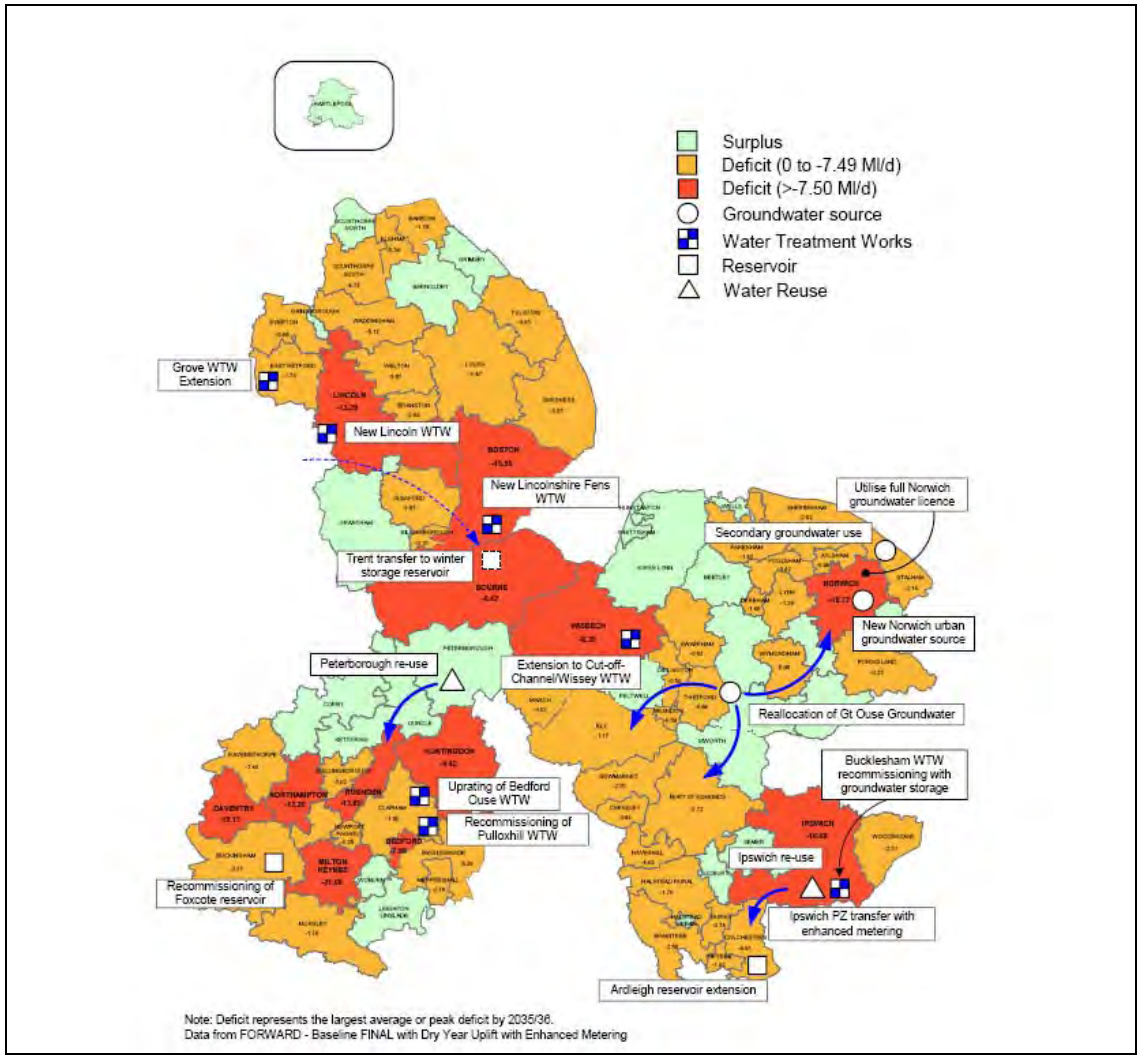

Figure 6.6: Anglian Water planning zones - selected resource development options are also shown (from Anglian Water's draft WRMP, April 2008)

6.8.3.5 In its draft WRMP, AW has selected a number of schemes that would maintain the supply-demand balance within the zone.

Table 6.2: Components of Single Combined Resource Scheme Identified by AW in its draft WRMP

Scheme	Output (Ml/d)	
	Average	Peak
Re-commissioning of Foxcote reservoir WTW	7	12
Up-rating of Bedford Ouse WTW	up to 20	
Peterborough discharge re-use	up to 20	
Integrated enhanced metering in Ruthamford WRZ	up to 10	
Total	47	47

6.8.3.6 The integrated nature of the Ruthamford WRZ means that resource schemes can benefit all PZs. However, the associated reinforcement of the trunk main and local distribution systems are required to ensure that the increased supplies are distributed to where the demand is.

6.8.3.7 Furthermore, the Bedford Ouse WTW and Peterborough components of the scheme count on increased abstraction due to increased runoff from the ever-expanding centres of Milton Keynes and Peterborough.

6.8.3.8 The final planning scenario for Anglian Water's draft WRMP is based upon maintaining demand management through leakage control, household metering and the promotion of water efficiency in all PZs at the appropriate time. The likely phasing for the commissioning of the selected schemes is summarised in Table 6.3.

Table 6.3: Possible Phasing of AW Schemes from draft WRMP

PZ	Selected Option	Period
All	Integrated enhancement metering in Ruthamford WRZ	2010-2015
	Up-rating of Bedford Ouse WTW	2015-2020
	Re-commission Pulloxhill WTW	2015-2020
	Re-commission Foxcote Reservoir WTW	2015-2020
	Peterborough discharge re-use	2020-2025
	Bedford Ouse WTW Phase 2 extensions	2030-2035

6.8.3.9 Existing mains will need to be extended to serve new developments and local supplies may need to be reinforced. In addition, Anglian Water may also have some water resource resilience issues and these should be explored in more detail during the study for the detailed WCS.

6.9 Cambridge Water Area

6.9.1.1 The CWC water supply area is identified as an area of serious water stress, now and in the future, by the Environment Agency (see Figure 6.1). Furthermore, Cam and Ely Ouse CAMS classifies most of the area from where CWC draws its supply as either ***over-licensed***, ***over-abstracted*** or ***no water available***. This means that no new consumptive licences, where water is withdrawn without ultimately being returned to the same location, are likely to be granted. Any new non-consumptive licences or upward variations of existing ones will be time-limited to the common end date of 2027.

6.9.1.2 CWC's supply and distribution network is fully integrated, and forms a single resource zone (a resource zone is defined within the EA guidance document as 'the largest possible zone in which all resources, including external transfers, can be shared and hence the zone in which all customers experience the same risk of supply failure from a resource shortfall'). All of the water supplied by CWC is from underground boreholes. More specifically, 97% of the Company's deployable output is abstracted from chalk sources to the south and east of Cambridge, and the remainder from greensand sources. Currently, two sources are temporarily out of use because of Cryptosporidium risk; nevertheless, they feature as supply side options in CWC's drought plan. A risk analysis of this scenario should be undertaken.

6.9.1.3 From CWC's draft WRMP, at present CWC has a healthy surplus of supply over demand, with deployable output exceeding the dry year average daily demand by 40%. Although demands are forecast to rise by around 25% over the planning period (2010-2035), the supply-demand balance is expected to remain in surplus, without the need to increase the current licensed deployable output: there are no proposals within the draft WRMP to develop new resource.

Under normal conditions, annual abstraction from individual sources ranges typically from 60% to 90% of licensed capacity and CWC is confident that, under normal conditions, sufficient water remains available for environmental needs. These predictions take into account the significant growth in housing numbers planned for the Cambridge sub-region over the next 15 years. However, they rely on the fact that per property consumption for the new homes is forecast to be lower than traditionally assumed, as the principles set out in the new Building Regulations request. The Code for Sustainable Homes sets even more conservative targets, however, incorporation into planning and building policy is not a certainty yet and the water companies cannot rely on such reductions, albeit these are in line with the EA and HDC visions of future development.

6.9.1.4 An overall plan of the CWC's area of supply, divided by parish is shown in Figure.6.7. The parishes within Huntingdonshire are: Ramsey; Bury; Wistow; Warboys; Pidley Cum Fenton; Broughton; Old Hurst; Wood Hurst; Somersham; Colne; Earith; Bluntisham; Holywell Cum Needingworth; St Ives, Fenstanton; and Hilton. The Local Investment Framework for Huntingdonshire specifically identifies growth at Ramsey, St Ives and Fenstanton, along with 'windfall' growth within the more rural areas served by Cambridge Water.

6.9.1.5 The northern parishes of Ramsey, Bury, Wistow, Warboys, Pidley Cum Fenton, Broughton, Old Hurst, Wood Hurst, and Somersham lie within the Old Bedford CAMS area which does not have any potable water abstraction licences. Water supply is imported from elsewhere in CWC's supply zone. In fact, as mentioned above, 97% of the CWC water supply is abstracted from the chalk aquifer to the south and east of Cambridge.

Figure 6.7: CWC Area of Supply Divided by Parishes

The Huntingdonshire parishes have been highlighted in orange (from CWC's draft Water Resources Management Plan, May 2008)

6.10 CWC Water Resources Strategy

6.10.1.1 The CWC's supply-demand projection is based on the following strategies:

- all currently un-metered properties will be metered by 2035;
- control of leakage by the introduction of new technology in the monitoring of the distribution network and increasing the level of mains renewal;

- deliver water efficiency for households and business in existing and new developments and promote water efficiency through customer education and communication;
- support the development of rain and greywater use in new developments – all major new developments will incorporate appropriate water re-use technologies to reduce demand for mains water from each new house by an estimated 30%; and
- support for the development of new water resources in the Anglian region in partnership with other water suppliers.

6.10.1.2 The CWC will aim to apply a twin-track approach, as specified in DEFRA's Future Water, of maximising the amount of water available for use, within current licensing and aquifer constraints; and regulating distribution input through a combination of active leakage control and demand management. In order to meet increasing demand due to proposed growth in its area of supply over the next 25 years, CWC has identified two principal aims within its WRP04, of which draft WRMP09 is a development:

- utilise the full licensed potential of its Thetford sources; and
- refurbish two existing pumping stations in order to realise their full licensed output.

6.10.1.3 These objectives do not require new abstraction licences or increase to existing licences. However, the licences in question are time limited, in part due to the EA's sustainability concerns. The CWC will need to renegotiate these licences for the period beyond 2015, at which time the EA may require the level of abstraction to be reduced.

6.10.1.4 The CWC is also proposing to invest in further investigation over the next five years (2010-2015) and beyond, to improve the quality of data, thereby increasing confidence in its planning assumptions, and reducing uncertainty. The main areas for investigation and action are listed below:

- district metering: the completion of the Cambridge city DMA project, in 2009, will allow a comparison of leakage performance among DMAs, and provide evidence of the effectiveness of leakage actions;
- nitrate studies: further work will be carried out to improve CWC's understanding of the likelihood and consequences of a rise in aquifer nitrate levels. This knowledge will ensure that all relevant factors are considered when deciding on the most appropriate mitigation measures;
- grey water recycling and rainwater harvesting;
- supply pipe ownership: ownership and responsibility for customers' private supply pipes as a means of reducing leakage; and
- additional boreholes at single borehole sites: the construction of additional boreholes at single borehole sites would improve security of supply and reduce outage.

6.11 HDC and Water Supply

6.11.1.1 In its Five-Year Delivery Action Plan, the HDC has identified the importance of water use in its Resource Efficiency section, which has priority two, second only to tackling climate change.

6.11.1.2 HDC is fully aware of its role as a leader in the community and the importance of leading by example. Among the actions identified by the Council are to:

- accurately monitor water usage at all council sites and produce site-specific water management plans. This will include auditing all Council sites to assess areas where water savings can be made, and upgrading facilities where necessary; and
- introduce rainwater harvesting systems and other water efficiency measures at new Council buildings and, where feasible, at existing ones.

6.11.1.3 Also, the Council will work to increase awareness of water saving measures, and promote water saving methods such as grey water devices and water-efficient appliances. This scope will be achieved by means of information on the Council's Website. The Council will also encourage improvements in water efficiency in all new homes built in the district. To this end, a sustainable homes showcase development of thirty exemplar 2-, 3- and 4-bed homes are to be constructed to achieve compliance with level 5 of the Code for Sustainable Homes (80litres per person per day).

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Waste Water

7 Waste Water

7.1 Introduction

7.1.1.1 Anglian Water (AW) is responsible for the operation and maintenance of the existing foul drainage network within Huntingdonshire. AW is also responsible for surface water drainage from roofs, driveways and hard standings relating to properties if they are connected directly to the public sewerage system or if the surface water system has been adopted by AW. They are not responsible for soakaways, land drainage, highway drainage, or private water systems.

7.1.1.2 The document includes details of the development areas and numbers. However, the requirements to service these sites will be considered under the Detailed Water Cycle Strategy once the preferred development areas have been identified.

7.1.1.3 For new developments, the Developer may choose to offer the surface water system for adoption by AW, in which case agreement must be reached regarding design standards (reference Sewers for Adoption; 6th Edition; March 2006).

7.1.1.4 AW has been the main source of information relating to the existing foul drainage network and sewage treatment facilities in this study. The EA has provided water quality information.

7.2 Waste Water Treatment

7.2.1 Waste Water Treatment Works (WwTWs) Considered

7.2.1.1 The Huntingdonshire district is served by 27 Waste Water Treatment Works (WwTWs) in its territory and the Flag Fen WwTW in Peterborough serves Yaxley. Of these, 13 will be serving one or more of the areas identified for development in the HDC Core Strategy and described in Chapter 4 of this report. However, only 6 of these WwTWs will be affected by relatively large impacts caused by increases in local population and industry due to future development in Huntingdonshire as identified in HDC's Core Strategy and HDC's Local Investment Framework (LIF). The baseline for forecasts in this latter document is 2006. These WwTWs are listed below:

- **Brampton WwTW.** This WwTW is located east of the RAF Brampton site. The WwTW serves the village of Brampton only. Within the HDC LIF for development in the Huntingdon area, three sites have been identified for development at Brampton. A total of 427 new housing units and 2,730 new employment opportunities are forecast to impact on this WwTW by 2016. Brampton WwTW discharges into Brampton Brook.
- **Huntingdon WwTW.** This WwTW is located southeast of Huntingdon. It serves the town of Huntingdon and a number of surrounding villages. These are Godmanchester, in the Huntingdon development area, and Houghton, Wyton, Hemingford Abbots, Hemingford Grey and Fenstanton, in the St Ives development area. The HDC LIF forecasts a total of 3,513 new housing units and 6,117 new employment opportunities to impact on this WwTW by 2023. Huntingdon WwTW discharges into the River Great Ouse.
- **Ramsey WwTW.** This WwTW is located north of the town of Ramsey. It serves the town of Ramsey and the nearby villages of Bury, Ramsey St Mary's, Ramsey Forty Foot, Ramsey Mereside, Ramsey Heights, and Upwood in the Ramsey development area. The HDC LIF forecasts a total of 469 new housing units and 218 new employment opportunities to impact on this WwTW by 2017. Ramsey WwTW discharges into the Ramsey High Lode of the Middle Level system.
- **Sawtry WwTW.** This WwTW is located south of Sawtry and serves Sawtry and the nearby villages of Conington and Glatton. The HDC LIF forecasts a total of 50 new housing units and 249 new employment opportunities to impact on this WwTW by 2015. It is also expected that development in this area will increase the volume of trade effluent entering the system. Given that the Sawtry WwTW discharges into a tributary of the Middle Level catch drain, which is upstream of the Great Fen Project, the capacity of this WwTW to cope with new development is ecologically very important. The concerns that arose during the course of

this study are not critical of the capacity of the WwTW, but rather critical of the impact of effluent quality on downstream conservation areas.

- **St Ives WwTW.** This WwTW is located north of the town of St Ives. It serves the town of St Ives and Fenstanton. The HDC LIF forecasts a total of 983 new housing units and 278 new employment opportunities to impact on this WwTW by 2022. St Ives WwTW discharges into Marley Gap Brook.
- **St Neots WwTW.** This WwTW is located between the town of St Neots and the village of Little Paxton and it serves these centres only. The HDC LIF forecasts 5,021 new housing units and 4422 new employment opportunities to impact on this WwTW by 2022. However, exploiting full capacity at the Cambridge Road sites, the number of new housing units could be as high as 5,841 by 2026, with a further 950 units developed after that date for a total of 6,791 units impacting on the WwTW sometime after 2026. The St Neots WwTW discharges into the River Great Ouse.

7.2.1.2 Although Yaxley is an important development area in the HDC Core Strategy, it has not been included in the list of development areas affecting WwTWs in Huntingdonshire. This is because the sewerage system at Yaxley drains to the Peterborough (Flag Fen) WwTW, which lies outside the district. Yaxley has been taken into account in a WCS commissioned by Peterborough Council. The extent to which development can be accommodated at Yaxley rather than the other areas served by Flag Fen WwTW, will be dependent upon the restrictions identified by the relevant stakeholders.

7.2.1.3 The extent to which development can be accommodated at Yaxley rather than the other areas served by Flag Fen WwTW, will be dependent upon the restrictions identified by the relevant stakeholders.

7.2.2 Current Performance and Headroom

7.2.2.1 Details of the principal waste water treatment works (WwTWs) serving the main proposed development areas listed above are given in Table 7.1. It should be noted that Anglian Water (AW) and the Environment Agency (EA) are currently in the process of revising some of the discharge consents for WwTWs within Huntingdonshire. The EA has confirmed that the discharge consents will be changed in line with Anglian Water's proposed new dry weather flow (DWF) requests. The completion of the updated DWF consents is a wording / definition issue, so would not hold back development applications.

7.2.2.2 AW has provided the Treated Sewage Flow Recorder (TSFR) data for all of the waste water treatment works in the table, giving the Trended Dry Weather Flows (TDWF). The headroom shown in table 7.1 has been assessed based on the difference between the current TDWF and the current or proposed revised DWF consent that will be in place by 2010. The table indicates that the identified WwTWs all have adequate volumetric headroom for the 2008 TDWFs against the 2010 DWF consents.

Table 7.1: Details of the WwTWs Serving the Main Proposed Development Areas (source AW)

WwTW Name	2008 TDWF [m^3/d]	2010 DWF Consent [m^3/d]	2010 DWF Headroom [m^3/d]	Receiving Watercourse
Brampton	1,007	2,051	1,044	Brampton Brook
Huntingdon	9,069	10,700	1,631	Bedford Ouse
Ramsey	2,347	2,576	229	Ramsey High Lode
Sawtry	860	1,500	640	Tributary of Middle Level Catch Drain
St Ives	2,790	4,581	1,791	Marley Gap Brook
St Neots	8,915	10,483	1,568	River Ouse

7.2.2.3 The current qualitative consents that apply at the WwTWs under consideration are shown in Table 7.2. Biochemical Oxygen Demand (BOD), Suspended Solids (SS), and Ammonia (NH3) are based on 95 percentile compliance and Phosphorus (P) is on an annual average basis. At St Neots there is also a limit of 13 mg/l on Fe (iron salt dosing is being used to achieve the P consent limit).

7.2.2.4 Compliance information has been reviewed for 2008 and this shows that all of the WwTWs were performing well with effluent quality consistently within the current discharge consent limits. When the 2010 DWF consents are finalised they may include different qualitative consent requirements.

Table 7.2: Qualitative Consents that Apply at the WwTWs Under Consideration

WwTW	BOD mg/l	SS mg/l	NH3 mg/l	P mg/l
Brampton	10	20	5	1
Huntingdon	20	30	7	1
Ramsey	12	20	12	2
Sawtry	10	20	5	N/A
St Ives	11	20	4	1
St Neots	55	90	N/A	1

7.2.3 Estimated Performance and Headroom in 2026

Population and Employment Growth

7.2.3.1 In order to estimate the performance and headroom of the identified WwTWs in 2026 it has been necessary to make some assumptions.

7.2.3.2 The residential population growth impacting on each WwTW has been estimated, based on occupancy rates forecast in the Huntingdonshire Local Investment Framework (LIF) report. These occupancy rates are expected to vary in the future and are shown in Table 7.3. As can be seen, it is anticipated that household size will reduce considerably between 2006 and 2026. This trend is common across the UK as a result of numerous factors such as the breakdown of traditional married family units, an increase in single parent families and an ageing population.

Table 7.3: Anticipated Change in Average Occupancy Rate in Huntingdonshire (from LIF report)

	2006	2011	2016	2021	2026
Average Household Size	2.40	2.33	2.25	2.19	2.16

7.2.3.3 The residential population increase affecting each WwTW under scrutiny is based on the predicted 2026 residential occupancy rate of 2.16.

7.2.3.4 The growth in employment opportunities has been estimated very roughly from a number of assumptions regarding the potential density and type of development, based on land areas and anticipated development type provided by HDC, as indicated in Chapter 4.

7.2.3.5 The predicted residential population and employment population increase for each of the identified WwTWs in 2026 is shown in Table 7.4.

Table 7.4: Estimated Increase in Population Impacting on WwTWs Serving the Main Proposed Development Areas

WwTW	Dwellings Proposed	Population Increase	Employment Opportunities
Brampton	427	922	2,730
Huntingdon	3,513	7,588	6,117
Ramsey	469	1,013	218
Sawtry	50	108	249
St Ives	983	2,123	278
St Neots	5,021	10,845	4,422

7.3 Increase in Dry Weather Flow (DWF)

7.3.1.1 The Code for Sustainable Homes will seek to impose reduction in per capita water consumption. The impact of this will be to reduce the volume of waste water per capita, increasing its specific concentration. At this outline stage of the water cycle strategy, AW has not provided details of the process plant at the WwTWs, so it is not possible to comment on the adequacy of the plant to process the increased specific loads in the waste water within existing or proposed discharge consents.

7.3.1.2 For the purposes of this outline water cycle strategy study, the predicted Dry Weather Flow from residential development is based on an assumed current average consumption of 144 litres per head per day, plus an allowance of 25% for infiltration of ground water. This assumption has been made, even though water efficiency measures will be imposed to reduce domestic water consumption, as the volume of waste water is likely to increase because of increased local development. The assumption attempts to estimate the increase in discharged waste water in relation to the existing discharge consent on an equivalent volume basis. A more detailed analysis may be considered in the production of the detailed water cycle strategy, based on the ability of each treatment plant to process heavier loads.

7.3.1.3 The volume and nature of waste water discharged from employment sites is more difficult to predict, as it is dependent upon the nature of each individual business. Some manufacturing processes require large volumes of water and some businesses use strong chemicals. For the purposes of this stage 1 study trade flow was not considered. The impact of new employment opportunities due to Core Strategy development was considered as domestic type waste water flows with an average contribution of 50 litres per new employee per day, as recommended by British Water Code of Practice. A more detailed analysis may be considered in the production of the detailed water cycle strategy.

7.3.1.4 The predicted increase in DWF from residential development and employment opportunities are shown in Table 7.5.

Table 7.5: Predicted Increase in Dry Weather Flows (DWF) from Residential Development and Employment Opportunities

WWTW	DWF from Population Increase m^3/d	DWF from Employment m^3/d	Total Increased DWF m^3/d
Brampton	166	137	303
Huntingdon	1,366	306	1,672
Ramsey	182	11	193
Sawtry	20	12	32
St Ives	382	14	396
St Neots	1,952	221	2,173

7.4 Future WwTW Performance

7.4.1.1 The ‘volumetric’ headroom capacity at each of the WwTWs considered within this outline water cycle strategy is based on assumptions for population growth, employment growth, increase in dry weather flows and ability of WwTWs to treat greater loads within existing discharge consents. Where WwTWs need to be considered within a detailed water cycle strategy study, it will be necessary to review the assumptions made and consider the process capacity at each WwTW. It must be highlighted that the EA are looking to tighten environmental constraints. Therefore, an increase in consented DWF does not necessarily imply an increased capacity for development.

7.4.1.2 The predictions for the 2026 DWFs are the sum of the current 2008 DWF plus the predicted increase in DWF from Table 7.5. The 2008 DWF and 2026 DWF figures are then compared with the current / agreed proposed 2010 DWF to give an indication of the significance of the change in DWF and need for more detailed study. The predictions for future WwTW performance are shown in Table 7.6. The comparison does not take account of any safety factor that may be necessary for the proper management of the WwTWs. Rather, it highlights those WwTWs where further analyses in the context of a detailed WCS will be necessary.

7.4.1.3 It is important that the EA and AW discuss the implications of the proposed Core Strategy Developments and the likely new consent limits required. AW need to be confident that they can achieve these new limits with existing plant or, if extra treatment is deemed necessary, they need to be able to programme this well in advance of required implementation to secure funding from OFWAT.

Table 7.6: Predicted Future Performance of WwTWs, indicating where there is a Need for More Detailed Study

WWTW	2008 DWF	DWF Increase to 2026	2026 DWF	2010 DWF Consent	2008 DWF / 2010 consent	2026 DWF / 2010 consent
Brampton	1007	303	1310	2051	49%	64%
Huntingdon	9069	1672	10741	10700	85%	100%
Ramsey	2347	193	2540	2576	91%	99%
Sawtry	860	32	892	1500	57%	59%
St Ives	2790	396	3186	4581	61%	70%
St Neots	8915	2173	11088	10483	85%	106%

7.5 Implications of Predicted Future WwTW performance

7.5.1 St Neots WwTW

7.5.1.1 Table 7.6 indicates that St Neots WwTW is likely to require an increase in discharge consent from that currently proposed and agreed, even for the lowest level of anticipated growth up to 2021. Based on the current volumetric headroom of 1568 m^3/day, it is considered likely that a new discharge consent would need to be put in place to support more than circa 70% of this growth. However this position is affected by groundwater infiltration issues and the need to maintain a satisfactory safety margin. The AW Stage 2 Growth Report recognises groundwater infiltration as a major issue at St Neots. The report states that without infiltration reduction a further consent revision will be required almost immediately following the introduction of the new consent.

7.5.1.2 The predicted impact of 850 additional residential units by 2026 would be a further increase in DWF of circa 330 m^3/day and the predicted impact of these and a further 950 residential units beyond 2026 would be circa 700 m^3/day increase in DWF. The implications of the different growth options should be considered within a detailed water cycle strategy study.

7.5.1.3 As the St Neots WwTW discharges directly to the River Great Ouse, as opposed to a tributary, there will be significant dilution of the discharged waste water. The effluent will still be subject to assessment for impact on the river. However, it is considered that it should be possible to treat the waste water associated with the full scale of proposed growth at St Neots, albeit with possible upgrading of facilities at the WwTW.

7.5.1.4 St Neots WwTW should be considered within a detailed water cycle strategy study.

7.5.2 Huntingdon WwTW

7.5.2.1 Table 7.6 indicates that Huntingdon WwTW is likely to be operating at or close to its current discharge consent by the time all proposed development has been completed, expected to be in 2023. AW has advised that the WwTW is currently operating at its full process capacity. Accordingly, additional treatment capacity would need to be provided to accommodate the proposed growth.

7.5.2.2 It has been suggested that Alconbury WwTW might be used to support some of the proposed development to the west of Huntingdon; however, the discharge consent at Alconbury WwTW is modest and is limited by environmental factors. AW has advised that in fact Alconbury WwTW treats all flow (i.e. No storm tanks), is overloaded at the secondary settlement stage of treatment at current flow and suffers from high SS in final effluent, so it could not accommodate 244 new dwellings in its present condition. *Brampton WwTW also falls into the Huntingdon development area.* It should be noted that the Brampton WwTW occasionally suffers from SS risk. This is associated with a tertiary filter. This filter is due to be replaced under a Local Delivery Scheme.

7.5.2.3 In view of the assumptions contained within this study it has not been possible to eliminate the need for a change to the existing discharge consent or upgrading of facilities at the WwTW.

7.5.2.4 Huntingdon WwTW, Brampton WwTW and Alconbury WwTW should be considered within a detailed water cycle strategy study.

7.5.3 St Ives WwTW

7.5.3.1 Table 7.6 indicates that St Ives WwTW has sufficient headroom to cope with development. AW has advised that the plant is currently operating with overloaded humus tanks. A new tertiary *filter begun in 2008 will bring the plant into line until 2015.* However, proposed developments beyond that point in time will require expansion of the WwTW.

7.5.4 Ramsey WwTW

7.5.4.1 Table 7.6 indicates that Ramsey WwTW is likely to be operating at or close to its current discharge consent by the time all proposed development has been completed, expected to be in 2017. An increase in consented discharge will trigger need for an extension to the WwTW. The possibility of extending the WwTW will also depend on conservation constraints given Ramsey's location in the Fenland.

7.5.4.2 It is accepted that the planned completion of development at Ramsey, currently planned for 2017, may be delayed due the current economic downturn and conservative assumptions relating to predicted employment opportunities

7.5.4.3 In view of the assumptions contained within this, study it has not been possible to eliminate the need for a change to the existing discharge consent or upgrading of facilities at the WwTW.

7.5.4.4 Ramsey WwTW should be considered within a detailed water cycle strategy study.

7.5.5 Sawtry WwTW

7.5.5.1 Proposed development at Sawtry is predicted to be very modest in comparison with existing development and available headroom.

7.5.5.2 However, the anticipated nature of employment opportunities is such to forecast an increase in waste water and, hence, increased loading at the WwTW. This will have an impact on the effluent quality and the receiving watercourse. It is considered prudent, therefore, to ensure any perceived risk of potential environmental impact be addressed within a detailed water cycle strategy study. This being particularly important given that Sawtry WwTW is upstream of the Great Fen Project, which aims to protect, and expand, Holme Fen (SSSI) and Woodwalton Fen (SAC).

7.5.5.3 Sawtry WwTW should be considered within a detailed water cycle strategy study.

7.5.6 Flag Fen WwTW

7.5.6.1 The sewerage network at Yaxley transfers waste water out of Huntingdonshire and the Middle Level catchment, into the Nene catchment at Flag Fen WwTW.

7.5.6.2 Flag Fen WwTW is the largest in the Nene catchment, serving a population equivalent (PE) of 182,068 which includes Peterborough and some surrounding villages. Details of Flag Fen WwTW are presented in Table 7.7. An outline WCS for the Peterborough area has been commissioned by Opportunity Peterborough and Peterborough City Council. This study includes Yaxley within the study area and recognises its dependence on Peterborough for waste water disposal and treatment, and water supply. AW has confirmed that the Peterborough WCS has made allowance for development at Yaxley. However, developments at a scale proposed in the HDC Core Strategy will require coordination between Peterborough City Council and HDC.

Table 7.7: Details of Flag Fen WwTW (from Peterborough Outline WCS)

WwTW Name	2008 Population Equivalent	Consented DWF (m^3/day)	2008 Calculated DWF (m^3/day)	2008 Calculated DWF Headroom (m^3/day)	Receiving Watercourse
Flag Fen	182,068	43,653	29,704	13,949	Counter Drain

7.5.6.3 Flag Fen WwTW has been considered within a detailed water cycle strategy study for the Peterborough area. HDC need to ensure that development at Yaxley is not compromised by development elsewhere in the Flag Fen WwTW catchment.

7.6 Environmental Issues

7.6.1.1 Based on 'volumetric' considerations only, the WwTWs at Brampton, Buckden and St Ives would not require further investigation, either because there is little change or because there would appear to be ample volumetric headroom. However, environmental considerations also need to be considered.

7.6.1.2 The National Environment Programme (NEP) is a list of environmental improvement schemes that ensure that water companies meet European and national targets related to water. The Water Framework Directive (WFD) is a new piece of European legislation which promotes a new approach to water management through river basin planning. The WFD is included in the NEP. The NEP includes requirements for water companies to undertake improvement schemes, or where more evidence is required, to investigate a particular problem. Each water company's NEP is different, as there will be different issues in every region. Generally, the types of actions expected include:

- improving the quality of water that is discharged from sewage treatment works;
- investigating the risk from certain chemicals and assessing the best treatment options;
- preventing chemicals from entering groundwater;
- protecting the waters where there are shellfish which will improve the quality of shellfish that people eat;
- ensuring that abstractions do not impact adversely on habitats which are protected by law;
- improving the quality of bathing waters;
- improving inland waters for fish; and
- reducing the risk of eutrophication (excessive plant growth and decay).

7.6.1.3 Changes in water quality should be expressed as changes in River Ecosystem (RE) class for the receiving watercourse. The RE classification is based on the basic chemical requirements of a healthy river ecosystem that is able to support fish. It consists of eight parameters that together form a ladder of increasing quality to reflect the needs of communities of plants and animals in our rivers. The five RE classes are described in the table below. For more details regarding the parameters used refer to The Surface Waters (River Ecosystem) (Classification) Regulations 1994, SI 1994 No. 1057.

Table 7.8: River Ecosystem Classifications

RE Class	Class Description
RE1	Water of very good quality suitable for all fish species
RE2	Water of good quality and suitable for all fish species
RE3	Water of fairly good quality suitable for high class coarse fish populations
RE4	Water of fairly good quality suitable for coarse fish populations
RE5	Water of poor quality, which is likely to limit coarse fish populations

7.6.1.4 Within the Upper Ouse and Bedford Ouse catchment the main water quality issue for this catchment concerns eutrophication and nutrient loading of phosphorous. Grafham Water and the River Great Ouse (from Ouzel to Welney) are designated as Eutrophic Sensitive Areas under the Urban Waste Water Directive. These designations required the installation of nutrient removal at all sewage treatment works (WwTW) serving a population of more than 10,000.

7.6.1.5 The major discharges within the catchment are mainly from public sewage treatment works with the largest being Cotton Valley, which serves Milton Keynes and is upstream of Huntingdonshire. However, a number of WwTWs in Huntingdonshire have been identified under the National Environment Programme (NEP) of the Water Framework Directive (WFD) for improvement or further investigation. These are:

- Great Gidding WwTW at Alconbury Brook. Investigation regarding phosphorus compliance with proposed NEP standards
- Somersham WwTW. Investigation regarding BOD compliance with proposed NEP standards
- St Ives WwTW. Investigation regarding ammonia compliance with proposed NEP standards

- Upwood WwTW. Investigation regarding phosphorus compliance with proposed NEP standards

7.6.1.6 The St Neots WwTW was covered in the Habitats Directive High Priority Programme during the current AMP4 period, hence why it is not being considered as part of the NEP. Currently, St. Neots has a phosphorus standard of 2mg/l annual average, in accordance with the Urban Waste Water Treatment Regulations (UWWTR). However, this will change on 1st January 2010 to 1mg/l annual average under the more stringent requirements of the Habitats Directive.

7.6.1.7 The EA sets effluent standards to protect water quality. Among the instruments the EA uses in order to do this is Water Quality Modelling, which allows them to simulate the impact of discharges on watercourses. The results of these modelling analyses are used as guides for the management of eutrophication and P reduction within a catchment based approach, as expected from River Basin Management Plans.

7.6.1.8 A 2005 study by Dempsey & Codling *et al*., 'Integrated modelling of rivers and washlands to meet conservation objectives - a case study', identified that the then current average annual levels of phosphorous at the Ouse Washes was 0.29mg/l compared with a target value of 0.11mg/l for ditch flora and fauna. Approximately 70% of the then current value was attributed to discharges from WwTWs. In addition to the need to change farmland fertilization practices, it would also be necessary to reduce overall P discharge from WwTWs to circa 15% of their 'then current' values for the ecologically ideal levels of P to be reached.

7.6.1.9 The same study confirms that ammonia levels are of consequence only locally to discharge points, particularly where these are not main rivers, or where there is an SSSI in close proximity. This is due to the toxicity of ammonia to fish, but dilution downstream reduces these effects greatly. The study indicates that at the Ouse Washes, there is the potential to accommodate 30% increase, with respect to the then current situation of abstraction and discharge upstream, before guideline values from the Freshwater Fisheries Directive are reached.

7.6.1.10 Nitrate is of greater concern in terms of eutrophication and the long-term impacts on the ecology of the receiving watercourse. The River Great Ouse in Huntingdonshire is, as mentioned above, a designated Eutrophic Sensitive Area, and nitrates are of concern, as highlighted by the inclusion of the St Ives WwTW in the NEP.

7.6.1.11 Great Gidding WwTW, Somersham WwTW, St Ives WwTW and Upwood WwTW should be considered within a detailed water cycle strategy study, which should also include an overall strategy for P reduction and management of eutrophication in light of forecast Core Strategy developments. The EA already has an eutrophication strategy in place which may require revision to take account of increased discharges.

7.7 Waste Water Networks

7.7.1.1 As mentioned above, AW has 27 WwTWs within Huntingdonshire. Each one of these serves a relatively independent catchment by means of a sewerage network. As above, the networks of interest are essentially 7 plus 1, those serving the 7 abovementioned WwTWs and the network at Yaxley, which transfers waste water to the Flag Fen WwTW in Peterborough.

7.8 Huntingdon Waste Water Network

7.8.1 Description

7.8.1.1 The Huntingdon waste water catchment serves the parishes of:

- Abbots Ripton;
- Fenstanton;
- Hemingford Abbots;
- Hemingford Grey;
- Hilton;
- Houghton & Wyton;
- Huntingdon;
- Huntingdon – North;
- Huntingdon – South; and
- Godmanchester.

7.8.1.2 The catchment is served by a predominantly separate system. The foul flows are conveyed to the Huntingdon WwTW, located in the centre of the catchment, by a network of 34 pumping stations and 121km of foul water sewer. Surface water discharges into the River Great Ouse, which runs through the centre of the catchment. There are two surface water pumping stations in the catchment and 61km of surface water sewer. A small combined sewerage system exists in the south of Huntingdon, totalling 2km in length.

7.8.1.3 Surface water from the major residential areas of Huntingdon, Godmanchester and Wyton drains via surface water sewers and channels into the River Great Ouse. Areas in the south-east of the catchment, including the parishes of Fenstanton, Hemingford Grey and Hilton, discharge surface water into unnamed drains. There are no surface water sewers in the parish of Abbots Ripton. There are no known separate surface water networks in the parishes of Hemingford Grey and Houghton and Wyton.

7.8.1.4 Godmanchester has a separate surface water system that is not yet shown on Anglian Water's sewerage records. These are old sewers which have been proved to be public but have not yet been added to AW's records.

7.8.1.5 Overall, the catchment is characterised by the large numbers of inter-connected foul pumping stations.

7.8.2 System Performance

7.8.2.1 AW report that, generally, the catchment is performing satisfactorily. In the recent past, severe annual river and surface flooding problems have affected parts of Hemingford Grey. However, the issue appears to have been resolved as a result of a flood defence scheme undertaken by the EA.

7.8.2.2 Hemingford Abbots, Hemingford Grey, Houghton and Wyton catchments suffer from groundwater infiltration reducing capacity in the foul sewers for genuine waste water. This is only a problem during periods of high water table but surcharging of the sewer has prevented toilets from being able to discharge at several properties. AW has previously tankered flows away from the system to create capacity but it is unclear whether this arrangement will continue. The Hemingfords have improved since the introduction of the flood alleviation scheme which has reduced flood water in the area but the Houghton and Wyton catchment has not yet been improved.

7.8.2.3 Severe septicity issues have been reported in the vicinity of the Fenstanton-Hilton Road Pumping Station and Hemingford (Ex-STW) Pumping Station. The septicity issue is related to dairy trade discharges and to the long residence times of Houghton and Wyton flows, which are ultimately delivered to the Hemingford (Ex-STW) Pumping Station. Core Strategy development sites are present at Houghton, Wyton, and Fenstanton. The increased flows from Core Strategy developments may reduce the septicity problem due to reduced residence times. However, the use of the existing sewerage network, given its current problems, for the local Core Strategy developments will require a more detailed analysis considering the forecast hydraulic loads and with special emphasis given to the septicity problem..

7.8.2.4 AW has used the Huntingdon hydraulic model to assess the current and future performance of the network and associated assets downstream of the anticipated points of connection. There is to be no significant deterioration in levels of asset performance or customer service as a result of additional flows, generated by development sites, being accommodated within the existing network. The one issue identified by AW for further investigation is the operation of the Huntingdon Hartford Road Overflow Pumping Station. Time series analysis should be undertaken to assess whether the increased spill frequency from the discharge, following upstream development, is likely to be significant.

7.8.2.5 AW has also pointed out a number of practical issues that will arise due to development within the Huntingdon sewerage catchment:

- Fenstanton - Cambridge Road (F1) and Ivy Nursery (F3). Septicity issues due to trade effluent and long retention times in sewer.
- Godmanchester – Bearscroft Farm (G8). AW has responded to developer enquiries for this site. Following a modelling study, AW advised that there is insufficient network capacity to serve this development. It is therefore imperative that development at this site be carried out only after a sewerage upgrade has been agreed between AW, HDC and developers;

- Godmanchester – Clyde Farm (G9) and Wigore Farm (GOD2). There is no obvious point of connection for these sites;
- Huntingdon – HWAAP Site (H3). AW has assumed that the 675mm foul sewer crossing the site will be used for connections of new dwellings, otherwise there is no obvious connection;
- Huntingdon – Off Kings Ripton Road (HUN1). No correspondence between proposed development and existing network was found from GIS data. AW has anticipated connection to an existing manhole, however, this has not yet been confirmed;
- Huntingdon – Sapley Park (HUN6). AW requires further investigation to verify if the proposed connection to public sewerage is feasible; and
- Huntingdon – Ermine Street (HUN4). Hydraulic modelling by AW has recommended a time series analysis of CSO operation at Hartford Road to verify the increase in frequency of use, if any, due to this large development.

7.8.2.6 As a whole, it is envisaged by AW that additional flows arising from developments within the existing sewerage catchment envelope will continue to be directed to Huntingdon WwTW for treatment. However, development to the west of the railway may need to be served from Alconbury, as there are constraints in the existing rising mains at the railway and at the river crossing to the treatment works at Godmanchester. Development at Godmanchester would be easier to accommodate. The Alconbury WwTW has modest capacity and environmental constraints in the receiving watercourse. The limiting factors would be phosphorus and ammonia concentration levels being discharged into a designated Eutrophic Sensitive Area.

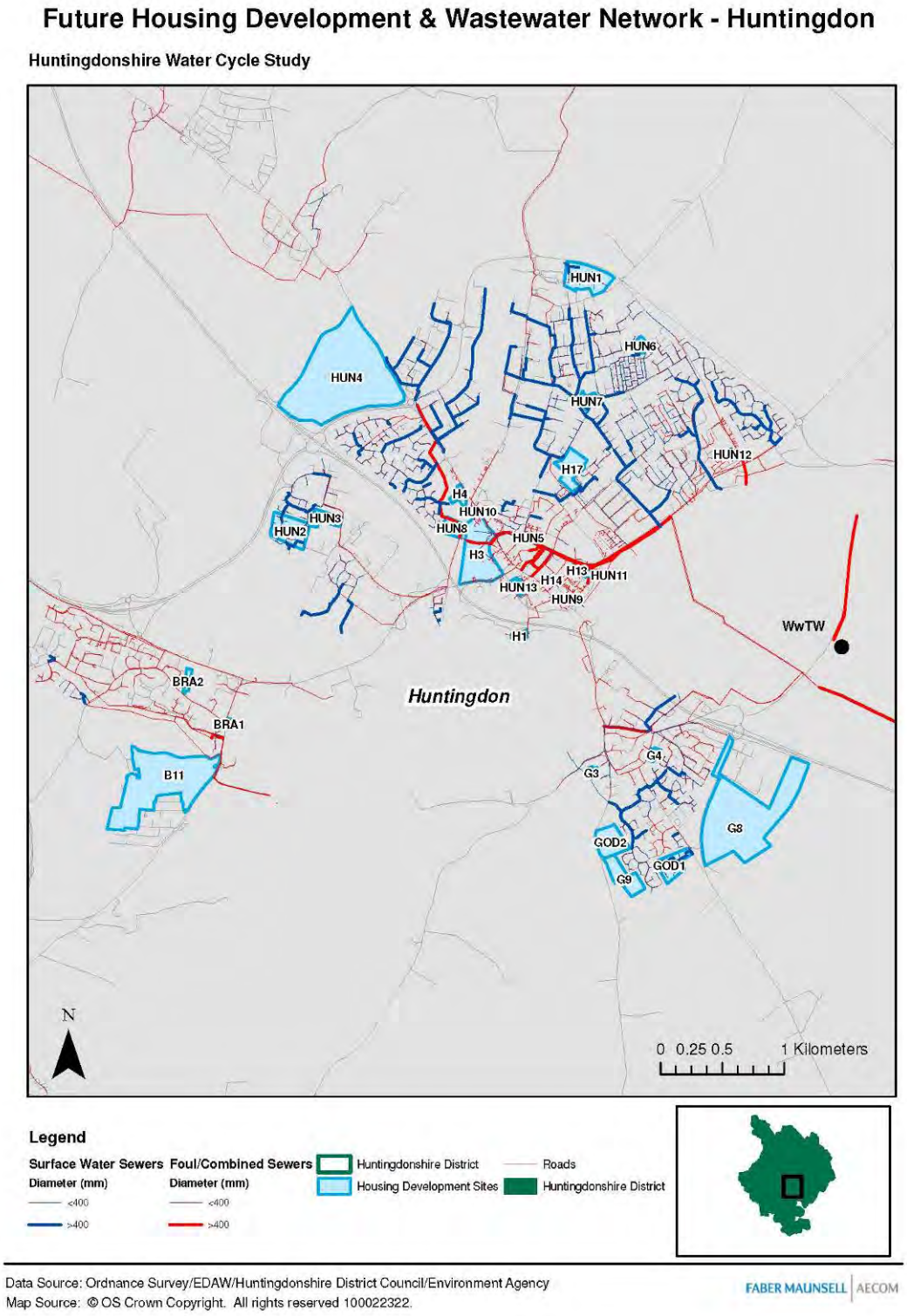

Figure 7.1: Sewerage Networks (partial) in the Huntingdon Area

7.9 St Neots Waste Water Network

7.9.1 Description

7.9.1.1 The St Neots WwTW is located north of the main St Neots town centre. Overall, the catchment comprises the villages of Southoe and Little Paxton to the north and St Neots, Eaton Socon and Eynesbury to the south. The A1 generally forms the western boundary of the catchment,

however, Southoe village is located on the opposite side of the highway. Southoe Lees Lane PS pumps southwards into the head of the Little Paxton sub-catchment.

7.9.1.2 All flow received by the St Neots WwTW is pumped – from Little Paxton Wantage Gardens TPS, St Neots Huntingdon Street TPS, Eaton Ford St Neots Road TPS, St Neots Cemetery Lane TPS and from St Neots Loves Farm TPS.

7.9.1.3 There is a reasonable coverage by separate surface water sewerage networks, which outfall either directly or indirectly into the River Great Ouse, which runs generally south to north through the catchment. However, a significant portion of the older, central part of St Neots has no public surface water sewers and a significant length of combined sewers has been identified. Most of the town centre combined sewers were re-laid in 1989.

7.9.2 System Performance

7.9.2.1 There are a significant number of flood-susceptible locations included on the DG5 register. Additionally, the poor performance of the St Neots Cemetery Lane TPS has been identified as a cause of flooding at the nearby cemetery and the rising main from the station has burst on a number of occasions. The operation of the St Neots Market Square CSO has been attributed to performance issues at Cemetery Lane TPS. The Southoe catchment is known to suffer from groundwater infiltration.

7.9.2.2 The on-going development of the Loves Farm site (STN3) located on the eastern side of the East Coast main railway line has been incorporated into the catchment by the construction of a new pumping station and rising main discharging direct to the WwTW.

7.9.2.3 AW report that there is to be no significant deterioration in levels of asset performance or customer service as a result of additional flows, generated by development sites, being accommodated within the existing network. This will be achieved by directing flows generated by new developments within the existing catchment envelope to the St Neots WwTW for treatment. Existing sewerage infrastructure will be upgraded or replaced to accommodate increases in flow.

7.9.2.4 AW has been consulted on development in the area. They have reached the following conclusions regarding a number of sites within the St Neots sewerage catchment:

- St Neots Loves Farm site (STN3). The site will drain to the new Loves Farm pumping station. This will discharge directly to St Neots WwTW by means of new rising main. No further enhancement required.
- Little Paxton Riverside Mill site (LIT3). AW has considered a possible flow split from this site in order not to overload the network locally. However, they are confident that the Little Paxton Wantage Gardens TPS discharging to St Neots WwTW will not need to be upgraded as the development of the residential site will be offset by a reduction in trade flows from the existing site occupier.
- St Neots Barford Road sites (STN1a & STN1b). AW has pointed out that Foul sewers in vicinity of proposed developments are private and un-adopted. Permission of owner is required for capacity and connection permission. On the other hand, hydraulic modelling has predicted relatively small increases in spill volumes from the Cemetery Road CSO as a result of the additional hydraulic load from upstream developments. It is recommended, however, that time series analysis be undertaken to assess whether the spill frequency is likely to be significant.

7.9.2.5 A new strategic sewer will be required to support the full scale of development to the east of the railway. It is currently anticipated that the capital expenditure for these works will fall into the early part of AW's 2016 – 2020 asset management programme (AMP6).

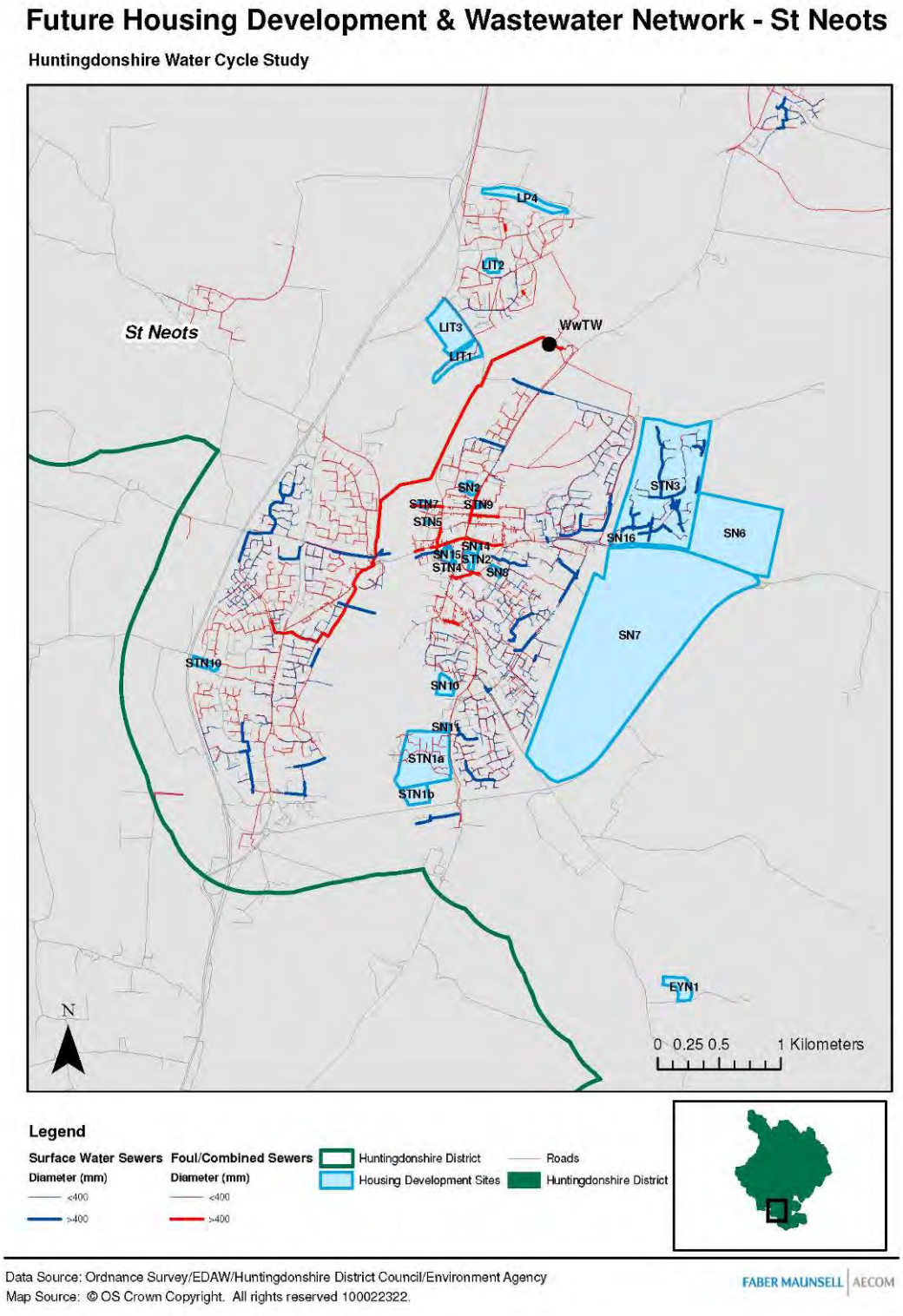

Figure 7.2: Sewerage Networks (partial) in the St Neots Area (Southoe is not in frame)

7.10 St Ives Waste Water Network

7.10.1 Description

7.10.1.1 The St Ives WwTW is located north of the St Ives town centre. The catchment it serves comprises the town of St Ives and Fenstanton. There is a reasonable coverage of separate sewerage systems over most of the town, the exception being the historical town centre, which, from information received from HDC, is served by a combined sewerage system which drains to

Meadow Lane, where there is a consented storm overflow using a separator before pumping excess to the River Ouse. The entire catchment is characterised by a network of 19 interconnected pumping stations, of which 5 discharge directly to the St Ives WwTW.

7.10.1.2 AW has not yet prepared a report on St Ives sewerage catchment in relation to future developments.

7.10.2 System Performance

7.10.2.1 It is anticipated that AW will identify issues associated with development to the south of St Ives, as the WwTW is located to the north of the town. The routing of waste water through ageing combined sewers in the historic town centre is likely to be considered unacceptable in the long-term, so it is considered probable that new rising mains or improvements to existing rising mains will be required.

7.10.2.2 The following points can be noted regarding current developments:

- North Houghton Road (STI1), and Houghton Grange (HOU1) have no trace of correspondence with the existing system. Furthermore, they are practically equidistant from the St Ives System and the Huntingdon system. The obvious choice would be to connect to the St Ives system, based on the little data available, even because the nearby parts of the Huntingdon system is subject to septicity due to long storage times in the network. However, a cost-benefit analysis may be considered in order to aid in deciding which way the flows from these sites should be diverted. This same observation could also, partially, be applied to the golf course sites (STI2 & SI18);
- the West Street (STI5), No.23 North Road (STI7), Needingworth Road (STI4), South of New Road (SI2), and Fire Station & Clinic (SI3) sites are located in the historical centre of St Ives which is served only by a combined sewer. In order to contain the hydraulic loads to the foul water pumping stations, and reduce the frequency of spillage at the CSOs associated with combined systems, the developers would be recommended to use SUDS above and beyond legal requirements;
- the Wyton Top Farm (WYT1), Houghton The Elms (HOU2), Lynhurst (STI3), London Road (HEM1), Cambridge Road Fenstanton (F1) and Ivy Nursery Fenstanton (F3) sites, though grouped into the St Ives development area by HDC, are in the Huntingdon sewerage catchment for waste water management. As mentioned above, these sites are draining to parts of the Huntingdon sewerage network that are subject to severe septicity, due to trade effluents and long storage times in the network. Hydraulic modelling and cost-benefit analyses should be carried out to identify feasible solutions to this problem. These may include upgrading the capacity of the Huntingdon WwTW and the pumping stations discharging to it from this sector of the catchment, or expanding the St Ives catchment to include these sites, given the current headroom at St Ives WwTW;
- the Burleigh Road site (STI8) is upstream of an area that has been subject to a number of sewer floodings in the past. Available data does not indicate whether these are foul sewer or storm sewer flooding events, although the EA show flooding problems from the piped watercourse downstream of the site and this is being investigated by the EA and HDC. However, whether foul or surface water flooding, the development at Burleigh Road may further aggravate the problem. It is recommended that the developer make maximum use of SUDS in order not to impact further on the existing sewerage. It is also recommended that catchment analysis and appropriate modelling be carried out in order to ascertain whether the possible foul sewer problem is due to under capacity pipes or under capacity pumps at the Wheatfields PS, which discharges to St Ives WwTW; and
- a suggestion has been made in the LIF that network improvements in the St Ives system would increase its overall capacity by reducing the groundwater infiltrations into it. In this way the system could cope with larger future developments than currently planned.

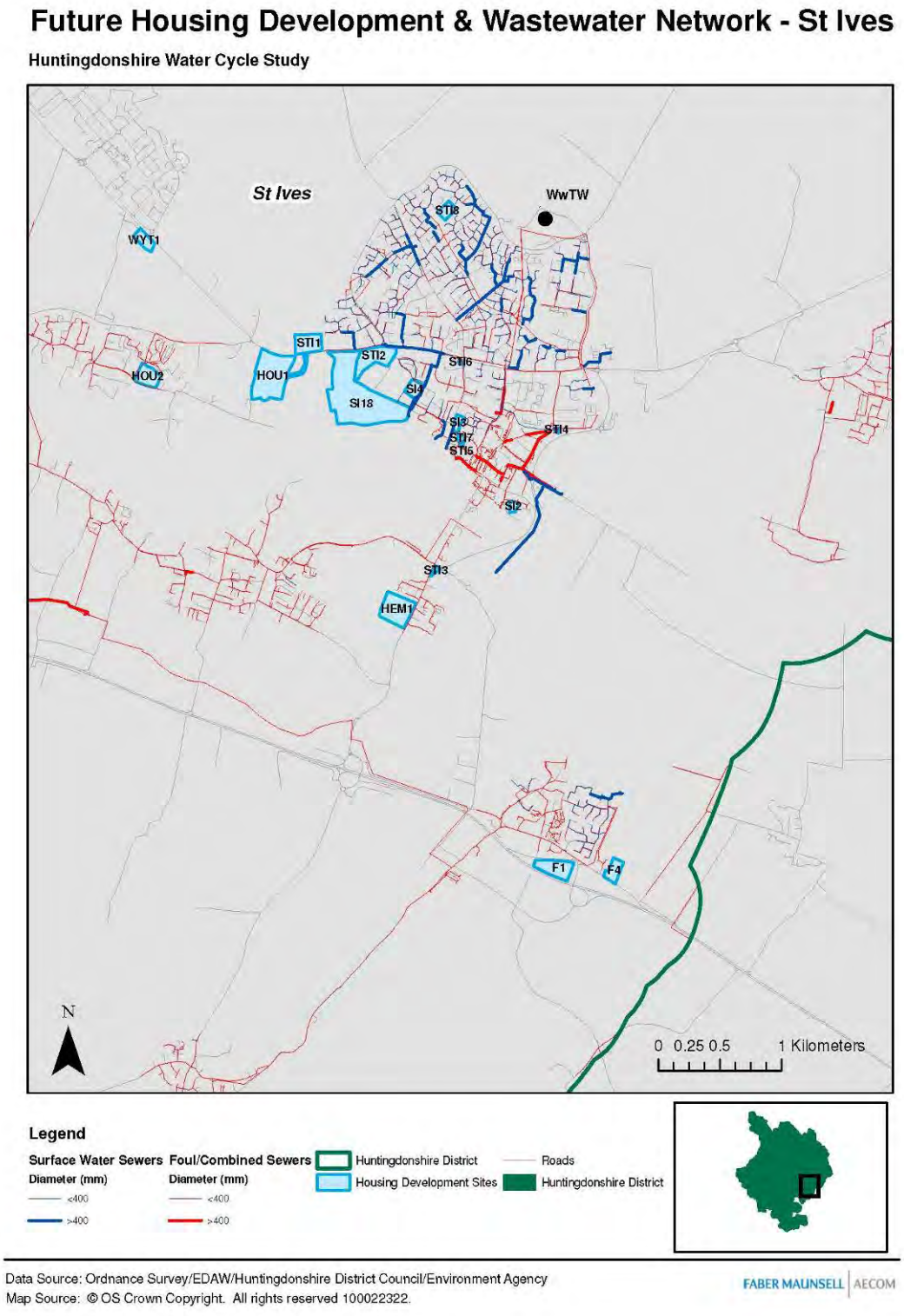

Figure 7.3: St Ives Sewerage Network and Huntingdon Sewerage Network (partial)

7.11 Ramsey Waste Water Network

7.11.1.1 The Ramsey WwTW is located north of Ramsey town centre. The catchment it serves comprises the town of Ramsey and the villages of Bury, Ramsey Forty Foot, Ramsey Mereside, Ramsey St Mary's, and Ramsey Heights. From available GIS data, it appears that the outer parts of the catchment are covered by a combined sewerage system, while there is reasonable coverage of a separate surface water system in the town of Ramsey and the village of Bury. The entire catchment is characterised by a network of 20 interconnected pumping stations, of

which 4 discharge directly to the Ramsey WwTW. AW has not yet prepared a report on the Ramsey sewerage catchment in relation to future developments. When that report is ready, further considerations can be made.

7.11.1.2 In the meantime, the following points can be noted:

- the RAF Upwood (R11) and Hill House Upwood (R2) sites are located on the outskirts of the catchment and therefore are served only by the combined sewerage system. It is recommended that the developers at this site make maximum use of SUDS in order to reduce the surface water flows to the combined sewerage system to a minimum; and
- the same considerations should be made for the North Biggin Lane (R5) and the South Field Lane (R6) sites. These are greenfield sites and though they are closer to the existing surface water system, their connection to it may not be feasible. Furthermore, the Middle Level Commissioners and the EA are pushing for the application of Planning Policy Statement 25 – Development and Flood Risk (PPS25) in their jurisdiction.

7.12 Sawtry Waste Water Network

7.12.1.1 The Sawtry WwTW is located south of Sawtry. The catchment it serves comprises the town of Sawtry and the villages of Conington and Glatton. The entire catchment is characterised by a series of 5 interconnected pumping stations, one of which discharges directly to the Sawtry WwTW. AW has not yet prepared a report on the Sawtry sewerage catchment in relation to future developments. When that report is ready, further considerations can be made.

7.12.1.2 The main issue within this sewerage catchment is that a marked increase in trade effluent is expected following the Core Strategy developments. The current capacity of the WwTW is sufficient to deal with the increased flows due to estimated population increase. However, given its location upstream of the Great Fen Project site, a very high profile conservation project in Huntingdonshire, the water quality standards to be applied to the WwTW discharge will be ever more stringent. Generally, the discharge consents at Sawtry are well within their current limits, however, there have been occasional spikes in ammonia values above the limits. Given the toxicity of ammonia to fish, and the local Conservation Project, a strategy to cope with future contaminant variations are particularly important at this location.

7.13 Yaxley Waste Water Network

7.13.1.1 The Yaxley sewerage sub-catchment is a part of the extensive Peterborough Flag Fen sewerage catchment. It serves Yaxley town, and the villages of Stilton, Folksworth and Farcet. The existing network is a predominantly separate surface water and foul sewerage system with some small areas of combined sewerage. The district is relatively flat and consequently much of the waste water transfer occurs via a series of pumping stations.

7.13.1.2 A number of properties in the Yaxley area have experienced sewer flooding. The Great Haddon urban extension in Peterborough may potentially have an adverse impact on this area unless additional discharge is diverted elsewhere. However, it should be noted that AMP4 improvement schemes have been implemented to address the flooding issues at Lee Gardens and Yaxley Main Street areas.

7.13.1.3 The Yaxley area has been considered in the WCS commissioned by Opportunity Peterborough and Peterborough Council.

7.14 Brampton Waste Water Network

7.14.1.1 The catchment is served by a predominantly combined system. The flows are conveyed to the Brampton WwTW, located southwest of the relatively small catchment, by a network of 7 pumping stations.

7.14.1.2 From available GIS data, it would seem that there should not be any connection issues with the proposed Core Strategy development sites at Brampton. AW has not yet prepared a document regarding their point of view regarding development in this sewerage catchment. When this document is ready, the situation should be reviewed.

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Sustainable Drainage

8 Sustainable Drainage

8.1.1.1 The Government's policies on land use and flood risk, and as a consequence on drainage, are set out in Planning Policy Statement (PPS) 25, published by the Department for Communities and Local Governments (DCLG) in December 2006. The practical guide to applying PPS 25 is The SUDS manual, Ciria c697, 2007. Most water governing bodies, such as the Environment Agency (EA) and the Internal Drainage Boards (IDBs), have accepted the SUDS Manual as a complete, accurate and practical interpretation of PPS25, other interpretations will be questioned. The upcoming Flood and Water Management Bill will further reinforce the requirements for SUDS in new developments.

8.1.1.2 The term Sustainable Drainage Systems (SUDS) is frequently used and taken in this PPS to cover the whole range of sustainable approaches to surface water drainage management including:

- source control measures including rainwater recycling, green roofs and permeable surfacing;
- infiltration devices to allow water to soak into the ground, that can include individual or communal trench, basin or underground soakaways;
- filtration techniques, such as sand filters or vegetated swales, which mimic natural drainage flows and patterns;
- retention measures including ponds and underground storage in pipes or tanks, with flow control devices to limit the discharge rate;
- open channels instead of pipes to provide natural habitat and reduce risk of flooding during more extreme flood events; and
- wetland techniques to allow natural shallow flooding where appropriate to do so.

8.2 Use of Sustainable Drainage Systems (SUDS)

8.2.1.1 The application of SUDS to minimise environmental impacts of development plays a significant role in sustainable development. The ideal SUDS option for a development site will vary in each situation, depending upon:

- the goals of the local planning authority and the developer;
- the geological and topographical characteristics of the site; and
- the requirements of the EA or, where pertinent, the local IDB

8.2.1.2 Appropriately designed, constructed and maintained SUDS are more sustainable than conventional drainage methods because they can mitigate many of the adverse effects of urban storm water runoff on the environment. They can achieve this through:

- reducing runoff rates, thus reducing the risk of downstream flooding;
- reducing the additional runoff volumes and runoff frequencies that tend to be increased as a result of urbanisation, and which can exacerbate flood risk and damage receiving water quality;
- encouraging natural groundwater recharge (where appropriate) to minimise the impacts on aquifers and river base flows in the receiving catchment;
- reducing pollutant concentrations in storm water, thus protecting the quality of the receiving water body acting as a buffer for accidental spills by preventing direct discharge of high concentrations of contaminants to the receiving water body;
- reducing the volume of surface water runoff discharging to combined sewerage systems, thus reducing discharges of polluted water to watercourses via Combined Sewer Overflow (CSO) spills;
- contributing to the enhanced amenity and aesthetic value of developed areas; and
- providing habitats for wildlife in urban areas and opportunities for biodiversity enhancement.

8.2.1.3 The IDBs and the EA have managed facilities and responsibility for control of river levels, so developers will be actively encouraged to adopt a more strategic approach to SUDS. Run-offs

from development on a green field site should be no higher than the previous green field conditions. Brownfield sites should be developed using appropriate SUDS techniques to minimise the run-off, even if the previous run-off was higher.

8.2.1.4 SUDS should be considered in the wider context of effective surface water management and delivered through integrated drainage management techniques. Components of the whole drainage system include roads, sewers, retention storage and SUDS, together with water courses. Each element plays a role in conveying water and appropriate management options must be considered in order to limit flood risk and the migration of pollutants from their source, both locally and further away.

8.3 Flood Risk Mitigation

8.3.1.1 One of the primary applications of SUDS with respect to PPS25 is mitigation against flood risk. This may be achieved through attenuation or filtration ponds, wetlands, or through a number of smaller scale infiltration and site specific SUDS such as porous pavements, green roofs, or rainwater harvesting.

8.3.1.2 The Code for Sustainable Homes requires that peak run-off rates and annual volumes of run-off are no greater than the previous conditions of the development site. However, as mentioned above, developers will be actively encouraged to adopt a more strategic approach to SUDS.

8.3.1.3 It is the developer's responsibility to undertake the analysis required to provide the evidence base to prove that flood risk will not increase as a result of their development, taking into consideration the impacts of climate change and the use of SUDS. They may also be required to guarantee minimum downstream flows if required locally, perhaps to maintain water quality in the receiving water course.

8.4 Groundwater Recharge

8.4.1.1 The objective of sustainable development should be to minimise the impact on natural environmental processes. In the natural environment, rainfall will infiltrate the soil and recharge the underlying groundwater. This process should be imitated where possible as required by the Building Regulations, Part H.

8.4.1.2 There may be constraints to implementing infiltration SUDS such as limited soil permeability, or the situation of a development site within a protected groundwater zone. Localised assessment surveys should be requested within the planning application submissions along with the SUDS strategy.

8.5 Geology

8.5.1.1 Cambridgeshire's underlying geology is relatively simple. The basic geology of Cambridgeshire is identified in simple format in Figure 8.1. It can be noted that most of Huntingdonshire is underlain by Oxford Clay, with Corallian Limestone running down the south-eastern border from St Ives to St Neots, and Oolite Limestone and Clays forming the bedrock in the north-western tip of the district.

8.5.1.2 However, the superficial geology of Huntingdonshire shows considerable variety. The more recent superficial deposits are of prime importance as parent soil materials and are a huge influence on the hydrological and hydrogeological, characteristics of the local areas. Typically, the Fens are characterised by peat, with extremely high water retention characteristics, and boulder clay in the rest of Huntingdonshire. The use of SUDS would require localised assessment of the local soil types and conditions.

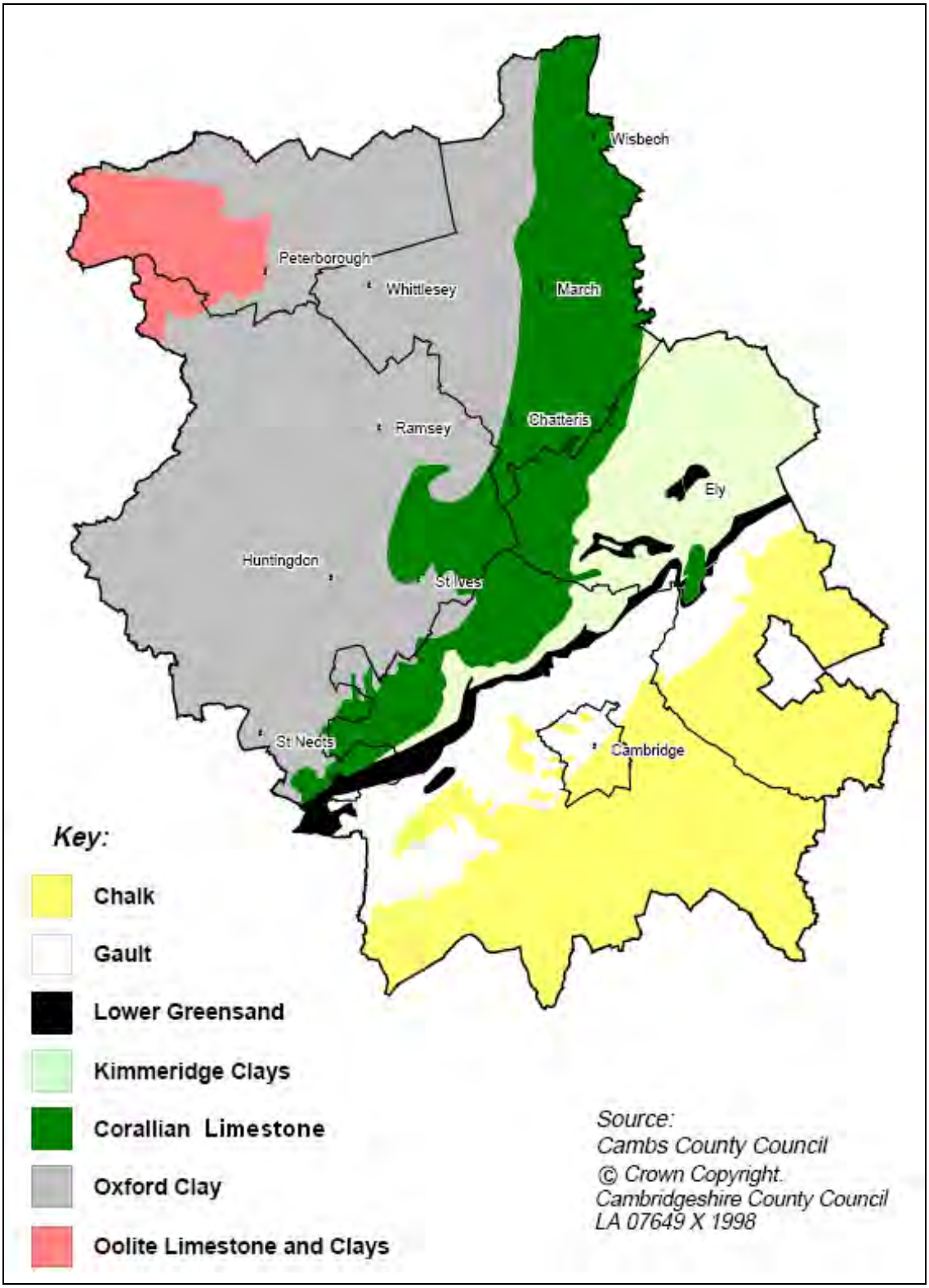

Figure 8.1: Solid Geology of Cambridgeshire (from Cambridgeshire and Peterborough's State of the Environment Report, 1998)

8.6 Pollution Control

8.6.1.1 SUDS can also be used for pollution control. The EA will generally advise if pollution control SUDS is required for a specific development site. The SUDS manual indicates the pollutant removal potential and hydraulic control of various SUDS techniques; please refer to the table below.

Table 8.1: Quantity and Quality Performance Selection Matrix (from the SUDS manual)

SUDS group	Technique	Water quality treatment potential					Hydraulic control			
		Total suspended solids removal	Heavy metals removal	Nutrient (phosphorous, nitrogen) removal	Bacteria removal (*)	Capacity to treat fine suspended sediments and dissolved pollutants	Runoff volume reduction	0.5 (1/2 yr)	0.1 – 0.3 (10/30 yr) Suitability for flow rate control (probability)	0.01 (100 yr)
Retention	Retention pond	H	M	M	M	H	L	H	H	H
	Subsurface storage	L	L	L	L	L	L	H	H	H
Wetland	Shallow wetland	H	M	H	M	H	L	H	M	L
	Extended detention wetland	H	M	H	M	H	L	H	M	L
	Pond / wetland	H	M	H	M	H	L	H	M	L
	Pocket wetland	H	M	H	M	H	L	H	M	L
	Submerged gravel wetland	H	M	H	M	H	L	H	M	L
	Wetland channel	H	M	H	M	H	L	H	M	L
Infiltration	Infiltration trench	H	H	H	M	H	H	H	H	L
	Infiltration basin	H	H	H	M	H	H	H	H	H
	Soakaway	H	H	H	M	H	H	H	H	L
Filtration	Surface sand filter	H	H	H	M	H	L	H	M	L
	Sub-surface sand filter	H	H	H	M	H	L	H	M	L
	Perimeter sand filter	H	H	H	M	H	L	H	M	L
	Bioretention/filter strips	H	H	H	M	H	L	H	M	L
	Filter trench	H	H	H	M	H	L	H	H	L
	Detention basin	M	M	L	L	L	L	H	H	H
Open channels	Conveyance swale	H	M	M	M	H	M	H	H	H
	Enhanced dry swale	H	H	H	M	H	M	H	H	H
	Enhanced wet swale	H	H	M	H	H	L	H	H	H
Source control	Green roof	n/a	n/a	n/a	n/a	H	H	H	H	L
	Rain water harvesting	M	L	L	L	n/a	M	M	H	L
	Permeable pavement	H	H	H	H	H	H	H	H	L

KEY

* limited data available

n/a = non applicable

H = high potential

M = medium potential

L = low potential

8.7 Amenity and Green Spaces

8.7.1.1 Local policies within Huntingdonshire create a strong emphasis on public amenity and maintaining green space in line with the HDC's Environmental Plan. SUDS measures should be planned carefully at the master planning stage of development to achieve these goals.

8.7.1.2 SUDS measures provide an effective ecological opportunity to enhance existing habitats, or to compensate for encroachment on natural habitat elsewhere within the development site. In fact, HDC aims to '*ensure early involvement in master planning processes and that biodiversity, open space and recreational objectives are included in development plans, structure plans, community strategies and other strategic documents, and that all development proposals adhere to wildlife legislation and good practice*' (HDC Environment Plan – Growing Awareness; 2008).

8.7.1.3 Examples of this are the Great Fen Project and the Paxton Pits Project. Within the Great Fen Project, Woodwalton Fen National Nature Reserve and Holme Fen National Nature Reserve will be connected into one large area of fenland covering 3,700 hectares. The artificial draining of the project area will be discontinued and replaced with appropriate wetland management. This will result in, among other things, improved capacity for storage of winter water which could reduce flood risk in the surrounding areas.

8.8 Integrated Urban Drainage

8.8.1.1 With respect to the development sites in Huntingdonshire, the implementation of new Integrated Urban Drainage Systems (IUDM) will not always be feasible, given the limited size and relative isolation of most of the sites. This obstacle, however, does not and should not hinder the implementation of available SUDS techniques at these sites.

8.8.1.2 As a general rule, the local water authorities, such as the EA and local IDBs, prefer SUDS that are either public property or will be adopted by a public body. This is because it is often the case that private SUDS proposed by developers, such as permeable paving or water butts within the property boundary, can no longer be relied upon once the property is sold due to adaptations or misuse. Indeed, proposals by developers to supply every home with a water butt, for example, would probably not be acceptable because once they are full they lose all their attenuation capacity.

8.8.1.3 The sites within Huntingdonshire that have been identified as presenting a real possibility of IUDM are:

- Loves Farm (**STN3** and **SN16**) and South of Cambridge Road (**SN7**), **St Neots**. These three sites are located west of St Neots, on either side of the Cambridge Road. They cover a total area of 221ha of what is essentially greenfield site. These three sites alone represent more than one third of the area identified for proposed and forecast development in Huntingdonshire up to 2026.
  The developments will constitute, practically, a new 'quarter' for the town St Neots. The various developers, local authorities and key stakeholders should work together for the implementation of IUDM for all three sites as a whole. This is not only to fall into line with national and regional policy, but it is also of great practical importance locally, particularly given that parts of the sites are currently within the EA's flood zone 3, covering a total estimated area of 27.2ha.
- Bearscroft Farm (**G8**), London Road (**GOD1**), Clyde Farm (**G9**), and Wigmore Farm (**GOD2**), Godmanchester, **Huntingdon**. These sites are located on the southern outskirts of the village of Godmanchester. They cover a total area of 50.3ha of essentially green field site. Although these sites are not connected directly, they are sufficiently close to make IUDM a realistic and practical choice. This will be particularly important for the Wigmore Farm and Clyde Farm sites which are partially affected by the EA's flood zone 3, for a total of 1.5ha.
- Northbridge (**HUN4**), **Huntingdon**. This large future development is located northwest of Huntingdon in a greenfield site. It covers an area of 49.9ha. The size of this site, and the fact that it is separate from existing infrastructure, makes IUDM a valid and realistic choice for surface water management.
- RAF Brampton (**B11**), Brampton, **Huntingdon**. This is a relatively large site, just south of the village of Brampton, covering 29.5ha. It is a brownfield site that is already largely developed. This will make an ideal IUDM system difficult. However, parts of the site do fall into flood zone 3, highlighting the importance of strategic drainage systems here.
- Houghton Grange (**HOU1**), North Houghton Road (**STI1**), St Ives Golf Course (**STI2** and **SI18**), St Ives. These four sites are just west of St Ives, on the Huntingdon Road, covering a total area of 39.4ha. Apart from Houghton Grange, which is already largely developed, these sites are essentially greenfield. Given their proximity and expanse, they may be suitably considered as a single IUDM unit.

8.9 Internal Drainage Boards in Huntingdonshire

8.9.1.1 The Internal Drainage Boards within Huntingdonshire District are administered by the Middle Level Commissioners with the exception of Alconbury and Ellington IDB which is located further to the south of the district and is administered by the Bedford Group of IDBs.

8.9.1.2 The impact of development on the hydraulic characteristics of each area is a prime consideration for the IDBs.

8.9.2 Bedford Group of IDBs

8.9.2.1 Only one of the Bedford Group's IDBs is located in Huntingdonshire, and affected by development. It is the Alconbury and Ellington IDB just west of Huntingdon. There are no pumping stations used for drainage within the Alconbury and Ellington IDB. However, as far as future development is concerned, the IDB would look for maintenance (greenfield sites) or betterment (brownfield sites) of surface water run-off rates for the development sites by means of Strategic Integrated Systems and SUDS to be publicly maintained. The proposed development sites affected by this IDB are listed below. The best SUDS solution would need to be selected on a site to site basis.

- Ullswater (HUN8). This site is a partially brownfield site and it falls almost entirely within the Alconbury and Ellington IDB catchment. The IDB will require that the proposed surface water drainage system will be such to improve the current surface water run-off rates.
- Bus garage (H4). This site is a brownfield site that lies (51.7%) within the local IDB catchment. As for the Ullswater site, the surface water run-off rates will have to improve. Furthermore, the run-off from outside the IDB catchment must not be transferred into it.
- Northbridge (HUN4). This is a large greenfield site which falls partially (16.5%) into the IDB catchment. Therefore, the surface water run-off rates within the catchment will have to be maintained at greenfield levels and, as for the Bus garage site, run-off transfers into the IDB catchment must not be made.
- HWAAP (H3). This is a relatively large brownfield site close to the railway station. It encroaches into the IDB catchment only slightly (2.3%). As above, in this section the run-off rates need to be improved and there are to be no net transfers of run-off into the catchment from outside at this site.
- Fire Station (H13). This is a brownfield site located close to where the Ellington meets the Great Ouse. It falls partially into the IDB catchment, (4.5%) and the same considerations as above are valid.
- Brookside (HUN5), RAF Brampton (B11) and Manor Farm Brampton (BRA1). All of these sites border on the IDB catchment. No transfers of run-off into the catchment from these sites must be made.

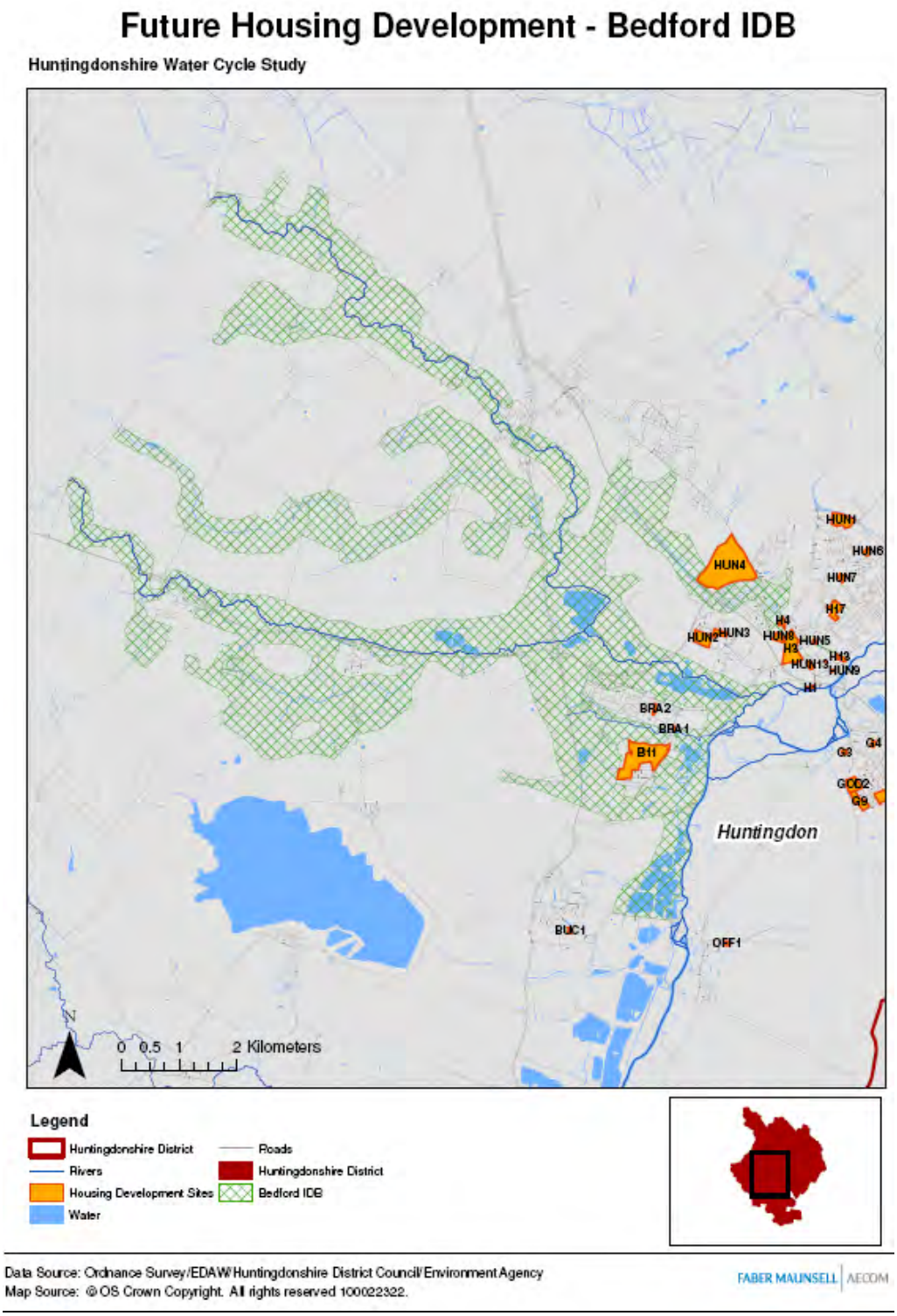

Figure 8.2: The Alconbury & Ellington IDB Catchment (green) with respect to Proposed Development Sites in Huntingdon

8.9.3 Middle Level

8.9.3.1 In the north of the district lie the Fens. A two-tier administrative system is in place here since 1862, with the passing of the Middle Level Act. A series of canals and high-level carriers, draining to St Germans pumping station in Norfolk, are administered and managed by the Middle Level Commissioners (MLC). The low-level system of drainage canals is administered by independent IDBs, each one covering a separate sub-catchment that drains into the Middle Level high-level carriers. The laws that define the nature and powers of the MLC and IDB are integrated with the Land Drainage Act and the associated by-laws. The by-laws can be

imposed within the by-law strip, which is 20m along the banks of Middle Level watercourses and 9m along the banks of the IDB watercourses.

8.9.3.2 The independent drainage boards within the Middle Level catchment make up some of the lowest lying land in the country and rely extensively on pumping stations in order to maintain the land drained. There are a total 106 pumping stations and gravity outfalls draining into Middle Level watercourses, of which 35 in the Huntingdonshire District. It is for this reason that the discharge into IDB watercourses is dictated by the relevant IDB. The interested areas within the Huntingdonshire district are around Ramsey and Sawtry.

8.9.3.3 Regarding developments, the general view of the MLC is to maintain run-off rates for greenfield developments and to expect betterment, ideally converging towards greenfield values, for redevelopment of brownfield sites. However, the runoff rate cannot be reduced to below the greenfield runoff rate as downstream residents are entitled to minimum flow in the watercourses going through their land. It has to be highlighted that costs of maintenance of the drainage system in developed areas is more expensive than in areas of agricultural land where the maintenance principle is 'dredge and spread'. However, this should not prove to be an issue as the value of developed land is greater than agricultural land and therefore higher rates can be charged by the relevant IDB.

8.9.3.4 The IDB will require that developments be carried out with strategic solutions for surface water, as discussed above. Furthermore, adoption and maintenance requirements need to be considered, along with the identification of areas of low amenity value that can be used for flood attenuation.

8.9.3.5 The sub-catchments of the Middle Level catchment are identified in Figure 5.3 (chapter 5) however the actual rateable areas administered by the IDBs are smaller. A representation of these is shown in Figure 8.3. The IDBs with rateable areas in the Huntingdonshire District are:

- Benwick;
- Bluntisham;
- Conington & Holme;
- Holmewood & District;
- Ramsey 1st;
- Ramsey 4th;
- Ramsey 5th;
- Ramsey, Upwood and Great Raveley;
- Sawtry;
- Sutton and Mepal;
- Warboys, Somersham and Pidley;
- Whittlesey; and
- Woodwalton.

8.9.3.6 When taking these rateable areas into account, it would seem apparent that the sites selected for future development have largely taken account of the IDBs. In fact, only one site, the Herne Road site (RSM1) at Ramsey lies within an IDB rateable area, Ramsey 4th. All other sites within the Middle Level catchment are located outside of IDB catchment.

8.9.3.7 The remainder of the sites at Ramsey and the sites at Warboys are in the Bury Brook catchment. This is an EA Main River that runs for 13km from Kings Ripton, north of Huntingdon, to the Great Whyte Culvert at Ramsey. From this culvert the flow from the Brook joins High Lode as part of the Middle Level Commissioners District. It has never been clearly defined whether the Great Whyte culvert is property of the EA or the MLC. The EA will expect developers to refer to PPS25 and will prefer the use of the SUDS manual. Though the MLC are not directly involved within the Bury Brook catchment, given that the waters will eventually reach their system, they will push for conservative interpretations of the PPS25. This is also due to the fact the there is no room to expand the drainage system around Ramsey, and so increase capacity, and therefore current run-off rates are to be maintained if the MLC are to guarantee their current level of protection.

8.9.3.8 The development sites at Sawtry are not within Sawtry IDB rateable area. However, they are within the Middle Level catchment, with all water eventually entering the Middle Level system.

To this end it is important that run-off rates are maintained or improved in order that the greater system can guarantee an adequate level of protection to the local community.

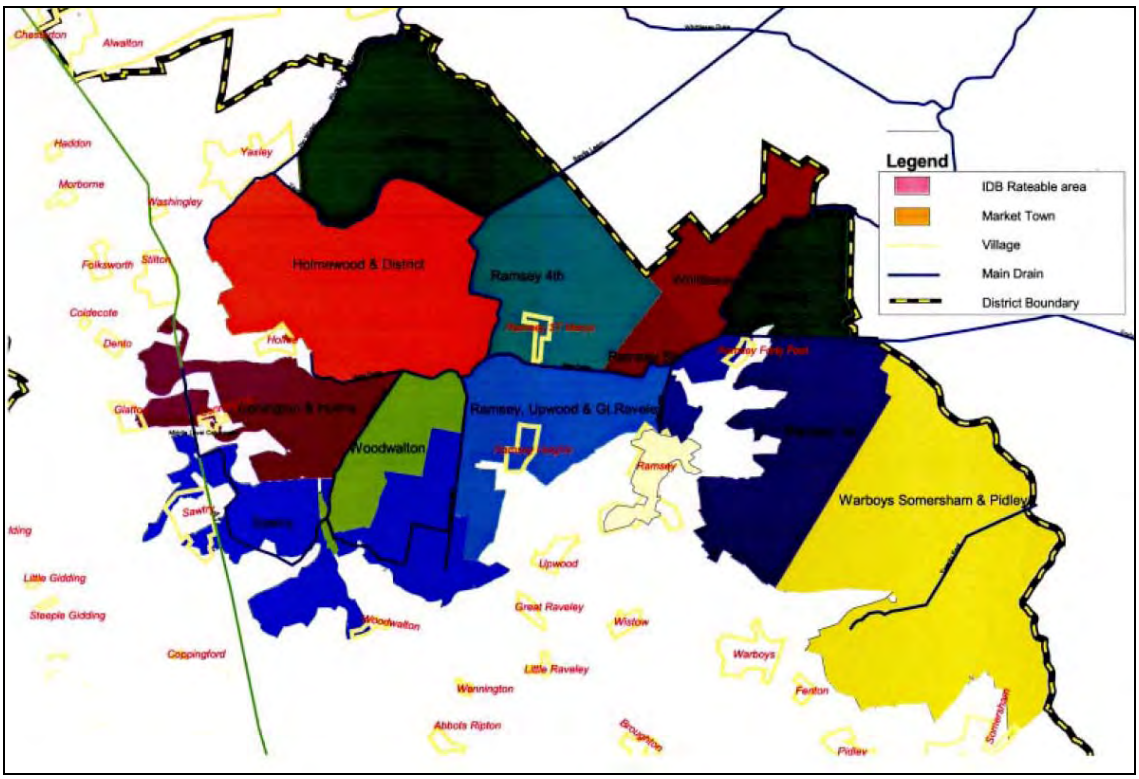

Figure 8.3: Middle Level system in Huntingdonshire, showing the rateable areas administered by the various IDBs

8.9.3.9 The area around Yaxley also falls into the Middle Level catchment. Here also, no sites are located within IDB rateable areas. However, here there is room for expansion of the drainage canals in the general area and so increase system capacity. This does not imply that developers need not apply PPS25 and similar policies in this area. It simply means that it will be easier to reach a compromise with the MLC should the need arise.

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Environmental Improvement

9 Environmental Improvement

9.1.1.1 Huntingdonshire District Council (HDC), in its 5-year strategic environmental plan, Growing Awareness, defines with three blanket titles the environmental issues that are of primary importance for the district. These are:

- Environmental Improvement;
- Tackling Climate Change;
- Using resources Efficiently; and
- Protecting and Improving the Local Environment.

9.1.1.2 Under this last chapter, HDC underlines that the pressure to find space for development is strong and it is therefore crucial that in a district with great environmental value, the development needs to be guided and managed in a way that doesn't impact adversely on the features that define Huntingdonshire as an attractive and prosperous place to live.

9.1.1.3 The environment strategy looks to raise awareness of the important environmental features in the district and their protection by encouraging more learning and interaction with the natural environment. This strategy recognises the need to protect and enhance the environment and looks to tackle the issue in four ways:

1. minimising harm from contaminated and polluted land;
2. protecting and improving biodiversity and green space;
3. protecting our urban and rural character; and
4. maintaining a clean and safe Huntingdonshire.

9.2 Environmental Improvement and the Water Cycle

9.2.1.1 Water quality is greatly influenced by human activities. In addition to the obvious discrete discharges to watercourses from surface water drains and WwTWs there is also diffuse pollution from fertilizers used in agriculture and migration of pollutants mainly from business activity through groundwater to aquifers and water courses.

9.2.1.2 The effluents from WwTWs are principally treated to reduce their impact on the environment. There are tight controls on what may be discharged and consents are required. However, in rural areas, many properties are not served by public utility Sewage Treatment Works (WwTWs) and therefore make use of smaller private WwTWs and septic tanks. These discharge to land and/ or a watercourse and can impact on both ground and surface water.

9.2.1.3 Diffuse sources of pollution are more difficult to address. Agriculture and business are very important to the region. An education programme is being pursued to ensure working practices minimise waste and incorporate mitigation measures against impacts on the water environment.

9.2.1.4 The recently published DEFRA document 'Protecting our Water Soil and Air' provides a Code for Good Agricultural Practice aimed at farmers, growers, and land managers. The document describes many of the actions that can be taken to protect and enhance the quality of water, soil and air.

9.2.1.5 The environmental impact of abstractions must also be taken into account. The Government is aware of this and a national document supporting the development of Catchment Abstraction Management Strategies (CAMS) has been published, Managing Water Abstraction: The Catchment Abstraction Management Strategy Process. CAMS are strategies for management of water resources at a local level. They aim to ensure that water resources of the particular catchment are managed in a sustainable way, with due regard for the environment, abstractors, and other water users. CAMS make more information on water resources and licensing practice publicly available and therefore allow sustainable management in consultation with the local community and interested parties.

9.2.1.6 The Environment Agency (EA) analyses large amounts of ecological data, including data on macroinvertebrates, macrophytes, and fish as these are sensitive to changes in environmental conditions and become indicators of the ecological status of a watercourse. The data is used

within the biological component of the General Quality Assessment (GQA) scheme, an assessment of water quality. GQA scores range from A (highest quality, where the biology or chemistry is similar to or better than that expected for an unpolluted river of that size, type and location) to F (lowest quality, where the biology or chemistry is limited to a small number of very tolerant families, often only worms, midge larvae, leeches and the water hoglouse).Generally, the Biological GQA scores in Huntingdonshire are very good, as indicated in table 9.1. However, the table also indicates that nutrients are a problem, as highlighted in Chapter 7: Waste Water. Nutrients are scored on a scale from 1 to 6, 1 corresponding to very low levels and 6 corresponding to very high levels.

Table 9.1: GQA scores for Huntingdonshire (EA, 2008).

Name and Locality	Chemical GQA	Biological GQU	Nitrates	Phosphates
Ouse at Hemingford	B	A	5	5
Ouse at Huntingdon	C	B	5	5
Brampton Brook	E	C	6	6
Kym	D	B	6	5
Ouse at St Neots	B	B	5	

9.2.1.7 Huntingdonshire, for the most part straddles two CAMS areas, the Old Bedford including Middle Level CAMS area to the north, and the Bedford Ouse CAMS area to south. The northwest finger of the district, from Stilton to Wansford indicatively, reaches into the Nene CAMS area.

9.3 The Middle Level Catchment

9.3.1.1 Within the Middle Level catchment, in the north of the district, most of the watercourses are man-made pumped drains that are extensively used as sources for spray irrigation. Maintaining water quality suitable for spray irrigation is therefore vital to the intensive arable farming in the area. Fisheries, amenity and conservation are equally important uses, which are dependent on suitable water quality.

9.3.1.2 All main rivers and main drains in the Middle Level catchment are assessed for compliance with River Quality Objectives (RQOs). Of the 32 drains which were monitored within the catchment, in 2002–2004, all but 5 attained a Biological GQA grade of A or B.

9.3.1.3 There are several nationally designated water dependent sites within the Middle Level catchment. These include the Ouse Washes Ramsar, SAC, SPA and SSSI, Woodwalton Fen SSSI, Holme Fen SSSI and Upwood Meadows SSSI. The designated conservation zones within the catchment are shown in Figure 9.1.

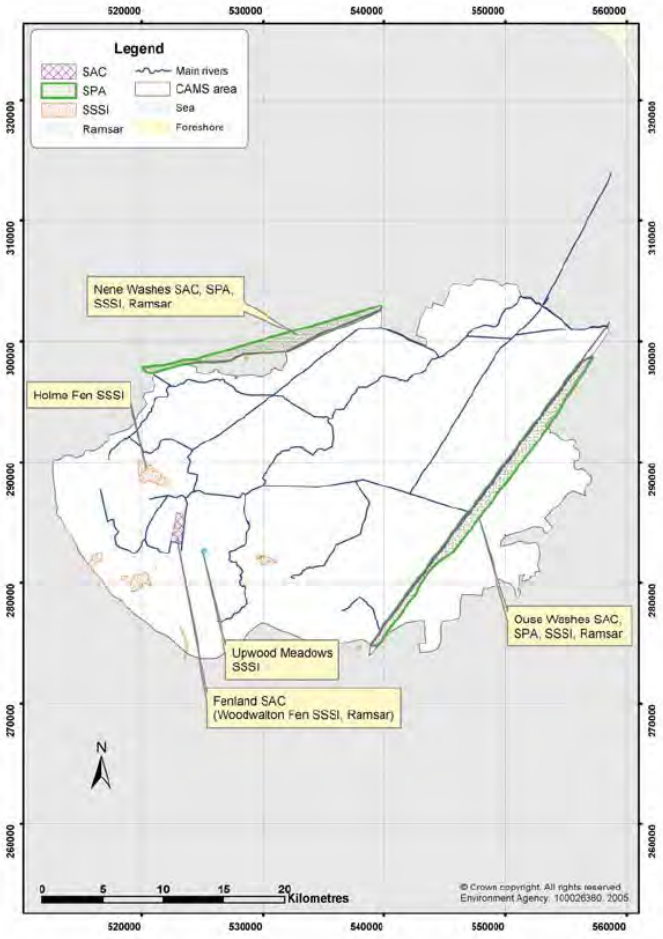

Figure 9.1: Designated Conservation Sites in the Middle Level (from EA)

9.3.1.4 Woodwalton Fen and Holme Fen are at the heart of the Great Fen Project. The Great Fen Project aims to restore over 3,000 hectares of wetland habitat between Huntingdon and Peterborough. In doing so, it will connect Woodwalton Fen with Holme Fen to create a very large site, with both conservation benefits for wildlife and socio-economic benefits for people. The project is impressive in its ambition and vision. It aims to combine nature conservation and management with tourism and other income-generating activities. It could also play a strategic role by storing flood water for the protection of the Middle Level System and the homes, farms and businesses that depend on the system.

9.3.1.5 Sawtry WwTW discharges upstream of the proposed Great Fen site. Currently, the trended DWF of this WwTW is easily contained in the consented DWF volumetric discharge and will continue to do so following Core Strategy developments in the Sawtry area. The discharge consent also limits ammonia, suspended solids and BOD. From data obtained from AW, it is apparent that the discharged concentrations are typically less than 50% of consented concentrations. However, given the importance of the future downstream site, it would be advisable for AW to review their emergency procedures at the Sawtry WwTW to ensure process failure would not cause significant environmental damage.

9.3.1.6 The Ouse flows out of Huntingdonshire into the Ouse Washes. The combined Ouse and Nene Washes are extensive areas of washland habitat (3700ha). The Washes were originally built as flood storage areas in the 17th Century to protect surrounding farmland and communities from riverine flooding. The Ouse Washes forms the largest area of washland (grazing pasture that floods in the winter) in the UK. It is designated as an SPA under the Birds Directive. It attracts thousands of ducks and swans in winter, and in spring, hundreds of snipe, lapwings and redshanks breed. However, current issues relating to water quality and management of the Washes mean that these breeding populations have, in recent years, been less successful. The Ouse Washes are also designated as a SAC because of the presence of spined loach Cobitis taenia populations within the Counter Drain and Old Bedford/Delph. Under the

European Habitats Directive, the EA is currently required to review all consents that may affect the integrity of designated sites. This means that by 2010, the impact of all abstraction licences on those sites must have been investigated. At present there are a small number of licences which have the potential to impact on levels in the Counter Drain and therefore on the integrity of the spined loach population. Investigations may result in the need for these licences to be amended.

9.3.1.7 Safeguarding of the Washes requires control of water quality upstream of the Washes, not only in the Old Bedford and Middle Level catchment in the north of Huntingdonshire, but also in the Bedford Ouse catchment in the south of the district and further upstream at Bedford and Milton Keynes.

9.3.1.8 In a study by Dempsey & Codling et al (2005) an investigation was carried out to assess the risk posed by the significant level of water abstractions and waste water discharges in the catchments upstream of the Ouse and Nene Washes. The assessment demonstrated that the water supply abstractions are not likely to have a significant impact on the conservation features. In addition, the waste water discharges were shown to have little impact upon nitrogen levels, which are predominantly impacted by agricultural inputs. It was found that the waste water discharges in the Ouse catchment, upstream of the Middle Level catchment, do cause phosphorous levels to exceed ecohydrological prescription levels set for the ditch flora and fauna. The EA is addressing these issues through its education programme, implementation of the Water Framework Directive and review of discharge consents with AW.

9.3.1.9 The rivers and drains provide boaters with an extensive network of navigable waterways. The Middle Level System provides a link between the navigable River Nene, where access is gained via the lock at Stanground, and the navigable Great Ouse through Salters Lode lock. Of the 187km of main channels, about 150km are navigable. The need for maintenance of water levels in the network to ensure adequate draft for boats is an obvious issue for navigation.

9.3.1.10 The Middle Level is regularly used for recreation on or near water, including walking, horse riding, cycling, angling, boating and canoeing, picnicking and visiting waterside areas. These activities are facilitated by a vast network of bridleways, footpaths, river accesses such as slipways for boats and canoe portages for canoeists. Planners and developers are encouraged, through consenting processes, to incorporate recreational aspects into their development, where practicable.

9.3.1.11 Angling is an important recreational use of the river and surrounding wetlands and relies on the waterways being of good quality.

9.4 The Bedford Ouse and Upper Ouse Catchment

9.4.1.1 The Bedford Ouse is a typical lowland river; slow flowing, clear, with abundant and diverse macrophyte growth along its length. The recent warm summers have benefited the annual recruitment of the dominant cyprinid species such as roach, common bream, silver bream, perch, tench and bleak. In the upper reaches of the Great Ouse, the Environmental Weighting scores indicate that the river is very sensitive to flow, with this sensitivity decreasing further downstream. There are several other smaller tributaries of the main rivers that have been classed as sensitive with regard to flow. This sensitivity may be due, in part, to water quality issues, with some tributaries suffering the effects of pollutants. When the biological water quality is poor it is difficult to elucidate whether the sensitivity is truly related to flow issues. The sites to which these problems apply will be investigated by the EA and alternative sites will be considered for the next cycle of the CAMS cycle where necessary.

9.4.1.2 593.3km of river within the catchment are monitored and assessed against River Ecosystem targets, and at the end of December 2001 92% of this length was compliant. Failures were mainly due to low dissolved oxygen, caused by high temperatures and low flows. Where practicable, consideration should be given to aeration techniques.

9.4.1.3 The main water quality issue for Ouse catchment concerns eutrophication and nutrient loading of phosphorous. Foxcote Reservoir, Grafham Water and the River Great Ouse (Ouzel to Welney) are designated as Eutrophic Sensitive Areas under the Urban Waste Water Directive. These designations require the installation of nutrient removal at all sewage treatment works (WwTW) serving a population of more than 10,000.

9.4.1.4 The major discrete discharges within the catchment are mainly from public sewage treatment works with the largest being Cotton Valley, which serves Milton Keynes and has a consented dry weather flow of 50,000 m^3/d. The Milton Keynes Expansion Study indicates that the capacity of this facility can be increased when required. The effects of this on water quality downstream in Huntingdonshire should be analysed in a detailed Water Cycle Strategy.

9.4.1.5 There is one Habitats Directive site in the Upper Ouse and Bedford Ouse catchment, this is Portholme Meadow SSSI and SAC, which is an important habitat for wet grassland and associated species. The Environment Agency is required to review all consents that may affect the integrity of a Habitats Directive site by 2010. The impacts of all abstraction licences that may affect a Habitats Directive site have to be investigated. There are also several SSSIs related to the rivers and floodplains in the Huntingdonshire, such as Brampton Racecourse, Alconbury Brook, and Houghton Meadows. These and the previously mentioned Ouse Washes are particularly sensitive to discharges and potentially abstractions in Huntingdonshire as they rely on water flowing along the Great Ouse. The EA takes the Washes into account when reviewing licenses and consents within the Bedford Ouse and Upper Ouse catchment. Furthermore, Dempsey & Codling et al (2005), considered the Washes within the complete Great Ouse and Nene catchments, finding the main issues to be high nitrogen levels due mainly to agricultural inputs and high phosphorous levels due mainly to treated waste water discharges by AW.

9.4.1.6 The Upper Ouse and Bedford Ouse is regularly used for recreation on or near water, including walking, horse riding, cycling, angling, boating and canoeing, picnicking and visiting waterside areas. These activities are facilitated by a vast network of bridleways, footpaths, river accesses such as slipways for boats and canoe portages for canoeists. Planners and developers are encouraged, through consenting processes, to incorporate recreational aspects into their development, where practicable. There are a number of riverside parks close to market towns providing a nearby local amenity for people to enjoy the aquatic landscape. Of particular note are Hinchingbrooke Country Park and Paxton Pits Nature Reserve. The Ouse Valley Way is a long distance footpath that runs along the River Great Ouse from Eaton Socon to Earith and passes through St. Neots, Huntingdon and St. Ives.

9.4.1.7 Angling is an important recreational use of the river and surrounding wetlands and relies on the waterways being of good quality.

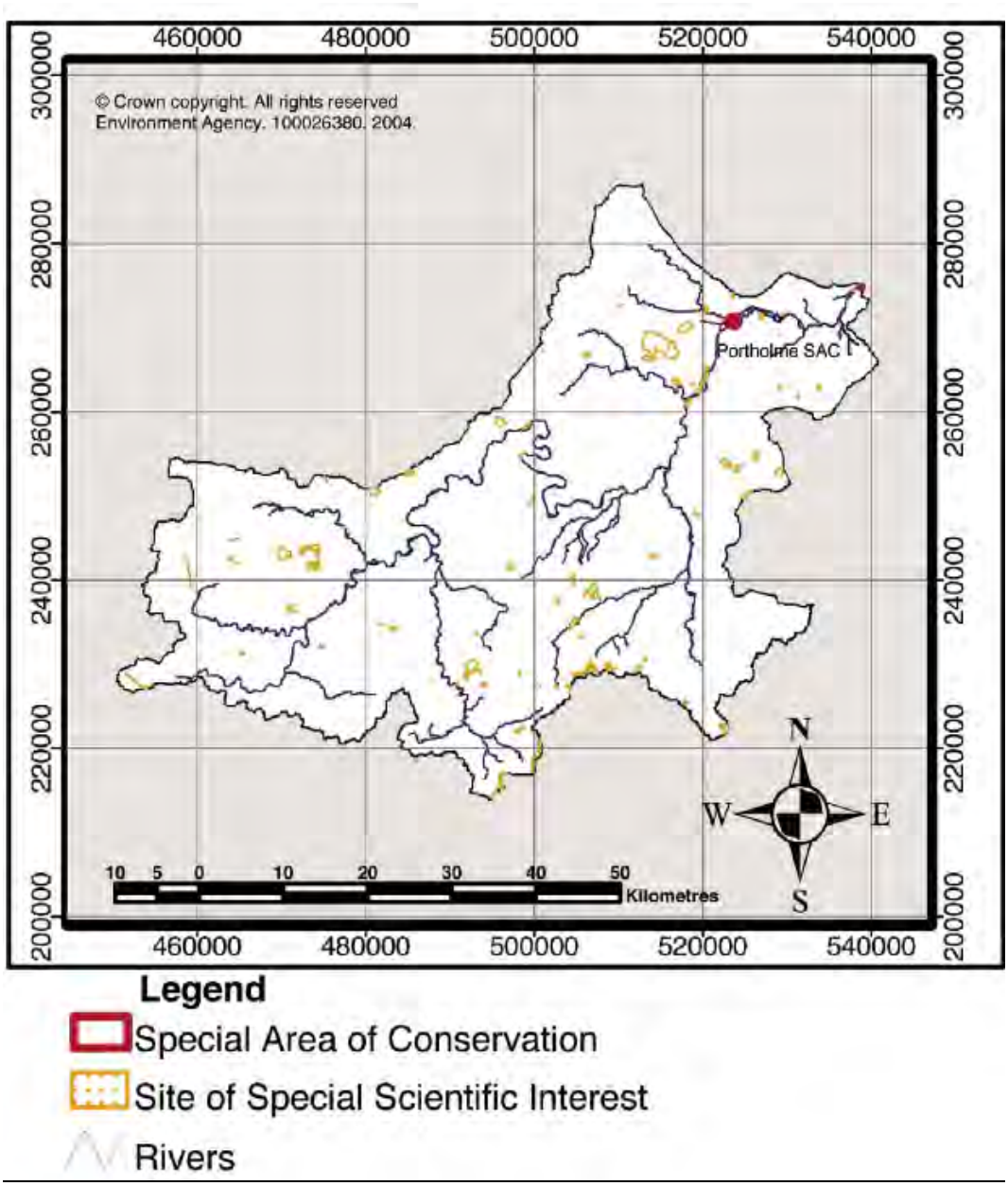

Figure 9.2: Designated Conservation Sites in the Upper Ouse and Bedford Ouse Catchment (from EA)

9.4.1.8 With respect to ecological sensitivity to flow variations, the Bedford Ouse as far as Earith is not sensitive (sensitivity score of 1 where least sensitive scores 1 and most sensitive scores 5). However, the Alconbury Brook and Ellington Brook score 4 on the ecological sensitivity scale. This area is managed by the Bedford Group of IDBS, as mentioned in Chapter 7. Developments within this sub-catchment must bring surface run-off rates into line with greenfield run-off rates not only to satisfy drainage requirements, but also to protect the delicate ecological balance in place within the sub-catchment.

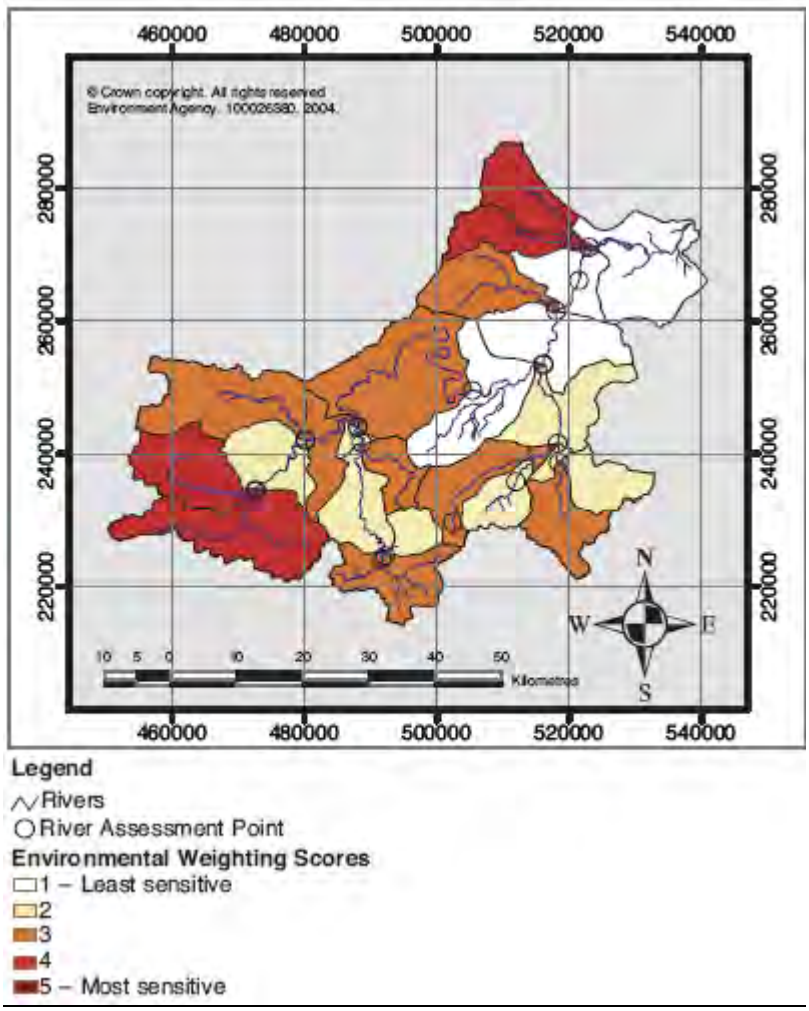

Figure 9.3: Environmental Weighting Scores in the Upper Ouse and Bedford Ouse catchment (from EA)

9.4.1.9 An issue of particular importance to local agriculture along the Great Ouse, though of less importance to housing developments, is that the River Great Ouse from Great Barford Bridge down to Earith (including side channels) has been found in recent years to be contaminated with the Brown Rot organism (Ralstonia Solanacearum). As a result, the use of water directly from designated stretches of watercourse for irrigation or spraying of potato (and tomato) crops has been prohibited in the past. Prohibitions on irrigation and spraying do not apply to any other crops. Details of the prohibitions are available on the DEFRA web site (www.DEFRA.gov.uk/planth/brownrot.htm).

9.4.1.10 The importance of rivers, waterways, and wetlands for protected species such as otters and other mammals, fish species and invertebrates cannot be highlighted enough.

9.5 Huntingdonshire Overview

9.5.1.1 Despite this apparent wealth of habitats as highlighted in Table 9.1, the general picture across Huntingdonshire's countryside is one of progressive loss in habitat quality and diversity. Intensive agriculture, urbanisation and other human activities have all contributed to this process. The Cambridgeshire and Peterborough Biodiversity Partnership has formulated action plans for important habitats and species that identify the measures needed to increase the variety and vitality of habitats and species in the county, and some progress is being made. Particular opportunities have been identified by the Biodiversity Partnership in the 50-year Wildlife Vision for Cambridgeshire, as well as the Natural England and Environment Agency Great Ouse Vision. These highlight a number of priority areas in Huntingdonshire for habitat creation and enhancement. The HDC Environment Strategy strongly supports the work of these visions and they will enable HDC to work with partners to protect both designated sites and influence the management of the wider countryside and all biodiversity.

Table 9.2: Wildlife sites in Huntingdonshire (from HDC Environment Strategy)

Wildlife Site	Size	Status
Brampton Wood	132 hectares	SSSI
Monks Wood	157 hectares	NNR
Waresley and Gransden Woods	54 hectares	SSSI
Holme Fen National Nature Reserve	266 hectares	NNR
Houghton Meadow	8 hectares	SSSI
Portholme Meadow	104 hectares	SSSI
St Neots Common	32 hectares	SSSI
Upwood Meadow	6 hectares	/
Grafham Water	149 hectares	SSSI
Hinchingbrooke Country Park	68 hectares	/
Woodwalton Fen National Nature Reserve	208 hectares	SSSI
Hanson RSPB Wetland Project	Under development	/
Paxton Pits Nature Reserve	75 hectares	SSSI
Barford Road Pocket Park	18 hectares	/
Holt Island Nature Reserve	2.8 hectares	/
Spring Common	5.2 hectares	/
The Thicket	2.5 hectares	

9.5.1.2 HDC has identified a number of goals in its Environmental Strategy, including the following:

- protect and enhance biodiversity and open space of international, national and local importance through legislation, policy, site purchase and awareness-raising, and create habitats and areas of strategic green space enhancement in line with UK BAP and county targets;
- ensure early involvement in master planning processes and that biodiversity, open space and recreational objectives are included in development plans, structure plans, community strategies and other strategic documents, and that all development proposals adhere to wildlife legislation and good practice;
- develop community involvement in green space and biodiversity enhancement projects and encourage experience of the natural world through environmental education.
- protect and promote allotments and community gardens, and provide further opportunities for people who wish to grow their own produce as part of the long-term promotion of sustainability, health and social inclusion; and
- improve the quantity and quality of publicly-accessible open space and improve opportunities for people to access wildlife.

9.5.1.3 A number of projects have already been set in motion in order to achieve these goals:

- **Landscape scale restoration projects**. The Great Fen and Paxton Pits extension projects;
- **Local Development Framework (LDF)**. Require new dwellings to achieve high levels of biodiversity and open space amenity in accordance with the biodiversity chapter of the Code for Sustainable Homes;
- **Sustainable Homes Showcase – New Build**. A development of 30 exemplar 2-, 3- and 4-bed homes, constructed to achieve compliance with level 5 of the Code for Sustainable Homes;
- **Environmental Education Officer**. To publicise and promote a broad range of environmental messages and projects in line with the Council's role as community leader, and to work with schools and the local community;
- **Godmanchester Nursery Project**. Nursery of trees, local provenance, vegetable and orchard areas and greenhouses to provide some of the Council's own plant needs; and
- **Access to privately-owned green space**. Engage with private landowners in relation to using their land as access to green space.

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Conclusions and Recommendations

10 Conclusions and Recommendations

10.1.1.1 This Outline Water Cycle Strategy has considered the achievability of the proposed level of growth for Huntingdonshire in terms of the Water Cycle, with particular reference to the relative feasibility of the Core Strategy sites. The following aspects have been considered:

- Flood risk management;
- Water resources and supply;
- Waste water;
- Sustainable drainage; and
- Environmental improvement.

10.1.1.2 Each of these aspects has been considered in detail in the preceding chapters, and the conclusions are here summarised by category.

10.2 Flood Risk Management

10.2.1.1 HDC consulted with the EA during the drafting of their Core Strategy. As a result, the majority of the proposed development sites fall within the 2004 SFRA's Flood Zone 1. Some sites are either partially within Flood Zone 3 or bordering Flood Zone 3. In these cases, development has been limited following consultation between HDC and the EA.

10.2.2 Huntingdon Area

10.2.2.1 With regard to developments at Huntingdon and Brampton the EA concluded that no strategic issues apply other than the need to avoid areas of flood plain.

10.2.2.2 At Godmanchester the EA found no strategic issues here other than the proximity of the diverted A14. However, some fluvial flooding does occur to lower lying areas so a flood defence improvement feasibility study is currently being undertaken.

10.2.2.3 As indicated in the relevant chapter, a number of sites border or are crossed by Flood Zone 3 areas. Development type should be selective in these areas.

10.2.3 St Neots

10.2.3.1 At St Neots, though the numbers of proposed units are large, the EA concluded that there are no strategic issues affecting expansion to the east, where the flood plain is limited. There are also areas outside of the flood plain within the current extent of St Neots where infill development could take place.

10.2.4 St Ives

10.2.4.1 With regard to development at St Ives the EA inferred that the natural expansion direction from town planning perspectives would be to the east, with the regeneration of the existing industrial area located there. However, this part of the town is bordered by flood plain which would be an effective barrier to further eastward expansion unless major earthworks to relocate the flood volume were undertaken. Such a course of action might trigger betterment of the existing developments within flood plain nearby. Mixed use expansion towards the north and south-west should not encounter any strategic issues.

10.2.4.2 This has, generally, been the approach applied within the Core Strategy. Three sites are located within the floodplain, as listed within the relevant chapter. Development at these sites will need to be adequate to the flood risks involved.

10.2.5 Ramsey

10.2.5.1 All of the proposed developments in Ramsey fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers. However, the entire area is within the Middle Level, which depends on artificial pumped drainage to evacuate excess rainfall. Increases in surface runoff due to developments would not be acceptable here. Integrated drainage schemes and SUDS techniques are highly recommended at all development sites in the Ramsey area.

10.2.6 Yaxley and Sawtry

10.2.6.1 All of the proposed developments in Yaxley and Sawtry fall within Flood Zone 1 and are therefore considered at low risk of flooding from rivers. However, Sawtry is within the Middle Level and Yaxley borders upon it. The Middle Level depends on artificial pumped drainage to evacuate excess rainfall. Increases in surface runoff due to developments would not be acceptable here. Integrated drainage schemes and SUDS techniques are highly recommended at all development sites in the Yaxley and Sawtry area.

10.3 Water Resources and Supply

10.3.1.1 Huntingdonshire is supplied by two water companies, Anglian Water (AW) in the west, and Cambridge Water Company (CWC) in the east. The respective areas are served by sturdy water supply resource zones that extend beyond the borders of Huntingdonshire. In this way deficit and surplus can be distributed easily.

10.3.1.2 Both of these companies have prepared draft Water Resources Management Plans (WRMPs) which are available for public consultation. The final WRMPs are due towards the end of 2009. These draft WRMPs have taken into account future population growth and development, and the fact that certain planning zones are indeed in deficit.

10.3.1.3 AW has identified a number of schemes that would increase its available resources to levels necessary to cope with increases in demand in the entire Ruthamford Water Resource Zone. It is also working towards improving efficiency as part of a twin-track approach to managing the supply-demand balance.

10.3.1.4 CWC has concluded that currently it can rely on enough resources to cope with the forecast increase in development in its supply area, most of which is concentrated around Cambridge. Some of its abstraction licences are time-limited and will require negotiation for renewal. However, generally, CWC's draft WRMP does not envisage a need to increase resource availability up to 2035. Rather, CWC has chosen to invest in water efficiency, including measures as widespread metering of domestic connections.

10.3.1.5 The RSS, and EA, are proposing a target reduction in per capita consumption of 25% for new dwellings and a reduction of 8% for existing dwellings in order to achieve their goals. This puts the onus on developers to construct as per the amended Building Regulations, and to aim towards the Code for Sustainable Homes. Retro-fitting of water-saving devices, such as grey water devices and water-efficient appliances, is to be pursued if water resources are going to be sufficient in the future, and actively promoted by local authorities and water companies where it is economically beneficial.

10.4 Waste Water

10.4.1.1 The waste water company serving Huntingdonshire is AW. There are 27 WwTWs in the district, however, only 6 are affected by Core Strategy sites. These are Brampton WwTW, Huntingdon WwTW, Ramsey WwTW, Sawtry WwTW, St Ives WwTW, and St Neots WwTW.

10.4.1.2 In terms of capacity, all sites except St Neots have sufficient headroom to deal with the forecast population growth. The need for an increase in discharge consent at the St Neots WwTW has already been identified by AW and HDC. A new pumping station to drain the Loves Farm site to St Neots WwTW has already been built.

10.4.1.3 The majority of the larger town centres within Huntingdonshire are served by dated combined sewerage systems, whilst isolated villages and hamlets have no surface water sewerage, which gives rise to problems associated with the connection of surface water into the foul sewerage systems. Core Strategy development sites located in areas with combined sewerage systems or no surface water sewerage should consider SUDS and rainwater harvesting in order to reduce the volumes impacting on the foul sewerage network and on the serving WwTW. This point is of particular importance in central Huntingdon, central St Ives, and the outskirts of Ramsey. This approach not only benefits the network, which has to transfer lesser volumes, but the WwTWs, which function more efficiently when the incoming flows and concentrations are relatively constant. This is of particular relevance to the WwTW at St Ives, which already has ammonia issues, and at Sawtry, which is upstream of the Great Fen Project and therefore requires tight control of effluent concentrations.

10.4.1.4 A problem of septicity is recognised at the far eastern reaches of the Huntingdon sewerage catchment, which falls into the St Ives area from a Core Strategy point of view. The causes of

this have been identified by AW as trade effluents from the Fenstanton Dairy Crest dairy and excessive residence times in the system for effluents from Wyton and Houghton. It is recommended that this problem be affronted and analysed by AW. The nature of the Huntingdon sewerage network is such that increased capacity at pumping stations may be sufficient to solve the problem. Alternatively, the Wyton and Houghton flows could be diverted to St Ives WwTW. This would require a careful analysis of St Ives capacities to deal with increased volumes and capacity to remove nutrients before discharging treated waste water. Currently, the major environmental problem in the Ouse catchment is eutrophication caused by excessive chemical nutrient concentrations.

10.5 Sustainable Drainage

10.5.1.1 Generally, increased development implies increased surface water run-off. In the past, these volumes were gathered into the combined sewerage system and dealt with at the WwTW or, in extreme cases, overflowed directly into a nearby water body via a combined sewer overflow (CSO). The negative impact on the biochemical processes at the WwTW and the environmental implications of CSOs and badly treated effluent discharges are sufficient to explain the preference for a separate sewerage system. In this way, the relatively constant volume of foul sewage is transferred to the WwTWs while the variable storm water volumes are transferred to a nearby water body.

10.5.1.2 Furthermore, the increase in run-off volumes in urban areas, due to increased impermeable surface areas, means that the natural attenuation capacity of the land is being eroded. Flood risk is increased and groundwater recharge is reduced. In the case of Huntingdonshire, the Middle Level is particularly sensitive, as the entire area relies on artificial pumped drainage to evacuate excess rainfall. In certain areas, around Yaxley, there is room to widen the drains and so increase their capacity. However, in other areas, around Ramsey, the drains cannot be increased in size due to existing developments. The storage capacity of the system in these areas is capped.

10.5.1.3 While PPS25 states clearly the requirement to consider integrated drainage systems and SUDS in all new developments, the Middle Level Commissioners and the local IDBs, in their role as hydraulic administrators of the local drainage system insist that all new development in the area make use of sustainable drainage technologies in order to safeguard the Middle Level catchment from unnecessary flooding. They will question developers on their choice of methods, particularly if the developers' interpretation of PPS25 is different than that given in The SUDS Manual (Ciria 697).

10.5.1.4 As stated in the relevant chapter, the contained area and relative isolation of some of the Core Strategy sites will mean integrated urban drainage systems will not be feasible. However, SUDS methods will be expected and their capacity will need to be proved with appropriate calculations by the developer.

10.6 Environmental Improvement

10.6.1.1 A number of authorities within Huntingdonshire are working together in a huge conservation project that is the Great Fen Project. The project is long term and will recreate a sustainable fenland environment that will not only be of great ecological, conservational and recreational value, but will also provide a large storage area to alleviate flooding within the ever susceptible Middle Level.

10.6.1.2 Eutrophication is a major issue for the River Great Ouse along its entire course within Huntingdonshire. It is caused by high concentrations of chemical nutrients, specifically nitrogen and phosphorus. The main source of nitrogen is agriculture. The main source of phosphorus is waste water discharges from waste water treatment works (WwTWs). Ammonia, a compound of nitrogen, is also found in high concentrations in WwTW discharges. The negative effects in this case are localised, given the point source of the contaminant with respect to nitrogen of agricultural origin. On the other hand, phosphorus from point discharges in the Great Ouse catchment has negative effects all the way downstream as far as the Ouse Washes.

10.6.1.3 The EA are working on an educational programme for farmers in order to, among other things, reduce the concentrations of nitrogen entering the river and drainage system because of their activities. The EA are also discussing new discharge consents with AW in order to fall into line with acceptable phosphorus levels by 2010.