Suffolk Coastal District Council and Ipswich Borough Council

Cross Boundary Water Cycle Study

Wood Environment & Infrastructure Solutions UK Limited – January 2019

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Report for

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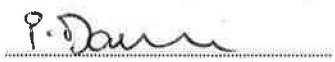

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Doc Ref. 41086RR037i4

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Document revisions

No.	Details	Date
1	DRAFT report	Nov 2018
2	Issue 2 Report	Dec 2018
3	Issue 3 Report	Jan 2019
4	Final Report	Jan 2019

Executive summary

Purpose of this report

This report has been produced for the purpose of undertaking a cross boundary Water Cycle Study (WCS) to support Suffolk Coastal District Council (SCDC) and Ipswich Borough Council (IBC) in their decision making process as they start to compile their respective Local Plans.

The WCS has been undertaken to understand the impact of likely development on the water environment, specifically this Outline Phase WCS has provided a high level assessment of the following three aspects; water resources and supply infrastructure; wastewater treatment, water quality and sewage; and flood risk. This WCS can be used by SCDC and IBC to support and understand the implications of the growth options and provide a basis for any future detailed WCS once the respective Local Plans has been finalised.

It should be borne in mind by the reader that these sites represent a snapshot in time, and that the sites to be included in both local plans will change as a result of the conclusions in this study, and additional studies that feed into the local plan decision making process. The following provides a summary of the three main sub-chapters in this report.

Water resources and supply infrastructure

This report draws on available evidence to set out the pressures on the local water dependent environment in relation to water resources and supply. The study area is within an area of serious water stress and this is reflected in revised water company plans such that options to develop new sources of water are extremely limited. Growing population and pressures on existing resources to support the achievement of environmental objectives mean that for both Anglian Water Services and Essex and Suffolk Water, a forecast deficit in the supply demand balance needs to be addressed in the long term. The water companies have set out a range of ambitious water efficiency and leakage management schemes to counter rising demand. Despite these steps, Anglian Water Services have identified a need for significant investment in regional infrastructure to enable the transfer of water from areas of surplus to areas facing a deficit.

Current proposals for new housing developments from both IBC and SCDC have been compared at a high level to assumptions made by the water companies in forming their water demand forecast. In the medium to long term, both Anglian Water and Essex and Suffolk Water have accounted for a sufficient level of growth so as not to constrain development. However, in the shorter term (to 2025), active engagement with both water companies is recommended to ensure that phasing of new developments is appropriate and can be accommodated within the forecast supply demand balance

New measures outlined by the water companies in their plans take time to develop, and water efficiency in new builds can play an important role in curtailing rising demand in the short and long term. This report recommends that planning policy is developed within the study area in support of water efficient design (linked to a household water consumption target of 110 l/h/d). Both water companies have outlined their support for such a policy.

Wastewater treatment, water quality and sewerage assessment

The wastewater treatment, water quality and sewerage assessment provides an indication of the potential future environmental impact on the receiving watercourses downstream of the growth areas and the WRCs which serve them.

Water quality modelling has been undertaken to clarify potential changes to the existing WFD status of the watercourses due to an increased discharge of treated sewage effluent. A change from moderate to poor

status for phosphate is predicted for the River Deben by 2036 and therefore a review of current phosphate treatment at Easton, Charsfield and Wickham Market WRCs is recommended to identify whether improvements in effluent quality are possible.

It is also expected that additional capacity will be required at:

- Framlingham and Melton WRCs by 2020.
- Charsfield, Westleton and Yoxford WRCs by 2025.
- Benhall (Saxmundham) and Felixstowe WRCs by 2030.

The WRCs serving the growth areas all discharge ultimately to coastal waters that are designated as SSSIs. The additional nutrient loading to these waters would be increased by these proposed developments, and this should be taken into consideration in any Habitats Regulations Assessment.

Early consultation with Anglian Water Services concerning treatment technologies, improved WRC capacity and sewer network capacity is also recommended.

Flood risk

The flood risk section provides a high level review of flood risk for the SCDC and IBC sites without planning permission. NPPF directs new development to land at the lowest risk of flooding - i.e. avoidance is the preferred method of managing flood risk. Where possible, development should be directed towards sites which lie in Flood Zone 1 (lowest risk from fluvial and tidal sources). Where development is proposed on land in Flood Zone 3 and 2, NPPF's sequential and exception tests should be used to justify the location of a development in these areas. In these cases, approaches to managing flood risk and ensuring the safety of a development will be required and the development's Flood Risk Assessment should set out how they satisfy the requirements of the exception test. These include using a sequential approach to position the most vulnerable development in the areas of the site at lowest risk of flooding; or the incorporation of measures in the building design such as raising floor levels. Similar approaches for other sources of flood risk (such as surface water) may be required depending on the severity.

An appropriate method, such as computer modelling will be required to determine the boundaries of the Flood Zone 3b functional floodplain and Flood Zone 3a with climate change where sites are situated in or adjacent to Flood Zone 3. For SCDC this modelling has been done as part of the SFRA, for IBC this modelling should be completed as part of a separate SFRA investigation, or as part of the planning process.

Drainage strategies should be prepared for all sites, commensurate with the scale of the development, and should detail the drainage design and SuDS measures incorporated to mitigate against any potential increase in run off which could increase flood risk downstream.

A high level summary of flood risk for each site is summarised in Chapter 4. This demonstrates that of the 90 site allocations in the IBC area and 72 site allocations located within the SCDC area that 53 IBC sites and 56 SCDC sites lie within in Flood Zone 1. These sites therefore pass the sequential test. **Development should where possible be directed towards sites which lie in Flood Zone 1.**

In addition, 2 SCDC sites lie wholly or partially within Flood Zone 2, and 12 SCDC sites lie wholly or partially within Flood Zone 2. In IBC 3 sites lie wholly or partially within Flood Zone 2, and 34 sites lie wholly or partially within Flood Zone 3. **Development should only be directed towards sites in Flood Zone 2 and 3 if the site passes the sequential test. The exception test also needs to be addressed as appropriate**.

Contents

Glossary

Abbreviation	Definition
Abstraction License	Authorisation granted by the Environment Agency to allow the removal of water from a source of supply (e.g. a river or a well/borehole).
AEP	Annual Exceedance Probability
AMP	Asset Management Plan - The water industry 5 yearly investment cycle.
AMP6	AMP6 is the 6th Asset Management Plan since privatisation, to run from 2015-2020.
AMP7	AMP7 is the 7th and is to run from 2020-2025,
AMP8	AMP8 is the 8th, running from 2025-2030.
AMP9	AMP9 is the 9th, running from 2030-2035.
AWS	Anglian Water Services
Baseline scenario	Assumes continuation of existing and already planned policies and practice, but without any new measures. The baseline scenario is used to establish the situation if no new policies or measures were adopted. This scenario includes the impacts on demand and supply of factors external to the water company (e.g. population growth, sustainability reductions, climate change).
BOD	Biochemical Oxygen Demand
CAPEX	**Capital Expenditure –** Expenses on capital equipment, including machinery, equipment and buildings. Capital expenditure is also termed investment.
CFMP	Catchment Flood Management Plans
Class Boundary	Surface water body classification of rivers, lakes, transitional and coastal waters for the Water Framework Directive is based on: biological elements; hydromorphological elements supporting the biological elements; and chemical and physico-chemical elements supporting the biological elements. Physico-chemical supporting quality elements include BOD, ammonia and phosphate. Class boundary values have been developed for these supporting elements corresponding to high, good, moderate, poor and bad status
Defra	Department of Environment, Food and Rural Affairs
Dry Weather Flow	The average daily flow to a waste water recycling centre during a period without rain.
dWRMP	Draft Water Resource Management Plan
Ecological Flow Indicator	The river flow targeted to support the achievement of ecological objectives. Changes to flow regimes (e.g. as a result of abstraction) are assessed against these target flows.
ESW	Essex and Suffolk Water
Final plan	The proposed final plan for a WRMP, deemed the best option in ensuring the security of supply of cost to customers, the environment and society with regard to practicability, flexibility and impact considerations. This scenario includes the use of a water company's measures and policies relating to supply and demand to close any forecast deficit.
FRA	Flood Risk Assessment
GIS	Geographical Information System

Abbreviation	Definition
Groundwater	Water that is contained in underground rocks (stored within pores and fractures). Normally abstracted via a borehole drilled into the rock. Natural, slow release of groundwater into rivers often provides important base flow during dry weather.
Hydrological regime	**Hydrological regime (as a WFD supporting element) –** Classification of a surface water body under the Water Framework Directive (High, Good, Moderate, Poor) depends on the observed class of a number of elements (both ecological and chemical). The hydrological regime is a supporting element only, and failure to meet the Ecological Flow Indicator in a water body does not drive the overall water body classification alone. This does however, trigger an investigation to determine the effects on ecology.
IBC	Ipswich Borough Council
l/h/d	Litres per head per day
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
m2	Square meters
Ml/d	Megalites per day. A megalitre is 1 million litres (or 1,000 cubic meters)
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
ONS	Office for National Statistics
OPEX	**Operating Expenditure –** Fixed and variable operating costs.
PCC	**Per capita consumption –** The volume of water typically consumed by one person per day, normally stated in litres per head per day (l/h/d).
RQP	River Quality Planning tool. A simple model developed by the Environment Agency to assess the impact of discharges on river water quality.
SAC	Special Area of Conservation
SCDC	Suffolk Coastal District Council
SDB	Supply Demand Balance
SFRA	Strategic Flood Risk Assessment
SIMCAT	A mathematical model that calculates the quality of river water throughout a catchment. The model can be used to assess threats to water quality and to plan action to improve or protect water quality.
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage Systems
Supply demand balance	The difference between water available for use and demand at any given point in time.
Sustainability reduction	Reductions in deployable output required by the Environment Agency to meet statutory and/or environmental requirements.

Abbreviation	Definition
TON	Total Oxidised Nitrogen.
Water Framework Directive (WFD)	**Water Framework Directive (WFD) classification -** European directive requiring management of the water cycle through river basin management. The WFD requires all inland and coastal waters to reach 'good chemical and ecological status' for surface waters and 'good status' for groundwater in terms of quality and quantity by 2015 (or a later date under specific circumstances).
WCS	Water Cycle Study
WINEP	Water Industry National Environment Programme
WRC	Water Recycling Centre
WRMP	**Water Resources Management Plan -** A plan by a given water company to ensure sustainable water supplies over the next 25 years. WRMPs are based on predictions of how much water will be needed to meet customer demand set against forecasts of water available for use. In areas where demand is expected to be greater than supply, plans indicate essential changes needed to maintain a secure water supply.
WRZ	**Water Resource Zone -** The largest possible zone (geographic area) in which all water resources can be shared. All consumers within a WRZ experience the same risk of supply failure from a resource shortfall.

1. Introduction

1.1 Purpose of the "Outline" Water Cycle Study

1.1.1 Housing growth is critical for both social and economic benefits to meet the growing needs of the United Kingdom but must comply with the needs of National Planning Policy Framework and Planning Practice Guidelines (primarily the Climate Change and Natural Environment guidance) and be robust enough to stand up against public examination.

1.1.2 Local Planning Authorities need to prepare and maintain Local Plans which are consistent with the principles and policies set out in the National Planning Policy Framework (NPPF, 2018), including the presumption in favour of sustainable development. A robust evidence base is critical to providing support for Local Plans, and this evidence base needs to stand up to challenges throughout the plan period and at any Public Examination.

1.1.3 Suffolk Coastal District Council (SCDC) and Ipswich Borough Council (IBC) are in the process of reviewing their Local Plans to cover the period to 2036 and bring the Local Plans for both areas in line with the NPPF. They have commissioned a Cross Boundary Water Cycle Study (WCS) to increase their understanding of the potential impact of the growth options proposed for the new Local Plans on the water environment.

1.1.4 The study area for the IBC and SCDC cross boundary WCS encompasses the administrative boundaries for the IBC and SCDC areas. The area is some 960 km^2 with large areas of rural landscape and a number of large towns. Development has traditionally been focussed on the towns of Ipswich, Felixstowe, Aldeburgh, Framlingham, Saxmundham and Woodbridge. As of mid-2017, there were approximately 138,480 people living in IBC and 129,000 living in SCDC (ONS, 2018).

1.1.5 The Suffolk Coastal District is a particularly water sensitive area. The whole of East Anglia has been identified as a high water stress area, and the specific study area as under "serious stress" by the Environment Agency, leading to the need to ensure that all new development conforms to the higher efficiency water use of 110 l/h/d.

1.1.6 The Councils need to produce Local Plans that support sustainable growth, including businesses and employment, as well as housing, whilst maintaining a high quality of life with a minimum impact on sensitive ecosystems.

1.1.7 The two main suppliers of potable water in the study area are Anglian Water Services (AWS) and Essex and Suffolk Water (ESW). Anglian Water Services are the incumbent wastewater services company for the study area. Alongside water required for human consumption and use there are numerous designations in the study area including estuary based Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), and Ramsar sites for the Deben, Alde-Ore, and Orwell rivers. These rivers drain some of the key areas identified for development and receive treated waste water from water recycling centres operated by AWS.

1.1.8 The water demand in the area is mainly fed by groundwater with some surface water abstractions, for which there are source protection zones for the Chalk and Crag aquifers that underlie the study area. The whole area is covered by groundwater and surface water nitrate vulnerable zones. In the Environment Agency's Suffolk Coastal, Deben and Gipping management catchments some water bodies did not reach good status under the WFD assessment due to continuous sewage discharge in the 2015 classification assessment.

1.2 Aims and objectives

1.2.1 The aims and objectives of this Water Cycle Study therefore are as follows:

- What will be the water supply needs of the expanding population and associated infrastructure?
- How much more wastewater treatment, in terms of capacity and infrastructure, will be needed by the expanding population, and what will be the impact on water quality? Is there enough capacity in the wastewater network for the proposed development?
- Will the proposed development increase flood risk?

1.3 Report Structure

1.3.1 The structure of this report is as follows:

- Section 2: Water resource and supply infrastructure assessment. The results of the reviews of the water company's water resource availability and the implications for future growth.
- Section 3: Wastewater treatment, water quality and sewerage assessment. Identifies constraints on water recycling centres (WRC) and sewer network based on future growth projections and provides an indication of any potential water quality issues based on additional effluent discharges.
- Section 4: Flood risk assessment. High level review of potential flooding issues at the proposed developments.
- Section 5: Strategy recommendations and conclusions.

1.4 Planned growth

1.4.1 The SCDC First Draft Local Plan proposed a housing requirement of 10,900 dwellings over the period 2016 – 2036. Following publication of new household projections, the current housing need figure is 10,476 dwellings over the period 2018-2036. Employment land requirements are at least 11.7 hectares over the period 2018-2036. The housing need for IBC is 8,622 dwellings and employment land requirements are at least 23.2 hectares over the period 2018-2036. In September 2018 both IBC and SCDC sent across a full list of sites that needed to be incorporated into this WCS in order that they could use the results to support their local plan development. The sites sent across include those sites which currently have planning permission, but which have not yet been completed, and those sites which were either carried across as allocations from the previous plan or are proposed allocations to ensure that all committed and potential growth is considered. Allocations in 'made' Neighbourhood Plans that don't have planning permission have been considered within the report however the Local Plan is not reviewing these sites.

A summary of all the sites included as of the end of **September 2018** are included in Appendix A.

It should be borne in mind by the reader that these sites represent a snapshot in time, and that the sites to be included in both local plans may change as a result of the conclusions in this study, and additional studies that feed into the local plan decision making process.

1.4.2 For IBC the growth includes:

- 94 housing sites - 18 sites with planning permission and 76 sites as housing allocations;

- 11 employment sites - 2 sites with planning permission and 9 sites as employment allocations; and
- 8 mixed use sites - all included as mixed use allocations.

1.4.3 For SCDC the growth includes:

- 148 housing sites - 108 sites with planning permission and 40 sites as housing allocations (including 3 Neighbourhood Plan areas);
- 71 employment sites - 46 sites with planning permission and 25 sites as employment allocations (including 11 Neighbourhood Plan areas); and
- 6 mixed use sites – 5 sites included as mixed use allocations (including 4 Neighbourhood Plan areas) and 1 permission.

1.4.4 This housing and employment growth would impact on two water companies namely Essex and Suffolk Water and Anglian Water.

1.4.5 The potential options for planned growth are summarised in Appendix A.

1.5 Water Cycle Study projection assumptions

1.5.1 Through the development of this WCS various assumptions have been made to facilitate modelling and calculation projections (e.g. number of potential occupants in future dwellings). To understand the maximum impact of development, a precautionary approach has been undertaken and generally a 'worst case scenario' has been selected. These assumptions are documented within each section where necessary.

1.5.2 A 'worst case scenario' approach has been adopted to ensure that SCDC and IBC are prepared for this potential scenario in drafting their Local Plans.

1.5.3 It should be borne in mind by the reader that the impacts of each assumption may be subject to change in the future due to external factors which could not be predicted at the time of modelling. Subsequently, in respect of the worst case scenario approach and potential for unforeseen changes in the future, the results should be interpreted as the likely **worst case impacts only**. The results do not bind any water companies to undertake any improvements, upgrades or works, including those recommended within this Water Cycle Study, and this will be the decision of the respective water company based on their Water Resource Management Plan (WRMP), evidence and any planned works.

2. Water resource and supply infrastructure

2.1 Aims of water resource and supply infrastructure assessment

2.1.1 The water resources assessment has sought to determine whether Essex and Suffolk Water (ESW) and Anglian Water (AWS) as the water suppliers, have accounted for an appropriate level of growth within their plans so as not to constrain the rate of development targeted by IBC and SCDC.

In addition, the most up to date view of the environmental water resources situation has been gathered, so that water company plans, and growth in water demand can be set in the context of water availability and water stress.

2.1.2 This section aims to explore the following:

- Whether there is enough water or plans in place to meet the needs of growth outlined by the local authorities, and what role the Local Plans play in managing demand effectively;
- Identify whether environmental capacity is a potential constraining factor for growth; and
- Identify whether there is a need for additional major infrastructure, and where required when this infrastructure would be need by.

2.1.3 As a result, this section will:

- Identify whether higher water efficiency targets will help to meet demand whilst mitigating environmental impacts;
- Confirm demand management, leakage reduction measures, and new resource schemes identified in the revised draft Water Resource Management Plan (WRMP) for each of the Water Resource Zones (WRZs) which cover the area and those connected via inter-zonal transfers;
- Further review the assumptions made by AWS and ESW in their population and demand forecasts and assess their forecasts' alignment with the development plans set out by IBC and SCDC;
- Identify whether increased abstraction has the potential to cause WFD class deterioration, or prevent meeting WFD objectives;
- Gather information from the Environment Agency and the water companies regarding the latest position and impacts of the Water Industry National Environment Programme (WINEP) and associated sustainability reductions;
- Understand what the potential cost/infrastructure requirements of importing water to the catchment from other water resource zones or water transfers from other water companies are; and
- Reflect on recent publications and policy developments and ambition across the country in relation to water efficiency, demand management and the role of planning authorities.

2.2 Assessment methodology

2.2.1 The sources of information that have been drawn on as part of the water resources assessment are included below in Table 2.1.

Table 2.1 Data and information supporting the water resources assessment

	Primary source	Geography/scale	Additional detail
Water company plans	Draft and revised Water Resources Management Plans 2019	Anglian Water Services Essex & Suffolk Water Focus on two Water Resource Zones: Blyth (ESW) East Suffolk (AWS)	Draft WRMP19 (Mar 2018); Revised WRMP19 (Sept 2018); Associated technical appendices: Draft Demand forecasts Draft Water Resource Planning tables Statement of Response (Sept 2018); Water Resource Zone boundaries (GIS shapefiles)
Local authority plans	Current plan in development Previous plans	IBC SCDC	Current developing plan: Housing allocations and existing permissions GIS shapefiles of locations Phasing detail Previous plan: SCDC 2013 Core Strategy policy areas, housing targets and phasing assumptions. IBC 2013 plan phasing information provided to AWS in 2017
Environmental water availability	Environment Agency licensing strategy	East Suffolk abstraction licensing strategy	Assessment Point status Water resource availability status (at WFD water body scale)
Environmental objectives and programmes	Water Framework Directive; Water Industry National Environment Programme (WINEP)	River Basin District: Anglian Management catchments: Suffolk East Anglian Groundwater	WINEP March 2018 WFD water body classifications WFD reasons for not achieving good status WFD measures and objectives

2.2.2 The environmental water resources situation is assessed by review of Water Framework Directive Classifications, Environment Agency-defined water availability status and environmental objectives relating to water abstraction.

2.2.3 Both ESW and AWS operate their water supply systems on a scale that extends beyond the boundaries of the IBC and SCDC authority boundaries and are required to plan ahead at least 25 years to maintain a positive supply-demand balance. Both companies are in the process of developing their Water Resources Management Plans (WRMPs) for the period beginning in 2020. These draft plans and their technical appendices have been reviewed in order to:

- Compare the growth assumptions with the developing local plan's housing projections;
- Understand water company assumptions relating to housing design and water efficiency standards;
- Understand where and when a shortfall in water supply is expected to occur; and
- Identify the measures proposed to restore a supply-demand balance.

It should be noted that during this period in which water company plans are under review, some elements of this assessment are based on the latest, best available information. Water Company WRMPs are due to be finalised in 2019, ready for implementation at the start of the next water industry planning cycle (AMP7) in 2020.

2.2.4 Proposed development sites provided by IBC and SCDC have been mapped to Water Resource Zones, and phasing detail has been used to set out the trajectory of growth aligned to the water industries planning periods:

- AMP6: 2015/16-2019/20.
- AMP7: 2020/21-2024/25.
- AMP8: 2025/26-2029/30.
- AMP9: 2030/31-2034/35.

2.2.5 Development targets have been provided to 2036. For the purposes of simplification however, we have assumed that development planned in 2036, should be accounted for during AMP9 (ending 2035). **This allows for a conservative view.**

2.2.6 Both SCDC and IBC have consulted the water companies during the formulation of their local plans. Bearing in mind the local plans and WRMPs have been under development and are in a state of change during an overlapping time period, further engagement has taken place as part of this project to understand how such changes might alter the water resources situation. In addition it is recommended that dialogue between the councils and the water company continues as and when the Local Plans are formalised.

2.3 Environmental water availability

2.3.1 This section reviews available evidence in relation to the capacity of the water environment in the vicinity of the study area to support further abstraction of water to meet water supply demand. Environmental links to waste water treatment and water quality are considered in Chapter 3.

2.3.2 The Environment Agency manage abstraction of water from the environment and set out their approach to new and existing abstractions within published licensing strategies. The study area falls within the East Suffolk catchment licensing strategy (Environment Agency, 2017). The East Suffolk catchment area (see figure 2.1) includes the Rivers Lothingland, Wang, Blyth, Yox, Fromus, Alde, Ore, Deben, Lark and Fynn, and the Gipping and Belstead Brook which together drain to the Orwell estuary. The area includes internationally important designated sites.

2.3.3 Groundwater provides the dominant source of water for public supply for domestic and non-household use. However, in many cases the availability of water for further abstraction within the groundwater management units depends strongly on the link to river flows and surface water bodies due to the role that groundwater-fed baseflow plays in protecting resources and ecology of the area's rivers and water dependent habitats.

2.3.4 Within the East Suffolk licensing strategy, water resource availability is assessed under four different flow conditions:

- Q95 – very low flows which are exceeded 95% of the time.
- Q70 – low flows which are exceeded 70% of the time.
- Q50 – median flows which are exceeded 50% of the time.
- Q30 – high flows which are only exceeded 30% of the time.

2.3.5 Under each flow condition, the Environment Agency assesses whether further water would be available for licensing under two scenarios:

- Recent actual – this scenario assumes that all licensed abstractions take water at recently measured rates.
- Fully licensed – this scenario assumes that all licensed abstractions are used to their fully permitted extent, utilising any recently unused headroom on their licensed volumes.

2.3.6 The outcome of the assessment is the definition of water resource availability colours for each water body. Figure 2.2, extracted from the East Suffolk Licensing Strategy explains the meaning of these colours and the implications for further licensing.

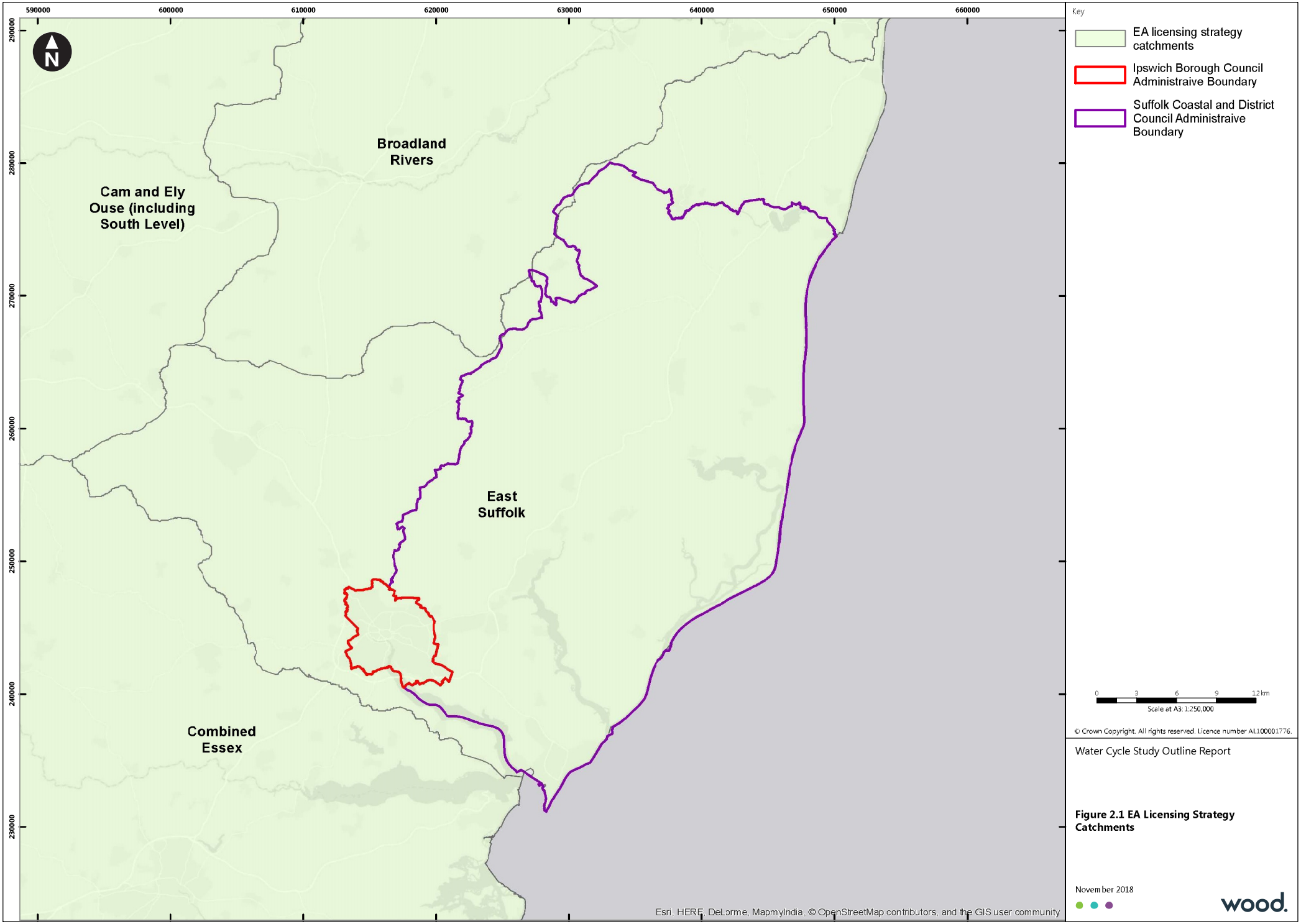

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Figure 2.1 EA Licensing Strategy Catchments

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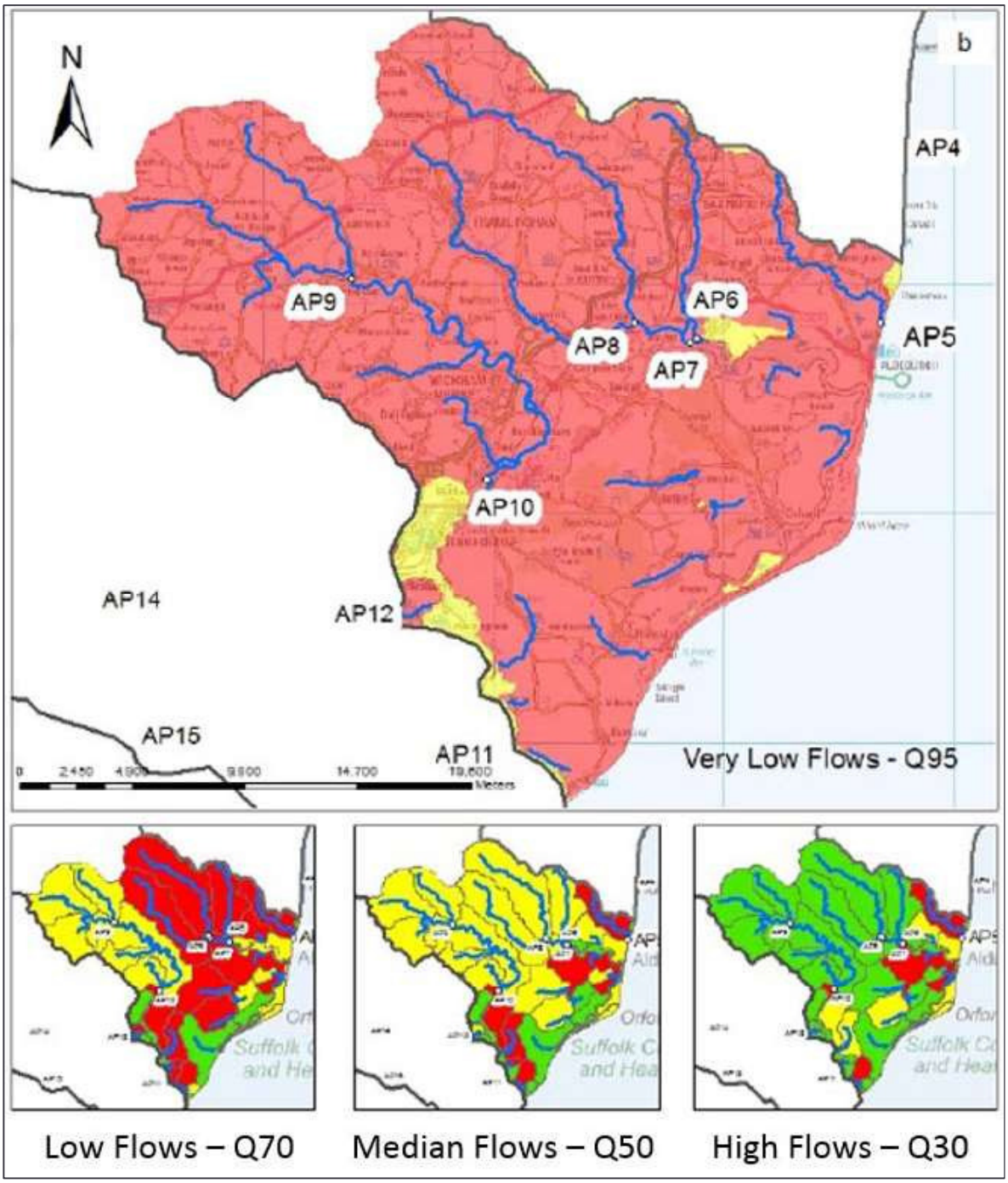
Figure 2.2 Water resource availability colours and implications for licensing (source: Environment Agency, 2017)

Water resource availability colour	Implication for licensing
Water available for licensing	There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts. Some time limited licence renewals may require changes to reflect historic annual usage in order to manage the risk of deterioration to the environment. Abstractions for non-consumptive uses can still be permissible in catchments where there are sustainability issues.
Restricted water available for licensing	Full Licensed flows fall below the Environment Flow Indicators (EFIs). If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted. Some time limited licence renewals may require changes to reflect historic annual usage in order to manage the risk of deterioration to the environment. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available if you can 'buy' (known as licence trading) the entitlement to abstract water from an existing licence holder. Abstractions for non-consumptive uses can still be permissible in catchments where there are sustainability issues.
Water not available for licensing	Recent actual flows are below the EFI. This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status/Potential (GES/P) (as required by the Water Framework Directive). Note: we are currently taking action in water bodies that are not supporting GES / GEP). No further consumptive licences will be granted. Some time limited licence renewals may require changes to reflect historic annual usage in order to manage the risk of deterioration to the environment. Water may be available if you can buy (known as licence trading) the amount equivalent to recently abstracted from an existing licence holder. Abstractions for non-consumptive uses can still be permissible in catchments where there are sustainability issues.

2.3.7 Typically, but depending on the nature of the environmental needs and types of abstraction present within a catchment, water is more likely to be available during periods of higher flow (Q50 and Q30). Figure 2.3 shows how water availability in the mid-Suffolk area increases in this way.

Figure 2.3 Mid-Suffolk water resource availability



2.3.8 Since low flow conditions typically reflect the greatest stress on the environment and the lowest availability of resources, the water availability status at Q95 is often the primary consideration. Figures 2.4 and 2.5 present the water availability status of the North Suffolk and South Suffolk areas respectively which encompass the SCDC and IBC areas. These figures clearly present the Environment Agency's position in relation to the potential impacts of existing abstraction rates, and future increases towards fully licensed rates.

2.3.9 Significant portions of the study area classified as red ("water not available for licensing") represent water bodies in which current abstraction may be reducing flows below those targeted for water-dependent ecology, and in which the Environment Agency seek to reduce the volume of water abstracted. This is achieved by thorough review of existing time-limited licences during renewal applications, or through the wider Restoring Sustainable Abstraction programme that seeks voluntary or compulsory licence changes or alternative mitigation measures.

2.3.10 Those areas classified as yellow ("restricted water available for licensing") indicate that growth towards fully licensed rates of abstraction may risk deterioration in the environment.

2.3.11 Water companies play a leading role in investigating the impacts of their abstractions and the potential for deterioration if growth is expected. This is discussed in more detail in the following section.

Figure 2.4 North Suffolk water resource availability colours (source: Environment Agency, 2017)

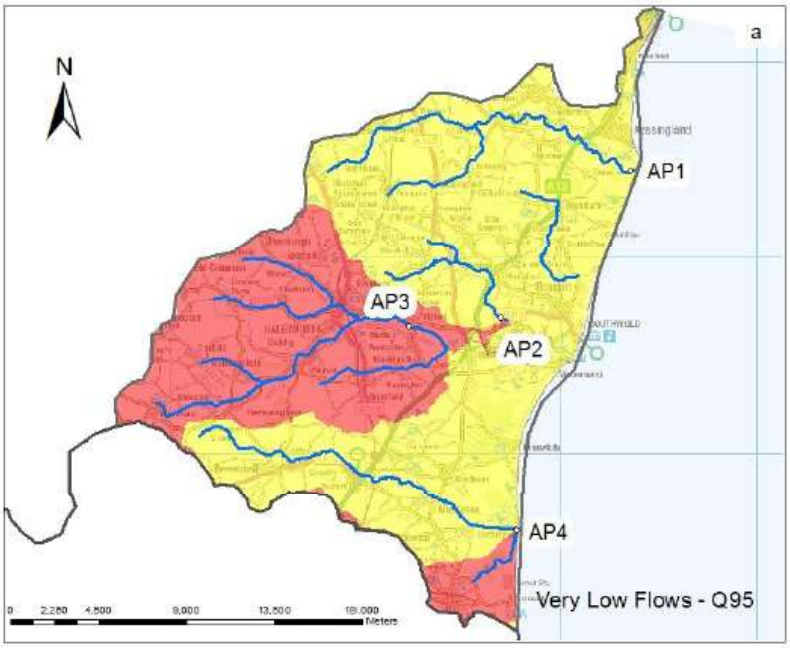
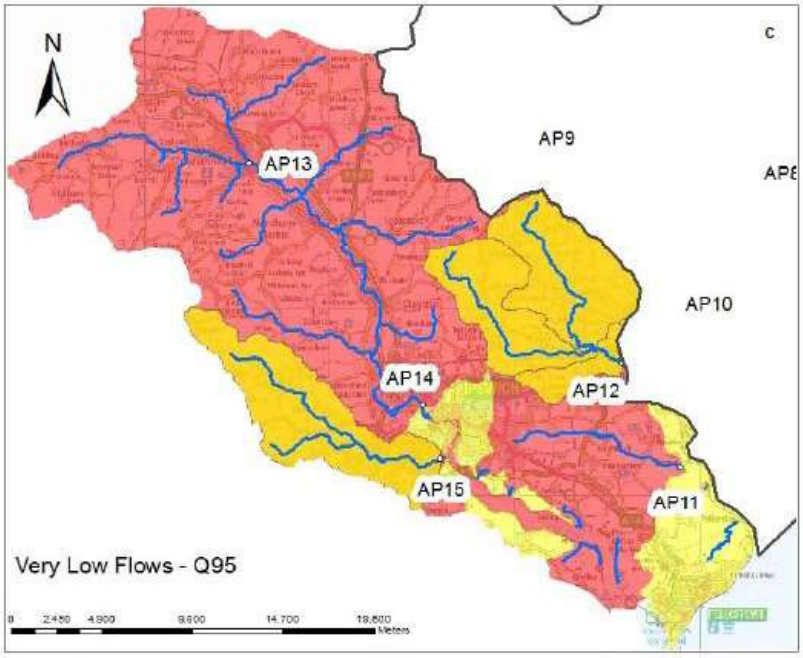


Figure 2.5 South Suffolk water resource availability colours (source: Environment Agency, 2017)



2.3.12 It should be noted that while the East Suffolk licensing strategy catchment encompasses this project's study area, the public water supply distribution networks of Anglian Water and Essex and Suffolk Water mean that water may be imported or exported to other catchments to address deficits in supply or take advantage of surplus. Other catchments within the east of England, linked to the wider public water supply network face a very similar water availability status to that presented here.

2.3.13 This position of limited water availability is a major driver for careful water resources management in the east of England and has led to significant efforts amongst water-using sectors to reduce water demand and explore alternative sources of supply so that growth can be accommodated within the prevailing and future environmental capacity. In fact, due to this pressure, neither AWS nor ESW have proposed new groundwater or surface water abstractions in their developing 2019 WRMPs. Measures to ensure a resilient supply of water to this area are discussed in more detail in following sections.

2.4 Environmental objectives and programmes relating to water resources

2.4.1 This section sets out where existing abstraction of water from the environment (for various purposes including public water supply and agriculture) is thought to potentially inhibit the achievement of environmental objectives. This forms the justification for environmental investigations and improvement projects (see section 2.5) that the water companies are required to undertake.

2.4.2 The study area falls within the Anglian River Basin District under the Water Framework Directive (WFD). River Basin Districts are split into a hierarchy of spatial units. Surface Water Management Catchments form the first and largest tier, and these are further sub-divided into Operational Catchments, which typically reflect natural river catchments. These are shown in Figure 2.6 for the

study area, which spans the three Operational Catchments of the Deben, Gipping and Suffolk Coastal.

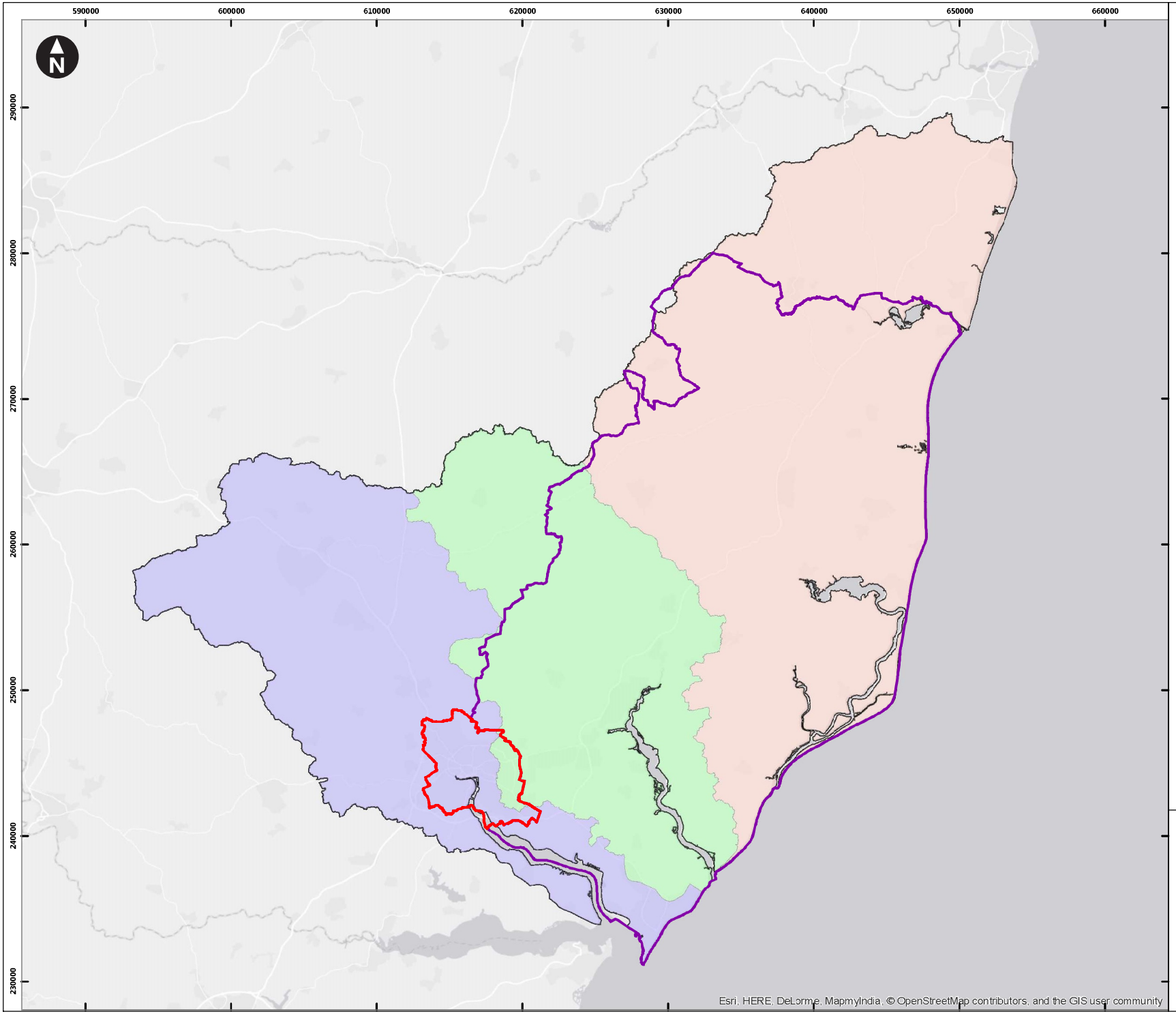
2.4.3 WFD status classifications are reported at the water body scale. Groundwater bodies within and encompassing the study area are shown in Figure 2.7. These are the Felixstowe Peninsula Crag and Chalk and the Waveney and East Suffolk Chalk and Crag. There are 43 surface water bodies within the Suffolk East Management Catchment, typically representing the sub-catchments associated with main rivers and their tributaries.

2.4.4 A water body-scale status of High, Good, Moderate, Poor, or Bad is associated with the worst performing classification of an element within it. Elements driving the status of a water body include a range of ecological and physico-chemical components. The WFD requires all water bodies to reach good overall ecological status.

2.4.5 The Felixstowe Peninsula Crag and Chalk groundwater body is at poor overall status (achieving good quantitative and poor chemical status). This means that abstraction is not thought to be a contributing factor in its poor status. The poor chemical status of the Felixstowe Peninsula Crag and Chalk is associated with agricultural and rural land management point and diffuse sources of pollution.

2.4.6 The Waveney and East Suffolk Chalk and Crag groundwater body is at poor overall status, failing under both the quantitative and chemical elements. The Waveney and East Suffolk Chalk and Crag water body fails the quantitative groundwater balance test, indicating that total existing abstraction may not be sustainable in the long term. This failure is currently associated with abstraction for agricultural and rural land management purposes. Abstraction for public water supply is not currently directly linked to this failure.

2.4.7 An assessment of the hydrological regime (flow) forms part of the ecological classification of a surface water body. Using an approach very similar to that applied to assessment points to inform the Environment Agency's catchment licensing strategies, river flows (either gauged or modelled) are compared against environmental flow targets. Where flows are determined to fall below this target under current rates of abstraction a water body's hydrological regime is classified as "Does Not Support Good Status".



Key

WFD Surface Water Operational Catchments

- Deben
- Gipping
- Suffolk Coastal
- WFD Surface Water Management Catchment: East Suffolk
- Ipswich Borough Council Administraive Boundary
- Suffolk Coastal and District Council Administraive Boundary

0 3 6 9 12 km

Scale at A3: 1:250,000

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Figure 2.6 WFD Management and Operational Catchments (Surface Water)

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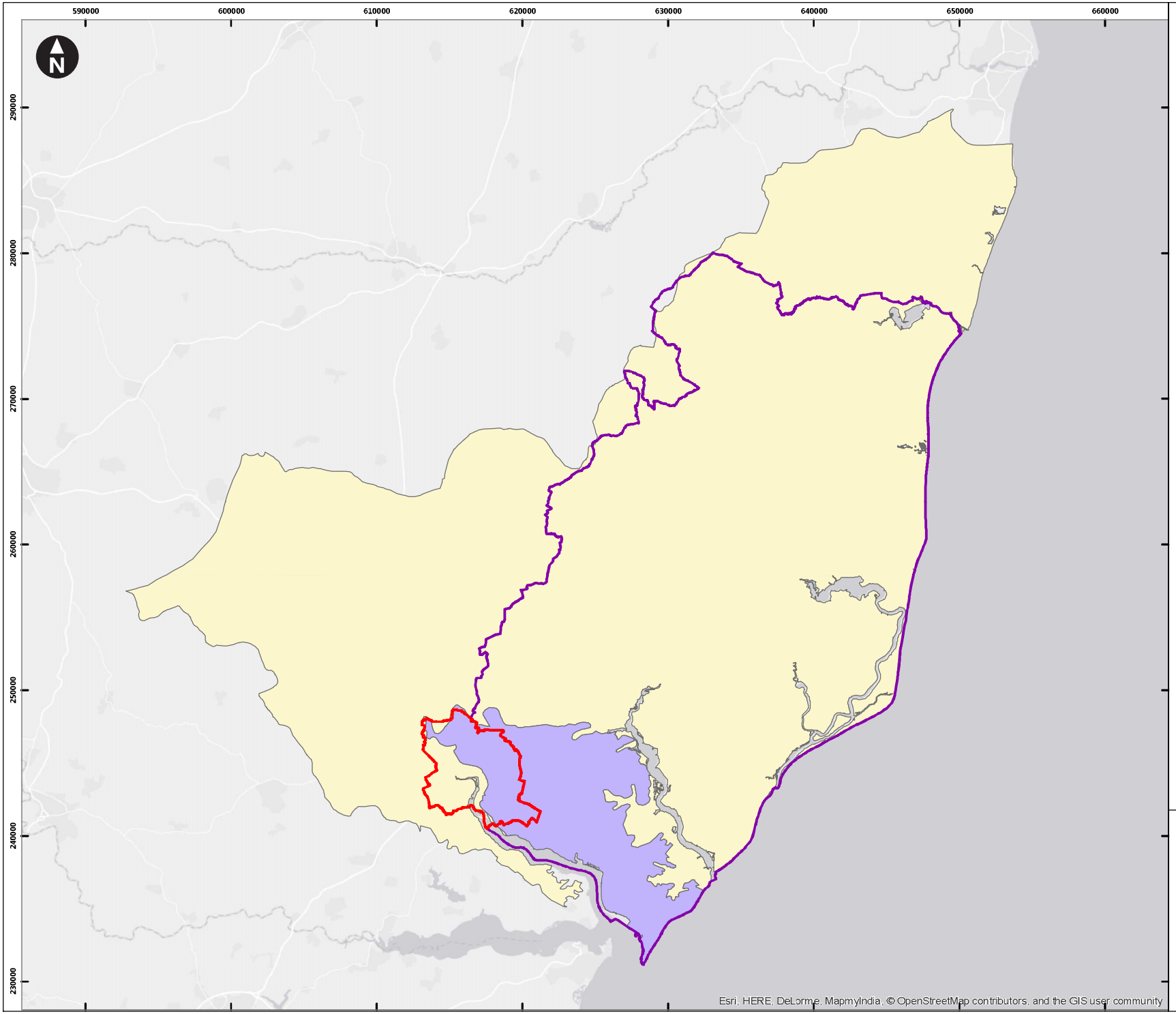
H:\Projects\VL1086_WCS_Suffolk\Ipswich\Drawings\ArcGIS\OutlineStudy\WR\Fig 2.6 WFD Surface Water Catchments.mxd Originator: katy.james



Key

WFD Ground Water Bodies

- Felixstowe Peninsula Crag & Chalk
- Waveney and East Suffolk Chalk & Crag
- Ipswich Borough Council Administraive Boundary
- Suffolk Coastal and District Council Administraive Boundary

0 3 6 9 12 km

Scale at A3: 1:250,000

Water Cycle Study Outline Report

Figure 2.7 WFD Ground Water Bodies

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H:\Projects\41086_WCS_Suffolk\Ipswich\Drawings\ArcGIS\OutlineStudy\WR\Fig 2.7 WFD GW bodies.mxd Originator: katy.james

2.4.8 In-river ecology is sensitive to a variety of factors (e.g. water quality, morphology, naturally occurring drought, invasive species) and can in many cases reflect a healthy ecosystem despite an apparent failure in the hydrological regime. Hydrological regime is therefore deemed to be a "supporting element" under the WFD and does not directly lead to an overall water body status change in the same way as other elements. Where a water body's hydrological regime is classified as "does not support good status" and this coincides with a failure of an ecological element (such as fish or macroinvertebrates), an investigation can be initiated.

2.4.9 Figure 2.8 shows surface water bodies in the Suffolk East management catchment, where hydrological regime does not support good status. Those highlighted in blue however (totalling 7), indicate where groundwater or surface water abstraction for public water supply is a primary contributor. Within these 7 surface water bodies, and within the groundwater bodies where abstraction is thought to be a potential reason for the current failure of WFD objectives, it is very unlikely that further abstraction for public water supply will be permitted to meet growth in demand in these areas. Furthermore, section 2.5 describes where the Environment Agency may seek reductions in recent abstraction to support the achievement of WFD objectives.

2.4.10 Bearing in mind the limited local availability of additional water to meet growing demand, it is important to realise the importance of water efficiency programmes, leakage reduction and the exploration of non-traditional sources of water (e.g. desalination or water recycling) that water companies can employ in order to meet the demands of a growing population without significantly increasing the volume of water abstracted from the environment locally. Sections 2.7 to 2.11 set out Anglian Water and Essex and Suffolk Water's approach.

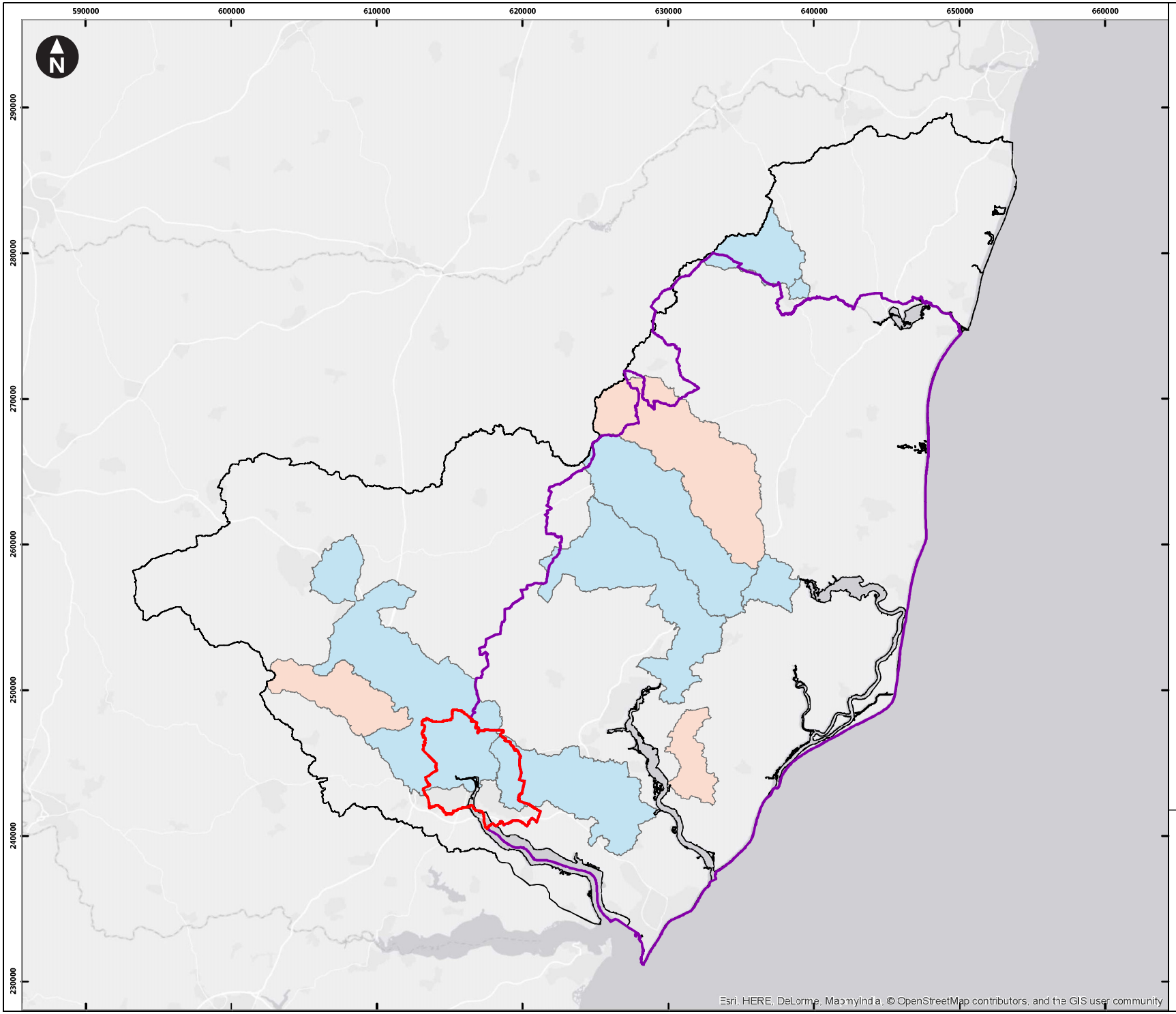
The Deben Holistic Water Management Project

2.4.11 The Deben Holistic Water Management Project, led by SCC, is a catchment-based pilot aimed at managing all aspects of the water cycle. This includes natural flood management projects, various river restoration schemes and a water resources project on the Felixstowe Peninsula. A key focus of the water resources project is on mechanisms for utilising water that is currently drained from the land by the Internal Drainage Board and discharged to the estuary, to support agricultural storage reservoirs.

2.4.12 The project which began many years ago, but now forms the basis for one of four pilot catchments adopted by the Defra and the Environment Agency in support of the Abstraction Reform programme, has significant buy in from both Anglian Water and Essex and Suffolk Water, as well as the wider Water Resources East programme. The purpose of these Defra pilot projects is to find and test innovative approaches to reforming water abstraction, particularly where cross sector inputs are required.

2.4.13 Anglian Water remains an interested party in the development of new water storage solutions with a view to potential future use of this water not only for local agricultural business, but for public water supply.

2.4.14 The importance that Defra and the Environment Agency have placed on this catchment, and the multi-sectoral interest is further evidence of the water stress that the region faces and the need to manage water resources in a sustainable manner.



Key

- WFD Surface Water Management Catchment: East Suffolk
- Hydrological Regime "Does Not Support Good Status"
- Water Supply suspected/confirmed RNAG
- Ipswich Borough Council Administraive Boundary
- Suffolk Coastal and District Council Administraive Boundary

0 3 6 9 12 km

Scale at A3: 1:250,000

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Figure 2.8 WFD Surface Water bodies where hydrological regime does not support good status

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H:\Projects\41086_WCS_Suffolk\Ipswich\Drawings\ArcGIS\OutlineStudy\WR\Fig 2.8 WFD Hydro regime and Water Supply RNAG.mxd Originator: kathyjames

2.5 Water Industry National Environment Programme

2.5.1 Following on from section 2.4 which described where abstraction for the purposes of public water supply may be inhibiting the achievement of WFD objectives, this section describes where the Environment Agency requires the water companies to investigate the sustainability of their water abstraction operations or implement reductions.

2.5.2 The Water Industry National Environment Programme (WINEP) sets out the Environment Agency's requirements for water companies to carry out investigations, options appraisals and implement solutions that contribute to the achievement of WFD objectives. These align to both water quality and water resources functions. Within the water resources function, these investigations and implementation schemes link to licensed abstractions that may currently or may in the future (under growth scenarios) result in WFD failures. The outcome of these schemes may lead to a voluntary or compulsory reduction in licenced abstraction (termed a sustainability reduction), the addition of environmental constraints on operations (such as a new "hands off flow"), or alternative mitigating measures such as river enhancement designed to increase ecological resilience.

2.5.3 It is important to note that a multitude of factors determine whether waterbodies will reach good status. Carrying out the investigations and implementation schemes listed in the WINEP will not guarantee achievement of WFD objectives alone. A suite of other linked programmes involving the input from numerous partners within each catchment will be required, and even then a level of uncertainty remains due to the unpredictable nature of environmental responses. However, the WINEP does set out the short and medium-term actions required of the water industry to support the wider ambition.

2.5.4 These schemes and their costs are built into water company investment plans and potential or confirmed licence changes must be accounted for when developing their supply-demand balance as part of their WRMPs.

2.5.5 The surface water bodies shown in Figure 2.8, as well as the two groundwater bodies in Figure 2.7 feature within the latest WINEP (presented to the water companies in March 2018). An extract of the WINEP is shown in Table 2.2. The measures presented here relate directly to the water bodies mentioned above but it is important to note that AWS and ESW plan at the Water Resource Zone, Water Company and regional scale. This means that the full list of measures, linked to other catchments and water bodies can have consequences for the resources availability at a larger scale.

Table 2.2 WINEP extract – AWS and ESW water resources measures lined to local water bodes

Water company	WINEP ID	Scheme/site name	Water body name	Scope
AWS	EAN00155	GIPPING / Bramford	Gipping (d/s Stowmarket)	Investigate the degree to which AWS abstraction could prevent hydrology from supporting Good Ecological Status
AWS	EAN00156	GIPPING / Sproughton	Gipping (d/s Stowmarket)	As above
AWS	EAN00157	GIPPING / Whitton, Westerfield, Belstead, Baylham, Claydon, Rushmere	Gipping (d/s Stowmarket)	As above
AWS	EAN00158	GIPPING / Bramford	Somersham Watercourse	As above
AWS	EAN00164	BUCKLESHAM MILL RIVER / Mill River	Mill River Kirton Sluice	Establish to what extent planned AWS abstraction might cause deterioration of flow /

Water company	WINEP ID	Scheme/site name	Water body name	Scope
				ecological status of the waterbody before 2027, and to identify suitable options to ensure this risk is removed.
AWS	EAN00200	EAST SUFFOLK C&C GW / Winston, Tuddenham St Martin, Playford, Woodbridge, Pettistree	Waveney and East Suffolk Chalk & Crag	Investigate whether abstraction is causing a failure of the status of Waveney and Suffolk East Chalk and Crag groundwater body.
AWS	EAN00201	EAST SUFFOLK C&C GW / Whitton, Westerfield, Belstead, Baylham, Claydon, Rushmere	Waveney and East Suffolk Chalk & Crag	Investigate whether abstraction is causing a failure of the status of the groundwater body.
AWS	EAN00202	EAST SUFFOLK C&C GW / Bramford Hall	Waveney and East Suffolk Chalk & Crag	As above
AWS	EAN00203	EAST SUFFOLK C&C GW / Debenham WRC	Waveney and East Suffolk Chalk & Crag	As above
AWS	EAN00242	Fx PENN GW / Diss	Felixstowe Peninsula Crag & Chalk	Investigate whether an increase in abstraction within licensed quantities will cause a deterioration in the status of Felixstowe Peninsula Crag and Chalk groundwater body, and if so, options for avoiding that deterioration.
AWS	EAN00243	Fx PENN GW / Tuddenham St Martn, Pettistree. Woodbridge	Felixstowe Peninsula Crag & Chalk	As above
AWS	EAN00244	Fx PENN GW / Whitton, Westerfield, Belstead, Baylham, Claydon, Rushmere	Felixstowe Peninsula Crag & Chalk	As above
AWS	EAN00245	Fx PENN GW / Bramford	Felixstowe Peninsula Crag & Chalk	As above
ESW	EAN00317	Walpole/Rockstone Lane	Catchment Scale: - see additional comments	Reviewing all GW licences within the East Suffolk Chalk and Crag GW unit and their contribution to river baseflow. This GW unit failed the GW balance test in 2015. Watercourses connected to these boreholes include: R. Blyth, Chediston watercourse, R. Alde, Wenhanson, Hundred river, Leiston Back and River Ore.
ESW	EAN00318	Holton/ Halesworth	Catchment Scale: - see additional comments	As above
ESW	EAN00319	Alder Carr and Quay Lane	Catchment Scale: - see additional comments	As above
ESW	EAN00320	3 BORES AT COLDFAIR GREEN,KNODISH"	Catchment Scale: - see additional comments	As above
ESW	EAN00321	BOREHOLE AT LEISTON	Catchment Scale: - see additional comments	As above

Water company	WINEP ID	Scheme/site name	Water body name	Scope
ESW	EAN00322	Benhall, Parham and Saxmundham	Catchment Scale: - see additional comments	As above
ESW	EAN00323	WELL SW OF ALDEBURGH HALL	Catchment Scale: - see additional comments	As above
ESW	EAN00330	BOREHOLE AT LITTLE GLEMHAM	Catchment Scale: - see additional comments	As above

2.6 Water company approach to uncertainty within the WINEP

2.6.1 All of the measures shown in Table 2.2 are at the "investigation and options appraisal" stage. This means that the water companies have made assumptions, agreed with the Environment Agency, regarding the final magnitude and timing of any potential licence changes. Dealing with this uncertainty and ensuring that there is sufficient resilience within the supply system to maintain a positive supply-demand balance is critical to the WRMP process.

2.6.2 The assumptions agreed by AWS, ESW and the Environment Agency have developed during the consultation period for the draft WRMPs in early 2018 and have changed within the revised draft plans prepared in September 2018. Further engagement with the Environment Agency has taken place as part of this project to gather an up to date view of the agreed approach to uncertainty.

2.6.3 Following consultation, both AWS and ESW have adjusted their approach to dealing with uncertainty in their plans. ESW have agreed to voluntarily limit groundwater abstractions to recent actual rates to prevent deterioration in the environment (according to the Water Framework Directive). The company will carry out investigations of sensitive sources listed in the WINEP during AMP7 (2020-2025) with a view to making formal licence changes as required in AMP8 (2025-2030).

2.6.4 AWS has brought forward its assumptions regarding the timing of sustainability reductions to 2022. For AWS's East Suffolk Water Resource Zone, sustainability reductions result in a loss in deployable output of 5 Ml/d.

2.6.5 This results in a supply demand balance deficit. In the intervening period, the company has voluntarily capped groundwater abstractions in their supply forecasts to recent actual levels and have removed proposed additional groundwater abstraction from their suite of preferred options until environmental investigations are complete.

2.6.6 This section demonstrates that water resources, when considered in the context of environmental capacity are under increasing pressure. Both AWS and ESW have had to explore a wider range of supply and demand-side options to maintain resilient water supplies in the face of projected growth. The following sections explores the company plans in more detail and assesses whether new growth projections provided by IBC and SCDC can be accommodated.

2.7 Water Company planning

2.7.1 Much has changed in water resources planning and regulatory steer in the last 10 years and in particular in this planning cycle. Methods to assess water resource yields, demand forecasts and climate change impacts have been updated.

2.7.2 The Environment Agency and Ofwat are driving for high levels of ambition in demand reduction and joined-up planning (as evidenced through the Water Resources East group), and a need to

demonstrate resilience to more extreme droughts. Compounding and reflecting the water-stressed status of the area, both Anglian Water and Essex and Suffolk Water have a challenging suite of environmental investigations and implementation schemes set out within the Water Industry National Environment Programme (WINEP) linked to water treatment and water abstraction, which in some cases is seen to be the key driver for deficits in the baseline water resources supply demand balance.

2.7.3 All water companies in the UK are required to review their plan to provide resilient water supplies to their customers every 5 years by developing a Water Resources Management Plan (WRMP). These plans must look at least 25 years ahead and assess the Supply Demand Balance (SDB) for each year of the plan period. The next planning period begins in 2020 and runs to at least 2044/45. Water companies prepared their draft WRMPs in December 2017. These underwent a period of consultation through summer 2018 and the companies have since released their "Statements of Response" to the consultation and at the time of writing are preparing their revised draft WRMPs. Both Anglian Water and Essex and Suffolk Water received consultation responses from a range of stakeholders including Ofwat, the Environment Agency, Natural England and a number of planning authorities. The companies' revised draft WRMPs will be subject to further review by the regulators before being finalised in 2019 ready for implementation.

2.7.4 A water company's WRMP must set out both the baseline supply demand balance for each year in its planning period and its final plan supply demand balance. The "baseline scenario" sets out the forecast water supply situation if the water company were to continue with its existing operations (e.g. it does not develop new sources of water, or does not enhance its water efficiency or leakage reduction programmes). External drivers affecting demand or supply such as local authority growth projections, environmentally driven changes in abstraction and climate change are factored into both the forecast demand and the company's forecast ability to supply water.

2.7.5 The "final plan" scenario presented by a water company retains the effect of external drivers, but instead of assuming that existing company operations continue unchanged, a series of supply and demand measures are selected for investment and appropriate phasing that ensure that the company's forecast ability to supply water is sufficient to meet forecast demand.

2.7.6 Both scenarios account for population growth, projections in non-household use, climate change, sustainability reduction impacts on supplies, headroom and outage allowances, amongst other elements. The baseline may present a deficit in the supply demand balance based on the utilisation of only existing sources, transfers and demand management programmes. However, the final plan must not show a deficit and will achieve this through the appraisal and selection of a range of demand management and supply-side options. The water company can choose to phase the introduction of these options to maintain pace with any forecast supply demand deficit so as not to constrain growth.

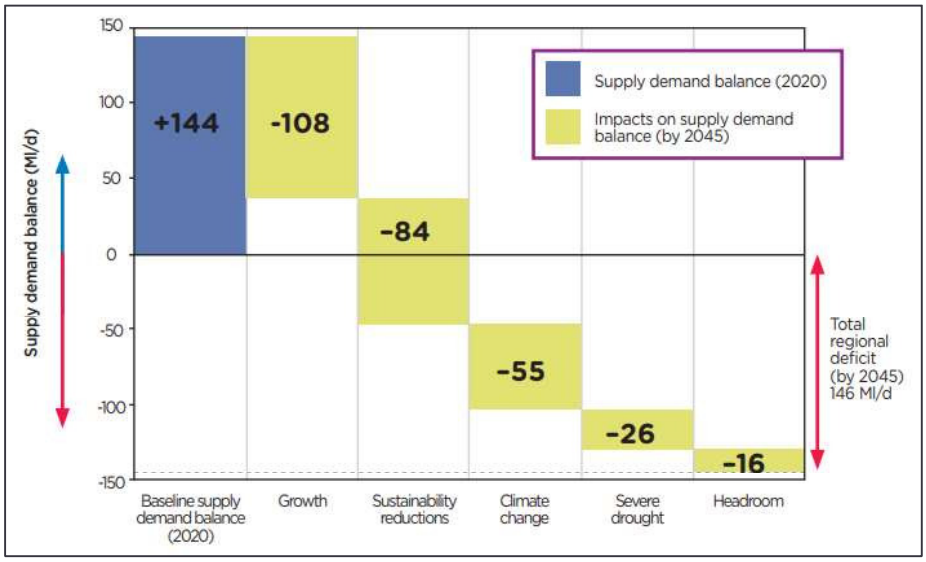
2.7.7 Future demand is forecast based on population growth assessments, economic trends and business use, and predicted climate change effects. Population and housing growth is the dominant factor that increases demand for water. Future water supply availability is assessed by taking account of a multitude of factors that include:

- Climate change impacts on resources;
- Abstraction licence reductions required by the Environment Agency to protect the environment; and
- The effect of drought scenarios.

2.7.8 Water companies must assess their baseline supply demand balance to determine the magnitude and timing of any forecast deficits through the planning period. Figure 2.9 below is taken from Anglian Water's revised draft WRMP and illustrates the effect that each component of their forecast

has through to 2045 on the surplus they begin the planning period with (in 2020). It shows that, at the company level, demand is forecast to increase by 108Ml/d as a result of growth by 2045. Loss of deployable output as a result of environmentally driven licence changes reduces the base year surplus by an additional 84Ml/d. Further climate change, the effects of severe drought and an increase in headroom allowance means that a surplus of 144Ml/d in 2020 becomes a deficit of 146Ml/d by 2045 under their baseline scenario.

Figure 2.9 Anglian Water – pressures on the supply-demand balance – source Anglian Water's dWRMP (September 2018)



2.8 Mapping development to Water Resource Zones

2.8.1 Water companies assess their supply demand balance at a Water Resource Zone (WRZ) scale. Household and non-household users of water within the proposed development areas receive their supply from either Essex and Suffolk Water (ESW) or Anglian Water (AWS).

2.8.2 Anglian Water's East Suffolk Water Resource Zone (WRZ) broadly supplies the southern portion of SCDC and IBC, encompassing both Ipswich and Felixstowe. Supplies in the WRZ are currently obtained from a combination of sources that include groundwater abstracted from the Suffolk and Essex Chalk aquifers and surface water which is pumped from the River Gipping into Alton Water Reservoir.

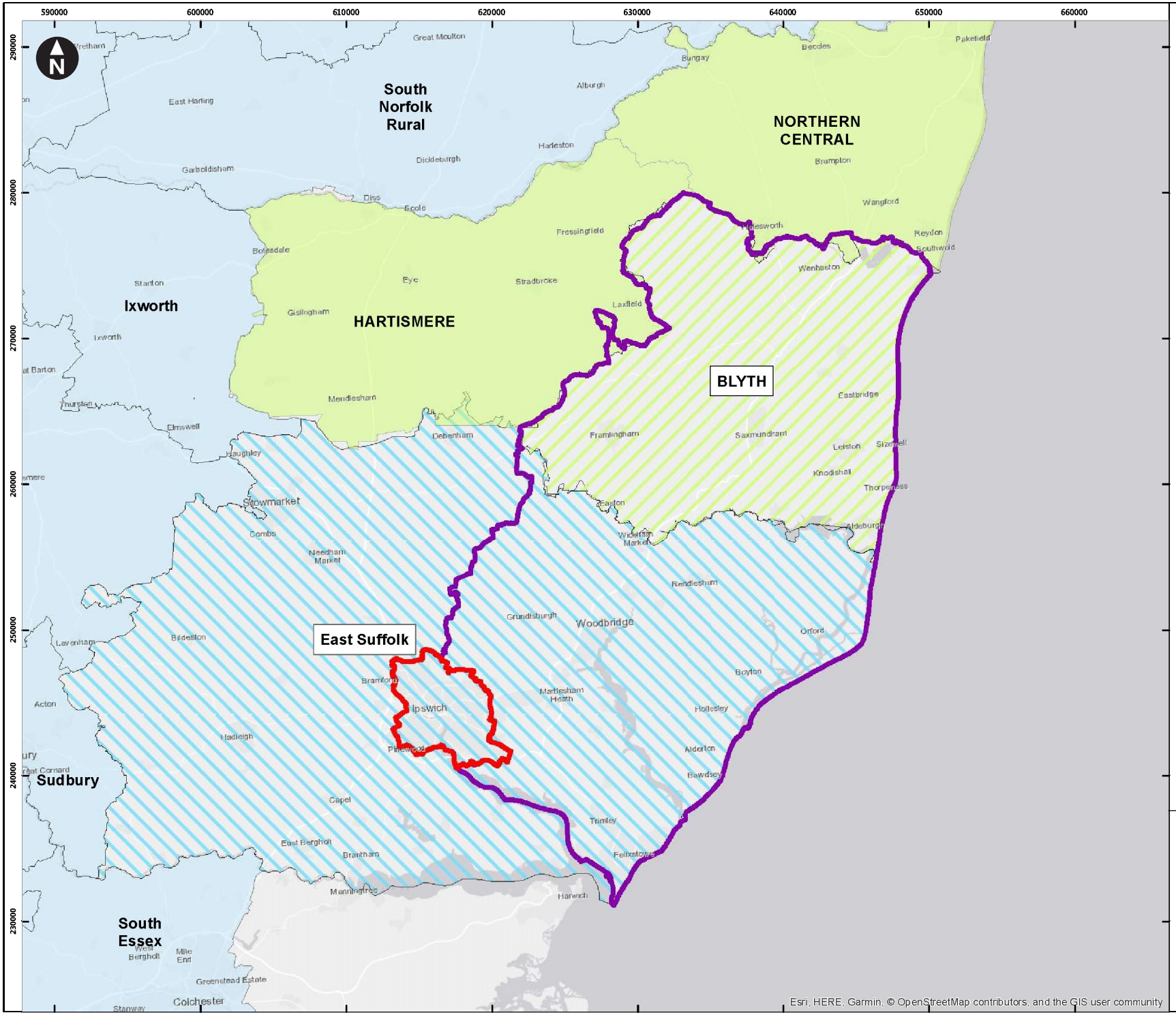
2.8.3 Essex and Suffolk Water's Blyth WRZ supplies the northern area of SCDC, including the proposed Garden Neighbourhood development in Saxmundham as well as Aldeburgh, Leiston and Framlingham. Water supplies for this WRZ are sourced entirely from the Chalk and Crag boreholes (see Figure 2.10).

2.8.4 Based on the information provided by IBC and SCDC, and phasing assumptions, Table 2.3 sets out the number of new dwellings proposed within each WRZ, for each AMP period. These WRZs are shown in figure 2.11.

Figure 2.10 ESW's Suffolk WRZs and associated infrastructure (source: ESW's dWRPM19)

Table 2.3 Dwellings proposed within each WRZ

	Total to 2019/20 AMP6	Total to 2024/25 AMP7	Total to 2029/30 AMP8	Total to 2035/36 (end of local plan period) AMP9	WRZ total
Anglian Water: East Suffolk WRZ	4,489	5,191	4,004	4,173	**17,857**
Essex & Suffolk Water: Blyth WRZ	946	849	708	37	**2,540**
Total per AMP period	5,435	6,040	4,712	4,210	
Cumulative total	**5,435**	**11,475**	**16,187**	**20,397**	



Key

- Ipswich Borough Council Administraive Boundary
- Suffolk Coastal and District Council Administraive Boundary
- Blyth - Essex & Suffolk Water
- East Suffolk - Anglian
- Essex & Suffolk Water WRZs
- Anglian Water WRZs

0 2.5 5 7.5 10 km

Scale at A3:1:250,000

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Figure 2.11 Water Resources Zones (WRZs) in the vicinity of IBC and SCDC

December 2018

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\\BSL-FS1\Shared\Projects\41086_WCS_Suffolk\Ipswich\Drawings\ArcGIS\OutlineStudy\WRYfig 2.11 WRZs_v2.mxd Originator: ben.fitzsimons

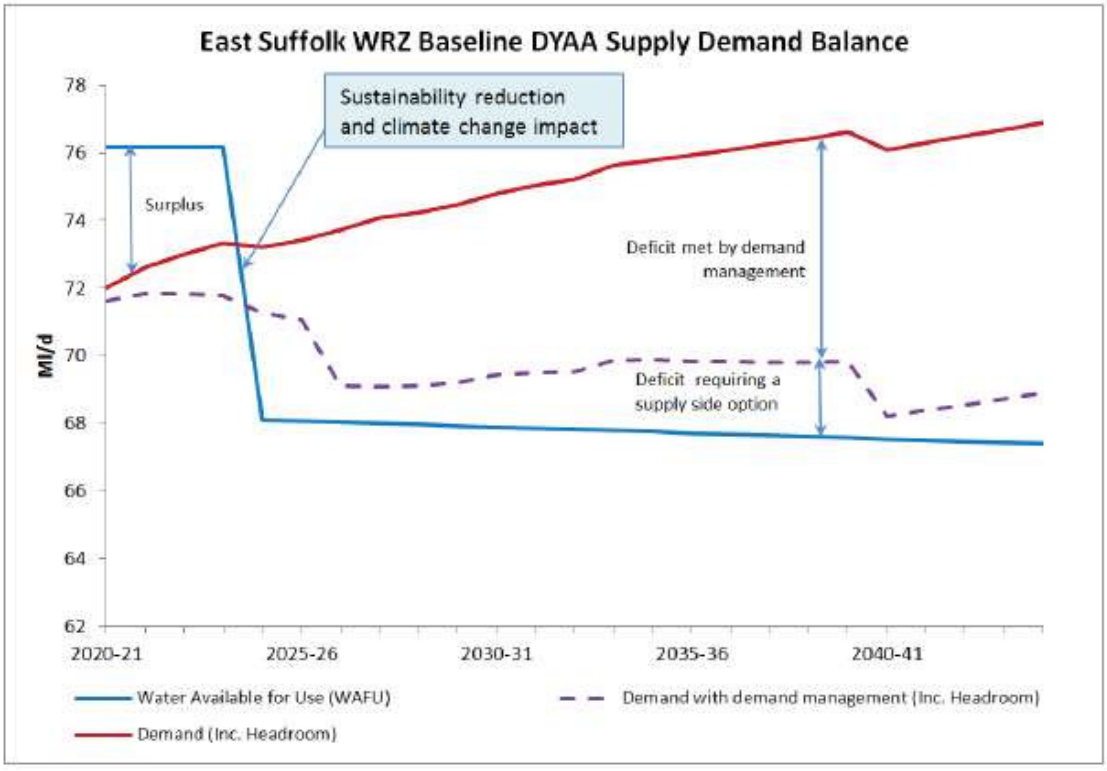
2.9 Baseline supply demand balance

2.9.1 It is important to note that the water company's baseline supply demand balance takes account of external drivers such as forecast Local Plan population growth, and climate change impacts on supply. However, the baseline scenario assumes that the company continues with only existing programmes and operations.

2.9.2 AWS present a baseline supply demand balance for the East Suffolk WRZ with a healthy surplus at the start of the planning period, but this quickly changes to a deficit by the end of AMP7, as a result of sustainability reductions to their licences and climate change impacts (thus reducing their ability to supply). AWS have assessed the additional demand resulting from population growth to be 5.34Ml/d in the East Suffolk WRZ. This represents a change of 7.78%.

2.9.3 Within their draft plan, the company demonstrated the need for both demand management and new supply-side measures to address the deficit (see Figure 2.12). The deficit by the end of AMP7 is forecast at 5.05Ml/d, extending to 8.05Ml/d by 2044/45.

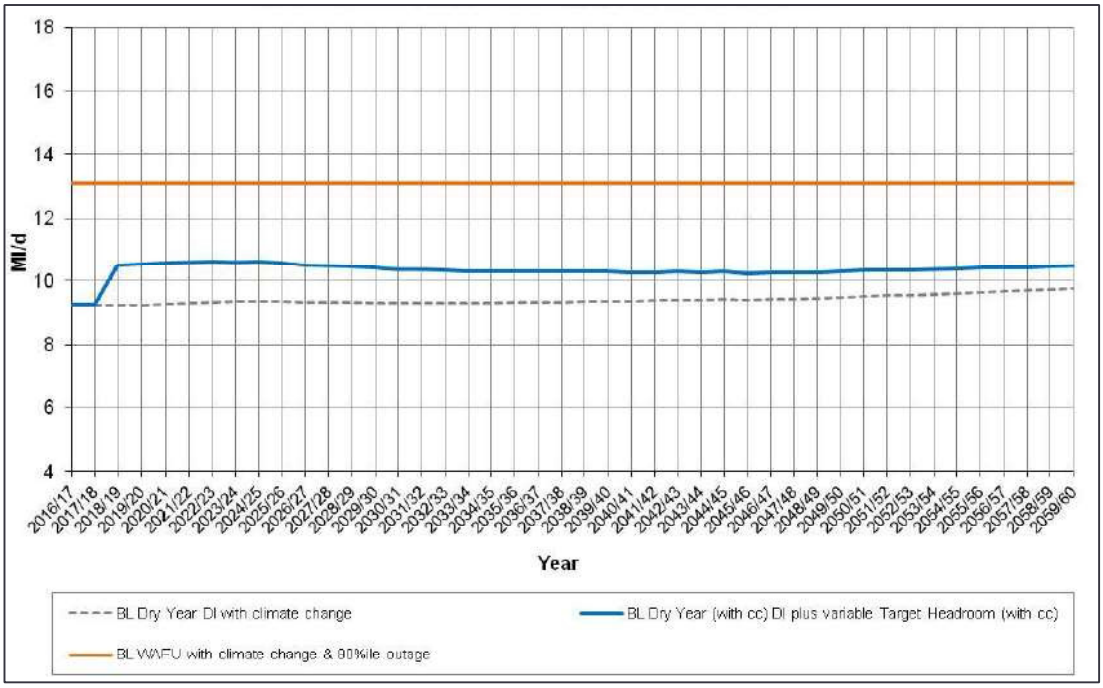
Figure 2.12 East Suffolk WRZ baseline supply demand balance (source: AWS dWRMP19)



2.9.4 At the time of writing, ESW have not yet published a revised WRMP or summary document setting out the updated supply demand balance following consultation and revisions to the approach agreed with the Environment Agency relating to sustainability reductions. Figure 2.13 shows the draft baseline supply demand balance to 2059/60 for the Blyth WRZ. This assumed that water available for use would remain constant throughout the planning period and a surplus (taking account of target headroom) of 2.45Ml/d at the end of AMP7 would exist, increasing slightly to 2.81Ml/d in 2044/45. ESW's draft forecast indicated that in the Blyth WRZ, despite a significant increase in population, household demand would increase only slightly from 5.42Ml/d in 2020/21

to 5.56Ml/d in 2044/45. This is largely due to their baseline demand management programmes and their analysis of trends in water use.

Figure 2.13 Blyth WRZ baseline supply demand balance (source: ESW dWRMP19)



2.9.5 It should be noted that the baseline supply demand balance presented in Figure 2.13 assumes that abstraction licences can be utilised at their fully licensed rates. That is to say, if there are no other constraints on the use of a source such as pump or distribution limitations, the water company may assume that the deployable output, available to supply users with the WRZ, is based on the fully licensed volumes. Water available for use, as presented in the baseline supply demand balance is therefore not necessarily reflective of recent actual source utilisation.

2.9.6 ESW's Statement of Response (ESW, 2018b) to the consultation on their draft WRMP outlines the implications of the latest agreed approach to uncertain sustainability reductions in the Blyth and Hartismere WRZs. In order to account for uncertainty relating to potential licence changes required to protect the environment, ESW have agreed to cap their assumed licence use to recent actual levels (maximum annual abstraction between 2005 and 2015). The Statement of Response indicates that, when accounting for "target headroom" (an allowance for uncertainty within the plan), there would be a small deficit of 0.32Ml/d at the start of AMP7 (2019/20), reducing to a deficit of 0.15Ml/d by the end of AMP7 in 2024/25. The reduction in this deficit during AMP7 is expected to occur due to a range of leakage reduction and demand management savings. From 2025 onwards, ESW forecast a surplus for the remainder of the planning period.

2.9.7 Under a baseline scenario therefore, both ESW and AWS needed to proceed with existing and enhanced demand management solutions while AWS indicated that the magnitude of their forecast deficit would require an approach which would include supply-side options.

2.10 Essex and Suffolk Water Preferred options and the final planning scenario

Supply-side options

2.10.1 Prior to consultation, ESW's draft WRMP forecast a surplus in all WRZs and therefore did not explore the need for supply-side measures. Following a new agreement with the Environment Agency to assume a cap on the use of existing sources, it is not yet known whether the small deficit now forecast, early in the planning period during AMP7 the Blyth WRZ will drive the need for investment in a supply scheme. A healthy surplus is forecast for the company's Essex WRZ and this presents potential opportunities for transfers in the short to medium term.

2.10.2 The company also notes the need to work with the Water Resources East group if new sources of supply are required.

Demand management

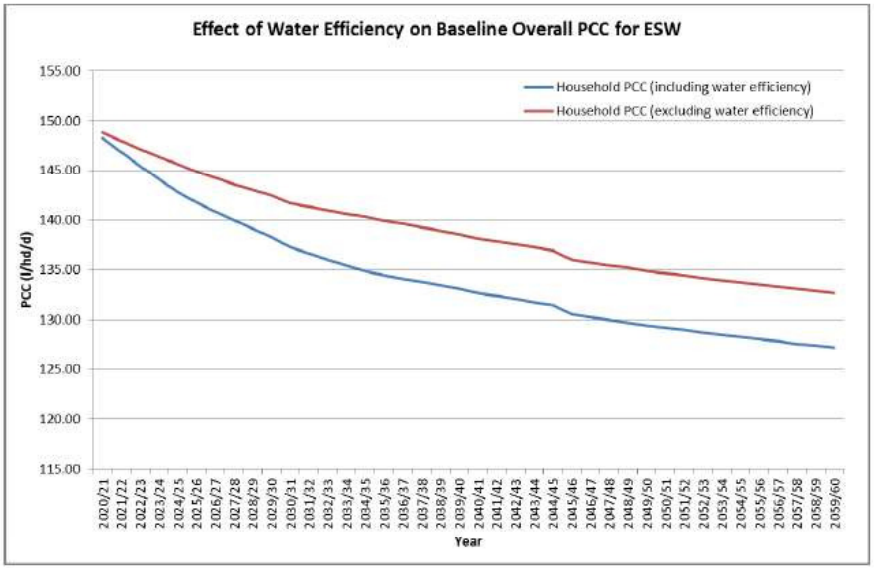
2.10.3 During AMP6, ESW have received recognition for its innovation in delivering a wide range of initiatives for water efficiency through a whole-town approach (the company's "Every Drop Counts" programme). The company is on track to meets its AMP6 commitment to reduce per capita consumption (PCC) by 0.26 l/h/d (litres per head per day) every year. Through the Every Drop Counts programme, ESW has completed 12,365 home retrofit audits and 64 business audits in four towns. These audits include the installation of a range of retrofit products (e.g. low flow shower heads, tap inserts, tap repairs, leaky toilet repairs etc.) designed to save water and engage people in behavioural change in water use. On average, a home saves 21.3 litres per day following an audit. ESW's research and trials highlights the importance of behavioural changes alongside simple retrofits and internal leak repairs. Their draft WRMP states that customers that receive a full audit, including advice save an additional 7 litres per property per day of those that receive only a retrofit product offering.

AMP7 strategy: Water efficiency

2.10.4 ESW have committed in their draft WRMP to deliver through water efficiency measures, a 2% reduction in PCC by the end of AMP7 (2024/25). This equates to an annual reduction of 0.57 l/h/d and a reduction of 2.85 l/h/d per person by 2024/25. The forecast savings through the remainder of the planning period are shown in Figure 2.14. This enhanced demand reduction is forecast as a result of a continuation of the company's Every Drop Counts programme, with additional targeting and a transition to the use of a digital platform for incentivising water efficiency behaviours amongst their customers.

2.10.5 At a company level ESW have committed in their Statement of Response to a reduction in PCC from 149.1 litres per person per day in 2016/17 to 118.6 litres per person per day in 2040. This equates to a 20.4% reduction over that time period. This takes account of both water efficiency and metering schemes.

Figure 2.14 ESW - PCC reduction resulting from water efficiency measures (source: ESW dWRMP19)



AMP7 strategy: Metering

2.10.6 Metering in order to provide feedback on demand, and charge according to the volume of water used is widely regarded as an effective method to reduce household consumption. Within an area designated as "seriously water stressed" by the Environment Agency, a company must consider the option of compulsory universal metering. In the case of ESW, customer research indicates that this is not a favoured option while new supply-side measures are not being considered to meet a deficit, and as such has not been pursued.

2.10.7 Within ESW's Suffolk WRZs, they estimate that by the start of AMP7 in 2020, 69% of domestic customers will be on a metered supply. During AMP7 and beyond ESW will continue with their current strategy of "optant" and change of occupier metering (voluntary meter installation). This is predicted to result in meter penetration of 73% by the end of AMP7, rising to 78% in 2044/45.

2.10.8 A saving of 5% is assumed when a customer switches from unmeasured, to metering billing. Using occupancy assumptions, this is forecast to deliver a saving across Suffolk of 41,739 litres per day (0.042 Ml/d).

2.10.9 The total estimated cost across Suffolk during AMP7 is £923,225.

2.10.10 Since submitting their draft WRMP ESW have now increased optant metering by a further 25% per annum throughout AMP7. The costs and overall saving associated with ESW's revised demand management schemes are not yet available, but will be when their revised draft WRMP is published.

AMP7 strategy: Leakage

2.10.11 OFWAT set out the requirements for all companies to plan to reduce leakage by 15% during AMP7. ESW has planned for a reduction of 17.5% during this period. This will be achieved through leak detection and repair, investing in the use of permanent and semi-permanent noise loggers, and a programme of mains renewals.

2.10.12 Beyond AMP7, the company targets a further 10% reduction in leakage during each 5 year AMP period. Over the period to 2044/45, this will total a further 34% reduction.

2.10.13 Leakage is targeted to reduce by 17.5% during AMP7.

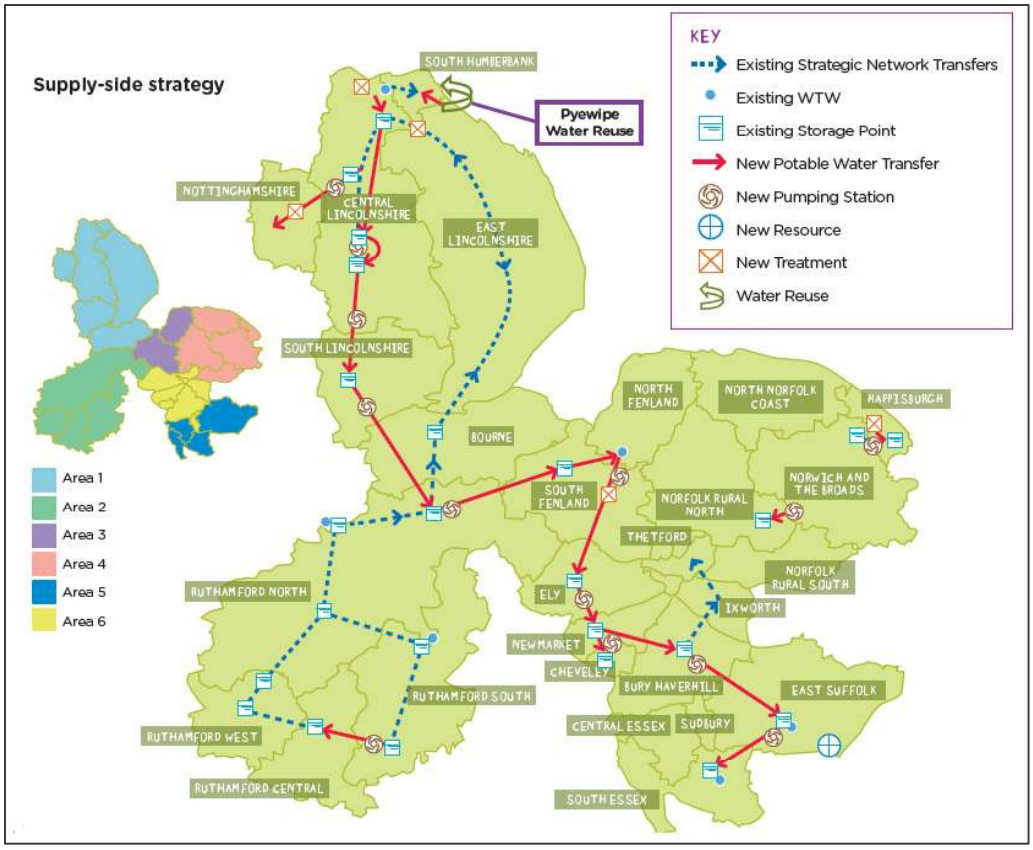
2.10.14 The costs associated with ESW's leakage schemes are not yet available, but will be when their revised draft WRMP is published.

2.11 Anglian Water Preferred options and the final planning scenario

Supply-side options

2.11.1 Despite an ambitious demand management strategy, AWS have demonstrated that investment in supply-side capacity is also required. As noted in previous sections, options to more fully utilise existing sources or develop new sources in environmentally sensitive areas have been limited. As a result, the supply-side strategy is based on the development of a more integrated network that allows transfers to play a key role in balancing deficits between WRZs. Figure 2.15 illustrates how this plan allows surplus in Lincolnshire and North Fenland to support WRZs with deficits (e.g. East Suffolk WRZ).

Figure 2.15 AWS – Supply-side strategy (source: AWS revised WRMP19)



2.11.2 Supply-side options for the East Suffolk WRZ considered feasible by AWS are shown in Table 2.4.

Table 2.4 AWS - Feasible supply-side options for the East Suffolk WRZ (source: AWS revised WRMP19)

	Average capacity	Capital cost	Selected in revised plan
Felixstowe Desalination	25 Ml/d	£50,491	Yes, but deferred to AMP9
Ipswich water reuse	10.7 Ml/d	£88,167	Yes, early in planning period
Bury Haverhill WRZ to East Suffolk WRZ transfer	20 Ml/d	£26,075	Yes, in order to utilise surplus in other WRZs
Bury Haverhill WRZ to East Suffolk WRZ transfer	10 Ml/d	£21,548	No. The larger 20 Ml/d variant has been selected

2.11.4 A key option identified during the development of the draft WRMP, the desalination plant at Felixstowe, has been deferred in the revised plan to AMP9 (2033-34). However, investment in the strategic grid is intended to give flexibility in future schemes and is to be built with adequate capacity to cope with any future need for the desalination plant.

2.11.5 The desalination plant has been replaced by the Ipswich water reuse scheme earlier in the planning period.

2.11.6 For the East Suffolk WRZ, a new transfer linking to the Bury Haverhill WRZ means that forecast surplus in northern WRZ can be made available.

2.11.7 With the inclusion of these supply-side schemes, alongside demand management programmes, the preferred plan supply-demand balance is forecast to be 15.68 Ml/d in surplus in 2045.

2.11.8 The importance of, and preference for large water transfer schemes in the AWS supply area is indicative of a growing drive from government and the water sector regulators for greater collaboration and investment in major infrastructure (alongside ambitious demand management programmes). A draft Water Resources National Policy Statement has recently been published for consultation (in November 2018) which sets out the need for and government's policies for the development of nationally significant infrastructure projects relating to water resources in England.

Demand management

2.11.9 At a company level, AWS proposes savings of 43 Ml/d by the end of AMP7, and up to 123 Ml/d by 2044/45. This is intended to more than offset the projected growth in household demand.

2.11.10 Within the company's revised WRMP, they have selected what they refer to as the "Extended Plus" demand management strategy. This strategy is expected to balance cost with an ability to mitigate growth, provide resilience, meet customer expectations and support environmental objectives.

2.11.11 The strategy and its costs (in terms of capital expenditure – CAPEX, and operational expenditure – OPEX) are summarised in Table 2.5.

Table 2.5 AWS – Demand management strategy at the company scale (source: AWS revised WRMP19)

	Key elements	Demand saving at the company scale by 2045	Capex cost (2020-2045) - £m	Opex cost (2020-2045) - £m/year
Smart metering	Achieve 95% meter penetration over two AMP periods	51 Ml/d	343	10.1
Water efficiency	"Leaky loos" campaign, rewards schemes, free installation of water butts, home audits, retrofit water efficient devices.	30 Ml/d	-	3.7
Leakage reduction	15% reduction in leakage during AMP7 Through pressure management, leakage detection and data analysis	42 Ml/d	292	1.4
Total			635	15.2

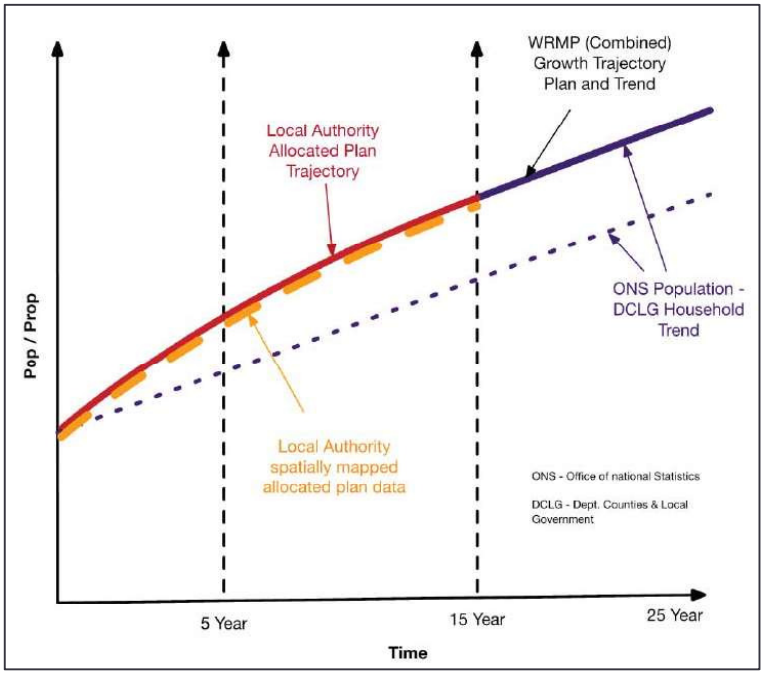
2.12 Accounting for growth

2.12.1 In line with water resource planning guidelines, both ESW and AWS have drawn on local authority planning data to develop their demand forecasts. Since the preparation of the companies' demand forecasts, local plans across the supply area have evolved, including those of IBC and SCDC. Several local authorities provided representations to the AWS and EWS consultations on their draft WRMPs, offering support for the use of local authority data as the basis for demand forecasting, but noting that housing targets may have changed since the demand forecasts were produced. ESW and AWS responded in their Statements of Response in support of continued engagement with planning authorities and indicated that forecast surplus in supply would allow for changes in actual housing delivery.

2.12.2 In the short to medium term (10-15 years) water companies use local authority growth data, where available, to steer their demand forecast. This is not necessarily a straightforward process due to mis-aligned spatial scales, phasing assumptions, differences between housing targets and actual build rates, and not least the fact that multiple local authority plans within a water company supply area are likely to be at different stages of development.

2.12.3 Figure 2.16 illustrates how local authority data is merged with a trend-based analysis over longer planning horizons used by water companies. This shows the principal of using local authority allocation data in the short to medium term to inform population forecasts and then a shift to other methods of forecasting in the longer term.

Figure 2.16 Short and long-term data sources and growth forecasts (source: AWS dWRMP19, Demand forecasting technical report)



2.12.4 This section takes a closer look at the data and assumptions used by AWS and ESW and how this might compare to the latest available information from IBC and SCDC. Through this high level analysis, we can draw conclusions as to whether the companies' revised WRMP have sufficiently accounted for the levels of growth now proposed.

Essex & Suffolk Water's Blyth WRZ

2.12.5 ESW's Blyth WRZ almost entirely encompasses the SCDC authority area.

2.12.6 ESW have confirmed that their population forecasts in the short to medium term are based on local plan information supplied by SCDC, aligned to SCDC's 2013 Core Strategy. While it has not been possible to determine precisely how the information contained with the 2013 Core Strategy was translated into WRZ-scale growth forecasts, the following assessment makes a high-level appraisal so as to make comparisons between this and the developing local plan in 2018.

2.12.7 It is important to note that the time periods of relevance to local plan projections do not align neatly to water company planning cycles. In the case of the former SCDC 2013 Core Strategy, information extended to 2027, whereas water company plans focus on 5-year AMP cycles (e.g. AMP7 2020-25, AMP8 2026-30). Table 2.6 presents the number of new dwellings forecast by ESW in their revised draft WRMP for the Blyth WRZ, along with the number of new dwellings proposed by SCDC (both currently in the developing local plan, and previously in the 2013 Core Strategy). Figures are aligned where possible to AMP periods AMP7-9 (20220/21-2034/35), but estimates for the period 2018/19-2019/20 and for the year 2035/36 are also given.

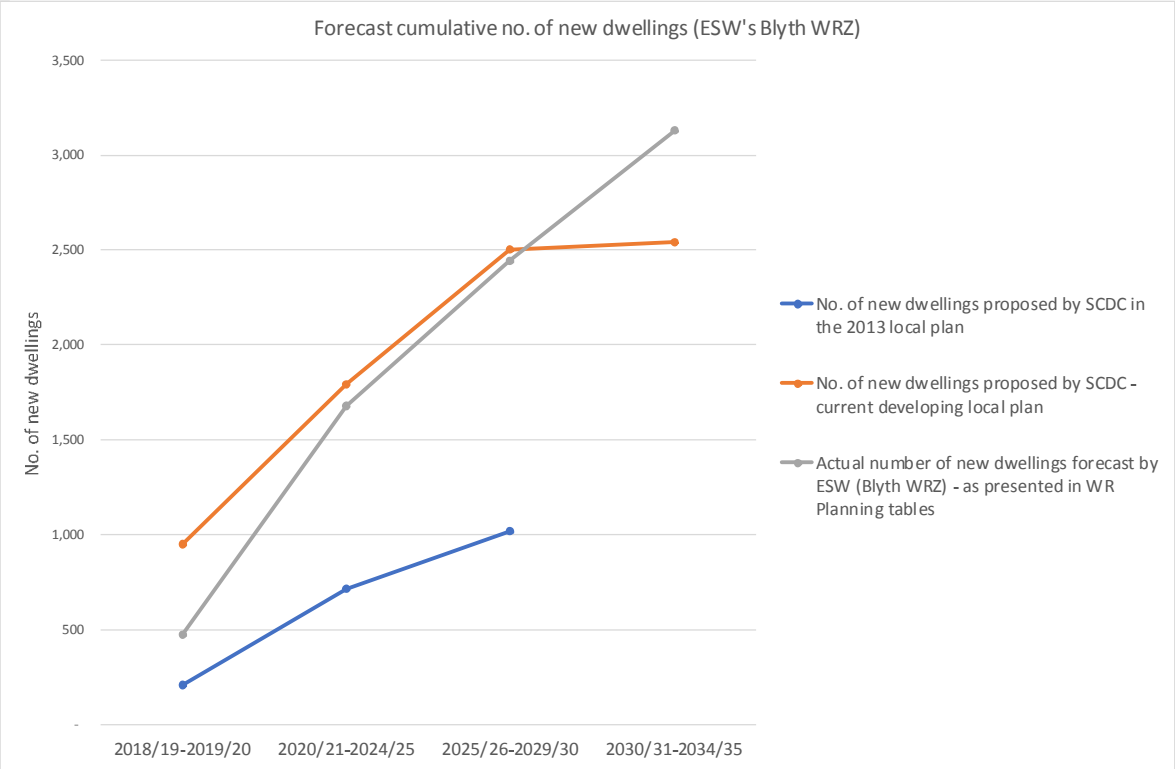
Table 2.6 Forecast new dwellings 2018-2036 within ESW's Blyth WRZ

	AMP6	AMP7	AMP8	AMP9	AMP10
Period	2018/19-2019/20 2 years	2020/21-2024/25 5 years	2025/26-2029/30 5 years	2030/31-2034/35 5 years	2035/36 1 year
No. of new dwellings proposed by SCDC – 2013 Core Strategy	204*	509*	305* (plan to 2027 only)	Unspecified (plan to 2027 only)	Unspecified (plan to 2027 only)
No. of new dwellings proposed by SCDC – current developing local plan	946	849	708	37 (2030-2036)	
Actual no, of new dwellings forecast by ESW (Blyth WRZ) – revised dWRMP19	470	1,210	760	690	130

* Figures relating to the 2013 Core Strategy are calculated estimates based on target build rates (number of dwellings per annum) as set out in SCDC's 2013 Core Plan.

2.12.8 Figure 2.17 plots the cumulative number of dwellings according to each forecast through the planning period. What this shows is that while ESW's forecast was informed by data within SCDC's 2013 Core Strategy, the number of new dwellings for which they have ultimately planned is much higher, particularly in the medium to long term. However, SCDC's current proposals exceed those planned for by ESW in the short to medium term to 2030. This shortfall is primarily driven by an underestimation in the number of new homes expected to be built in the period 2018-2020. By 2025, a significant increase in the number of new builds expected by ESW in AMP7 (1,210 new homes) means that SCDC's current developing local plan only exceeds ESW's forecast by 115 homes, and by 63 homes in 2030.

Figure 2.17 Forecast cumulative number of new dwellings – ESW's Blyth WRZ



2.12.9 Taking this conclusion in the context of the remaining uncertainty during AMP7 linked to the inclusion of sustainability reductions, **it is possible that an accelerated rate of growth within the Blyth WRZ early in the planning period could result in a small forecast deficit.**

2.12.10 Note however, that ESW's Statement of Response for their revised dWRMP, sought to reassure consultees from local authorities that additional housing numbers arising from the ongoing development of local plans would not cause problems with supply. Additionally, the company points out that the WRMP is refreshed every 5 years in order that such developments in policy can be taken into account.

2.12.11 It is recommended that SCDC engage with ESW in the early stages of the planning period to ensure that plans can be accommodated within the existing supply demand balance in the short term, prior to the effects of any sustainability reductions.

Anglian Water's East Suffolk WRZ

2.12.12 AWS's East Suffolk WRZ spans both the southern portion of the SCDC area and IBC, as well as the neighbouring authorities of Babergh and Mid Suffolk, therefore providing supply systems for Ipswich, Hadleigh, Stowmarket and Woodbridge. AWS's demand forecast included allowance for a number of known growth "hotspots", which included Ipswich.

2.12.13 AWS's draft WRMP set out the base of local authority and local plan data drawn on to develop their short to medium term population forecast. Both IBC and SCDC submitted draft planning information to AWS in 2016 to support their assessments, covering the period to 2030/31. This information will have been used by AWS to develop their short to medium term population forecasts. A comparison is therefore made here between the plans as they stood in 2016 and the

current developing local plans (2018) to determine whether an appropriate level of growth is likely to have been accounted for within AWS's plan.

2.12.14 Table 2.7 sets out the forecasts submitted to AWS in 2016 from both IBC and SCDC. The information is broken down by authority area in addition to the combined total. Where possible, figures have been aligned to AMP cycles 6-9 (2020-2035) as well as the two-year period 2018-2019 and for 2036. Table 2.8 presents the current developing local plan forecast in 2018 for comparison along with AWS's forecast for the whole of the East Suffolk WRZ.

Table 2.7 Forecast new dwellings (as of 2016) within AWS's East Suffolk WRZ

	AMP6	AMP7	AMP8	AMP9	AMP10
Period	2018/19-2019/20 2 years	2020/21-2024/25 5 years	2025/26-2029/30 5 years	2030/31-2034/35 5 years	2035/36 1 year
No. of new dwellings proposed by SCDC – 2016 draft plan*	983	2,506	1,000	Not specified	Not specified
No. of new dwellings proposed by IBC – 2016 draft plan	1,013	3,524	2,549	469 (data to 2031 only)	Not specified
Cumulative total no. of new dwellings – 2016 draft plans	1,996	8,026	11,575	12,044	12,044

* 2016 draft plan also includes emerging Site Allocations Plan and Felixstowe Peninsula Area Action Plan at the time of writing.

Table 2.8 Forecast new dwellings (as of October 2018) within AWS's East Suffolk WRZ

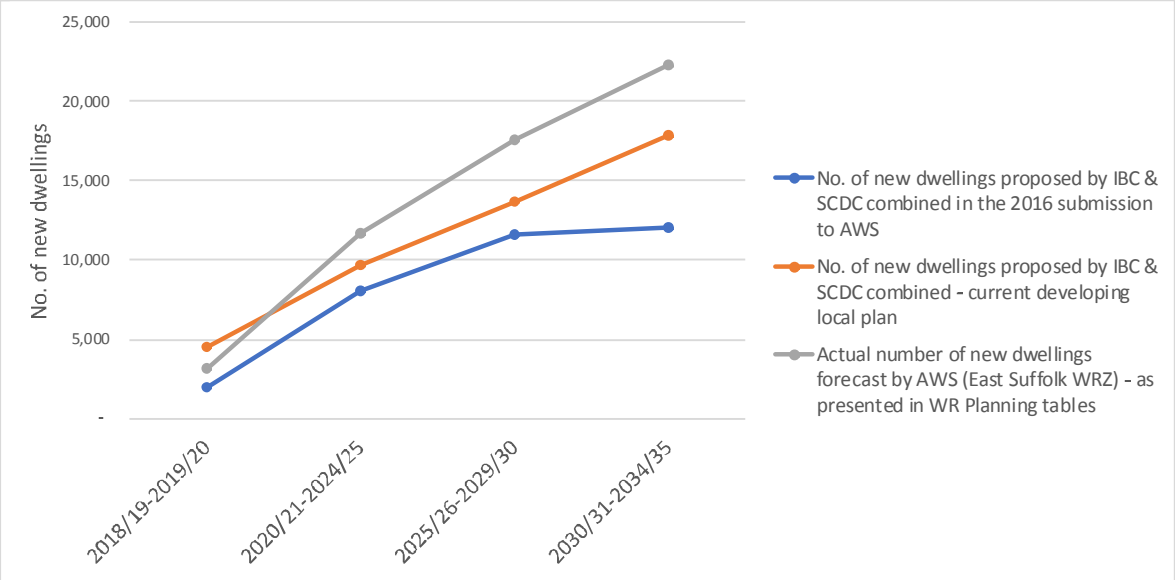
	AMP6	AMP7	AMP8	AMP9	AMP10
Period	2018/19-2019/20 2 years	2020/21-2024/25 5 years	2025/26-2029/30 5 years	2030/31-2034/35 5 years	2035/36 1 year
No. of new dwellings proposed by SCDC – 2018 draft plan	2,145	2,414	2,111	1,798 (figure given to 2036)	
No. of new dwellings proposed by IBC – 2018 draft plan	2,344	2,777	1,893	2,375 (figure given to 2036)	
Cumulative total no. of new dwellings – 2018 draft plans	4,489	9,680	13,684	17,857	17,857
Cumulative no. of new dwellings forecast by AWS – revised dWRMP19	3,190	11,710	17,600	22,260	23,110

2.12.15 Tables 2.7 and 2.8 demonstrate that overall, the current developing local plans as of October 2018 target a greater number of new dwellings than was forecast in 2016. This is illustrated in Figure 2.18. This shows that AWS may have underestimated the number of new builds immediately prior to their formal planning period beginning in 2020/21. Although it is important to note that the East Suffolk WRZ covers the neighbouring authorities of Babergh and Mid Suffolk, in the medium to longer term it appears that sufficient growth has been accounted for.

2.12.16 This potential underestimation in the number of new dwellings in the period immediately preceding the water companies' formal planning period in 2020/21 suggests that it will be particularly important for IBC and SCDC to engage with AWS to ensure phasing of construction is appropriate and can be accommodated within the existing supply demand surplus in the short term.

2.12.17 Reference to section 2.11 however, demonstrates how AWS plan to maintain a significant surplus in the supply demand balance throughout the planning period thanks to a series of supply and demand-side measures. As such, while there is some uncertainty in the short term, AWS are able to demonstrate that in the medium to long term, sufficient growth has been accounted for and a surplus in supply can be maintained.

Figure 2.18 IBC and SCDC forecast number of new dwellings 2018-2035/36 within the East Suffolk WRZ



2.13 Per capita consumption and the role of water efficient building standards

2.13.1 IBC and SCDC are considering the adoption of the optional higher standard for water efficiency set out in Part G of the Building Regulations. Local Planning Authorities can play a key role in delivering water efficiency. The National Infrastructure Commission (NIC) report 'Preparing for a drier future'[1] sets out that without further action, there is a 1 in 4 chance over the next 30 years that large numbers of households in England will have their water supply cut off for an extended period because of severe drought. And it estimates the economic impact of severe restrictions in England at between £25 and £40 billion.

2.13.2 A per capita consumption target in England will need to be delivered by both new and existing households. IBC and SCDC have the opportunity to support this through the use of the optional higher standard in the building regulations.

[1] https://www.nic.org.uk/publications/preparing-for-a-drier-future-englands-water-infrastructure-needs/

2.13.3 In January 2018 the UK Government published 'A Green Future: Our 25 Year Plan to Improve the Environment'[2] for England. This document outlines the government's intentions to work with the industry to set an ambitious personal consumption target and agree cost-effective measures to meet it. The plan also sets out that the government will 'work with the group led by Waterwise to improve water efficiency and customer involvement to explore the impact of introducing new water efficiency measures'. There have been many policy developments linked to water efficiency in the first year of the Strategy. These are detailed in a Waterwise policy update published online[3].

2.13.4 The Building Regulations (HM Government, 2016) require that the estimated consumption of wholesome water within the home (based on design calculations) does not exceed 125 litres per person per day. This falls under part G2 of the regulations which states that for new dwellings "reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiency for the prevention of undue consumption of water". The optional design standard of 110l/h/d may be applied where this is included as part of planning permission under which the new dwelling is to be built.

2.13.5 A review by the Environment Agency of local planning authorities in September 2017 suggested around 80 utilised the optional requirement for developers to build to the lower level of 110 l/h/d in their planning conditions.

2.13.6 Both AWS and ESW have assumed that all new dwellings built during the planning period will be designed to the compulsory 125l/h/d standard. In addition, Anglian Water is planning to waive the fixed element of the zonal charge where applicants can demonstrate water efficiency of 100 l/h/d to incentivise increased water efficiency/re-use.

2.13.7 ESW however, have drawn on their data which has shown that homes built to this standard within their supply area generate a demand of just 118l/h/d on average[4]. As such, and in line with their ambitions, ESW have adopted this in their planning assumptions. However, research by Thames Water on homes built to 105 l/ h/d (the standard in the London Plan, which excludes 5l/h/d external water use) suggests that when accounting for abnormally high or low use, the range is 110 l/h/d to 140.75 l/h/d[5]. Therefore, it is recommended that the 110l/h/d standard be selected. The Waterwise Water Efficiency Strategy for the UK steering group is working with Government to review the current building regulations and better link these with a mandatory water efficiency labelling standard.

2.13.8 Engagement with the water companies as part of this project and as stated within their Statements of Responses, **both companies actively encourage local planning standard designed to increase water efficiency**. Furthermore, AWS plans to incentivise developers to build more efficient homes (building to a 100l/h/d standard and including grey water reuse design elements) with reduced or waived zonal charges.

2.13.9 Anglian Water has been increasingly working with local planning authorities and has published 'Local Plans: An Anglian Water Perspective'[6], which sets out three key areas for water efficiency to be included in local plans:

- Development proposals should demonstrate that dwellings meet the Building Regulation optional higher water efficiency standard of 110 l/h/d, as set out in building regulations part G2;

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
[3] https://www.waterwise.org.uk/wp-content/uploads/2018/11/Waterwise-Policy-Update-2018.pdf
[4] https://www.waterwise.org.uk/resource/essex-and-suffolk-water-2018-building-regulations-part-g-analysis-of-water-consumption/
[5] https://www.waterwise.org.uk/wp-content/uploads/2018/11/Advice-on-water-efficient-homes-for-England061118.pdf
[6] https://drive.google.com/file/d/1YrCO5HXc4oqUu4XoYN2QdBkcZWF5J2Yh/view

- Consideration to be given to the inclusion of a specific water efficiency BREEAM standard for commercial development as part of the preparation of Local Plans; and
- Developments should be water-efficient and should aim to be water-neutral in areas of serious water stress by incorporating innovative water efficiency/re-use measures. This level of ambition is being seen in areas of significant development. For example Thames Water and Southern Water are exploring this in the Ebbsfleet development in north Kent.

2.13.10 Within new developments, the water companies can only educate, inform and incentivise water efficient design. To enforce this optional standard is not within the powers of the water supplier, and so they are reliant upon ambition in planning policy and individual planning permissions. While it can be shown that each water company has planned to a less stringent water efficiency assumption for new builds, **both have expressed support for the implementation of policy that requires the adoption of the higher optional standard.** The companies have also supported this through the Water Efficiency Strategy for the UK Steering Group. This group recently produced advice for Defra[7], which recommended all local authorities should be implementing the 110l/h/d standard and that the previous estimate of an additional cost of £9/home to meet this standard would now likely be negligible based on changes in the market.

2.13.11 Water efficient design and water efficiency in general leads to multiple benefits beyond simple demand reduction and maintenance of a positive supply demand balance. Such benefits include:

- Reduced energy consumption in the home (especially where water is heated) - this accounts for around 25% of energy use in the home and 5% of UK carbon emissions;
- Reduced energy consumption in the regional distribution of water;
- Reduced carbon emissions;
- Reduced costs to water and energy bill payers, improving affordability and supporting vulnerable customers;
- Protection of the water dependent environment;
- Reduced need for investment in supply-side measures; and
- Resilient water supplies during periods of peak demand.

2.13.12 Where uncertainty remains in the supply demand balance presented by AWS and ESW, it is prudent to support the water companies' demand management strategies by adopting water efficient planning policies, thus contributing to regional water resource planning approaches that actively seek to avoid limiting growth.

2.13.13 Table 2.9 sets out the theoretical demand saving that adopting the 110l/h/d standard would produce in each WRZ. Each company has made different assumptions regarding new build occupancy and consumption rates and these have been taken into account. Overall, a saving of 15l/h/d in AWS's East Suffolk WRZ and an 8l/h/d saving in ESW's Blyth WRZ could theoretically produce a saving of 0.46 Ml/d. The figures presented in Table 2.9 relate only to housing allocations targeted for the period 2020-2036.

[7] https://www.waterwise.org.uk/resource/advice-on-water-efficient-new-homes-for-england-september-2018/

Table 2.9 Theoretical savings resulting from the adoption of optional building regulations standard

	No. of new dwellings proposed 2020-2036	Occupancy rate assumed by water company (people per property)	New build PCC assumed by water company (l/h/d)	Potential saving resulting from adoption of 110l/h/d standard (Ml/d)
East Suffolk WRZ	13,368	2.14	125	0.43Ml/d
Blyth WRZ	1,594	2.1	118	0.03Ml/d

2.13.14 In the context of the supply demand balance presented by AWS and in particular the fine margins in the Blyth WRZ, overall potential savings of this magnitude are of value and would be supported by the water companies as a significant contribution to maintaining a healthy supply demand balance.

2.13.15 A project 'Delivering successful integrated water management through the planning system' is being undertaken by CIRIA[8]. The project aims to review and showcase good planning policies and the processes that underpin their production. It will also provide local councils with the confidence to produce their own set of policies and guidance, ensuring that high quality developments with good water management are cost-effectively delivered. Water efficiency and water reuse can be key elements of an integrated water management approach linked to wider benefits on reducing flood risk and improving water quality of new developments.

2.13.16 There are currently no mandatory standards for water efficiency in non-households, although planning requirements may link to BREEAM. There are a range of easy ways to attain water credits under BREEAM. The London Plan includes BREEAM as a planning requirements[9]. The Waterwise Strategy Steering Group plans to take forward a collaboratively-funded evidence project to identify the range of policy options and water, energy carbon savings that can be achieved for new non-household buildings. This may include approaches to guidance that can be given by water companies or regulators, planning implications and building regulations.

2.14 Outstanding uncertainties

2.14.1 Uncertainty in relation to future sustainability reductions has been discussed and an approach has been agreed between the water companies and the Environment Agency. This has generated additional drivers for enhanced demand management and exploration of alternative supply-side measures. Particular uncertainty remains regarding ESW's final approach to resolving a small forecast deficit (when accounting for target headroom) in the early stages of their planning period.

2.14.2 EDF Energy/CGN is proposing to construct and operate a new nuclear power station to be known as Sizewell C in the Suffolk Blyth WRZ within ESW's 2020 – 2060 planning period. The development will require an estimated 2Ml/d supply of water. On the request of the Environment Agency, ESW have assessed the supply demand balance under a scenario in which this additional demand features within the forecast. As a result of insufficient environmental capacity for further abstraction at existing sources, this results in a deficit and would require a new supply side measure.

2.14.3 ESW consider that the construction of Sizewell C remains unconfirmed and the timing uncertain. As such, this additional demand has not been formally factored into their revised WRMP. The costs

[8] https://www.ciria.org/Research/Projects_underway2/Delivering_successful_integrated_water_mangement_through_the_planning_ystem.aspx

[9] https://www.london.gov.uk/sites/default/files/draft_london_plan_-showing_minor_suggested_changes_july_2018.pdf

associated with a new supply-side scheme, should the development proceed, would be met by EDF Energy.

2.15 Water supply infrastructure

2.15.1 Strategic infrastructure required (and the costs associated) to address the baseline supply demand balance at the WRZ and regional scale have been outlined in section 2.9.

2.15.2 At a more local scale, specific supply infrastructure needs and upgrades are addressed on a case by case basis. The timing and cost implications are dealt with between the water company and the developers through infrastructure charges schemes and are considered as "business as usual" by the water companies.

2.15.3 Both AWS and ESW have been consulted during the development of the IBC and SCDC local plan allocations. While minor infrastructure upgrades are likely to be required at the majority of site allocations, these are not considered a constraint to development by the water companies.

2.15.4 The allocation of 1,440 new dwellings to the north of Felixstowe (SCDC site FID 19) presents a larger challenge and may require major infrastructure upgrades for AWS.

2.15.5 ESW expressed concern only in relation to the proposed development of 800 new dwellings in Saxmundham (SCDC site FID 94). However, the company subsequently withdrew this concern as it linked to the uncertainty surrounding the development of Sizewell C, which is now excluded from the final supply demand balance, as discussed above.

2.16 Water resources summary

Environmental capacity

2.16.1 This outline water cycle study has explored the water availability status and water resource-related environmental status of water bodies within and in the vicinity of the study area. It is clear that this represents a highly water stressed region with little or no capacity for additional natural water resource utilisation.

2.16.2 Water companies supplying the study area have agreed to cap their abstractions at recent rates in order to prevent deterioration in the environment and have a challenging suite of environment investigations under the Water Industry National Environment Programme which may lead to further abstraction reductions or mitigation actions.

Water supply and infrastructure

2.16.3 As a result of regional population growth, a drive for ambition from the water industry's regulators, projected climate change impacts on sources of supply, and a need to plan for more serious droughts, the baseline supply demand balance within the study area faces significant deficits from early in the forthcoming planning period and extending beyond.

2.16.4 Sustainability reductions driven by the limited environmental capacity within the region have necessitated a range of ambitious demand management schemes including water efficiency programmes, widespread metering and leakage reduction. Despite these schemes, significant investment is required in regional infrastructure (particularly in the Anglian Water supply area) that allows water surpluses found elsewhere to be transferred via a strategic grid to meet forecast deficits. In addition, in the East Suffolk WRZ, water reuse and desalination are included within the water company plan in order to address the need for further resource.

2.16.5 Both ESW and AWS are found to have accounted for sufficient growth in their forecasts in the longer term, so as not to constrain development proposed under the draft local plans. However, in the shorter term (to 2025), clear engagement between IBC and SCDC and the water companies is to be encouraged to ensure that rapid growth early in the planning period can be accommodated within existing water surplus.

2.16.6 Both water suppliers' WRMPs are yet to be finalised, and small deficits remain in the supply demand balance currently presented by ESW under certain scenarios relating to sustainability reductions and significant non-household development.

2.16.7 Local authorities have a role to play in supporting and advancing ambition in water demand management and the protection of the water-dependent environment. Adopting local planning policy in support of optional raised water efficiency design standards in new builds is a prudent step towards this goal that can yield multiple benefits.

3. Wastewater treatment, water quality and sewerage assessment

3.1 Aims of wastewater treatment, water quality and sewerage assessment

3.1.1 The wastewater treatment, water quality and sewerage assessment has sought to determine the potential future environmental impact on the receiving watercourses downstream of the growth areas and the Water Recycling Centres which serve them. This section of the report provides a summary of the assessment methodology and presents the results of the assessment.

3.1.2 This wastewater treatment, water quality and sewerage assessment will contribute towards the evidence base to support the SCDC and IBC Local Plans, by showing how water quality could be impacted by and, also protected, during housing and employment growth over the lifespan of the plan up to 2036, and the environmental implications of growth and planning for the future in the context of the Natural Environment White Paper[10] (2011) and Defra's proposed 25 year plan[11].

3.1.3 This section assesses whether there is sufficient environmental capacity to accommodate the impact of new developments, understand whether there are any requirements for additional major infrastructure, and details where environmental opportunities exist. As a result, this section will:

- Use the Environment Agency SIMCAT models and the River Water Quality Planning Tool (RQP) to identify whether increased sewage effluent discharges will prevent waterbodies from meeting WFD objectives.
  - Will discharges cause WFD class deterioration, or in-class deterioration of more than 10%?
  - Will discharges prevent the receiving watercourse from meeting future WFD objectives and what are the impacts on the condition of protected sites?
- Identify whether increased discharges will cause Water Recycling Centres (WRCs) to exceed currently permitted Dry Weather Flow (DWF), and when during the lifetime of the Local Plan this will occur.
- Hence identify when and where (at which works) upgrades will be required, and any constraints on implementing the required upgrades (e.g. whether improvements to effluent quality can be achieved with existing technologies) in particular for rural water recycling centres (WRCs).
- Understand what the impact will be from rural WRCs where higher levels of treatment are too costly to implement.
- Identify any constraints to growth from sewer network capacity.

[10] Department for Environment, Food & Rural Affairs, 2011, The Natural Choice: securing the value of nature.
[11] Available at https://www.gov.uk/government/publications/25-year-environment-plan

3.2 Assessment methodology

Data collation

3.2.1 Sewerage services within the SCDC and IBC areas are provided by Anglian Water Services. Information provided by Anglian Water Services and the Environment Agency for the water quality, WRC capacity and sewer network capacity assessments is shown in Table 3.1.

Table 3.1 Data collation

Data	Description and purpose	Source
WRC effluent quality data (2015-2017)	Current WRC effluent quality (Biochemical Oxygen Demand (BOD) and ammonia) discharged to receiving waters. For input to the SIMCAT modelling tool. No phosphate and only limited TON data available.	Anglian Water Services
WRC flow data (2015-2017)	Current WRC flows discharged to receiving waters. For input to the SIMCAT modelling tool and WRC capacity assessment.	Anglian Water Services
WRC permit data	Current permitted Dry Weather Flow for input to WRC capacity assessment.	Anglian Water Services
River quality data (2015-2017)	Current river quality (BOD, ammonia and phosphate) at WFD assessment points on receiving waters downstream of WRCs. For input to the SIMCAT modelling tool.	Environment Agency
SIMCAT models (Anglian River Basin District)	**Model 1**: SIMCAT model containing the following determinands: • Total P • Soluble reactive P • Nitrate **Model 2:** SIMCAT model containing the following determinands: • BOD • Ammonia • Dissolved oxygen	Environment Agency
Environmental Quality Standards (EQS)	EQS for BOD, ammonia and phosphate. Phosphate standards are site specific.	Environment Agency
Historical pollution incidents and their locations	Sewage related pollution incidents only. For input to the sewer capacity assessment.	Environment Agency
Growth areas and annual housing and employment numbers	Proposed future dwelling numbers and employment areas in each growth area. For input to the SIMCAT modelling tool to understand potential discharge increase at WRCs.	SCDC and IBC

Allocation of growth areas

3.2.2 Based on the locations of the proposed housing and employment sites, it is expected that the growth will impact on 16 Water Recycling Centres (WRCs), formerly Sewage Treatment Works (STWs), discharging to inland waterbodies and 9 WRCs discharging to coastal waterbodies.

3.2.3 The locations of WRCs, and WFD water quality monitoring points relevant to the WCS, are shown on Figure 3.1 (blue and red dots respectively). It is noted that the nearest WFD assessment point for a WRC, such as Framlingham WRC on the River Ore, can be quite a way downstream and

cumulative impacts from multiple WRC discharges need to be considered along rivers such as the Deben.

Key

- Water Quality Sites
- AWS WRC Discharge Locations
- Ipswich Borough Boundary
- SCDC District Boundary
- Main Rivers

WFD Catchments

- Coastal Catchment
- River WB catchment

0 1.5 3 4.5 6km

Scale at A3:1:150,000

Water Cycle Study Outline Report

Figure 3.1
Location Map

December 2018

wood.

3.2.4 Each housing site and employment area has been allocated to a sewerage catchment. For the purposes of this study, the nearest sewerage catchment to each growth area has been used although it is recognised that Anglian Water Services may suggest an alternative for some sites. It may also not be viable to connect foul water from sites that are remote from the nearest sewer.

3.2.5 Following allocation of growth areas to a sewerage catchment, the housing and employment growth planned for each WRC up to 2036 was determined. The planned growth was phased across three five-year periods (2016-2020, 2021-2025 and 2026-2030) and one six-year period (2031-2036). These periods were chosen primarily to align with water company business plan cycles, but also to consider the WFD cycles. Although the WFD objectives currently only state objectives for getting to Good Status by 2027, the WFD planning cycle continues beyond that in order to ensure no deterioration.

3.2.6 It is noted that phasing information was not available for all development sites. In the absence of any information, an even spread across the 4 periods to 2036 was assumed.

3.2.7 In total, development is being considered for 20,437 new homes and 873,458 square metres (m^2) of new office floorspace up to the year 2036. Any growth beyond this would need to be included in further studies and falls outside the scope of this assessment.

3.3 Water quality assessment

SIMCAT modelling

3.3.1 The river catchment water quality (SIMCAT) models provided by the Environment Agency (Table 3.1) were used to model the potential water quality impacts (phosphate, ammonia and BOD concentrations) of increased discharges of treated sewage effluent on rivers by 2036. The models were used in order to account for upstream impacts from growth areas as well as impacts from individual WRCs, and also to take in to account other pressures on water quality (such as sources of pollution that occur from a range of dispersed land use activities such as farming).

3.3.2 SIMCAT modelling was undertaken for the 16 WRCs discharging to inland waterbodies.

Calibration

3.3.3 The data period used to build the SIMCAT models (2010-2012) is now quite a few years old. Therefore, before the SIMCAT modelling was undertaken the values for effluent flow and quality (BOD and ammonia) at the WRCs being assessed were updated for a more recent data period (2015-2017). In general, this resulted in a reduction in flow volumes, since the original calibration period of 2010-2012 was wetter than average (2012 was particularly wet), whilst 2015-2017 is more representative of average conditions. The updated models were used as the baseline for the 2036 growth scenario.

3.3.4 No further calibration work was undertaken but differences between model (2010-2012) and 2015-2017 water quality at WFD assessment points were noted to determine how accurately water quality was now being represented.

3.3.5 For interpreting the model results, consideration has been given to the difference between baseline and 2036 scenario model output rather than absolute values. Therefore, over, or under, prediction of water quality by the model is allowed for when assessing potential WFD class deterioration.

Assumptions for SIMCAT modelling

3.3.6 As detailed in Section 1.5, it has been necessary to make a number of assumptions when undertaking the water quality modelling work in order to improve the certainty behind the results and to take a precautionary approach due to some uncertainties (e.g. number of people who will eventually live in the dwellings). The assumptions are:

- A single dwelling has an occupancy of 5 people. This household occupancy value is based on an assumption that an average house comprises 3 bedrooms, a size which is 'designed for a minimum population of 5 people[12]. This is an overestimate based on an average household size of 2.4 persons in 2011[13]. When undertaking growth assessments, AWS assume a lower occupancy rate, more aligned with the average figure. **For the purposes of modelling the use of 5 persons per dwelling provides a 'worst case' scenario for consideration.**
- 150 l/h/d residential waste water flow loading to a WRC and 100 l/h/d for employment sites[14]. **This residential figure is higher than the 110 l/h/d included in planning policies, and thus provides a 'worst case' scenario.**
- Employment densities of[15]:
  - 47 m^2 per person for use classes B1 and B1c.
  - 12 and 50 m^2 per person for use classes B1a and B1b respectively.
  - 36 m^2 per person for use class B2.
  - 77 m^2 per person for use classes B8 and B8c.

  These figures from national guidance are broadly comparable with local guide figures[16]. However, there is greater uncertainty over the figure of 47 m^2 used for class B1 (detail on sub-category not available) as employment densities vary a lot between sub-categories B1a, B1b and B1c. In the absence of more detailed information, the value for class B1 was chosen for consistency with classes B1b and B1c but it should be noted that the population equivalent (site area divided by employment density) for class B1 may be underestimated if large areas of class B1 are assigned to Class B1a in the future.
- It was assumed that the WRC will produce the same quality effluent post growth as they do now.
- The water quality modelling was based on predicted flow estimates for growth on top of current mean discharge volume irrespective of the WRC Dry Weather Flow permit (i.e. the volume of effluent going to the works during dry conditions). It is assumed that the permitted Dry Weather Flow will be increased in line with growth predictions and other required permit changes based on the model results.
- Future impacts were assessed based on the current quality of effluent the WRCs produce (e.g. a baseline set using 2015-2017 data).

[12] British Water, 2015. Code of Practice, Flows and Loads – 4 Sizing Criteria, Treatment Capacity for Sewage Treatment Systems, British Water (http://www.britishwater.co.uk/code-of-practise-flows-and-loads-4-on-sizing-criteria-treatm.aspx).
[13] http://www.ons.gov.uk/ons/rel/census/2011-census/population-estimates-by-five-year-age-bands--and-household-estimates--for-local-authorities-in-the-united-kingdom/stb-population-and-household-estimates-for-the-united-kingdom-march-2011.html
[14] British Water, 2015. Code of Practice, Flows and Loads – 4
[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/484133/employment_density_guide_3rd_edition.pdf
[16] http://www.eastsuffolk.gov.uk/assets/Planning/Waveney-Local-Plan/Background-Studies/Employment-Land-Needs-Assessment-2016.PDF

3.3.7 No consideration of the effects of future climate change has been made as part of the modelling work.

Results of the SIMCAT modelling for river waterbodies

2036 model results

3.3.8 The results of the SIMCAT modelling for inland waterbodies are presented in Tables 3.2 (Phosphate), 3.3 (BOD), and 3.4 (Ammonia) below.

Table 3.2 Results of the SIMCAT modelling - Phosphate

WRC name	River	Downstream WFD assessment point (AP)	Baseline water quality at AP: Phosphate (mg/l)	Baseline WFD class	2036 water quality at AP: Phosphate (mg/l)	2036 WFD class
Otley	Lark (tributary of Fynn)	FYN050	0.29	Poor	0.33	Poor
Grundisburgh	Lark (tributary of Fynn)	FYN050	0.29	Poor	0.33	Poor
Tuddenham (IPS)F/E	Fynn	No AP	-	-	-	-
Earl Soham	Deben	DEB026	0.24	Poor	0.25	Poor
Easton (Suffolk)	Deben	DEB070	0.22	Moderate	0.26	Poor
Charsfield	Potsford Brook (tributary of Deben	DEB070	0.22	Moderate	0.26	Poor
Wickhan Market	Deben	DEB070	0.22	Moderate	0.26	Poor
Rendlesham Park	Deben	DEB090	0.22	Moderate	0.26	Poor
Framlingham	Ore (tributary of Alde)	ORE040	0.26	Poor	0.34	Poor
Benhall (Saxmundham)	Fromus (tributary of Alde)	FRO040	0.68	Poor	1.07	Poor
Blaxhall	Alde	ALD040	0.23	Moderate	0.34	Poor
Yoxford	Minsmere Old River	MIN010	0.12	Moderate	0.13	Moderate
Westleton	Minsmere Old River	MIN020	0.14	Moderate	0.16	Moderate
Leiston	Leiston Beck (tributary of Minsmere Old River)	No AP	-	-	-	-
Thorpeness	Hundred River	THP020	0.37	Poor	0.42	Poor
Hollesley	Black Ditch	BDI030	AP not in SIMCAT	-	-	-

Note: WRCs are listed in downstream order along the river.

Table 3.3 Results of the SIMCAT modelling - BOD

WRC name	River	Downstream WFD assessment point (AP)	Baseline water quality at AP: BOD (90%-ile)	Baseline WFD class	2036 water quality at AP: BOD (90%-ile)	2036 WFD class
Otley	Lark (tributary of Fynn)	FYN050	1.70	High	1.72	High
Grundisburgh	Lark (tributary of Fynn)	FYN050	1.70	High	1.72	High
Tuddenham (IPS)F/E	Fynn	No AP	-	-	-	-
Earl Soham	Deben	DEB026	2.55	High	2.54	High
Easton (Suffolk)	Deben	DEB070	1.31	High	1.34	High
Charsfield	Potsford Brook (tributary of Deben	DEB070	1.31	High	1.34	High
Wickhan Market	Deben	DEB070	1.31	High	1.34	High
Rendlesham Park	Deben	DEB090	1.18	High	1.19	High
Framlingham	Ore (tributary of Alde)	ORE040	1.29	High	1.30	High
Benhall (Saxmundham)	Fromus (tributary of Alde)	FRO040	1.85	High	2.20	High
Blaxhall	Alde	ALD040	1.07	High	1.11	High
Yoxford	Minsmere Old River	MIN010	2.19	High	2.20	High
Westleton	Minsmere Old River	MIN020	1.15	High	1.15	High
Leiston	Leiston Beck (tributary of Minsmere Old River)	No AP	-	-	-	-
Thorpeness	Hundred River	THP020	1.45	High	1.45	High
Hollesley	Black Ditch	BDI030	AP not in SIMCAT	-	-	-

Note: WRCs are listed in downstream order along the river.

Table 3.4 Results of the SIMCAT modelling - Ammonia

WRC name	River	Downstream WFD assessment point (AP)	Baseline water quality at AP: Ammonia (90%-ile)	Baseline WFD class	2036 water quality at AP: Ammonia (90%-ile)	2036 WFD class
Otley	Lark (tributary of Fynn)	FYN050	0.38	Good	0.38	Good
Grundisburgh	Lark (tributary of Fynn)	FYN050	0.38	Good	0.38	Good
Tuddenham (IPS)F/E	Fynn	No AP	-	-	-	-
Earl Soham	Deben	DEB026	0.21	High	0.21	High
Easton (Suffolk)	Deben	DEB070	0.11	High	0.11	High
Charsfield	Potsford Brook (tributary of Deben	DEB070	0.11	High	0.11	High
Wickhan Market	Deben	DEB070	0.11	High	0.11	High
Rendlesham Park	Deben	DEB090	0.08	High	0.08	High
Framlingham	Ore (tributary of Alde)	ORE040	0.07	High	0.07	High
Benhall (Saxmundham)	Fromus (tributary of Alde)	FRO040	0.36	Good	0.39	Good
Blaxhall	Alde	ALD040	0.12	High	0.12	High
Yoxford	Minsmere Old River	MIN010	0.09	High	0.09	High
Westleton	Minsmere Old River	MIN020	0.05	High	0.05	High
Leiston	Leiston Beck (tributary of Minsmere Old River)	No AP	-	-	-	-
Thorpeness	Hundred River	THP020	0.07	High	0.07	High
Hollesley	Black Ditch	BDI030	AP not in SIMCAT	-	-	-

Note: WRCs are listed in downstream order along the river.

Adjusted 2036 model results

3.3.9 For interpreting the model results presented above, the difference between baseline and 2036 scenario model output has been considered rather than absolute values, so over, or under, prediction of water quality by the baseline model is allowed for when assessing potential WFD class deterioration.

3.3.10 The predicted change in water quality at WFD assessment points has been added to observed values for the 2015-2017 data period to determine the predicted WFD class in 2036.

3.3.11 The adjusted results of the SIMCAT modelling for phosphate and ammonia are presented in Tables 3.5 and 3.6 below.

3.3.12 No adjustment can be made for BOD results as no observed data are available. However, a BOD status for WFD Cycle 2 (2015) is available through the Environment Agency's Catchment Data Explorer website for waterbodies GB105035046310 (assessment points DEB070 and DEB090) and GB105035046270 (assessment points MIN010 and MIN020). The status is high for both waterbodies which is consistent with the model predictions. Values below 4 mg/l (90%-ile) are required for high status and the model predictions are well below this, being 2.54 mg/l or less.

Table 3.5 Adjusted results of the SIMCAT modelling - Phosphate

WFD AP	Observed data (2015-2017 average mg/l)	WFD class based on observed data	River waterbody	WFD class Cycle 2 (2015)	Predicted change in phosphate by 2036 (mg/l)	Predicted 2036 water quality (mg/l)	Predicted 2036 class	Percentage increase relative to baseline (%)
FYN050	0.296	Poor	GB105035040360	Poor	0.040	0.336	Poor	14
DEB026	0.338	Poor	GB105035046210	Poor	0.010	0.348	Poor	3
DEB070	0.215	Moderate	GB105035046310	Moderate	0.040	0.255	Poor	19
DEB090	0.189	Moderate	GB105035046310	Moderate	0.040	0.229	Moderate	21
ORE040	0.267	Poor	GB105035045970	Poor	0.080	0.347	Poor	30
FRO040	0.599	Poor	GB105035045980	Poor	0.390	0.989	Poor	65
ALD040	-	-	GB105035045950	Moderate	0.110	-	-	-
MIN010	0.054	High	GB105035046270	Good	0.010	0.064	High	19
MIN020	0.048	High	GB105035046270	Good	0.020	0.068	High	42
THP020	0.154	Moderate	GB105035046260	Moderate	0.050	0.204	Moderate	32
BDI030	0.170	Moderate	GB105035040150	Moderate	-	-	-	-

Table 3.6 Adjusted results of the SIMCAT modelling - Ammonia

WFD AP	Observed data (2015-2017 average mg/l)	WFD class based on observed data	River waterbody	WFD class Cycle 2 (2015)	Predicted change in ammonia by 2036 (90%-ile)	Predicted 2036 water quality (mg/l)	Predicted 2036 class	Percentage increase relative to baseline (%)
FYN050	0.088	High	GB105035040360	High	0	0.088	High	0
DEB026	0.074	High	GB105035046210	High	0	0.074	High	0
DEB070	0.052	High	GB105035046310	High	0	0.052	High	0
DEB090	0.047	High	GB105035046310	High	0	0.047	High	0
ORE040	0.068	High	GB105035045970	High	0	0.068	High	0
FRO040	0.090	High	GB105035045980	High	0.03	0.12	High	33
ALD040	-	-	GB105035045950	High	0	-	-	-
MIN010	0.053	High	GB105035046270	High	0	0.053	High	0
MIN020	0.051	High	GB105035046270	High	0	0.051	High	0
THP020	0.071	High	GB105035046260	High	0	0.071	High	0
BDI030	0.044	High	GB105035040150	High	-	-	-	-

3.3.13 The adjusted results for phosphate predict a change from moderate to poor status for DEB070 by 2036. However, it is noted that the observed 2015-2017 value of 0.215 mg/l is close to the class boundary (0.227 mg/l) so any development is likely to cause a change in status.

3.3.14 A 10% deterioration in water quality was defined as a 10% increase in pollutant concentrations relative to 2015-2017 baseline monitoring data.

3.3.15 With the exception of DEB026 (downstream of Earl Soham WRC), a deterioration greater than 10% is predicted for phosphate at all WFD assessment points. For all assessment points, apart from DEB070 which is 1 km downstream of Wickham Market WRC, this deterioration occurs over a distance greater than 1.5 km and therefore would be deemed to have a significant effect on the ecological status of a waterbody.

3.3.16 An in-class deterioration greater than 10% is predicted for ammonia at WFD assessment point FRO040 resulting from increased discharges from Benhall (Saxmundham) WRC.

3.4 WRC capacity assessment

3.4.1 A high-level assessment has been undertaken to determine the increase in Dry Weather Flows required at each WRC to accommodate the proposed housing and employment growth.

3.4.2 The results of the Dry Weather Flow (DWF) assessment are presented in Table 3.7.

Table 3.7 Dry Weather Flow assessment (all values m^3/d)

WRC Name	Permitted DWF	DWF (20%-ile flow 2015-2017)	2020	2025	2030	2036
Aldeburgh	1,196	No data	-	-	-	-
Alderton	82	43	52	60	60	60
Benhall (Saxmundham)	1,500	910	1,106	1,308	1,815	1,833
Blaxhall	159	62	87	87	87	87
Charsfield	53	25	33	57	58	59
Cliff Quay	34,213	23,012	25,311	27,867	29,629	31,753
Earl Soham	80	39	42	45	48	51
Easton (Suffolk)	19	No data	-	-	-	-
Felixstowe	9,229	7,442	8,102	8,984	10,093	11,022
Framlingham	1,000	1,039	1,347	1,544	1,589	1,633
Gedgrave	188	148	165	175	177	178
Grundisburgh	300	187	187	214	229	230
Hollesley	1,400	247	280	321	339	356
Kirton	370	240	246	299	301	303
Leiston	1,400	864	1,085	1,260	1,275	1,290
Melton	1,257	1,226	1,451	1,575	1,618	1,660
Otley	159	78	93	149	151	153
Rendlesham Park	646	347	370	392	411	430
Sudbourne	50	No data	-	-	-	-
Thorpeness	482	261	282	290	297	305
Tuddenham (IPS)F/E	420	261	275	317	329	332
Westleton	248	213	221	273	273	273
Wickham Market	580	391	410	484	515	516
Woodbridge	4,800	2,527	2,989	3,415	3,819	4,223
Yoxford	280	215	219	294	309	309

Note: Red text indicates currently permitted DWF exceeded.

3.4.3 The results presented in Table 3.7 indicate that additional capacity will be required at:

- Framlingham and Melton WRCs by 2020.
- Charsfield, Westleton and Yoxford WRCs by 2025.
- Benhall (Saxmundham) and Felixstowe WRCs by 2030.

3.4.4 It is noted here that this assessment is indicative only and is not representative of precise investment requirements for Anglian Water. Whilst Q80 (20%-ile) flows are recognised as a good indicator of flow compliance, flows are only non-compliant if Q90 (10%-ile) is breached. Nonetheless, in response to specific housing and employment site queries from SCDC[17], Anglian Water have indicated that enhanced treatment capacity will be required at Framlingham and Kirton WRCs, and may also be required at Yoxford WRC.

Sewer network capacity assessment

3.4.5 Information provided by the Environment Agency in relation to historical sewage related pollution incidents (Category 1 or 2) indicates there has been 1 water industry related incident since 2007 that had a significant impact on the water environment. The incident occurred in 2016 in the Framlingham WRC catchment and was caused by sewer failure or overflow.

3.4.6 Anglian Water as a sewerage company is responsible for managing the risk of flooding within the sewerage network as part of which they make investment to address known issues. Developer charges are sought for additional connections to the foul sewerage network as part of the zonal charging regime - there can be synergies between these. An assessment of the available capacity within the foul sewerage network is not limited to any historic issues within the catchment. It is important to note that developers cannot be required to fund any required works to address historic issues within a catchment.

3.4.7 Anglian Water's Water Recycling Long Term Plan (WRLTP)[18], submitted with their 2020-2025 Business Plan to economic regulator Ofwat, indicates investigations and improvements are already planned for the following WRCs:

- Framlingham WRC – Combined Sewer Overflow (CSO) investigations, CSO improvements and additional WRC flow capacity.
- Cliff Quay (Ipswich) - CSO improvements, increase WRC process capacity and increase drainage capacity (Defined contingent scheme).
- Sudbourne – investment planned for investigations (WRC – descriptive to numeric permit).
- Woodbridge - increase drainage capacity.

3.4.8 This information does not alter the WRC capacity assessment, which is based on current permitted DWF, but highlights that Anglian Water are planning for greater capacity going forwards. This applies to development considered by Anglian Water in the formulation of their WRLTP. Anglian Water will undertake investigations and improvements when triggers are met that warrant mitigation.

3.4.9 In response to specific housing and employment site queries from SCDC[19], Anglian Water have also indicated that where a site is remote from the nearest sewer, connecting foul water may not be viable.

[17] RAG sheet Suffolk Coastal Local Plan – Aug 18 (updated 21/9/2018 with latest policy reference numbers)
[18] https://www.anglianwater.co.uk/about-us/water-recycling-long-term-plan.aspx
[19] RAG sheet Suffolk Coastal Local Plan – Aug 18 (updated 21/9/2018 with latest policy reference numbers)

3.4.10 Early consultation with Anglian Water concerning drainage strategies for development is recommended, particularly in areas where the ground conditions create a complex local drainage structure.

3.4.11 The specific details of surface water drainage strategies are not known at this stage but Sustainable Drainage Systems (SuDS), water efficiency and water reuse[20] measures should be considered to reduce pressure on drainage networks. SuDS are an approach to managing surface water that replicates natural drainage. The key objective is to manage the flow rate and volume of runoff at the source, to reduce risk of flooding and improve water quality. In accordance with national guidance, the SCDC and IBC local plans incorporate a SuDS policy, where a threshold of 10 or more dwellings and one hectare is used during the planning process for consideration of which SuDS options should be used in the form of a drainage assessment. SuDS are discussed in more detail in Section 4.5 (Surface water management and sustainable drainage).

3.4.12 In areas where groundwater infiltration to the sewer network may be significant, sewer lining may also be beneficial for reducing pressure on drainage networks.

3.5 Designated sites

3.5.1 The increased nitrogen loading at WRCs resulting from the planned growth has implications for coastal waters and designated sites located along the Suffolk coast.

3.5.2 Effluent quality can vary greatly with respect to nitrogen loading but only limited data (Total Oxidised Nitrogen) are available for the WRCs being assessed in this study.

3.5.3 The predicted increase in Dry Weather Flow at each WRC by 2036 (Table 3.7) has been used to estimate the increased nitrogen loading (KgN/yr) at each WRC, assuming an effluent quality of 20 mg/l N[21]. This is a conservative estimate but it is comparable with the Total Oxidised Nitrogen data provided by Anglian Water for Benhall WRC (average 22.4 mg/l N from 18 records) and Framlingham WRC (average 26 mg/l N from 3 records). Nonetheless, actual effluent quality could be significantly higher at other WRCs.

3.5.4 The estimated additional nitrogen loading to designated sites resulting from the planned growth is shown in Table 3.8. However, it is recognised that the estimates carry considerable uncertainty and are conservative. Depending on the condition of designated sites and conservation objectives, it may be considered necessary to assess the implications of increased nitrogen in coastal waters.

Table 3.8 Estimated additional nitrogen loading to designated sites

Designated Site	Upstream WRC	Estimated 2036 additional nitrogen loading (KgN/yr)
Orwell Estuary SSSI	Cliff Quay	63,813
Deben Estuary SSSI	Alderton	126
	Charsfield	245
	Earl Soham	89
	Easton (Suffolk)	551
	Grundisburgh	312

[20] Covered by Policy SCLP9.7 Holistic Water Management in the SCDC Final Draft Plan
[21] Entec UK Ltd, 2010. Cumulative Nitrogen and Phosphorus Loadings to Groundwater.

Designated Site	Upstream WRC	Estimated 2036 additional nitrogen loading (KgN/yr)
	Kirton	462
	Melton	3,167
	Otley	548
	Rendlesham	603
	Tuddenham	520
	Wickham Market	914
	Woodbridge	12,383
		Total: 19,919
Alde-Ore Estuary SSSI	Benhall (Saxmundham)	6,740
	Blaxhall	181
	Framlingham	4,334
	Gedgrave	219
	Hollesley	794
	Sudbourne	6
		Total: 12,274
Minsmere-Walberswick Heaths & Marshes SSSI	Westleton	438
	Yoxford	684
		Total: 1,122
Sizewell Marshes SSSI	Leiston	3,107
Leiston-Aldeburgh SSSI	Thorpeness	318

Note: SSSI – Site of Special Scientific Interest

3.6 Cumulative assessment

3.6.1 The results of the water quality assessment and the calculated increased nitrogen loading to coastal waters and designated sites indicate there will be cumulative impacts on water quality in receiving watercourses, either at the site or catchment level.

3.7 Summary

3.7.1 The wastewater treatment, water quality and sewerage assessment was undertaken to understand the potential future environmental impact on the receiving watercourses downstream of the growth areas and the WRCs which serve them. Water quality modelling was undertaken to clarify potential changes to the existing WFD status of the watercourses from the current baseline due to an

increased discharge of treated sewage effluent. Future changes in water quality were also assessed against a 10% deterioration threshold, an aspirational objective set by the Environment Agency in order to limit in class deterioration.

3.7.2 The conclusions from the adjusted 2036 model results are summarised as follows:

- It is not expected that BOD discharges will result in any deterioration.
- An in-class deterioration greater than 10% is predicted for ammonia at WFD assessment point FRO040 resulting from increased discharges from Benhall (Saxmundham) WRC.
- A change from moderate to poor status for phosphate at WFD assessment point DEB070 is predicted by 2036. However, phosphate class deterioration is because baseline water quality is close to the class boundary meaning that a relatively modest increase in phosphate concentration is sufficient to cause a drop in class.
- With the exception of DEB026 (downstream of Earl Soham WRC), a deterioration greater than 10% is predicted for phosphate at all WFD assessment points.

3.7.3 The conclusions of the water quality modelling are summarised on a site by site basis in Section 5 (Table 5.2).

3.7.4 It is also expected that additional capacity will be required at:

- Framlingham and Melton WRCs by 2020.
- Charsfield, Westleton and Yoxford WRCs by 2025.
- Benhall (Saxmundham) and Felixstowe WRCs by 2030.

3.7.5 Early consultation with Anglian Water concerning treatment technologies, improved WRC capacity and sewer network capacity is recommended. Anglian Water Services already have plans in place to improve sewer network capacity and process capacity at some WRCs, as set out in their WRLTP, and the predicted deteriorations in phosphate and ammonia water quality may be overcome with upgrades to treatment technology. However, it may not be viable to install expensive treatment technologies at small, rural WRCs so this needs to be discussed.

3.7.6 The predicted increase in nitrogen loadings to coastal waterbodies and designated sites from planned growth also needs to be discussed with Anglian Water Services, Natural England and the Environment Agency.

4. Flood Risk

4.1 Aims of a high level flood risk review

4.1.1 This section of the water cycle study aims to outline the level of flood risk at each of the proposed development sites in order to assist the development of the local plan and set out how development safe from flood risk can be delivered without increasing flood risk elsewhere. Broadly this section of the Outline Water Cycle Study will cover:

- Section 4.2: An overview of relevant guidance to planning and flood risk;
- Section 4.3: An understanding flooding mechanisms in the SCDC and IBC areas;
- Section 4.4: A summary of flood risk management options; and
- Section 4.5: A review of flood risk to proposed developments.

4.2 Planning and flood risk

4.2.1 The NPPF directs new development to land at the lowest risk of flooding. Where development is proposed on land at risk of flooding, NPPF's sequential and exception tests are designed to assess whether a development proposal could be considered at a given location. The tests consider the vulnerability of the development type, the availability of alternative sites, and whether a development safe from flooding that does not increase flood risk elsewhere can be delivered. Local plans will need to present how the sequential process has been robustly followed in selecting suitable strategic development sites.

4.2.2 Avoidance is the principal method of managing flood risk through the spatial planning process and is discussed further in this section (sequential test). If, in exceptional circumstances, development is proposed in areas of flood risk, then section 4.4 provides guidance on managing the risk through site layout and building design (exception test).

4.2.3 Flood risk refers to the probability of river and sea flooding, ignoring the presence of defences. Table 4.1 shows the NPPG flood zone classification.

Table 4.1 Flood Zones

Flood Zone	Probability of Flooding from Rivers or Sea	Definition
Flood Zone 1	Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. This is equivalent to less than a 0.1% annual exceedance probability (AEP) of river and tidal flooding.
Flood Zone 2	Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. This is equivalent to between 0.1% and 1% AEP for fluvial flooding and 0.1% and 0.5% AEP for tidal flooding.
Flood Zone 3a	High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. This is equivalent to 1% AEP for fluvial and 0.5% AEP for tidal flooding.

Flood Zone	Probability of Flooding from Rivers or Sea	Definition
Flood Zone 3b	*The Functional Floodplain*	*This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map).*

Source: NPPG, 2018, Flood Risk and Coastal Change: Paragraph 065 Reference ID: 7-065-20140306

4.2.4 Table 4.2 shows the NPPG's flood vulnerability classification for different types of development.

Table 4.2 NPPG Flood Risk Vulnerability Classification

Classification	Description
Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and essential utility infrastructure, including electricity generating power stations and grid and primary substations and water treatment works that need to remain operational in times of flood.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and command centres. • Telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • 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. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • 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 which do not need to remain operational during times of flood. • Sewage 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.

Classification	Description
	• 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. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Source: NPPG, 2018, Flood Risk and Coastal Change: Paragraph 066 Reference ID: 7-066-20140306

4.2.5 The aim of the sequential test is to steer new development to Flood Zone 1 where possible. As stated in the NPPF *"The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding."* (NPPF, 2018: 158). Any form of flooding could refer to fluvial or tidal flood risk, severe surface water flood risk, groundwater flood risk or flooding resulting from artificial sources.

4.2.6 The NPPG states that *"where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 (areas with a medium probability of river or sea flooding), applying the exception test if required"* (NPPG 2018, Paragraph 19 Reference ID: 7-019-20140306).

4.2.7 A summary of the flood risk vulnerability and flood zone 'compatibility' is outlined in Table 4.3. This indicates the compatibility of the development vulnerability types (Table 4.2) with the various flood zones (Table 4.1) and, where further assessment in the form of the exception test is required, or the development type should not be permitted.

Table 4.3 Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification (see Table 4.2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (See Table 4.1)	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception test required	✓	✓
	Flood Zone 3a	Exception test required	✓	×	Exception test required	✓
	Flood Zone 3b "Functional floodplain"	Exception test required	✓	×	×	×

✓ Development is appropriate
✗ Development should not be permitted
Source: NPPG, 2014, Flood Risk and Coastal Change: Paragraph 067 Reference ID: 7-067-20140306

4.2.8 Table 4.3 shows that the exception test is required if the development is classified as:

- highly vulnerable and in flood zone 2;
- essential infrastructure in flood zone 3a or 3b; and
- more vulnerable in flood zone 3a.

4.2.9 The exception test recognises that there will be some exceptional circumstances when development within higher risk zones is unavoidable. As well as demonstrating the exception test is met, proposed development layouts should adhere to the sequential approach to direct the most vulnerable development proposed on site to the areas of the site at the lowest risk of flooding.

4.2.10 To pass the exception test, the following criteria must be met:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment (SFRA) where one has been prepared; and
- a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. (NPPG, 2018).

4.2.11 Both elements of the test will have to be passed for development to be allocated or permitted.

4.2.12 Demonstrating compliance with the aims of the exception test requires preparation of a Flood Risk Assessment (FRA), demonstrating that the proposed development will be safe, without increasing the flood risk elsewhere. FRAs will need to consider:

- Safe access and egress;
- Operation and maintenance;
- Design of development to manage and reduce flood risk wherever possible;
- Resident awareness;
- Flood warning; and
- Evacuation procedures and funding arrangements.

4.3 Flood overview in study area

4.3.1 The NPPF guidelines state that strategic policies should be informed by a SFRA. To date, both SCDC and IBC have SFRAs that cover their administrative areas. The East Suffolk SFRA which covers the SCDC administrative area was completed in 2018 (AECOM, 2018). IBC's SFRA was completed in 2011. Given that a new tidal barrier for Ipswich is nearing completion the SFRA will require updating in due course so that it reflects the presence of this new flood risk management asset.

4.3.2 Flood risk across the study area is associated with a range of sources: tidal, fluvial, pluvial, groundwater, sewer and artificial sources. The East Suffolk SFRA indicates that the most severe flood events are associated with combined tidal, fluvial and surface water events owing to the low-lying topography of the parts of the study area (East Suffolk SFRA (2018), Section 4.1). The East Suffolk SFRA for SCDC provides further details on historic flood records which are not repeated here.

4.3.3 The following sections outline the main flood risk elements in the study area.

Tidal flood risk

4.3.4 In the study area, there are extensive low-lying areas of coastline at high risk of tidal flooding (Figure 4.1). The Environment Agency's Flood Map for Planning (Figure 4.1) shows fluvial flood risk combined with tidal flood risk. More detailed figures for the proposed sites are included in Appendix C.

4.3.5 A significant proportion of this area is undeveloped marshland (likely to be Flood Zone 3b) unsuitable for most types of new development (Table 4.3). Expected future sea level rise will have significant implications for new and existing development situated in low-lying coastal areas.

4.3.6 Significant portions of existing development in the study area is located in areas at risk from tidal flooding, particularly around river estuaries, resulting in the exposure of vulnerable land uses to flood risk. In response, there has been greater investment in flood defences along much of the coastline (East Suffolk SFRA, 2018 pp. 29). The most significant defences are those concentrated in Ipswich and around Felixstowe port sea wall.

4.3.7 The East Suffolk Catchment Flood Management Plan (CFMP) (Environment Agency, 2009) notes that main areas of tidal flood risk from the River Gipping occurs in the ports, docklands and some areas of Ipswich. Additionally there is flood risk associated with the impacts of rivers not being able to flow freely to the high tide (called tide locking), such as at Ipswich (River Gipping), the Hundred River and the River Minsmere (pp.6).

4.3.8 Existing coastal defences comprise both natural frontages (dunes, embankments and ridges) as well as engineered solutions (embankments and sea walls). Engineered solutions are currently located along the Orwell, Deben, Alde-Ore and Blyth estuaries. In addition to coastal defences from Felixstowe to Southwold there are further tidal defences along the Orwell estuary and Belstead Brook valley providing protection to Ipswich. Construction of the Ipswich tidal flood barrier started in late 2015 with the final stretch of the barrier still underway.

4.3.9 The East Suffolk SFRA (2018) notes that along the defended areas of coastline when sea levels reach a critical level, flood defences will (without further investment) become vulnerable to breaching or overtopping. The SFRA notes that many of the defences in along the coast fall below the current 1 in 200 year flood level (0.5% AEP) standard and thus there will be significant implications for future flood risk management with expected sea level rise.

4.3.10 Development should be directed away from low-lying coastal areas, unless it is demonstrated that there are significant reasons to support a proposed development justified by application of the NPPF sequential and exception tests.

Fluvial flood risk

4.3.11 The Environment Agency's Flood Map for Planning (Figure 4.1) shows fluvial flood risk combined with tidal flood risk. More detailed figures for the proposed sites are included in Appendix C. Key areas of fluvial flood risk in the study area is located along the following watercourses:

- The River Blythe is located to the north of the study area. In upper reaches of the river is the town of Halesworth which has a history of flooding. At Halesworth the New River joins the River Blyth. Further downstream the River Blyth discharges into the North Sea through Southwold harbour. Just upstream of this point the Dunwich River discharges into the Blyth. There are significant areas of high flood risk in the marshes surrounding Southwold, the River Blythe and the Dunwich River where mapping shows extensive areas of Flood Zone 3. Further upstream, between Halesworth and Blythborough there is also a wide area which experiences high flood risk and is situated in Flood Zone 3.

- The River Yox which rises upstream of Yoxford, along its course a narrow corridor of land is at risk of fluvial flooding. Further downstream the area at risk of flooding widens out, here the River Yox has been heavily modified to become the Minsmere Old River and New Cut which form low lying drainage rivers draining the Minsmere area. Flood risk management is dependent on a network of ditches which are drained via gravity by a sluice channel that carries off excess water. Tide-locking is therefore the key control on flood risk. The sluice outfall is midway along the coastal frontage and flows into the sea (Environment Agency, 2009). The areas at highest risk (Flood Zone 3) are situated along the River Yox around Yoxford and Minsmere Bird Reserve.
- Hundred River is a coastal draining river that rises near Knodishall before draining through the low-lying Beachfarm and Churchfarm Marshlands into the North Sea. A large network of drainage channels drain these marshes. Upstream of Aldringham court the river has a very small Flood Zone 3 area, with the primary flood risk resulting from tidal flooding.
- The River Alde rises to the north east of the study area. As it flows to the south-east it is fed by the Rivers Ore and Fromus. The River becomes tidal at Snape Bridge where further smaller watercourses feed the River Alde (including Ham Creek and the River Butley). Downstream the River Alde has an area of extensive estuary which is located at or below sea level. The areas of highest flood risk and which are encompassed by Flood Zone 3 occur around the river estuary, with significant flood risk in the vicinity of Snape Bridge which has a history of flooding and up the corridors of the Rivers Alde, Ore and Fromus upstream of this point, including around the towns of Saxmundham and Framlingham.
- The River Deben rises near Debenham and drains generally towards the south-east through Wickham Market, Woodbridge and discharging into the North Sea north of Felixstowe. From Woodbridge the River Deben is estuarine in character with marsh areas and tidal mud flats and there are a number of drainage ditches and small tributaries including Byng Brook and Martlesham Creek. The areas with significant mapped flood risk (Flood Zone 3) are to the east of Wickham Market and south east of Woodbridge, although this area benefits from flood defences. Lower downstream, there are large areas of land at high risk of flooding which includes Felixstowe and Bawdsey Marshes where tidal flood risk combines with fluvial risk.
- The River Gipping and the River Orwell are located to the south of the study area. The normal tidal limit between the tidal Orwell and the freshwater River Gipping are formed by Handford Sluice and the Horseshoe Weir. The SFRA (Ipswich Borough Council, 2011) indicates that the island is defended against tidal flooding but not fluvial flooding. Fluvial flooding along the River Gipping is in the IBC area is significant to the north of the Collisons and Elton Park housing areas. The mapped fluvial and tidal flood risk is significant to the east and west of Yarmouth Road (Suffolk Retail Park and New Way Road) and further downstream the Portman Road office area.
- The Belstead Brook joins the Orwell Estuary at Bourne Bridge south of Ipswich. A wide corridor of Flood Zone 3 follows this watercourse associated with low-lying nature of the land and the combined effect of fluvial flood risk and tide locking. The fluvial and tidal flood risk combined shows a wide area of flood risk which tracks to the south of the Chantry and Stoke Park area of Ipswich.

4.3.12 The East Suffolk CFMP (Environment Agency, 2009) highlights that fluvial flood risk is particularly prevalent at the towns of Ipswich, Framlingham and Halesworth.

4.3.13 The East Suffolk SFRA (2018) concludes that in the upper catchment of the watercourses the floodplain is confined to the river channel and there are only small areas of Flood Zone 2 and 3. Here, the land use is rural and limited flood defence infrastructure is present. However, in

downstream areas closer to the sea floodplains become more extensive, with significant areas of Flood Zone 3.

4.3.14 Development should be directed away from these areas, at risk of fluvial flooding unless it is demonstrated that there are significant reasons to support a proposed development justified by application of the NPPF sequential and exception tests.

Surface Water Flood Risk

4.3.15 Figure 4.2 shows areas of surface water flood risk across the study area and further demonstrates that surface water flood risk is often determined by the subtleties of the local topography. More detailed figures for the proposed sites are included in Appendix C.

4.3.16 Surface water or "pluvial" flooding occurs from intense rainfall events where rainfall intensity exceeds infiltration or piped drainage system capacity, resulting in large volumes of runoff flowing overland. For this reason, areas where the underlying geology is dominated by clay, or there are extensive urban impermeable surfaces are most at risk. Surface water flooding can be exacerbated by raised features such as embankments, or by topographic depressions resulting in particularly deep areas of flooding.

4.3.17 Surface water flood risk mapping indicates extensive corridors of flood risk in Ipswich and Felixstowe associated with the existing urban area and low-lying areas behind raised coastal defences. Elsewhere developed areas such as Woodbridge and Saxmundham also have significant areas of land at high and medium risk of surface water flooding. The East Suffolk CFMP (Environment Agency, 2009) highlights that Halesworth, Leiston and Knodishall are also key areas at risk.

4.3.18 Development should be directed away from areas at significant risk of surface water flooding unless it is demonstrated that there are significant reasons to support a proposed development justified by application of the NPPF sequential and exception tests. For some sites, areas of the site at risk of surface water flooding may be able to be set aside as green/blue infrastructure, with development directed to lower risk areas. 'Designing for exceedance' techniques can also be deployed.

Groundwater Flood Risk

4.3.19 Groundwater flood risk in the SCDC area is considered to be relatively low. The East Suffolk SFRA (2018) concludes that the vast majority of the study area has a designation of *"Limited potential for groundwater flooding to occur"*. The primary mechanisms for groundwater flooding in the area therefore are summarised as:

- Short period of above average rainfall in permeable superficial deposits;
- Permeable superficial deposits in hydraulic continuity with high river water levels;
- Interruption of groundwater flow paths; and
- Cessation of groundwater abstraction causing groundwater rebound.

Sewer Flood Risk

4.3.20 The East Suffolk SFRA (2018) also notes that there has been some evidence of previous sewer flooding in the past. During heavy rainfall, flooding from the sewer system may occur when:

- Rainfall intensity exceeds the capacity of the sewer system/drainage system;
- The system becomes blocked by debris or sediment; and

- The system surcharges due to high water levels in receiving watercourses or tidal outlets.

4.3.21 The risk of sewer flooding can managed by ensuring new developments are built within the existing Anglian Water sewer capacity limits, ensuring appropriate regular maintenance and development design, in particular designing for exceedance.

Reservoir Flood Risk

4.3.22 The Environment Agency provide mapping of reservoir flood risk[22] online, showing areas that would be at risk in the unlikely evident that a reservoir impoundment were to fail. As noted in the East Suffolk SFRA (2018) following the 1975 Reservoirs Act all reservoirs are regularly inspected and supervised by reservoir panel expertise and as such reservoirs in the UK have a good safety record. A reservoir is capable of holding at least 10,000 m^3 of water[23].

Flood Risk Summary

4.3.23 There are two main sources of flood risk in the study area: tidal and fluvial. There are also localised areas of moderate to high risk from surface water flooding. Groundwater, sewer and artificial flood risk is considered to be relatively low in the context of the study area but should be assessed during site specific investigations.

4.4 Flood risk management options

4.4.1 Section 4.3 sought to provide a high level overview of the flooding mechanisms within the study area. **Avoidance is the principal method of managing flood risk through the spatial planning process** as facilitated by the sequential test.

4.4.2 If, in exceptional circumstances following acceptance of a suitable sequential test by the the Local Planning Authority (LPA), developments proposed in areas of flood risk will need to utilise measures such as site layout and building design to manage the risk of flooding. This section outlines the potential flood risk management options which could be used by developers for new developments located within Flood Zones 2 and 3.

4.4.3 This section presents flood risk management measures appropriate in Flood Zones 2 and 3 for guidance only. **In all instances where development is proposed in areas of flood risk, it is recommended that the LPA and the Environment Agency are consulted early in the process to establish any site specific issues and requirements.** The sequential approach is applicable both in terms of site allocation and site layout. This would need to be addressed as part of site-specific FRA.

Site layout

4.4.4 Following the full application of the sequential test, a site may be proposed for development within a medium to high flood risk zone. The sequential approach to the spatial distribution of land uses on site should be deployed ahead of building design solutions.

4.4.5 In an instance where parts of a site lie within Flood Zones 2 and 3 or are at moderate to high risk of surface water flooding, the sequential approach can be used to direct the most vulnerable development types to the areas of the site at the lowest risk of flooding.

[22] Flood risk from reservoirs available here: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map
[23] Reservoir Act 1975 available here: https://www.legislation.gov.uk/ukpga/1975/23

4.4.6 For example, Table 4.3 on flood zone - development vulnerability compatibility indicates that water compatible uses could be placed in areas in Flood Zone 3, with less vulnerable uses occupying Flood Zone 2, and any more or highly vulnerable uses being placed in the area of lowest flood risk. Water compatible uses may include public open space and recreational or outdoor sport areas.

Development Controls

4.4.7 Under exceptional circumstances, following the application of the sequential test, where development is proposed in areas of flood risk, it will be necessary for the design to incorporate certain flood risk management elements. The following paragraphs describe some of these control measures.

Development in fluvial flood risk areas

4.4.8 The Environment Agency's policy is that any proposed development within 8 metres of the bank of a main river, or 16 metres from the landward toe of any fluvial flood defence requires Environment Agency consultation. All development proposals within this zone should involve consultation with the Environment Agency.

4.4.9 Development within a fluvial flood risk area will be subject to Development Controls, including:

- The provision of safe access and egress - The FD2320/TR1 Report[24] (Defra, 2005) Section 7.5.3 states that 'new developments are required to provide safe access and exit during a flood'. Measures by which this will be achieved should be clear in the site-specific FRA.
- The specification of finished floor levels - Finished floor levels of more vulnerable uses should be above the predicted 1% AEP water levels plus climate change and inclusive of a freeboard allowance. The freeboard allowance used may be site specific and will depend on developers' discussions with the LPA and the Environment Agency. Typically freeboard is 300mm if the site is behind hard defences/flood levels are supported by high quality data/modelling, with a freeboard of 600mm being deployed in other situations. Ideally less vulnerable land uses should also have minimum floor levels that protect the development from flood risk and this arrangement should be sought wherever possible. Otherwise, flood resilience and resistance measures should be utilised.
- Provision of compensatory storage - Compensatory storage will be required if the proposed development (whether via ground raising, or new building footprints) reduces the volume of storage available in the floodplain. The resulting loss of floodplain storage will require compensation, through the lowering of land levels elsewhere within the site. Compensation should be provided for flood events less than and including the 1% AEP plus climate change event. Storage should be provided on a level for level and volume for volume basis, so that the behaviour of the floodplain during a flood event remains unchanged. All proposals requiring compensatory storage should be discussed with the LPA and the Environment Agency.

Development in areas designated as functional floodplain (Flood Zone 3b)

4.4.10 Development in the functional floodplain should be avoided in line with the sequential approach presented in NPPF. Only water compatible uses will be permitted providing there is no reduction on flood conveyance or flood storage. Less vulnerable, more vulnerable and highly vulnerable uses are not permitted in Zone 3b. Essential infrastructure may be permitted providing the exception test is satisfied.

[24] FRA guidance for new development. Available at : https://www.thenbs.com/PublicationIndex/documents/details?Pub=DEFRA&DocID=275716

4.4.11 Any development within Flood Zone 3 must be supported with hydraulic modelling which assesses the flood hazard, depths and velocities associated with a range of return periods up to and including the 1% AEP plus climate change return period. The hydraulic modelling should define the extent of Flood Zone 3b. The requirements of the modelling should be agreed with the LPA and the Environment Agency in advance. Discussions with Anglian Water as the sewerage company will also be required.

Development in surface water flood risk areas

4.4.12 In accordance with NPPF, any new development proposed in Flood Zones 2 or 3, or in Flood Zone 1 if the site is greater than 1 hectare, must include a site-specific FRA, which will be reviewed by the Environment Agency. Site specific FRAs should consider all local hydrological features and drainage infrastructure that could influence flood risk at the site in detail.

4.4.13 A Drainage Strategy should be prepared for all developments, unless confirmed otherwise. The detail contained within a Drainage Strategy should be commensurate with the scale of the proposed development, and include a consideration of surface water drainage and measures to mitigate against any potential increase in run off. As part of these assessments, Suffolk County Council as the LLFA should be contacted to comment on the proposed strategy and in addition, the sewerage company (Anglian Water) should be contacted to discuss the proposed method of managing surface water.

4.4.14 An area identified at risk from surface water flooding – either from flood mapping or from historical records – should not be excluded from development solely on that basis. Surface water flooding can often be carefully managed and good site design may not only reduce the risk of flooding on site but could also help alleviate flooding problems downstream from the development.

4.4.15 The management of runoff during the construction period is an important consideration, particularly for large sites and details of measures to mitigate for this phase of development are required as part of an FRA. The Water Framework Directive (WFD) places specific requirements on the management of non-point source pollution such as that from construction site silts. Methods to reduce the volume of solids (and runoff) leaving the site include:

- Phased removal of surface vegetation at the appropriate construction phase;
- Provision of a grass buffer strip around the construction site and along watercourses;
- The covering of stored materials;
- Ensuring exposed soil is re-vegetated as soon as feasibly possible;
- Protection of storm water drain inlets; and
- Silt fences, siltation ponds and wheel washes.

Consideration of climate change

4.4.16 Managing climate change and the associated heightened flood risks are key components of NPPF. Site specific FRAs should take into account climate change, for at least the next 100 years, unless it can be demonstrated that the development will have lifespan of less than 100 years in which case a shorter horizon would be considered acceptable, upon agreement with the LPA and the Environment Agency[25].

[25] Climate change allowances available here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Basements

4.4.17 It is recommended that habitable rooms in basements should not be permitted in Flood Zones 2 or 3. Basements for less vulnerable uses or non-habitable rooms must be designed with safe internal escape. Each application should be discussed with the LPA and the Environment Agency. Site specific analysis should accompany any proposal, to demonstrate that a proposed basement would not impede the flow of groundwater in such a way that the risk of groundwater flooding elsewhere is increased.

Building design

4.4.18 The final step in the flood risk management hierarchy is to mitigate through building design. NPPF considers this as the least preferred option and should not be used in place of the sequential approach to land use planning on a site.

4.4.19 Defra (2007) has published guidance on improving the flood performance of new buildings. The guide identifies a hierarchy of building design which fits within step 5 of the flood risk management hierarchy of NPPF (assess, avoid, substitute, control and mitigate). This is set out below:

- Flood avoidance: Constructing a building and its surrounds (at site level) to avoid it being flooded (e.g. by raising it above the flood level).
- Flood resistance: Constructing a building in such a way to prevent flood water entering the building and damaging its fabric.
- Flood resilience: Constructing a building in such a way that although flood water may enter the building its impact is reduced (i.e. no permanent damage is caused, structural integrity is maintained and drying and cleaning are facilitated).
- Flood repairable: Constructing a building in such a way that although flood water enters a building, elements that are damaged by flood water can be easily repaired or replaced.

4.4.20 The Flood Resilient Construction Report (Defra, 2007), sets out to help the designer determine the best option or design strategy for flood management at the building site level, based on knowledge of basic flood parameters (e.g. depth, duration and frequency), these factors would normally be determined by the site specific FRA during the planning application process. Depending on these parameters (in particular depth) and after utilising options for flood avoidance at site level, designers may opt for a water exclusion strategy or a water entry strategy.

4.4.21 In a Water Exclusion Strategy, emphasis is placed on minimising water entry whilst maintaining structural integrity, and using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (up to a possible maximum of 0.6m).

4.4.22 In a Water Entry Strategy, emphasis is placed on allowing water into the building facilitating draining and consequent drying. Standard masonry buildings are at significant risk of structural damage if there is a water lever difference between outside and inside the building of about 0.6m or more. This strategy is therefore favoured when high flood water depths are involved.

Evacuation routes

4.4.23 In exceptional circumstances, pending successful application of the sequential test, development may be proposed in areas of flood risk. In such an event, safe escape routes to outside the flood risk zone should be incorporated into site designs to facilitate safe evacuation of the site.

4.4.24 Additional detailed modelling of watercourses may be required to provide the necessary flood levels and speeds of onset and flood hazard classifications needed to inform safe evacuation

routes. Safe routes should be identified both inside and beyond the site boundary of the new development. Even where a new development is above the floodplain and is considered to be acceptable with regard to its impact on flood flows and flood storage, it should be demonstrated that the routes to and from the development are also safe to use. Safe escape routes should be intuitively designed, so that they remain logical routes of escape during a flood event. In many cases, the adaptation of the normal access an egress routes so that they remain safe is the preferable option, rather than the engineering of routes specifically for use in flood events. Where possible, new development should aim to provide dry escape for the lifetime of the development.

4.5 Surface water management and Sustainable Drainage (SuDS)

4.5.1 Sustainable Drainage Systems (SuDS) are an approach to managing surface water that replicates natural drainage. The key objective are to manage the flow rate and volume of runoff at the source, to reduce risk of flooding and improve water quality. From 6 April 2015, the Planning Practice Guidance for Flood Risk and Coastal Change (PPG) was amended to provide a stronger emphasis on the usage of SuDS. LPAs are required to ensure that SuDS are incorporated in all major development plans where appropriate, and make sure that there are arrangements in place for ongoing maintenance over a development's lifetime.

4.5.2 LLFAs are statutory consultees for surface water drainage, and are required to take account of new "non-statutory" national SuDS standards that have been introduced[26] as part of the update to NPPG.

4.5.3 It is recommended that planning applications for all sites are supported by an appropriate Drainage Strategy. These should detail how surface water is currently managed on site and how it is proposed to be managed post development. The discharge route (e.g. infiltration, discharge to an open watercourse, discharge to surface water drains) should be detailed and it is important that there is evidence of either water company or Environment Agency consultation which includes approval of the discharge.

Runoff rates

4.5.4 Drainage Strategies should describe how current runoff rates and volumes are managed, and for greenfield sites how post development runoff rates will not exceed pre-development runoff rates.

4.5.5 For brownfield site development this should include details of how rates and volumes will be reduced, ideally to greenfield. If a reduction in runoff rates and volumes is not proposed the assessment must provide evidence to explain why this cannot be achieved.

4.5.6 Suffolk County Council are the Lead Local Flood Authority and in this role they will be required to act as SuDS approval body. The mechanism for this approval process should be established between both SCDC and IBC and Suffolk County Council.

Selecting appropriate SuDS

4.5.7 The applicability of SuDS techniques for use on potential development sites should be based on an assessment of the following key influences, put forward by CIRIA (2015) in the SUDS manual[27]:

[26] Non-statutory technical standards for sustainable drainage systems available from: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards
[27] The SUDS manual available from: https://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

- Land use characteristics favour different SuDS techniques. For example, industrial sites where pollution could be an issue are best managed with attenuation SuDS over infiltration SuDS, with multiple treatment stages;
- Catchment characteristics may have a bearing of the choice of SuDS, as particular catchments may be regulated for a sensitivity to flooding or pollution and may potentially be aggravated by one SuDS technique compared to another; and
- Quantity and quality performance would guide the choice of a particular SuDS technique and is dependent upon the requirements.

4.5.8 The SuDS Manual identifies four processes that can be used to manage and control runoff from developed areas. Each option can provide opportunities for storm water control, flood risk management, water conservation and groundwater recharge:

- Infiltration;
- Detention/attenuation;
- Conveyance; and
- Water harvesting.

4.5.9 Proposed and existing land-uses are thought to be a significant factor in deciding appropriate SuDS techniques, as these influence the volume of water required to be attenuated. Existing or historic land uses have the potential to influence the choice of SuDS techniques by informing the likelihood of pollution and potential contamination issues. Indications of the most suitable techniques for individual sites cannot be made at a strategic level, however, since these will be governed by site specific characteristics and other considerations. Therefore, site specific FRAs will provide the required recommendations. The applicability of SuDS techniques can only be assessed in the SFRA through the consideration of regional characteristics relating to the underlying geology.

4.5.10 The selection of the appropriate technique(s) is/are dependent on various factors. These include the following:

- Soils – soil permeability has a significant bearing on the choice of infiltration SuDS techniques;
- Groundwater – infiltration techniques require several metres of soil depth between the base of the device and the maximum expected groundwater level;
- Area draining to single SuDS component – vegetative or filtering SuDS can attenuate smaller volumes of runoff than ponds which can handle larger volumes generated from a bigger area;
- Slope of drainage area – steeper slopes reduce the suitability of some SuDS techniques, such as infiltration, which require longer residence times; and
- Head – SuDS that require gravity to operate will require a positive head between inflow and outflow.
- Source Protection Zones (SPZs) – SPZs for groundwater sources such as wells, boreholes and springs used for public drinking water supply are provided by the Environment Agency. SPZs are subdivided into the following categories:
  - SPZ1 (Inner SPZ – 50 day travel time or 50 metres): designed to protect against the effects of human activity which might have an immediate effect upon the source. SPZ1 was originally based on the need to protect against biological contaminants;

- SPZ2 (Outer SPZ – 400 day travel time or at least 25% of the recharge catchment area): designed to provide protection against slowly degrading pollutants; and
- SPZ3 (Catchment SPZ): covers the complete catchment area of the groundwater source.

4.5.11 Where development may be situated in SPZ1 there may be an associated constraint on use of infiltration SuDS but further consultation with the water company would be required in this instance.

Restrictions and controls on the use of SuDS

4.5.12 In locations where infiltration techniques are not appropriate, solutions that attenuate runoff and discharge to surface water (the fluvial water bodies or surface water sewers) are likely to be the most appropriate. Such schemes will require consultation with the sewage undertaker (Anglian Water) to determine discharge rates to the piped drainage network, and with the Environment Agency or Lead Local Flood Authority if it is proposed to discharge into a fluvial water body.

4.5.13 In some coastal locations, drainage may be to the sea therefore whilst attenuation may not be required to reduce fluvial or pluvial flood risk, additional water quality measures may still be required. This should be discussed with the LLFA and the Environment Agency prior to planning application submission.

Choice of SuDS

4.5.14 There are a range of possible SuDS options available, each offering different benefits. In selecting the most appropriate SuDS scheme for a new development consideration should be given to:

- Access for, and ease of maintenance as well as who will adopt;
- The long term sustainability of the design;
- How water quality can be improved; and
- How biodiversity can be enhanced.

4.5.15 Oversized pipes and underground storage cells should be considered only when all other, more beneficial solutions, have been exhausted.

4.6 Flood risk to proposed developments

4.6.1 The NPPF guidance is clear that developments should be directed towards areas with lower flood risk. An overview of flood risk in the IBC and SCDC areas is provided in Section 4.3. This sub-section aims to document the results of a high level review of all the proposed sites in the SCDC and IBC areas to understand the level of flood risk. This review has been documented in Table 4.4 which outlines the following information:

- The location, proposed development type and total area of the site. Sites greater than 1 hectare in size in Flood Zone 1, and all development within Flood Zones 2 and 3 are covered by the legislation presented in NPPF, which dictates a FRA must accompany a planning application. It is recommended that all planning applications are supported by Drainage Strategies. No differentiation between Flood Zone 3a and 3b is provided, as it is expected that this level of detail would be investigated during the FRA process.
- The maximum flood zone of the site, and the proportion of the site that lies within each given flood zone. This is included to allow development to be directed towards sites which lie in Flood Zone 1, and identify where a site may border a higher risk flood zone. The proportion in

each zone is given to enable an understanding of where detailed design may allow the development to go ahead: e.g. at Candlet Road (SCDC1) less than 1% of the site lies in FZ3 with over 99% in FZ1.

- The level of surface water flood risk and an indicative level of surface flood depth and flood hazard based on 0.1% AEP extent outlines downloaded from the Environment Agency in October 2018 to understand the impact of surface water flooding. This is the 'low' risk extent of the modelled flood extents, flood depth and flood velocity and hazard rating based on a 0.1% AEP flood.
- The flood hazard ratings or "hazard to people" classification is a function of velocity and depth (Defra, 2006). Under any given flood scenario the flood hazard ratings calculated relate to the following:
  - Low Flood Hazard: Less than 0.75 – caution: flood zone with shallow flowing water or deep standing water;
  - Moderate Flood Hazard: 0.75 to 1.25 – danger for some (includes children, the elderly and the infirm): flood zone with deep or fast flowing water;
  - Significant Flood Hazard: 1.25 to 2.50 – danger for most (includes the general public): flood zone with deep fast flowing water; and
  - Extreme Flood Hazard: More than 2.50 – danger for all (includes the emergency services): flood zone with deep fast flowing water.
- BGS 1:625K mapped bedrock and superficial geology. This geology dataset has been used as a surrogate for identifying land where infiltration potential is likely to be high and therefore where infiltration SuDS may be appropriate. Infiltration/discharge to groundwater SuDS techniques are considered amongst the most sustainable solutions as maintenance requirements are comparatively low and the systems do not discharge to watercourses or the sewage undertakers piped drainage network.
- A check to see whether or not the development site is located, partially or wholly, within an SPZ zone. This may impact infiltration SuDS potential and thus further consultation may be required with the relevant water company.
- A final column in the table outlines what further work and/or assessment would be required at each site.

4.7 Flood Risk Conclusions

4.7.1 The planning and flood risk section highlights that in terms of flood risk, avoidance is the preferred method of managing flood risk. This means directing new development to areas of Flood Zone 1. Where this is not strategically possible and the sequential test has been passed, Section 4.4 details how a sequential approach to site layout during the detailed design process and in some circumstance building design will be required to manage the risk of flooding to development in Flood Zones 2 or 3. Planning applications for developments located in these flood zones will need to be prepared in consultation with the Environment Agency and Suffolk County Council (as LLFA).

4.7.2 Appendix B details the flood zone for each of the proposed potential development sites. A total of 162 proposed development sites have been analysed for this Water Cycle Study. These are the sites which have not currently been granted planning permission. There are 90 site allocations in the IBC area and 72 site allocations located within the SCDC area.

4.7.3 The Appendix B flood risk summary table has concluded that 53 IBC sites and 56 SCDC sites lie within in Flood Zone 1. These sites therefore pass the sequential test (with regards to fluvial and tidal flooding).

The SCDC sites that have passed the sequential test include 38 housing sites, 14 employment sites and 4 mixed-use sites.

The IBC sites that have passed the sequential test include 45 housing sites, 6 employment sites and 2 mixed-use sites.

Development should where possible be directed towards sites which lie in Flood Zone 1.

4.7.4 The Appendix B flood risk summary table has concluded that 5 sites lie wholly or partially within in Flood Zone 2.

There are two SCDC sites that lie wholly or partially within in Flood Zone 2. These include 1 employment and 1 mixed-use site.

There are three IBC sites that lie wholly or partially within in Flood Zone 2. These include 1 housing site, 1 employment site and 1 mixed-use site.

Development should only be directed towards sites in Flood Zone 2 if the site passes the sequential test. The exception test also needs to be addressed as appropriate (see Table 4.3).

4.7.5 The Appendix B flood risk summary table has concluded that 48 sites lie wholly or partially within Flood Zone 3.

There are 14 SCDC sites that lie wholly or partially within Flood Zone 3. These include 3 housing sites, 10 employment sites and 1 mixed-use site.

There are 34 IBC sites that lie wholly or partially within in Flood Zone 3. These include 28 housing sites, 1 employment site and 5 mixed-use site.

Development should only be directed towards sites in Flood Zone 3 if the site passes the Sequential Test. The exception test also needs to be addressed as appropriate (see Table 4.3).

An appropriate method, such as computer modelling will be required to determine the boundaries of the Flood Zone 3b functional floodplain and Flood Zone 3a with climate change where sites are situated in or adjacent to Flood Zone 3. Where a proposed development site intercepts multiple Flood Zones, a detailed site specific flood risk assessment and careful site layout design using a sequential approach should be adopted.

4.7.6 Sustainable Drainage Systems (SuDS) are the best practice approach for managing surface water runoff, to reduce risk of flooding as a result of the development and improve water quality. SuDS will need to be included in all future developments. Infiltration SuDS and soakaways mimic natural recharge and are an effective way of managing flood risk. Where infiltration SuDS are not viable, attenuation SuDS will be required. The method of SuDS will need to be incorporated in the detailed design process to ensure flood risk is managed both on site, and site runoff does not increase flood risk elsewhere in the catchment. An initial assessment of infiltration SuDS has been included in Appendix B using a high level review of the BGS 1:625K geology. The following is noted:

- The BGS 1:625K mapping provides details of the broad geology at each of the proposed development to allow and initial review of the potential of infiltration SuDS. This does not replace the need for a full geological assessment as there has been no consideration of the depth of each unit at the site, or local variability. For each site a developer should undertake their own review of the onsite geology and provide details to the LLFA as to which SuDS method will be utilised to reduce flood risk on site, and ensure flood risk elsewhere in the

catchment is not exacerbated as a result of development. Site-specific infiltration testing is likely to be required.

4.7.7 Appendix B also highlights where further investigation is required as a result of the following criteria:

- If the proposed development site lies in Flood Zone 2 or 3 then it has been concluded that a detailed site-specific flood risk assessment is required as part of the planning application;
- In accordance with NPPF legislation, if the proposed development site lies in Flood Zone 1 and is greater than 1 hectare it must also include a site-specific FRA;
- Drainage Strategies should be prepared for all residential sites in the Local Plan that are to have ten or more dwellings allocated, or that are over 1 hectare in size, and all non-residential sites over 1,000 m^2 in size. The drainage strategy should detail the drainage design and SuDS measures incorporated to mitigate against any potential increase in run off. As part of these assessments, the sewerage company (Anglian Water) should be contacted to discuss the proposed method of managing surface water; and
- If a site is located partially or wholly within Flood Zone 3 further modelling may be requested by the LLFA and the Environment Agency before the development can be granted permission.

4.7.8 In Appendix B a graded "traffic light" system on the suitability of each site for development has been applied to the Flood Zone column to rank the sites sequentially according to their level of flood risk. The criterion have been summarised in Table 4.4.

Table 4.4 Grading system for Appendix B Flood Risk Summary

Site Category	Details*
	A "green" site is identified as a site located wholly within Flood Zone 1 and thus passes the sequential test. A Drainage Strategy will still be required, and a site-specific FRA if over 1 hectare.
	A "yellow" site is identified as a development partially or wholly located within Flood Zone 2. A site-specific FRA and Drainage Strategy will be required. Depending on the development vulnerability, compliance with, the aims of the exception test will need demonstrating. Site layout and building design should be considered using a sequential approach.
	A "red" site is identified as a development partially or wholly located within Flood Zone 3. A site-specific FRA and Drainage Strategy will be required. Depending on the development vulnerability, compliance with, the aims of the exception test will need demonstrating. Site layout and building design should be considered using a sequential approach. Further modelling may be required to confirm the functional floodplain (Flood Zone 3b) and extent of Flood Zone 3a with climate change in order to pass the exception test.

*At all stages developers should seek consultation with the LLFA and Environment Agency during the planning application process to confirm any additional requirements to ensure adequate consideration of all flood risk elements.

5. Strategy conclusions and recommendations

5.1 Outline Study

5.1.1 The aim of an outline water cycle study is to provide an evidence base to understand the following:

- identify environmental risks and constraints;
- identify if environmental resources can cope with further development;
- identify if the development would overload the existing infrastructure;
- identify if major new systems are needed to allow development;
- ascertain if there is water cycle capacity for new development without needing to build major new infrastructure; and
- provide the evidence base for the local planning authority's Core Strategy.

5.1.2 This outline study has assessed any water constraints related to water resources, wastewater treatment and water quality and flood risk elements. The conclusions and recommendations below summarise the information provided in sections 2 to 4. The primary output is the Water Cycle Study conclusions in Table 5.2 which provides a high level overview of water-related constraints at each proposed site.

5.1.3 Table 5.2 uses a traffic light system which summarises the status of each site for each individual element. The traffic light system does not include consideration of potential capacity constraints at WRCs since this will not directly change the WFD classification of receiving waters. However, capacity at WRCs is a potential constraint to housing and employment growth as discussed in Section 3.4.

5.1.4 Table 5.2 does not contain conclusions for those sites which are already permitted, as these sites would have been assessed as part of the planning application process.

Table 5.1 Grading system for Table 5.2 Water Cycle Study Conclusions

Site Category	Details
	A "green" site is identified as a site that is considered to have a negligible impact of the status of that element and the recommendations provided should be followed in order to maintain the "green" status.
	A "yellow" site is identified as a site that is considered to have a moderate impact on the status of that element, or where there is some degree of uncertainty in the results which will require further investigation.
	A "red" site is identified as a site that is considered to have a significant impact on the status of that element, or where there is a high degree of uncertainty in the results which will require further investigation.

5.2 Conclusions

Water resources

5.2.1 The study area falls within a region of serious water stress. There is little or no capacity for additional utilisation of river and groundwater resources. More strategic and innovative options must be explored to cope with public water supply demand and the demands of other water users.

5.2.2 To support the achievement of WFD objectives, on the request of the Environment Agency, both AWS and ESW have committed to a voluntary limit on existing abstraction. This will essentially cap their use of licensed abstractions to recent rates to prevent deterioration in the water environment ahead of a phase of important investigations in AMP7 and AMP8. The effect of this is to limit flexibility in their water available for use to meet rising demand and reduces any forecast surplus in the supply demand balance.

5.2.3 As a result of this, and growing population, without wide ranging water efficiency and demand management programmes proposed by the water companies, the supply demand balance would be in significant deficit and a much greater range of supply-side measures would be needed. Options for the development of new sources of water in this water stressed region are highly limited and this means that demand management and water efficiency is an essential measure.

5.2.4 Demand management and water efficiency can only achieve so much. Significant investment in supply infrastructure to transfer water surplus from other WRZs within the region, to the study area. is also necessary in order to return the forecast supply demand balance to a surplus in the medium to long term. Such regional initiatives mean that new sources of water in environmentally sensitive areas within the study area are not required.

5.2.5 The effect of growth on water demand in the region has been taken into account within the latest round of water company plans. However, some uncertainty remains in the short-term growth trajectory and in the longer term when competing demands (e.g. Sizewell C) may necessitate additional supply schemes.

Wastewater treatment and water quality

5.2.6 Housing growth is predicted to lead to Dry Weather Flows (DWF) that exceed currently permitted levels at:

- Framlingham and Melton WRCs by 2020.
- Charsfield, Westleton and Yoxford WRCs by 2025.
- Benhall (Saxmundham) and Felixstowe WRCs by 2030.

5.2.7 These works are predicted to require capacity upgrades and revised permits during the period of the Local Plan. However, it should be recalled that these calculations are based on a worst-case scenario, and are likely to represent overestimates of actual increases in DWF due to housing growth.

5.2.8 Housing growth is predicted to result in a deterioration in WFD class for phosphate in the River Deben (assessment point DEB070). This point lies downstream of the WRCs at Easton, Charsfield and Wickham Market. This is because current baseline water quality is very close to the boundary between “moderate” and “poor” status, meaning that only a modest increase in phosphate concentration will result in a drop in class.

5.2.9 It is likely that revised permits may be required at one or more of these works during the period of the Local Plan, but this should be reviewed following Cycle 3 WFD classification of the river, and as individual developments come forward for consideration.

5.2.10 It is not predicted that housing growth will result in any WFD deterioration in BOD or ammonia.

5.2.11 AWS have planned improvements to the sewer networks to Framlingham, Cliff Quay, Sudbourne and Woodbridge WRCs. No additional constraints to housing growth due to network capacity have been identified.

Flood risk

5.2.12 The planning and flood risk section highlights that in terms of flood risk, avoidance is the preferred method of managing flood risk.

5.2.13 Development should where possible be directed towards sites which lie in Flood Zone 1.

5.2.14 Where this is not strategically possible and the sequential test has been passed, a sequential approach to site layout during the detailed design process and in some circumstance building design will be required to manage the risk of flooding to development in Flood Zones 2 or 3.

5.2.15 An appropriate method, such as computer modelling will be required to determine the boundaries of the Flood Zone 3b functional floodplain and Flood Zone 3a with climate change where sites are situated in or adjacent to Flood Zone 3. For SCDC this has been done as part of the SFRA, for IBC this exercise should either be completed as part of a separate SFRA investigation, or by the developer as part of the planning process. For strategic regeneration purposes/localities with multiple small brownfield sites, the preparation of flood risk strategies supported by appropriate modelling where required would assist in enabling regeneration and avoiding development blight. Where a proposed development site intercepts multiple Flood Zones, a detailed site specific flood risk assessment and careful site layout design using a sequential approach should be adopted.

5.2.16 Planning applications for developments located in these flood zones will need to be prepared in consultation with the Environment Agency and Suffolk County Council (as LLFA).

5.2.17 Drainage Strategies should be prepared for all sites, and should detail the drainage design and SuDS measures incorporated to mitigate against any potential increase in run off. As part of these assessments, Suffolk County Council as the LLFA should be contacted to comment on the proposed strategy and in addition, the sewerage company (Anglian Water) should be consulted on the proposed method of managing surface water.

5.2.18 Sustainable Drainage Systems (SuDS) are the best practice approach for managing surface water runoff, to reduce risk of flooding as a result of the development and improve water quality. SuDS will need to be included in all future developments.

5.3 Recommendations

Water resources recommendations

5.3.1 Following the water resources conclusions noted in Table 5.2, and above in section 2.16, the following recommendations are presented for consideration:

- Adopt the optional Building Regulations water efficiency standard of 110l/h/d in all new dwellings;
- Consider requiring water neutrality as an option to improve water efficiency in existing homes to offset demand from new homes;
- Engage further with water companies (Anglian Water and Essex and Suffolk Water) to achieve shared goals for demand management that go beyond a design standard of 110l/h/d. One such example is Anglian Water's "Green Water" programme;
- Engage with water companies' partnership programmes in the field of water efficiency (especially in relation to town-scale approaches, and retro-fit projects linked to council owned properties);

- Work with retail water companies and AWS/ ESW to address water use by business customers in the region, and
- Consider planning policies related to water efficient or sustainable design within employment allocations.

Wastewater treatment and water quality recommendations

5.3.2 Based on the Water Quality Assessment, the following are recommended:

- Review current phosphate treatment at Easton, Charsfield and Wickham Market WRCs. Engage with AWS to identify whether improvements in effluent quality are possible; and
- Engage with the Environment Agency, particularly during and after WFD Cycle 3 classification (in 2021) to confirm the baseline WFD classification of the River Deben with respect to phosphate.

Flood risk recommendations

5.3.3 In Table 5.1 a graded "traffic light" system on the suitability of each site for development has been applied to the Flood Zone column to rank the sites sequentially according to their level of flood risk. This is a summary of the information provided in Table 5.2 and Table 4.4. These tables should be used in conjunction with more detailed SFRA study outputs by SCDC and IBC to apply the sequential approach to their local plans. Should sites located within Flood Zone 2 or 3 need to be brought into the local plan, Table 5.2 details the assessment requirements for each site in order to demonstrate development that is justified, and safe to future occupiers and that flood risk is not increased.

5.3.4 Sustainable Drainage Systems (SuDS) are the best practice approach for managing surface water runoff, to reduce risk of flooding as a result of the development and improve water quality. SuDS will need to be included in all future developments.

Table 5.2a Water Cycle Study Conclusions for SCDC sites

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
SCDC 7	Carlton Park, Main Road, Kelsale cum Carlton				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 8	Rendlesham (Bentwaters)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 9	Port of Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy.
SCDC 10	Land at Carr Road/Langer Road, Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
SCDC 11*	Woodbridge Road, Framlingham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. Surface water flood risk high in parts. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 12*	Station Road East, Framlingham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. Surface water flood risk high in parts. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 13*	Sandy Lane, Martlesham				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 14*	Wilford Bridge Road, Melton				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 15*	Melton Road (Deben Mill), Melton				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 16*	Station Road, Melton				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 17*	MEL20 Residential Only				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 18	Land at Street Farm Ipswich Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. Surface water flood risk high in parts. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 19	Eastward Ho, Grove Road, Felixstowe				Water Resource Availability Flagged for potential major infrastructure upgrades Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 62	Land at Haven Exchange, Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with moderate tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 63	Ransomes, Nacton Heath				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 64	Clopton Commercial Park				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 65	Levington Park, Levington				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 66	Land at Silverlace Green (former airfield) Parham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 67	Former airfield Parham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 68	Riverside Industrial Estate, Border Cot Lane, Wickham				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 69	Land at Bridge Road, Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation.
SCDC 70*	Land off Woodbridge Road, Framlingham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 71*	Masterlord Industrial Estate				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 72*	Eastlands Industrial Estate				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 73*	Martlesham Heath General Employment Area				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 75	Land at Innocence Farm				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
SCDC 76	Land at Felixstowe Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 77*	Land off Victoria Mill Road				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 78*	The Old Gas Works site				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 79*	IN2 , Leiston				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 80*	TC2 Leiston				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 81	Land to the west of Garden Square				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 82	Land opposite Townsfield Cottages Laxfield Road				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 83	Land north east of Street Farm				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 84	Land to the rear of Rose Hill, Saxmundham Road				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 85	Land off Howlett Way,				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 86	Land North of Conway Close,				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 87	Land north of Mill Close,				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 88	Land south of Ambleside, Main Road				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 89	Land south of Lower Road,				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 90	Land to the east of Aldeburgh Road				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 91	Land East of Redwald Road,				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 92	Land opposite The Sorrel Horse, The Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 93	Land off Laxfield Road, Dennington				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 94	South Saxmundham Garden Neighbourhood				Water Resource Availability Potential uncertainty in supply demand balance and infrastructure when considered alongside Sizewell C Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
SCDC 95	Land to the south of Eyke CoE Primary School and East of The Street, Eyke				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 96	Land adjacent to Reeve Lodge, High Road, Trimley St Martin				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 97	Land to the south of Darsham Station				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 98	Land West of B1125, Westleton				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 99	Land South of Forge Close between Main Road and Ayden, Benhall				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 100	Land to the South East of Levington Lane, Bucklesham				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 101	land to the south of Station Road, Campsea Ashe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 102	Land behind 15 St Peters Close, Charsfield				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 103	Land Bounded by Helmingham Road & Ipswich Road, Otley				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 104	Land at Chapel Road, Otley				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 105	Land at The Street & Mill Lane, Brandeston				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 106	Land to the west of Ipswich Road, Grundisburgh				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 107	Land north of the Street, Kettleburgh				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 108	Land off Keightley Way, Tuddenham				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 109	Land between High Street and Chapel Lane				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality Will contribute to potential deterioration due to phosphate in the Deben. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
SCDC 110	Land at Mow Hill, Witnesham				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 111	Land adjacent Levington Park, Bridge Road, Levington				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
SCDC 112	land south of Sutton Walks, Sutton				*Proposed Allocation - First Draft Local Plan - not taken forward*
SCDC 113	Land north of The Street, Darsham				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 114	Land to the rear of 31-37 Bucklesham Road, Kirton				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 115	Brackenbury Sports Centre, High Road East, Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 227	Land at Felixstowe Sunday Market Site, Sea Road, Felixstowe				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy.
SCDC 228*	Land at Abbey Road				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
SCDC 229	Land off Vyces Road/Brook Lane				Water Resource Availability ESW have accounted for the scale of growth proposed in the local plans, but there is outstanding uncertainty in the final plan supply demand balance, especially during the early phases of the planning period in AMP7. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with moderate tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. Surface water flood risk high in parts. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
SCDC 230	Martlesham Hi-Tech Cluster				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.

Note: * Neighbourhood Plan allocations, not being considered in the Local Plan.

Table 5.3b Water Cycle Study Conclusions for IBC sites

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 2	Depot, Beaconsfield Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 3	Land between railway junction and Hadleigh Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with moderate tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 4	Bus Depot, Sir Alf Ramsey Way				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 5	Smart Street/Foundation Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 6	West End Road Surface Car Park				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 7	Burrell Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 9	Island Site				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 10	Land between Lower Orwell Street and Star Lane				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					This site is located within an area with moderate tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 11	Land between Old Cattle Market and Star Lane				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 13	Handford Road (east)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with moderate tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 14	Transco, south of Patteson Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. The majority of this site is in Flood Zone 2. Thus for a housing development further modelling is likely required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 15	Silo, College Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 16	Land between Gower Street and Great Whip Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 17	South of Felaw Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 18	Bridge Street, Northern Quays (west)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 19	Burton's College Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 20	Commercial Bldgs & Jewish Burial Ground, Star Ln				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 21	Arclion House and Elton Park Industrial Estate, Hadleigh Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 22	Webster's saleyard site, Dock Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 23	23-25 Burrell Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 24	Cranfields				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 25	Regatta Quay				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 28	Old Cattle Market site, Portman Road (South)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 30	Helena Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 32	Land between Cliff Quay and Landseer Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy. Consultation required with Water Company on SPZ.
IBC 37	Land at Commercial Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 44	Holywells Road (east)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. In terms of on-site drainage there is potential for infiltration SuDS at the site,

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					although investigation is required as part of the drainage strategy. Consultation required with Water Company on SPZ.
IBC 45	Banks of river, upriver from Princes Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 46	Rear of Grafton House, Russell Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 47	Bath Street (Griffin Wharf)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 48	Thurleston Lane area				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 67	Rear of Jupiter Road and Reading Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 68	Former Tooks Bakery, Old Norwich Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 69	Victoria Nurseries, Westerfield Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 70	Opposite 674-734 Bramford Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 71	Land at Bramford Road (Stock's site)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 72	Lavenham Road School site				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage there is potential for infiltration SuDS at the site, although investigation is required as part of the drainage strategy. Consultation required with Water Company on SPZ.
IBC 73	J J Wilson, White Elm Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 74	King George V Field, Old Norwich Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 75	Waterworks Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 76	Peter's Ice Cream etc, Grimwade Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 77	240 Wherstead Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 78	Co-op Depot, Felixstowe Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 79	Felixstowe Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 80	St Clement's Hospital Grounds				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 81	Milton Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 82	Eastway Business Park, Europa Way				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 83	Waterford Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 84	Smart Street/Foundation Street (former Gym and Trim)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 85	Church and land at Upper Orwell Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 86	79 Cauldwell Hall Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 87	BT Depot, Woodbridge Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 88	Old Foundry Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 89	Arcade Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 90	Former British Energy Site, Cliff Quay (south)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 91	Land north of Whitton Lane				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are likely to be viable but will be based on final use of Employment Site. This should be documented in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 92	Airport Farm Kennels, north of A14				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 93	Land south of Ravenswood fronting Nacton Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 100	Land south of Ravenswood (Sports Park)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 101	Duke Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 102	Mint Quarter/Cox Lane East				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 104	112-116 Bramford Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 105	15-19 St Margaret's Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 106	Sports Club, Henley Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 107	Former Police Station, Civic Drive				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 109	Areas U, V & W Ravenswood, Nacton Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 110	2 Park Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 111	Land at Futura Park, Nacton Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 113	Car Park, Smart Street/Foundation Street				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 114	Hope Church, Fore Hamlet				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 116	Mint Quarter/Cox Lane West regeneration area				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 117	Former British Energy Site, Cliff Quay (north)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 118	Former Norsk Hydro, Sandy Hill Lane				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 119	Ravenswood (south of Alnesbourne Crescent off Edith Cook Way)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 120	Ravenswood				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy.
IBC 121	Civic Centre area, Civic Drive				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, but may be dependant on the final use of this site. Further investigation and details on the on-site SuDS should be included in the drainage strategy. Consultation required with Water Company on SPZ.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
IBC 122	Prince of Wales Drive				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site could be permitted subject to LPA/LLFA consultation. A drainage strategy is recommended. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 129	Humber Doucy Lane area				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 130	Whitton Church Lane area				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 131	Land west of Greyfriars Road (Jewsons)				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 132	Waste tip north of Sir Alf Ramsey Way				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 133	Land bounded by Cliff Road, Toller Road and Holywells Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage Large proportion of this site in Flood Zone 3. This site is located within an area of very high and significant tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required and early consultation with the LLFA and EA is essential. A large proportion of this site is located within Flood Zone 3 and modelling may be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 135	Land east of West End Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 136	Land west of West End Road				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 138	Ipswich Garden Suburb Phase N3a				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development.

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 139	Ipswich Garden Suburb Phase N3b				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 140	Ipswich Garden Suburb Phase N2b				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage This site is located within an area with high tidal or fluvial flood risk and thus a site-specific flood risk assessment will be required. Consultation with the LLFA and EA is also required. A sequential approach to site design will be required. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 141	Ipswich Garden Suburb Phase N2a				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. It is likely that infiltration SuDS are viable at this site, further investigation and details of which should be included in the drainage strategy. Consultation required with Water Company on SPZ.
IBC 142	Ipswich Garden Suburb Phase N1a				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage

ID	Address	Water Resources	Wastewater Treatment/ Water Quality	Flood Risk	Comment
					A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.
IBC 143	Ipswich Garden Suburb Phase N1b				Water Resource Availability AWS have accounted for the scale of growth proposed in the local plans and presented a WRMP that demonstrates that a supply demand balance is maintained without constraining development. Wastewater Treatment and Water Quality No deterioration in WFD classes predicted. Further assessment will be required within the lifetime of the plan. Flood Risk and Drainage A site-specific flood risk assessment will be required for this site. In terms of on-site drainage, infiltration SuDS are unlikely to be viable at this site and attenuation SuDS are recommended. This should be included in the drainage strategy.

6. Development Site Changes October 2018

6.1 Additional Sites Summary

6.1.1 Following on from the initial list of development proposals provided in early October 2018, SCDC and IBC have updated their draft development plans. This section provides a qualitative summary of the impact of the changes to the location of proposed developments analysed in Section 2 to 6 on water resources, wastewater treatment and water quality and flood risk.

6.1.2 The following site additions are currently being considered by SCDC:

- Suffolk Police HQ, Martlesham: 300 dwellings.
- Peasenhall: 14 dwellings.
- Land at School Road, Knodishall: 16 dwellings.
- Land at and surrounding Woodbridge Football Club (Martlesham parish): 120 dwellings.
- Land north of Humber Doucy Lane, Rushmere St Andrew: 150 dwellings.
- Land adjacent to Swiss Farm, Otley: 60 dwellings.
- Old District Council offices, Melton: 100 dwellings.
- Land west of Chapel Road, Grundisburgh: 70 dwellings.
- Land at Cherry Lee, Darsham Road, Westleton: 15 dwellings.

6.1.3 The following increase in dwelling numbers are currently being considered by SCDC:

- Easton Neighbourhood Plan area increase dwellings from 10 to 20.
- Framlingham Neighbourhood Plan area increase dwellings from 50 to 100.
- Leiston Neighbourhood Plan area increase dwellings from 50 to 100.
- Land to the south of Eyke CoE Primary School and East of The Street, Eyke increase dwellings from 45 to 65.
- Mow Hill, Witnesham increase dwellings from 20 to 30.

6.1.4 The following changes are being considered by IBC:

- Island adjacent to Jewsons, Greyfriars Road site added, 11 dwellings.
- Key Street / Star Lane / Burtons (St Peter Port) site added, 86 dwellings and employment.
- 25 Grimwade Street. Student Union Club and adjacent car park, Rope Walk site added, 12 dwellings.
- Suffolk Retail Park – North site added, 88 dwellings.
- Land bounded by Cliff Road, Toiler Road and Holywells Road (IP045): addition of employment allocation on 20% of site.

6.1.5 Reductions in dwelling numbers or site removals have not been considered in this section.

6.2 Water Resources

6.2.1 Based on their locations, it has been assumed that the development sites not included in the previous water resources analysis will provide up to an additional 800 dwellings in the AWS supply area, and up to 40 additional dwellings in ESW's Blyth WRZ. This is a significant increase for AWS's East Suffolk WRZ, representing an 8.7% uplift on the figures assessed in section 2.12.

6.2.2 Phasing information is not yet available for these sites, but reference to section 2.12 shows that development of an additional 800 dwellings early in AWS's planning period (during AMP7 and AMP8) could reflect a rate of growth in excess of that accounted for by the water company. If the phasing leads to delayed development (after 2030), then the water company is likely to have greater flexibility to maintain a positive forecast supply demand balance.

6.2.3 The outstanding uncertainties regarding the forecast supply demand balance in ESW's Blyth WRZ and the measures needed to maintain resilient supplies to household and non-household demand were discussed in section 2.14. Potential increased development at previously identified sites within the Blyth WRZ total up to 220 additional dwellings. This represents a 12.7% uplift.

6.2.4 The implications of this additional growth in the Blyth WRZ may be more significant if planned phasing brings development into AMP7 or AMP8, early in ESW's planning period when the greatest uncertainty in the supply demand balance exist. Increased growth later in the planning period would pose less risk.

6.3 Waste Water Treatment and Water Quality

6.3.1 Based on their locations, it has been assumed that development sites not included in the previous analysis are likely to connect to WRCs at Woodbridge, Yoxford, Benhall (Saxmundham), Melton, Grundisborough, Westleton and Cliff Quay. This has not been confirmed with AWS.

6.3.2 Melton, Westleton, Benhall and Yoxford WRCs are predicted to exceed their currently permitted Dry Weather Flow during the period of the Local Plan. Additional developments connecting to these centres increases the likelihood of this occurring. The IBC additions are not expected to increase the likelihood of exceeding dry weather flows at these WRCs.

6.3.3 None of these centres discharges to the River Deben, and so these additional developments would not increase the likelihood of WFD deterioration of this waterbody due to phosphate discharge.

6.3.4 These centres all discharge ultimately to coastal waters that are designated as SSSIs. The additional nutrient loading to these waters would be increased by these proposed developments, and this should be taken into consideration in any Habitats Regulations Assessment.

6.4 Flood Risk

6.4.1 For those sites with an increase in dwelling numbers (section 6.1.3) the approach to assessing flood risk and demonstrating compliance with the aims of the sequential and exception tests remains unchanged and the reader is directed to Table 5.1. Detailed consideration of flood risk to suit the type/density of development will be required at the planning application preparation stage.

6.4.2 For those sites which are currently being considered as additions (section 6.1.2) no shapefiles have been provided, however, the following is noted in the vicinity of each area:

- The Suffolk constabulary HQ (IP5 3QS) is located in Flood Zone 1 with low surface water flood risk. The site is located on outcrop Crag and thus from a drainage perspective there is a

potential for infiltration SUDS to be used. Further investigation is required once the site outline has been selected.

- Peasenhall is located in an area which has higher fluvial flood risk associated with the River Yox and its' tributaries. The flood risk at this site can only be determined once the site has been selected.
- Land at School Road, Knodishall (SHEELA sites north of School Road) are located in Flood Zone 1. The site is located on outcrop Sand and thus from a drainage perspective there is a potential for infiltration SUDS to be used.
- Land at Woodbridge Football Club is located in Flood Zone 1 with low surface water flood risk. The site is located on Sand and Gravel superficial deposits which overlie the Crag and thus from a drainage perspective there is a potential for infiltration SUDS to be used.
- Land north of Humber Doucy Lane is located in Flood Zone 1 with low surface water flood risk. The site is located near the edge of the Till deposits and thus from a drainage perspective there is a minimal potential for infiltration SUDS to be used. Further investigation is required once the site outline has been selected.
- Land adjacent to Swiss Farm, Otley is located in Flood Zone 1 with generally low surface water flood risk aside from a corridor of moderate surface water flood risk near the corner of the B1078. The site is located where Till deposits are present and thus infiltration SUDS are likely to have minimal potential. Further investigation is required once the site outline has been selected.
- Old District Council offices, Melton. A site outline is required to confirm where this site is located.
- Land west of Chapel Road, Grundisburgh is located in Flood Zone 1 with generally low surface water flood risk from two tracks of higher flood risk, one along lower road, and a further on along the footpath between Chapel road and Woodbridge Road towards Bridge Farm. The site is located on the Till margins and thus from a drainage perspective further investigation will be required to determine any infiltration potential at the site. Once the site outline has been selected a further assessment of both flood risk and drainage can be made.
- Land at Cherry Lee, Darsham Road, Westleton is located in Flood Zone 1 with very low surface water flood risk. The site is located on outcrop Crag and thus from a drainage perspective there is a potential for infiltration SUDS to be used.
- Island adjacent to Jewsons, Greyfriars Road is partially located within Flood Zone 2 and 3 with low surface water flood risk.
- Key Street / Star Lane / Burtons (St Peter Port) is a brownfield site located in Flood Zone 3. The site has low to medium surface water flood risk.
- 25 Grimwade Street. Student Union Club and adjacent car park, Rope Walk is located in Flood Zone 1 with very low surface water flood risk.
- Suffolk Retail Park – North is located within Flood Zone 2 with low to medium surface water flood risk.

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