

Swale Borough Council Sustainability
Appraisal
**Water Infrastructure and Environmental
Capacity Assessment**

Outline report
November 2010

Prepared for



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1 Glossary

AA	Appropriate Assessment
AMP	Asset Management Plan
BAT	Best Available Technology
BATNEEC	Best Available Technology Not Entailing Excessive Cost
BGS	British Geological Society
BOD	Biochemical Oxygen Demand
CAMS	Catchment Abstraction Management Strategy
CBA	Cost Benefit Analysis
CFMP	Catchment Flood Management Plan
CS	Core Strategy
CSH	Code for Sustainable Homes
CLG	Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DO	Dissolved Oxygen
DPD	Development Plan Documents
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
EiP	Examination in Public
ELR	Employment Land Review
FEH	Flood Estimation Handbook
FFT	Flow to Full Treatment
GQA	General Quality Assessment
GWMU	Groundwater Management Unit
HA	Highways Agency
HRA	Habitats Regulation Assessment
HMWB	Heavily Modified Water Body (under the Water Framework Directive)
l/h/d	Litres/head/day (a water consumption measurement)
LDDs	Local Development Documents
LDF	Local Development Framework
LPA	Local Planning Authority
MI	Mega Litre (a million litres)
NE	Natural England
NRA	National Rivers Authority
NWA	No Water Available (in relation to CAMS)
OFWAT	The Office of Water Services

O-A	Over Abstracted (in relation to CAMS)
O-L	Over Licensed (in relation to CAMS)
P	Phosphorous
PE	Population Equivalent
PPS	Planning Policy Statement
PR	Periodic Review
RBMP	River Basin Management Plan
RSS	Regional Spatial Strategy (revoked)
RQO	River Quality Objective
SA	Sustainability Appraisal
SAC	Special Area for Conservation
SBC	Swale Borough Council
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
UKTAG	United Kingdom Technical Advisory Group (to the WFD)
UWWTD	Urban Wastewater Treatment Directive
WIECA	Water Infrastructure and Environmental Capacity Assessment
WCS	Water Cycle Study
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRMU	Water Resource Management Unit (in relation to CAMS)
WRZ	Water Resource Zone (in relation to a water company's WRMP)
WwTW	Wastewater Treatment Works

2 Introduction

Swale Borough Council (SBC) is undertaking a Sustainability Appraisal (SA) and Appropriate Assessment (AA) of its Core Strategy (CS) Development Plan Documents (DPD). As a part of the SA, Scott Wilson has been commissioned to carry out a Water Infrastructure and Environmental Capacity Assessment to support the evidence base, providing information relating to the management of potable water supplies, wastewater and sewage sludge in the SBC area up to 2031. It is anticipated that the Water Infrastructure and Environmental Capacity Assessment (WIECA) will be similar in structure and scope to a Scoping Water Cycle Study (WCS).

Unlike the production of a Sustainability Appraisal (SA) or Strategic Flood Risk Assessment (SFRA), a WCS is not currently a statutory requirement in the support of LDFs unless a planning area is awarded New Growth Point Status.

However, WCS are generally undertaken in areas where the Environment Agency or Natural England (NE) have suggested that there is a critical water related issue that they consider could potentially limit the amount of growth being proposed. WCSs are undertaken in conjunction with water companies and statutory bodies such as the Environment Agency and NE to ensure that solutions are possible to constraints and that an evidence base exists to demonstrate that the solutions are achievable. This limits the likelihood of water based representations against the soundness of the Local Development Documents (LDD) during consultation and Examination in Public (EiP) of the various LDDs. This study has been undertaken in consultation with the Environment Agency, Southern Water and South East Water.

The intention of the WIECA is to demonstrate that there is sufficient existing or planned water services infrastructure to support the levels of housing and employment growth proposed within Swale's LDF, and that the level of growth can be accommodated without impacting negatively on the water environment and associated ecological sites.

The study is generally undertaken in three stages, as advised by current Environment Agency guidance on WCS, and the stages of the study should coincide with the production of different Local Development Documents. See section 2.3 for further detail on the proposed study methodology.

2.1 Study Area

The Borough of Swale lies on the North Kent coast, to the south of the Thames estuary. See Figure 1 in Appendix A for a map of the study area. The Borough encompasses an area of 'mainland' Kent and the Isle of Sheppey. The main towns in the Borough are Sittingbourne and Faversham on the mainland and Queenborough and Sheerness on Sheppey. The Borough is named after the channel called The Swale that separates the mainland of Kent from the Isle of Sheppey.

The largest watercourses are The Swale and the River Medway. The Swale is an estuarine area which runs between the Medway Estuary and the North Sea, separating the Isle of Sheppey from the mainland. The Swale itself is a well defined channel, with adjacent areas comprising a complex of brackish and freshwater floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The River Medway rises near East Grinstead in the county of West Sussex and flows north-east to join the Thames just before it exits into the North Sea.

The final portion of the Medway forms a tidal estuary and runs along the northwest border of Swale Borough. In addition to these, the Borough contains extensive areas of marshland along the borders of the Swale and around the Isle of Sheppey, which is covered by a network of small creeks and drainage ditches.

Towards the south of the Borough the underlying geology and topography forms chalk downland, part of the South Downs, which limits the presence of rivers, although there is a principal chalk aquifer and a secondary aquifer comprised of superimposed sands present. This is used a source of potable water and there are extensive areas designated as Source Protection Zones (SPZs), surrounding these potable water sources, as discussed further in Section 3.2.

To the north of the study area, the underlying geology of the Isle of Sheppey is composed of Alluvium in the west and south and London Clay in the north east of the island. South of The Swale, Alluvium deposits border the mainland coastline but inland the geology is comprised of sand, gravel and clay beds overlying the chalk bedrock, which is exposed in the North Downs, as discussed above^{1&2}.

There are two water companies operating within the study area:

- Southern Water, which provides potable water supply to the northern portion of the study area and wastewater treatment to the entire study area; and
- South East Water, which supplies potable water to the southern portion of the study area.

2.2 Objectives

It is intended that this report and the outcomes of this study be a 'Living Document', to be updated and amended as and when new data, such as housing figures, or new policies and guidance are published and become available. It should be noted that this report provides a picture of the current situation with regards to water resource and infrastructure capacity and it is likely that the conclusions could become obsolete if not regularly updated.

The objectives of this project are to:

- assess the baseline capacity of water resources and wastewater within the Swale Borough;
- determine any issues with the available capacity relating to future housing and employment growth within the area;
- for significant issues, identify reasonable outline options for capacity expansion; and
- test the identified available options to identify the most suitable option(s).

2.3 Swale WIECA Methodology

The Swale WIECA will be undertaken in 2 stages:

¹ British Geological Survey, England and Wales, sheet 272

² British Geological Survey, England and Wales, sheet 273

2.3.1 Stage 1: Spatial Growth Options Assessment

This stage will assess the water infrastructure and water environment capacity for the various spatial options being considered for growth. This will give an indication of the suitability of the spatial options from a water point of view and how much development can be accommodated with existing infrastructure and environmental constraints.

A baseline of existing infrastructure capacity, available water resource and the water environment has been produced, followed by assessment of each spatial option covering:

- capacity of nearest wastewater treatment works (WwTW) to accept further wastewater for treatment;
- capacity of wastewater pipe network in proximity to each option to transmit additional wastewater to the WwTW;
- water quality capacity of receiving water course to accept further discharge;
- capacity of water resources to accept further exploitation through abstraction;
- any downstream ecological 'water dependent' sites that might be affected by associated discharge from development;
- flood risk and PPS25 limitations on site options (using the SFRA); and
- water availability to supply the development in terms of availability of raw water resource (in terms both of environmental water availability and deployable output from treatment works) and proximity of water supply infrastructure such as mains supply pipes.

The capacity will be presented as a 'traffic light' colour coded table indicating whether growth could be accepted with existing infrastructure and environmental constraints (green), where some investment will be required (amber), or where there is a constraint that needs significant investment in new infrastructure or an environmental mitigation solution to allow development to proceed (red).

2.3.2 Stage 2: Possible Solutions Assessment

Once it is known what the favoured options for growth are, an assessment of the most likely feasible infrastructure and mitigation solutions to allow development to proceed can be undertaken. This would allow identification of any strategic level policy to support water infrastructure requirements in the Core Strategy. The outline assessment undertaken at this stage would be sufficient to determine that a solution is feasible and that growth proposals are achievable.

These solutions would only be outline at this stage and would likely need to be defined in more detail during further assessment to support site specific Development Management, or SPD policy. It is recommended that a Detailed Water Cycle Study be undertaken at a future date to support this.

2.4 Legislative Context

2.4.1 Water Industry Funding and Regulation

South East Water and Southern Water are appointed as the water and sewerage undertakers for the study area, through an appointment made under the Water Industry Act 1991³. The principal duties of water and sewerage undertakers are set out in that legislation. Section 37 of that Act places a duty upon a water undertaker to develop and maintain an efficient and economical system of water supply within its area. Similarly Section 94 places a duty upon a sewerage undertaker to provide, improve and extend a system of public sewers to ensure that its area is effectually drained and the contents of those sewers effectually dealt with.

The Water Services Regulation Authority (OFWAT) is the economic regulator of water and sewerage companies in England and Wales.

For every five year asset management planning (AMP) cycle, companies submit a business plan to OFWAT. The plans set out each company's view of what it needs to do to maintain its assets, improve services to customers, provide for growth in its region and deal with its impact on the environment. OFWAT's decision on how much companies need to recover from customers through bills is expressed as price limits ('K factors').

Any major infrastructure requirements which arise after agreement of the five year AMP will normally be considered for the following AMP period. AMP5 will cover the period 2010 to 2015.

At the time of undertaking the Swale WEICA, the Strategic Business plans had been submitted for the Price Review 2009 (PR09) and OFWAT has determined the price limits from this PR09 (November 2009).

Where significant water cycle infrastructure requirements are not included within PR09, funding cannot be sought until the next Price Review towards the end of AMP5 (PR14). Only in exceptional circumstances will Water Companies seek to deviate from their Business Plan and submit an interim determination within the 5 year AMP cycle to provide funding for unforeseen investment requirements. However, these have significant cost implications and it is considered that infrastructure for planned development should be planned for in sufficient time to be included in the relevant Business Plan and Price Review.

Developer Contributions

When a developer wishes to proceed with a particular site, they may requisition the appropriate water company (or companies if separate for water and wastewater) to provide infrastructure in accordance with the relevant provisions of the act (Section 98 for sewerage and Section 41 for water). The cost of this is shared between the developer and undertaker in accordance with the legislation.

For infrastructure serving more than one development site, the Water Industry Act assumes that the first developer will pay the majority of the costs. In most cases, however, it will be preferable to share costs equitably between developers. This will need to be facilitated through the planning system.

It is also important for the WCS (or related studies such as the WIECA) to resolve any funding issues associated with non-water company assets where development will necessitate upgrades.

³ <http://www.legislation.gov.uk/ukpga/1991/56/contents>

Developers also pay an “infrastructure charge” to the water company to cover the cost of general improvements which cannot be allocated to a specific site. If the developer provides new infrastructure all the way to the treatment works, then this may be waived or taken into account in calculating other contributions.

2.4.2 Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) was passed into UK law in 2003. The competent authority responsible for its implementation is the Environment Agency in England and Wales. The overall requirement of the directive is that all water bodies in the UK must achieve good ecological, chemical status and morphological status by 2015 unless there are grounds for derogation.

The WFD combines water quantity and water quality issues together by combining previous water legislation and in certain areas strengthens existing legislation. An integrated approach to the management of all freshwater, groundwater, estuaries and coastal waters at the river basin level has been adopted. Involvement of stakeholders is seen as key to the success in achieving the tight timescales and objectives set by the directive. The WFD states that all countries in the European Union must:

- prevent deterioration in the classification status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- aim to achieve at least good status for all waters. Where this is not possible, good status should be achieved by 2021 or 2027;
- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out releases of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- contribute to mitigating the effects of floods and droughts.

The River Basin Management Plans (RBMPs) (Environment Agency, 2010), set out detailed proposals for the next 6 years via a Programme of Measures (POM) to bring about the changes necessary in order to bring the water bodies which are currently failing the required standards up to good status. The measures in the plans have been developed with the assistance of the River Basin Liaison Panels, and include actions required by a wide range of organisations under three scenarios; business as usual, baseline and those actions desirable if there were more information. The range of organisations responsible for co-delivering elements of the POM include the water industry, businesses, planning authorities, environmental organisations, agriculture, forestry, consumers, fishing bodies, ports, drainage boards and regional government, which will all have key roles to play in implementing the plan.

2.4.3 Freshwater Fish Directive

The Freshwater Fish Directive (2006/44/EC) seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water objectives for salmonid waters and cyprinid waters. The

directive will be replaced in 2013 by the WFD. Annex I of the directive lists the parameters for a freshwater fishery to be maintained⁴.

2.4.4 Urban Wastewater Treatment Directive

The objective of the Urban Waste Water Treatment Directive (UWWTD) is to protect the environment from the adverse effects of sewage discharges. It sets treatment levels on the basis of sizes of sewage discharges and the sensitivity of the waters receiving the discharges.

Under the Directive, the UK is required to review environmental waters at four-yearly intervals to determine if they are sensitive to the effects of sewage discharges⁵. As part of the UWWTD, areas sensitive to sewage discharges have been mapped. The eastern Swale and the River Stour are noted as sensitive.

The European Court of Justice (ECJ) took action against the UK relating to designation of 'sensitive areas' for estuaries and seas, allegedly not complying with the Urban Waste Water Treatment Directive. The ECJ suggested that the UK should have designated the Humber, the Wash, the Deben and Colne Estuaries, the Outer Thames Estuary, Southampton Water and the North East Irish Sea as 'sensitive areas'. However, the ECJ ruled in favour of the UK in late 2009.

2.4.5 Groundwater Directive

The Groundwater Directive aims to protect groundwater from pollution by controlling discharges and disposals of certain dangerous substances to groundwater. In the UK, the directive is implemented through the Groundwater Regulations 1998. The Directive aims to protect groundwater under these Regulations by preventing or limiting the inputs of listed substances into groundwater. Substances controlled under these Regulations fall into two lists:

- List 1 substances are the most toxic and must be prevented from entering groundwater. Substances in this list may be disposed of to the ground, under a permit, but must not reach groundwater. They include pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide.
- List 2 substances are less dangerous, and can be discharged to groundwater under a permit, but must not cause pollution. Substances in this list include some heavy metals and ammonia (which is present in sewage effluent), phosphorus and its compounds

The existing Groundwater Directive is to be repealed by the WFD in 2013. New or amended regulations are expected before then to enact both the Water Framework Directive and its Daughter Directive on the protection of groundwater. This new Groundwater Directive (2006/118/EC) is commonly referred to as the Groundwater Daughter Directive.

The WFD and the new Groundwater Directive make changes to how groundwater can be protected. These changes will provide a new regulatory setting for the protection of groundwater. However, the new or amended Regulations will be no less protective than the existing Regulations. The existing principle of preventing or limiting the inputs of list 1 or list 2 substances respectively into groundwater under the original Groundwater Regulations 1998 will remain, but will be expanded to encompass all pollutants (any substance liable to cause pollution). For example, nitrate will be included as a pollutant.

⁴ Defra website, www.defra.gov.uk/environment/water/quality/fwfish

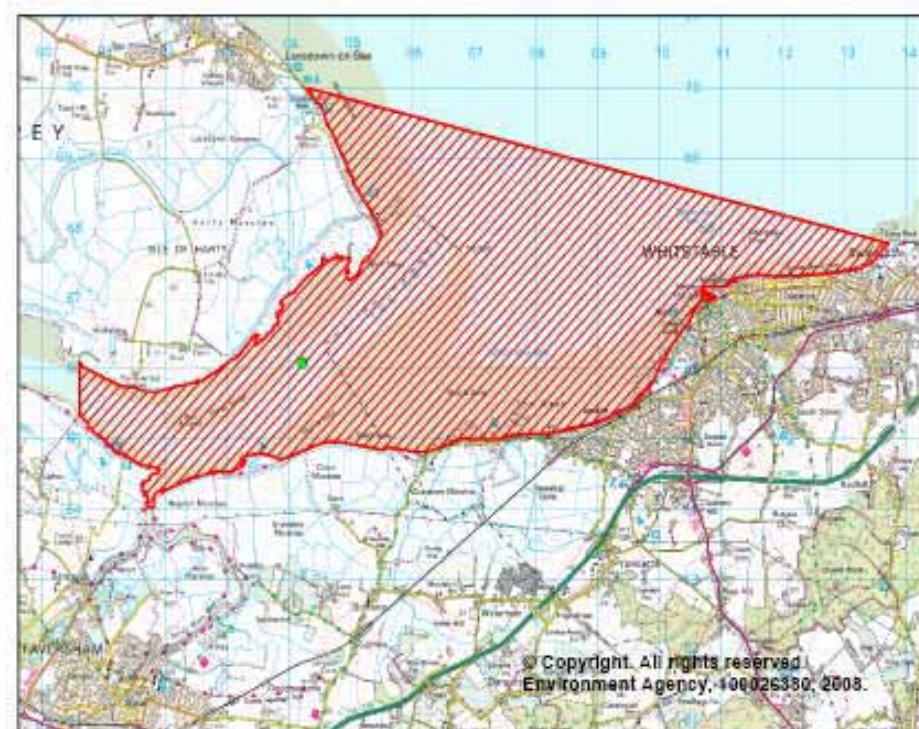
⁵ Defra website, www.defra.gov.uk/environment/water/quality/uwwtd/default.htm

2.4.6 Shellfish Waters Directive

The aim of the EC Shellfish Waters Directive is to protect or improve shellfish waters in order to support shellfish life and growth, therefore contributing to the high quality of shellfish products directly edible by man. It sets physical, chemical and microbiological water quality requirements that designated shellfish waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards)⁶.

There are two designated shellfish waters in the coastal waterbodies adjacent to the study area, Swale East and Swale Central.

Figure 2.1: Swale East shellfish water

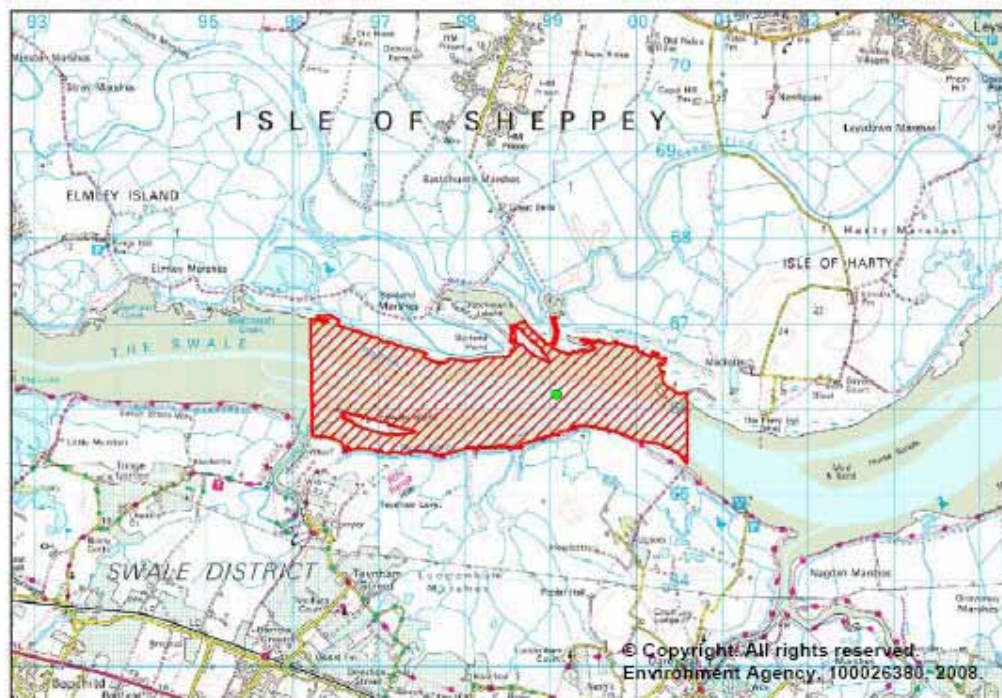


Key

- Shellfish water sample point
- /// Designated Shellfish water

⁶ Defra website, www.defra.gov.uk/environment/water/quality/shellfish

Figure 2.2: Swale Central shellfish water



Key

- Shellfish water sample point
- /// Designated Shellfish water

2.4.7 Bathing Water Directive

The main objective of the current and revised Bathing Water Directives (76/160/EEC and 2006/7/EC) is to protect public health and the environment from faecal pollution at bathing waters. Member States are required to identify popular bathing areas and to monitor water quality at these bathing waters throughout the bathing season.

Directive 76/160/EEC sets a number of microbiological and physico-chemical standards that bathing waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards). These standards will continue to be monitored until 2012, at which point Defra and the Environment Agency will change monitoring to meet the higher standards set out in Directive 2006/7/EC⁷.

There is one designated Bathing Water within the study area on the northeast coast of Sheppey at Leysdown. There are also designated Bathing Waters at Swalecliffe (Tankerton) and Herne Bay (Herne Bay Central and Herne Bay), approximately 12 km to the east of the Borough.

2.4.8 Marine and Coastal Access Bill

The aims of the Marine and Coastal Access Bill, published in December 2008, are:

⁷ Defra website, www.defra.gov.uk/environment/water/quality/bathing/default/htm

-
- To create a new network of marine conservation zones;
 - the establishment of a new Marine Management Organisation which will be a centre of marine expertise;
 - a new marine planning system which will enable a more strategic approach to be taken to the use of our seas;
 - a simpler more streamlined marine licensing system; and
 - better management of fisheries.

2.4.9 Flood and Water Management Act

The Flood and Water Management Act 2010 is the outcome of a thorough review of the responsibilities of regulators, local authorities, water companies and other stakeholders in the management of flood risk and the water industry in the UK. The Pitt Review of the 2007 flood was a major driver in the forming of the legislation. Its key features relevant to this WEICA are:

- to give the Environment Agency an overview of all flood and coastal erosion risk management and unitary and county councils the lead in managing the risk of all local floods;
- to encourage the uptake of sustainable drainage systems by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SUDS for new developments and redevelopments;
- to widen the list of uses of water that water companies can control during periods of water shortage, and enable Government to add to and remove uses from the list;
- to enable water and sewerage companies to operate concessionary schemes for community groups on surface water drainage charges; and
- to make it easier for water and sewerage companies to develop and implement social tariffs where companies consider there is a good cause to do so, and in light of guidance that will be issued by the SoS following a full public consultation.

2.4.10 Water White Paper (due 2011)

DEFRA is currently developing a Water White Paper⁸ to be published by early summer 2011. This will focus on the future challenges facing the water industry around maintaining water supplies, keeping bills affordable and reducing regulation and will look at:

- securing water resources for the future;
- increasing choice and competitive opportunities, driving innovation, improving customer service and value;
- creating a modern regulatory system that protects customers and minimises regulatory burdens;
- ensuring fair and affordable water charges; and
- incentivising water conservation.

⁸ <http://ww2.defra.gov.uk/environment/quality/water/whitepaper/>

The White Paper will build upon the recommendations of the Cave and Walkers reviews. The Cave Review interim report was published on 18th November 2009 and it sets out proposals on a range of measures for increasing competition and encouraging innovation in the water industry. The review's recommendations are the subject of a consultation that will close on the 18th of December⁹:

The Walker Review looked at charging for household water and sewerage, at the effectiveness and fairness of current and alternative methods of charging from the social, environmental and economic perspective; it also covered charging for water, metering, tariffs and affordability, bad debt in the industry and water efficiency¹⁰.

2.5 Other relevant studies

There are a number of other studies which have been carried out in the Swale Borough area, as briefly discussed below. Where appropriate, the conclusions of these studies have been taken in account in the production of this WEICA.

2.5.1 Shoreline Management Plan

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. The SMP is a non-statutory, policy document for coastal defence management planning. It takes account of other existing planning initiatives and legislative requirements, and is intended to inform wider strategic planning. It does not set policy for anything other than coastal defence management.

The SMP covers the Medway Estuary from its mouth between the Isle of Grain and Sheerness in the north to its tidal limit at Allington Lock in the south; and the Swale Estuary between the western mouth at Queenborough and the eastern mouth between Shell Ness and Faversham Creek, extending to the tidal limits of Milton, Conyer, Oare and Faversham Creeks.

The Swale SMP has appraised the four possible shoreline management options, namely Hold the Line, Advance the Line, No Active Intervention and Managed Realignment, to establish the most sustainable solution to all technical issues, economics, stakeholder interests, future developments and environmental impacts. The preferred SMP policy for the majority of the SMP area is Hold the Line; that is to undertake engineering works to hold the defence line. However, there are also some stretches of coastline where the preferred policy is to allow natural erosion to continue, which may result in some realignment of the shoreline. These areas include Cockham Wood, Ham Green to East of Upchurch, Funton to Raspberry Hill and the Medway Islands.

The Policy Options set out in the Swale SMP were adopted by the relevant Operating Authorities in the first half of 2008. Accordingly, the EA has established a National Quality Review Group [QRG] and a process to appraise and review all plans before approval. The QRG has approved the Swale SMP.

⁹ www.defra.gov.uk/environment/water/industry/cavereview

¹⁰ www.defra.gov.uk/environment/quality/water/industry/walkerreview/index.htm

2.5.2 Water Cycle Studies for adjacent Authorities

The following Water Cycle Studies have been carried out for other authorities near to the study area, the findings of which have been taken into account in this assessment.

- Kent Thameside WCS¹¹,
- Dover District Council WCS¹²; and
- Maidstone WCS¹³.

2.6 Growth in Swale Borough

2.6.1 Regional Spatial Strategy

The Secretary of State published the final version of the South East Plan¹⁴ (also known as the Regional Spatial Strategy for the South East) on May 6 2009. The purpose of this document was to provide a regional framework for the preparation of the Local Development Frameworks for each local authority within the southeast of England region.

It should be noted that as of the 6th July 2010, the Secretary of State for Communities and Local Government announced the revocation of Regional Strategies with immediate effect¹⁵. Regional Strategies are being revoked under s79(6) of the Local Democracy Economic Development and Construction Act 2009 and will thus no longer form part of the development plan for the purposes of s38(6) of the Planning and Compulsory Purchase Act 2004. However, in the absence of a replacement for the RSS, the previous housing figures will be used for the purposes of this study.

The revocation of the RSS also has implications for water resources, as the Environment Agency has used this to challenge South East Water's population assumptions in their Water Resource Management Plan.

Swale Borough lies within the Kent Thames Gateway sub-region, which has been identified as a priority area for regeneration and growth. The RSS set targets for housing and employment growth within the sub-region, which formed the basis for Swale Borough's Strategic Housing Land Availability Assessment and Employment Land Review, as discussed below. Policy KTG4: Amount and Distribution of Housing Development gave a target of 505 houses as an annual average and 10,100 total for housing growth between 2006 and 2026.

2.6.2 Strategic Housing Land Availability Assessment

All Councils must prepare a Strategic Housing Land Availability Assessment (SHLAA) annually, to demonstrate a minimum 5-year, but preferably 15-year, supply of deliverable housing land. The SHLAA must identify sites with potential for housing and assess when they are likely to be developed. The planning period addressed by the Swale SHLAA¹⁶ is 17 years, from the 1st April 2009 to 31st March 2026, which is that provided by the Regional Spatial Strategy for the

¹¹ Kent Thameside Regeneration Partnership, Kent Thameside Water Cycle Study, Phase 1 Final Report, Entec, March 2009

¹² Dover District Council WCS, Entec, January 2009

¹³ Maidstone Water Cycle Study, Outline Report, Halcrow, June 2010.

¹⁴ Government Office for the South East (2009) 'The South East Plan' <http://www.go-se.gov.uk>

¹⁵ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/1631904.pdf>

¹⁶ <http://www.swale.gov.uk/assets/Planning-General/Planning-Policy/Final-SHLAA.pdf>

South East (The South East Plan (2006-2026). The SHLAA does not cover the period to 2031. The 5-year supply period is 2009/10 to 2013/14.

The 2008/2009 Swale SHLAA gives the following overview of housing growth across the Swale Borough.

Table 2-1: Housing growth across Swale Borough to 2026

South East Plan Borough Housing target 2006-2026	10,800
Completions 1 st April 2006 – 31 st March 2009	2,096
Outstanding Planning Permissions	2,077
Other sites (outstanding local plan allocations, submitted by landowners/developers and other sources)	7,018
Total	11,191

It should be noted that the SHLAA results only include large sites of 0.15 ha or above, which are capable of delivering at least 5 dwellings, but it has identified sufficient sites to meet housing targets set by the Regional Spatial Strategy (South East Plan) at both the Borough and sub-regional levels. The SHLAA has identified and/or delivered 11,191 dwellings over the period to 2026, this is a total of 391 units over and above the RSS target of 10,800 dwellings.

It is very important to note that the SHLAA does not guarantee that a site would be granted planning permission or even be included within the LDF; the SHLAA merely represents a list of potential available land to aid the preparation of the LDF. Sites may ultimately not be allocated within the LDF because of other considerations.

The SHLAA shows the yield of the identified sites over the planning period, broken down into 5-year periods.

2.6.3 Assumed potential growth within Swale Borough

Tables 2-2, 2-3 and 2-4 below show four possible options for growth within the Swale Borough, to be tested within this WEICA. It should be noted that these four options do not represent the final growth allocations within the Borough; rather they give a range of assumed growth options to assess the water infrastructure capacity for growth within the Swale Borough. These potential growth options divide the total assumed potential growth between the main settlements.

Four growth options are presented below, these represent the following:

- Option 1: Continuing previous policy provision for development concentrated at urban areas;
- Option 2: Continuing previous policy provision for development concentrated at urban areas and larger villages;
- Option 3: Step change in employment growth and continuing previous policy provision for development concentrated at urban areas; and
- Option 4: Step change in employment and housing growth.

Table 2-2: Housing growth in the main settlements within the Swale Borough

	06/07 – 10/11			11/12 – 15/16			16/17 – 20/21		
	Total	Sittingbourne	Faversham	Total	Sittingbourne	Faversham	Total	Sittingbourne	Faversham
OPTION 1	2,446	1,292	1,052	4,954	2,576	2,130	4,504	2,342	1,937
OPTION 2	2,446	1,370	954	4,594	2,573	1,792	4,574	2,561	1,784
OPTION 3	2,446	1,027	1,296	4,334	1,820	2,297	3,284	1,379	1,741
OPTION 4	2,446	1,272	1,076	4,784	2,488	2,105	4,434	2,305	1,951
21/22 – 25/26									
		26/27 – 30/31			Post 2031				Total
Total	13,503	688	80	0	0	0	0	0	0
	13,503	698	89	100	56	39	5	0	0
	13,513	726	68	680	286	360	34	1,400	588
	18,593	1,342	122	1,680	874	739	67	2,200	924

Table 2-3: Total Housing growth over the three growth areas over the planning period

	Option 1	Option 2	Option 3	Option 4
Sittingbourne	7,041	7,562	5,675	9,448
Sheppey	5,807	5,267	7,162	8,379
Faversham	675	445	675	765

Table 2-4: Employment growth in the main settlements within the Swale Borough (m² employment land)

	Sittingbourne	Sheppey	Faversham
OPTION 1	61,950	0	0
OPTION 2	61,950	500	0
OPTION 3	603,200	500	20,000
OPTION 4	603,200	500	20,000
Total	1,330,300	1,500	40,000

2.6.4 Employment Land Review

SBC's Employment Land Review¹⁷ (ELR) was completed in April 2010, with the aim of:

- providing a review of employment land in the Borough, taking account of large scale sites in neighbouring areas;
- analysing the different market requirements in the three main parts of the Borough, namely Faversham, Sittingbourne and Sheppey; and
- critically reviewing the existing economic strategies and aspirations for the Borough.

The western part of Swale Borough forms part of the Thames Gateway growth area, with 12,000 additional jobs planned by 2016. This target exceeds the recent growth trends in the Borough, an approach which was reflected in the methodology of the ELR, although there have been fairly high levels of creation of employment space over the last 10 years. An average of 27,000 m² of employment floorspace has been created annually, mostly in the B2 (General industrial) and B8 (Storage or distribution) categories. There is also a large land allocation to meet future growth needs, as shown in Table 2-3 below.

The ELR concluded that the amount of employment land identified appeared more than adequate to meet the Swale job growth targets to 2026, although this was reliant on a few very large sites. Should any of these large sites not be delivered for any reason, the targets for employment land provision could be subject to a shortfall.

The Employment Land Review (ELR) also presented two potential growth options (low and high) ranging between 415,000 sq m and 595,000 sq m of assumed potential employment area. The choice in part reflects economic conditions, the type of business that Swale wishes to attract and the overall future ambitions of the Council.

2.6.5 Growth locations

As discussed above, while the SHLAA indicates potential development sites, individual sites have not yet been identified. For the purposes of this study, growth will be assessed for the three settlement areas as described in table 2-1 above, namely Sittingbourne, Sheppey and Faversham. This reflects the broad employment land areas given in the ELR. For the purposes of the study it will be assumed that growth in Sheppey will be centred in Queenborough, Sheerness (including Halfway) and Minster.

¹⁷ Swale Employment Land Reviews, Main Report and Appendices, Nathaniel Litchfield and Partners, 2010.
<http://www.swale.gov.uk/assets/Planning-Forms-and-Leaflets/Planning-General/Planning-Policy/Evidence-Base/Employment-Land-Review---Final-May-2010/1-Contents-Executive-Summary-and-Introduction.pdf>

2.7 Water Company Planning

Water Company planning and funding runs in five year cycles, called Asset Management Plans. The current Asset Management Plan, AMP5, runs from 2010 to 2015. South East Water and Southern Water submitted their final Business Plans to the Office of the Director General of Water Services (OFWAT) in 2009; Ofwat's decision on funding approval was issued in early 2010.

Southern Water's Business Plan, also referred to as PR09 submission¹⁸ (Price Review 2009), listed numerous schemes across the Southern Water area. Of the WwTW within the study area, all were identified as requiring improvements schemes during AMP5. Motney Hill WwTW has an AMP5 quality scheme requiring a consent change, with an output date of 31 March 2015. This comprises imposition of a 60 mg/l ammonia standard together with a no deterioration copper standard. No investment is planned to meet either of these additions to the consent.

The NEP also lists Eastchurch, Faversham, Queenborough, Sittingbourne and Teynham under 'investigations of impacts of water company assets on shellfish waters as referenced in the Shellfish Water Pollution Reduction Plan for each water'. The Shellfish Water Pollution Reduction Plans (PRP) are drawn up by the Environment Agency in accordance with the Surface Waters (Shellfish) Directions 1997, for the purposes of reducing pollution and to ensure that designated waters conform with statutory quality standards.

The programme shows the state of the catchment with respect to the Shellfish Waters Directive standards. It examines and explains the causes of any failures to meet those standards. The programme describes what actions are being taken to maintain and improve water quality in this catchment, ensure compliance with the mandatory standards of the Shellfish Waters Directive, and endeavour to observe the guideline standards. This plan is subject to annual review to establish progress and to periodic updating as circumstances change.

The PRPs for Swale East¹⁹ and Swale Central²⁰ recommended that significant point sources undergo investigation by Southern Water. To this end, the Environment Agency proposed that five continuous discharges (Eastchurch, Faversham, Queenborough, Sittingbourne and Teynham) be modelled with the view to having UV disinfection installed. OFWAT approved funding for this study and Scott Wilson were appointed by Southern Water to carry out this work in 2010. The results of the investigation are still pending.

South East Water's Business Plan²¹ gave details on the schemes required to ensure compliance with Environmental legislation. The water quality programme is based on a risk-based approach and includes:

- the renovation of 91 km of mains to resolve local discolouration problems;
- the provision of a new main to supply customers who currently experience intermittent quality problems from a neighbouring water company supply;
- the inclusion of a number of schemes to further reduce the risk of Cryptosporidium; and

¹⁸ http://www.southernwater.co.uk/pdf/aboutUs/businessPlan/SW_BusinessPlan_09v4.pdf

¹⁹ Directive (2006/113/EC) on the quality required of Shellfish Waters, Article 5 Programme, Swale East, Environment Agency 2008

²⁰ Directive (2006/113/EC) on the quality required of Shellfish Waters, Article 5 Programme, Swale Central, Environment Agency 2008

²¹ http://www.southeastwater.co.uk/pls/apex/PROD.download_file?p_doc_id=113

-
- the provision of a scheme to reduce the amount of ammonia that has recently contaminated an underground water sources causing it to be taken out of service.

As a result of reviews being carried out under new European legislation, such as the Habitats Directive and the Water Framework Directive South East Water is seeking to reduce its abstraction from groundwater and the Business Plan includes costs for investigations relating to environmental legislation but does not include any costs to mitigate any loss of supply.

3 Stage 1 – Baseline Assessment and Issue Identification

3.1 Flood Risk Assessment

3.1.1 Baseline

In April 2008, Swale Borough Council commissioned Halcrow to produce a Strategic Flood Risk Assessment²² (SFRA) in accordance with Planning Policy Statement 25 (PPS25): Development and Flood Risk (March 2010) and the accompanying Practice Guide (December 2009). Flood Zones were created by mapping the areas of the Borough which are lower than the 1 in 200 year and 1 in 1000 year events' peak sea levels, which gives an estimation of the extent of flooding which could occur if none of Swale Borough's defences were present.

PPS25 defines the following Flood Zones:

- **Zone 1** (Low Probability) - this zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%);
- **Zone 2** (Medium Probability) - this zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year;
- **Zone 3a** (High Probability) - this zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year; and
- **Zone 3b** (Functional Floodplain) - this zone comprises land where water has to flow or be stored in times of flood.

The above flood zone and the resultant Environment Agency flood zones mapping assumes no defences are present. The work undertaken for the SFRA, which was used to update the flood zones involved breach analysis of the existing defences. See Appendix A for detailed Flood Zone mapping, taken from the Swale SFRA²³.

Flooding from fluvial sources

The Swale Borough historic records do not include many events classified as fluvial, although it should be noted that as most of the rivers within the Borough lie within the tidal floodplain, in large events such as the 1953 and 1978 events discussed above, it may be expected that the tidal flooding which occurred overwhelmed any fluvial contribution.

Most of the main rivers have some form of defences along the majority of their length. In addition, the river forms part of a more complex network of numerous small watercourses and drainage ditches which can intercept and carry runoff, thereby reducing the flow peaks in the main rivers. There is generally good connectivity between the rivers and their largely unoccupied floodplains, which provide storage for out of bank events.

²² <http://www.swale.gov.uk/5658-flood-risk-strategic-assessment/>

²³ <http://www.swale.gov.uk/5658-flood-risk-strategic-assessment>

Flooding from tidal sources

The most significant tidal flood events within the Borough occurred in 1953 and 1978. In February 1953, overtopping and breaches of tidal defences occurred at Sheerness and along the western shore of the Isle of Sheppey, either side of the Swale near Sittingbourne, at Warden, and around the Isle of Harty (although the Island itself was not flooded). Extensive flooding of property is known to have occurred.

In January 1978, the tidal defences along the western marshes (Barksore, Chetney and Horsham) were overtopped, as were the defences north of Faversham. In addition the tidal defences around the Isle of Harty were breached, which resulted in flooding around the Isle and a breach of the defences east of The Lilies resulted in flooding along Conyer Creek.

Flooding from artificial sources

There are no impounded water bodies within Swale Borough to lead to a flood risk from artificial sources.

Flooding from surface water

The incidents relating to sewer flooding show that although all the main towns, namely Sittingbourne, Sheerness, Warden, Faversham and Minster have incidents of flooding, the latter two appear to have a particularly high density compared to the others.

Flooding from groundwater

The Swale SFRA lists the following groundwater flooding events, identified from the Environment Agency's database:

- saturated ground conditions and concentrated subsequent rainfall on the night of 13-14th January 1943 gave rise to flooding in the majority of the marsh areas of the Medway Estuary;
- the Stalisfield Road, Painters Forstal groundwater flooding site occurs along the length of a dry valley north of Church Farm towards Water Lane Ospringe; and
- flooded basements in Park Road, Faversham 2000/01.

3.1.2 Flood Risk to the Main Development Areas

Sittingbourne

Sittingbourne Town Centre is within Flood Zone 1 and at risk of flooding from groundwater and surface water, with several records of Southern Water sewer flooding incidents. Due to the closure of Sittingbourne Paper Mill, which was a significant groundwater abstraction, the risk of groundwater flooding in Sittingbourne has increased.

Milton Creek runs from the centre of Sittingbourne to the Swale and there are no previous records of fluvial flooding incidents. Milton Creek is surrounded by Flood Zones 2, 3a and 3b and is at risk from tidal, fluvial, groundwater and surface water flooding and is at risk of being affected by climate change. Milton Creek was also affected by 1953 tidal floods. The floodplain around Milton Creek should therefore not be developed.

Faversham

Faversham Creek runs close to the centre of Faversham, with a floodplain (Flood Zones 3b, 3a and 2) typically about 200 m wide. The centre of Faversham is subject to tidal flooding, which runs up Faversham Creek, and the creek can also indirectly cause flooding from the sewer system due to water backing up when it cannot get into the creek quickly enough.

Fluvial flooding occurred downstream of Faversham in the Ham Marshes during the 1978 event, so development should avoid encroaching on this area (as a minimum it should be treated as Flood Zone 2). A significant proportion of Faversham town centre is in Flood Zone 1, although there is a high density of sewer flooding records possibly due to blockages or insufficient capacity.

It should be noted that while the above is correct at the time of writing, discussions with the Environment Agency in respect of the Faversham Creek AAP are likely to lead to the reclassification of the area around the creek to Flood Zone 3ai; this is a special zone recently introduced by the Environment Agency to deal with the conflict that can arise from regeneration in the functional flood plain (FZ3b). SBC is due to make a decision in November 2010 as to whether to accept the proposed reclassification, which should allow residential development in former FZ3b, with the proviso that appropriate safeguards are included in the development, for example residential accommodation should be provided on the first, rather than ground, floor. Under the proposed reclassification undeveloped areas would remain as FZ3b.

Iwade

A significant proportion of Iwade village centre lies within Flood Zone 1. Downstream of Iwade village centre, there is a 50 m flood zone associated with the Iwade Drain, although there are no incidents of fluvial flooding recorded for this watercourse. Tidal flooding occurred downstream of Iwade in 1953 and flooded up to the Flood Zone 3a extents to the west of Iwade.

There are a few Southern Water flooding incidents associated with surcharged drains that are recorded to have caused flooding to property, although the lack of records could be due to householders dealing with problems themselves; information is not always relayed to Southern Water.

Sheppey (including Queenborough, Sheerness, Halfway, Minster and Eastchurch)

The outskirts of Queenborough Town are in Flood Zones 2 and 3a and flooded in the 1953 tidal floods. The very centre of Queenborough is in Flood Zone 1, however there several records of surface water flooding due to sewer flooding from under capacity networks.

Sheerness is in Flood Zone 3a, with no land in Flood Zone 1. Sheerness and the surrounding countryside were extensively flooded in 1953 from the overtopping of tidal defences at Sheerness. Flooding from the 1953 event stretched further inland than the extent of even Flood Zone 2 and there are records of properties flooding. There are also Southern Water records of sewer flooding in Sheerness due to the sewer network being under capacity.

Halfway is located slightly inland of land between Sheerness and Minster. The majority of Halfway is in flood zone 1. The very northern outskirts of Halfway are in flood zones 2 and 3a and the 1953 tidal floods flooded up to and over the flood zone 2 extents.

The majority of Minster is in Flood Zone 1, however the west of Minster and Scrapsgate drain lie within Flood Zones 2 and 3a and were affected by the tidal flooding of 1953. There are

records of high density sewer flooding in Minster, possibly due to blockages or insufficient capacity.

The village of Eastchurch lies within Flood Zone 1 with no records of sewer flooding. Eastchurch was not flooded by the 1953 overtopping of tidal defences or by the 1978 floods.

3.2 Water Supply Capacity

3.2.1 Baseline

The study area lies within the North Kent Catchment Abstraction Management Strategy²⁴ (CAMS) area. CAMS are produced by the Environment Agency for all river and groundwater catchments across the country and provide a mechanism for managing water resources at a local level, particularly regarding the amount of water available in the catchment. The CAMS aims to balance the needs of the abstractor, other water users and the aquatic environment. The CAMS objectives are to:

- make information available to the public;
- provide the opportunity for greater public involvement;
- provide a structured national approach;
- provide a framework for time limited licences; and
- facilitate water rights trading.

The North Kent CAMS classifies the region as water stressed, with droughts in 1989-92, 1995 and 2004-06. Water is supplied from both groundwater (chalk and greensand aquifers) and surface water sources. There are two surfacewater Water Resource Management Units (WRMUs) each with the following status in relation to available water:

- Teynham and Seasalter (spring fed marshes), status: no water available; and
- Iwade and Sheppey (rain fed marshes), status: no water available.

There are three groundwater WRMUs:

- Faversham and Selling LLT, status: water available;
- Faversham and Selling Chalk Faversham & Selling Chalk, status: over licensed; and
- Gillingham and Sittingbourne Chalk and LLT, status: over abstracted.

The statuses given above are defined below in Table 3-1.

²⁴ http://www.environment-agency.gov.uk/static/documents/Research/north_kent_cams_772535.pdf

Table 3-1: Water resource status definitions

Status	Formal definition	What it means
Over Abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions, or through licence trading.	Abstraction at existing rates is causing flows to drop below those required to sustain the ecology.
Over Licensed	Current actual abstraction is such that no water is available at low flows. If the existing licensed were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions, or through licence trading.	At existing rates of abstraction, we are at a fine balance, leaving only just enough to sustain the ecology. However, if abstraction were increased to maximum permitted rates (by using up headroom), flows would drop below that required.
No Water Available	No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions, or through licence trading.	If licence headroom was used, we would be at a fine balance, leaving only just enough to sustain the ecology.
Water Available	Water is likely to be available at all flows, including low flows. Restrictions may apply.	There is probably capacity within the system to allow further abstraction.

Source Protection Zones

There are a number of Source Protection Zones (SPZs) within the aquifer area. The Environment Agency designates SPZs around groundwater abstraction sources, to protect the abstraction from potentially polluting activities, by limiting discharges to ground (i.e. via soakaway) within the SPZ. Four Zones are designated:

- SPZ 1 – the area immediately around the source, which represents a 50-day travel time for groundwater from a point on the surface to the abstraction or a 50 m radius;
- SPZ2 - this represents a 400-day travel time for groundwater from a point on the surface to the abstraction;
- SPZ3 – this represents the entire catchment of the abstraction; and
- SPZ4 – this zone is sometimes designated as a Zone of Special Interest, where activities could impact upon the groundwater, despite lying outside of the catchment (as defined by SPZ3).

The location of SPZs within the study area can be viewed using the Environment Agency's SPZ mapping, available at www.environment-agency.gov.uk.

3.2.2 Water Resource Management Plans

Water companies in England and Wales publish Water Resource Management Plans (WRMPs) to set out how they intend to provide a secure and sustainable water supply for the next 25 years. These plans are regularly updated to account for factors such as projections of household numbers and occupancy rates and the implications of climate change.

In 2008, all water companies submitted their first set of statutory draft water resources management plans to the Secretary of State. For the first time, the water resources management plans were subject to public consultation and all the water companies publicly consulted on their plans during summer 2008. All water companies prepared a statement of response, which showed the consideration that had been given to the consultation responses, and any changes that would be made to the water resources management plans.

The Secretary of State announced his decisions on the next steps for the water companies statutory WRMPs in August 2009. In reaching the decisions, the Secretary of State considered the water company's draft plan, together with responses received on the public consultation and the statement of response.

Southern Water

The northern part of the Swale Borough lies within Southern Water's Kent Medway Water Resource Zone (WRZ); this zone covers the northern part of Kent from Gravesend in the west, to Sittingbourne in the east and the North Downs to the south. There are inter-zone and inter-company transfers out of the WRZ and the Kent Medway WRZ, specifically the River Medway Scheme, is central to supply management in the area. Inter-connections between WRZs allow strategic water management, while the presence of surface water storage ensures the area is generally resilient to one season droughts, although vulnerable to successive season droughts.

The Kent Medway WRZ is predicted to have an average supply demand deficit of 7.37 MI/d at the start of the planning period (2010-11), which will improve to a surplus during the middle part of the period due to source improvements. A return to deficit 3.74 MI/d is predicted after 2024, escalating to 12.30 MI/d by 2035. Additionally demand will be addressed through continued implementation of universal metering, reduced leakage and improved water efficiency. Southern have a target of 100% metering across their supply region by 2015 and it is anticipated that the water savings resulting from this will provide enough resource and network capacity to provide for the increased water supply demand following the assumed potential growth.

South East Water

The southern portion of the study area falls within South East Water's Resource Zones (RZ) 6 and 8. RZ6 is predicted to be in supply deficit by 2016; post 2016 the deficit will be met by revision of the existing abstractions from the greensand aquifer and the development of a new groundwater sources from the greensand aquifer near Thurnham. From 2025, the construction of a new strategic main from the proposed new reservoir at Broad Oak (subject to the result of inquiry) in RZ8 will meet the increased demand.

At existing provisions, RZ8 is thought to have a demand supply surplus until 2019. A 1.3 MI/d peak deficit is predicted in 2020 which will continue to increase to a 28.8 MI/d deficit in 2035. The predicted average deficit is recorded in 2030 at 3.5 MI/d which increases to 9.9 MI/d by 2035. There are various schemes proposed to mitigate the deficit; initially this will be universal metering and improved water efficiency but new supply sources have also been put forward. From 2021, the construction of the winter storage reservoir, Broad Oak Reservoir, hopes to provide 28 MI/d average and 55 MI/d peak supply, of which some water will be inter-zone transferred to adjacent RZ6 (see above). Other options include a new groundwater scheme at Hoplands Farm near Canterbury and the theoretical proposed re-use schemes and desalination plants. Implementing these strategies hope to avert any water supply deficits in the area throughout the planning period.

However, for the purposes of this study it should be noted that South East Water's WRMP is currently in question, as the Environment Agency has questioned the calculation of supply and demand forecast in the plan. This particularly relates to South East Water's per capita consumption (pcc) forecast which the Environment Agency feels should be moving towards the Defra aspiration for a pcc of 130 litres per head per day (l/h/d) by 2030. See Appendix C for further details.

The inquiry into South East Water's WRMP was scheduled to finish on the 11th June 2010; at the time of writing this assessment the outcome of the inquiry had not been published.

3.3 Wastewater Treatment Capacity

3.3.1 Wastewater Treatment Works Consent Capacity

In order to assess the additional flow that could be treated at each WwTW, the available capacity within the existing Dry Weather Flow (DWF) discharge consent for the WwTW is calculated. DWF is defined as the 20th percentile of daily flows at the works²⁵. The definition of DWF therefore does not take into account storm water discharges, which may cause flooding and/or other sewage related issues during times of heavy rainfall. DWF capacity is therefore a measure of the additional flows that can be accommodated without any action being taken by the water company to amend the discharge consent or increase the physical capacity of the works.

The WwTW consent capacity for each of the works within the SBC area has been assessed by Southern Water, who provided their figures to Scott Wilson for the purposes of this study. The locations of the WwTW are shown in Figure 6 in Appendix A. Volumetric capacity (hereafter referred to as headroom capacity) is the difference between the consented maximum dry weather flow (DWF) and the current DWF that is treated from the existing population.

The headroom capacities at the WwTWs have been assessed based on the following criteria:

Capacity - The current measured DWF is much less than the consented DWF and therefore there is capacity to accept further flow to the WwTW;

Limited Capacity - The current measured DWF is close to the consented DWF resulting in a capacity of less than or equal to 5%. It is likely that any further flow to the WwTW will exceed the consented DWF and require a new discharge consent and/or upgrade to the WwTW. Mitigation measures may be planned to increase DWF consent but these are subject to approval;

No Capacity - The current measured DWF exceeds the current consented DWF and therefore no further flow can be accepted at the WwTW unless a new discharge consent is issued by the Environment Agency. If significant growth is planned here, new locations may need to be investigated; and

Not Assessed – The works will not experience increased flows as a result of planned growth within Swale Borough.

The following WwTWs have been identified by Southern Water as lying within the study area (either the works itself, or the work's catchment):

- Eastchurch WTW;
- Faversham WTW;
- Motney Hill WTW;
- Queenborough WTW;
- Sittingbourne WTW; and
- Teynham WTW.

²⁵ It should be noted that the definition of DWF used in this study replaces the previous DWF definition of "the average daily flow of sewage during seven consecutive days without rain following seven days during which the rainfall did not exceed 0.25mm on any one day, averaged over a summer and winter period".

However, of the above six works, Motney Hill and Teynham will not be subject to increased flows due to the assumed potential growth in the Swale Borough, as they do not treat waste from the three growth areas of Sittingbourne, Sheppey and Faversham. Motney Hill WTW and Teynham WTW have therefore not been assessed as part of this WIECA.

As the growth areas in Sheppey have not been accurately defined, it has been assumed for the purposes of this study that all of the assumed potential growth within Sheppey could be within the catchment of either Eastchurch or Queenborough. Therefore the maximum allocation for each Option has been assessed for both Queenborough and Eastchurch. This gives the absolute worst case scenario, which is unlikely to be the actual situation.

Eastchurch WTW

Eastchurch WwTW is located on the Isle of Sheppey and discharges to the Bells Creek, a tidal creek on the southern side of the island. The works treats a population equivalent between 2,000 and 10,000 and discharging to freshwaters, the works is subject to the Urban Wastewater Treatment Directive Regulations, see section 2.5.

The consented DWF at the works is 4,500 m³/day, with a Biochemical Oxygen Demand (BOD) limit of 40 mg/l as a 95thile, with an upper tier (UT) of 80 mg/l, and Total Suspended Solids (TSS) limit of 60 mg/l.

Faversham WTW

Faversham WwTW is located to the east of the Borough on the mainland and discharges to Faversham Creek, a tidal creek which flows into the Swale. The works treats a population equivalent of more than 15,000 and the works is therefore subject to the Urban Wastewater Treatment Directive Regulations, see section 2.5.

The consented DWF at the works is 7,000 m³/day, with a BOD limit of 40 mg/l and TSS limit of 60 mg/l.

Queenborough WTW

Queenborough WwTW is located to the west of the Isle of Sheppey and discharges to the Swale Estuary. The works treats a population equivalent of greater than 15,000 and the works is therefore subject to the Urban Wastewater Treatment Directive Regulations, see section 2.5.

The consented DWF at the works is 11,225 m³/day, with a BOD limit of 80 mg/l and no Total TSS limit. It also has consented limits for chromium (19 µg/l), copper (17 µg/l), zinc (61 µg/l), nickel (34 µg/l) and iron (1.4 mg/l).

Sittingbourne WTW

Sittingbourne WwTW discharges a consented DWF of 11,800 m³/day, discharging to the Milton Creek, which flows through the town of Sittingbourne. There is a TSS limit of 100 mg/l, but no BOD or other numeric limit. The works treats a population equivalent of more than 15,000 and the works is therefore subject to the Urban Wastewater Treatment Directive Regulations, see section 2.5.

3.3.2 Volumetric capacity

The assessment of current volumetric capacity at the six WwTW within the study area has been carried out by Southern Water, using available MCERTS²⁶ flow data for the works to assess consent headroom. Southern Water's population projections are estimated using Experian methodology²⁷ and are consistent with the figures given by the South East Plan²⁸. A judgement has then been applied, based on Southern Water's previous experience, as to the fraction of the volumetric headroom at the works available for new development. Southern Water has then converted this figure to the equivalent household numbers, assuming water use of 500 litres per property per day. However, the Southern Water assessment of volumetric capacity expressed as household numbers differs from the standard Scott Wilson methodology, which assumes an occupancy rate of 2.1 and a per capita water consumption of 125 litres per head per day (l/h/d)²⁹, which gives a household daily water use of 262.5 l. The Scott Wilson figures will be used for the remainder of this report.

However, it must be noted that discussions with Southern Water have indicated that it considers the above allowance of 262.5 l/property/day to be inadequate, as it does not sufficiently allow for infiltration of groundwater into sewers. Even sewerage systems in new development exhibit infiltration and Southern Water would wish to see an allowance made for infiltration increasing over time. Southern Water has therefore expressed concern that the figures given for headroom at the WwTW may be unrealistically high and therefore does not agree with the assessment of headroom undertaken by Scott Wilson based on the lower assumed per capita consumption figure and is of the opinion that the analysis overestimates the headroom available at its wastewater treatment works.

It is felt that for this level of assessment the Scott Wilson figures are sufficient to inform SBC's planning decisions, but more accurate figures should be used in more detailed assessments that might be undertaken once preferred growth options are identified and exact locations are confirmed. It is recommended that a Detailed Water Cycle Study be undertaken, at which point more accurate figures can be used, which reflect the current water consumption figures in the Borough and the future target figures following Southern Water's proposed universal metering scheme.

Table 3-2: Wastewater treatment works baseline volumetric capacity

WTW	Consented DWF m3/d	Scott Wilson assessed headroom hh@262.5l/prop/day
Eastchurch	4,500	8,400
Faversham	7,000	3,600
Queenborough	11,225	5,900
Sittingbourne	11,800	1000

²⁶ MCERTS is the Environment Agency's monitoring certification scheme established to deliver quality environmental measurements. MCERTS is based on international standards and provides for the product certification of instruments, the competency certification of personnel and the accreditation of laboratories.

²⁷ Household and population estimation and projections: Methodological guide, South East Water Companies Multi Client Study, October 2008.

²⁸ Chris Kneale, Corporate Planning Manager, Southern Water, Personal communication 14/05/2010

²⁹ Building Regulations figures; this should be considered to be an aspirational target to be achieved following Southern water's proposed universal metering scheme and as such is lower than the actual average water use within the Borough, which is estimated to be 165 l/h/d (information received from SBC).

The above figures (rounded to the nearest 100 households) represent the current capacity at the works and do not account for any future growth, as defined in the Council's Core Strategy and discussed above in section 2.6.

Using the growth figures given above in section 2, the post-growth capacity of each of the WwTW has been assessed, as shown below in Table 3-3. The full assessment spreadsheet is given in Appendix B.

Table 3-3: Wastewater treatment works future volumetric capacity

Treatment works	Option 1 Housing allocation		Option 2 Housing allocation		Option 3 Housing allocation		Option 4 Housing allocation	
	Post growth flow (m3/d)	Capacity post growth (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)
Eastchurch	3,825	675	3,684	816	4,181	319	4,500	0
Queenborough	11,204	21	11,063	162	11,560	-335	11,879	-654
Faversham	6,228	772	6,168	832	6,228	772	6,252	748
Sittingbourne	12,579	-779	12,716	-916	12,221	-421	13,211	-1,411

A negative figure for capacity indicates exceedance of the consented DWF at the WwTW. The following options may be required to increase the work's capacity:

- variation to the consented DWF, to increase the DWF volume (a relatively simple 'paperwork' exercise, albeit one which is subject to the Environment Agency's rigorous application and approval criteria);
- upgrading consent, to increase the DWF volume, but tighten other consented determinands (for example lowering the numeric limits for BOD or TSS) (See section 3.3.4 below); or
- a physical upgrade to the works or process, which may be required to increase the volume that can be treated at the works or to treat the effluent to the higher standards required by an upgraded consent (see previous bullet).

It is not possible to determine at this level of assessment which of the above three options would be required to resolve the capacity issues shown in Table 3-3 above. An exceedance of DWF is therefore not considered to be an absolute constraint to development; rather it is an area which needs to be further assessed at a later date, once the exact growth locations are known.

Table 3-3 above indicates that two of the works have limited capacity to accommodate the level of growth within the Borough. Queenborough will exceed its current DWF consent under growth Options 3 and 4 and Sittingbourne will exceed its current DWF under all growth Options. Under Option 4 Eastchurch will have no spare capacity.

Southern Water's flow figures indicated that Sittingbourne has just 255 m³/day available capacity, which equates to approximately 1000 households. As SBC's growth options propose between 1,830 (Option 3) and 5,860 (Option 4) new households, it can be seen that at the least an increase to the consented DWF will be required for Sittingbourne WwTW.

Southern Water's flow figures indicate that Queenborough has 1,545 m³/day available capacity, which equates to approximately 5,900 households. SBC's growth options propose 7,162 new houses under Option 3 and 8,379 under Option 4, although as discussed above these are the total housing figures for Sheppey and it is not known which WwTW catchment within Sheppey would receive the increased flows. It has therefore been assumed for the purposes of this study that all of the assumed potential growth within Sheppey could be within the catchment of either Eastchurch or Queenborough and the maximum allocation for each Option has been assessed for both Queenborough and Eastchurch. However, under this worst-case scenario, an increase to the consented DWF will be required for Queenborough WwTW.

Southern Water's flow figures indicate that Eastchurch has 2,199 m³/day available capacity, which equates to approximately 8,400 households. Under SBC's assumed potential growth options 8,380 houses are proposed in Sheppey under Option 4, although as above for Queenborough it is not known whether all of these will discharge to Eastchurch WwTW. Should all of the new properties be built within the catchment of Eastchurch WwTW, the consented DWF capacity would be reached, but not exceeded. An increase in the consented DWF would therefore be required in order to accommodate the proposed flows and allow headroom for future 'minor' growth, such as windfall or infill developments. If a headroom allowance of 20% is taken to be the target, the consented DWF at the works would need to be increased to 5,400 m³/day.

3.3.3 Timing of consented DWF exceedances

For the two works identified above as requiring increases to their consented DWF following growth, an assessment has been made as to the point at which the upgrades will be required. This will allow for the extended lead-in times that are required, to account for consent applications and negotiations with the Environment Agency, or the much lengthier process of physical upgrades to the works (see section 2.5.1 above for details of Water Company funding mechanisms and AMP cycles). Tables 3-4 and 3-5 below shows the results of this assessment and gives the estimated timings for when DWF consents will be exceeded at Queenborough and Sittingbourne WwTWs.

This shows that for all growth options, it is likely that the DWF capacity at Queenborough will be exceeded in the period 2021/22 to 2025/26. For Sittingbourne, it is likely that the DWF capacity will be exceeded sooner, in the period 2016/17 to 2021/22.

Table 3-4: Estimated timing of DWF consent exceedance at Queenborough WwTW

Option 3	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
1,345	3,090	1,296	340	10,020	1,226	943	3,593	1,741	5,334	1,400	11,080	1,185	726	6,060	1,391	11,271	1,481	48	360	6,420	1,985	11,365	1,940	742

Option 4	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
1,545	3,090	1,076	282	9,962	1,263	835	3,181	1,951	5,132	1,947	11,027	1,188	1,942	6,474	1,699	11,379	1,154	739	7,213	1,893	11,573	1,545	742	

Table 3-5: Estimated timing of DWF consent exceedance at Sittingbourne WwTW

Option 1	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
255	510	1,292	339	11,070	1,290	1,015	3,688	2,576	6,210	1,630	12,361	1,279	831	7,041	1,848	12,579	1,279	0	7,041	1,848	12,579	1,279	0	

Option 2	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
255	510	1,370	360	11,091	1,683	1,035	3,943	2,573	6,504	1,707	12,438	1,331	1,002	7,506	1,970	12,701	1,311	56	7,562	1,985	12,716	1,316	0	

Option 3	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
255	510	1,027	270	11,001	1,393	747	2,847	1,820	4,226	1,109	11,840	1,191	575	4,801	1,260	11,991	1,191	286	5,087	1,335	12,066	1,266	568	

Option 4	06/07-10/11				11/12-15/16				16/17-20/21				21/22-25/26				26/27-30/31				Post 2031			
	Headroom (m3/d)	Headroom (hh)	Post flow (m3/d)	Post capacity (m3/d)	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses	Additional flow (m3/d)	Post flow (m3/d)	Post capacity (m3/d)	Cumulative growth (m3/d)	Houses
255	510	1,272	334	11,065	1,335	897	3,760	2,488	6,065	1,592	12,323	1,233	1,585	7,650	2,008	12,759	1,233	874	8,524	2,238	12,969	1,169	924	

3.3.4 Calculation of future consent limits

In order to accommodate the required increases to consented DWF discussed above, while meeting the requirements of the WFD, discharge consent standards (for quality) are calculated to ensure that the downstream water quality achieves or maintains Good status. Using the guidance set out in the Environment Agency's draft No Deterioration document³⁰, Good status has been used as the target status for all STW. The detailed outputs of the water quality modelling and proposed consent limits determination are given in Appendix A. A summary is given below in Table 3-6.

The consent standards will be determined using Load Standstill Calculations, as the works discharge to tidal watercourses and the standard River Quality Parameter (RQP) modelling software is not applicable. The modelling was undertaken to determine what quality conditions (or consent standards) would need to be applied to the discharges to ensure no deterioration in water quality downstream and hence meet WFD standards and ecological requirements downstream. This is to determine whether a feasible solution to increase the discharge at the existing WwTW is available, and whether this is achievable within the limits of Best Available technology (BAT³¹). Modelling has been undertaken for the key discharge parameters of Ammonia (NH₄), Biochemical Oxygen Demand (BOD) and Phosphorus (P).

³⁰ No deterioration and growth, Environment Agency, 15th December 2009, DRAFT

³¹ i.e. BAT is currently considered to be the at the following limits for the following determinands 5 mg/l BOD, 1 mg/l NH₄ and 1 mg/l P

Table 3-6: Proposed future discharge consent standards to ensure no deterioration in water quality following the proposed growth

Treatment works	Development Option	Post-growth flow	Suggested BOD consent limit (mg/l as 95%ile)	Suggested TSS consent limit (mg/l as 95%ile)
Queenborough STW	1	11,560	38	57*
	2	11,879	37	56*
Sittingbourne WwTW	1	12,579	61*	93
	2	12,716	60*	92
	3	12,221	65*	96
	4	13,211	58*	89
Eastchurch WwTW	4	5,400**	33	50

* Currently no numeric limit on discharge consent for this determinand

**The values above in Table 3-3 indicate that the capacity of Eastchurch is 0 m3/day post-development (assuming all development on Sheppey is within the Eastchurch catchment), which theoretically means that there is sufficient capacity. However, this would not allow for any future 'minor' growth within the catchment, such as windfall or infill developments; to limit this minor growth could have implications for redevelopment and regeneration. Load standstill calculations have therefore been carried out for Eastchurch using the assumed future flow figure of 5,400 m3/day, (giving 20% headroom) as it is not known at this point what the consented DWF would be increased to.

3.4 Wastewater Treatment Works Process Capacity

3.4.1 Baseline

The WwTW process capacity has been assessed for each of the works within the SBC study area, based on the current process capacity at the works and the potential capacity and impacts of future development to 2026.

Process capacity refers to the volume that can be treated to the required quality standards set by the discharge consent. It is assumed that Southern Water would seek the funding required to upgrade the treatment processes in the works (if necessary) to treat the additional DWF to the standard required under the existing consent. Whilst this assumption is acceptable for the purposes of this study, a further detailed study (a modelling exercise in conjunction with SWS) may be required to assess the actual process capacity and need for process improvements using finalised housing figures, occupancy rates and consumption (based on water efficiency targets) when available. The assessment may also be required to provide information on if/when the funding is required to upgrade the process capacity of the WwTWs as any new upgrades or infrastructure requires funding to be sought by Southern Water and as such, there is an associated lead-in time for the upgrade works which would limit the amount of development that could take place before the upgrades are in place.

For the purposes of this study, the process capacity has been assessed by identifying those WwTW that are currently operating under stringent discharge consents and are therefore likely to have less capacity, require special technical measures and incur more expense to treat sewage from new developments up to 2031. A stringent consent is often an effective indicator that an effluent receives little dilution and/or discharges to a high quality watercourse. Tightening of these already strict standards is likely to be an expensive treatment option. In some instances, future development could require the effluent to be treated beyond that current achievable with the Best Available Technology (BAT).

The current consents for the WwTW in the SBC study area have been assessed (where available) to identify those works that are close to current Best Available Technology (BAT) discharge quality limits of 5 mg/l (95%ile) BOD, 1 mg/l (95%ile) Ammonia and 1 mg/l (mean) phosphorous (P), and will therefore be more constrained in terms of future development and improving the effluent quality from the WwTW. The results provided in this assessment should be taken as indicative and providing guidance to highlight potential rather than definitive constraints in terms of WwTW process capacity to future development across the region.

The process capacity at the WwTW has been assessed based on the following criteria:

Capacity - The current consents are not considered to be stringent (> 10 mg/l (95%ile) BOD, > 5 mg/l (95%ile) Ammonia and > 2 mg/l (Mean) P) and therefore there is likely to be capacity to treat further flow to the WwTW;

Limited Capacity - The current consents are considered to be stringent (=< 10 mg/l (95%ile) BOD, =< 5 mg/l (95%ile) Ammonia, =<2 mg/l (Mean) P) and future growth at the WwTW may require expensive treatment options to reach the required consent.

No Capacity - The current consents are at BAT (5 mg/l (95%ile) BOD, 1 mg/l (95%ile) Ammonia and 1 mg/l (Mean) P) and/or are close to BAT and have been identified by the Environment Agency as requiring further investigation.

Table 3-7 below highlights those works that currently have limited or no consent capacity and/or any proposed mitigation schemes under AMP5 or NEP that plan to address existing or known future capacity constraints by 2015. S and W refer to summer and winter discharge consent limits; stricter consent targets are required during the summer months to take account of decreased dilution from lower flows in watercourses and warmer temperatures which increase the environmental impacts of polluting loads.

Table 3-7: Wastewater treatment works process capacity

WwTW	WwTW Consent Capacity ³	Current consent (95%ile/Mean)
Eastchurch	BOD	40 (95%) 80 (UT)
	TSS	60
	Ammonia	-
Faversham	BOD	40 mg/l
	TSS	60
	Ammonia	-
Queenborough	BOD	40 mg/l
	TSS	60
	Ammonia	-
Sittingbourne	BOD	-
	TSS	100
	Ammonia	-

Table 3-7 above shows the four consents to have very relaxed limits, which should allow for upgrades in process to be carried out to meet the requirements of the consents calculated in

section 3.4.3 above. Discussions with Southern Water did not indicate that there would be difficulties in expanding or upgrading of any of the four works (subject to Environment Agency and Local Authority approval); none of the works are located on constrained sites.

The possible impacts of climate change should also be taken into consideration, as changes in rainfall patterns to shorter, more intense storms may lead to lower base flows in rivers. This would provide less dilution of discharges from WwTW. In the case of Swale Borough, where the majority of WwTW discharge to coastal waters, this will not be of such significance as the effects of increased sea temperatures. There is an inverse relationship between water temperature and dissolved oxygen; warmer water holds less oxygen than colder water. Localised effects of oxygen sags could therefore become a problem around the outfalls from WwTW and this will need to be taken into account when determining any future discharge consent standards.

3.5 Wastewater Network Capacity

There are recorded incidents of sewer flooding in Sittingbourne, Sheerness, Queenborough, Halfway, Iwade, Faversham and Minster, with the latter two appearing to have a particularly high density of incidents compared to the others. According to the Lower Medway Internal Drainage Board most of the sewer flooding incidents are related either to blockages or insufficient capacity in the network.

The sewer network in Faversham can be affected by water backing up the sewer network when Faversham Creek is in flood; the creek can also silt up the system and reduce capacity or cause blockage.

Wastewater networks that have an abundance of sewer flooding records (DG5 records) are possibly either under capacity or combined systems (drain wastewater and surface water) that become under capacity in periods of heavy rainfall.

Network modelling of combined systems is necessary to determine flows from surface water; this will enable the remaining capacity for wastewater to be calculated. Any plans to connect new development into a combined network will increase the risk of storm overflow spills and hence flooding from the network. However, should new development result in the upgrade of existing sewers the risk of flooding could be reduced due to the provision of increased capacity.

Networks that are reliant on pumping stations, due to flat topography, will also require a network model to assess the capacity of existing pumping stations and pumped mains and to determine whether they will require upgrading to take increased flow.

Existing wastewater networks may have capacity to take a DWF increase of 5% or less, especially if new development is small, close to a main sewer and sparsely spread over the area drained by the existing network. Parcels of land allocated for large volumes of development are more likely to require either major upgrades to existing trunk mains or new infrastructure connecting directly to the closest Sewage Treatment Works (STW) with capacity. New infrastructure is especially likely if the development is a long distance from, not currently connected to, or on the opposite side of town to the STW.

At this level of assessment it is not possible to draw further conclusions regarding the available capacity in the sewer network, as the exact location of the proposed development are not known. Once the proposed development sites have been determined, an assessment of the capacity within the sewer network should be carried out in conjunction with Southern Water.

3.6 Environmental and Ecological Impact

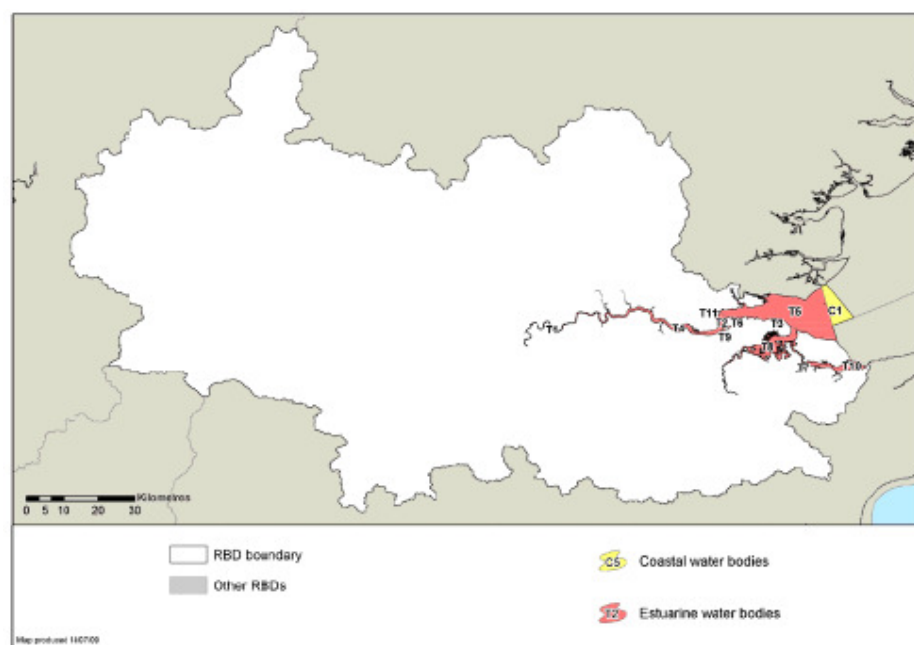
3.6.1 Baseline Water Quality

Under the WFD, all countries in the European Union should aim to achieve at least good status for all waters. Where this is not possible, good status should be achieved by 2021 or 2027.

Transitional waterbodies

Figure 3-1 below (taken from the Environment Agency's Thames RBMP³²), shows the WFD waterbodies within the study area.

Figure 3-1: Estuarine and Coastal waterbodies within the Thames river basin district



Source: <http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/thames/Intro.aspx>

As shown above, Swale Borough is surrounded by three transitional waterbodies:

- T5 Thames Lower (GB530603911401) to the north;
- T8 Medway (GB530604002300) to the west; and
- T10 Swale (GB530604011500) to the east.

Table 3-8 below gives the WFD status of these waterbodies.

³² <http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/thames/Intro.aspx>

Table 3-8: Status of transitional waterbodies in the study area

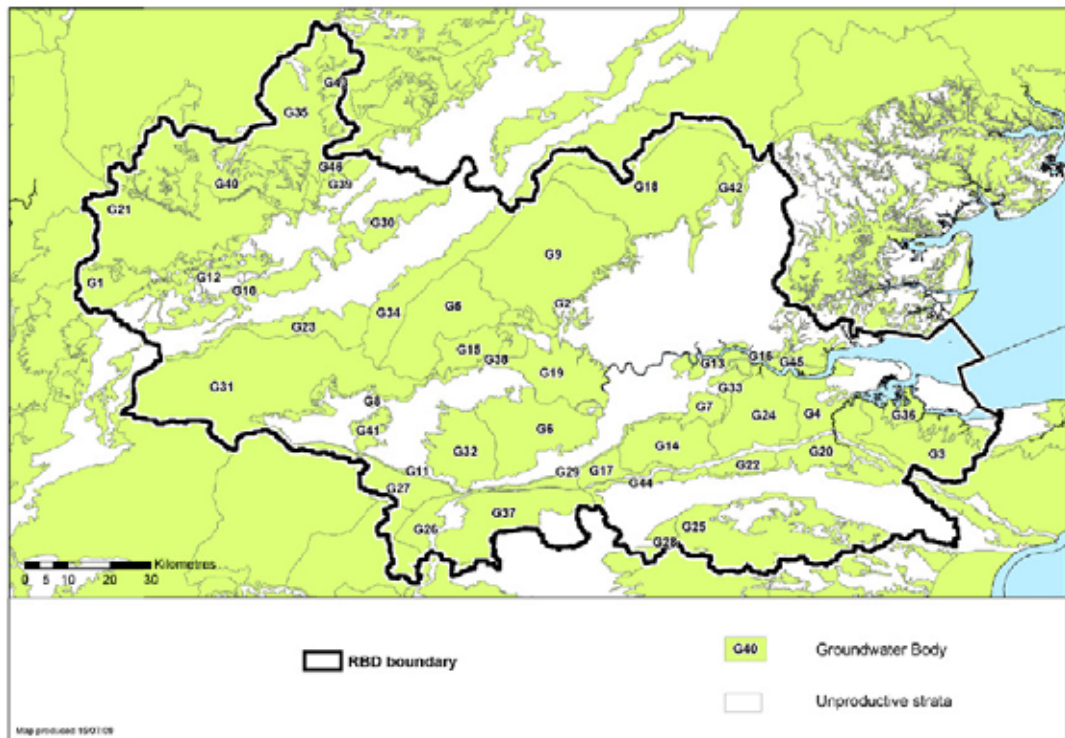
Waterbody	Map reference	Current overall potential	Current Ecological Status	Current Chemical Quality
Thames Lower	T5	Moderate	Moderate Potential	Fail
Medway	T8	Moderate	Moderate Potential	Fail
Swale	T10	Moderate	Moderate Potential	Fail

As discussed above in section 3.4.2, there are at least two WwTW which will discharge increased volumes of treated effluent (over and above their current consented volume) following the assumed potential development, namely Queenborough and Sittingbourne (Eastchurch is unlikely to require an increase to the consented DWF, as discussed above). Both of these WwTW discharge to the Swale, which is currently classed as being of Moderate overall potential, with a target status of Good by 2027. Calculations made of the required consents standard to meet current pollutant loadings indicate that it is possible to increase discharges to the Swale without affecting the potential of the waterbody to meet Good status by 2027.

Groundwater bodies

In addition to the above transitional waterbodies, there are also two groundwater bodies within the study area, as shown in Figure 3-2 below.

Figure 3-2: Groundwater bodies within the Thames river basin district



Source: <http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/thames/Intro.aspx>

As shown above, Swale Borough has two groundwater bodies:

- G3 North Kent Swale chalk (GB40601G501700) to the southeast; and
- G36 North Kent Tertiaries (GB40602G500200) to the southwest.

Table 3-9 below gives the WFD status of these waterbodies.

Table 3-9: Status of groundwater bodies in the study area

Waterbody	Map reference	Current overall potential	Current Quantitative Status	Current Qualitative status
North Kent Swale chalk	G3	Poor	Poor	Poor
North Kent Tertiaries	G36	Poor	Poor	Poor

Southern Water's WRMP states that it intends to implement universal water metering across its supply zone by 2015. The resulting water savings from this metering will account for the increased demand from the assumed potential growth and no new or increased water abstractions will be required. However, the start of the metering programme has been delayed.

South East Water proposes to meet its supply-demand deficit through efficiency measures and leakage reduction, in addition to two major schemes which are proposed in the Canterbury area. A new winter storage reservoir at Broad Oak is proposed, which will increase the storage capacity rather than abstraction rates, although this scheme is subject to the outcome of an inquiry. A new groundwater scheme is proposed at Hoplands, which lies within the area designated in the North Kent and Swale CAMS³³ as having 'Water Available'. This status is slightly contradictory to the RBMP status given above in Table 3-6, which states that the North Kent Swale chalk groundwater body is at Poor quantitative status, but this may be explained by the fact that the G3 waterbody covers a much larger area than that which is described in the CAMS as having water available.

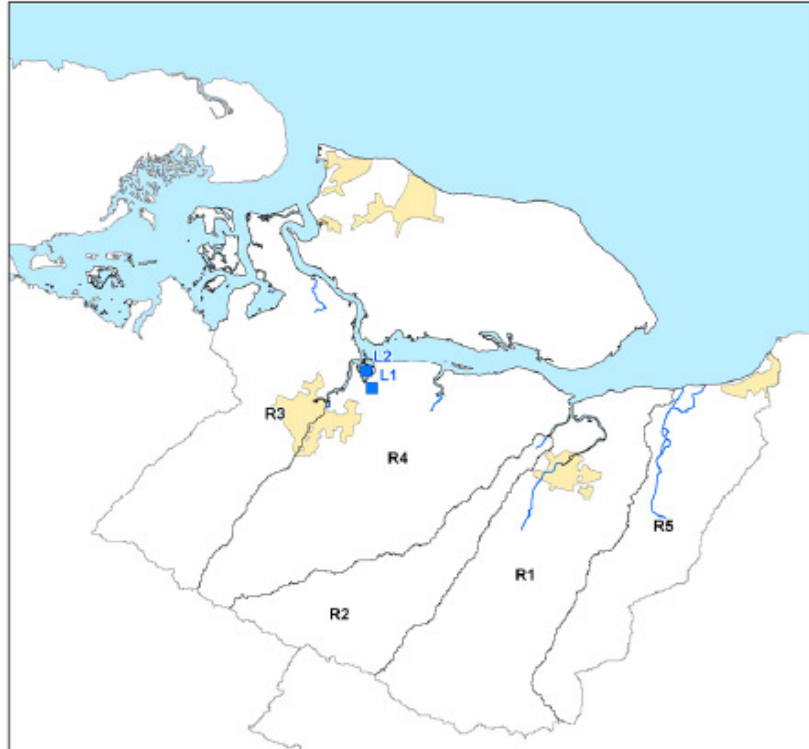
It is therefore possible to accommodate the increased water resource demand of Swale Borough without having an adverse effect on the groundwater resources of the study area.

Surface water bodies

There are also surface water bodies within the study area, as shown in Figure 3-3 below.

³³ <http://publications.environment-agency.gov.uk/pdf/GESO0405BNZL-E-E.pdf>

Figure 3-3: Surface water bodies within the study area



Source: <http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/thames/Intro.aspx>

As shown above, Swale Borough has several surface water bodies:

- R1 Dry valley south of Faversham (GB106040018530);
- R2 Dry valley southwest of Faversham (GB106040018540);
- R3 Iwade (GB106040018600);
- R4 Dry valley south of Sittingbourne (GB106040018550);
- R5 White Drain (GB106040018560);
- R16 Swale tributary at Lower Halstow (GB106040018220); and
- Two angling lakes at Murston L1 (GB30642956) and L2 (GB30642923).

Table 3-7 below gives the WFD status of these waterbodies.

Table 3-7: Status of surface water bodies in the study area

Waterbody	Map reference	Current overall potential	Current Ecological Status	Current Chemical Quality
Dry valley south of Faversham	R1	Moderate	Moderate	Does not require assessment
Dry valley southwest of Faversham	R2	Moderate	Moderate	Does not require assessment
Iwade	R3	Moderate	Moderate	Does not require assessment
Dry valley south of Sittingbourne	R4	Good	Good	Does not require assessment
White Drain	R5	Poor	Poor	Does not require assessment
Swale tributary at Lower Halstow	R16	Moderate	Moderate	Does not require assessment
Murston Angling lakes	L1	Poor	Poor	Does not require assessment
Murston Angling lakes	L2	Bad	Bad	Does not require assessment

While only one of these surface water bodies is currently achieving its target 'Good' status, the assumed potential development within Swale Borough will not cause any deterioration in the current situation. None of the above listed surface waterbodies will receive increased discharges from WwTW or increased abstraction, although these surface water units are in part dependent on spring flows which could be affected by increased public water supply abstraction from groundwater. However, subject to appropriate construction techniques, runoff control and site specific EIA etc, the effects of the assumed potential development will therefore be minimal.

3.6.2 Bathing and Shellfish waters

The designated Bathing Waters within and adjacent to the study area all achieved legislative compliance by attaining either Good or Excellent status over the recording period (1991 to present). The 2010 Bathing season is not yet finished and the full results for 2010 are therefore not yet available but the latest results recorded, for the 30th August 2010, indicated that the following beaches achieved Excellent status:

- Sheerness;
- Minster Leas; and
- Leysdown.

The following beaches achieved Good status:

- West Beach, Whitstable;
- Tankerton;
- Herne Bay Central; and
- Herne Bay.

The designated Shellfish Waters within or adjacent to the study area also all achieved legislative compliance by attaining the target status of Class B or higher. The only exception to this was Minnis Bay, which lies within the North Kent Coast area, which was recorded as being at Class C. However, Minnis Bay lies approximately 9 miles to the east of the study area, with the conurbations of Whitstable and Herne Bay between the two. It would therefore be not possible to attribute the failure of the Minnis Bay shellfish water to the discharge from any of the WwTW within the study; it is more likely that discharges from Whitstable and Herne Bay are responsible for the failure. Southern Water has recently commissioned a study of the impacts of consented discharges on Shellfish Waters and the outcomes of this should be used to inform any decisions made regarding the impacts of development within the study area on designated shellfish waters. The following classification were recorded for 2010-2011

- Sheppey B – LT;
- Swale B – LT;
- North Kent Coast, all B – LT apart from Kentish Flats (A) and Minnis Bay (C).

3.6.3 Ecological Assessment

The Swale SPA and Ramsar site

The Swale includes the largest remaining areas of freshwater grazing marsh in Kent and is representative of the estuarine habitats found on the north Kent coast. The habitats comprise chiefly mudflats, saltmarsh, and freshwater grazing marsh, the latter being intersected by extensive dykes and fleets. The area is particularly notable for the internationally important numbers of wintering and passage wildfowl and waders, and there are also important breeding populations of a number of bird species. Associated with the various constituent habitats of the site are outstanding assemblages of plants and invertebrates.

The mudflats of the Swale are extremely rich in invertebrates, over 350 species having been recorded. Some of these, such as the polychaete worm *Clymenella torquata* are unknown elsewhere in Britain, while other more widespread species are present at high densities and provide food for the huge numbers of birds, especially waders, which use the Swale.

The saltmarshes are among the richest for plant life in Britain with for example particularly good representation of the saltmarsh-grasses *Puccinellia* and the glassworts *Salicornia*. Other abundant species include sea aster *Aster tripolium*, sea lavender *Limonium vulgare*, sea purslane *Halimione portulacoides* and common cord-grass *Spartina anglica* while less common plants include small cord-grass *Spartina maritima* and golden samphire *Inula crithmoides*. As well as providing feeding and roosting places for many birds, the saltmarshes are of entomological interest; for example, this is the habitat of the scarce ground lackey moth *Malacostoma castrensis*.³⁴

The Environment Agency controls water pollution from point source discharges by the application of a permit issued under the Environmental Permitting Regulations (2010)³⁵. The implementation of the Habitats Regulations 1994 established a requirement to review existing permissions to ensure that no Agency permission results in an adverse effect, directly or indirectly, either alone or in combination, on the integrity of a classified Special Protection Area (SPA) or candidate or designated Special Area of Conservation (SAC).

³⁴ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003678.pdf

³⁵ http://www.opsi.gov.uk/si/si2010/draft/ukdsi_9780111491423_en_1

This process, known as the Review of Consents (RoC), is undertaken in four stages:

- Stage 1: Identifying relevant permissions
- Stage 2: Assessing likely significant effect
- Stage 3: Appropriate assessment
- Stage 4: Determination of existing consents

A total of 130 consented discharges were considered likely to have a significant effect on the interest features at Stage 2 of the review process³⁶ and so were carried forward to be considered by the Stage 3 Appropriate Assessment of the Swale SPA.

The Stage 3 Appropriate Assessment concluded that all discharge consents were shown not to be having an adverse effect on site integrity. Only two water quality consented discharges, Eastchurch and Faversham WwTW, discharge directly to designated habitat sub-features (mudflats) of the SPA and neither of these were shown to be having an adverse impact.

The RoC concluded that there would be no impact on dissolved oxygen (DO) standard compliance, should loads increase across the Thames, Medway and Swale, despite low dissolved oxygen events occurring intermittently in Milton Creek, which lies in Sittingbourne (outside the SPA). If the flows discharged were increased to the maximum consented flow, by utilising the available headroom at Sittingbourne WwTW, it is thought likely to increase frequency of low DO events. However, the available headroom in the BOD consent at Sittingbourne is small and breaches would remain marginal and intermittent. The review therefore concluded no impact.

Background ammonia levels in the SPA are low and for all water quality consents the RoC concluded that there are no adverse effects on the integrity of the Swale SPA.

The Swale has not been proposed for designation as a Sensitive Area or Polluted Water under the Urban Wastewater Treatment Directive. The water within the estuary is hypernutrified in summer and winter, but there is no subsequent widespread growth of nuisance macroalgae or other undesirable ecological impacts. This is thought to be due to the influence of other growth limiting factors, such as tidal energy, light and sediment erodibility. The RoC therefore concluded there is no foreseeable risk that increasing nutrients released by existing consents would increase macroalgae cover or biomass and impact the integrity of the SPA.

Medway Estuary and Marshes SPA and Ramsar site

The Medway Estuary and Marshes form the largest area of intertidal habitats which have been identified as of value for nature conservation in Kent and are representative of the estuarine habitats found on the North Kent coast. A complex of mudflats and saltmarsh is present with in places grazing marsh behind the sea walls which is intersected by dykes and fleets. The area holds internationally important populations of wintering and passage birds and is also of importance for its breeding birds. An outstanding assemblage of plant species also occurs on the site.

The Medway Estuary is now believed to be the most important area in north Kent for wintering wildfowl with shelduck *Tadorna tadorna*, brent goose *Branta bernicla*, grey plover *Pluvialis squatarola*, ringed plover *Charadrius hiaticula*, pintail *Anas acuta*, dunlin *Calidris alpina*, and redshank *Tringa totanus* occurring in numbers of international significance. Also present in

³⁶ Part B – Functional Appropriate Assessment – Water Quality

numbers of national significance are turnstone *Arenaria interpres*, black-tailed godwit *Limosa limosa*, curlew *Numenius arquata*, great crested grebe *Podiceps cristatus*, shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas penelope* and white-fronted goose *Anser albifrons*. Passage migrants include ruff *Philomachus pugnax*, whimbrel *Numenius phaeopus* and avocet *Recurvirostra avosetta*.³⁷

As for the Swale above, a RoC has been carried out the Medway Estuary and Marshes SPA, under the Habitats Regulations. The Appropriate Assessment for the Medway Estuary and Marshes SPA assessed 405 permissions and found that four Consents to discharge may pose a risk of adverse effect on the integrity of the SPA due to toxic contamination, particularly from copper.

One of the four consents is held by Southern Water Services and permits the discharge of treated sewage effluent from the Motney Hill sewage treatment works (STW). A further three consents permitting the discharge of trade and industrial effluents were found to be acting in combination with the discharge from Motney Hill STW, compounding the risk of toxic contamination by adding to the potential concentration of contaminants. In order to rectify this situation the concentration of copper within the discharge from Motney was limited by a variation to the discharge consent. The RoC concluded this reduction in copper levels from Motney Hill would remove the in combination effect from the three trade discharges, for which no variations were made.

The RoC ultimately concluded that the above action would be sufficient to conclude that no Environment Agency permissions (discharges and abstractions) are having an adverse effect on the integrity of the site.

The western portion of Swale Borough lies within the catchment of Motney Hill WwTW, although there is currently no growth proposed within this area and hence it has not been considered within this WIECA. However, it should be noted that there is the potential for the discharge from the Motney Hill WwTW to impact upon the Medway Estuary and Marshes SPA, should any increase to the consented DWF for the works be required. While the Environment Agency would consider impacts on the Medway Estuary and Marshes SPA as a part of any variation to the discharge consent and no adverse effects would therefore result, it should be noted that this could form a constraint to future development within the Motney Hill catchment. Should the Council's preferred growth location alter so as to encompass the Motney Hill catchment, an assessment of the impacts on the discharge from the works should be carried out at an early stage in the planning process.

Blean Complex SAC

The Blean complex comprises a mosaic of ancient semi-natural woodland and conifer plantation and includes several rare woodland types. The area is noted for birds with over 50 species of breeding bird having been recorded. The woodland also supports a diverse invertebrate fauna including 5 nationally rare and 13 nationally scarce species. Tree species recorded include coppiced sweet chestnut *Castanea sativa* and birch *Betula spp*, through coppice-with-standard to high forest dominated by sessile oak *Quercus petraea* and beech *Fagus sylvatica*. Peripheral areas of more mixed coppice include hornbeam *Carpinus betulus*, ash *Fraxinus excelsior*, hazel *Corylus avellana* and field maple *Acer campestre*. About one third of the site has been clear felled and replanted with conifers such as Corsican pine *Pinus nigra* and Scots pine *Pinus sylvestris*.

³⁷ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000244.pdf

The woods are situated on London Clay and gravel drift deposits which have given rise to a range of free to poorly drained moderately acidic soils. The site is therefore not thought to be hydrologically sensitive and can therefore be scoped out of further assessment in this WIECA.

Thanet Coast and Sandwich Bay SPA and Ramsar site (adjacent)

This site does not lie within Swale Borough, as it extends from Swalecliffe to Ramsgate, but the proximity of the site to the study area means there is the potential for effects from the assumed potential development in Swale. The site comprises mainly unstable cliff and foreshore (including shingle, sand and mudflats), with smaller areas of saltmarsh, coastal lagoons, coastal gill woodland and cliff-top grassland. There are a number of biological, geological and geomorphological features of interest within the site.

The Thanet Coast is particularly noted for its bird populations, supporting both internationally and nationally important numbers of wintering birds, with one species breeding in nationally important numbers. Associated with the various constituent habitats of the site are outstanding assemblages of both terrestrial and marine plant species, including communities of marine algae that are of limited occurrence elsewhere in the British Isles. Invertebrates are also of interest and there are recent records of three nationally rare and one nationally scarce species.³⁸

A RoC has been carried out the Thanet Coast and Sandwich Bay SPA, under the Habitats Regulations. The RoC concluded that there was no adverse effect on the integrity of the Thanet Coast SAC or SPA from nutrient enrichment due to Environment Agency consents. The RoC also concluded no adverse effect on the integrity of the Thanet Coast SAC or SPA from toxic contamination from Environment Agency permissions.

Sheppey Cliffs and Foreshore SSSI

This site has been designated for its geological interest, as one of the best known Palaeogene sites in Britain which has been the focus of scientific study since the eighteenth century. The cliff and foreshore section between Warden and Minster comprise Eocene London Clay, capped by Pleistocene sediments except between East End and Cliff Farm where the cliff intersects an outlier of the Eocene Virginia Water Formation. This is the only extant section of the upper part of the London Clay and is geographically the most extensive section of this Formation in Britain.³⁹

The site is therefore not thought to be hydrologically sensitive and can therefore be scoped out of further assessment in this WIECA.

South Thames Estuary and Marshes SSSI (adjacent)

This site does not lie within Swale Borough, as it lies to the north west of the Borough between Gravesend and the eastern end of the Isle of Grain, but the proximity of the site to the study area means there is the potential for effects from the assumed potential development in Swale.

The site consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of the north Kent marshes. Freshwater pools and some areas of woodland provide additional variety and complement the estuarine habitats. The site supports outstanding numbers of waterfowl with total counts regularly exceeding 20,000. Many species regularly occur in nationally important numbers and some species regularly use the

³⁸ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003560.pdf

³⁹ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1001313.pdf

site in internationally important numbers. The breeding bird community is also of particular interest.⁴⁰

As discussed above in section 3.4.2, there are at least two WwTW which will discharge increased volumes of treated effluent following the assumed potential development, namely Queenborough and Sittingbourne, both of which discharge to the eastern edge of the Swale, closest to South Thames Estuary and Marshes SSSI. However, calculations made of the required consents standard to meet current pollutant loadings indicate that it will be possible to upgrade the current discharge standards to ensure there is no adverse effect on water quality from increased discharges following growth. There will therefore be no associated effects on the South Thames Estuary and Marshes SSSI.

⁴⁰ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003874.pdf

4 Stage 2 Significance of Issues

Tables 4-2 to 4-4 provide a summary of the issues identified in Stage 1 of the study for each of the three assumed potential development areas. The issues have been subdivided as above, with the available capacity assessed in terms of flood risk, water supply capacity, wastewater treatment and network capacity and environmental and ecological. The capacity assessment has been colour coded to allow a quick appraisal of the constraints both under current conditions and in the future (as a result of assumed potential development). An explanation of the colour coding used is provided in Table 4-1 below. The assessment is subject to some uncertainty, and many of the impacts and capacity assessment cannot be undertaken without further more detailed information on development locations, data or subsequent investigations.

It should be noted when examining Tables 4-2 to 4-4 that the presence of individual 'red' assessment criteria does not necessarily result in an overall constraint at a particular site. There may be capacity for development despite certain constraints and further assessment should be carried out, in conjunction with SWS and the EA, in order to allow for expansion.

Table 4-1 Significance Assessment Criteria

Flood Risk Management	Water Resources Capacity	WwTW Capacity	Environmental Capacity and Ecology
There is little or no risk of flooding to the development area (Flood Zone 1).	There is an existing raw water source with spare licence capacity, and/or There is water available based on CAMS Classification. Groundwater body is at High or Good status	Capacity in DWF consent	Good Ecological Status. Likely to be capacity for development. No environmental constraints were identified.
There is a medium risk of flooding to the development area (Flood Zone 2).	There is an existing raw water source but with no spare capacity and/or There is no water available based on CAMS Classification. Groundwater body is at Moderate status	Limited or no capacity Current consents are Descriptive or much laxer than BAT i.e. >10mg/l BOD, >5mg/l Ammonia and there is therefore the possibility to increase the consented DWF.	Moderate Ecological Status. Measures will be required to bring environment up to Good Ecological Status. May be capacity for development. Site is downstream of or in close proximity to European sites and may impact upon site if not mitigated
There is a high risk of flooding to the development area (Flood Zone 3).	There is no existing raw water source nearby and/or; Water sources are over abstracted/over licensed based on CAMS Classification. Groundwater body is at Poor or Bad status	No capacity and constraints/issues are known to exist. Consent standards are very tight and there is no capacity to tighten consents i.e. new discharge locations will need to be investigated	Poor/ Bad Ecological Status. Measures will be required to bring environment up to Good Ecological Status. Unlikely to be capacity for development Site is downstream of or in close proximity to European sites and is likely to impact upon site if not mitigated.

4.1 Sittingbourne

Table 4-2 Significance Assessment for Sittingbourne

Flood Risk Management	Water Resources Capacity	WwTW Capacity	Environmental Capacity and Ecology
There is a medium risk of flooding to the development area, with limited areas of Flood Zones 2 and 3 located in the central north area of the town.	There is an existing raw water source with spare licence capacity, and/or There is water available based on CAMS Methodology Classification.	No capacity as DWF consent will be exceeded by all 4 development options. However, the current consent has very relaxed standards and there is therefore the possibility to increase the consented DWF.	The Swale WFD transitional waterbody is currently at Moderate Ecological Status and measures will be required to bring environment up to Good Ecological Status. However, it should be possible to develop without compromising this target. Site is immediately adjacent to the Swale SPA and Ramsar site

There are areas of Flood Zones 2 and 3 located in the central north area of the town and in accordance with the requirements of the Sequential Test, development should be steered away from these areas and located in Flood Zone 1 where possible. The majority of Sittingbourne lies within the Flood Zone 1 and there should be plenty of available sites within the zone in which to develop. It is noted that Sittingbourne Town Centre AAP is not affected by tidal flooding and will remain in Flood Zone 1 in 2115. However outside of the AAP, including the Milton Creek (DA2) and North East Sittingbourne (DA9) AAPs, it should be noted that the SFRA predicted that the areas of Flood Zone 3b will have greatly increased by 2215, which will limit the areas suitable for development. However, due to the large areas of Flood Zone 1 available within the town, this is an issue of only **minor significance** and consideration should be given to increased flood zones following climate change when locating development.

Sittingbourne WwTW will exceed its current DWF under all growth Options. It is shown in table 3-5 above, that it is likely that the DWF capacity will be exceeded in the period 2016/17 to 2021/22. However, the works has a very relaxed consent and it is theoretically possible to discharge increased volumes of wastewater without impacting on the environment by tightening the consent and treatment standard of the effluent. Table 3-7 above shows the suggested required consent standards to allow an increased volume of effluent to be discharged. This is therefore of **minor significance** and consideration should be given to the timing of development and the lead in times required for the upgrade of WwTW, if required.

Sittingbourne lies immediately adjacent to the Swale SPA and Ramsar site. However, calculations made of the required consents standard to match current pollutant loadings with an increased discharge volume, indicate that it is possible to increase treated wastewater discharges without affecting the potential of the waterbody to meet Good status by 2027. Similarly, it should be possible to increase treated wastewater discharges without affecting designated shellfish or bathing waters. This is therefore of **minor significance** and again consideration should be given to the timing of development and the lead in times required for the upgrade of WwTW, if required.

4.2 Sheppey

Table 4-3 Significance Assessment for Sheppey

Flood Risk Management	Water Resources Capacity	WwTW Capacity	Environmental Capacity and Ecology
There is a high risk of flooding to the development area, with extensive areas of Flood Zone 2 and 3 to the west and south of the island.	There is an existing raw water source with spare licence capacity, and/or There is water available based on CAMS Methodology Classification.	No capacity as DWF consent for Eastchurch will be reached by development Option 4 and the current DWF consent for Queenborough will be exceeded by will be exceeded by Option s 3 and 4. However, both the consents have very relaxed standards and there is therefore the possibility to increase the consented DWF at both.	The Swale, Thames Lower and Medway WFD transitional waterbodies are currently all at Moderate Ecological Status and measures will be required to bring environment up to Good Ecological Status. However, it should be possible to develop without compromising this target. Site is immediately adjacent to the Swale SPA and Ramsar site and the Medway Estuary and Marshes SPA and Ramsar site.

Significant areas of Sheppey, particularly Minster, Sheerness and the south east of the island, lie in Flood Zones 2 and 3. This is less of an issue for the south eastern area, where no major development is assumed potential, however the Masterplan⁴¹ document for the redevelopment and regeneration of the Isle of Sheppey indicates the assumed potential development to be located between the towns of Queenborough and Rushenden (Development Area 3 – DA3) and Sheerness (DA8), which lie within the tidal Flood Zones 2 and 3. DA8 (Sheerness) is noted by the SFRA to currently lie 98% in Flood Zone 3a, with 89% predicted to be in Zone 3b by 2115. The SFRA states that DA3 by 2115 almost half of DA3 will be in Flood Zone 3b.

In order for residential development to proceed within Flood Zone 3, it must pass the Exception Test. That is, it must demonstrate (amongst other points) that the development provides wider sustainability benefits and will be safe, without increasing flood risk elsewhere. This will place restrictions on the type of development possible, particularly as the southern end of DA3 is near to an area where the preferred Shoreline Management Plan policy is ‘hold the line’ for the first 20 years, followed by ‘managed realignment’. The ‘managed realignment’ policy could potentially restrict the ability to defend the site. This is a **significant issue** for any development proposed within the flood zone particularly between Minster and Sheerness.

Queenborough WwTW will exceed its current DWF consent under growth Options 3 and 4 and under Option 4 Eastchurch WwTW will have no spare capacity. However, the works has a very relaxed consent and it is theoretically possible to discharge increased volumes of wastewater without impacting on the environment by tightening the consent and treatment standard of the effluent. This is of **minor significance** and consideration should be given to the timing of development and the lead in times required for the upgrade of WwTW, if required.

The point when the DWF consent is exceeded depends on the distribution of growth across Sheppey, but Table 3-4 above shows that if all the assumed potential development were located within the catchment of Queenborough, then it is likely that the DWF capacity would be exceeded in the period 2021/22 to 2025/26. For Eastchurch, the capacity will be reached rather

⁴¹ Swale Borough Council, Masterplan Queenborough and Rushenden Regeneration, Rumney Design, Consultation Document, November 2007.

than exceeded and the point of the exceedance will therefore be at the end of the planning period.

Sheppey lies immediately adjacent to the Swale SPA and Ramsar site and the Medway Estuary and Marshes SPA and Ramsar site. However, calculations made of the required consents standard to match current pollutant loadings with an increased discharge volume, indicate that it is possible to increase treated wastewater discharges without affecting the potential of the waterbody to meet Good status by 2027. Similarly, it should be possible to increase treated wastewater discharges without affecting designated shellfish or bathing waters. This is therefore of **minor significance** and again consideration should be given to the timing of development and the lead in times required for the upgrade of WwTW, if required.

4.3 Faversham

Table 4-4 Significance Assessment for Faversham

Flood Risk Management	Water Resources Capacity	WwTW Capacity	Environmental Capacity and Ecology
<p>There is little or no risk of flooding to the development area, as the majority of the town lies in Flood Zone 1 with a very limited area of Flood Zone 3.</p>	<p>Due to the uncertainty regarding South East Water's WRMP it is not certain that solutions will be in place at this stage. This should not be considered a constraint to development, but this should be re-assessed once the outcome of the inquiry is known.</p>	<p>There is sufficient capacity in the DWF consent at Faversham to accommodate all growth.</p>	<p>The Swale WFD transitional waterbody is currently at Moderate Ecological Status and measures will be required to bring environment up to Good Ecological Status. However, it should be possible to develop without compromising this target.</p> <p>Site is immediately adjacent to the Swale SPA and Ramsar site and in close proximity to Thanet Coast and Sandwich Bay SPA and Ramsar site</p>

Due to the uncertainty regarding South East Water's WRMP it is not certain that supply demand balance solutions will be in place in time for the assumed potential development. This should not be considered a constraint to development, but this should be re-assessed once the outcome of the inquiry is known.

There is sufficient capacity in the DWF consent at Faversham to accommodate all growth. However, the SFRA notes that Southern Water records show twelve incidents of sewer flooding in Faversham, which suggests that some of the drainage network may be at capacity. This is not considered to be an issue of significance as it is not possible to assess at this point whether this is a localised or a catchment-wide issue, but further study should be carried out in conjunction with Southern Water during the planning of new development.

The SFRA shows that just 3% of the Faversham Town Centre AAP lies within Flood Zone 3b and 2% within Flood Zone 3a. Between 2010 and 2115 there is a loss of only 3% of DA4's area within Flood Zone 1. Only a tiny proportion of the DA is within Flood Zone 3b and this will only increase marginally by 2115, the SFRA notes that as a large proportion of DA4 is entirely within Flood Zone 1, this is a preferential development area in terms of flood risk. However, DA5 (Oare) has considerable areas which lies within Flood Zone 3, which will increase with the climate change and development should therefore be steered away from this area, where possible. However, due to the large areas of Flood Zone 1 available within the town, this is an issue of only **minor significance** and consideration should be given to flood zones when locating development.

Faversham lies immediately adjacent to the Swale SPA and Ramsar site and in close proximity to Thanet Coast and Sandwich Bay SPA and Ramsar site. However, calculations made of the required consents standard to match current pollutant loadings with an increased discharge volume, indicate that it is possible to increase treated wastewater discharges without affecting the potential of the waterbody to meet Good status by 2027. Similarly, it should be possible to increase treated wastewater discharges without affecting designated shellfish or bathing waters. This is therefore of **minor significance** and again consideration should be given to the timing of development and the lead in times required for the upgrade of WwTW, if required.

4.4 Overall Options Assessment

Table 4-5 Significance Assessment for the four proposed growth Options

	Option 1	Option 2	Option 3	Option 4
Flood Risk	Sittingbourne and Faversham both have large areas of Flood Zones 1 and 2, which should provide sufficient space for development outside of the Flood Plain. However, large areas of Sheppey lie within Flood Zone 3, which is predicted to expand following the anticipated effects of climate change. The SMP 'managed realignment' policy could also potentially restrict the ability to defend the site.			
Water Resources	No adverse effects on water resources are anticipated from the assumed potential growth Options; both Southern Water and South East Water predict adequate future resources.			
Wastewater	Limited capacity at Sittingbourne WwTW		Limited capacity at Sittingbourne and Queenborough WwTWs	
Environment and Ecology	No anticipated effects on designated sites from the assumed potential growth Options			

The assessment of the four growth options has shown only one issue to be significant, which is the flood risk to assumed potential development areas in Sheppey. This will be a significant issue for all four assumed potential growth options.

While limited WwTW capacity has been identified, for Sittingbourne for all four Options and for Queenborough for Options 3 and 4, this is not considered to be an absolute constraint to development, although further study should be carried out once the exact growth locations have been identified, to identify the most sustainable solution to the capacity limitations.

5 Stage 3 – Possible Solutions Assessment

Of the issues identified above in section 4, only one has been assessed to be significant, that is flood risk to assumed potential development areas in Sheppey. This is therefore the only issue that has been carried forward to the option assessment stage.

5.1 Option Identification

A review of the Swale Borough SFRA and the current and future predicted Flood Zones in Sheppey has identified areas that are not suitable for development. In particular, development should be directed away from the area to the west of Sheppey, around Minster and Sheerness. In addition to the flood risk issues, this area lies within the catchment of Queenborough WwTW, for which the consented DWF capacity is exceeded by Options 3 and 4. Moving the development on Sheerness further east, to the areas of FZ1 and the catchment of Eastchurch could solve both the flooding and capacity issues at Queenborough. However, there is also limited wastewater treatment capacity at Eastchurch; under Option 4 the capacity at Eastchurch WwTW would be exceeded.

Two possible options have therefore been identified and assessed, as follows.

5.1.1 Option 1: Split growth across two catchments

As discussed above, there is limited treatment capacity at both Queenborough and Faversham WwTW, which would be exceeded if all of the assumed potential growth were located entirely within the catchment of either one of the works. It is therefore suggested that a possible solution to both the flooding issues and the limited wastewater treatment capacity would be to split the growth between the catchments of Queenborough and Eastchurch WwTW. In order to inform this split, an assessment has been carried out of the amount of growth that could be accommodated within each catchment.

Table 5-1: Possible split of development across Sheppey

	Option 1	Option 2	Option 3	Option 4
Total housing allocation across Sheppey	5,807	5,267	7,162	8,379
Baseline capacity at Queenborough WwTW (households)*	5,900	5,900	5,900	5,900
Baseline capacity at Eastchurch WwTW (households)*	8,400	8,400	8,400	8,400
Suggested possible split of housing between the two works' catchments	5,807 Eastchurch	5,267 Eastchurch	6,720 Eastchurch/442 Queenborough	6,720 Eastchurch/1,659 Queenborough

* Southern Water's methodology for the assessment of volumetric capacity differs slightly from the Scott Wilson methodology, as used above. The Scott Wilson methodology assumes an occupancy rate of 2.1 and a per capita water consumption of 125 litres per head per day (l/h/d), which gives a household daily water use of 262.5 l. Figures have been rounded to the nearest 100 households

It should be noted that for Options 3 and 4 above, not all of Eastchurch WwTW's available capacity has been used by the assumed potential growth in Sheppey, an allowance of 20% headroom remains. 6,720 is 80% of Eastchurch's calculated capacity, this has been taken to

be the maximum number of houses that the works can accommodate, to allow for 'minor' levels future growth in the Eastchurch catchment, for example windfall sites or infill development. The 20% headroom also allows for possible future employment sites which may have high wastewater treatment demands. It is thought that to use up all of Eastchurch's available capacity could limit future growth within the catchment, which could have implications for redevelopment and regeneration of the area.

5.1.2 Option 2: Locate all new housing in Eastchurch catchment (out of flood zone)

A second possible option would be to locate all of the assumed potential growth in Sheppey in the catchment for Eastchurch WwTW. This would remove the issue of the limited capacity at Queenborough WwTW and the high flood risk in the areas to the west of the island; other than a small area in the coastal zone between Warden and Leysdown-on-Sea, the Eastchurch catchment lies entirely in Flood Zone 1. The SFRA notes that for the north coast of Sheppey the Shoreline Management Plan shows defence lines which may change in the future. The locations of growth should therefore be chosen for locations where there will not be an issue of tidal inundation due to coastal erosion.

5.2 Option Assessment

5.2.1 Option 1: Split growth across two catchments

Splitting the assumed potential growth in Sheppey between the catchments of Queenborough and Eastchurch WwTWs will not require either works to be upgraded or DWF consents to be varied. In addition, if the majority of growth goes to Eastchurch i.e. is located to the east; this would allow the vulnerable flood zones to the west of Sheppey to be avoided. Eastchurch WwTW has more available capacity than Queenborough, but it can be seen from Table 5-1 above that not all of the available capacity should be used as this could limit the potential for future growth in Eastchurch (e.g. windfall/infill development or new future employment with high water demands), which could have implications for redevelopment and regeneration of the area. Hence for Options 3 and 4 not all of Eastchurch's available capacity has been used, to allow 20% headroom to remain. 6,689 is 80% of Eastchurch's capacity, this has been taken to be the maximum number of houses that the works can accommodate, however it should be noted that this figure is an estimate and further study should be carried in conjunction with SWS to ensure Eastchurch WwTW can treat these proposed increased flows within current consent limits.

The SFRA notes incidents of sewer flooding in and around Sheerness and Minster, which may indicate that there are capacity issues in the sewer network in these areas. However, it is not possible to assess at this point whether these issues are specific to Sheerness and Minster or part of a larger catchment-wide capacity problem. A full assessment of the capacity of the sewer network should be carried out in conjunction with Southern Water before growth is proposed within the catchment and once it is known where preferred growth locations are likely to be,

Reducing the number of houses proposed in the Queenborough catchment would allow the houses to be located in the small areas of Flood Zone 1 to the west of Sheppey.

5.2.2 Option 2: Locate all new housing in Eastchurch catchment (out of flood zone)

As noted in Section 3 and Table 3-3 above, if all the assumed potential growth within Sheppey were located within the catchment of Eastchurch WwTW, the consented DWF capacity would be reached, but not exceeded. An increase in the consented DWF would therefore be required in order to accommodate the proposed flows and allow headroom for future 'minor' growth, such as windfall or infill developments. If a headroom allowance of 20% is taken to be the target, the consented DWF at the works would need to be increased to 5,400 m³/day. Table 3-7 indicates the discharge consent limits that would be needed to ensure no adverse impacts on the water quality of the receiving watercourse, namely 33 mg/l BOD and 50 mg/l TSS.

Other than a small area in the coastal zone between Warden and Leysdown-on-Sea, the Eastchurch catchment lies entirely in Flood Zone 1. The SFRA notes that for the north coast of Sheppey the Shoreline Management Plan shows defence lines which may change in the future. The locations of growth should therefore be chosen for locations where there will not be an issue of tidal inundation in the future due to coastal erosion.

The SFRA notes incidents of sewer flooding in and around Warden, which may indicate that there are capacity issues in the sewer network in this area. However, it is not possible to assess at this point whether these issues are specific to Warden or part of a larger catchment-wide capacity problem. Development within the Eastchurch catchment should therefore not be located within Warden and a full assessment of the capacity of the sewer network should be carried out in conjunction with Southern Water before growth is proposed within the catchment.

6 Stage 4 – Conclusions and Recommendations

6.1 Conclusions

The assumed potential level of growth within Faversham should not pose significant water environment or infrastructure capacity concerns and would not exceed the water resources (subject to the outcome of South East Water's WRMP inquiry) or wastewater treatment capacity of the area. However, early discussions with Southern Water must be carried out for any significant development sites to ensure there is adequate capacity within the sewer network. The recommendations of the SFRA must be taken into account when locating development in and around areas of flood risk.

The assumed potential level of growth in Sittingbourne will exceed the capacity of Sittingbourne WwTW, which will require an increase to consented DWF to accommodate the growth. The consent standards for Sittingbourne are relaxed and it should theoretically be possible to treat the effluent to a higher standard in order to ensure there is no deterioration in the water quality of the receiving watercourse, but it should be noted that process upgrades may be required in order to meet tighter standards.

Assessment carried out on the phasing of development indicates that for Queenborough for Options 3 and 4, it is likely that the DWF capacity will be exceeded in the period 2021/22 to 2025/26. For Sittingbourne for all growth Options, it is likely that the DWF capacity will be exceeded sooner, in the period 2016/17 to 2021/22. Sufficient lead-in times must therefore be allowed for upgrades, if required, and early discussions with Southern Water are recommended to ensure the timing of the proposed development and the provision of infrastructure are aligned.

As for development within Faversham, the recommendations of the SFRA must be taken into account when locating development in and around areas of flood risk.

For the assumed potential growth within Sheppey, two scenarios have been considered for the location of development, due to the issues of limited capacity at both of the WwTW and the flooding issues on the west of the island. Of these two scenarios both are feasible, although to split the development between the catchments of Queenborough and Eastchurch WwTW, and therefore distribute the housing widely across Sheppey, would seem at this point to be preferable. This would allow for the available headroom at both works to be utilised, thereby negating the need for increases to consented DWF at either works and the possible process and works upgrades that may be required. In addition, the spread of development would allow for development to be located in Flood Zone 1, which is limited in some areas of Sheppey.

6.2 Recommendations

6.2.1 Review of WEICA

A review of the outcomes of this WEICA should be carried out once the outcomes of the inquiry into South East Water's WRMP are available. This will establish whether the schemes required to meet the water resource supply demand balance will be in place in time for the assumed potential growth.

In addition, Southern Water is currently undertaking an investigation into the impact of several of its WwTW on designated shellfish waters, including Faversham, Queenborough and

Sittingbourne. Should the outcome of the study indicate that the discharges are having an adverse impact on the shellfish waters, upgrades to the WwTW may be required. The results of the investigation should therefore be used to inform a review of this study.

6.2.2 Early consultation with Southern Water

In order to ensure the required discharge consent variations can be made in time to allow the additional flows to Queenborough and Sittingbourne to be treated, discussion should be held with Southern Water early in the planning process. This is particularly pertinent for Sittingbourne, where it is likely the works capacity will be exceeded for all growth Options from early in the planning period. For any works upgrades (if required) to be carried out in time for the assumed potential growth, they would need to be put forward as AMP6 schemes, which would require inclusion within Southern Water's PR14 Business Plan.

In addition to ensuring timely provision of WwTW upgrades, discussions with Southern Water would also identify any sewerage network capacity issues, the solutions to which could also require considerable lead-in times for planning and construction. Funding for any required upgrades could be funded either through the AMP process or by developer contributions, as discussed above in section 2.4.1. Funding for improvement works should not be considered an absolute constraint to development, although depending on the funding mechanism used, it may place a heavy time limitation on development.

6.2.3 Sequential test

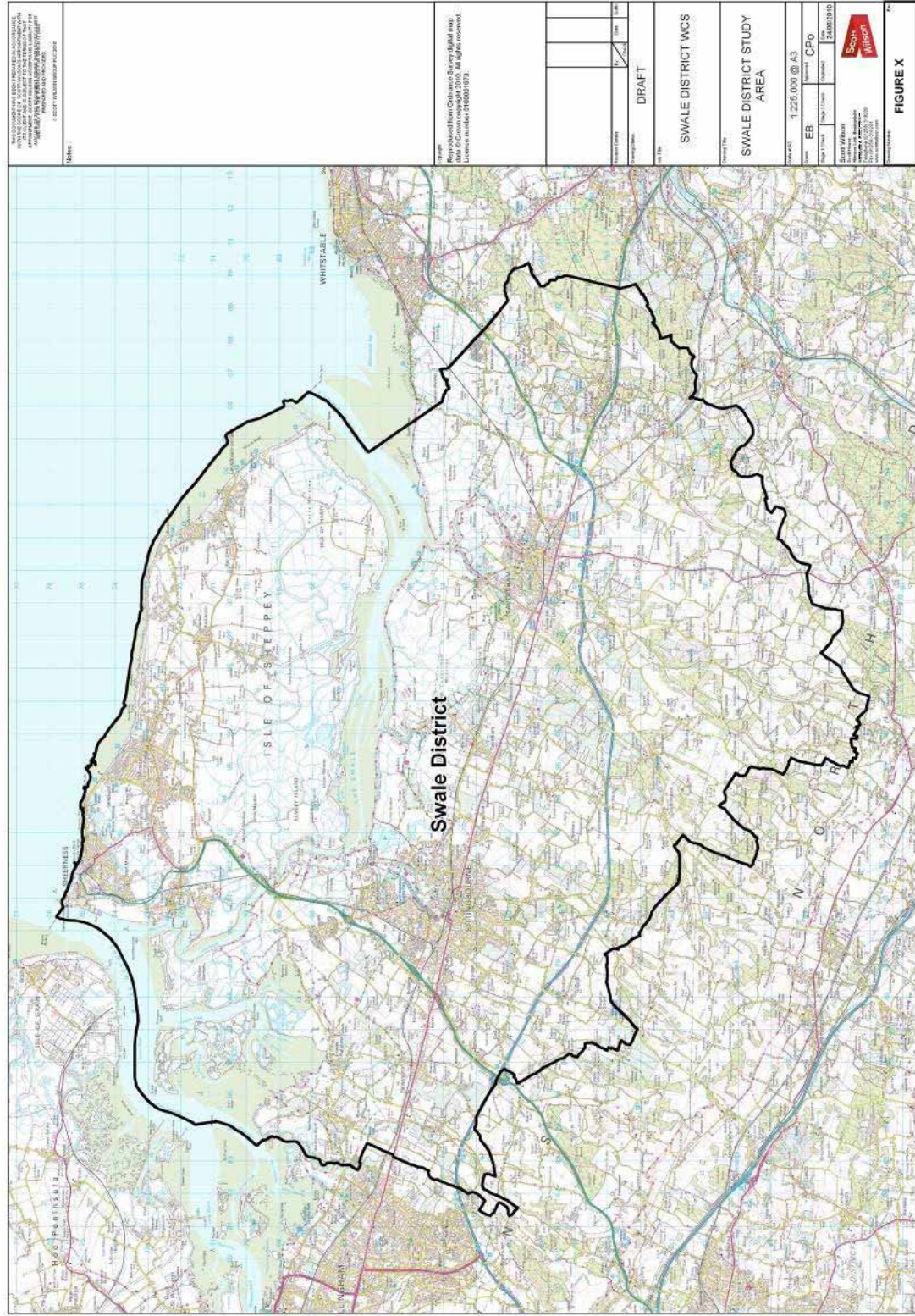
As recommended by the SFRA, SBC should carry out a Sequential Test of the assumed potential development sites. This will allow for the Development Areas to be ranked in order of preference and the Exception Test to be carried out, where required for the sites in the higher risk flood zones.

The application of the Sequential Test can be summarised as follows:

- to look for sites in areas at least risk from flooding (Flood Zone 1), only making allocations in Zones 2 or 3 if there are no alternatives;
- within Flood Zones 2 and 3, give preference in the order Flood Zone 2, then Flood Zone 3a;
- the functional floodplain, Flood Zone 3b, should be protected, with only water compatible and, if they pass the Exception Test, essential infrastructure, being permitted; and
- for sites in Flood Zones 2, 3a and 3b, to apply the Exception Test if required, as set out in PPS25.

7 Appendix A – Figures

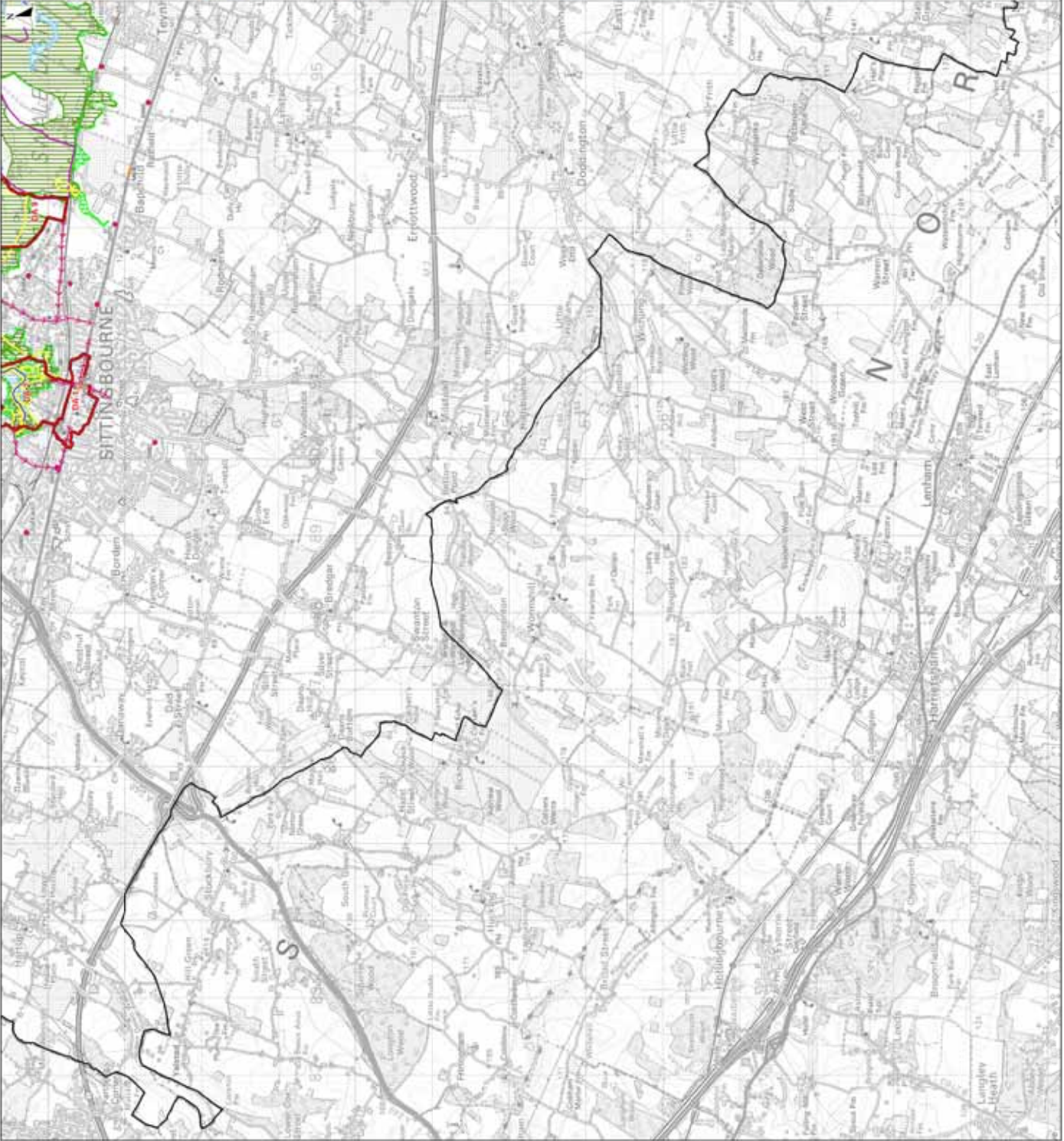
7.1 Figure 1 – Study Area



7.2 Figure 2 – Flood Risk mapping (Sheet 1)

7.3 Figure 3 – Flood Risk mapping (Sheet 2)

7.4 Figure 4 – Flood Risk mapping (Sheet 3)



PP325 - Flood Risk Vulnerability Classification

Introduction
This map shows the flood risk vulnerability classification for the area. The map is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency. The FRVC methodology is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency. The FRVC methodology is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency.

FRVC Methodology
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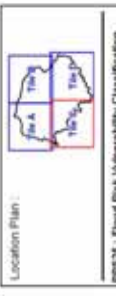
PP325 - Flood Zones Definition

Zone 1 - Low Probability
This zone is defined as the area where the probability of flooding is less than 1% per annum. This zone is defined as the area where the probability of flooding is less than 1% per annum. This zone is defined as the area where the probability of flooding is less than 1% per annum.

Zone 2 - Medium Probability
This zone is defined as the area where the probability of flooding is between 1% and 10% per annum. This zone is defined as the area where the probability of flooding is between 1% and 10% per annum. This zone is defined as the area where the probability of flooding is between 1% and 10% per annum.

Zone 3 - High Probability
This zone is defined as the area where the probability of flooding is between 10% and 50% per annum. This zone is defined as the area where the probability of flooding is between 10% and 50% per annum. This zone is defined as the area where the probability of flooding is between 10% and 50% per annum.

Zone 4 - Very High Probability
This zone is defined as the area where the probability of flooding is greater than 50% per annum. This zone is defined as the area where the probability of flooding is greater than 50% per annum. This zone is defined as the area where the probability of flooding is greater than 50% per annum.



Location Plan

PP325 - Flood Risk Vulnerability Classification

Introduction
This map shows the flood risk vulnerability classification for the area. The map is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency. The FRVC methodology is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency. The FRVC methodology is based on the Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency.

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Swale
Swale Water & Sewerage Services Ltd
Swale Water & Sewerage Services Ltd
Swale Water & Sewerage Services Ltd

Halcrow
Halcrow Ltd
Halcrow Ltd
Halcrow Ltd

LEGEND

Flood Zones
Zone 1 - Low Probability
Zone 2 - Medium Probability
Zone 3 - High Probability
Zone 4 - Very High Probability

Flood Risk Vulnerability Classification
Flood Risk Vulnerability Classification (FRVC) methodology developed by the Environment Agency.

Environment Agency Data
Environment Agency Data
Environment Agency Data
Environment Agency Data

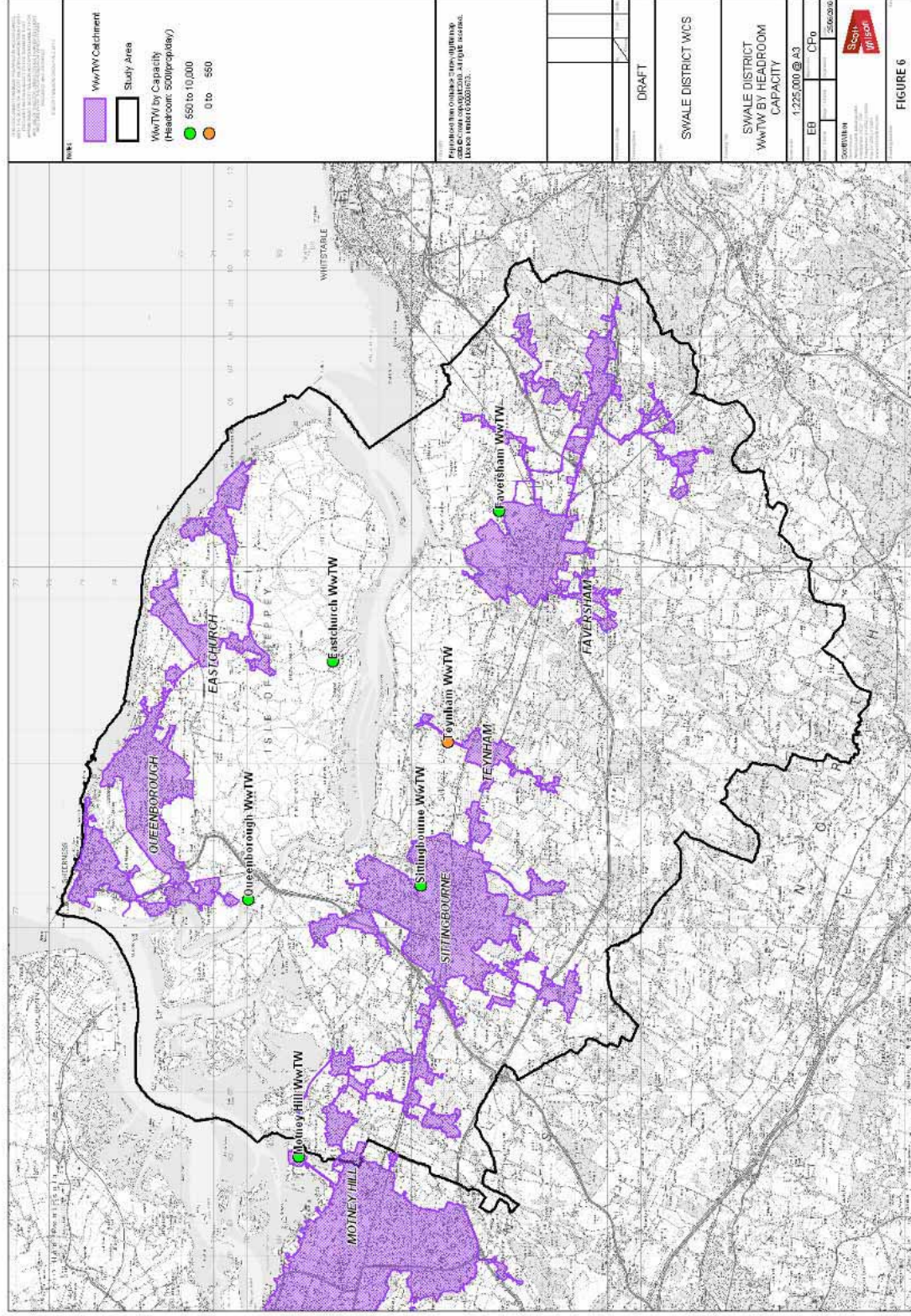
Development Agency Data
Development Agency Data
Development Agency Data
Development Agency Data

Project
Swale SFRA for Local Development Framework
Flood Map - Flood Zones 2, 3a, 3b & Historical Flooding
Tile C in 2010

Scale
1:50,000

7.5 Figure 5 – Flood Risk mapping (Sheet 4)

7.6 Figure 6 – Wastewater Treatment Works locations and capacities



8 Appendix B - Wastewater Calculations

WwTW	DWF consent	Headroom (households)	Consent limits			Scenario 1 Housing allocation				Scenario 2 Housing allocation						
			BOD	TSS	NH4	Houses flow (m3/d)	Additional flow (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Capacity (% consented DWF)	Houses	Additional flow (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Capacity (% consented DWF)	
Eastchurch	4,500	8,377	40 (95%)	80 (UT)	60	-	5,807	1,524	3,825	675	15	5,267	1,383	3,684	816	18
Queenborough	11,225	5,886	40	60	60	-	5,807	1,524	11,204	21	0	5,267	1,383	11,063	162	1
Faversham	7,000	3,615	40	60	60	-	675	177	6,228	772	11	445	117	6,188	832	12
Sittingbourne	11,800	971	-	100	100	-	7,041	1,848	12,579	-779	-7	7,562	1,985	12,716	-916	-8

Scenario 3 Housing allocation				Scenario 4 Housing allocation				
Houses flow (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Capacity (% consented DWF)	Houses flow (m3/d)	Additional flow (m3/d)	Post growth flow (m3/d)	Capacity post growth (m3/d)	Capacity (% consented DWF)
7,162	1,880	4,181	532	8,379	2,199	4,500	0	0
7,162	1,880	11,560	-558	8,379	2,199	11,879	-654	-3,168
675	177	6,228	1,286	765	201	6,252	748	97
5,675	1,490	12,221	-421	9,448	2,480	13,211	-1,411	181

9 Appendix C – South East Water’s WRMP status

In August 2009 the Department for Environment, Food and Rural Affairs (Defra) announced its decision to hold a public inquiry on South East Water’s proposed Water Resource Management Plan. This marked the next stage in the Government’s new statutory process and in December 2009 Defra appointed an Inspector to hear the inquiry. South East Water has issued a Statement of Common Ground⁴² between the Environment Agency and South East Water, which summarises those matters which the Environment Agency and South East Water have been able to agree and those matters which remain, as issues between them, prior to the public inquiry into South East Water’s WRMP.

The Environment Agency and the Company still disagree on the following matters:

- 1) the appropriateness of the Company’s per capita consumption (pcc) forecast and the extent to which the Company is moving, as desired by the Environment Agency, further towards the Defra aspiration for a pcc of 130 litres per head per day (l/h/d) by 2030. The Environment Agency has indicated to the Company that an equivalent dry year annual average pcc of between 136 and 155 l/h/d could constitute moving towards the Defra figure by the Company. The Company’s estimate of the dry year annual average equivalent of the Defra figure is 152.6 l/h/d. The Company has considered this in how it could move towards that figure but the Company does not plan to that figure;
- 2) that the Company demand forecast is overly cautious, including high forecast pcc, increasingly out of line with other companies in the south east, item 2.1);
- 3) whether the Company has justified its demand forecast using microcomponent analysis (see the attached table, item 2.3);
- 4) further quantification is sought by the Environment Agency of the Company’s metering, leakage and water efficiency savings assumed in its baseline forecast;
- 5) whether the Company’s housing and population growth assumptions are compatible with the Regional Spatial Strategy. Recently provided Company data are still being checked by the Environment Agency;
- 6) whether the Company, in its selection of options, for the post 2020 period of the current plan, has:
 - (i) planned to provide more resources than will be needed; and
 - (ii) in choosing its preferred options, chosen the most appropriate options, with respect to overall cost, reliability and the environment;
- 7) the adequacy of the information and explanations included in the plan. It is anticipated that this issue has been resolved, or will be largely if not entirely resolved, by the proposed revised WRMP. However, as at submission of Statement of Common Ground, this issue is unresolved because the revised WRMP has not been available for review.

⁴² http://www.southeastwater.co.uk/pls/apex/PROD.download_file?p_doc_id=159