



West Suffolk Council Water Cycle Study

Stage 1 Outline Water Cycle Study Addendum - 2022
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This report dated 28 March 2022 has been prepared for West Suffolk Council (the “Client”) in accordance with the terms and conditions of appointment dated 30 November 2021 (the “Appointment”) between the Client and **Arcadis Consulting (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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Technical glossary

Asset Management Period (AMP) - A period of five years in which water companies implement planned upgrades and improvements to their asset base. For example, AMP5 is 2010-2015 and AMP6 is 2015-2020.

Biochemical Oxygen Demand (BOD) – a measure of the oxygen demand that results from bacteria breaking down organic carbon compounds in water. High levels of BOD can use up oxygen in a watercourse, to the detriment of the ecology.

Catchment Abstraction Management Strategies (CAMS) - the production of a strategy by the Environment Agency (EA) to assess and improve the amount of water that is available on a catchment scale. The latest CAMS strategies can be found at:

<https://www.gov.uk/government/collections/water-abstraction-licensing-strategies-cams-process/>

Combined Sewer Overflow (CSO) – a point on the sewerage network where untreated wastewater is discharged during storm events to relieve pressure on the network and prevent sewer flooding. Sewerage systems that are not influenced by storm water should not require a CSO.

Deployable Output – the amount of water that can be abstracted from a source (or bulk supply) as constrained by environment, license, pumping plant and well/aquifer properties, raw water mains, transfer, treatment and water quality.

Discharge Consent – a consent issued and reviewed by the EA which permits an organisation or individual to discharge sewage effluent or trade effluent into surface water, groundwater or the sea. Volume and quality levels are set to protect water quality, the environment and human health.

Dry Weather Flow (DWF) – an estimation of the flow of wastewater to a Water Recycling Centre during a period of dry weather. This is based on the 20th percentile of daily flow through the works over a rolling three year period.

Dry Year Critical Period (DYCP) – the period of time during which the customer experiences the greatest risk of loss of potable water supply, during a year of rainfall below long-term average (characterised with high summer temperatures and high demand).

Eutrophication – higher than natural levels of nutrients in a watercourse, which may lead to the excessive build-up of plant life (especially algae). Excessive algal blooms remove valuable oxygen from the watercourse, block filters at water recycling centres, affect the taste and smell of water, and can be toxic to other wildlife.

Flow to Full Treatment (FTFT) - the maximum flow passed from the sewerage network to direct treatment and discharge at the WRC during storm events. Typically this is estimated as 3 x DWF. Flows above this are either stored on site for treatment after the storm event, or discharged directly as a storm overflow.

General Quality Assessment (GQA) – The current assessment method used by the EA to describe the chemical and biological quality of watercourses, along with nutrient levels and aesthetic quality.

Habitats Directive - promotes biodiversity by requiring measures to be taken to maintain or restore natural habitats and wild species to a favourable conservation status, introducing robust protection for those habitats and species of European importance.

Index Flood (QMED) – A flood with a return period of 2 years. At a gauged location, the index flood is the median value of the Annual Maximum Series.

Local Plan – A document outlining the spatial planning strategy for each local authority. The Local Plan will contain a number of statutory documents setting out the long-term planning and land use policies for a given area.

Local Nature Reserve (LNR) – are areas with wildlife or geological features that are of special interest locally. Details of LNR can be found at <http://www.natureonthemap.org.uk/>.

National Nature Reserve (NNR) – are areas of national importance, protected because they are amongst the best examples of a particular habitat in the country. Details of NNR can be found at <http://www.natureonthemap.org.uk/>.

National Planning Policy Framework (NPPF) - The National Planning Policy Framework sets out government's planning policies for England and how these are expected to be applied. The framework acts as guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.

Natura 2000 Sites - Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. It stretches across all 28 EU countries, both on land and at sea. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive. More information is available at: http://ec.europa.eu/environment/nature/natura2000/index_en.htm.

Optant – In terms of water supply the term optant is used to describe customer driven water reducing measures. A customer can choose to use these measures under recommendation from the water supplier.

Per Capita Consumption (PCC) – the volume of water used by one person over a day, expressed in units of litres per person per day (l/p/d).

Population Equivalent – is a method of measuring the loading on a Water Recycling Centre and is based on a notional population comprising; resident population, a percentage of transient population, cesssed liquor input expressed in population, and trade effluent expressed in population.

Potable Water – is water that is fit for drinking, being free of harmful chemicals and pathogens. Raw water can be potable in some instances, although it usually requires treatment of some kind to bring it up to this level.

Raw Water - is water taken from the environment, which is subsequently treated or purified to produce potable water.

River Basin Management Plans (RBMP) – documents being produced for consultation by each of the EA regions to catalogue the water quality of all watercourses and set out actions to ensure they achieve the ecological targets stipulated in the WFD.

River Ecosystem (RE) Targets – are the targets uses to assess quality against the above mentioned RQO.

River Quality Objective (RQO) - targets for all rivers in England and Wales that specify the water quality needed in rivers if we are to be able to rely on them for water supplies, recreation and conservation.

Site of Special Scientific Interest (SSSI) - an area of special interest by reason of any of its flora, fauna, geological or physiographical features (basically, plants, animals, and natural features relating to the Earth's structure). A map showing all SSSI sites can be found at: <http://www.natureonthemap.org.uk/>.

Source Protection Zones (SPZ) - zones designated around public drinking water abstractions and sensitive receptors which detail risk to the groundwater zone they protect.

Special Area for Conservation (SAC) - a site designated under the European Community Habitats Directive, 1991, to protect internationally important natural habitats and species. A map showing all SAC sites can be found at <http://www.natureonthemap.org.uk/>.

Special Protection Area (SPA) - sites classified under the European Community Directive on Wild Birds to protect internationally important bird species. A map showing all SPA sites can be found at: <http://www.natureonthemap.org.uk/>.

Strategic Flood Risk Assessment (SFRA) – document required by NPPF that informs the planning process of flood risk and provides information on future risk over a wide spatial area. It is also used as a planning tool to examine the sustainability of the proposed development allocations.

Strategic Housing and Economic Land Availability Assessment (SHELAA) One of the principal documents used in the preparation of the local plan. This document is produced periodically to help demonstrate that the area has sufficient sites to meet demand and it is a key evidence base for the local plan insofar as it considers the 'status' of all known sites within the area i.e. their availability, suitability, viability and deliverability.

Surface Water Management Plans (SWMP) – assist in the assessment of flood risk to ensure that increased levels of development, and climate change, do not have an adverse impact on flooding from surface water sources within the catchment. SWMP were introduced following the severe flooding in 2007, as means for Local Authorities to take the lead in reducing flood risk.

Sustainable Drainage Systems (SuDS) – a combination of physical structures and management techniques designed to drain, attenuate, and in some cases treat, runoff from urban (and in some cases rural) areas.

Target Headroom - the threshold of minimum acceptable headroom, which would trigger the need for water management options to increase water available for use or decrease demand.

Type A Villages – villages with a primary school with some local services e.g. village hall / pub / shop.

Urban Wastewater Treatment Directive (UWWTD) 1991 – A European Union directive (91/271/EEC) which sets treatment levels on the basis of sizes of wastewater discharges and the sensitivity of waters receiving the discharges. Under the Directive the UK is required to review environmental waters at four-yearly intervals to determine whether they are sensitive to the effects of wastewater discharges.

Water Available for Use (WAFU) – the amount of water remaining after allowable outages and planning allowances are deducted from deployable output in a WRZ.

Water Framework Directive (WFD) 2000 - A European Union directive (2000/60/EC) which commits member states to make all water bodies of good qualitative and quantitative status by 2015. The WFD could have significant implications on water quality and abstraction. Important dates for the WFD are:

- 2015 Meet environmental objectives

First management cycle ends

Second river basin management plan and first flood risk management plan

- 2021 Second management cycle ends
- 2027 Third management cycle ends, final deadline for meeting objectives

Water Neutrality – the concept of offsetting demand from new developments by making existing homes and buildings more water efficient.

Water Resource Zone (WRZ) – are areas based on the existing potable water supply network and represent the largest area in which water resources can be shared.

Wastewater - is any water that has been adversely affected in quality by anthropogenic influence. It comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture.

Water Recycling Centre (WRC) – facility which treats wastewater through a combination of physical, biological and chemical processes.

Water Resource Management Plan (WRMP) - The WRMP19's are now finalised and published. Draft WRMP24's are due to be submitted in August 2022. The Water Resource Management Plans are studies undertaken by every water company in England to determine the availability of water resources for the next 25 years. WRMPs can be found on most water company websites. A Regional Water Resource Management Plan is also currently under preparation and a draft version is due to be submitted in August 2022.

1. Introduction

West Suffolk Council came into being on 1 April 2019 following the abolition of Forest Heath District Council and St Edmundsbury Borough Council. West Suffolk's local plan (the local plan) is currently being prepared and is expected to be adopted in 2024. The Regulation 18 Issues and Options Consultation stage took place between October and December 2020. Therefore, a Water Cycle Study (WCS) was needed to ensure that water supply, water quality, sewerage and flood risk management issues can be addressed to enable the delivery of sustainable growth to 2040, that preserves and enhances the existing water environment.

The WCS is a key evidence base for the local plan, that is being undertaken in two main stages (1. Outline WCS 2. Detailed WCS). This document is an addendum to the Stage 1 Outline WCS that was completed in April 2021. This is mainly required due to the updated housing need forecast and distribution for West Suffolk Council.

1.1 Previous water cycle studies

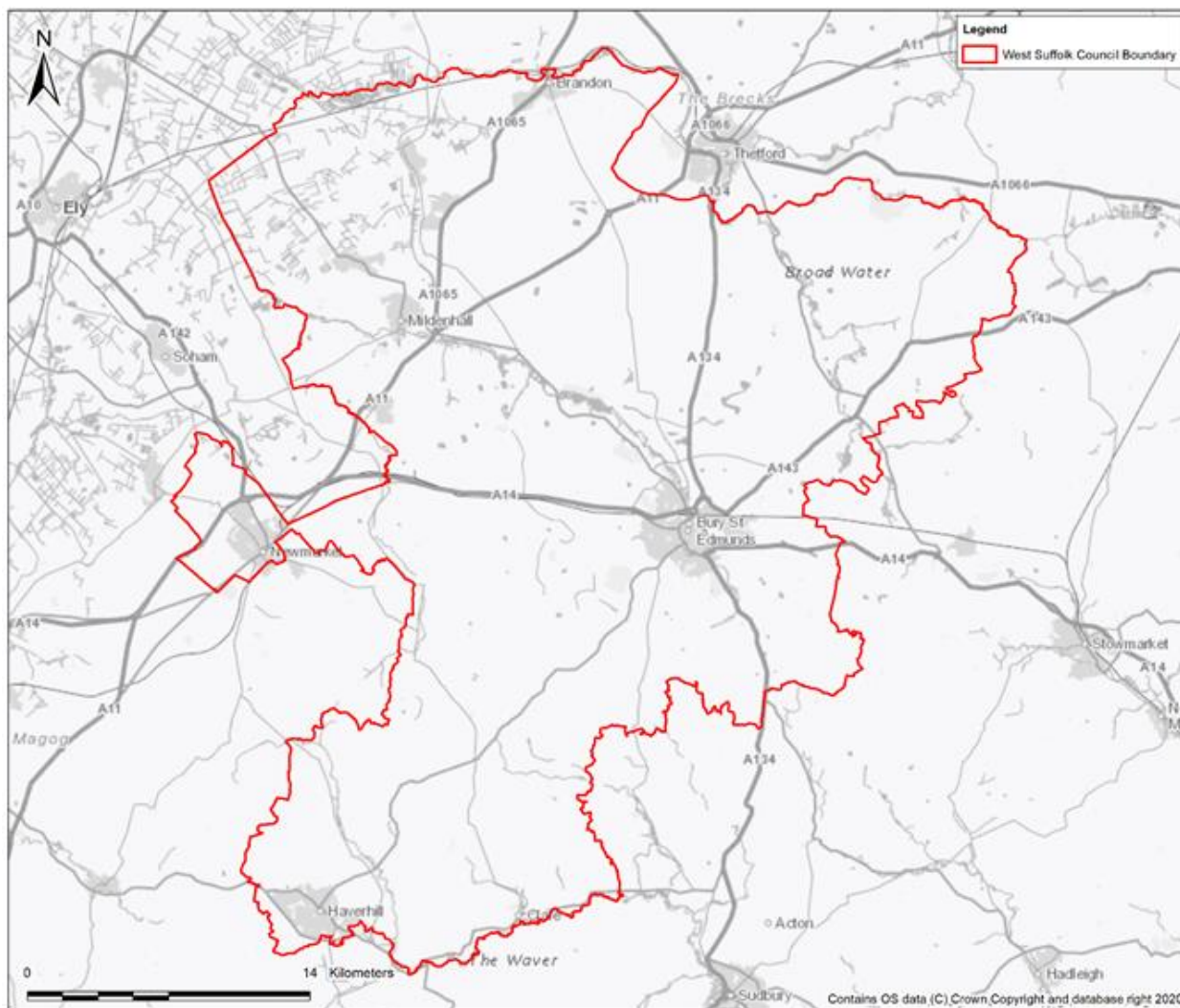
In 2008, before the councils merged to become West Suffolk, the former Forest Heath area and former St Edmundsbury area produced a Level 1 Strategic Flood Risk Assessment and Water cycle Study report. While this report is now very outdated with regards to more recent policy and the projected future water usage within West Suffolk, it did not highlight major concern with regards to water supply, the environmental capacity of the receiving watercourses, or wastewater management.

The Stage 1 Outline Water Cycle Study (WCS) was produced in 2021 in conjunction with a parallel Level 1 Strategic Flood Risk Assessment (SFRA), as key evidence base documents for the emerging local plan. Therefore, these two recent documents and this WCS Addendum should be used as key reference documents during preparation of the West Suffolk local plan and subsequent planning application stages to guide making the key development decisions in relation to the water environment and water services infrastructure. This WCS addendum should be read in conjunction with the Stage 1 assessment.

1.2 Study area

West Suffolk (see Figure 1) is a district in the county of Suffolk, in the east of England. It was created from the unification of the former Forest Heath area and former St. Edmundsbury area in 2019. The district is predominantly rural in nature. Bury St Edmunds, Haverhill, Newmarket, Brandon and Mildenhall are major towns. Key service centres include Barrow, Clare, Ixworth, Kedington, Lakenheath, Red Lodge and Stanton. There are a large number of smaller villages.

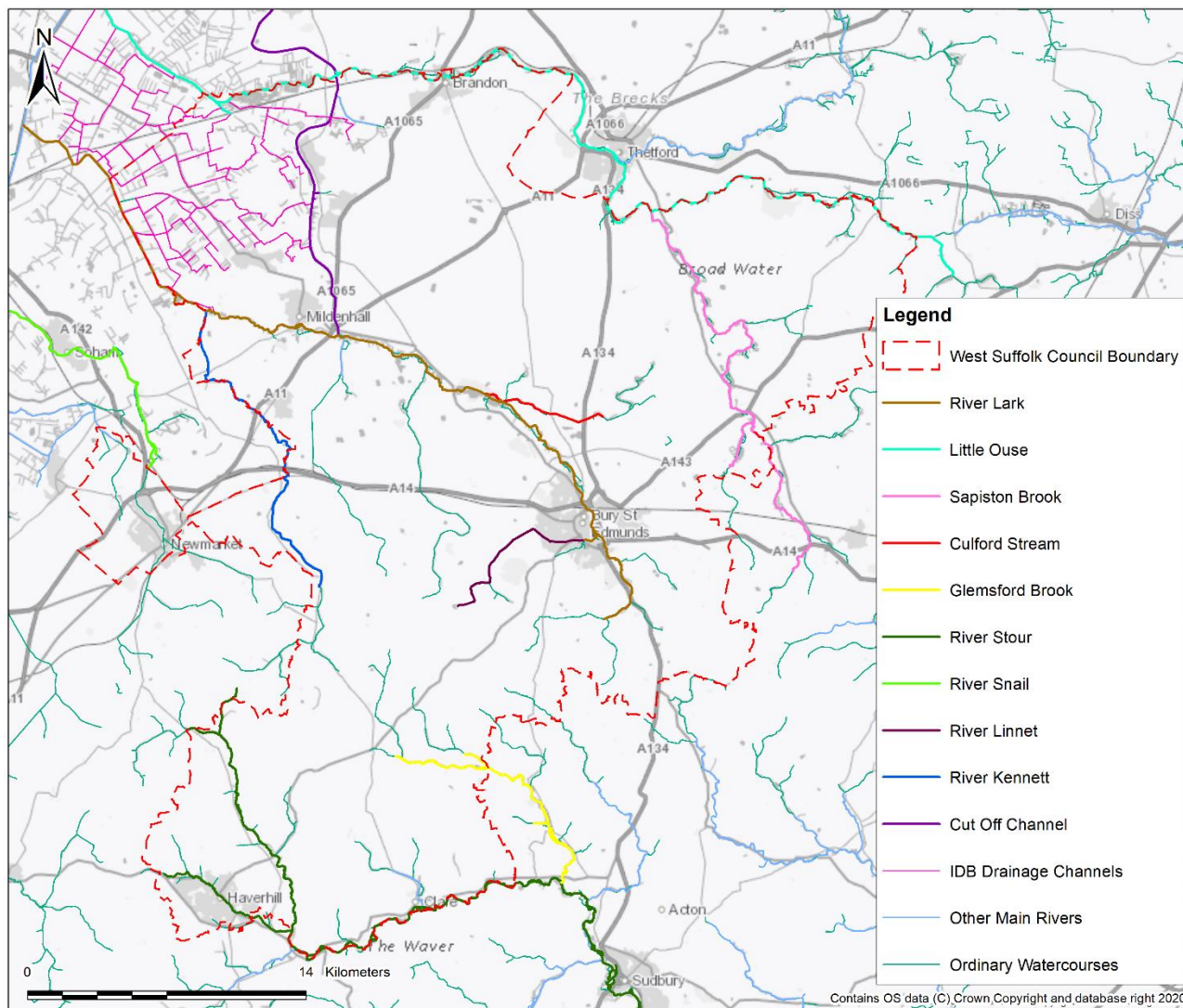
Figure 1: West Suffolk Contains OS data © Crown Copyright and database right 2020.



West Suffolk's hydrological setting is illustrated in Figure 2. The map shows the main rivers, ordinary watercourses and drainage channels managed by Burnt Fen, Lakenheath and Mildenhall Internal Drainage Boards (IDB) within West Suffolk. Key watercourses within West Suffolk are named.

Hydrologically, West Suffolk is drained to the north by tributaries of the Great Ouse, which ultimately reaches the coast at Kings Lynn, and to the south by the Stour and its tributaries which reach the coast at Harwich.

Figure 2: West Suffolk's hydrological setting. Contains OS data © Crown Copyright and database right 2020.



Potable water is supplied to the district by Anglian Water Services (AWS). The entirety of the study area is located within the Supply Area 6 (Cambridgeshire and West Suffolk) of Anglian Water's Water Resources Management Plan (WRMP). Five Water Resource Zones (WRZs) cover the study area; Bury Haverhill, Ely, Newmarket, Ixworth and Thetford. It is understood that AWS have proposed changes to its WRZs for WRMP24, further details will be requested from AWS to consider if this impacts on the next stage Detailed WCS.

The water company responsible for collecting and treating wastewater within the district is also AWS.

1.3 Local plan trajectory

The draft local plan development trajectory has been analysed as part of the water Cycle Study (WCS), forming the evidence base for deciding the number and location of site allocations including any potential new settlements in the plan. The Stage 1 WCS found that the capacity of the water recycling centres (WRCs) and the associated impact on water quality and water environment are one of the greatest potential issues in relation to the currently proposed development aspirations within West Suffolk.

West Suffolk Council is currently in the process of developing its preferred options for the new local plan, covering the period the period 2021- 2040. The Council has identified housing numbers and their distribution in settlements across the district, which have informed the preferred sites selected for allocation.

The total housing included in the Stage 1 WCS was 15,491 but at the time of writing this addendum and at the associated stage in the local plan update process this has since increased slightly to 15,892 and the distribution across the study area has also been refined. This estimation is based on early indicative figures at a point in time prior to the final draft of Preferred Options. The majority of the development is allocated in the towns and key service centres as detailed in the table below.

Table 1 – West Suffolk Local Plan (WSLP) updated housing distribution

Settlement	Total housing
Bury St Edmunds	5575
Haverhill	3691
Mildenhall	2014
Newmarket	1538
Lakenheath	900
Stanton	525
Tuddenham	510
Clare	245
Thurston	166
Barrow	149
Hopton	120
Wickhambrook	98
Kedington	96
Moulton	65
Hundon	62
Rougham	55
Brandon	47
Ingham	22
Stoke by Clare	14
Total	15,892

The updated local plan housing distribution (see Table 1) and the annualised trajectory (see Appendix A) has been evaluated against baseline conditions in relation to water resources and wastewater to assess the impact of the emerging local plan.

1. Water resources and supply

Anglian Water (AWS) is the sole statutory supplier of potable water to the West Suffolk area and the entirety of the study area is located within Anglian Water Supply Area 6 (Cambridgeshire and West Suffolk). However, new developments can be supplied by alternative providers through the Ofwat New Appointees and Variations (NAV) process. Five Anglian Water Water Resource Zones (WRZs) cover the study area; Bury Haverhill, Ely, Newmarket, Ixworth and Thetford. Potable water is supplied to West Suffolk via the AWS network; a vast majority of which is abstracted from the region's chalk aquifers.

Using data within the AWS Water Resources Management Plan 2019 (WRMP19) and from discussions with AWS we have understood that there is surplus water within the WRZs to supply the proposed growth in West Suffolk. However, the Environment Agency (EA) have some concerns regarding deterioration risk in the existing waterbodies during the preparation of Stage 1 Outline WCS. Therefore, AWS have been consulted to understand any key constraints associated with the supply required to support the proposed local plan development, as part of this WCS Addendum preparation.

2.1 Potable water demand projections

The change in district wide potable water demand (from domestic properties) due to the proposed development has been estimated using the following equation:

$$\text{Total district demand} = \text{Change in demand from existing dwellings} + \text{new dwelling demand}$$

Where demand from new and existing dwellings is calculated from:
 number of dwellings x occupancy rate x per capita consumption (PCC)

The baseline population figure has been provided by West Suffolk and the baseline total is 184,632. As per the Stage 1 Outline Water Cycle Study (WCS), three demand scenarios have been considered by this WCS addendum, to assess how West Suffolk can enable the potential growth to be accommodated whilst minimising the impact on water resources. This is important as the environment is already being damaged due to abstraction; and any increase in abstraction will worsen the situation. These are based on predicted changes to PCC driven by AWS strategy, and the implementation of regulations.

All scenarios assume that occupancy rate remains constant at 2.4. The conventional understanding within the water industry is that smaller households tend to have higher PCC rates, as there are less opportunities to 'share' demand for washing machines, dishwashers etc. It is therefore considered conservative to discount any potential demand reductions due to falling occupancy rates. In addition, all scenarios start from an existing PCC of 126.2l/p/day, which is a representative value estimated by AWS for the weighted average value of PCC in the region. The Code for Sustainable Homes guidance is no longer official but is included as another best practice reference for comparison purpose.

Table 2 – Potable demand scenarios

Scenario	Details	l/h/d
Best	The Code for Sustainable Homes (CSH) Levels 3/4 (2007)*	105
Preferred	Water Resources East (WRE) preferred PCC target	110
Worst	Based on AWS Water Resource Management Plan (WRMP) predicting 120 l/h/d PCC by end of planning period of 2044	120

The Anglian Water Services (AWS) Water Resources Management Plan 2019 (WRMP19) predicts an average increase in water demand of 14% for West Suffolk (household and non-household demand) and this is also in line with the worst-case predictions shown below. However, the new development proposed within the local plan should aspire to achieve the lowest demand figures as outlined in Figure 3, to minimise the impact of increased demand as a result of development on the water environment.

Figure 3: Potable water demand projection results for WSLP growth

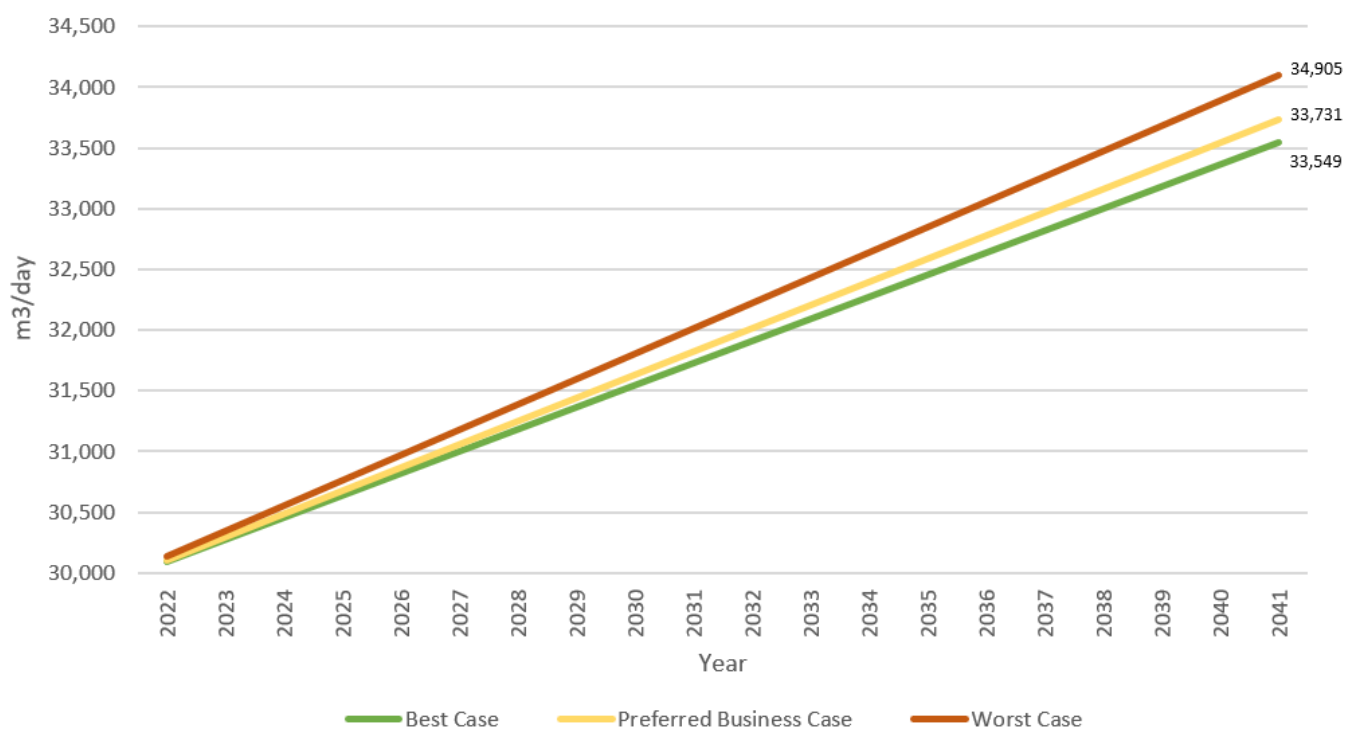


Table 3– Potable demand scenarios

Scenario	Change in demand (m³/day)	Change in demand (%)
Best case (green, and lowest line on Figure 8)	3,823	12.9%
Preferred business case (amber and middle line on Figure 8)	4,005	13.5%
Worst case (red and upper line on Figure 8)	4,369	14.7%

The demand calculations show an overall increase in demand of some 4,005m³/day between 2022 and 2041. AWS have concluded there is not enough water to meet the increasing demand in all of the operating areas, and therefore AWS have undertaken an options appraisal to consider ways to resolve the deficits. With the appropriate mitigation measures the WRMP19 concluded demand can be met, however developers should liaise with AWS early in the development process. AWS also recommend the water efficiency and water reuse in new developments as set out in their Water Resources Management Plan 2019 (WRMP19) and published five-point plan for a green recovery following the Covid-19 pandemic. It is recommended that the larger new settlement sites undertake site specific assessments, as new water supply infrastructure will be required for the larger development sites (i.e. in addition to water efficiency). It is also recommended to engage with the neighbouring water companies and Water Resources East project members to better

understand how sustainable water supply demand can be met to deliver new transfer schemes and planned local plan growth, without compromising the sensitive environmental objectives.

The findings of the recently published Water Resources East (WRE) report are that the whole of Eastern England is now classified as 'seriously water stressed'. There is not enough water to go round now reliably nor to meet new demand for homes, for food or for energy or be resilient to the impact of climate change as it bites further and society adapts to it. WRE are producing a long-term water resource plan for the region covering public water supply, environmental protection and restoration, for agriculture and energy and for other sectors reliant on water. It is predicted that by 2050, the region could require around double the amount of water currently used. This arises from the need to restore, protect and enhance the environment at the same time as increasing demands for public water supply and for the agri-food and the energy sectors, alongside an increasing allocation to the natural environment, and mitigating or adapting to the effects of climate change.

While future water demand drivers from population and housing growth are significant, these could be largely offset through demand management measures such as leakage reduction and a focus on household and non-household water efficiency, enabled by an increase in measures such as smart metering. However, water demand management alone is not going to provide sufficient water to enable the region's environmental vision to be realised while also aiming to support water-dependent economic activity. Significant new infrastructure will be required, and the water industry planning includes processes for identifying an appropriate mix of new strategic water supply options to develop such as reservoirs, transfers, desalination plants and water reuse. Reducing the impact of the new development on overall potable water demand has multiple benefits:

- The reduction in new demand allows Anglian Water Services (AWS) to better manage the risks of climate change, as the strain on existing resources will be lessened, allowing greater flexibility and resilience.
- Under the River Basin Management Plans (RBMP) legislation there is a legal duty to not allow deterioration within a water body. Growth and increased demand could have a negative effect on aquifers and streams (that are already experiencing environmental damage) due to increased abstraction, however if the demand is reduced there is the potential to lessen the negative impact.
- This would support the recently published Anglian Water Services (AWS) five-point plan for green recovery following the Covid-19 pandemic, which specifically promotes water efficiency and water neutrality in new developments.
- The strategic water transfers may be able to operate less frequently/ at lower flow rates. This reduces the impact of pumping this water in terms of energy/ carbon and cost to consumers and can increase the asset lifespan.
- The local distribution network reinforcements which may be required to supply the district in the future, such as increases to the capacity of mains and service reservoirs, may be lessened in scale and frequency, again allowing for a potential energy and cost saving, and an increase in asset lifespan.

2.2 Potable water availability projections

AWS take the proposed growth into account when determining which aspects of their strategic supply network to upgrade in each Asset Management Period (AMP), based on a cost benefit analysis, which will take account of risks such as occupancy rate changes, per capita consumption (PCC) fluctuations, and climate change. AWS will fund the majority of these improvements through revenue from customers. It is unlikely that upgrades such as this will constrain the development on a particular site, as the new demand from a site will be a negligible proportion of the volume of water considered at this strategic level. Anglian Water Service (AWS) have not specifically highlighted any issues relating to demand for the proposed local plan development within this

addendum although further attention to this will be required during preparation of the Detailed Water Cycle Study in consultation with AWS, the Environment Agency and Water Resources East.

More locally, any potential per capita consumption (PCC) reductions, will reduce the impact of the proposed growth on the existing water distribution infrastructure. However, a requirement will remain for new water mains to link the sites to the nearest trunk main (or large diameter distribution main with available capacity), or the potential need for reinforcement and capacity upgrades to the surrounding distribution mains. Such upgrades would be funded through the developer new connection charges and requisition processes, during which AWS would investigate the most efficient solution to connect to each proposed site in the local plan, utilising existing capacity where available.

AWS have confirmed that within the Bury Haverhill Water Resource Zone (WRZ) there is an initial surplus at the very start of the plan in the baseline, but this turns into a deficit before the end of Asset Management Period (AMP7) (2025) as AWS time limited licences become capped. The final plan solution for this WRZ is for demand management to reduce demand plus connection to the strategic interconnectors which will address the predicted areas in deficit, such as Bury Haverhill WRZ.

2.3 Water efficiency

Increasing public awareness of water resource issues, and their enthusiasm to conserve water, is an important factor for Anglian Water Service (AWS), West Suffolk, the Environment Agency (EA) and developers to consider. Consumers may find (or perceive) that some water efficient fittings limit their water use experience to unsatisfactory levels. It is vital that consumers understand the local implications of conserving water, and the personal cost savings they might potentially achieve, in order to prevent any water efficient fittings and fixtures being replaced with less efficient models by the homeowner in the future.

Smart water meters with internal displays offer the potential to engage consumers and highlight the cost savings they can achieve, whilst information placards, strategically placed at water features throughout development sites (for example at attenuation basins) can highlight the importance of water resources to the environment. Rainwater harvesting has been included in the Department for Environment, Food and Rural Affairs (DEFRA) updated non-statutory technical draft standards for Sustainable Drainage Systems (SuDS) which was consulted on in October 2020.

The Waterwise website provides a useful source of information in relation to water efficiency, which includes an independent review of costs and benefits of rainwater harvesting and greywater recycling technologies in the UK (Ref: ED 13617100, dated September 2020).

West Suffolk and developers should continue to consult with AWS throughout preparation of the local plan, and as planning applications are developed, to identify where new networks may be put in place, and the existing network reinforced, to serve a number of sites. It is recommended that West Suffolk consider the implementation of local Developer Forums, to facilitate a coherent approach to strategic discussions with AWS. It is also recommended that the local plan should consider a policy on maximising water efficiency that should achieve 110 l/p/d as a minimum for an optional Building Regulation standard. The West Suffolk Joint Development Management Policies local plan (adopted February 2015), includes Policy DM7 and an extract is outlined below.

Policy DM7: Sustainable Design and Construction

All proposals for new development including the re-use or conversion of existing buildings will be expected to adhere to broad principles of sustainable design and construction and optimise energy efficiency through the use of design, layout, orientation, materials, insulation and construction techniques. In particular, proposals for new residential development will be required to demonstrate that appropriate water efficiency measures will be employed to ensure that either:

- Water consumption is no more than 110 litres per person per day (including external water use) as calculated using the government's (September 2009) Water Efficiency Calculator or such standard that replaces it, or
- No water fitting exceeds the values set out in Table 4 (or any other fittings specification that government issues to supersede this).

Table 4- Fittings based specification from DCLG (2014) Housing Standards Review: Approved Document G: Requirement G2 Water Efficiency

Water fitting	National base level
WC	6/4 litres dual flush or 4.5 litres single flush
Shower	10 litres per minute
Bath	185 litres
Basin taps	6 litres per minute
Sink taps	8 litres per minute
Dishwasher	1.25 litres per place setting
Washing machine	8.17 litres per kilogram

In light of evidence relating to the Anglian Water Service (AWS) Green Recovery Five Point Plan there are plans proposed by West Suffolk to potentially reduce this further to 80 l/p/d, in line with the Greater Cambridge local plan proposal. This more stringent and ambitious target would further improve water efficiency and decreasing the demand in the study area.

Following consultation with the EA regarding water supply and demand it is recommended that the highest level of water efficiency in any new development in this area is implemented. However, there are uncertainties and risks regarding water efficiency measures, and the implementation may not be successful or delivered in new builds. It is recommended that West Suffolk Council and AWS should work together to discuss solutions to maximise long term water efficiency uptake in new developments.

2. Wastewater treatment and sewerage

Where large scale growth through extensions, intensification or new settlements, is required to meet the growth targets, the current volumetric flow consent figures, measured or calculated Dry Weather Flow (DWF) figures, and estimated population equivalent (PE) have been assessed. The calculated baseline DWF figures take into account all current permissions or allocations (i.e. those that are planned, but have not yet have happened) whereas the measured baseline DWF will not include those current permissions or allocations that are yet to be connected to the respective wastewater recycling centres (WRCs). The capacity of each WRC to receive wastewater flows from additional development currently outlined in the emerging local plan has then been estimated through high-level assessment and consultation with Anglian Water Service (AWS).

3.1 Wastewater treatment

AWS have been consulted regarding the capacity at the works against the existing permit data and the proposed allocated development. The majority of the development within the local plan can be accommodated within the receiving WRC. Our preliminary work indicates that the new local plan trajectory primarily impacts on the WRCs below.

- Tuddenham
- Haverhill
- Lakenheath
- Thurlow
- Fornham All Saints
- Barrow
- Mildenhall
- Newmarket
- Stanton
- Stanton
- Kedington
- West Stow
- Wickhambrook
- Clare
- Thurston
- Rougham
- Stoke by Clare
- Brandon

Based on the key notes from the discussions to date a Red Amber Green (RAG) rating has been applied to highlight the significance of the treatment required at the works and a description of this is outlined below.

Table 5 – Natura 2000 Assessment

Red amber green (RAG) status	Definition
Red	Significant constraints relating to capacity and treatment at the works
Amber	Upgrades required to treat proposed growth
Green	Capacity available to treat proposed growth

A detailed assessment, including the information regarding the consenting, proposed population increase and the settlements served is contained in Appendix A.

The assessment indicates that development can be accommodated at the majority of water recycling centres (WRCs) without major upgrades. The WRCs listed below have all been classified as green, as the growth proposed in the emerging local plan does not exceed the consents at the WRC. Anglian Water Services (AWS) have confirmed that there are no know issues or expected issues with the additional treatment required at the works.

- Fornham All Saints
- Barrow
- Mildenhall
- Newmarket
- Stanton
- Kedington
- West Stow
- Wickhambrook
- Clare
- Thurston
- Rougham
- Stoke by Clare
- Brandon

There are known constraints associated with development in the Tuddenham, Haverhill, Lakenheath and Thurlow WRC catchments and AWS are monitoring the situation and are in consultation with the Environment Agency (EA) regarding optioneering, as part of the emerging Drainage and Wastewater Management Plan (DWMP). All of the WRCs have been classified as amber and a description of the key constraints are outlined below.

Tuddenham

There are known issues at the WRC regarding the Technical Achievable Limits (TAL) within the existing consent for Ammonia. AWS are in discussion with the EA regarding options for future treatment at the works. Options could include infiltration removal from the existing network and by diverting additional DWF away from the WRC as increasing the consent to accommodate additional development at the works is unlikely to be viable. Growth within the WRC and subsequent mitigation is being considered in the developing AWS Drainage and Wastewater Management Plan (DWMP) that is to be published in 2022 (draft) with the final plan in 2023. This DWMP is a key next phase in AWS's long-term planning of WRC and sewerage assets, covering the period 2025-2050.

Haverhill

There are known issues at the WRC regarding TAL within the existing consent for Phosphate. AWS are in discussion with the EA regarding options for future treatment at the works. Options could include infiltration removal from the existing network and by diverting additional dry water flow (DWF) away from the WRC as increasing the consent to accommodate additional development at the works is unlikely to be viable. Growth within the water recycling centre (WRC) and subsequent mitigation is being considered in the developing Anglian Water Services (AWS) Drainage and Wastewater Management Plan (DWMP). Section 3.2 contains further information regarding water quality.

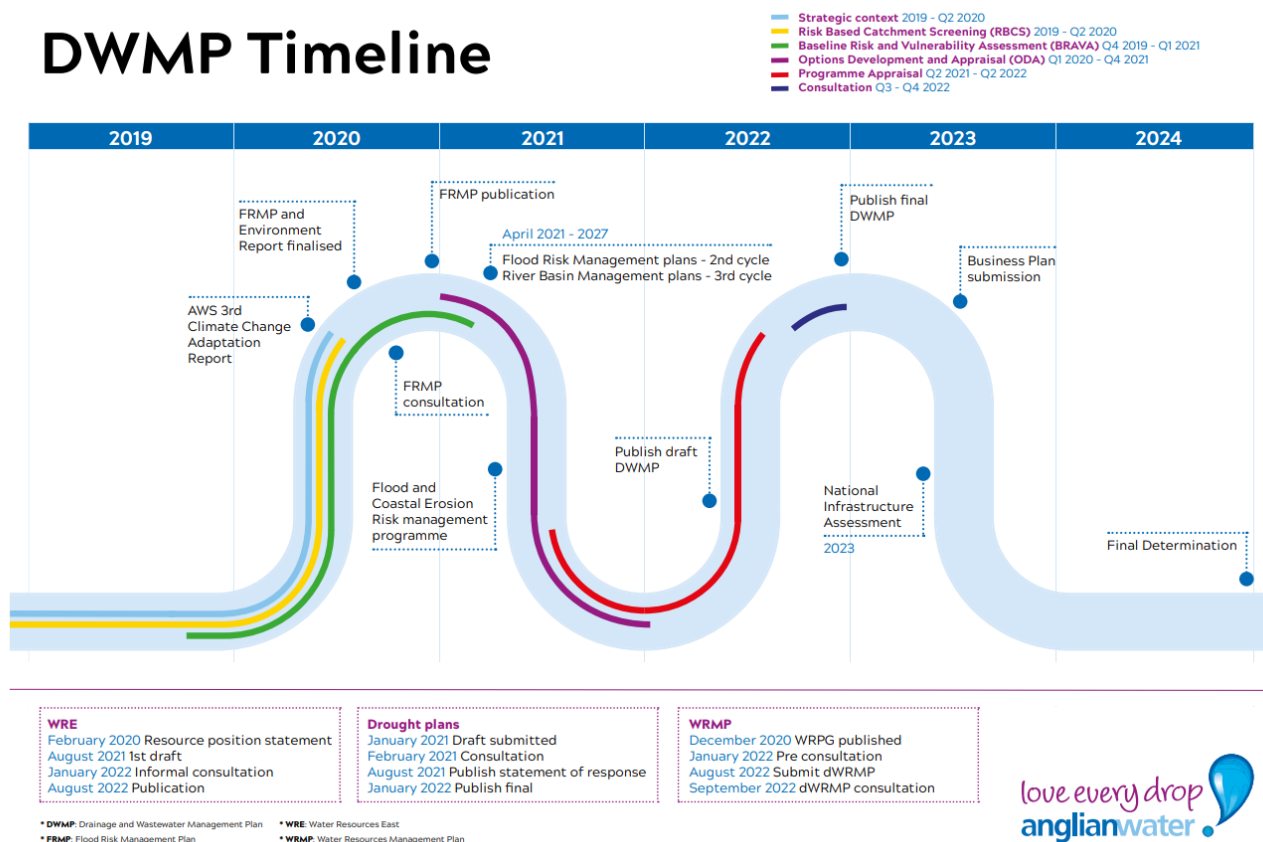
Lakenheath

The allocated growth within the WRC catchment results in the existing consent being exceeded, however AWS have confirmed that there are no known issues or expecting issues with providing the additional treatment required at the works.

Thurlow

The allocated development results in a minor increase in flows to the works. The additional flow can be accommodated by infiltration removal from the existing network, which will avoid the need for a new consent. AWS are not expecting issues with providing the additional treatment required at the works.

Figure 4: Indicative timeline for Anglian Water Services Drainage and Wastewater Management Plan (DWMP) Timeline



Source: <https://www.anglianwater.co.uk/siteassets/drainage-and-wastewater-management-plan.pdf>

3.2 Water quality impacts

To provide evidence that the proposed growth and development can be accommodated, all local plan proposed development within the AWS operational area has been initially reviewed. A full list of all development sites and the receiving Water Recycling Centre (WRC) is contained

Based on updated Dry Weather Flow (DWF) calculations and during consultation with AWS it has been confirmed that the majority of growth proposed can be accommodated within the existing WRCs consents and as such the Red, Amber, Green (RAG) status of green has been allocated. It has been assumed that as the development can be accommodated within the existing consents that there will be no deterioration to the water requirement as a result of growth. It should be noted that although consents are not exceeded at some locations further upgrades are still required to accommodate the extra growth without compromising water quality (for example Fornham All Saints)

There are two WRCs where upgrades or alternative options for treatment could be required to accommodate future growth and based on consultation with AWS they have been allocated the RAG status of amber. Further details are provided below.

- **Tuddenham WRC**– The AWS Drainage and Wastewater Management Plan (DWMP) optioneering was based on 2019 measured flows (687m³/d) and it is expected that the allocated growth should be able to fit within the existing permit. Therefore, Anglian Water Services (AWS) have not completed optioneering for this site as part of the Drainage and Wastewater Management Plan (DWMP). However, in 2020 the measured flow increased due to Covid19 to 969m³/d and if this flow remains then AWS will have a flow non-compliance issue. Therefore, the site is on a list of water recycling centres (WRCs) that AWS are discussing with the Environment Agency (EA) and the site is currently allocated to “monitor”, to see if that elevated flow remains.
- **Haverhill WRC**– AWS have not forecast a breach in Dry Weather Flow (DWF) before 2050 and therefore detailed optioneering has not been undertaken. This correlates with the local plan trajectory which indicates there are around 2766 properties remaining to build out within the catchment. AWS predict the DWF in 2041 will be around 5200m³/d. As this is predicted to be within the existing consent, the WRC is a site that AWS are discussing with the EA regarding future upgrades in relation to the Technical Achievable Limits (TAL) for Phosphate. AWS do not perceive growth within this WRC being an issue at present.

It is recommended that AWS continue to be consulted throughout the local plan process to understand and contribute to the potential options for treatment within the DWMPs and how they can be implemented to ensure growth within the catchments does not result in deterioration to the water environment.

3.3 Natura 2000 sites

Natura 2000 is the centrepiece of the European Union (EU) nature and biodiversity policy. It is an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long term survival of Europe's most valuable and threatened species and habitats. Site Improvement Plans (SIPs). have been developed for each Natura 2000 site in England. Site improvement plans can be accessed from the Natural England website. Distance from the development locations has been a consideration when scoping Natura 2000 sites into the assessment. The Natura 2000 sites which could be impacted by development within the local plan are included below. The issues from the Site Improvement Plans (SIPs) are outlined, as well as the measures. Additional mitigation measures recommended by this Water Cycle Study (WCS) Addendum to ensure that development proposed in the local plan does not negatively impact on the Natura 2000 sites are also included.

Natura 2000 Assessment by site:

- **Breckland Special Area of Conservation and Special Protection Area (SAC and SPA)**

West Suffolk local plan potential development locations: Brandon; Tuddenham and Lakenheath where it is estimated that the growth proposed in the catchments will exceed the current volumetric discharge consents and process capacity at the receiving WRCs.

Issue or Priority - 1 Inappropriate scrub control. 2 Pollution: risk of nitrogen deposition.

Site Improvement Plans (SIPs) Measures - 1 Improve vegetation management.
2. Investigate potential pollution impacts.

West Suffolk local plan mitigation - Surface water management (including the use of sustainable drainage systems (SuDS) and other nutrient mitigation) to ensure the quality of runoff is not adversely impacted. Tightened water recycling centre (WRC) discharge consent standards to ensure no deterioration in receiving waterbody.

- **Devils Dyke (SAC)**

West Suffolk local plan potential development locations: Newmarket

Issue or Priority - 1 Water Pollution. 2 Planning Permission: General

Site Improvement Plans (SIPs) Measures - 1. Reduce nutrients through agri-environment or diffuse water pollution plans and identify actions for the river basin management plan. 2. Develop evidence to assist with determination of planning applications to prevent unsustainable development impacting SPA species

West Suffolk local plan mitigation - Surface water management (including the use of SuDS and other nutrient mitigation) to ensure the quality of runoff is not adversely impacted. Tightened WRC discharge consent standards to ensure no deterioration in receiving waterbody.

- **Chippenham Fen/ Fenland (SAC)**

West Suffolk local plan potential development locations: Newmarket

Issue or Priority - 1. Water Pollution. 2. Hydrological Changes.

Site Improvement Plans (SIPs) Measures - 1. Undertake water quality assessment. 2. Review the Water Level Management Plan (WLMP). Investigate other flood storage options.

West Suffolk local plan mitigation - Surface water management (including the use of SuDS and other nutrient mitigation) to ensure the quality of runoff is not adversely impacted. Tightened WRC discharge consent standards to ensure no deterioration in receiving waterbody.

- **Rex Graham Reserve (SAC)**

West Suffolk local plan potential development locations: Mildenhall

Issue or Priority - 1 Changes in species pressure distributions

Site Improvement Plans (SIPs) Measures - 1. Create new chalk pits and exposures for orchid colonisation.

West Suffolk local plan mitigation - Maintain WRC consent standards to ensure no deterioration in receiving waterbody.

- **Waveney and Little Ouse Valley (SPA)**

West Suffolk local plan potential development locations: not applicable.

Issue or Priority - 1. Inappropriate water levels. 2. Water pollution

Site Improvement Plans (SIPs) Measures - 1. Investigation of the impacts of water level changes. 2. Establish a Diffuse Water Pollution Plan.

West Suffolk local plan mitigation - No development planned in the vicinity of the SPA. If development is planned, then implement surface water management (including the use of SuDS and other nutrient mitigation) to ensure the quality of runoff is not adversely impacted.

Therefore, all Natura 2000 Sites should be scoped for the Appropriate Assessment for the local plan and further assessment will be required during preparation of the Detailed WCS, in consultation with Natural England. A summary of the Natura 2000 sites is provided below.

3. Conclusions and recommendations

The draft West Suffolk local plan development distribution and trajectory has been analysed as part of the Water Cycle Study (WCS). This WCS Addendum forms part of the evidence base to assist the council in deciding the number and location of allocations, including any new settlements in the local plan. The conclusions and recommendations of the outline assessment are presented in the section below. It is considered that the capacity of the water recycling centres (WRCs) and the associated impact on water quality and water environment are the greatest potential issues in relation to the currently proposed development aspirations within West Suffolk. As this is a Level 1 WCS Addendum it should be treated as a 'living document' with the conclusions and analysis being subject to change following further investigation and consultation.

Water resources and supply – summary

The initial demand calculations show an overall increase in demand of some 4,005m³/day between 2022 and 2041. AWS have concluded there is not enough water to meet the increasing demand in all of the operating areas, and therefore AWS have undertaken an options appraisal to consider ways to resolve the deficits. With the appropriate mitigation measures the WRMP19 concluded demand can be met, however developers should liaise with AWS early in the development process. AWS also recommend the water efficiency and water reuse in new developments as set out in their WRMP19 and recently published five-point plan for a green recovery following the Covid-19 pandemic. It is recommended that the larger new settlement sites undertake site specific assessments, as new water supply infrastructure will be required for the larger development sites (i.e., in addition to water efficiency and water reuse).

Wastewater, sewage and water quality – summary

The assessment indicates that development can be accommodated at the majority of WRCs without major upgrades. There are known constraints associated with development in the Tuddenham and Haverhill WRC catchments and AWS are monitoring the situation at both WRC locations and are in consultation with the EA regarding optioneering, as part of the emerging DWMP. However, AWS do not have major concerns regarding development within the two WRC catchments at this stage, and it is advised that consultation occurs throughout the emerging WSLP and DWMP process. Lakenheath and Thurlow WRCs are also shown to exceed the existing DWF discharge permits, but AWS have no concerns in implementing the required mitigation measures.

Natura 2000 – summary

The Natura 2000 sites which could be impacted by development within the WSLP are Breckland (SAC and SPA), Devils Dyke (SAC), Rex Graham Reserve (SAC), Waveney and Little Ouse Valley (SPA) and Chippenham Fen/ Fenland (SAC). Mitigation measures to ensure that development does not negatively impact on the Natura 2000 are delivering effective surface water and flood management, tightening WRC consent standards, phasing of development to ensure the timely implementation of infrastructure upgrades and encouraging holistic water management.

Based on the currently available information from the local plan preparation process, this Water Cycle Study (WCS) Addendum (together the Stage 1 Outline WCS Report) provide West Suffolk Council with an updated indication of where water and wastewater infrastructure, and the wider water environment, is likely to constrain the proposed development and where further assessment is required to progress the West Suffolk local plan to the submission stage. A Detailed WCS should also be undertaken, as part of the next steps to inform this process.

Appendix A- Waste water treatment summary

Waste water recycling centre	Settlement served	Existing consent (m3/day)	Measured DWF (m3/day)	Increase in dwellings (2041)	2041 calculated DWF (m3/day)	Consent exceeded post development	Consultation summary
Tuddenham	Tuddenham and Red Lodge	1,100		510	1,265	Yes	There are known issues at the WRC regarding the Technical Achievable Limits (TAL) within the existing consent for Ammonia. AWS are in discussion with the EA regarding options for future treatment at the works. Options could include infiltration removal from the existing network and by diverting additional DWF away from the WRC as increasing the consent to accommodate additional development at the works is unlikely to be viable. Growth within the WRC and subsequent mitigation is being considered in the developing AWS Drainage and Wastewater Management Plan (DWMP) that is to be published in 2022 (draft) with the final plan in 2023. This DWMP) is a key next phase in AWS's long-term planning of WRC and sewerage assets, covering the period 2025-2050.
Haverhill	Haverhill and Little Wratting	5,700		3,691	5,200	No	There are known issues at the WRC regarding TAL within the existing consent for Phosphate. AWS are in discussion with the EA regarding options for future treatment at the works. Options could include infiltration removal from the existing network and by diverting additional DWF away from the WRC as increasing the consent to accommodate additional development at the works is unlikely to be viable. Growth within the WRC and subsequent mitigation is being considered in the developing

West Suffolk Council
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Waste water recycling centre	Settlement served	Existing consent (m3/day)	Measured DWF (m3/day)	Increase in dwellings (2041)	2041 calculated DWF (m3/day)	Consent exceeded post development	Consultation summary
							AWS DWMP. Section 3.2 contains further information regarding water quality.
Lakenheath	Lakenheath	860		900	1,205	Yes	The allocated growth within the WRC catchment results in the existing consent being exceeded, however AWS have confirmed that there are no known issues or expecting issues with providing the additional treatment required at the works.
Thurlow	Hundon	140		62	149	Yes	The allocated development results in a minor increase in flows to the works. The additional flow can be accommodated by infiltration removal from the existing network, which will avoid the need for a new consent. AWS are not expecting issues with providing the additional treatment required at the works.
Fornham All Saints	Bury St Edmonds and Fornham All Saints	14,584		5,575	11,282	No	Although significant development is proposed within the WRC catchment, AWS have confirmed that there are no know issues or expecting issues with the additional treatment required at the works.
Barrow	Barrow	363		149	349	No	The growth proposed in the emerging local plan does not exceed the consents at the WRC. AWS have confirmed that there are no know issues or expected issues with the additional treatment required at the works.
Mildenhall	Mildenhall	3,900		2,014	3,608	No	
Newmarket	Newmarket	6,100		1,538	4,968	No	
Stanton	Stanton and Ixworth	1,500		525	1,176	No	
Kedington	Kedington	600		96	394	No	
West Stow	West Stow	810		22	442	No	
Wickhambrook	Wickhambrook	338		98	295	No	
Clare	Clare	873		245	668	No	

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Waste water recycling centre	Settlement served	Existing consent (m3/day)	Measured DWF (m3/day)	Increase in dwellings (2041)	2041 calculated DWF (m3/day)	Consent exceeded post development	Consultation summary
Thurston	Thurston	1,500		166	1,200	No	
Rougham	Rougham	337		55	225	No	
Stoke by Clare	Stoke by Clare	96		14	69	No	
Brandon	Brandon	2,006		47	1,711	No	

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