SODC Local Plan Water Cycle Study Update

Phase 1: Assessment of potential site allocation options

November 2018

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South Oxfordshire District Council

Listening Learning Leading

JBA - Project Manager

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Revision history

Revision Ref/Date	Amendments	Issued to
22/11/2018	Draft Report	James Gagg
04/12/2018	Updated to reflect comments from SODC	James Gagg
07/12/2018	Updated to reflect comments from SODC	James Gagg
02/01/2019	Document renamed for clarity	James Gagg
02/01/2019	Site name updated to 'Land south of Great Western Park' for consistency	James Gagg

Contract

This report describes work commissioned by James Gagg, on behalf of South Oxfordshire District Council, by an email dated 28 September 2018. South Oxfordshire's representative for the contract was James Gagg. Paul Eccleston and Jennifer Hill of JBA Consulting carried out this work.

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Purpose

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Executive summary

A Water Cycle Study (WCS) was published by South Oxfordshire District Council in October 2017. This study assessed the capacity and ability of the water supply and water treatment system to deal with the additional development planned for in the last stage Regulation 19 consultation stage Local Plan. Subsequently the draft local plan has been revised, and as such, the evidence base required revision. Therefore, JBA Consulting was commissioned by SODC to update the existing WCS to inform the emerging Local Plan.

This document is an interim report to document phase one of the WCS update. It focuses on assessment of potential site allocation options for SODC, based on the site assessment work undertaken to support the updated plan. This document will be developed later this year to reflect the final publication consultation version of the local plan and the final document will form an addendum to the existing WCS for South Oxfordshire.

This report documents the following assessments:

- Water resources assessment
- Water supply assessment
- Wastewater collection (sewerage) assessment
- Wastewater treatment works headroom assessment
- Odour impact screening
- Flood risk impact assessment.

The WCS interim addendum concluded that the biggest issues for potential site allocations locations in SODC from a Water Cycle perspective were:

- The cumulative impact of development on water resources at Reading
- The cumulative impact of development on wastewater infrastructure around Oxford
- Wastewater infrastructure for the Harrington and the impact of increased effluent of flood risk

The next step for this study is to assess SODC's preferred growth scenario and conclude if these issues remain. If there are significant restrictions identified, SODC, Thames Water and the Environment Agency will identify these in a statement of common ground, which will also outline in more detail how they can be addressed to enable new development to come forward in a timely manner.

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Abbreviations

AMP	Asset Management Plan
CSO	Combined Sewer Overflows
DWF	Dry Weather Flow
dWRMP	Draft Water Resource Management Plan
DYAA	Dry Year Annual Average
DYCP	Dry Year Critical Period
EA	Environment Agency
EP	Environmental Permits
FEH	Flood Estimation Handbook
JBA	Jeremy Benn Associates
LPA	Local Planning Authority
Ml/d	mega litre per day
OCC	Oxford City Council
SBP	Strategic Business Plan
SESRO	South East Strategic Reservoir Option
SODC	South Oxfordshire District Council
SuDS	Sustainable Drainage Systems
SWOX	Swindon and Oxfordshire
TWUL	Thames Water Utilities Limited
WCS	Water Cycle Study
WRMP	Water Resource Management Plan
WRZ	Water Resource Zone
WTW	Water Treatment Works
WwTW	Wastewater Treatment Works

1 Introduction

1.1 Terms of reference

A Water Cycle Study (WCS) was published by South Oxfordshire District Council (SODC) in October 2017. This study assessed the capacity and ability of the water supply and wastewater treatment system to deal with the additional development planned for in the last stage Regulation 19 consultation stage Local Plan. Subsequently the draft local plan has been reviewed and updated, and as such, an update to the evidence base was required. Therefore, JBA Consulting was commissioned by SODC to update the existing WCS to inform the new version of the emerging Local Plan.

This document is an interim report to document phase one of the WCS update. This document will be developed later this year to include a second phase which will review and report on the cumulative impacts of the preferred development scenario. The final document will form an addendum to the existing WCS for South Oxfordshire.

1.2 The Water Cycle

National Planning Policy Framework Practice Guidance on Water Supply, Wastewater and Water Quality[1] describes a Water Cycle Study as:

"a voluntary study that helps organisations work together to plan for sustainable growth. It uses water and planning evidence and the expertise of partners to understand environmental and infrastructure capacity. It can identify joined up and cost-effective solutions, that are resilient to climate change for the lifetime of the development.

The study provides evidence for Local Plans and sustainability appraisals and is ideally done at an early stage of plan-making. Local authorities (or groups of local authorities) usually lead water cycle studies, as a chief aim is to provide evidence for sound Local Plans, but other partners often include the Environment Agency and water companies."

The Environment Agency's guidance on WCS[2] recommends a phased approach:

- Phase 1: Scoping study, focussing on formation of a steering group, identifying issues for consideration and the need for an outline study.
- Phase 2: Outline study, to identify environmental constraints, infrastructure constraints, a sustainability assessment and consideration of whether a detailed study is required.
- Phase 3: Detailed study, to identify possible infrastructure requirements, when they are required, how they will be funded and implemented and an overall assessment of the sustainability of proposed infrastructure. This does not negate the need for detailed site-specific planning of water and wastewater infrastructure. This should be undertaken through early engagement with Thames Water and is the responsibility of the developer.

This WCS addendum could be classified as a Phase 2 WCS.

Figure 1-1 shows the main elements that compromise the Water Cycle and shows how the natural and man-made processes and systems interact to collect, store or transport water in the environment.

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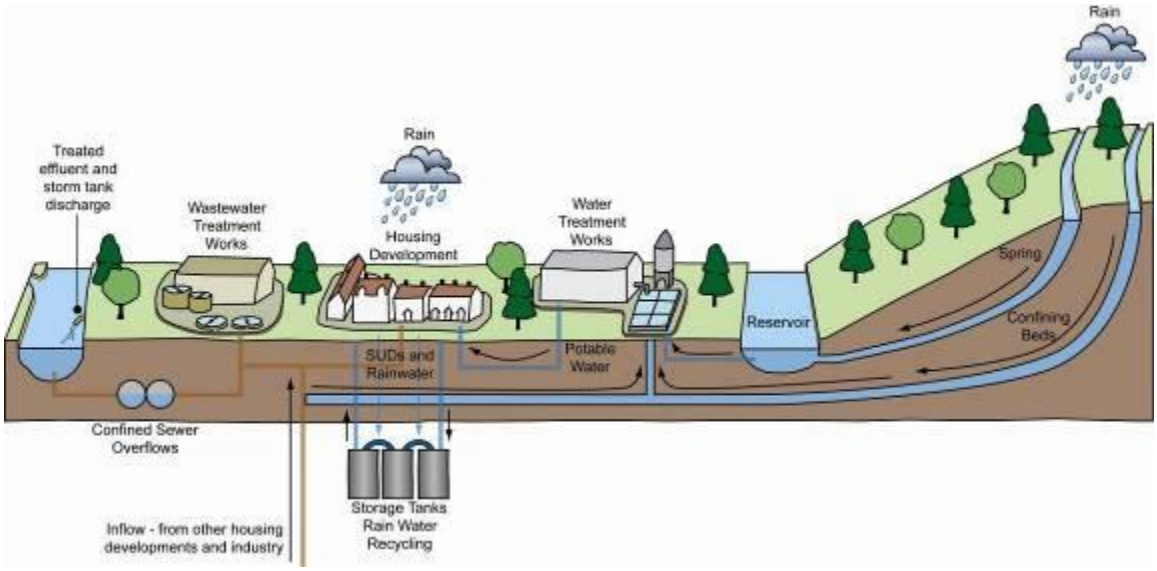
1 Planning Practice Guidance: Water supply, wastewater and water quality, Department for Communities and Local Government (2014). Accessed online at: http://planningguidance.planningportal.gov.uk/blog/guidance/ on: 09/03/2018

2 Water Cycle Study Guidance, Environment Agency (2009). Accessed online at: http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/geho0109bpff-e-e.pdf on: 09/03/2018

Figure 1-1: The Water Cycle



1.3 Impact of development on the water cycle

New homes require the provision of clean water, safe disposal of wastewater and protection from flooding. It is possible that allocating large numbers of new homes at some locations may result in the capacity of the existing available infrastructure being exceeded. This situation could potentially lead to service failures to water and wastewater customers, have adverse impacts on the environment or cause the high cost of upgrading water and wastewater assets being passed on to bill payers. Climate change presents further challenges such as increased intensity and frequency of rainfall and a higher frequency of drought events that can be expected to put greater pressure on the existing infrastructure.

1.4 Objectives

Specific requirements for this Phase 1 assessment were; considering proposed and considered SODC sites:

- calculate the available headroom for water resources, supply and wastewater treatment

A follow-on stage will address the following requirements; considering the preferred growth scenario:

- calculate the available headroom for water resources, supply and wastewater treatment (including water quality), building on the work from Phase 1
- establish the evidence to input to an updated statement of common ground with Thames Water and the Environment Agency

1.5 Study area

The study area, shown in Figure 1-2, is the largely rural district of South Oxfordshire within the county of Oxfordshire in South East England. The district is around 655km^2 in size and has four main towns, Didcot, Henley-on-Thames, Wallingford and Thame. The north of the district contains part of the Oxford Green Belt, and in the south, much of the district is designated as part of the North Wessex Downs or the Chilterns Areas of Outstanding Natural Beauty.

Significant watercourses within the study area include the River Thames, Thame and Cherwell. Some of the key transport routes passing through the district are the A40, A34, A44, A420, A412 and the M40.

Figure 1-2: South Oxfordshire District study area

1.6 Record of engagement

The preparation of this WCS addendum was supported by engagement of Thames Water, the Environment Agency and Oxford City Council. A summary of involvement of each party has been included below.

1.6.1 Thames Water

Representatives from SODC, Thames Water and JBA Consulting held a meeting in October 2018. During this meeting, the scope of works was discussed and the approach to the assessment was agreed. JBA requested a series of data from Thames Water, which was provided.

1.6.2 Environment Agency

Representatives from the Environment Agency confirmed a meeting would not be required with SODC and JBA Consulting as the approach to the WCS update was consistent with the WCS from 2017. JBA requested a series of data from the Environment Agency, which was provided.

1.6.3 Oxford City Council

Growth in Oxford City is of particular relevance to this study as the Oxford Wastewater Treatment Works (WwTW) could also serve new development in SODC. SODC requested the OCC WCS which was provided once published.

2 Future growth

2.1 South Oxfordshire

To inform the updated version of the SODC Local Plan, a site assessment process has been undertaken which has reviewed the impacts of potential strategic development allocations. This Stage 1 study specifically assesses the water resources, supply and wastewater treatment implications of these potential site allocations, including the potential cumulative impacts where relevant. The potential site allocations and their forecast capacities is given in Table 2.1. The update also took into account additional growth to be associated with Neighbourhood Plan updates for larger towns and villages, taking into account the latest targets as previously set out in the last stage plan (as shown in table 2.2).

For the sake of this assessment, the proposed location of the small-scale development has not been considered and the growth has been considered at a parish scale.

2.2 Neighbouring authorities

Where growth within a neighbouring Local Planning Authority (LPA) area may be served by infrastructure within or shared with SODC, the LPA were contacted to provide information on any WCS for the area. In this instance, this includes OCC and Reading.

2.2.1 Oxford City Council

OCC completed a Water Cycle Study in 2018 which considered two growth scenarios:

- Scenario 1; The realistic scenario - 8,000 homes by 2036;
- Scenario 2; The higher growth scenario – 12,000 homes by 2036

The study concluded that:

- The water resource developments proposed by Thames Water in their latest WRMP should meet the expected increases in demand for both scenarios.
- The Oxford WwTW recently underwent a significant upgrade to increase treatment capacity four-fold, which should mean that there is sufficient treatment beyond 2036.
- Population growth will likely lead to an increase in discharges from the WwTW, therefore liaison will likely be required with the Environment Agency to amend existing permits whilst ensuring that water quality and flood risk are not compromised.
- Provided the correct measures are followed by the key stakeholders and the WwTW are upgraded where necessary the environmental capacity should be sufficient to ensure that the water environment remains healthy.

2.2.2 Reading Borough Council

The Local Plan for Reading has been submitted for inspection but is not supported by a WCS. The Local Plan states that although there is a need for 16,077 new homes in Reading, given the available land, a development target of 15,433 is realistic for the plan period. The plan has a specific policy (EN16[3]) to address pollution and water resources.

[3] http://www.reading.gov.uk/media/8053/Pre-Submission-Local-Plan-November-2017/pdf/Pre-Submission_Local_Plan_November_2017.pdf

Table 2-1: Potential site allocations for SODC

Site	Max potential capacity
Land adjacent to Thornhill Park and Ride	875
Northfield	2000
Harrington	6500
Grenoble Road	3000
Wick Farm	1750
Lower Elsfield	1100
Land south of Great Western Park	1000
Land Off Thame Road, North Weston	1200
Playhatch	1000
Palmers Riding Stables	510
Reading Golf Club	450
Chalgrove*	3000
Culham*	3500
Wheatley*	300
Berinsfield*	1700

* Site assessed as part of 2017 Water Cycle Study

Table 2-2: Growth for towns and villages in SODC

Settlement	Dwellings
Henley-on-Thames	500
Thame	775
Benson	541
Sonning Common	229
Watlington	260
Woodcote	76
Brightwell-cum-Sotwell	67
The Baldons	15
Warborough and Shillingford	29

3 Water resources assessment

When new houses are planned it is important to ensure that there are enough water resources in the area to cover the increase in demand without the risk of shortage in the future or in periods of high demand. Thames Water is responsible for supplying water for the whole district and all the potential site allocations are located within the supply zones of Thames Water.

The aim of this assessment is to flag up if the emerging housing growth projections proposed by SODC exceeds what TWUL has considered in planning the future demands for water, so that actions can be implemented, and resources planned to overcome future shortages.

3.1 Methodology

Thames Water's draft Water Resource Management Plan[4] (dWRMP) published in February 2018 was reviewed. Attention was focussed upon:

- The available water resources and future pressures which may impact the supply element of the supply/demand balance.
- The allowance within those plans for housing and population growth and its impact upon the demand side of the supply/demand balance.

In addition, Thames Water were provided with the list of settlements including the number of houses planned for each scenario and were invited to comment upon these.

The results were assessed against the following three positions:

- The dWRMP has planned for the increase in demand.
- Insufficient evidence in the dWRMP to confirm that the planned increase in demand can be met.
- The dWRMP does not take into consideration the planned increase in demand. Additional water resources may be required.

3.2 Results

The dWRMP sets out how Thames Water plan to provide a secure and sustainable supply of water for customers from 2020 to 2100. As part of the planning process, Thames Water has divided their supply area into six Water Resource Zones (WRZs). The Swindon and Oxfordshire (SWOX) zone covers the majority of the South Oxfordshire District, except the south west of the district, which is in the small Henley WRZ.

3.2.1 Swindon and Oxford (SWOX)

The SWOX zone was forecasted to increase consumption from 141Ml/d in 2016/17 to 170Ml/d in 2044/45. The increases in household consumption are driven by increases to population. The assessment concluded that SWOX has a supply/demand deficit in dry year critical period (DYCP) starting from 2022/23 and growing throughout the planning period.

As part of the dWRMP, Thames Water have developed a preferred plan to balance the water demand with available resources in the short, medium and long term. The plan is based on the strategy that the demand per customer is reduced and a large-scale reservoir is built to provide a long-term water supply.

[4] https://corporate.thameswater.co.uk/About-us/our-strategies-and-plans/water-resources

In the short term (between 2020 and 2025) Thames Water will increase metering to 95% of customers and promote water efficient. The aim is that 8.8Ml/d of benefits will be delivered through the water efficiency campaign.

In the medium term (between 2020 and 2025) Thames Water will introduce an incentive based financial tariff, commencing in 2035. Thames Water have proposed the development of South East Strategic Reservoir Option (SESRO), which will be available from 2037. This would provide water resource to the SWOX and London water resource zones and enable reduced extraction from Farmoor Reservoir.

In the long term (between 2040 and 2099) Thames Water will manage an inter zonal water transfer from SWOX to the Slough, Wycombe and Aylesbury WRZ, via the River Thames. This will be used to address the deficit in SWA but will result in reduced available water resources in SWOX by up to 24Ml/d.

3.2.2 Henley

The Henley zone was forecasted to increase consumption from 7Ml/d in 2016/17 to 8Ml/d in 2044/45. The increases in household consumption are driven by increases to population. The assessment concluded that the Henley zone had no forecast supply-demand deficit over the planning period for either dry year annual average (DYAA) or DYCP. The resource zone was classified as low risk.

The water resource plan for the Henley zone is simple due to the surplus of supply throughout the plan period. Steps include, reduced leakage by 0.36Ml/d and total demand by 1.47Ml/d. As part of reducing demand, household meter penetration of 96% should be achieved by 2039-40.

3.3 Thames Water Assessment

Thames Water were provided with a complete list of potential site allocations and the potential / equivalent housing numbers for each. Using this information, they were asked to comment on the impact of the proposed growth on water resources in the SODC area. A risk assessment was then applied using the following definitions to score each site:

Adopted WRMP has planned for the increase in demand, or sufficient time to address supply demand issues in the next WRMP.	Insufficient evidence in adopted WRMP to confirm that the planned increase in demand can be met.	Adopted WRMP does not take into consideration the planned increase in demand. Additional water resources may be required.

Table 3-1 summarises the scoring given to each site by Thames Water.

Table 3-1: Summary of Thames Water water resource comments and risk score

Potential Site Allocations	Water Resource Assessment	Water Resource Comment
Harrington, Wick Farm, Lower Elsfield, Land adjacent to Thornhill, Grenoble Road, Northfield, Land south of Great Western Park, Land off Thame Road, North Weston	Adopted WRMP has planned for the increase in demand, or sufficient time to address supply demand issues in the next WRMP.	The water treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development.
Playhatch, Palmers Riding Stables, Reading Golf Club	Adopted WRMP does not take into consideration the planned increase in demand. Additional water resources may be required.	Due to an unprecedented recent increase in demand in this area Playhatch WTW is operating at very close to our licence to abstract water. The predicted additional demand of these developments takes the works over the peak treatment and abstraction license.

4 Water supply infrastructure

An increase in water demand adds pressure to the existing supply infrastructure. This is likely to manifest itself as low pressure at times of high demand. An assessment is required to identify whether the existing infrastructure is adequate or whether upgrades will be required. The time required to plan, obtain funding and construct major pipeline works can be considerable and therefore water companies and planners need to work closely together to ensure that the infrastructure is able to meet growing demand.

Water supply companies make a distinction between supply infrastructure, the major pipelines, reservoirs and pumps that transfer water around a WRZ, and distribution systems, smaller scale assets which convey water around settlements to customers. This outline study is focused on the supply infrastructure. It is expected that developers should fund water company impact assessments and modelling of the distribution systems to determine requirements for local capacity upgrades to the distribution systems.

4.1 Methodology

Thames Water were provided with a complete list of potential site allocations and the potential / equivalent housing numbers for each. Using this information, they were asked to comment on the impact of the proposed growth on water supply infrastructure in the SODC area. A risk assessment was then applied using the following definitions to score each site:

Capacity available to serve the proposed growth	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified	Infrastructure and/or treatment upgrades will be required to serve proposed growth. Major constraints have been identified.

4.2 Results

Table 4-1 summarises the scoring given to each potential site allocation by Thames Water.

Table 4-1: Summary of Thames Water water supply comments and risk score

Potential Site Allocations	Water Supply Assessment	Water Supply Comment
Harrington, Wick Farm, Lower Elsfield, Land adjacent to Thornhill, Grenoble Road, Northfield, Playhatch, Land south of Great Western Park, Palmers Riding Stables, Land off Thame Road, North Weston,	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified	The water treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development.

4.3 Conclusions

Due to the scale of the development proposed at each of the potential site allocations, Thames Water have concluded that significant network reinforcement would be required to serve these communities. However, no significant constraints to providing additional water supply infrastructure have been identified for any of these potential site allocations.

5 Wastewater disposal

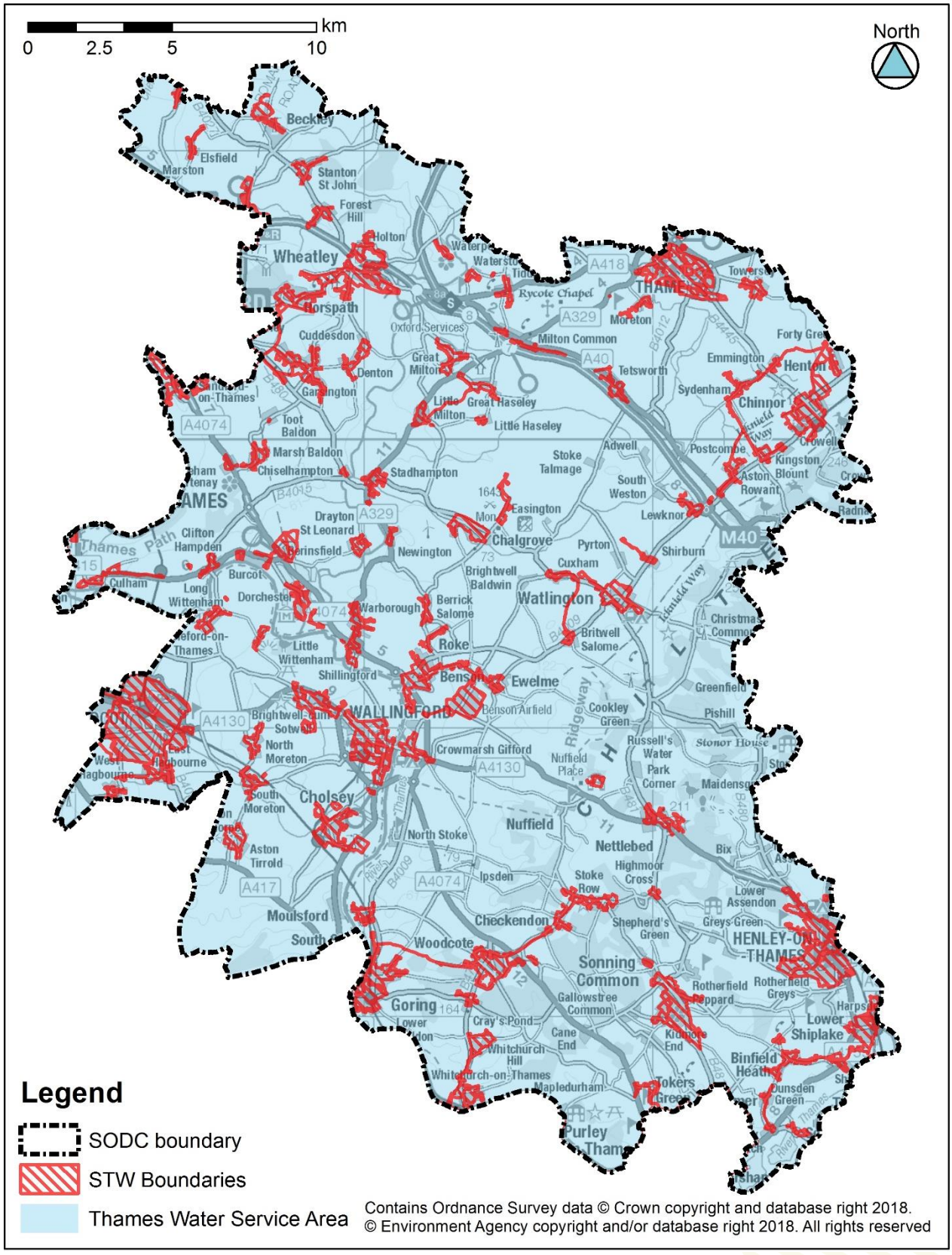
Thames Water is the Sewerage Undertaker across the whole district as shown in Figure 5-1. The role of the sewerage undertaker includes collection and treatment of wastewater from domestic and commercial premises, and in some areas drainage of surface water from building cartilages to combined or surface water sewers. It excludes, unless adopted by TWUL, systems that do not connect directly to the wastewater network, e.g. highway drainage.

Increased wastewater flows into collection systems due to growth in population or per-capita consumption can lead to overload of infrastructure, increasing the risk of sewer flooding and, where present, increase the frequency of discharges from Combined Sewer Overflows (CSOs).

Likewise, headroom at wastewater treatment works can be eroded by growth in population or per-capita consumption, requiring investment in additional treatment capacity. As the volume of treated effluent rises, even if the effluent quality is maintained, the pollutant load discharged to the receiving watercourse will increase. In such circumstances the Environment Agency, as the environmental regulator, may tighten the permitted effluent permits in order to achieve a "load standstill" i.e. ensuring that as effluent volumes increase the pollutant load discharged does not increase. Again, this would require investment by the water company to improve the quality of the treated effluent.

In combined sewerage systems, or foul systems with surface water misconnections, there is potential to create headroom in the system, thus enabling additional growth, by removal of surface water connections. This can mostly readily be achieved on redevelopment of brownfield sites with combined sewerage, where there is potential to discharge water via sustainable drainage systems (SuDS) to groundwater, watercourses or surface water sewers.

Figure 5-1: Existing Thames Water wastewater network catchments within South Oxfordshire



5.1 Foul sewerage network capacity assessment

New houses add pressure to the existing sewerage system. An assessment is required to identify the available capacity within the existing systems and the potential to upgrade overloaded systems to accommodate growth. The scale and cost of upgrading works may vary very significantly depending upon the location of development in relation to the network and the receiving WwTW.

It may be possible that an existing sewerage system is already working at its full capacity and further investigations have to be carried out to define which solution is necessary to implement to increase its capacity. New infrastructure may be required if for example a site is not served by an existing system.

Sewerage undertakers must consider growth in demand for wastewater services when preparing their five-yearly Strategic Business Plans (SBPs) which set out investment for the next Asset Management Plan (AMP) period. Typically, investment is committed to provide new or upgraded sewerage capacity to support allocated growth with a high certainty of being delivered. Additional sewerage capacity to serve windfall sites, smaller infill development or to connect a site to the sewerage network across third party land is normally funded via developer contributions.

5.1.1 Method for the Thames Water assessment of foul sewerage network capacity

Thames Water was provided with the list of potential site allocations and the potential / equivalent housing numbers for each and were invited to comment upon the impact of development on sewerage infrastructure within South Oxfordshire.

The results were assessed against the following three positions:

Capacity available to serve the proposed growth	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified	Infrastructure and/or treatment upgrades will be required to serve proposed growth. Major constraints have been identified.

5.1.2 Results for the Thames Water assessment of foul sewerage network capacity

Thames Water's assessment of the sewerage system capacity is summarised in Table 5-1.

Table 5-1: Sewerage System Capacity Assessments

Potential Site Allocations	Wastewater Treatment Works	Sewerage Infrastructure Assessment	Sewerage Infrastructure Assessment Comments
Harrington	None existing	Infrastructure and/ or treatment works upgrades will be needed to serve proposed growth. Major constraints have been identified.	The wastewater network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic drainage infrastructure is likely to be required to ensure sufficient capacity is brought forward ahead of the development.
Wick Farm, Lower Elsfield	Oxford	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.

Potential Site Allocations	Wastewater Treatment Works	Sewerage Infrastructure Assessment	Sewerage Infrastructure Assessment Comments
Land adjacent to Thornhill Park and Ride	Oxford	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Grenoble Road	Oxford	Capacity available to serve the proposed growth	On the information available to date we do not envisage infrastructure concerns regarding wastewater infrastructure capability in relation to this site.
Northfield	Oxford	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Playhatch	Reading	Infrastructure and/or treatments work upgrades are required to sewer proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Reading Golf Club	Reading	Infrastructure and/or treatments work upgrades are required to sewer proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Palmers Riding Stables	Reading	Infrastructure and/or treatments work upgrades are required to sewer proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Land south of Great Western Park	Didcot	Infrastructure and/or treatments work upgrades are required to sewer proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development.
Land off Thame Road, North Weston	None existing	Infrastructure and/or treatments work upgrades are required to sewer proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development

5.2 Wastewater treatment works flow

Two assessments of wastewater capacity have been made. This first was completed by Thames Water. The second was an independent assessment by JBA Consulting.

5.2.1 Method for the Thames Water assessment of WwTW flow capacity

Thames Water was provided with the list of potential site allocations including the and the potential / equivalent housing numbers for each and were invited to comment upon the impact of development on sewerage infrastructure within South Oxfordshire.

The results were assessed against the following three positions:

- Capacity available to serve the proposed growth
- Treatment works upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure has been identified
- Treatment works upgrades will be needed to serve proposed growth. Major constraints have been identified.

5.2.2 Results for the Thames Water assessment of WwTW flow capacity

Thames Water's assessment of the WwTW capacity is summarised in Table 5-2.

Table 5-2: WwTW Flow Capacity Assessments

Potential Site Allocations	Wastewater Treatment Works	Sewerage Infrastructure Assessment	Sewerage Infrastructure Assessment Comments
Land south of Great Western Park	Didcot	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development.
Wick Farm, Lower Elsfield, Land adjacent to Thornhill Park and Ride, Grenoble Road, Northfield	Oxford	Infrastructure and/or treatment upgrades will be required to serve proposed growth. Major constraints have been identified.	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from all this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development.
Playhatch, Reading Golf Club, Palmers Riding Stables	Reading	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	Significant development would require careful planning. Based on available information, at this time, no major upgrades are required to accommodate this development.
Harrington	No existing	Infrastructure and/or treatment upgrades will be required to serve proposed growth. Major constraints have been identified.	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from all this development. Significant infrastructure upgrades are likely to be required to ensure sufficient

Potential Site Allocations	Wastewater Treatment Works	Sewerage Infrastructure Assessment	Sewerage Infrastructure Assessment Comments
			treatment capacity is available to serve this development.
Land off Thame Road, North Weston	No existing	Infrastructure and/or treatment work upgrades are required to serve proposed growth, but no significant constraints to the provision of this infrastructure have been identified.	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development.

5.2.1 Method for the JBA assessment of WwTW flow capacity

The Environment Agency is responsible for regulating sewage discharge releases via a system of Environmental Permits (EPs). Monitoring for compliance with these permits is the responsibility of both the EA and the plant operators. Increased domestic population and/or employment activity can lead to increased wastewater flows arriving at a WwTW. Where there is insufficient headroom at the works to treat these flows, this could lead to failures to meet flow consents. JBA have used the consented discharge data and the flow monitoring data to complete an independent assessment of capacity available at the WwTWs likely to receive flows from new development in South Oxfordshire.

The process was as follows:

- Calculate the current measured Dry Weather Flow (DWF). This was calculated as the 80-percentile exceedance flow for the period January 2013 to December 2017.
- The flow data was cleaned to remove zero values and low outlier values which would bring the measured DWF down.
- Potential development sites and existing commitments were assigned to a WwTW using the sewerage drainage area boundaries.

For each site, the future DWF was calculated using the occupancy rates and per-capita consumption values obtained from the Water Resource Management Plans and the assumption that 95% of water used is returned to sewer. Permitted headroom was used as a substitute for actual designed hydraulic capacity for each WwTW being assessed.

5.2.2 Results for the JBA assessment of WwTW flow capacity

Oxford WwTW

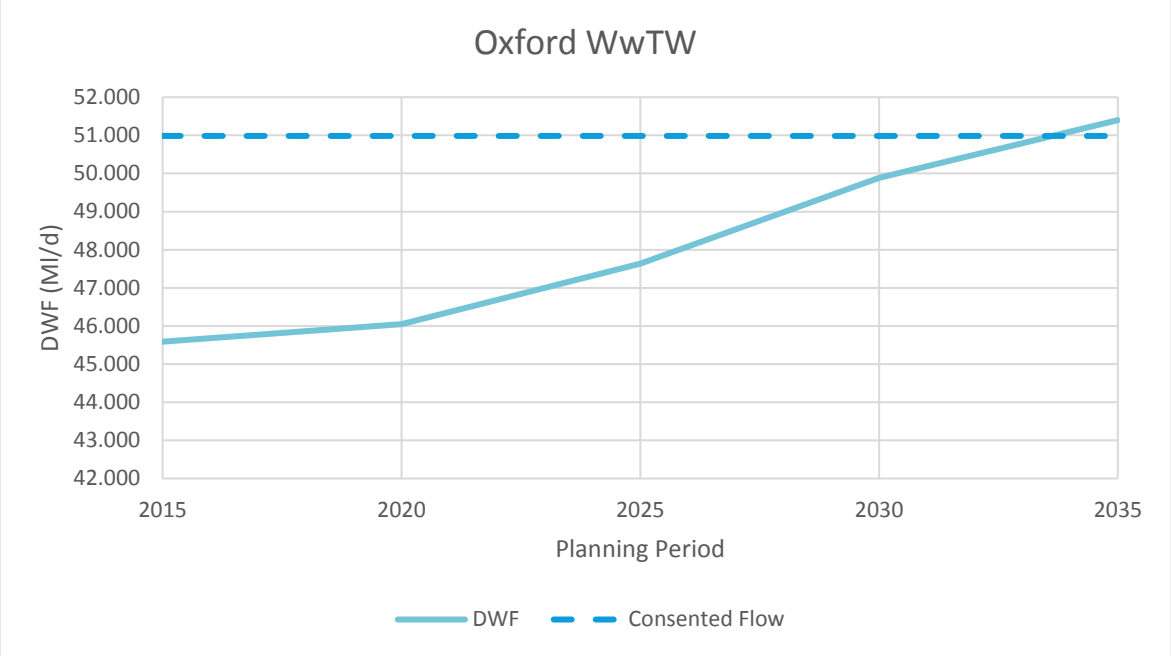
Oxford WwTW is located to the south of Oxford City, within the SODC authority area. The effluent is discharged to the Northfield Brook.

In the first phase of the SODC WCS there were no potential site allocations around Oxford and therefore the headroom at Oxford WwTW was not considered. However, there are now four potential site allocations in SODC which could drain to Oxford WwTW. These have been considered with the development allocated (or proposed for allocation) for Oxford and Kidlington, which would also drain to Oxford WwTW.

Flow data was provided from Thames Water covering the period from January 2016 to November 2018. This showed that the treatment works is currently well within its

consented discharge. However, as there is significant proposed growth planned for the fringes of Oxford over the plan period we estimate that the permit would be exceeded by AMP 9 if no improvements were made to capacity, as illustrated by Figure 5-2.

Figure 5-2: Flow permit assessment for Oxford WwTW



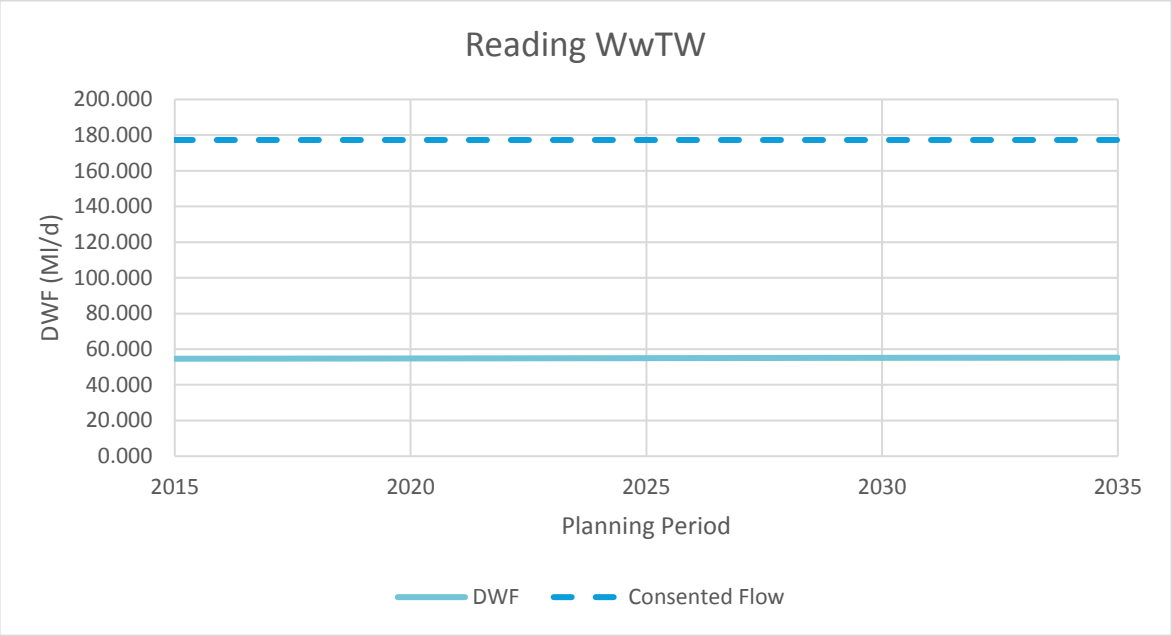
Reading WwTW

Reading WwTW is located toward the south of the Reading Borough. The effluent is discharged to the Foundary Brook.

In the first phase of the SODC WCS there were no potential site allocations around Reading and therefore the headroom at Reading WwTW was not considered. However, there are now three potential sites in SODC which could drain to Reading WwTW. These have been considered with the proposed development allocated for Reading, which would also drain to Reading WwTW.

Daily flow data, received from Thames Water, was analysed for the period of January 2015 to December 2017. This showed that the treatment works is currently well within its consented discharge. Even when considering the potential growth in Reading Borough and SODC, the predicted DWF effluent is still well within the permitted discharge.

Figure 5-3: Flow permit assessment for Reading WwTW



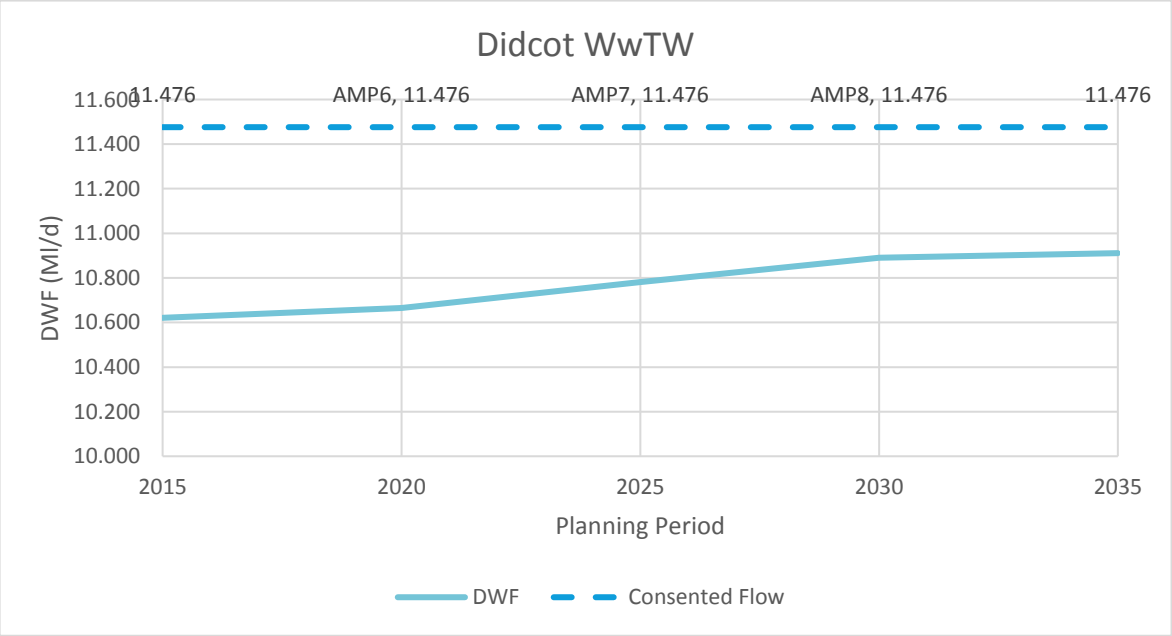
Didcot WwTW

The Didcot WwTW is located in the north west of Didcot, within the SODC authority area. The effluent discharges to Moor Ditch.

The growth in Didcot was considered in the first phase of the SODC WCS. However, this addendum considers one additional potential site allocation that would drain to Didcot WwTW.

Daily flow data, received from Thames Water, was analysed for the period of January 2014 to December 2017. This showed that the treatment works is currently well within its consented discharge. Even when considering the growth in Didcot, the predicted DWF effluent is still well within the permitted discharge.

Figure 5-4: Flow permit assessment for Didcot WwTW



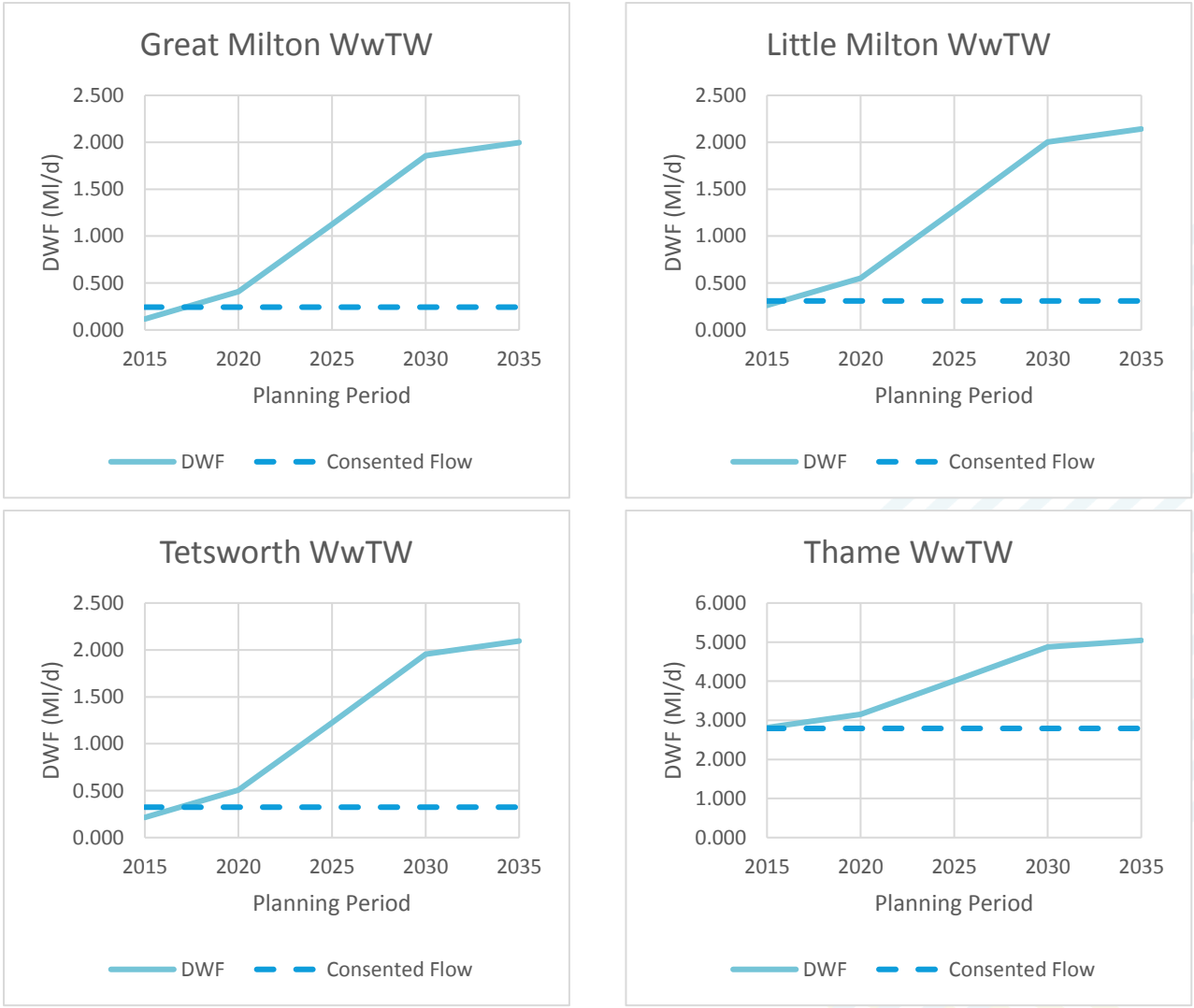
No existing WwTW

The potential site allocation at Harrington would be a new settlement. As such there is no existing sewerage infrastructure. If development was to be allocated here it is possible that a new WwTW would be constructed. Alternatively, the new settlement could drain to existing WwTW near the site. The WwTWs considered were; Great Milton, Little Milton, Tetsworth and Thame.

In addition, the potential site allocation at Thame Road, North Weston would be a new settlement. If development was allocated here, the new settlement could also drain to Thame WwTW.

In each case the analysis showed that the WwTWs are currently just operating within their permitted discharge. Therefore, any growth was shown to cause the permit to be exceeded. This was predicted to occur from 2020.

Figure 5-5: Flow permit assessment for Great Milton, Little Milton, Tetsworth and Thame WwTWs



5.2.3 Conclusions

Flow permit assessments were carried out at all of the WwTWs that are expected to serve potential growth which was not considered under the previous WCS. Didcot and Reading WwTWs have sufficient cumulative capacity to serve all of the potential site allocations identified. The analysis suggests that consents at Oxford and Great Milton/ Little Milton/ Tetsworth/ Thame can be expected to be exceeded in the longer-term, if all the sites considered are allocated and come forward for development. An increase to the DWF permit and a capacity upgrade may therefore be required at these works in order to serve any growth The detailed planning for such upgrades would need to happen once the exact development proposed for these areas, both in SODC and surrounding authorities, is better known.

5.2.4 Recommendations

Thames Water have stated that they would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve a specific development. They have highlighted that it is important not to under estimate the time required to deliver necessary infrastructure. For example: Wastewater Treatment Works upgrades can take 18 months to 3 years to design and build.

6 Odour assessment

Where new developments encroach upon an existing Wastewater Treatment Works (WwTW), odour from that site may become a cause for nuisance and complaints from residents. Managing odour at WwTWs can add considerable capital and operational costs, particularly when retro-fit to existing WwTWs. National Planning Policy Guidance recommends that plan-makers consider whether new development is appropriate near to sites used (or proposed) for water and wastewater infrastructure, due to the risk of odour impacting on residents and requiring additional investment to address.

6.1.1 Method

Sewerage undertakers recommend that an odour assessment may be required if the site of a proposed development is close to a WwTW and is encroaching closer to the WwTW than existing urban areas.

A GIS assessment was carried out to identify sites that are the sewerage undertaker considers may be at risk from odour nuisance due to encroachment on an existing WwTW. For Thames Water, this is development sites less than 800m from the WwTW and encroaching closer to the WwTW than existing urbanised areas.

If there are no existing houses close to a WwTW it is more likely that an odour assessment is needed. Another important aspect is the location of the site in respect to the WwTW. Historic wind direction records for sites in SODC indicate that the prevailing winds is from a west-south-west direction (Brize Norton) to a Southerly direction (Benson)[5].

The following risk-based screening assessment was applied:

Site is unlikely to be impacted by odour from WwTW	Site location is such that an odour impact assessment is recommended	Site is in an area with confirmed WwTW odour issues

6.1.2 Data Collection

The datasets used to assess the impact of odour from a WwTW were:

- Site location in GIS format (provided by SODC)
- WwTW locations (provided by TW)
- Site tracker spreadsheet

6.1.3 Results

Six of the potential site allocations are within 800m of a WwTW, however this does not take into account the size of the WwTW. The sites at risk are shown in Table 6-1. At these sites, it is recommended that an odour assessment is undertaken by the site developer.

5 RenSMART website http://www.rensmart.com/Weather/WindArchive#monthlyLayer accessed on 11/04/2017

Table 6-1: List of potential sites at risk of nuisance odour from WwTWs

Potential Site Allocations	Distance to WwTW (m)	Cardinal Direction to WwTW
Grenoble Road	176	South east
Harrington	458	South west
Chalgrove	648	South west
Land of Thame Road	693	South east
Wheatley	732	North-north west
Culham	747	West

Due to its proximity to Oxford WwTW, Grenoble Road is highest risk site. It is understood that there is an ongoing site-specific odour assessment for this site. However, these have not been provided for review in this study.

Most of the sites within the 800m are located south of the WwTW. As the prevailing wind is likely to be from a west-south-west direction or southerly direction, it is unlikely that these sites would be subject to nuisance odours. However, the Wheatley site is north-north west of the Wheatley WwTW and therefore is the second highest risk site.

As this is only a high-level assessment, it is recommended that all the sites highlighted in Table 6-1 are subject to further nuisance odour screening during the planning process.

7 Flood risk impact

In catchments with a large planned growth in population and which discharge effluent to a small watercourse, the increase in the discharged effluent might have a negative effect on the risk of flooding. An assessment has been carried out to quantify such an effect.

7.1 Methodology

The following process has been used to assess the potential increased risk of flooding due to extra flow reaching a specific WwTW:

- Calculate the increase in DWF attributable to planned growth;
- Identify the point of discharge of these WwTWs;
- At each outfall point, use the FEH CD-ROM v3.0 to extract the catchment descriptors;
- Use FEH Statistical method to calculate peak 1 in 30 and 1 in 100-year fluvial flows;
- Calculate the additional foul flow as a percentage of the 1 in 30 and 1 in 100-year flow

A risk score was applied to score the associated risk as follows:

Additional flow ≤5% of Q30. Low risk that increased discharges will increase fluvial flood risk	Additional flow ≥5% of Q30. Moderate risk that increased discharges will increase fluvial flood risk	Additional flow ≥5% of Q100. High risk that increased discharges will increase fluvial flood risk

The following datasets were used to assess the risk of flooding:

- Current and predicted future DWF for each WwTW
- Location of WwTW outfalls
- Catchment descriptors from FEH CD-ROM v3.0[6]

The hydrological assessment of river flows was applied using a simplified approach, appropriate to this type of screening assessment. The Q30 and Q100 flows quoted should not be used for other purposes, e.g. flood modelling or flood risk assessments.

7.2 Results

Table 7-1 reports the additional flow from each WwTW as a percentage of the Q30 and Q100 peak flow. This shows that additional flows from the WwTW post potential development would have a negligible effect on the predicted peak flow events at Oxford, Reading, Thame and Didcot. However, the increased effluent from the smaller treatment works which could service the potential site allocation at Harrington would impact flood risk. There is medium risk of increased flooding at Tetsworth and Little Milton and high risk predicted if Harrington flows were to be treated at Great Milton.

Table 7-1: Summary of DWF increase as a percentage of 1 in 30 and 1 in 100-year peak flow

WwTW	FEH Stat Q30 (m^3/s)	FEH Stat Q100 (m^3/s)	Additional Average DWF (Ml/d)	Additional Flow (m^3/s)	Flow increase % Q30	Flow increase % Q100
Oxford	4.78	6.28	5.81	0.07	1.4%	1.1%
Reading	19.01	22.52	0.57	0.01	0.0%	0.0%
Tetsworth	0.47	0.62	2.23	0.03	5.5%	4.2%
Thame	16.99	20.57	2.23	0.03	0.2%	0.1%
Great Milton	0.25	0.34	2.23	0.03	10.3%	7.6%
Little Milton	0.48	0.64	2.23	0.03	5.4%	4.0%
Didcot	1.88	2.43	0.29	0.00	0.2%	0.1%

7.3 Conclusions

A detailed assessment of flood risk can be found within the SODC Strategic Flood Risk Assessment. The impact of increased effluent flood is predicted to have a significant impact upon flood risk at Great Milton, Tetsworth and Little Milton, all of which are potential treatment options of flow from the potential site allocation at Harrington.

7.4 Recommendations

Proposals to increase discharges to a watercourse may also require a flood risk activities environmental permit from the EA (in the case of discharges to Main River), or a land drainage consent from the Lead Local Flood Authority (in the case of discharges to an Ordinary Watercourse).

If Harrington is allocated, decisions regarding treatment of wastewater flows should consider how the increased effluent will impact flood risk. From a flood risk perspective, Thame WwTW would be the preferred existing treatment works, as the receiving watercourse is large enough to cope with the increased flows. Should a new works be required the location of the discharge should be located to minimise the flood risk impact of the works.

8 Summary and overall conclusion

The WSC addendum was carried out with cooperation from Thames Water. Table 8-1 summarises the conclusions of the individual assessments and outlines the requirement for the second phase of this WCS addendum.

The overall assessment was that strategic scale water resources constraints have been identified for potential site allocations around Reading. Capacity of the wastewater infrastructure has been raised as a potential issue around Oxford. Thames Water have flagged that major constraints have been identified to the infrastructure upgrades required to serve all the proposed growth. However, it is concluded that this can be addressed by adopting best available technology. The potential site allocation of Harrington would be a new settlement and is not currently served by sewer infrastructure. The assessment concludes that none of the local WwTWs currently have sufficient capacity to serve this development. Therefore, a major infrastructure project would be required to upgrade an existing WwTW or construct a new one.

Table 8-1: Summary of conclusions

Assessment	Conclusion	Requirement for Phase 2 Study
Water Resources	All SODC is served by Thames Water. The authority is largely covered by the SWOX resource zone, with a small area covered by the Henley resource zone. SWOX has a supply/demand deficit from 2022/23. Thames Water have developed a strategy to balance the water demand with available resources. This focuses on reducing per customer demand and constructing a large-scale reservoir. The Henley resource zone has no forecast supply-demand deficit. Thames Water plan to reduce leakage and reduce per customer demand. Thames Water have commented that although their WRMP has planned for the increase in demand, or sufficient time to address supply demand issues for most sites, there is concern that the WRMP does not take into consideration the planned increase in demand at the Playhatch WTW. Therefore, additional water resources may be required.	The water resources for the final proposed arrangement of sites should be assessed.
Water Supply	Thames Water have commented on the capacity of the existing water supply network to serve the potential development allocations. This concluded that although infrastructure upgrades would be required to serve this scale of development, no significant constraints to the provision of this infrastructure have been identified.	The water supply infrastructure for the final proposed arrangement of sites should be assessed.
Wastewater Collection	All SODC is served by Thames Water. Thames Water have commented on the capacity of the existing sewerage network to serve the potential site allocations. Major constraints have been identified to provide the infrastructure upgrades required to serve a potential allocation at Harrington. No significant constraints have been identified to provide the infrastructure upgrades required to serve potential allocations at Wick Farm, Lower Elsfield, Land adjacent to Thornhill Park and Ride, Northfield, Playhatch, Reading Golf Club, Palmers Riding Stables,	The wastewater collection for the final proposed arrangement of sites should be assessed.

Assessment	Conclusion	Requirement for Phase 2 Study
	Land south of Great Western Park or Land off Thame Road. Capacity is available to serve a potential allocation at Grenoble Road.	
Wastewater Treatment	All SODC is served by Thames Water. Thames Water have commented on the capacity of the existing WwTW to serve the potential development allocations. Major constraints have been identified to provide the infrastructure upgrades required to serve a potential site allocation at Harrington and potential growth around Oxford. No significant constraints have been identified to provide the infrastructure upgrades required to serve potential site allocations at Didcot or Reading WwTWs. In addition, no significant constraints have been identified to provide the infrastructure upgrades required to served land of Thame Road. JBA have completed a high-level assessment of headroom, which accounts for the cumulative impact of all development identified. The assessment found that the consented discharge from Oxford WwTW and any WwTW that could serve Harrington would be exceeded without upgrade works. Both Didcot and Reading were found to have sufficient capacity to accommodate the potential growth.	The wastewater treatment capacity for the final arrangement of sites should be assessed.
Odour Assessment	JBA have completed a high-level assessment of potential nuisance odour at the potential site allocations. Six sites are within 800m of a WwTW and therefore could be at risk. Grenoble Road is at highest risk and it is understood that a detailed assessment is ongoing. Wheatley is the second highest risk.	An odour assessment for the final arrangement of sites should be included.
Flood Risk Impact	JBA have completed a high-level assessment of the impact of increased effluent discharge on flood risk to the receiving watercourses. The assessment found that the increased discharge to minor watercourses from the potential Harrington Site could impact flood risk. The flood risk impact is expected to be negligible at all other receiving watercourses.	The flood risk impact for the final arrangement of sites should be included.

Appendices

A Full comments from Thames Water

Water Resources RAG descriptions
Adopted WRMP has planned for the increase in demand, or sufficient
Insufficient evidence in adopted WRMP to confirm that the planned
Adopted WRMP does not take into consideration the planned increase in

Water Supply RAG descriptions
Capacity available to serve the proposed growth
Infrastructure and/or treatment work upgrades are required to serve proposed
Infrastructure and/or treatment upgrades will be required to serve proposed

WwTW Flow Capacity RAG descriptions
Capacity available to serve the proposed growth
Infrastructure and/or treatment work upgrades are required to serve proposed
Infrastructure and/or treatment upgrades will be required to serve proposed

Foul Sewerage RAG descriptions
Capacity available to serve the proposed growth
Infrastructure and/or treatment work upgrades are required to serve
Infrastructure and/or treatment upgrades will be required to serve

Surface Water Network RAG descriptions
Capacity available to serve the proposed growth
Infrastructure and/or treatment work upgrades are required to
Infrastructure and/or treatment upgrades will be required to serve

Odour Screening RAG descriptions
Site is unlikely to be impacted by odour from WwTW
Site location is such that an odour impact assessment is
There is an area within 1km of the WwTW and/or there

Effluent flood risk RAG descriptions
Additional flow ≤5% of Q30. Low risk that increased
Additional flow ≥5% of Q30. Moderate risk that
Additional flow ≥5% of Q30. High risk that is caused

Water Quality RAG descriptions
Sufficient Environmental Capacity. Proposed development has
Proposed development can be accommodated with a tighter
Good Ecological Status cannot be achieved due to current

								Water Supply						Wastewater										Flood risk		Water Quality	
Local Planning Authority	In study area?	Parish / Settlement	Location	Type	Size	Proposed Use	Potential housing number (2011-31)	Water Company	Water Resource Zone	Water Resources RAG	Water Resources Comments	Water Supply Networks RAG	Water Supply Networks Comments	Company Treating Wastewater	WwTW	WwTW Flow Capacity RAG	WwTW Flow Capacity Comments	Sewerage Undertaker	Sewerage catchment	Foul Sewerage Network Capacity RAG	Foul Sewerage Network Capacity Comments	Surface Water Network capacity	Surface Water Network Capacity Comments	Site boundary distance from WwTW (m)	Site encroaches closer than existing urban area?	Location of site relative to WwTW	Odour Screening RAG	Odour screening comments	Effluent discharge flood risk RAG	Effluent discharge flood risk Comments	Water Quality RAG	Water Quality Comments
SODC	Yes	New settlement	Harrington	Residential	6500	Housing	6500	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic water supply infrastructure upgrades are likely to be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what water infrastructure is required, where, when and how it will be delivered.	TWUL	No existing public sewerage	Red	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	No existing public sewerage	Red	The wastewater network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic drainage infrastructure is likely to be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a wastewater network capacity constraint the developer should liaise with Thames Water and provide a detailed drainage strategy with the planning application, informing what infrastructure is required, where, when and how it will be delivered		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Oxford	Lower Elsfield / Land at Baywater	Residential	1500	Housing	1500	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic water supply infrastructure upgrades are likely to be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what water infrastructure is required, where, when and how it will be delivered.	TWUL	Oxford	Amber	Infrastructure at the wastewater treatment works in this area may be unable to support the demand anticipated from this development. Minor infrastructure upgrades maybe required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build	TWUL	Oxford	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Oxford	Land at Wick Farm	Residential	1750	Housing	1750	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic water supply infrastructure upgrades are likely to be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what water infrastructure is required, where, when and how it will be delivered	TWUL	Oxford	Amber	Infrastructure at the wastewater treatment works in this area may be unable to support the demand anticipated from this development. Minor infrastructure upgrades maybe required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build	TWUL	Oxford	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Oxford	Land adjacent to Thornhill Park and Ride	Residential	650	Housing	650	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic water supply infrastructure upgrades are likely to be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what water infrastructure is required, where, when and how it will be delivered.	TWUL	Oxford	Green		TWUL	Oxford	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Oxford	Grenoble Road	Residential	3000	Housing	3000	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing water network infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what infrastructure is required, where, when and how it will be delivered	TWUL	Oxford	Red	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years.	TWUL	Oxford	Amber	On the information available to date we do not envisage infrastructure concerns regarding wastewater infrastructure capability in relation to this site.		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Oxford	Northfield	Residential	2000	Housing	2000	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing water network infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what infrastructure is required, where, when and how it will be delivered	TWUL	Oxford	Amber	Infrastructure at the wastewater treatment works in this area may be unable to support the demand anticipated from this development. Minor infrastructure upgrades maybe required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build	TWUL	Oxford	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Reading	Playhatch	Residential	1000	Housing	1000	TWUL	Kennet Valley	Red	Due to a unprecedented recent increase in demand in this area Playhatch WTW is operating at very close to our licence to abstract water and the 2018 summer supply demand deficit is highlighted as leaving the area at very low headroom. The predicted additional demand of this development of 15.61 l/s/1.35 Mld tikes the works over the peak treatment and abstraction license. I have definite concerns that this demand combined with the 'Reading Golf Club (450 net capacity)' and Palmers Riding Stables, Emmer Green, Reading (500 houses) will result in loss of customer supply.	Amber	The water treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the water treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Water Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	Reading	Amber	It is a significant development which requires careful planning. We would welcome information on phasing of this development. Based on available information, at this time, no major upgrades are required to accommodate this development.	TWUL	Reading	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Reading	Reading Golf Club	Residential	450	Housing	450	TWUL	SWOX	Red	Due to a unprecedented recent increase in demand in this area Playhatch WTW is operating at very close to our licence to abstract water and the 2018 summer supply demand deficit is highlighted as leaving the area at very low headroom. The predicted additional demand of this development of 7.03 l/ 0.61 Mld takes the works to its peak treatment and abstraction license. I have concerns that this demand combined with the 'Playhatch (Land East of Caversham Park Rd, Reading) (1000 net capacity)' will result in loss of customer supply.	Amber	The water treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the water treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Water Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	Reading	Amber	It is a significant development which requires careful planning. We would welcome information on phasing of this development. Based on available information, at this time, no major upgrades are required to accommodate this development.	TWUL	Reading	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Didcot	Land at Great Western Park	Residential	1000	Housing	1000	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing water network infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what infrastructure is required, where, when and how it will be delivered	TWUL	Didcot	Amber	Infrastructure at the wastewater treatment works in this area may be unable to support the demand anticipated from this development. Minor infrastructure upgrades maybe required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build	TWUL	Didcot	Amber	The wastewater network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic drainage infrastructure is likely to be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a wastewater network capacity constraint the developer should liaise with Thames Water and provide a detailed drainage strategy with the planning application, informing what infrastructure is required, where, when and how it will be delivered		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	Reading	Palmers Riding Stables, Emmer Green, Reading	Residential	510	Housing	510	TWUL	SWOX	Red	Due to a unprecedented recent increase in demand in this area Playhatch WTW is operating at very close to our licence to abstract water and the 2018 summer supply demand deficit is highlighted as leaving the area at very low headroom. The predicted additional demand of this development of 7.03 l/ 0.61 Mld takes the works to its peak treatment and abstraction license. I have concerns that this demand combined with the 'Playhatch (Land East of Caversham Park Rd, Reading) (1000 net capacity)' and Reading Golf Club (450 net capacity) will result in loss of customer supply.	Amber	The water treatment capacity in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the water treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Water Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	Reading	Amber	It is a significant development which requires careful planning. We would welcome information on phasing of this development. Based on available information, at this time, no major upgrades are required to accommodate this development.	TWUL	Reading	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
SODC	Yes	New settlement	Land off Thame Road, North Weston	Residential	1203	Housing	1203	TWUL	SWOX	Green	No comment provided	Amber	The water network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing water network infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. The developer is encouraged to work Thames Water early on in the planning process to understand what infrastructure is required, where, when and how it will be delivered	TWUL	No existing public sewerage	Amber	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	No existing public sewerage	Amber	The wastewater network capacity in this area may be unable to support the demand anticipated from this development. Local upgrades to the existing drainage infrastructure may be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a potential wastewater network capacity constraint, the developer should liaise with Thames Water to determine whether a detailed drainage strategy informing what infrastructure is required, where, when and how it will be delivered is required. The detailed drainage strategy should be submitted with the planning application		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
OCC	No	Oxford	Various	Residential	8620	Housing	8620	TWUL	SWOX	Green	No comment provided	Not assessed	Comment not yet provided	TWUL	Oxford	Red	Major project to upgrade the network and Sewage Treatment Works required. AMP8 earliest	TWUL	Oxford	Red	Due to the complexities of wastewater networks the level of information contained in this document does not allow Thames Water to make a detailed assessment of the impact the proposed housing provision will have on the wastewater infrastructure. To enable us to provide more specific comments on the site proposals we require details of the Local Authority's aspiration for each site. For example, an indication of the location, type and scale of development together with the anticipated timing of development. Thames Water would welcome the opportunity to meet with the Local Planning Authority to discuss the wastewater infrastructure needs relating to the Local Plan.		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete
CDC	No	Kidlington	Land north of Kidlington	Residential	4400	Housing	4400	TWUL	SWOX	Green	No comment provided	Not assessed	Comment not yet provided	TWUL	Oxford	Red	Infrastructure at the wastewater treatment works in this area is unlikely to be able to support the demand anticipated from this development. Significant infrastructure upgrades are likely to be required to ensure sufficient treatment capacity is available to serve this development. Thames Water would welcome the opportunity to work closely with the Local Planning Authority and the developer to better understand and effectively plan for the sewage treatment infrastructure needs required to serve this development. It is important not to under estimate the time required to deliver necessary infrastructure. For example: Sewage Treatment Works upgrades can take 18 months to 3 years to design and build. Implementing new technologies and the construction of a major treatment works extension or new treatment works could take up to ten years	TWUL	Oxford	Red	The wastewater network capacity in this area is unlikely to be able to support the demand anticipated from this development. Strategic drainage infrastructure is likely to be required to ensure sufficient capacity is brought forward ahead of the development. Where there is a wastewater network capacity constraint the developer should liaise with Thames Water and provide a detailed drainage strategy with the planning application, informing what infrastructure is required, where, when and how it will be delivered		Assessment not yet complete				Assessment not yet complete		Assessment not yet complete		Assessment not yet complete

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