Sandwell Water Cycle Study - Stage 2

Final Report

September 2024

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Sandwell Metropolitan Borough Council

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This report describes work commissioned by Sandwell Metropolitan Borough Council, by an instruction dated 07 February 2024. The Client's representatives for the contract was Philippa Smith of Sandwell Metropolitan Borough Council. Dylan Nattrass, James Fitton and Richard Pardoe of JBA Consulting carried out this work.

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Abbreviations

AMP ..... Asset Management Plan

AONB ..... Area of Outstanding Natural Beauty

AW ..... Anglian Water

BNG ..... Biodiversity Net Gain

BOD ..... Biochemical Oxygen Demand

BREEAM ..... Building Research Establishment Environmental Assessment Methodology

CAPEX ..... Capital Expenditure

CFMP ..... Catchment Flood Management Plan

CfSH ..... Code for Sustainable Homes

CSO ..... Combined Sewer Overflow

DLUHC ..... Department for Levelling Up, Housing & Communities

DWF ..... Dry Weather Flow

DWI ..... Drinking Water Inspectorate

DWMP ..... Drainage and Wastewater Management Plan

EA ..... Environment Agency

EFI ..... Ecological Flow Indicator

EP ..... Environmental Permit

EU ..... European Union

FEH ..... Flood Estimation Handbook

FFT ..... Flow to Full Treatment

FWMA ..... Flood and Water Management Act

FZ ..... Flood Zone

GIS ..... Geographic Information Systems

HRA ..... Habitats Regulations Assessment

JBA ..... Jeremy Benn Associates

LLFA ..... Lead Local Flood Authority

LNRS ..... Local Nature Recovery Strategy

LPA ..... Local Planning Authority

l/p/d ..... Litres per person per day

Ml/d ..... Mega (Million) litres per day

MHCLG ..... Ministry of Housing Communities and Local Government (replaced by DLUHC)

NAV.....New Appointment and Variations suppliers
NH4.....Ammonia
NMP.....Nutrient Management Plan
NPPF.....National Planning Policy Framework
NRN.....Nature Recovery Network
OAN.....Objectively Assessed Need
OfWAT.....Water Service Regulation Authority
OPEX.....Operational Expenditure
OS.....Ordnance Survey
P.....Phosphorous
RAG.....Red / Amber / Green assessment
RBD.....River Basin District
RBMP.....River Basin Management Plan
RoFSW.....Risk of Flooding from Surface Water (replaced uFMfSW)
RQP.....River Quality Planning tool
SA.....Sustainability Appraisals
SAC.....Special Area of Conservation
SBP.....Strategic Business Plan
SEA.....Strategic Environmental Assessment
SfA.....Sewers for Adoption
SFRA.....Strategic Flood Risk Assessment
SHELAA.....Strategic Housing and Economic Land Availability Assessment
SHMA.....Strategic Housing Market Assessment
SMBC.....Sandwell Metropolitan Borough Council
SPA.....Special Protection Area
SPD.....Supplementary Planning Document
SPZ.....Source Protection Zone
SS.....Suspended Solids
SSSI.....Site of Special Scientific Interest
SU.....Sewerage Undertaker
SuDS.....Sustainable Drainage Systems
SWMP.....Surface Water Management Plan
UWWTD.....Urban Waste Water Treatment Directive
WaSC.....Water and Sewerage Company

WCS.....Water Cycle Study
WFD.....Water Framework Directive
WINEP .....Water Industry National Environment Programme
WRMP.....Water Resource Management Plan
WRZ.....Water Resource Zone
WTW .....Water Treatment Works
WwTW.....Wastewater Treatment Works

Glossary

Term	Description
Abstraction Point	The location where water is either taken or extracted from either a surface or groundwater waterbody.
Agricultural Management	The farming techniques and practices used to produce food and manage livestock.
Abstraction Licencing Strategy	The Abstraction Licencing Strategy sets out the Environment Agency's approach to managing new and existing abstraction and impoundments within their river management catchments.
Asset Management Plan (AMP) Period	Price limit periods in the water sector are sometimes known as Asset Management Plan (AMP) periods. The current period (2020-25) is commonly known as AMP 7 because it is the seventh price review period since privatisation of the water industry in 1989. AMP periods are five years in duration and begin on 1 April in the years ending in 0 or 5. Every five years the industry submits a Business Plan to OfWAT for a Price Review (PR). These plans set out the companies' operational expenditure (OPEX) and capital expenditure (CAPEX) required to maintain service standards, enhance service (for example where sewer flooding occurs), to accommodate growth and to meet environmental objectives defined by the Environment Agency. OfWAT assesses and compares the plans with the objective of ensuring what are effectively supply monopolies and operating efficiently.
Aquifer	An aquifer is a rock and/or sediment body that holds groundwater.
Dry Weather Flow	Dry weather flow is the average daily flow of wastewater to a waste water treatment works during a period without rain.
Effluent	Effluent discharge is the liquid waste produced from residential, commercial and industrial processes.
Environmental Flow Indicator	The Environmental Flow Indicator (EFI) is the proportion of natural flows that are required to support the environment of a waterbody.
Groundwater Body	A Groundwater Body is the management unit under the Water Framework Directive which represents a distinct body of groundwater with its own hydrogeological characteristics.
Lead Local Flood Authority	A county council or unitary authority which leads in managing local flood risks (i.e., risks of flooding from surface water, ground water and ordinary (smaller) watercourses). Their duties are outlined in the Flood and Water Management Act.
Natural Flood Management	Natural flood management is the use of natural processes to reduce the risk of flooding and coastal erosion.

Term	Description
Per Capita Consumption	The per capita consumption is the average volume of water used by one person in a day. It is defined as the sum of the measured household consumption of clean water and unmeasured household consumption of clean water divided by the total household population. This is often expressed in litres per person per day (l/p/d).
Permitted Headroom	The difference between the volume of treated wastewater a treatment works is allowed to discharge under its environmental permit, and volume it currently discharges. It can be used to estimate the number of properties that could be connected to a WwTW catchment before a flow permit is exceeded.
Sustainable Drainage Systems (SuDS)	Sustainable drainage systems are drainage solutions that provide a natural alternative to the direct channelling of surface water through an artificial networks of pipes and sewers to nearby watercourses.
Waterbodies	Water bodies constitute areas of water – both salt and fresh, large and small – which are distinct from one another in various ways. All surface waters (including rivers, lakes, estuaries and stretches of coastal water) and groundwaters have been divided up into discrete units called water bodies. Water bodies are the basic unit that are used to assess the quality of the water environment and to set targets for environmental improvements.
Water Framework Directive (WFD)	The Water Framework Directive is a river basin management planning system which was implemented to help protect and improve the ecological health of the UK's rivers, lakes, estuaries and coastal and groundwaters.
Water Framework Directive Classification Status	Rivers, lakes, estuaries and coastal waters can be awarded one of five WFD statuses: High Good Moderate Poor Bad Groundwater can be awarded one of two statuses: Good Poor
Water Framework Directive – Reasons for not achieving good (RNAG)	Where a WFD element is classified as being at less than good status, a reason for the failure to meet the good status is attributed, including the sector deemed responsible or a pressure affecting a biological element.
Water Framework Directive objectives	The Water Framework Directive objectives are set out in Regulation 12 and Regulation 8 of the Water Environment Regulations 2017.

Term	Description
Water Industry National Environment Programme	The Water Industry National Environment Programme is the programme of work in which water companies in England must meet their obligations from environmental legislation and UK government policy.
Water Resource Management Plan (WRMP)	Water Resource Management Plans are statutory documents that all water companies must produce at least every five years. They set out how the water company intends to achieve a secure water supply for their customers while protecting and enhancing the environment.
Water Recycling Centres (WRC)	A wastewater treatment works receive flows from the sewerage system and treats it so it can be discharged back into a river. They may also be called Sewage Treatment Works (STWs) or Wastewater Treatment Works (WwTWs).
Water Resource Zone (WRZ)	A Water Resource Zone is an area in which the abstraction and distribution of water is self-contained and is used to meet demand within that area.
Wastewater Treatment Works (WwTW)	A wastewater treatment works receive flows from the sewerage system and treats it so it can be discharged back into a river. They may also be called Sewage Treatment Works (STWs) or Water Recycling Centres (WRCs).

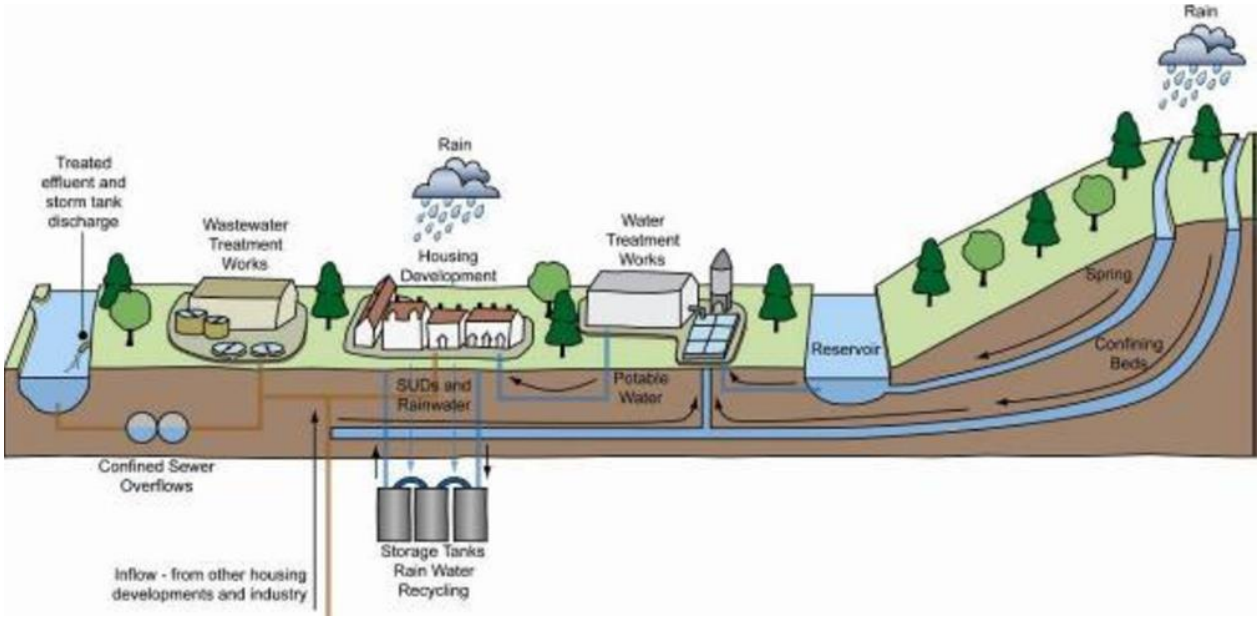
Executive Summary

JBA Consulting was commissioned by Sandwell Metropolitan Borough Council (Sandwell MBC) to undertake a Water Cycle Study (WCS) for Sandwell. The purpose of the WCS is to form part of a comprehensive and robust evidence base to inform the preparation the Sandwell MBC Local Plan. A Regulation 18 consultation on the draft Local Plan was undertaken in winter 2023 and a further consultation stage is expected to take place in quarter 4 of 2024.

Unmitigated future development and climate change can adversely affect the environment and water infrastructure capability. A WCS will provide the required evidence, together with an agreed strategy to ensure that planned growth occurs within environmental constraints, with the appropriate infrastructure in place in a timely manner so that planned allocations are deliverable.

New homes require the provision of clean water, safe disposal of wastewater and protection from flooding. The allocation of large numbers of new homes in certain locations may result in the capacity of existing available infrastructure being exceeded, a situation that could potentially cause service failures to water and wastewater customers, adverse impacts to the environment, or high costs for the upgrade of water and wastewater assets being passed on to the bill payers.

In addition to increased urbanisations, future climate change including increased intense rainfall events and a higher frequency of drought periods, is likely to present further challenges to the existing water infrastructure network. Sustainable planning for water must now take this into account. The water cycle is presented in the below figure. It shows how the natural and artificial processes and systems interact to collect, store or transport water in the environment.



Source: Environment Agency – Water Cycle Study Guidance

This Stage 2 Study will assist Sandwell MBC to provide robust evidence to underpin the process used to select allocations where there is minimal impact on the environment, water quality, water resources, infrastructure and flood risk. This has been achieved by identifying areas where there may be conflict between any proposed development, and the requirements of the environment (and the environmental legislative tests). The Stage 2 WCS will provide robust evidence to underpin Sandwell MBC's site selection process and builds on the Black Country Stage 1 Scoping Study (2020). Chapter 2 sets out the approach used to assess planned growth within Sandwell and neighbouring Local Planning Authorities as part of the WCS.

Relevant environmental and water industry policy and legislation is presented in Section 3 to provide context for the following sections. The report is then divided into sections assessing the impact of growth on each topic in relation or in connection to the water cycle.

Water resources and supply

Sandwell receives its water from South Staffs Water and Severn Trent Water. In the water resource zones (WRZs) covering Sandwell, the forecast percentage growth in the draft WRMP24s is lower than the expected growth during the Local Plan period.

The Water Industry National Environment Programme (WINEP) is a set of actions that the Environment Agency (EA) have requested that all 20 water companies operating in England would complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are already underway or planned to ensure that abstraction of water from both groundwater and rivers is not resulting in unsustainable reductions in flow. Development and population growth can increase abstraction of water, therefore Sandwell MBC has an opportunity to contribute to the actions identified in the WINEP indirectly by pursuing policies that promote water efficiency in new developments. In addition, work undertaken by water companies on environmental improvement schemes/initiatives provides a baseline against which the assessment of the environmental capacity and opportunities for enhancement via the Local Nature Recovery Strategy and Biodiversity Net Gain from developments.

Climate change (CC) is inevitable therefore to tackle the challenges associated with CC, Sandwell MBC is working with local communities, aiming to become a carbon neutral borough by 2041, as set out in the Sandwell Climate Strategy. Climate change is predicted to increase pressure on water resources, increasing the potential for a supply-demand shortage in the future, and resulting in environmental damage associated with likely over abstraction of water resources. Furthermore, the delivery of water and wastewater supply and heating up of water at home require high energy

inputs, contributing directly to emissions of greenhouse gases. Water efficiency results in reduced energy use and decreased carbon emissions.

It is important therefore that new developments do not contribute to an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new developments through to achieving “water neutrality” in a region by offsetting a new development's water demand by improving efficiency in existing buildings.

Defra has signalled their intention to review the water efficiency standards for new homes, including consideration of a new national 105l/p/d standard and 100l/p/d where there is a clear local need.

Water resources are under significant pressure in the UK, and the direction of travel in their planning is to achieve a reduction per capita consumption in new build developments below the optional building regulations standard of 110 l/p/d. Currently this approach is not adequately supported in building regulations. The NPPF and policies requiring water efficiency standards of less than 100l/p/d may only be supported by the Local Plan inspection where exceptional circumstances, such as a direct link between water abstraction and damage to a Special Area of Conservation (SAC) occur. Until this changes, LPAs should encourage developers to go beyond building regulations. This is supported by the water companies' incentives for water efficient design in new builds outlined in 3.5 where significant incentives are offered to reduce design consumption below 110l/p/d.

Given the evidence of pressures on the environment, and on public water supply, it is recommended that the Council considers a domestic water efficiency target beyond 110 l/p/d for all new homes and works with the water suppliers to incentivise even lower consumption.

Wastewater network and treatment

Severn Trent Water provide wastewater services for Sandwell. Developments in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on existing customers, and increasing the likelihood of storm overflow operation. Early engagement with developers and the sewerage providers is required and modelling of the network may be required at the planning application stage. Furthermore, in the Severn Trent Water network, there are areas where the drainage is a combined system, and separation on site must be provided before connecting to the existing system where appropriate.

Early engagement between developers, Sandwell MBC and the water companies is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.

It is widely recognised that the water industry in the UK faces significant challenges to meet the expectations of customers, regulators and government and confront the

challenges of climate change mitigation and a growing population. At the same time, the industry is committed to becoming net zero by 2030. Consideration should be given to using capacity in existing permits as this provides a lower carbon cost than upgrading capacity at existing Waste Water Treatment Works (WwTWs) or building new treatment works, as this helps to avoid or defer investment in carbon-intensive new infrastructure.

Water quality and environmental impact

An increase in the discharge of effluent from WwTWs as a result of development and growth in the area in which they serve can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD), a watercourse is not allowed to deteriorate from its current WFD classification (either as an overall watercourse or for individual elements assessed).

It is Environment Agency (EA) policy to model the impact of increasing effluent volumes on the receiving watercourses. Where the scale of development is such that a deterioration is predicted, a variation to the Environmental Permit (EP) may be required for the WwTW to improve the quality of the final effluent, so that the increased pollution load will not result in a deterioration in the water quality of the watercourse. This is known as "no deterioration" or "load standstill". The need to meet river quality targets is also taken into consideration when setting or varying a permit.

Water quality modelling was performed using the Environment Agency's SIMCAT modelling tool. A baseline scenario was run, updating the existing EA model to the latest flow from WwTW to account for growth since the model was created. A future scenario was then run using the growth forecast for the end of the Local Plan period and the results compared to check for deterioration in water quality. A further test then investigated whether deterioration could be prevented by improvements in upstream treatment.

Development sites within the study area could be sources of diffuse pollution from surface runoff. Sustainable drainage systems (SuDS) are currently required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development. Sandwell MBC should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors.

It should be noted that Schedule 3 of the Flood and Water Management Act is due to be implemented in England, which will make SuDS mandatory. It is also expected to establish Sandwell MBC as a SuDS Approving Body (SAB), responsible for the approval and adoption of SuDS. The SAB approval of SuDS designs will form a separate process to the planning system.

1 Introduction

1.1 Terms of reference

JBA Consulting was commissioned by Sandwell Metropolitan Borough Council (SMBC) to undertake a Water Cycle Study (WCS) to support their new draft Local Plan. This will provide an assessment of the impact of the growth options on water infrastructure and the water environment.

This study builds on the Stage 1 Scoping Study completed in 2020 as a joint study for the Black Country Authorities (Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Council and City of Wolverhampton Council). This Stage 2 WCS is specific to SMBC and will update the evidence provided in Stage 1.

The purpose of the WCS is to form part of a comprehensive and robust evidence base to inform the preparation of the new Local Plan, which will set out where and how development will take place during the plan period, which is expected to be at least 15 years in length and will be used to inform decisions on the location of future development.

Unmitigated future development and climate change can adversely affect the environment and water infrastructure capability. A WCS will provide the required evidence, together with a strategy to ensure that planned growth occurs within environmental constraints, with the appropriate infrastructure in place in a timely manner so that planned allocations are deliverable.

1.2 Structure of report

The requirements and objectives of the WCS are set out in the section below. Planned growth in and around Sandwell is characterised in Section 2 of the report, before relevant environmental and water industry policy and legislation is presented in Section 3 to provide context for the following assessment. The report is then divided into sections assessing the impact of growth on each topic in the water cycle study.

1.3 The Water Cycle

Planning 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

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: 08/02/2023.

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:

- Stage 1: Scoping study, identifies if the water infrastructure capacity could constrain growth and if there are any gaps in the evidence you need to make this assessment. The scoping study will identify:
  - The area and amount of proposed development;
  - the existing evidence;
  - main partners to work with; and
  - evidence gaps and constraints on growth.
- Stage 2: Detailed study, to provide the evidence to inform an integrated water management strategy. It will identify the water and flood management infrastructure that will mitigate the risks from too little or too much water. It will also identify what you need to do to protect and enhance the water environment.

As a WCS is not a mandatory document, Local Planning Authorities are advised to prioritise the stages of the WCS to integrate with their Local Plan programme. Figure 1-1 below shows the main elements that compromise the Water Cycle.

The natural water cycle describes the continuous transfers of water around the planet, from atmosphere to surface and back via evaporation, transpiration and precipitation, and the various flows and storage processes that occur. The artificial water cycle looks at the availability of water resources for human consumption, its treatment and supply to homes and business, its use and consequently the generation of wastewater. It then looks at how wastewater is taken away, treated, and finally what happens when it is returned to the environment.

2 Water Cycle Study Guidance, Environment Agency (2021). Accessed online at: https://www.gov.uk/guidance/water-cycle-studies on: 08/02/2023.

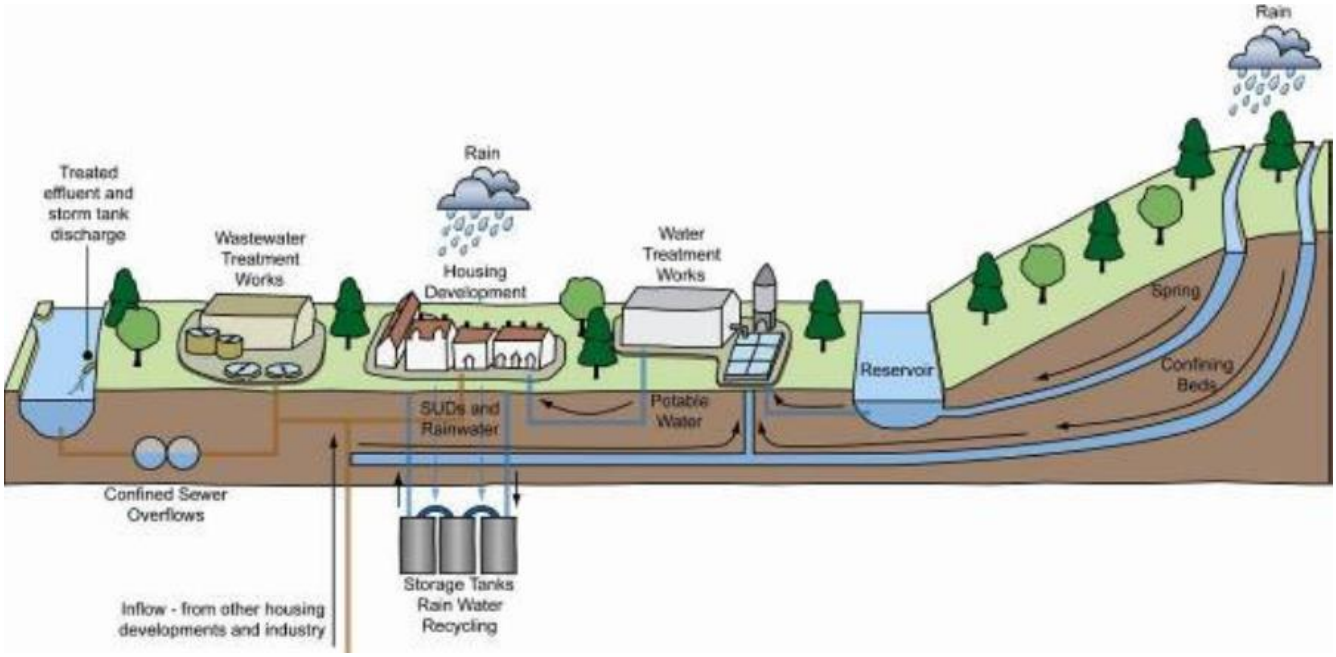


Figure 1-1 The Water Cycle

1.4 Impacts of Development on the Water Cycle

New homes require the provision of clean water, safe disposal of wastewater and limitation of flood risk. 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. Development, when planned correctly, can also offer opportunities to reduce flood risk to existing properties and increase community resilience, contribute to nature recovery, and allow a collaborative approach to infrastructure.

1.5 Objectives

This Stage 2 Detailed WCS is written to support SMBC's new Local Plan. The overall objective of the WCS is to understand the environmental and physical constraints of development and identify opportunities for more sustainable planning and improvements that may be required to achieve the required level of development.

This WCS will consider the following issues:

- Water resources, demand, and supply.
- Wastewater infrastructure and treatment.
- Water quality and environmental impact.

1.6 Study Area

Sandwell Metropolitan Borough Council is a metropolitan borough located in the West Midlands, close to Birmingham. The borough and covers an area of approximately 86 km^2 comprising six former boroughs: Oldbury, Rowley Regis, Smethwick, Tipton, Wednesbury and West Bromwich. The area is highly urbanised, with the main transport routes being major national motorway networks, the M5 and M6 as well as a mainline railway station and Midland Metro connections.

The study area has a population of 341,900 (based on the 2021 census data).

Sandwell contains roughly 66km of canals and Environment Agency (EA) designated main rivers flow through Sandwell, including the River Tame, River Stour and their associated tributaries.

Water supply services in the Sandwell are provided by South Staffordshire Water, Severn Trent Water and a number of NAV providers.

The study area is shown in Figure 1-2.

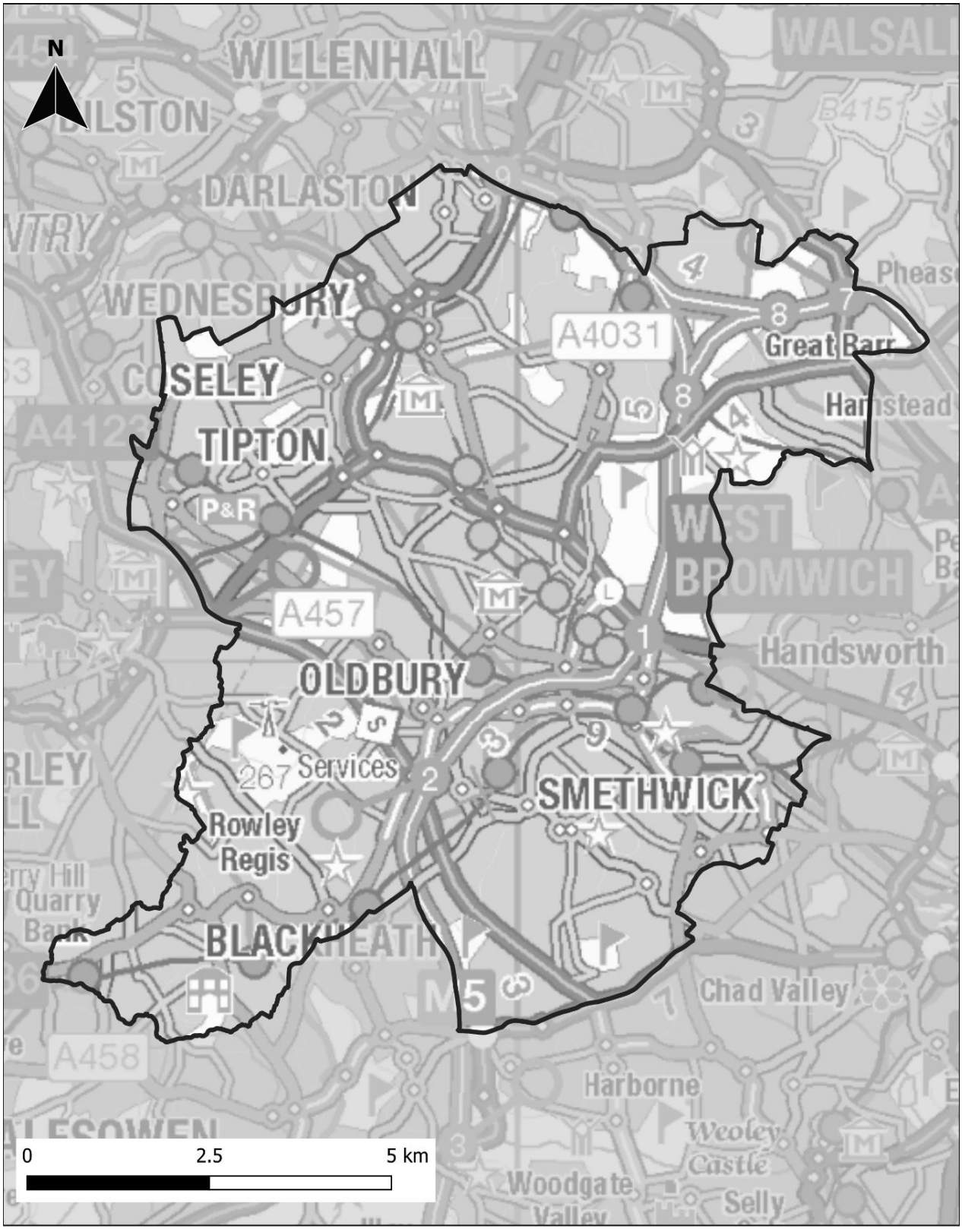


Figure 1-2: Study area

1.7 Authorities responsible for Water Resource and Wastewater Management in Sandwell

Within SMBC there are a number of authorities and regulators responsible or involved in supplying, managing, and overseeing water supply, wastewater and the environment. The table below explains the responsibilities of various bodies within the local plan area.

Table 1-1 Responsibilities of authorities within Sandwell

Authority Name	Key Responsibilities of Different Authorities
Environment Agency	The EA are the environmental regulator in the UK with responsibilities for water quality, flood risk and administering licences for water abstraction. They are a statutory consultee for many development plan documents and for some planning applications. They advise on environmental and infrastructure capacity issues across the water cycle.
Natural England	Natural England are the Government's advisors on the natural environment, which they have a responsibility to protect and enhance. In a WCS they may provide information on the conservation objectives, and guidance on, the protection of designated sites.
Severn Trent Water	Severn Trent Water is the water supplier for some small areas of Sandwell, including around Hamstead in the north east and around Wednesbury in the north west. As the water supplier for these part of Sandwell, Severn Trent Water have the responsibility to maintain an efficient and economical system of water supply. Severn Trent Water is also the sewerage undertaker for the whole of Sandwell. As the sewerage undertaker for Sandwell, Severn Trent Water are responsible for providing, improving and extending a system of public sewers (for both domestic and trade flows) and to make provision for the emptying of those sewers. Note: The boundaries of water supply and of waste water areas served by water companies are not the same.

Authority Name	Key Responsibilities of Different Authorities
South Staffordshire Water	South Staffordshire Water is the water supplier for the majority of Sandwell. As the water supplier for this part of Sandwell, South Staffordshire Water have the responsibility to maintain an efficient and economical system of water supply.
Retail suppliers to non-household customers	Businesses and other non-household customers are supplied via non-household water and wastewater service retailers. The "wholesale supplier" remains the local supplier of water and/or wastewater services in that area. Retail suppliers were introduced with the intention of providing competition in the monopolistic water market.

1.8 Record of Engagement

1.8.1 Overview

Preparation of a WCS requires significant engagement with stakeholders, within the Local Planning Authority area, with water and wastewater utilities, with the Environment Agency, and where there may be cross-boundary issues, with neighbouring local authorities. This section forms a record of engagement for the WCS. Further engagement will take place if necessary, as the Local Plan progresses.

1.8.2 Engagement

The preparation of this WCS was supported by the following engagement:

Inception meeting

Engaged Parties	Details
Sandwell Metropolitan Borough Council (LPA)	Scope of works and data collection requirements.

Neighbouring authorities

Engaged Parties	Details
All 10 neighbouring Local Planning Authorities	Request and receipt of site allocation and commitment data

Collaboration with Water Companies and Risk Management Authorities

Engaged Parties	Details
Sandwell Metropolitan Borough Council (LPA) Sandwell Metropolitan Borough Council (LLFA) Severn Trent Water South Staffordshire Water Environment Agency	Scope of works and data collection requirements.

2 Future Growth in Sandwell

2.1 Growth in Sandwell

Sandwell Council's new Local Plan is currently expected to be adopted in 2025/26 and cover the period from 2024 to 2041. The plan will direct future growth and associated infrastructure across the area and will include new housing and employment requirements for Sandwell.

The following section summarises how Sandwell is expected to grow during the plan period, this generates a forecast that can be used to estimate the volume of water and wastewater required in the future and assess the impact of the resulting pressure on water infrastructure.

This forecast consists of:

- Allocations - sites specifically defined in the Local Plan, or which are to be considered further for allocation in the Local Plan Review
- Committed sites - unallocated sites which have grant of planning permission
- Recent completions - sites completed in the last year that may now yet appear in flow data provided by water companies
- Windfall - sites that have not been specifically identified in the Local Plan, normally comprised of previously developed sites that have unexpectedly come available
- Neighbouring authority growth - growth served by infrastructure within or shared with the study area

Sandwell MBC's new Local Plan is expected to be published imminently. The draft plan states that land must be identified for a minimum of 26,350 homes over the plan period (2024 to 2041). The Development Strategy sets out that Sandwell will deliver at least 10,434 net new homes and 1,221ha of employment land over the Local Plan period. Sandwell provided information on expected growth during the plan period which was collated into a forecast for housing and employment. This is summarised in Table 2-1.

Table 2-1 Overall growth in the Sandwell area

Type of Growth	Number of houses	Potential Employment Space (m^2)
Potential allocations	6,461	55,000
Adopted allocations	5,633	97,081
Commitments	6,014	62,345
Recent Completions	727	N/A
Windfall	1,862	N/A

2.2 Windfall

Windfall sites are sites that are not specifically allocated in the Local Plan or neighbourhood plans. Local Plans usually provide an allowance to cover this circumstance, consistent with the National Planning Policy Framework (NPPF). For the purpose of the study, windfall sites were distributed between WwTWs based on the proportion of the commitments at each WwTW. The windfall allowance of 133 homes per year across Sandwell was advised by Sandwell MBC as an estimate to inform the WCS. This may be different in the published Local Plan and may change as a result of subsequent monitoring.

2.3 Growth outside Sandwell

2.3.1 General approach

Where growth within a neighbouring Local Planning Authority (LPA) area may be served by infrastructure within or shared with Sandwell, the LPA were contacted as part of a Duty to Cooperate request to provide information on:

- The latest growth forecast (housing and employment) for the local plan area.
- Details of future growth within the catchments of WwTW which serve part of their council area and Sandwell.

The neighbouring authorities to Sandwell are shown in Figure 2-1, these include LPA areas which do not share a border with Sandwell, however, are likely to share water infrastructure. The neighbouring authorities in this study are as follows:

- Birmingham
- Solihull
- Walsall
- Stratford-on-Avon
- North Warwickshire
- Bromsgrove
- Dudley
- Wolverhampton
- South Staffordshire
- Wyre Forest

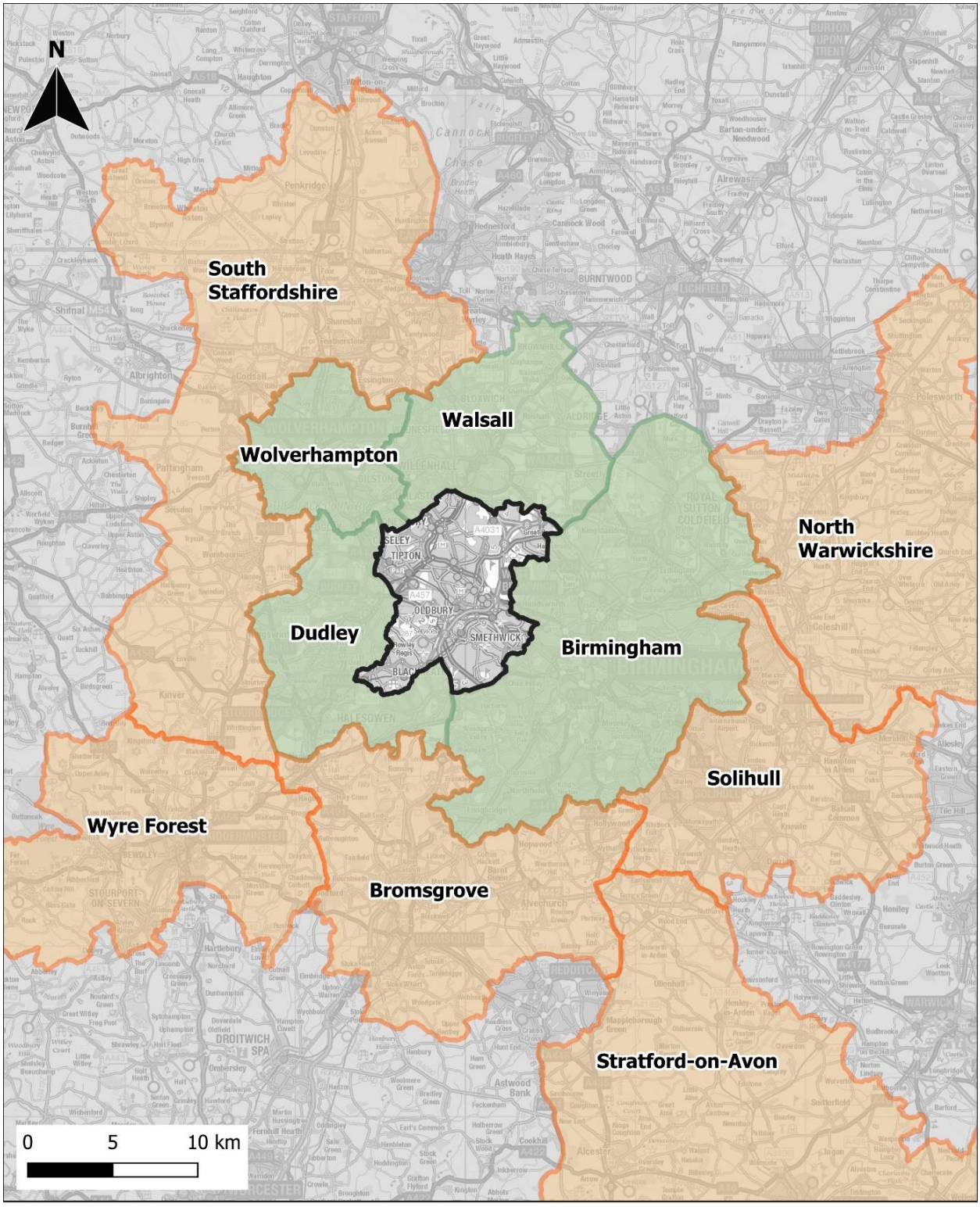


Figure 2-1 Neighbouring authorities to Sandwell

2.3.2 Neighbouring Authority Growth

Growth within neighbouring authorities to Sandwell MBC is summarised, alongside the WwTW infrastructure that is shared.

2.3.2.1 Birmingham

Growth within Birmingham has been taken from the completions and allocations data supplied by Birmingham City Council for the Birmingham Water Cycle Study undertaken by JBA in 2022/23. These sites would be served by Minworth WwTW which is shared with Sandwell.

Table 2-2 Summary committed growth in Birmingham served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	71,672	93,044 (indicative number of employees)

2.3.2.2 Bromsgrove

Growth within Bromsgrove served by has been taken from the completions and allocations data supplied by Bromsgrove District Council for the Coventry and Warwickshire Sub-regional Water Cycle Study undertaken by JBA in 2023/24. These sites would be served by Minworth WwTW and Roundhill WwTW which is shared with Sandwell.

Table 2-3 Summary committed growth in Bromsgrove served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	320	3,360 (indicative number of employees)
Roundhill	141	N/A

2.3.2.3 Dudley

Dudley Council provided their housing and employment commitments for the study. A summary of the commitments provided in settlements with shared wastewater treatment facilities to settlements in Sandwell is displayed below.

Table 2-4 Summary committed growth in Dudley served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	132	N/A
Roundhill	5,990	1,356 (indicative number of employees)
Lower Gornal	1,090	49 (indicative number of employees)
Ray Hall	1,346	275 (indicative number of employees)

2.3.2.4 North Warwickshire

Growth within North Warwickshire has been taken from the completions and allocations data supplied by Bromsgrove District Council for the Coventry and Warwickshire Sub-regional Water Cycle Study undertaken by JBA in 2023/24. These sites would be served by Minworth WwTW and Roundhill WwTW which is shared with Sandwell.

Table 2-5 Summary committed growth in North Warwickshire served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	189	N/A

2.3.2.5 Solihull

Growth within Solihull has been taken from the completions and allocations data supplied by Solihull Council for the Birmingham Water Cycle Study undertaken by JBA in 2022/23. These sites would be served by Minworth WwTW which is shared with Sandwell.

Table 2-6 Summary committed growth in Solihull served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	650	N/A

2.3.2.6 South Staffordshire

South Staffordshire Council provided their housing and employment commitments for the study. A summary of the commitments provided in settlements with shared wastewater treatment facilities to settlements in Sandwell is displayed below.

Table 2-7 Summary committed growth in South Staffordshire served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Roundhill	454	N/A

2.3.2.7 Walsall

Growth within Walsall has been taken from the completions and allocations data supplied by Walsall Council for the Birmingham Water Cycle Study undertaken by JBA in 2022/23. These sites would be served by Minworth WwTW which is shared with Sandwell.

Table 2-8 Summary committed growth in Walsall served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	2,102	42,624 (indicative number of employees)

2.3.2.8 Wolverhampton

Bath and North East Somerset Council provided their housing commitments as of the 31 March 2024. A summary of the commitments provided in settlements with shared wastewater treatment facilities to settlements in Sandwell is displayed below in Table 2 2.

Table 2-9 Summary committed growth in Wolverhampton served by infrastructure shared with Sandwell

WwTW	Number of Houses	Employment
Minworth	489	27,078 (indicative number of employees)

2.3.2.9 Other Neighbouring Authorities

Development data from other Local Authorities neighbouring Sandwell was assessed, however, no sites were identified as sharing wastewater infrastructure with settlements in Sandwell.

2.4 Growth and Water Demand

A forecast of the impact of the planned housing and employment growth in and around Sandwell on water demand was prepared as follows:

2.4.1 Water Demand from Housing

Data from the water supply companies draft Water Resource Management Plan (WRMP24) market information tables was used. The forecast for water demand is based on per-capita consumption for the year 2023-2024, as published in the draft WRMP24s. As a result of this the forecast represents the baseline "business-as-usual" scenario, not accounting for water efficient design and supply and demand measures from the water companies' WRMPs. Water efficient design is explored further in Section 3.4, while measures set out in the draft WRMP24s are reviewed in Section 4.2.

2.4.2 Water Demand from Employment Sites

Demand from employment sites was calculated assuming a rate of 100l/d per employee. Where the forecast number of employees for a site was not specified by Sandwell MBC, employment floorspace and assumed density based on employment use classes was used to calculate an indicative number of employees for a site. Table 2-10 below outlines the assumed densities of employment space derived from the Homes and Communities Agency (2015) Employment Density Guide 3rd edition. This guide pre-dates recent changes in working practices as a result of the Covid-19 pandemic, technological changes to support working from home and automation.

Table 2-10 Employment use classes and assumed densities used to calculate water demand

Use class	Description	Density (m^2/employee)
B1	Offices (assumed)	13
B1a	Offices	8

Use class	Description	Density (m^2/employee)
B1b	R&D space	40
B1c	Light industrial	47
B2	Industrial and manufacturing	36
B8	Storage and distribution	70
Mixed B	Mixed	28
Mixed	Mixed	40
SG	Data centres	180
A1	Retail	15
A2	Finance and professional services	16
A3	Restaurants and cafes	15
Mixed A	Mixed	15
C1	Hotels	requires bed count
C2	Residential institutions	requires bed count
D1	Cultural Attraction	36
D2	Leisure	65

2.4.3 Business as Usual Water Demand Forecast

The impact of planned growth across the Sandwell MBC's Local Plan Review period on water demand is summarised in Figure 2-2 below, displaying demand from each source of growth outlined in 2.1 and from neighbouring authorities. Additional water demand from planned development in Sandwell is forecast to grow by 9 Ml/d across the five water industry Asset Management Plan (AMP) periods spanning the Local Plan period.

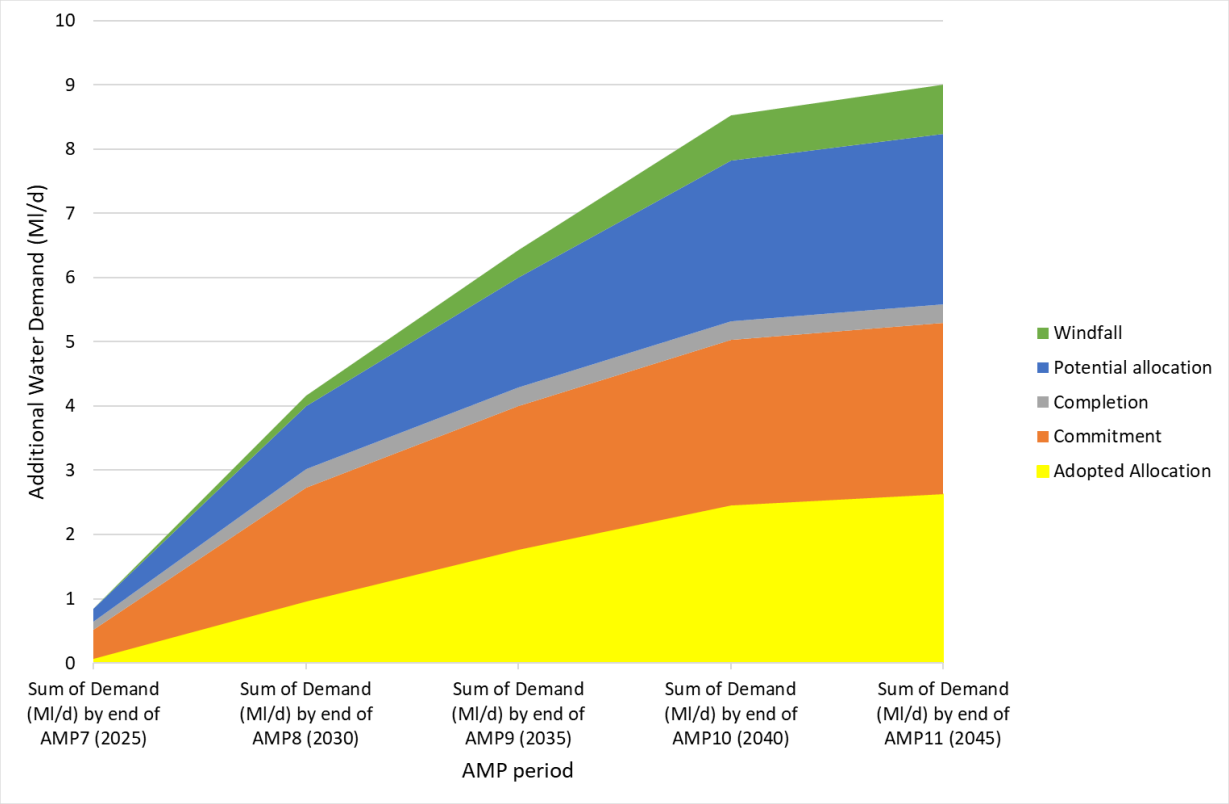


Figure 2-2 Additional water demand (Ml/d) forecast across the Local Plan review period

3 Policy and Legislation

3.1 Introduction

The following sections introduce several national, regional, and local policies that must be considered by the Local Planning Authority (LPA), water companies and developers during the planning stage. Key extracts from these policies are presented as well as links to the full text. Whilst care has been taken to ensure that the information presented in this report was up to date at the time of writing, policy and guidance can change rapidly and the reader should ensure that the most up to date information is sought.

3.2 Plan-making

The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023) was originally published in 2012, as part of reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

Local Plans are the primary mechanism by which plan-led spatial planning is implemented in England. Local Plans must be prepared by Local Planning Authorities (LPAs) and include:

- Strategic policies which set out the "overall strategy for the pattern, scale and design duality of places", including for the provision of infrastructure, transportation and community facilities.
- Non-strategic policies, which "set out more detailed policies for specific areas, neighbourhoods or types of development. This can include allocating sites, the provision of infrastructure and community facilities at a local level."

Under the Localism Act (HM Government, 2011) new rights were provided to allow local communities to come together and shape the development and growth of their area by preparing Neighbourhood Development Plans, or Neighbourhood Development Orders, where the ambition of the neighbourhood is aligned with strategic needs and priorities for the area. Neighbourhood Plans can make non-strategic policies, aligned to the strategic policies of the Local Plan. As neighbourhoods draw up their proposals, Local Planning Authorities are required to provide technical advice and support to communities.

3.3 Water and the Planning System

3.3.1 National Planning Policy Framework and water

The NPPF provides guidance to planning authorities to take account of flood risk and water and wastewater infrastructure delivery in their Local Plans. Key paragraphs include:

- Paragraph 34: “Plans should set out the contributions expected from development. This should include setting out the levels and types of affordable housing provision required, along with other infrastructure (such as that needed for education, health, transport,

flood and water management, green and digital infrastructure). Such policies should not undermine the deliverability of the plan."

- Paragraph 158: "Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply..."
- Paragraph 180e: "…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".

3.3.2 Planning Practice Guidance overview

Planning Practice Guidance (PPG) was originally issued in 2014 by the Department for Communities and Local Government, with the intention of providing guidance on the application of the NPPF. The individual guidance documents are updated periodically. The following guidance documents are particularly relevant to a WCS:

- Water Supply, Wastewater and Water Quality (HM Government, 2019)
- Housing - Optional Technical Standards (HM Government, 2015a)
- Flood Risk and Coastal Change (HM Government, 2022)

3.3.3 PPG - Water Supply, Wastewater and Water Quality

Two key passages from the PPG (Para 002) provide an overview of what needs to be considered by plan-making authorities, and provide a basis for the work contained in a WCS or IWMS:

"Early discussions between strategic policy-making authorities and water and sewerage companies can help to ensure that proposed growth and environmental objectives are reflected in company business plans. Growth that requires new water supply should also be reflected in companies' long-term water resources management plans. This will ensure that the necessary infrastructure is funded through the water industry's price review."

"Strategic policy-making authorities will also need to consider the objectives in the government's 25 Year Environment Plan to reduce the damaging abstraction of water from rivers and groundwater, and to reach or exceed objectives for rivers, lakes, coastal and ground waters that are specially protected."

A summary of the advice for plan-makers and for planning applications is contained below but it is recommended that the full text is reviewed.

Plan-making considerations - Infrastructure (Para 005)

- Identification of suitable sites for new or enhanced infrastructure, including the location of existing and proposed development.
- Consider whether new development is appropriate near to water and wastewater infrastructure (for example due to odour concerns).

- Phasing new development so that water and wastewater infrastructure will be in place when needed. Infrastructure should also be in place before any environmental effects occur on designated sites of importance for biodiversity.

Plan-making considerations - Water quality (Para 006)

- How to help protect and enhance local surface water and groundwater in ways that allow new development to proceed and avoids costly assessment at the planning application stage.
- The type or location of new development where an assessment of the potential impacts on water bodies may be required.
- Whether measures to improve water quality, (e.g., SuDS schemes) can be used to address water quality in addition to flood risk.

Plan-making considerations - Wastewater (Para 007)

- The sufficiency and capacity of wastewater infrastructure.
- The circumstances where wastewater from new development would not be expected to drain to a public sewer (such as via a package treatment sewage treatment works or septic tank).
- The capacity of the environment to receive effluent from development without preventing statutory objectives being met.

Early engagement with the LPA, the EA, and relevant water and sewerage companies can help establish whether any particular water and wastewater issues need to be considered.

Considerations for planning applications - Water supply (Para 016)

Water supply planning would normally be addressed through the LPA's strategic policies and reflected in the water companies WRMPs. Water supply is therefore unlikely to be a consideration for most planning applications. However, some exceptions might include:

- Large developments not identified in plans that are likely to require a large volume of water; and/or
- significant works required to connect the water supply; and/or
- where a plan requires enhanced water efficiency in new development as part of a strategy to manage water demand locally.

Considerations for planning applications - Water quality (Para 016)

Water quality is only likely to be a significant planning concern where a proposal would:

- Involve physical modifications to a water body such as flood storage areas, channel diversions and dredging, removing natural barriers, construction of new locks, new culverts, major bridges, new barrages or dams, new weirs, and removal of existing weirs; and/or
- indirectly affect water bodies, for example:
    - As a result of new development such as the redevelopment of land that may be affected by contamination, mineral workings, water and wastewater treatment, waste management facilities and transport scheme including culverts and bridges.

- Result in runoff into surface water sewers that drain directly, or via a combined sewer, into sensitive waterbodies e.g., waterbodies with a local, national or international habitat designation.
- Through a lack of adequate infrastructure to deal with wastewater.
- Through a local of adequate infrastructure to deal with wastewater where development occurs in an area where there is strategic water quality plan e.g., a nutrient management plan, River Basin Management Plan, Water Cycle Study, Diffuse Water Pollution plan or sewerage undertakers' drainage strategy which set out strategies to manage water quality locally and help deliver new development.

3.3.4 PPG - Housing - Optional Technical Standards

This guidance advises planning authorities on how to gather evidence to set optional requirements, including for water efficiency. It states that “all new homes already must meet the mandatory national standard set out in the Building Regulations (of 125 litres /person /day). Where there is a clear local need, local planning authorities can set out Local Plan policies requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day. Planning authorities are advised to consult with the EA and water companies to determine where there is a clear local need, and also to consider the impact of setting this optional standard on housing viability.

The evidence for adopting the optional requirements is outlined in section 4.8. Viability is reviewed in section 3.4.4.

3.3.5 PPG - Flood Risk and Coastal Change

This guidance (Department for Levelling Up, Housing and Communities, 2022) sets out how spatial planners, planning authorities and developers should manage flood risk to and from proposed developments, including assessing risk, avoiding flood risk, controlling, managing and mitigating flood risk. The main updates in the 2022 version were:

- Natural Flood Management (NFM)
- Surface water flood risk
- Using multifunctional SuDS
- Application of the sequential and exceptional tests to all sources of flood risk
- Safeguarding land of future flood risk management
- Supporting transition in unsustainable locations

Full details of this PPG are set out in the SFRA.

3.3.6 PPG - Climate Change

This guidance (Department for Levelling Up, Housing and Communities, 2019) advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. Planning can help increase resilience to climate change impact through the location, mix and design of development. There is a statutory duty on local

planning authorities to include policies in their Local Plan to tackle climate change and its impact.

3.3.7 Levelling-up and Regeneration Act 2023

The Levelling-up and Regeneration (HM Government, 2023) aims to support the Government's commitment to reducing geographical disparities between different parts of the UK. Within the Act are several parts relating to the water environment.

Part 7 relates to nutrient pollution standards. Where the Secretary of State considers that a habitats site that is wholly or partly in England is in an unfavourable condition by virtue of pollution from nutrients in water comprising phosphorus or compounds, or nitrogen or compounds, the Secretary of State may designate the catchment area for the habitats site as a phosphorus or nitrogen sensitive area.

It requires sewerage undertakers in England to upgrade phosphorus or nitrogen significant plants in its sewerage system by 2030 in order to meet phosphorus or nitrogen pollution standards.

A phosphorus or nitrogen significant plant is defined as one that discharges treated effluent into a sensitive catchment area and is not exempt in relation to the pollution standard. Unless otherwise defined, the treatment standard for phosphorous is 0.25mg/l, and for nitrogen is 10mg/l.

3.4 Water and design

3.4.1 Building Regulations

The Building Regulations (2010) Part G was amended in early 2015 to require that all new dwellings must ensure that the potential water consumption must not exceed 125 litres/person/day, or 110 litres/person/day where required under planning conditions (HM Government, 2015b) (see 3.3.4).

The Environmental Improvement Plan (discussed in 3.7.2) contains a commitment to consider a new standard for new homes in England of 105 litres per person per day (l/p/d) and 100 l/p/d where there is a clear local need, such as in areas of serious water stress. Whilst this new standard is only under consideration, it demonstrates the direction of travel for water efficiency standards, and it is highly likely that this or a similar standard will be adopted.

3.4.2 Building Research Establishment

The Building Research Establishment (BRE) publish an internationally recognised environmental assessment methodology for assessing, rating, and certifying the sustainability of a range of buildings.

New homes are most appropriately covered by the Home Quality Mark (BRE, 2023a), and commercial, leisure, educational facilities and mixed-use buildings by the Building Research Establishment Environmental Assessment Methodology (BREEAM) UK New Construction Standard (BRE, BREEAM, 2018b).

Using independent, licensed assessors, BREEAM/HQM assesses criteria covering a range of issues in categories that evaluate energy and water use, health and wellbeing, pollution, transport, materials, waste, ecology, and management processes.

In the Homes Quality Mark, 400 credits are available across 11 categories and lead to a star rating. 18 credits are available for water efficiency and water recycling. A greater number of credits are awarded for homes using water efficient fittings (with the highest score achieving 100l/p/d or less), and further credits are awarded for the percentage of water used in toilet flushing that is either sourced from rainwater or from grey water.

The BREEAM New Construction Standard awards credits across nine categories, four of which are related to water: water consumption, water monitoring, leak detection and water efficient equipment. This leads to a percentage score and a rating from “Pass” to “Outstanding”.

Through the Local Plan, the Council has the opportunity to seek BREEAM or HQM status for all new, residential, and non-residential buildings.

3.4.3 Energy and Water

18% of the UK’s domestic energy usage is for water heating (Department for Energy Security and Net Zero, 2022). If less water was being used within the home, for instance through more water efficient showers, less water would need to be heated, and overall domestic energy usage would be reduced.

The Government is currently analysing the results of a 2019 consultation on a Future Homes Standard that will involve changes to Part L (conservation of fuel and power) of the Building Regulations for new dwellings. Whilst there is no direct mention of water efficiency in this consultation, there is an important link between water use and energy use, and therefore between water use and the whole-life carbon cost of developments.

3.4.4 Viability

The evidence for the costs of meeting the optional 110l/p/d water efficiency target in new homes indicate that the costs are minimal:

- A 2014 study into the cost of implementing sustainability measures in housing found that meeting a standard of 110 litres per person per day would cost only £12 (at 2023 prices) for a four-bedroom house (EC Harris, 2014).
- The Committee on Climate Change report - UK Housing: Fit for the Future - stated that the cost of "requiring all homes in England to be built to 110 l/p/d is possible under Part G of regulations and would be no additional cost."(Committee on Climate Change, 2019)
- Heating water accounts for 18% of energy used in the home (Department for Energy Security and Net Zero, 2022) This would cost a 2-3 person, 3-bed household an average of £352 per year in energy at 2023 costs (British Gas, 2023). Water efficiency is therefore not only viable but of positive economic benefit to both private homeowners and tenants.

There is less evidence available on the costs of going below 110l/p/d. The Sussex North Water Neutrality Strategy (JBA Consulting, 2022) found that the additional cost to meet 85l/p/d using water efficient fittings would be between £349 and £431 per dwelling, or £1,049 to £1,531 where white-goods appliances would not otherwise have been installed in the dwelling (2022 prices).

3.5 The Water Industry

3.5.1 The Water Industry in England

Water and sewerage services in England and Wales are provided by eleven Water and Sewerage Companies (WaSCs) and six 'water-only' companies. The central legislation relating to the industry is the Water Industry Act 1991. The companies operate as regulated monopolies within their supply regions, although very large water users and developments are able to obtain water and/or wastewater services from alternative suppliers - known as inset agreements.

The Water Act 2014 aims to reform the water industry to make it more innovative and to increase resilience to droughts and floods. Key measures could influence the future provision of water and wastewater services include:

- Non-domestic customers are able to switch their water supplier and/or sewerage undertaker;
- new businesses will be able to enter the market to supply these services;
- measures to promote a national water supply network; and
- enabling developers to make connections to water and sewerage systems.

The water industry is primarily regulated by three regulatory bodies:

- **Economic regulation:** Office of Water Services (Ofwat) are the economic regulator. They have a statutory duty to protect the interests of consumers, ensuring water companies carry out their functions (customer service standards, environmental rules, drinking water standards etc) and can finance them. Part of this role is setting the limits on pricing of water and sewerage services.
- **Environmental regulation:** The Environment Agency are the environmental regulator. They are responsible for monitoring the impact of the water industry (as well as others) on the environment and issuing permits for abstraction of water and discharge of wastewater.
- **Drinking water regulation:** Finally, the Drinking Water Inspectorate (DWI) implement standards for drinking water and can take enforcement measures against water companies if those standards are not met.

3.5.2 Planning and funding of the water industry

The water industry works on a five-year cycle called the Asset Management Plan period or AMP periods. Every five years a water company submits a Business Plan to Ofwat for a Price Review. These plans set out the companies' operational expenditure (OPEX) and capital

expenditure (CAPEX) required to maintain service standards, enhance service (for example where sewer flooding occurs), to accommodate growth and to meet environmental objectives defined by the Environment Agency. Ofwat assesses and compares the plans with the objective of ensuring what are effectively supply monopolies are operating efficiently, and that the company is meeting its obligations. It then sets the allowable price increase for consumers based on the retail prices index, the business plan, and taking into consideration affordability for consumers. The current AMP period is AMP 7 (2020-2025), and the price of water for this period was set by Ofwat late in 2019 in a process referred to as Price Review 19 (PR19). The new price came into effect in April 2020. The next price review will be 2024 (PR24) and will set prices from 2025 to 2030. This system gives stability in pricing. Within this price review process there may also be incentives and penalties on the water company for exceeding or failing to meet targets.

When considering investment requirements to accommodate growing demand, water companies are required to ensure a high degree of certainty that additional assets will be required before funding them. Longer term growth is, however, considered by the companies in their internal asset planning processes and in their 25-year Strategic Direction Statements and Water Resource Management Plans (WRMPs).

The Water Industry National Environment Programme (WINEP) is a set of actions that are defined by the EA and given to all water companies operating in England for completion during a particular AMP period. The aim of the programme is to support the objectives in the Environment Act, Water Framework regulations, Habitats regulations and other environmental objectives. Examples of typical actions could include investigations into the sustainability of an abstraction, a reduction in an abstraction to support river flows, or new permit limits at a wastewater treatment works.

Water and wastewater infrastructure requires significant lead-times to plan, obtain planning and other permissions, finance and construct. The time required to provide new or upgraded infrastructure to serve a development or a larger spatial plan is highly locally specific. The following is provided as an indicative guide to lead-times.

Table 3-1: Indicative lead-times (years for new infrastructure to serve development

Scale of development	Water supply	Water resources	Wastewater network	Wastewater treatment
Minor	1	N/A	1	N/A
Major	1-3	1-5	1-5	3-5
Strategic / Plan	3-5	5-10	5-10	5-10

3.5.3 Planning for Water

Water resource management plans

Water Resource Management Plans (WRMPs) are 25-year strategies that water companies are required to prepare, with updates every five years. In reality, water companies prepare internal updates more regularly. WRMPs are required to assess:

- Future demand (due to population and economic growth).
- Future water availability (including the impact of sustainability reductions).
- Demand management and supply-side measures (e.g., water efficiency and leakage reduction, water transfers and new resource development).
- How the company will address changes to abstraction licences.
- How the impacts of climate change will be mitigated.
- Where necessary, they set out the requirements for developing additional water resources to meet growing demand and describe how the balance between water supply and demand will be balanced over the period 2015 to 2040.
- Using cost-effective demand management, transfer, trading and resource development schemes to meet growth in demand from new development and to restore abstraction to sustainable levels.
- In the medium to long term, ensuring that sufficient water continues to be available for growth and that the supply systems are flexible enough to adapt to climate change.

South Staffs Water's draft WRMP24 is published here and is reviewed in detail for the study area in section 4.4.3.

Severn Trent Water's draft WRMP24 is published here and is reviewed in detail for the study area in section 4.4.

Drought Plan

Linked to the WRMP is a water company's drought plan. This is a requirement under the Water Industry Act 1991 (as amended by the water Act 2003). A water company must state how it will maintain a secure water supply and protect the environment during dry weather and drought. The plan will contain:

- Drought triggers - these are points where a water company will take action to manage supply and demand. They are based on monitoring of rainfall levels, river flows, groundwater levels and reservoir stocks.
- Demand management actions - how a water company will reduce demand for water during a drought. Actions that save water before taking more water from the environment must be prioritised. These could include:
    - reducing leakage;
    - carrying out water efficiency campaigns with customers;
    - reducing mains pressure; and
    - restricting water use, for example through temporary use band which limit hosepipe and sprinkler use.
- Supply management actions - how a water company will maintain water supply during a drought. Actions that have the least effect on the environment must be prioritised. This could include:
    - carrying out engineering work to improve its supply;

    - transferring water in bulk from other water companies
    - using drought permits and drought orders to abstract more water
    - using desalination - permanent or temporary plants; and
    - using tankers to supply customers with water directly
- Extreme drought management actions - the actions it could take in an extreme drought. These could delay the need to use emergency restrictions standpipes and rota cuts.
- Communicating during a drought - a water company must set out how it will communicate in a clear and timely way during a drought with customers, partners or other stakeholders.
- Environmental assessment, monitoring and mitigation. A drought plan must include:
    - an environmental assessment
    - an environmental monitoring plan for each supply management action; and
    - details of mitigation measures the company plans to take for each supply management action.
- End of a drought - a water company must explain how it will identify when a drought is over or ending and the actions it will take during this stage, communicate this information to customers, and review its performance.

Regional water resource planning

Water resource planning is taking an increasingly regional focus, recognising the need for collaboration between water companies and sectors in order to address the challenges of climate change, increasing demand for water and protecting the water environment. Five regional groupings having been formed, including the Water Resources West (WRW) group which covers Sandwell. An advisory group consisting of their regulators (Environment Agency and Ofwat) and Defra regularly attend meetings of WRW.

WRW are prepared a draft regional water resource plan, published in 2022, which in turn will inform the next round of company WRMPs to be published in 2024. As part of this process, they have published an initial water resource position statement which sets out the water resources challenges and opportunities within the region.

3.5.4 Planning for Wastewater

21st Century Drainage

The UK Water Industry Research (UKWIR) “21st Century Drainage” programme has brought together water companies, governments, regulators, local authorities, academics, and environmental groups to consider how planning can help to address the challenges of managing drainage in the future. These challenges include climate change, population growth, urban creep and meeting the Water Framework Directive.

The group recognised that great progress has been made by the water industry in its drainage and wastewater planning over the last few decades, but that, in the future, there needs to be greater transparency and consistency of long-term planning. The Drainage and Wastewater Management Plan (DWMP) framework (Water UK, 2018) sets out how the industry intends to

approach these goals. Companies were required to published finalised DWMPs in 2023 to inform their business plans for the 2024 Price Review.

Drainage and Wastewater Management Plans (DWMPs)

DWMPs are consistently structured plans delivered at three spatial scales; company-wide, regional groupings and individual wastewater catchments. The framework defines drainage to include all organisations and all assets which have a role to play in drainage, although, as the plans will be water company led, it does not seek to address broader surface water management within catchments.

LPAs and LLFAs are recognised as key stakeholders and are invited to join, alongside other stakeholders, the Strategic Planning Groups (SPGs) organised broadly along river basin district catchments.

DWMPs aim to provide more transparent and consistent information on sewer flooding risks and the capacity of sewerage networks and treatment works, and this should be taken into account in SFRAs, Water Cycle Studies, as well as in site-specific FRAs and Drainage Strategies.

Severn Trent Water's final DWMP, including interactive mapping, is published here, and is reviewed in detail for the study area in section 6.2.1.

3.5.5 Developer Contributions and connection charges

A significant part of water company business is the interface with developers to facilitate connection to the public water supply and sewerage systems, through their developer services functions. Developments with planning permission have a right to connect to the public water and sewerage systems, (where this is for domestic use), however, there is no guarantee that the capacity exists to serve a development.

Developers may requisition a water supply connection or sewerage system or self-build the assets and offer these for adoption by the water company or sewerage undertaker. Self-build and adoption are usually practiced for assets within the site boundary, whereas requisitions are normally used where an extension of upgrading the infrastructure requires construction on third party land. The cost of requisitions is shared between the water company and developer as defined in the Water Industry Act 1991.

The above arrangements are third party transactions because the Town and Country Planning Act Section 106 agreements and Community Infrastructure Levy agreements may not be used to obtain funding for water or wastewater infrastructure.

OfWAT, the water industry's economic regulator, published revised rules covering how water and wastewater companies may charge customers for new connections (OfWAT, 2020). These rules have applied to all companies in England since April 2018. The key changes include:

- More charges will be fixed and published on water company websites. This will provide greater transparency to developers and will also allow alternative connection providers to offer competitive quotations more easily.

- There will be a fixed infrastructure charge for water and one for wastewater.
- The costs of network reinforcement will no longer be charged directly to the developer in their connection charges. Instead, the combined costs of all of the works required on a company's networks, over a five-year rolling period, will be covered by the infrastructure charges paid for all new connections.
- The definition of network reinforcement has changed and will now apply only to works required as a direct consequence of the increased demand due to a development. Where the water company has not been notified of a specific development, for example when developing long-term strategic growth schemes, the expenditure cannot be recovered through infrastructure charges.

South Staffs Water publish their charging arrangements annually here. These include incentives to encourage good design by developers, including:

- Incentive scheme for sustainable development consuming <100lpppd

Severn Trent Water publish their charging arrangements annually here. These include incentives to encourage good design by developers, including:

- An Environmental Discount Scheme available for development consuming <100lpppd evidenced by the WRc calculator.
- A sewerage Environmental Discount Scheme available if there is no surface water connection made to the public sewer.

3.5.6 Water companies and the planning system

Water companies are currently not statutory consultees to planning applications, although they do monitor planning applications and respond to potentially significant applications, or where requested to do so by the LPA. Defra are intending to consult on making water companies statutory consultees for some applications (Department for Environment, Food & Rural Affairs, 2023).

Where a water company is concerned that a new development may impact upon their service to customers or the environment (for example by causing foul sewer flooding or pollution) they may request the LPA to impose a Grampian condition, whereby the planning permission cannot be implemented until a third-party secures the necessary upgrading or contributions.

Defra has issued National Policy Statements (NPSs) on Nationally Significant Infrastructure Projects (NSIPs) for wastewater (Department of Environment, Food & Rural Affairs, 2012) and water (Department of Environment, Food & Rural Affairs, 2023), to be used as the primary basis when considering applications for Development Consent Orders (DCOs).

3.6 Flood Risk and Surface Water

3.6.1 Flood and Water Management Act 2010

The Flood and Water Management Act (FWMA) aims to improve both flood risk management and the way water resources are managed (HM Government, 2010).

The FWMA has created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. This included the creation of a lead role for LAs, as LLFAs, designed to manage local flood risk (from surface water, ground water and ordinary watercourses) and to provide a strategic overview role of all flood risk for the EA.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by LAs and other key partners. The integration and synergy of strategies and plans at national, regional, and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth.

Schedule 3 of the Act has not been enacted in England, but this is expected to be implemented in 2024. The enactment of schedule 3 will have the following implications for the planning process:

- Designation of local authorities as SuDS Approval Bodies (SAB) which have a duty to adopt new drainage systems.
- The cessation of the automatic right for new developments to connect to the existing sewer system.
- Developers must ensure that drainage systems are built as per the approved drainage plan that complied with mandatory national standards as outlined in the NPPF and the PPG.

3.6.2 Local Flood Risk Management Strategy (LFRMS)

Local Flood Risk Management Strategies set out how Lead Local Flood Authorities (LLFA) will manage local flood risk from surface water runoff, groundwater and ordinary watercourses, for which they have a responsibility as LLFA. They also sets out the work that other Risk Management Authorities are doing to manage flood risk within the area.

The Black Country Local Flood Risk Management Strategy [2015] sets out the following objectives:

- Understanding and communicating flood risk in the Black Country
- Managing the likelihood and impacts of flooding
- Helping the Black Country's citizens to manage their own risk
- Ensuring appropriate development in the Black Country
- Improving flood prediction, warning and post flood recovery
- Work in partnership with others to deliver the Local Strategy

3.6.3 Strategic Flood Risk Assessment (SFRA)

All LPAs are required, under NPPF, to prepare a SFRA, which forms a key part of the evidence base for their Local Plan. The SFRA must consider flood risks from all sources, collating up-to-date flood risk data and in some cases developing new flood risk modelling. The SFRA is used to inform the Sequential Test, by which Local Plan allocations should be sequentially selected to direct development towards areas of lower flood risk, taking into consideration the vulnerability to flooding of the proposed land use. The current SFRA for

Sandwell is the Black Country SFRA (published in 2020) and is available here. A level 1 SFRA for Sandwell MBC is being prepared alongside this WCS.

3.6.4 Surface Water Management Plan

Surface Water Management Plans (SWMPs) outline the preferred surface water management strategy in a given location and establish a long-term action plan to manage surface water. SWMPs are undertaken, when required, by LLFAs in consultation with key local partners who are responsible for surface water management and drainage in their area. Sandwell MBC does not currently have a published SWMP.

3.6.5 Sustainable Drainage Systems

From April 2015, Local Planning Authorities (LPA) have been given the responsibility for ensuring that sustainable drainage is implemented on developments of ten or more homes or other forms of major development through the planning system. Under the new arrangements, the key policy and standards relating to the application of SuDS to new developments are:

- The National Planning Policy Framework, which requires that development in areas already at risk of flooding should give priority to sustainable drainage systems.
- The House of Commons written statement (Pickles, 2014) setting out governments intentions that LPAs should “ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate” and “clear arrangements in place for ongoing maintenance over the lifetime of the development.” This requirement is also now incorporated in the 2019 update of the NPPF (paragraph 165). In practice, this has been implemented by making Lead Local Flood Authorities (LLFAs) statutory consultees on the drainage arrangements of major developments.
- The Defra non-statutory technical standards for sustainable drainage systems (HM Government, 2015c). These set out the government’s high-level requirements for managing peak flows and runoff volumes, flood risk from drainage systems and the structural integrity and construction of SuDS. This very short document is not a design manual and makes no reference to the other benefits of SuDS, for example water quality, habitat, and amenity.

Sandwell MBC are the LLFA and play a key role in ensuring that the proposed drainage schemes for all new developments comply with technical standards and policies in relation to SuDS. Further information on surface water drainage can be found here (LINK).

An updated version of the CIRIA SuDS Manual was published in 2015. The guidance covers the planning, design, construction and maintenance of SuDS for effective implementation within both new and existing developments. The guidance is relevant for a range of roles with the level of technical detail increasing throughout the manual. The guidance does not include detailed information on planning requirements, SuDS approval and adoption processes and standards, as these vary by region and should be checked early in the planning process. The manual itself can be found here.

CIRIA also publish “Guidance on the Construction of SuDS” (C768), which contains detailed guidance on all aspects of SuDS construction, with specific information on each SuDS component available as a downloadable chapter. The downloadable chapter is available here.

Severn Trent Water Provide SuDS guidance for adoption under the Sewerage Sector Guidance 2020 here.

3.6.6 Design and Construction Guidance

The Design and Construction Guidance (DCG), part of a new Codes for Adoption covering the adoption of new water and wastewater infrastructure by water companies, contains details of the water sector’s approach to the adoption of SuDS, which meet the legal definition of a sewer. This replaces the formerly voluntary Sewers for Adoption The new guidance came into force in April 2020 and compliance by water companies in England is mandatory.

The previous standards, up to and including Sewers for Adoption Version 7, included a narrow definition of sewers to mean below-ground systems comprising of gravity sewers and manholes, pumping stations and rising mains. This essentially excluded the adoption of SuDS by water companies, except for below-ground storage comprising of oversized pipes or chambers.

The new guidance provides a mechanism for water companies to secure the adoption of a wide range of SuDS components which are now compliant with the legal definition of a sewer. There are however several non- adoptable components such as green roofs, pervious pavements, and filter strips. These components may still form part of a drainage design so long as they remain upstream of the adoptable components.

The Design and Construction Guidance states that the drainage layout of a new development should be considered at the earliest stages of design. It is hoped that the new guidance will lead to better managed and more integrated surface water systems which incorporate amenity, biodiversity, and water quality benefits.

3.7 Environmental Protection and Biodiversity

3.7.1 The Environment Act 2021

The Environment Act (HM Government, 2021) came into UK law in November 2021 with the aim of protecting and enhancing the environment. The Act has objectives to improve air and water quality, biodiversity, waste reduction and resource efficiency. The implementation of the policies within the Environment Act has begun and legally binding environmental targets are being developed. This will be enforced by the newly created Office for Environmental Protection (OEP, more information available here).

The Environment Act (Part 5) contains policies concerning improvements to the water environment. These policies have the following aims:

- Effective collaboration between water companies through statutory water management plans.
- Minimise the damage that water abstraction may cause on environment.

- Modernise the process for modifying water and sewerage company licence conditions.

Further to this, there is specific legislation regarding storm overflows aiming to reduce the discharge of untreated sewage into waterways. This plan includes requirements for water companies to:

- report on the discharges from storm overflows;
- monitor the quality of water potentially affected by discharges;
- progressively reduce the harm caused by storm overflows; and
- report on elimination of discharges from storm overflows.

3.7.2 25-year Environment Plan

The Environmental Improvement Plan (EIP) is the first revision of the 25-year environment plan (25YEP) published in 2018. It contains ten goals which are shown in Figure 2.1. The full text of the EIP can be found here. Government must review and revise the plan, if needed, every five years to ensure continued progress against the ten 25YEP goals.

Of particular importance to a WCS is Goal 3 - Clean and plentiful water.

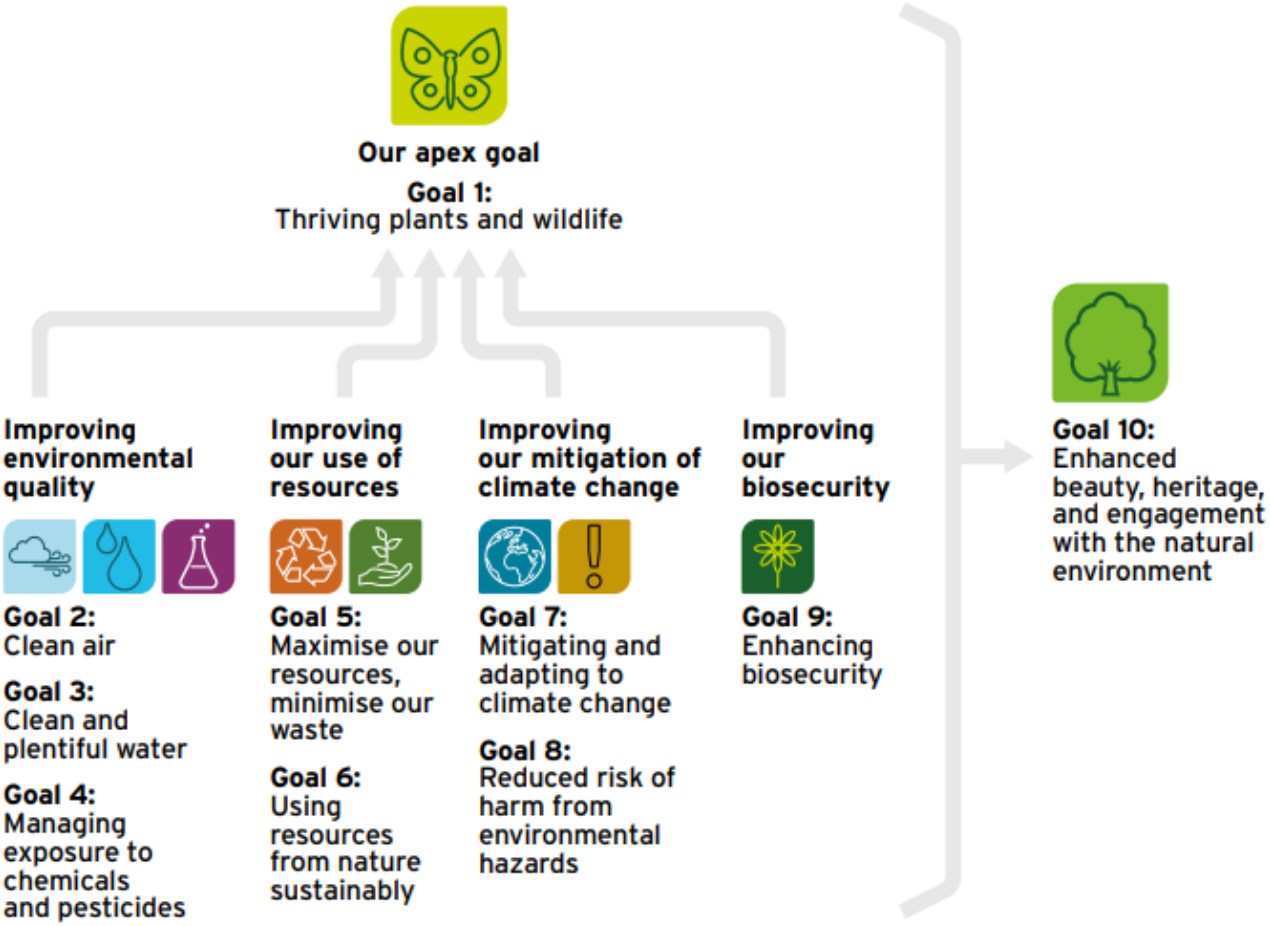


Figure 3-1: the 10 Environmental Improvement Plan goals

Under Goal 3 - Clean and plentiful water, there are eight sets of targets and commitments relating to different aspects of the water environment:

- "Reduce nitrogen, phosphorus, and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline, with an interim target of 10% by 31 January 2028, and 15% in catchment containing protected sites in unfavourable condition due to nutrient pollution by 2028.
- Reduce phosphorus loadings from treated wastewater by 50% by 2028 and 80% by 2038 against a 2020 baseline.
- Halve the length of rivers polluted by harmful metals from abandoned mines by 2038, against a baseline of around 1,500km (approximately 930 miles)...
- Reduce the use of public water supply in England per head of population by 20% from the 2019-20 baseline, 2038, with interim targets of 9% by 2027 and 14% by 2032, and to reduce leakage by 20% 2027 and 30% by 2032.
- Restore 75% of our water bodies to good ecological status.
- Require water companies to have eliminated all adverse ecological impact from sewage discharges at all sensitive sites by 2035, and at all overflows by 2050.
- Target a level of resilience to drought so that emergency measures are needed only once in 500-years."

To deliver these goals, the EIP outlines action across these areas:

- Improving wastewater infrastructure and water company environmental performance.
- Reducing pressures on the water environment from agriculture.
- Enabling the sustainable use of water for people, business and the environment
- Tackling pressures from chemicals and pollutants.
- Restoring natural function and iconic water landscapes.
- Joined-up management of the water system.

Progress towards delivering the EIP will be monitored annually.

3.7.3 Defra Plan for Water

Defra's Plan for Water (Department for Environment, Food & Rural Affairs, 2023) provides further detail on the actions towards achieving Goal 3 of the EIP23. It promotes an integrated approach to water management as the foundation of the plan. Whilst many of the actions contained within the Plan for Water are outside of the responsibilities of areas of influence of the LPAs, the following summarises those actions that LPAs should have regard to:

- Require standardised sustainable drainage systems (SuDS) in new housing developments in 2024, subject to final decisions on scope, threshold, and process following consultation in 2023.
- Designate all chalk catchments as water stressed and high priority under the sewer overflows reduction plan, driving action to improve water management.
- The plan reflects the predicted 4 billion litre per day (4,000 ml/d) gap between supply and demand across England and contains measures to both boost supply and reduce demand. Of interest to LPAs is the plan to reduce demand which will address half of the gap.

- A key component in reducing demand for water is improving water efficiency and there is a target under the Environment Act to reduce the use of public water supply in England per head of population by 20% by 2038.A road map on water efficiency in new developments and retrofits has been developed with ten actions to improve water efficiency:
    - **Action 1-** Implement schedule 3 to the Flood and Water Management Act 2010. The 2024 consultation will consider rainwater harvesting in developing the statutory SuDS National Technical Standards.
    - **Action 2-** Review the Water Supply (Water Fittings) Regulations 1999, the Water Supply (Water Quality) Regulations 2016 and/or any other relevant legislation to address wasteful product issues with toilets and enable new water efficient technologies.
    - **Action 3-** Develop clear guidance on 'water positive' or 'net zero water' developments and roles for developers and water companies.
    - **Action 4-** Review water efficiency options in planning, building regulations and through voluntary schemes for non-household buildings.
    - **Action 5-** Work with Ofwat to ensure the water industry can play a central role in retrofitting water efficient products in households, businesses, charities and the public sector.
    - **Action 6-** Work across government to integrate water efficiency into energy efficiency advice and retrofit programmes.
    - **Action 7-** Review the Building Regulations 2010, and the water efficiency, water reuse and drainage standards including considering a new standard for new homes in England of 105l/p/d and 100 l/p/d where there is a clear local need.
    - **Action 8-** Mandatory water efficiency labelling scheme.
    - **Action 9-** Investigate dual pipe systems (rainwater harvesting) and water reuse options for new housing development as part of the review of the planning framework.
    - **Action 10-** Enable innovative water efficiency approaches in buildings, including technologies and approaches to funding and maintenance.

3.7.4 Biodiversity Net Gain

Biodiversity net gain (BNG) is designed to contribute to the recovery of nature while developing land. The principle is that the natural environment is in measurably better state after development than it was before. The Environment Act 2021 requires all planning permissions granted in England (except for small sites) to achieve 10% BNG since January 2024. This will be required on small sites from April 2024.

Defra publishes a biodiversity metric tool, the latest version of which must be used for calculating the BNG deriving from a proposed development.

3.7.5 Local Nature Recovery Strategy

The Environment Act (HM Government, 2021) also established a duty to prepare, by March 2025, Local Nature Recovery Strategies (LNRS), recognising that England is one of the most

nature-depleted countries in the world. The West Midlands Combined Authority are the authority responsible for preparing the LNRS for the West Midlands. They are tasked with working with local partners to agree priorities for nature recover and identify "practical, achievable proposals" (Department for Environment Food & Rural Affairs, 2023) to address these priorities. The LNRS should also co-ordinate with neighbouring strategies to form a national Nature Recovery Network.

There is a close linkage with BNG, as developments proposing to create, enhance or recover habitat in locations mapped by the LNRS receive a higher value in the biodiversity metric calculator than in other locations.

3.7.6 Storm Overflow Reduction Plan

The Environment Act placed a legal duty on water companies to progressively reduce the adverse impacts of discharges from storm overflows. The storm overflow reduction plan (Department for Environment, Food & Rural Affairs, 2023) sets the following targets:

- By 2035, water companies will have: improved all overflows discharging into or near every designated bating water; and improved 75% of overflows discharging to high priority sites.
- By 2050, no storm overflows will be permitted to operate outside of unusually heavy rainfall or to cause any adverse ecological harm.

There is also an expectation that water companies ensure their infrastructure keeps pace with increasing external pressures, such as urban growth and climate change, without these pressures leading to greater numbers of discharges.

3.7.7 The Water Framework Directive (WFD) and Water Environment Regulations

Introduction

The European Union Water Framework Directive (WFD) 2000 is currently transposed into English and Welsh law by the Water Environment Regulations (HM Government, 2017). They apply to all waterbodies (watercourses, canals, lakes, estuaries and coastal waters), with the objective of meeting Good Ecological Status (GES) or, where heavily modified, Good Ecological Potential (GEP) To meet GES or GEP, a water body must achieve a good or high score for all elements - in the case of surface water, these are biological, physico-chemical, specific pollutants and hydromorphology (Figure 3-2). UK policy remains to meet GES or GEP for all waterbodies by 2027.

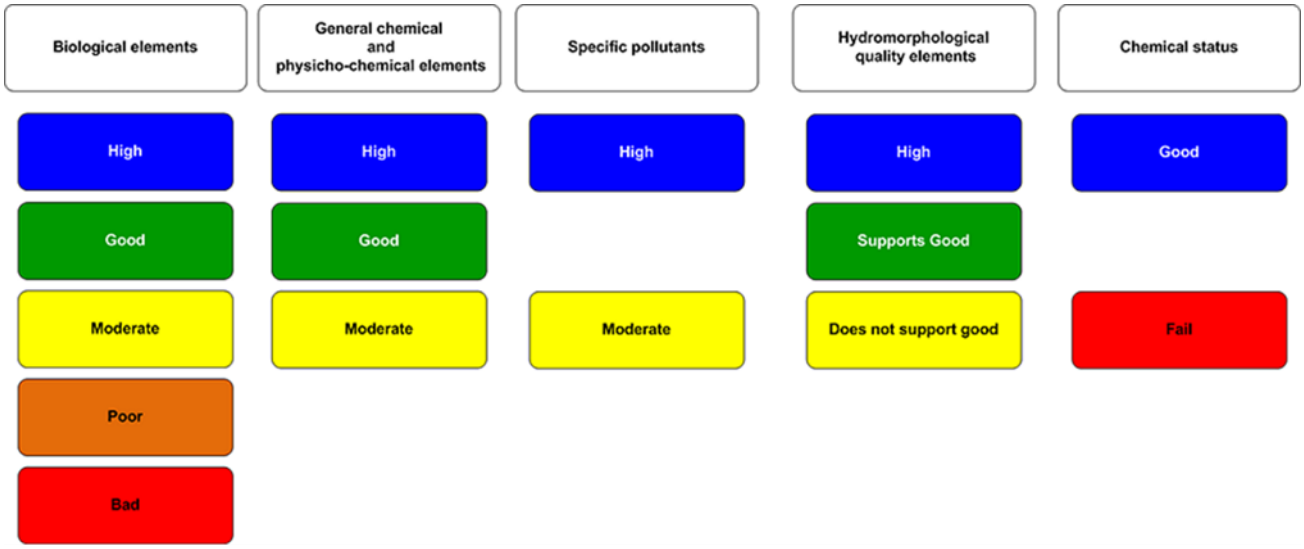


Figure 3-2: Status classification for surface water (Environment Agency, 2023a)

Chemical Status is separately assessed. The Water Framework Directive and the EA recognise a group of ubiquitous chemicals which are persistent, bioaccumulative or toxic (uPBT), and without which over 90% of England's waterbodies would achieve Good Chemical Status. Mercury, PFOS and PBDE are the most ubiquitous causes of failures. Due to the persistent nature of these chemicals, the date for getting all waterbodies to Good Chemical Status is set for 2063.

River Basin Management Plans

River Basin Management Plans (RBMP) are required under the WFD and document the baseline classification of each waterbody in the plan area, the objectives, and a programme of measures to achieve those objectives. Sandwell falls within the Humber RBMP and Severn RBMP. The third cycle RBMPs were published in 2022. A primary WFD objective is to ensure 'no deterioration' in environmental status, therefore all water bodies must meet the class limits for their status class as declared in the Anglian and Thames River Basin Management Plan. Another equally important objective requires all water bodies to achieve good ecological status. Future development needs to be planned carefully so that it helps towards achieving the WFD and does not result in further pressure on the water environment and compromise WFD objectives. The WFD objectives as outlined in the updated RBMPs are summarised below:

- Preventing deterioration of the status of surface waters and groundwater.
- Achieving objectives and standards for protected areas.
- Aiming to achieve good status for all water bodies.
- Reversing any significant and sustained upward trends in pollutant concentrations in groundwater.
- Cessation of discharges, emissions and losses of priority hazardous substances into surface waters.
- Progressively reducing the pollution of groundwater and preventing or limiting the entry of pollutants.

- Local Planning Authorities (LPAs) must have regard to the Water Framework Directive as implemented in the RBMPs. It is of primary importance when assessing the impact of additional wastewater flows on local river quality.
- Alongside the RBMP documents, the data behind them can be explored further using the Catchment Data Explorer (Environment Agency, 2023a) and map viewer (Environment Agency, 2023b).

Protected Area Objectives

The Water Environment Regulations specify that areas requiring special protection under other EC Directives, and waters used for the abstraction of drinking water, are identified as protected areas. These areas have their own objectives and standards.

Some areas may require special protection under more than one piece of EU-derived legislation or may have additional (surface water and/or groundwater) objectives. In these cases, all the objectives and standards must be met.

The types of protected areas are:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish);
- bodies of water designated as recreational waters, including Bathing Waters;
- nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Regulations; and
- areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites.

3.7.8 Conservation of Habitats Regulations 2017 (as ammended)

The Conservation of Habitats and Species Regulations 2010 (commonly referred to as the Habitats Regulations) consolidated the Conservation (Natural Habitats, &c.) Regulations 1994, and transposed the EU Habitats Directive in England and Wales which was aimed at protecting plants, animals and habitats that make up the natural environment. The regulations were further amended in 2017.

The Habitats Regulations define the requirement for a Habitats Regulations Assessment (HRA) to be carried out. The purpose of this is to determine if a plan or project may affect the protected features of a “habitats site”. These include:

- A Special Area of Conservation (SAC) or candidate SAC.
- A Site of Community Importance (SCI).
- A site hosting a priority natural habitat type or priority species protected in accordance with Article 5(4) of the Habitats Directive.
- A Special Protection Area (SPA) or potential SPA.

- Ramsar sites.

All plans and projects (including planning applications) which are not directly connected with, or necessary for the conservation management of a habitat site require consideration of whether the plan or project is likely to have significant effects on that site.

This is referred to as the “Habitats Regulations Assessment screening” and should take into account the potential effects of both the plan/project itself and in combination with other plans or projects.

Part 6 of the conservation of Habitats and Species Regulations 2017 states that where the potential for likely significant effects cannot be excluded, a competent authority must make an appropriate assessment of the implications of the plan or project for that site, in view of the site’s conservation objectives.

The competent authority may agree to the plan or project only after having ruled out adverse effects on the integrity of the habitats site.

If adverse effects cannot be ruled out, and where there are no alternative solutions, the plan or project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensatory measures can be secured.

The “People over Wind” ECJ ruling (C-323/17) clarifies that when making screening decisions for the purposes of deciding whether an appropriate assessment is required, competent authorities cannot take into account any mitigation measures. This must be part of the appropriate assessment itself.

The implementation of the Conservation of Habitats Regulations have had particular significant implications in two areas related to water and planning:

- Nutrient Neutrality. Natural England (NE) has identified a number of catchment areas where Habitats Sites are in unfavourable condition due to eutrophication (an excess of the nutrients phosphorous and/or nitrogen in water). NE have advised that developments in these catchments must demonstrate that they do not cause harm, and that one way to do this is to introduce mitigation measures in the catchment area which offset the additional nutrients emitted as a result of the development, an approach known as nutrient neutrality. There are no nutrient neutrality areas currently designated within Sandwell.
- Water Neutrality. Natural England (NE) has issued a position statement that it cannot be concluded with sufficient certainty that groundwater abstractions in the Arun Valley, West Sussex are causing no adverse effect on Habitats Sites. NE have advised that developments in Sussex North Water Resource Zone must demonstrate that they do not cause harm, and that one way to do this is to introduce mitigation measures in the zone which offset the additional water consumed as a result of the development, an approach known as water neutrality. There are no parts of the study area which are currently within a water neutrality zone, however NE may designate additional areas in the future.

Both nutrient and water neutrality designations have resulted in significant impacts on the granting of planning permission in the designated areas.

3.7.9 Wildlife and Countryside Act

Sites of Special Scientific Interest (SSSI) are designated and legally protected under the Wildlife and Countryside Act 1981, Section 28G places a duty to take reasonable steps, consistent with the proper exercise of the authority's functions, to "further to the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest." (HM Government, 1981).

The Government's 25-year Environment Plan has a target of "restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term." In line with this, and the Wildlife and Countryside Act 1981, Local Authorities should look put forward options that contribute to conservation or restoration of favourable condition, and at the very least must not introduce policies that hinder the restoration of favourable condition by increasing existing issues.

A site is said to be in "favourable condition" when the designated feature(s) within a unit are being adequately conserved and the results from monitoring demonstrate that the feature(s) in the unit are meeting all the mandatory site-specific monitoring targets set out in the favourable condition targets (FCT).

3.7.10 Ramsar

The Convention on Wetlands of International Importance, more commonly known as the Ramsar convention, aims to protect important wetland sites. Member counties commit to:

- Wise use of all their wetlands.
- Designating sites for the Ramsar list of "Wetlands of International Importance" (Ramsar Sites) and their conservation.
- Cooperating on transboundary wetlands and other shared interests.
- "Wise use" of wetlands is defined under the convention as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". (Ramsar Convention Secretariat, 2010)
- In the UK, Ramsar Sites are designated by the Joint Nature Conservation Committee (JNCC).

In general, the designation of UK Ramsar sites is underpinned through prior notification of these areas as Sites of Special Scientific Interest (SSSIs). Additionally, the NPPF states that Ramsar sites should be given the same protection in the planning process as sites designated under the EU Habitats Directive.

3.7.11 Bathing Water Regulations

The Bathing Water Directive was first published in 2006 and are currently transposed into English and Welsh law through the Bathing Water Regulations 2013. The aims of the directive are the protection of public health whilst bathing, standardisation of publicly available water quality information and to improve management practices at bathing waters.

The UK has over 600 designated bathing waters defined as areas of inshore waters designated for public swimming, these areas are typically characterised by large numbers of

swimmers and visitors per year. The Environment Agency are required to monitor water quality at these sites regularly (usually weekly) throughout the Bathing Water season, between 15th May and 30th September.

Water quality standards are based on the incidence of potentially harmful bacteria, E. coli and intestinal enterococci and are categorised as ‘excellent’, ‘good’, ‘sufficient’ or ‘poor’ on the basis of bacteria levels. Sites are rated annually and on a short-term basis in response to any temporary pollution incidents.

Achieving compliance with the Bathing Water Directive has driven some £2.5bn of investment by UK water companies since the early 1990s to reduce the impact of sewerage systems and treated wastewater discharges. Measures have included storage and surface water management to reduce storm overflow spills, moving or extending effluent outfalls and improving wastewater treatment, including ultra-violet (UV) treatment of final effluent.

In contrast to some other European nations, the UK has not previously designated stretches of river as bathing waters, however five new inland bathing waters have been designated since 2021, and across England there are numerous campaigns by NGOs and members of the public to designate other stretches of river. Defra has published guidance on applying for bathing water status, including a requirement for at least 100 bathers per day during the season (Department for the Environment, Food and Rural Affairs, 2023).

3.7.12 Environmental Permitting Regulations

Environmental permitting is a process used to manage and regulate activities which may cause harm to the environment. The Environmental Permitting Regulations (HM Government, 2016) were introduced in order to streamline a wide-ranging number of environmental permitting laws under one set of regulations. These include permits for emissions to air, water and land, and cover a range of industrial sectors and waste management streams.

Of particular relevance to this study are the regulations for permitting sewage effluent discharges to surface waters and groundwaters, known as water discharge activities (Environment Agency, 2022).

- The regulations are used to permit discharges from water company and private wastewater treatment works, and for sewer overflows.

- The Environment Agency will usually object to applications for a new private Package Treatment Plan (PTP) or septic tank where it is feasible to connect the development to a public sewerage system. A general rule of 30m per dwelling is used to define a reasonable distance from the site boundary to a public sewer. Hence a development of 10 homes should connect to a public sewer within 300m of the boundary, unless there are significant barriers, such as a river or motorway.

- Where an existing or new development treats its own wastewater, a PTP must be installed if the discharge is directly to surface water. Where the discharge is to ground, a

PTP or septic tank may be used, but must be connected to a suitably designed drainage field.

3.7.13 Groundwater protection

Under the regulations, the EA have published a set of position statements on protecting groundwater from various activities (Environment Agency, 2018). The position statements that are relevant to this study with regard to discharges to groundwaters, include surface water drainage and the use of SuDS, discharges from contaminated surfaces (e.g., lorry parks) and from treated sewage effluent.

The EA also maintain a set of maps of Source Protection Zones (SPZs) to help identify high risk areas within which pollution prevention measures should be implemented. The SPZs show the risk of contamination to public water supplies from activities that may cause pollution in the area, the closer the activity, the greater the risk:

- **Zone 1 (Inner protection zone)** This zone is designed to protect against the transmission of toxic chemicals and water-borne disease. It indicates the area in which pollution can travel to the borehole within 50 days from any point within the zone and applies at and below the water table. There is also a minimum 50 metre protection radius around the borehole.
- **Zone 2 (Outer protection zone)** This zone indicates the area in which pollution takes up to 400 days to travel to the borehole, or 25% of the total catchment area, whichever area is the largest. This is the minimum length of time the Environment Agency think pollutants need to become diluted or reduce in strength by the time they reach the borehole.
- **Zone 3 (Total catchment)** This is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.
- **Zone of special interest** This is defined on occasions, usually where local conditions mean that industrial sites and other polluters could affect the groundwater source even though they are outside the normal catchment.

3.8 Summary of key new and emerging policy and legislation

The policy and legislation covering the water environment, water and wastewater services and planning is wide and frequently changing. The new and emerging policy and legislation below have been identified as particularly important for consideration in the development of the Local Plan:

- In July 2024 a new Government was formed and committed to reform the planning system. As changes to the planning system emerge, this chapter may need to be updated as part of a Stage 2 study.
- At the time of writing a new draft NPPF was under consultation.
- Schedule 3 of the Flood and Water Management Act is expected to be enacted in England in 2024. This will designate Lead Local Flood Authorities as SuDS Approval

Bodies (SABs) with a duty to adopt new SuDS and removing the automatic right to connect to public sewers.

- Defra have signalled their intention, with the Plan for Water, to review the water efficiency standards for new homes, including consideration of a new national 105l/p/d standard and 100l/p/d where there is a clear local need.
- All development sites are expected to demonstrate at least a 10% net-gain in biodiversity.
- The designation of specific catchments in England as requiring to demonstrate Nutrient Neutrality under the Conservation of Habitats Regulations has led to significant limitations to development in these areas, as well as the development of offsetting schemes to enable nutrient-neutral development.
- Similarly, the availability of water resources, and the impact of new water demand on the environment, has led to restrictions on granting planning permission in Sussex North WRZ and a requirement to demonstrate water-neutral development in Cambridge Water WRZ. It is anticipated that LPAs will be increasingly required to demonstrate that there will be sufficient water resources to supply development without causing further harm to the environment through the life of their Local Plans.

4 Water Resources

4.1 Introduction

4.1.1 Objectives

The aim of the water resources assessment is to ensure that sufficient water is available in the region to serve the proposed level of growth, and that it can be abstracted without a detrimental impact on the environment, both during the plan period and into the future. The report characterises the study area, identifying the key surface water and groundwater bodies, and local geology. It highlights the pressures on water resources in the region, identifies existing constraints on abstraction and provides evidence for adopting tighter water efficiency targets.

4.1.2 Water resources in the UK

It is important to set water resources in Sandwell within the context of the overall national picture.

The Environment Agency (Environment Agency, 2024) have published a summary of the revised draft regional and Water Resources Management Plans which includes their view on the overall state of water resources in the UK and the challenges the country faces. They state that:

"In England, our climate is changing, our population is growing, and as a nation we want an improved environment along with a thriving economy, enabled by resilient water supplied. Action is required now to meet these objectives".

"The scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."

"Demand reductions are crucial, particularly in the short term. The Environment Act 2021 sets a target to reduce the use of public water supply in England, per head of population, by 20% by 2037-38 from the 2019-20 baseline."

"Government will be looking to water companies to act quickly and take significant steps forward on installing smart meters and delivering on their wider water efficiency commitments and reducing leakage. This will happen alongside the introduction of a mandatory water label which will enable water efficient decisions across the country. The government has also committed to review water efficiency requirements of building regulations which will be a key action to ensure new homes are water efficient."

There have been several important documents published in recent years, all highlighting the growing awareness and concern about this issue. The National Water Resources Framework led to the creation of the regional water resources planning groups and defined the objective to achieve an average household water efficiency of 110l/p/d by 2050 (including existing housing).

The Government's Environmental Improvement Plan published in January 2023 contains a roadmap for improving water efficiency in new developments and retrofits. This contains an action to review Building Regulations (2010) and consider a new standard for new homes in England of 105 l/p/d and 100 l/p/d where there is a clear local need, such as in areas of serious water stress. Whilst this is not current policy, it is likely that a tighter standard than the 110 l/p/d will be adopted in Building Regulations early in the Local Plan period.

4.2 Characterisation of the study area

4.2.1 Surface Waters

Figure 4-1 shows the main watercourses within the study area, which are summarised below:

The River Tame is a main river, flowing from south to north through the centre of the study area from its source near Blackheath, joining with another tributary at the northern boundary of Sandwell, near Bescot, before flowing south east through the north east of the study area, eventually joining the River Trent. Other main rivers within the study area include Tipton Brook, a tributary of the River Tame which flows from west to east through Tipton before its confluence with the River Tame to the east of the Black Country New Road. Another tributary of the River Tame flows from south to north from West Bromwich to its confluence with the River Tame near Wednesbury. The River Stour flows from east to west along part of the southern boundary of Sandwell, in the south east of the study area at Cradley Heath.

There is a canal network of roughly 66km in length in Sandwell, the locations of these canals are shown in Figure 4-1. The Birmingham and Wolverhampton Levels of the Birmingham to Wolverhampton canal run horizontally through Sandwell, from Smethwick to Tipton, with branches joining from Rowley Regis and West Bromwich. The Tame Valley Canal is located in the north of the study area, running from the Walsall Canal to Hamstead in the east. The Dudley No.2 canal is in the south west of the study area and runs from Coombs Road in the south to Warrens Hall Nature Reserve in the north. The Walsall canal also runs through the study area, joining with the Birmingham to Wolverhampton canal in the centre of Sandwell and exiting the study area to the north at Wednesbury.

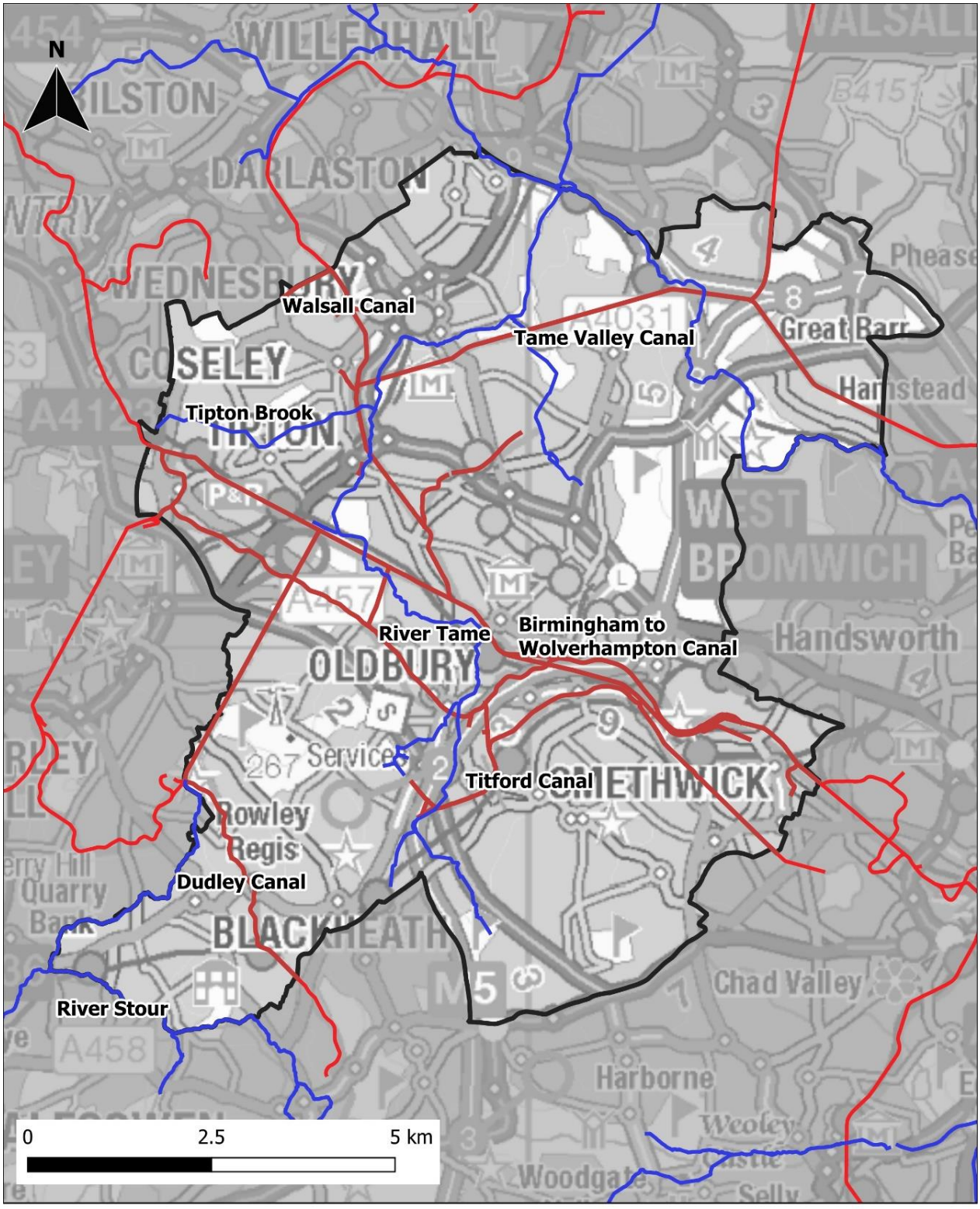


Figure 4-1 Significant watercourses within Sandwell

4.2.2 Groundwaters

A WFD groundwater body represents a distinct body of groundwater flow with a coherent flow unit including recharge and discharge areas with little flow across the boundaries. There are three groundwater bodies within the study area which are shown in Figure 4-2 and their corresponding WFD classification is summarised in Table 4-1 below.

One of the three groundwater bodies within the study area have poor quantitative status, the Tame Anker Mease Coal Measures Black Country. The poor quantitative status of the Tames Anker Mease- PT Sandstone Birmingham Lichfield groundwater bodies has the potential to impact waterbodies within the study area.

Table 4-1 WFD status of groundwater bodies

Groundwater Body	Quantitative Status	Chemical Status	Overall Status - WFD Cycle 2 (2019)
Tame Anker Mease - Coal Measures Black Country	Good	Good	Good
Shropshire Middle Severn - Coal Measures Dudley	Good	Good	Good
Tame Anker Mease - PT Sandstone Birmingham Lichfield	Poor	Poor	Poor

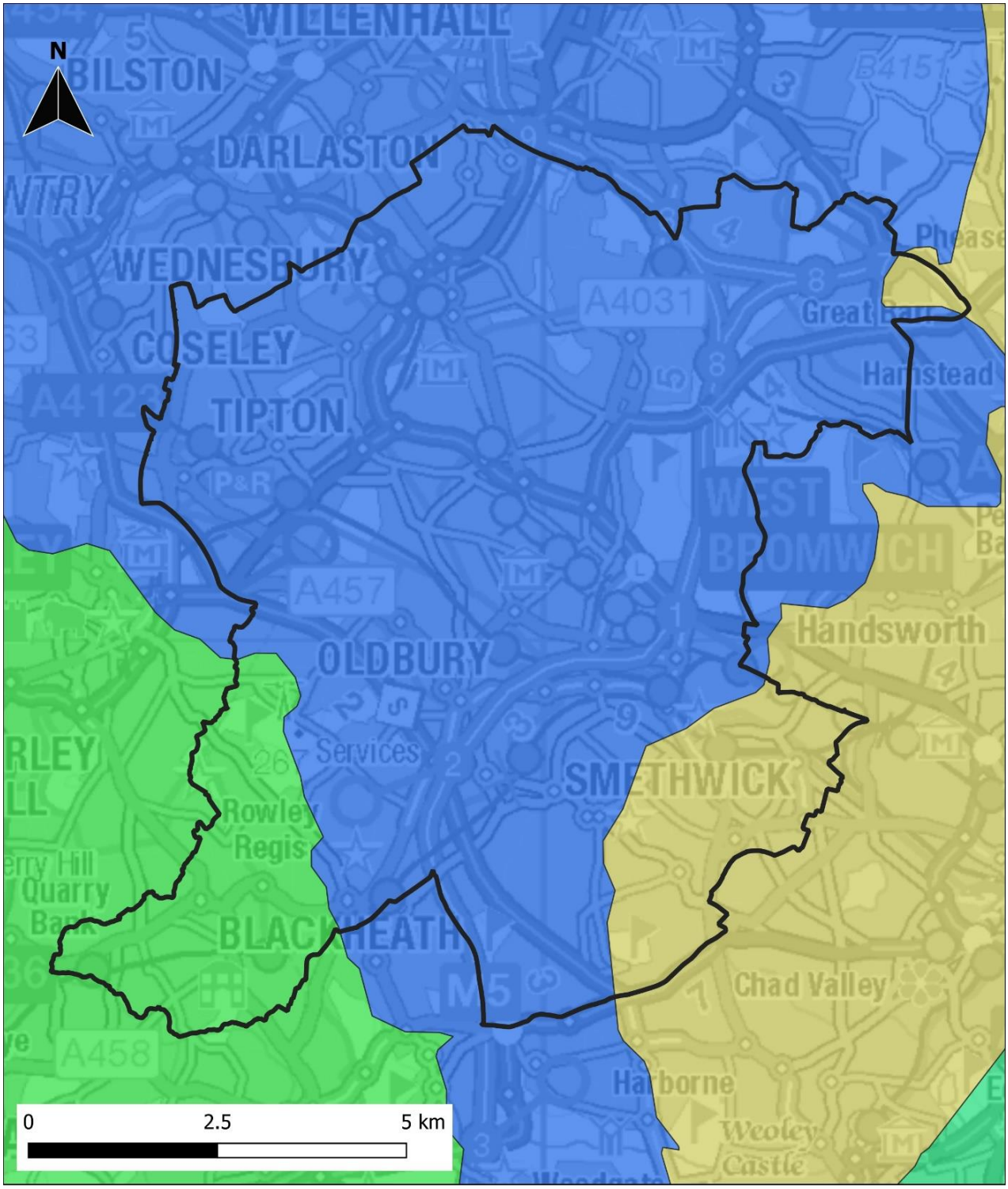


Figure 4-2 Groundwater bodies

4.2.3 Geology

The geology of the catchment can be an important influencing factor in the way that water runs off the ground surface, and also locally on the type of Sustainable Drainage System (SuDS) that is appropriate for development sites. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.

Figure 4-3 shows the bedrock geology of the study area. The geology of Sandwell is varied. It is predominantly divided into Warwickshire Group, Pennine Coal Measures (lower and middle), Triassic Rocks and Wenlock Rocks. The Warwickshire Group (previously named Ardwick Group), covers the largest area of Sandwell. From Blackheath to Tipton in the west and Brandhall to Hamstead in the east, this bedrock is comprised of siltstone and sandstone, with subordinate mudstone. In a small area at the centre of the study area, between Oldbury and West Bromwich, the Warwickshire Group bedrock also contains coal, ironstone and ferricrete. In the north, and a small area in the west of the study area, bedrock is comprised of Pennine Middle and Pennine Lower Measures formations, containing mudstone, siltstone, sandstone, coal, ironstone and ferricrete. This area covers Wednesbury, to the north of West Bromwich and areas in the west of Tipton. In the south east of the study area, around Smethwick and Bearwood bedrock is made up of interbedded sandstone and conglomerate associated with the Triassic Rocks. An unnamed igneous intrusion of Carboniferous to Permian age ages is present in the south west of the study area, from Rowley Village to Oakham. Wenlock Rocks are present in the north east of the study area, around Yew Tree, comprised of mudstone, siltstone and sandstone.

Figure 4-4 shows superficial (at the surface) deposits mostly in the centre and west of the study area. The majority of these superficial deposits are till, covering a large area from Bearwood in the south, to north of Wednesbury, including smaller areas at Hamstead and Blackheath. Alluvium deposits are also present, running from Wood Green in the north of the study area, through Sandwell Country Park in the east. Additionally, in the north of the study area, to the west of Wednesbury deposits of glacial sand and gravel are present.

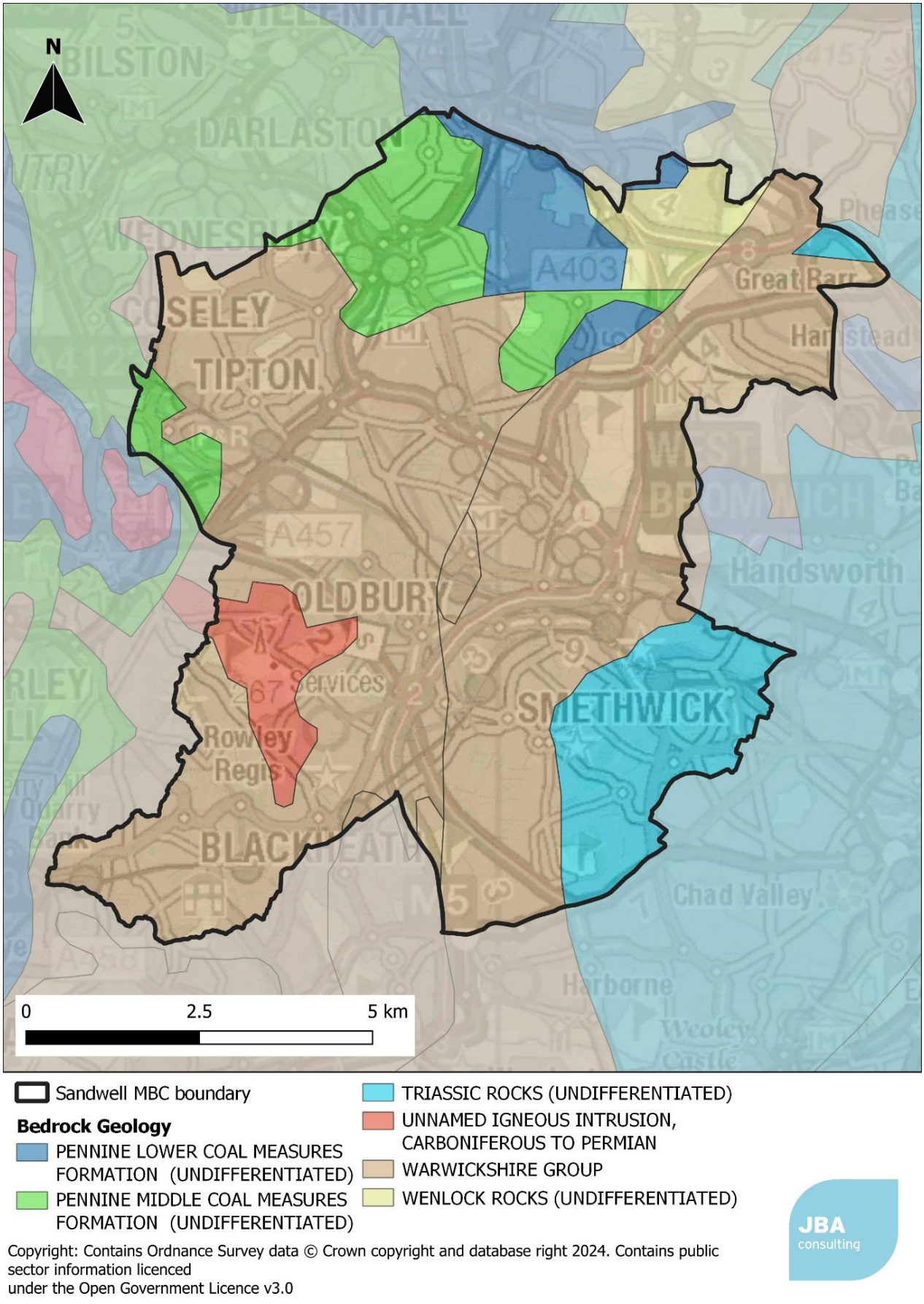


Figure 4-3 Bedrock geology of Sandwell

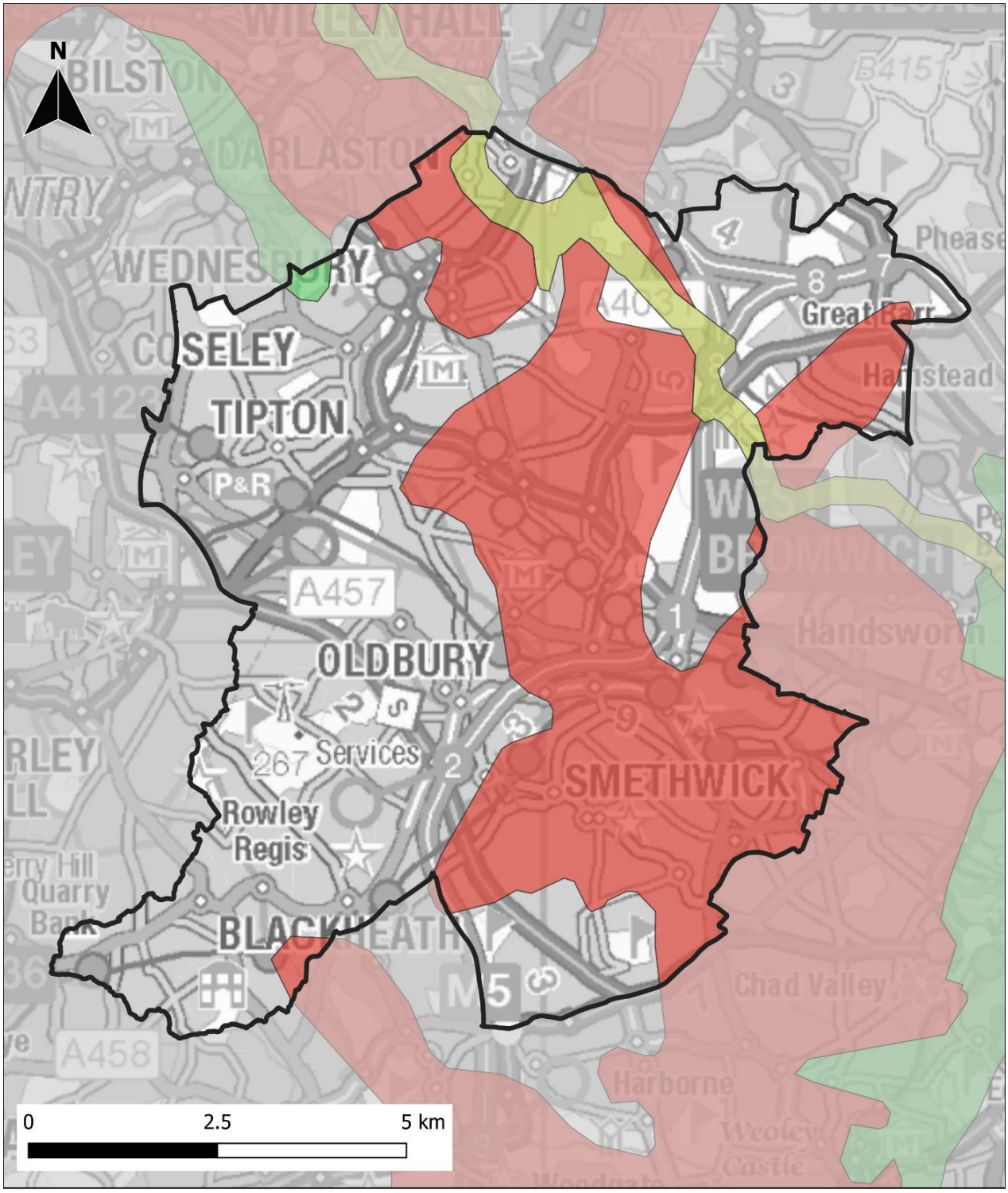


Figure 4-4 Superficial (at surface) geology of Sandwell

4.3 Availability of Water Resources

4.3.1 Abstraction Licensing Strategy

The Environment Agency (EA), working through their Resource Assessment Methodology (which replaces the former Catchment Abstraction Management Strategy (CAMS) process), prepare an Abstraction Licensing Strategy (ALS) for each sub-catchment within a river basin. Sandwell is covered by two ALS areas: Tame Anker and Mease and Worcestershire Middle Severn. These are shown in Figure 4-5 below.

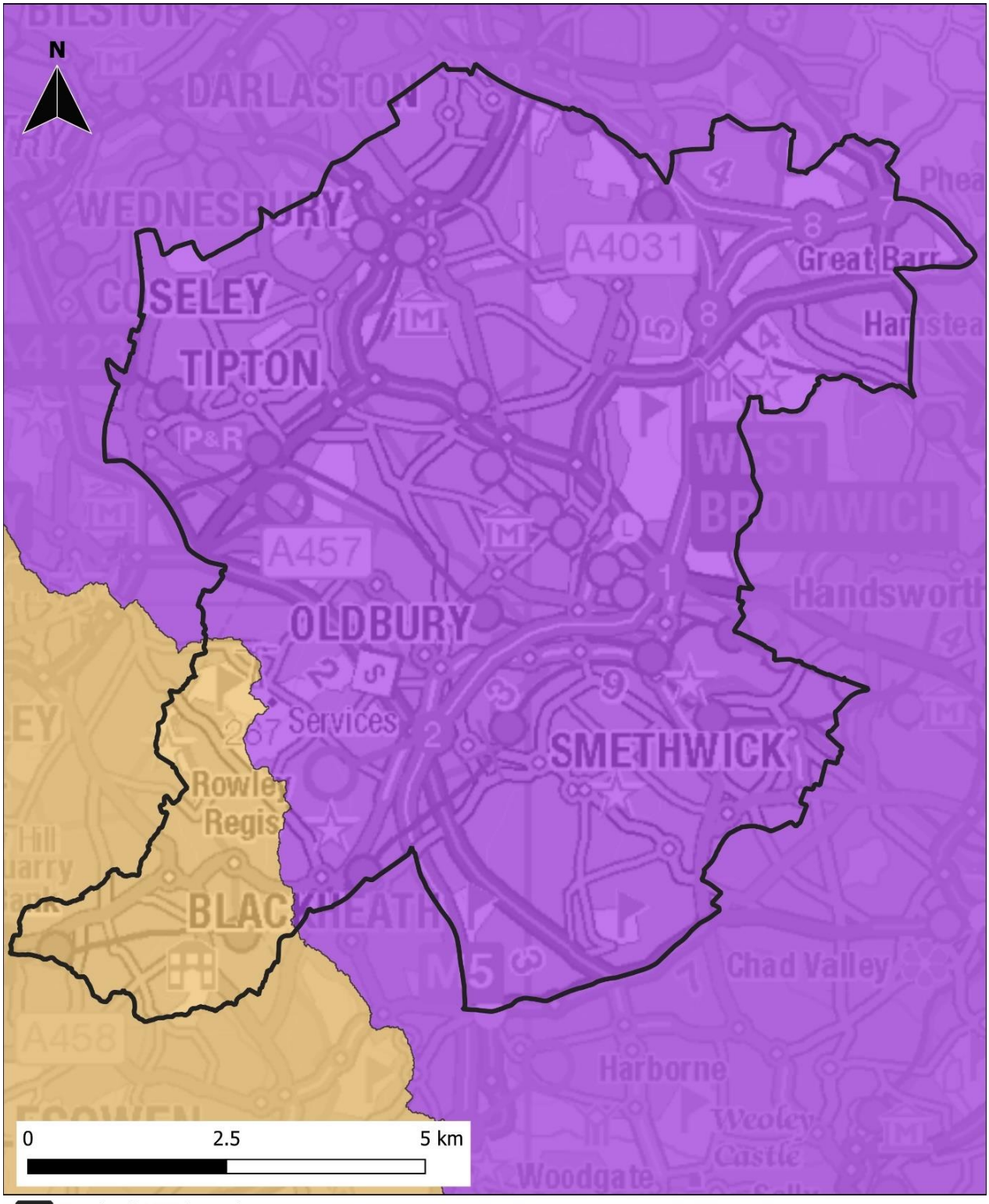


Figure 4-5 ALS (formally CAMS) boundaries covering Sandwell

4.3.2 Resource Availability Assessment

In order to abstract surface water, it is important to understand what water resources are available within a catchment and where abstraction for consumptive purposes may pose a risk to resources or the environment. The Environment Agency has developed a classification system which shows:

- The relative balance between the environmental requirements for water and how much has been licensed for abstraction;
- whether there is more water available for abstraction in the area; and
- areas where abstraction may need to be reduced.

The availability of water for abstraction is determined by the relationship between the fully licensed (all abstraction licences being used to full capacity) and recent actual flows (amount of water abstracted in the last six years) in relation to the Environmental Flow Indicator (EFI). Results are displayed using different water resource availability colours, further explained in Table 4-2. In some cases, water may be scarce at low flows, but available for abstraction at higher flows. Licences can be granted that protect low flows, this usually takes the form of a "Hands-off Flow" (HOF) or Hands-off Level (HOL) condition on a licence, which mean abstractions have to stop when the river flow or level falls below a particular value. This value is known as the HOF or HOL and ensures there is always a minimum flow in the river. Surface Water Flows can be assessed at Assessment Points (APs) which are significant points on the river, often where two main rivers join or at a gauging station.

Groundwater availability as a water resource is assessed similarly, unless better information on principle aquifers is available or if there are local issues that need to be considered.

Table 4-2 Implications of surface water resource availability colours

Water Resource Availability Colour	Implications for Licensing
BLUE- High hydrological regime	There is more water than required to meet the needs of the environment. Due to the need to maintain the near pristine nature of the water body, further abstraction is severely restricted.
GREEN-Water available for licensing	There is more water than required to meet the needs of the environment. Licences can be considered depending on local/downstream impacts.
YELLOW-Restricted water available for licensing	Fully Licensed flows fall below the Environmental Flow Indicator (EFI). If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available via licence trading.

Water Resource Availability Colour	Implications for Licensing
RED- Water not available for licensing	Recent Actual flows are below the Environmental Flow Indicator (EFI). This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status. No further licences will be granted. Water may be available via licence trading.
GREY-HMWBs (and /or discharge rich water bodies)	These water bodies have a modified flow that is influenced by reservoir compensation releases, or they have flows that are augmented. There may be water available for abstraction in discharge rich catchments.

Water resource availability is assessed under four different flow conditions:

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

The resource availability for Tame Anker and Mease and Worcestershire Middle Severn ALSs are summarised below, and for completeness the Water resource ALSs within the study area are presented graphically in Figure 4-6.

4.3.3 Tame Anker and Mease

The Tame Anker and Mease ALS sets out how water is sustainably managed in the Tame, Anker and Mease catchment to both provide water for abstraction and protect the environment. AP1 covers upper reaches of the River Tame in Sandwell, upstream of Bescot Gauging Station. The HOF for AP1 is 85.4 Ml/d at Bescot Gauging Station. At Q30, water is largely available for licensing with the exception of the Hockley Brook catchment located in the south east of Sandwell. At Q50 and Q70, water remains available for abstraction in this CAMS area in Sandwell aside from Hockley Brook. At Q95, water availability for licensing becomes restricted in Sandwell to the south of the Hockley Brook catchment.

4.3.4 Worcestershire Middle Severn

The Worcestershire Middle Severn ALS sets out how water is sustainably managed in the Worcestershire Middle Severn catchment to both provide water for abstraction and protect the environment. AP4, Smestow Brook at Stourton, covers the whole of the Smestow Brook catchment including upper reaches of the Stour located in the south west of Sandwell. At Q30, water is available for licensing in this catchment, however at Q50 and Q70 water availability becomes restricted. At Q95, water becomes unavailable for licensing in this area of Sandwell.

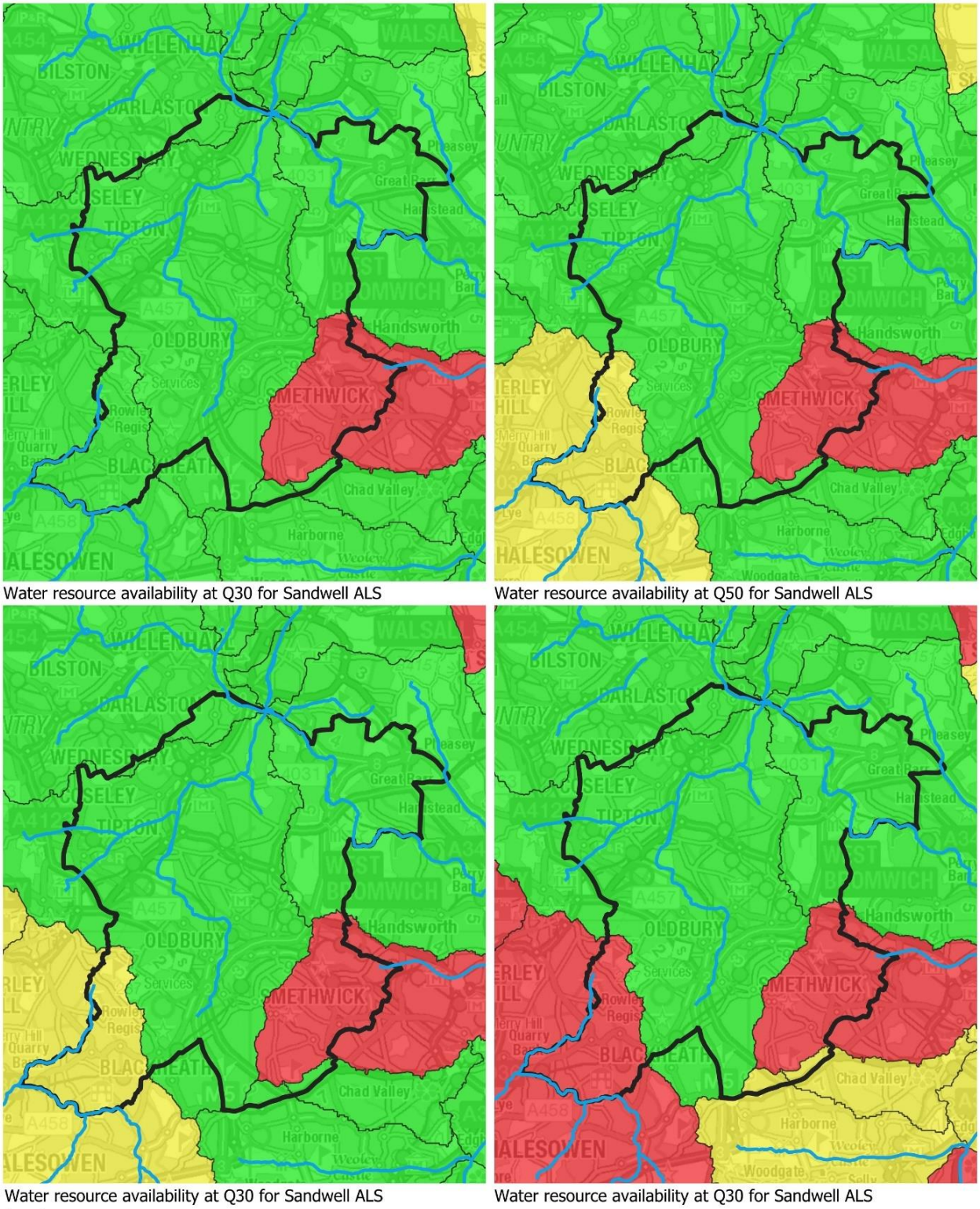


Figure 4-6 Water resource availability for Sandwell

4.4 Water Resource Assessment: Water Resource Management Plans

4.4.1 Introduction

Water Resource Management Plans (WRMPs) are 50-year strategies that water companies are required to prepare, with full updates every five years. WRMPs are required to assess:

- Future demand (due to population and economic growth).
- Future water availability (including the impact of sustainability reductions).
- Demand management and supply-side measures (e.g., water efficiency and leakage reduction, water transfers and new resource development).
- How the company will address changes to abstraction licences.
- How the impacts of climate change will be mitigated.
- Where necessary, they set out the requirements for developing additional water resources to meet growing demand and describe how the balance between water supply and demand will be balanced over the next 50 years.
- Using cost-effective demand management, transfer, trading, and resource development schemes to meet growth in demand from new development and to restore abstraction to sustainable levels.
- In the medium to long term, ensuring that sufficient water continues to be available for growth and that the supply systems are flexible enough to adapt to climate change.

When new development within a Local Planning Authority is being planned, it is important to ensure that there are sufficient water resources in the area to cover the increase in demand without risk of shortages in the future or during periods of high demand, and without causing a negative impact on the waterbodies from which water is abstracted.

The aim of this assessment was to compare the future additional demand as a result of development proposed within the emerging Local Plan, with the demand accounted for by South Staffordshire Water and Severn Trent Water within their Water Resource Management Plans.

This assessment has been undertaken using the revised draft 2024 Water Resource Management Plan (rdWRMP24) data.

Water Resource Zones are defined by the EA as areas in which the management of supply and demand is largely self-contained and where the supply infrastructure is linked such that customers within the zone experience the same risk of supply failure. Within a WRZ a customer may receive their water from anywhere within the zone, and not necessarily from the nearest source. The WRZs covering Sandwell are shown in Figure 4-7.

Sandwell MBC boundary

Water comapnies

South Staffordshire Water

Severn Trent Water

Independent Water Networks Ltd

Figure 4-7 Water supply companies in Sandwell

4.4.2 Methodology

The Water Resources Management Plans for the water companies supplying Sandwell were reviewed. Attention was mainly focussed upon:

- The available water resources and future pressures which may impact upon 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.

The Ministry for Housing, Communities and Local Government (MHCLG), (now Department for Levelling Up Housing and Communities (DLUHC)), 2018-based estimates of household growth up to 2041 has been used to estimate the present-day number of houses in Sandwell in this study.

4.4.3 South Staffordshire Water

South Staffordshire Water (SSW) is responsible for supplying the majority of Sandwell with water (see Figure 4.6). For the purposes of water resources planning, the SSW supply area operates as a single Water Resource Zone (WRZ). The SSW WRZ covers the majority of the Sandwell MBC area, aside from an area in the north east around Hamstead, small areas to the east of Smethwick and a small area in the north of Princes End in the north west of Sandwell.

The Baseline Supply Demand balance generated as part of the WRMP identifies a supply-demand deficit in the WRZ in the planning period without intervention. In the baseline scenario, the supply demand deficit in the WRZ increases as population increases and as a result of proposed abstraction reductions to protect the environment and meet WFD obligations. Both demand side and supply side options have been assessed in the WRMP to address the forecasted deficit, whilst protecting the environment. Supply side options explored in the revised draft WRMP24 include:

- Surface water enhancements, focussing on Blithfield Reservoir and Chelmarsh Reservoir.
- New surface water options looking at a 40 Ml/d transfer from the River Trent to Blithfield reservoir and development of a treatment works on the River Trent, enabling water to go straight in to supply.
- New water transfers/trades with United Utilities, partly connected to the Severn to Thames transfer.
- Transfers from the Canal and River Trust, including a potential transfer from the Birmingham Canal to Blithfield reservoir and potential capacity at Chasewater.

Demand management proposals assessed to address the forecasted deficit include:

- Plans to install smart metering across the entire customer base, as close as feasibly possible to 100% penetration by 2035 with prioritisation of the highest water usage DMAs first.

- Leakage reduction of 50% by 2050 to be achieved by a combination of activities including DMA active leakage control, distribution mains/comms pipe replacement, advanced pressure optimisation, and proactive trunk mains leakage reduction.
- Reductions to non-household consumption, through fitting of enhanced meter technology to the non-household customer base to achieve The Environment Act targets of 9% reduction from baseline by 2038 and a 15% reduction by 2050.
- Water efficiency plans to reduce PCC including increased meter reading frequency, expansion of innovative trials, installation of flow regulators, home efficiency visits and water labelling.

4.4.4 Severn Trent Water

Severn Trent Water is responsible for supplying areas around the eastern boundary of Sandwell and one area in the north west of Sandwell with water. The Strategic Grid WRZ intersects Sandwell in the Hampstead area, in the northeast and at small locations to the east of Smethwick on the boundary of the Borough. Severn Trent Water's Wolverhampton WRZ intersects Sandwell's boundary at area in the northwest of the Borough, around Princes End. The likely supply demand deficit in Severn Trent's area is likely to be 540 Ml/d by 2050, with the draft WRMP24 outlining the range of challenged impacting supply and demand.

The Strategic grid WRZ is Severn Trent Water's largest WRZ, covering the majority of their customer base and most strategic raw water reservoirs, this WRZ has also been classified as high vulnerability, expecting to see the greatest impact of climate change. Baseline supply demand projections for the Strategic Grid WRZ indicate a deficit of 13 Ml/d by 2030, growing to 133.5 Ml/d by 2050, highlighting the importance of supply and demand actions. The Wolverhampton WRZ has been classified as less vulnerable, with a baseline supply demand surplus projected until 2050, reducing to a deficit of 20 Ml/d by 2085. In this WRZ, Severn Trent Water receive a bulk supply of treated water from SSW.

To address the challenges of climate change, population growth, leakage, and value for customers outlined in the dWRMP24, Severn Trent Water have set out preferred demand side and supply side measures. Key demand side measures from the include:

- Roll out universal metering by 2035 (expected benefit of 52 million litres per day)
- Reduce leakage by 50% by 2045 (expected benefit of 135 million litres per day)
- Deliver the Severn Trent Efficiency Plan by 2050 (expected benefit of 37 million litres per day)

The best value supply options identified in the revised draft WRMP24 for AMP8 (2035-2030) include a transfer from Strategic grid to Nottinghamshire, reservoir and treatment works expansions, and United utilities Vyrnwy release to the River Severn. In AMP9 (2030-2035) options include ending Derwent Valley exports to Yorkshire Water and an internal import to the Mardy WRZ. For AMP10 options include a United Utilities import to Shelton WRZ and for AMP11 options include a new water treatment works, works to increase storage and a new groundwater source. For AMP12 and beyond (2045-2050+), options include expansion at Carsington Reservoir, Derwent Valley storage increase and a range of new/increased storage options and imports.

4.4.5 Population and household growth

Table 4-3 shows the household growth forecasts for the WRZs which serve growth within Sandwell from the MHCLG 2018 forecast, the emerging Local Plan and the 2023 draft WRMPs. It is difficult to make direct comparisons between growth forecasts in Sandwell and the WRZs due to their differing geographies, but in general the growth forecasted by the water companies is slightly higher to that considered in the emerging Local Plan.

Table 4-3 Comparison of household growth forecasts

Forecast	2024	2041	% increase
MHCLG 2018-based forecast – Sandwell	129,512	146,359	11.5
Expected growth in Local Plan period	129,512	150,209	16
dWRMP24 Forecast – South Staffs (Updated Nov 2022)*	614,910	702,800	12.5
dWRMP24 Forecast – Strategic Grid (Updated Nov 2022)*	2,393,440	2,776,680	13.8
dWRMP24 Forecast – Wolverhampton (Updated Nov 2022)*	112,330	127,250	11.7

* These figures are based on the Water Resources Market Information tables published as part of draft WRMP24 and updated in 2023.

4.4.6 Summary

Sandwell is within the South Staffs, Strategic Grid, and Wolverhampton WRZs. South Staffordshire Water and Severn Trent Water's WRMPs highlight a deficit between supply and demand forecast and defines the actions required to achieve a supply demand balance to prevent the risk of future environmental deterioration.

Although SSW and Severn Trent Water have not relied on new homes being more water-efficient than existing metered homes, the opportunity, through the planning system, to ensure that new homes do meet the higher standard of domestic water usage, at no significant additional cost to the developer, would be in line with general principals of sustainable development, and reducing energy consumed in the treatment and supply of water.

Growth during the Local Plan period is expected to be in the region of 16% between 2022 and 2041. This is higher than the percentage growth forecast in the South Staffs, Strategic grid and Wolverhampton WRZs. In those WRZs where the water company forecast is lower than the Local Plan review, assurance should be sought from the company that the Council's growth forecast can be accommodated. This is based on data published as part of the draft WRMP24s, updated in 2023.

4.5 Water Environment National Environment Programme Measures

The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. Actions may include investigations or actual measures, examples could be reductions in abstraction in a particular river to maintain flow to support WFD objectives, or a reduction in phosphate pollution in a catchment through upgrades to a WwTW.

Table 4-4 shows WINEP actions relating to water resources in surface and groundwater waterbodies in Sandwell. Actions relating to water quality are presented in section 8.6 (Water Quality).

Development and population growth can increase abstraction, and so Sandwell MBC have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development.

Table 4-4 Flow related WINEP actions on waterbodies in Sandwell

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes	Completion date
River Tame-confluence of two arms to the River Rea	WMD00171 WMD00174 WMD00177	7ST300401 7ST300422 7ST300468	Burbury Park (PWS_35) Crescent Hockley Birmingham Newton Place, Handsworth	Investigation and Options Appraisal. Outcome of recovering salmon river.	31/03/2025
Hockley Brook catchment (trib of Rea)	WMD00170 WMD00173 WMD00176	7ST300400 7ST300421 7ST300467	Burbury Park (PWS_35) Crescent Hockley Birmingham Newton Place, Handsworth	Investigation and Options Appraisal. Outcome of recovering salmon river.	31/03/2025
Stour - source to conf with Smestow Bk	WMD00317 WMD00421 WMD00312 WMD00133	7ST100328 7ST100577 7ST300491 7SS100055	Bellington Pumping Station Norton Boreholes A &B Tack Lane Prestwood Pumping Station	Sustainability Change Investigation and Options Appraisal Sustainability Change Investigation and Options Appraisal	22/12/2024 31/03/2025 22/12/2024 31/03/2022

4.6 Water demand management

4.6.1 Water efficiency

Climate change is predicted to increase pressure on water resources, increasing the potential for a supply-demand deficit in the future, and making environmental damage from over abstraction of water resources more likely. Furthermore, the delivery of water and wastewater services and the heating of water in the home require high energy inputs, and therefore contribute directly to emissions of greenhouse gases. Water efficiency therefore reduces energy use and carbon emissions.

It is important therefore that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new development's water demand by improving efficiency in existing buildings.

It is for Local Authorities to establish a clear need to adopt the tighter water efficiency target through the building regulations. This should be based on:

- Existing sources of evidence such as:
  - The Environment Agency classification of water stress;
  - Water resource management plans produced by water companies;
  - River Basin Management Plans which describe the river basin district and the pressure that the water environment faces. These include information on where water resources are contributing to a water body being classified as ‘at risk’ or ‘probably at risk’ of failing to achieve good ecological status, due to low flows or reduced water availability;
  - Defra Plan for Water
- consultations with the local water and sewerage company, the Environment Agency and catchment partnerships; and
- consideration of the impact on viability and housing supply of such a requirement

This evidence is laid out below.

4.6.2 Water Stress

Water stress is a measure of the level of demand for water (from domestic, business and agricultural users) compared to the available freshwater resources, whether surface or groundwater. Water stress causes deterioration of the water environment in both the quality and quantity of water, and consequently restricts the ability of a waterbody to achieve a “Good” status under the Water Framework Directive.

The Environment Agency has undertaken an assessment of water stress across the UK. This defines a water stressed area as where:

- “The current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand; or
- The future household demand for water is likely to be a high proportion of the effective rainfall available to meet that demand.

In the Environment Agency assessment[3] the South Staffordshire Water and Severn Trent Water (excluding Cheshire) supply regions were classified as being an area of serious water stress.

4.6.3 River Basin Management Plans

The study area is located within both the Severn and Humber River Basin Districts. The management recommendations from both RBMP's are listed below:

- **Government and agencies (Environment Agency)** grant licences under the Water Resources Act 1991 to regulate how much water is taken from rivers, lakes estuaries and groundwater. The Environment Agency reviews the sustainability of time-limited abstraction licences as they expire, and the licence holders seek replacement licences.
- **All sectors** take up or encourage water efficiency measures, including water industry work on metering, leakage, audits, providing water efficient products, promoting water efficiency and education.
- **Local Government** sets out local plan policies requiring new homes to meet the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010.
- **Industry manufacturing and other business** implement tighter levels of water efficiency, as proposed by changes to the Building Regulations.
- **Agriculture and rural land management** manage demand for water and use water more efficiently to have a sustainable water supply for the future.
- **Local government** commissions water cycle studies to inform spatial planning decisions around local water resources.

The RBMP goes on to state that "dealing with unsustainable abstraction and implementing water efficiency measures is essential to prepare and be able to adapt to climate change and increased water demand in the future."

4.6.4 Defra Plan for Water

Through their Plan for Water[4] Defra has signalled their intention to review the water efficiency standards for new homes, including consideration of a new national 105l/p/d standard and 100l/p/d where there is a clear local need.

The Future Homes Hub was established to "facilitate the collaboration needed within and beyond the new homes sector to help meet the climate and environmental challenges ahead"

3 Water Stressed Areas - Final Classification, Environment Agency and Natural Resources Wales (2021). Accessed online at: https://www.gov.uk/government/publications/water-stressed-areas-2021-classification on: 08/02/2023.

4 Defra (2023) Plan for Water. Accessed online at: https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water on 30/11/2023

(Future Homes Hub, 2024). It consists of representatives from the building industry, regulators, water companies, and environmental groups. Defra asked them to support them in the creation of the roadmap towards greater water efficiency. They have proposed a road map for water efficient homes in England and sets out a framework for the homebuilding sector to work in partnership with other stakeholders such as the water sector, local authorities and regulators to deliver it. The proposed roadmap is shown in Figure 4-8 below and outlines a staged approach to reducing per capita consumption. It also allows for a tighter figure of 90l/p/d by 2025 in seriously water stressed areas to enable sustainable growth.

Figure 4-8 Future Homes Hub proposed water efficiency roadmap

4.6.5 National Water Resources Framework

A new National Framework for Water Resources was published by the Government in March 2020[5]. This outlines the water resources challenges facing England and sets out the strategic direction for the work being carried out by regional water resource groups.

A range of options were explored, and the most ambitious scenarios rely on policy change to introduce mandatory labelling of water using fittings and associated standards. The Government is currently reviewing policy on water efficiency following a recent consultation. The framework proposes that regional groups plan to help customers reduce their water use to around 110 l/p/d. This is achievable without policy interventions.

This aligns with the tighter standard of 110 l/p/d per day as described in building regulations. However, in order to achieve an average of 110 l/p/d across the UK, including existing housing, a water efficiency target for new build housing of 110 l/p/d or higher would make this harder to achieve. New build housing should therefore be lower than 110 l/p/d.

4.6.6 Water company advice

- Severn Trent Water offers discounts on infrastructure charges where there is evidence that developments are designed to a standard of 100 l/p/d or less. Additionally, they ran a Water Efficiency trial Scheme for 4 months in 2021 including an incentive payment to retailers for reducing water demand and a customer incentive for reducing water demand at specific times and dates.
- South Staffordshire Water offers financial incentives relating to water efficiency, available where water consumption is below 100 l/p/d.

4.6.7 Impact on viability

As outlined in Section 4.7.2, the cost of installing water-efficient fittings to target a per capita consumption of 110l/d has been estimated as a one-off cost of £9 for a four-bedroom house. Engagement with developers and information from Defra that emerged as part of the Sussex North Water Neutrality Strategy[6] indicated that a target of 100l/p/d could be achieved with "minimal additional cost". Research undertaken for the devolved Scottish and Welsh governments indicated potential annual savings on water and energy bills for householders of £24-£64 per year as a result of such water efficiency measures. Water efficiency is therefore not only viable but of positive economic benefit to both private homeowners and tenants. In addition, financial incentives are available from the water companies to developers to encourage water-efficient design.

5 National Water Resources Framework, Environment Agency (2020). Accessed online at: https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources
on: 08/02/2023.

6 Sussex North Water Neutrality Study: Part C - Mitigation Strategy, JBA Consulting, 2022. Accessed online at: https://crawley.gov.uk/planning/planning-applications/you-apply/water-neutrality-crawley on: 12/12/2023

Research published by BRE[7] on the delivery of sustainable buildings reports that the cost of achieving lover BREEAM ratings incurs little or no additional cost and targeting higher BREEAM ratings incurs a typical cost of less than 2% above the baseline. The same study reports that the cost of achieving 3 credits in WAT01 (a 40% reduction in water consumption for baseline) would be £13,361 and payback could be achieved between 1 and 2.5 years depending on the price of water.

4.6.8 Summary

There is sufficient evidence to recommend the optional 110 litres per person per day design standard allowed under Building Regulations. This should be supported by an equivalent non-household water efficiency target. The BREEAM New Construction Standard can be used for this, and it is recommended that non-household development achieves a minimum of 3 credits under the measure "Wat01" which provides a 40% improvement in water consumption compared to the baseline for that type of building. Currently this approach is not adequately supported in building regulations and the NPPF and policies requiring water efficiency standards less than 100l/p/d may only be supported at Local Plan inspection in exceptional circumstances.

Given the evidence of pressures on the environment, and on public water supply, it is recommended that the Council considers a domestic water efficiency target of 100l/p/d for all new homes, in line with proposals in the Defra Plan for Water and works with the water suppliers to incentivise even lower consumption.

4.7 Water demand reduction

4.7.1 Water neutrality concept

Water neutrality is a relatively new concept for managing water resources, but one that is receiving increased interest as deficits in future water supply/demand are identified. The definition adopted by the Government and the Environment Agency[8] is:

"For every development, total water use in the wider area after the development must be equal to or less than total water use in the wider area before development".

It is useful to also refer to the refined definition developed by Ashton:

"For every new significant development, the predicted increase in total water demand in the region due to the development should be offset by reducing demand in the existing

7 Delivering Sustainable Buildings: Savings and Payback, BRE, 2018. Accessed online at: https://files.bregroup.com/breeam/briefingpapers/Delivering-Sustainable-Buildings-Savings-and-Payback-Office-Case-Study-BREEAM-NC-2018_BREEAM_BRE_115359_BriefingPaper.pdf on: 12/12/2023

8 Water Neutrality: An improved and expanded water resources management definition (SC080033/SR1), Environment Agency, 2009. Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291675/scho1009bqzr-e-e.pdf on: 08/02/2023.

community, where practical to do so, and these water savings must be sustained over time" (V Ashton, 2014)[9]

This definition states the need to sustain water saving measures over time, and the wording "predicted increase in total water demand" reflects the need for water neutrality to be designed in at the planning stage.

Both definitions refer to water use in the region or "wider area", and the extent of this area should be appropriate to local authority boundaries, water resource zones, or water abstraction boundaries depending on what is appropriate for that particular location. For instance, if a development site is in an area of water stress relating to a particular abstraction source, offsetting water use in a neighbouring town that is served by a different water source will not help to achieve water neutrality.

In essence water neutrality is about accommodating growth in a region without increasing overall water demand.

Water neutrality can be achieved in a number of ways:

- Reducing leakage from the water supply networks
- Making new developments more water-efficient
- "Offsetting" new demand by retrofitting existing homes with water-efficient devices
- Encouraging existing commercial premises to use less water
- Implementing metering and tariffs to encourage the wise use of water
- Education and awareness-raising amongst individuals

Suggestions for water-efficiency measures are listed in Table 4-5 below. Some of these approaches are currently subject to testing under a water neutrality pilot project being led by Affinity Water.[10]

4.7.2 Consumer water efficiency measures

Many interventions are designed to reduce water use if operated in a particular way, and so rely on the user being aware and engaged with their water use. The educational aspect is therefore important to ensure that home occupiers are aware of their role in improving water efficiency. Table 4-5 shows water efficiency measures that can be made by consumers.

9 Water Resources in the Built Environment, edited by Booth and Charlesworth (2014). Published by Wiley.

10 https://www.affinitywater.co.uk/waterneutrality

Table 4-5 Consumer water efficiency measures

Type of measure	Examples
Education and promotional campaigns	Encourage community establishments (e.g., schools, hospitals) to carry out self-audits on their water use Deliver water conservation message to schools and provide visual material for schools Building awareness with homeowners/tenants
Water-efficient measures for toilets	Cistern displacement devices to reduce volume of water in cistern Retro-fit or replacement dual flush devices Retro-fit interruptible flush devices Replacement low-flush toilets
Water-efficient measures for taps	Tap inserts, such as aerators Low flow restrictors Push taps Infrared taps
Water-efficient measures for showers and baths	Low-flow shower heads Aerated shower heads Low-flow restrictors Shower timers Reduced volume baths (e.g. 60 litres) Bath measures
Rainwater harvesting and water reuse	Large-scale rainwater harvesting Small-scale rainwater harvesting for example with a water butt, or rainwater tank for toilet flushing Grey water recycling
Water-efficient measures addressing outdoor use	Hosepipe flow restrictors Hosepipe siphons Hose guns (trigger hoses) Drip irrigation systems Mulches and composting
Commercial properties	Commercial water audits Rainwater recycling Grey water recycling Optimising processes Provide water efficiency information to all newly metered businesses

Type of measure	Examples
Metering	Promote water companies free meter option Compulsory metering (in water stressed areas) Smart metering (to engage customer with their consumption) Provide interactive websites that allow customers to estimate the savings associated with metering (environmental and financial) Innovative tariffs (seasonal, peak, rising block) Customer supply pipe leakage - supply pope repair and replacement
Other	Household water audits, including DIY or with help of plumber Seek-and-fix internal leaks and/or dripping taps Water efficient white goods, included washing machines and dishwashers Ask customers to spot and report leaks

Source: Adapted from Booth and Charleswell 2014

4.7.3 Rainwater and Greywater Recycling

Rainwater harvesting

Rainwater recycling or rainwater harvesting (RwH) is the capture of water falling on buildings, roads or pathways that would normally be drained via a surface water sewer, infiltrate into the ground or evaporate. In the UK this water cannot currently be used as a drinking water supply as there are strict guidelines on potable water, but it can be used in other systems within domestic or commercial premises.

Systems for collection of rainwater can be simple water butts attached to a drainpipe on a house, or it could be a complex underground storage system, with pumps to supply water for use in toilet flushing and washing machines. By utilising rainwater in this way there is a reduced dependence on mains water supply for a large proportion of the water use in a domestic property.

Benefits of RwH

- RwH reduces the dependence on mains water supply – reducing bills for homeowners and businesses
- Less water needs to be abstracted from river, lakes and groundwater
- Stormwater is stored in a RwH system reducing the peak surface water runoff leaving a site providing a flood risk benefit (for smaller storms)
- By reducing surface water flow, RwH can reduce the first flush effect whereby polluted materials adhering to pavement surfaces during dry periods are removed by the first flush of water from a storm and can cause pollution in receiving watercourses.

Challenges of RwH

- Dependency on rainfall can limit availability of harvested rainwater during drought and hot weather events.
- Increased capital (construction) costs to build rainwater harvesting infrastructure into new housing (£900 to £3,000 for a small-scale domestic system)11
- Payback periods are long as the cost of water is low so there is little incentive for homeowners to invest[12].

Greywater harvesting

Greywater refers to water that has been "used" in the home in appliances such as washing machines, showers and hand basins. Greywater recycling or greywater harvesting (GwH) is the treatment and re-use of this water in other systems such as for toilet flushing. By their nature, GwH systems require more treatment and are more complex than RwH systems, and there are limited examples of their use in the UK.

Greywater re-use refers to systems where wastewater is taken from source and used without further treatment. An example of this would be water from a bath or shower being used on plants in the garden. This sort of system is easy to install and maintain, however as mentioned above the lack of treatment to remove organic matter means the water cannot be stored for extended periods.

Greywater recycling refers to systems where wastewater undergoes some treatment before it is used again. These systems are complex and require a much higher level of maintenance than RwH or greywater re-use systems.

Domestic water demand can be significantly reduced by using GwH, and unlike with a RwH system where the availability of water is dependent on the weather, the source of water is usually constant (for instance if it is from bathing and showering). However, the payback period for a GwH system is usually long, as the initial outlay is large, and the cost of water relatively low.

Viability of greywater systems for domestic retrofit applications is therefore currently limited. However, communal systems may offer more opportunities where the cost can be shared between multiple households particularly on larger new build developments, or in new settlements.

11 Independent review of the costs and benefits of rainwater harvesting and grey water recycling options in the UK, Waterwise, 2020. Accessed online at: https://database.waterwise.org.uk/knowledge-base/independent-review-of-costs-and-benefits-of-rwh-and-gwr-options-in-the-uk/ on: 12/12/2023

12 Housing Standards Review, UK Government (2014). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/353387/021c_Cost_Report_11th_Sept_2014_FINAL.pdf on: 08/02/2023.

4.7.4 Energy and Water use

According to EU statistics (Eurostat 2017), 17% of the UK's domestic energy usage is for water heating. If less water was being used within the home, for instance through more water efficient showers, less water would need to be heated, and overall domestic energy usage would be reduced.

In 2020-2021 the Government consulted on a Future Homes Standard that will involve changes to Part L (conservation of fuel and power) of the Building Regulations for new dwellings[13]. Unfortunately, this fails to identify the role of water efficiency in the home in also reducing energy usage.

4.7.5 Funding for water efficiency

Water efficiency improvements or water neutrality is unlikely to be achieved by just one type of measure, and likewise it is unlikely to be achieved by just one funding source. Funding mechanisms that may be available could be divided into the following categories:

- Infrastructure-related funding (generally from developer payments)
- Fiscal incentives at a national or local level to influence buying decisions of households and businesses
- Water company activities, either directly funded by the five-year price review or as a consequence of competition and individual company strategies
- Joint funding through energy efficiency schemes (and possibly to integrate with the heat and energy saving strategy).

Currently in the UK, the main funding resource for the delivery of water efficiency measures is the water companies, with some discretionary spending by property owners or landlords. Both STW and SSW offer discounts on their infrastructure charges if developers demonstrate they are building homes to a tighter water efficiency standard. These are described in the section below.

For water neutrality to be achieved, policy shifts may be required in order to increase investment in water efficiency. Possible measures could include:

- Further incentivisation of water companies to reduce leakage and work with customers to reduce demand
- Require water efficient design in new development
- Developer funding to contribute towards encouraging water efficiency measures
- Require water efficient design in refurbishments when a planning application is made
- Tighter standards on water using fittings and appliances.

13 The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings. Accessed online at: https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings on: 08/02/2023.

4.8 Water Efficiency Incentives

4.8.1 South Staffordshire Water Incentives

South Staffordshire Water offer incentives to promote water efficient home building, through a scheme that provides discounts to infrastructure charges where properties are built to achieve 100 l/p/d. For 2024/25, the scheme has been expanded to set of options that can attract the discount. These options are: Internal fittings designed to limit usage, Reducers that reduce the flow from the water main to the property, Rainwater/greywater harvesting systems, and water neutrality. The level of discount is outlined below.

- Where consumption achieves 100 l/p/d, a discount of £203 per plot is available to developers.
- Where consumption achieves 80 l/p/d, a discount of £305 per plot is available to developers. The discount where properties are designed to achieve 80 l/p/d consumption will reflect 100% of the infrastructure charge.
- Where consumption achieves 60 l/p/d, a discount of £407 per plot is available to developers.

4.8.2 Severn Trent Water

To encourage water efficiency Severn Trent Water offer an Environmental Discount Scheme which can apply to both clean water and sewerage charges. To qualify for the STW Environmental Discount Scheme, applicants must use the WRc water calculators to demonstrate that homes are built to achieve 100 l/p/d consumption.

4.9 Conclusions

- Sandwell receives its water from South Staffordshire Water and Severn Trent Water. Sandwell is largely within the South Staffs WRZ, with smaller areas falling into the Strategic Grid and Wolverhampton Water Resource Zones (WRZ). In all WRZs, the forecast percentage growth in the WRMP is lower than the expected growth during the Local Plan period. In those WRZs where the water company forecast is lower than the Local Plan review, assurance should be sought from the company that the Council's growth forecast can be accommodated.
- The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are planned or underway to ensure that abstraction of water from both groundwater and rivers, is not leading to unsustainable reductions in flow. Development and population growth can increase abstraction, and so Sandwell MBC have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development.
- It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water

demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings.

- Water resources in the UK are under considerable pressure. The Environment Agency have stated that "the scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."
- The National Water Resources Framework sets the objective to reduce the average per capita consumption in the UK to 110l/p/d by 2050. This is now part of the Environmental Improvement Plan and water companies WRMPs. Within Defra's Plan for Water is the commitment to review Building Regulations and a target of 100l/p/d in water stress areas is suggested.
- The Future Homes Hub, who are supporting Defra to produce a roadmap to greater water efficiency propose a stages reduction in PCC, with a target of 100l/p/d in water stressed areas in place from 2025, and a reduced target of 90l/p/d in place by 2030 (depending on market conditions and customer acceptance).
- This study recommends that as a minimum the proposed new Building Regulations target of 100l/p/d outlined in Defra's Plan for Water be adopted across the study area. This should be achieved using a fittings-based approach.
- This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard.
- The Local Plan should allow for a future reduction in the Building Regulations target to 90l/p/d in 2030.
- This is supported by South Staffs Water and Severn Trent Water incentives for water efficient design in new builds outlined in Section 4.8 where significant incentives are offered to reduce design consumption below 100l/p/d.

4.10 Recommendations

The recommendations for water resources are provided in Table 4-6 below:

Table 4-6 Recommendations for water resources

Action	Responsibility	Timescale
Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	South Staffordshire Water, Severn Trent Water	Ongoing
Provide yearly updates of projected housing growth to water companies to inform WRMP updates.	Sandwell MBC	Ongoing
The council should consider a domestic water efficiency target of 100l/p/d for all new homes, and work with water suppliers to incentivise even lower consumption. This should be	Sandwell MBC	In Sandwell LP

Action	Responsibility	Timescale
achieved using a fittings-based approach.		
Use planning policy to require new build non-residential development to achieve at least 3 credits in the Wat01 Measure for water in the BREEAM New Construction standard.	Sandwell MBC	In Sandwell LP
The concept of water neutrality has the potential to provide a benefit in improving resilience to climate change and enabling all waterbodies to be brought up to Good status. Explore further with the water companies and the Environment Agency how the Council's planning and climate change policies can encourage this approach. This approach could have particular application in strategic sites.	Sandwell MBC, Environment Agency, Severn Trent Water, South Staffs Water	In Sandwell LP
Larger residential developments and commercial developments should consider incorporating greywater recycling and/or rainwater harvesting into development at the master planning stage in order to reduce water demand.	Sandwell MBC, Severn Trent Water, South Staffs Water	In Sandwell LP
Water companies should advise Sandwell MBC of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	Sandwell MBC, Severn Trent Water, South Staffs Water	Part of Sandwell LP process
Review this section of the WCS following publication of the final Water Resource Management Plans for 2024.	Sandwell MBC, Severn Trent Water, South Staffs Water	In Sandwell LP

5 Water Supply Infrastructure

5.1 Introduction

An increase in water demand due to growth can exceed the hydraulic capacity of 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 engage early with the Developer Services functions of the water and wastewater companies local to their site, and fund water company impact assessments and modelling of the distribution systems to determine requirements for local capacity upgrades to the distribution systems.

In addition to the work undertaken by water companies, there are opportunities for the local authority and other stakeholders to relieve pressure on the existing water supply system by increasing water efficiency in existing properties. This can contribute to reducing water consumption targets and help to deliver wider aims of achieving water neutrality.

A cost-effective solution can be for local authorities to co-ordinate with water supply companies and “piggyback” on planned leakage or metering schemes, to survey and retrofit water efficient fittings into homes[14]. This is particularly feasible within property owned or managed by the local authorities, such as social housing.

5.2 Methodology

A list of potential allocations was provided to Severn Trent Water and South Staffs Water as part of the Regulation 18 consultation in December 2023. This has been used to inform the Stage 2 assessment.

5.3 Results

Severn Trent Water provided the following comments on water supply:

"For the majority of new developments, we do not anticipate issues connecting new development, particularly within urban areas of our water supply network. When specific detail of planned development location and sizes are available a site-specific assessment of the capacity of our water supply network could be made. Any assessment will involve carrying out

14 Water Efficiency Retrofitting: A Best Practice Guide, Waterwise (2009). Accessed online at: http://www.waterwise.org.uk/wp-content/uploads/2018/01/Waterwise-2009_Water-efficiency-Retrofitting_Best-practice.pdf on: 10/02/2023.

a network analysis exercise to investigate any potential impacts. If significant development in rural areas is planned, this is more likely to have an impact and require network reinforcements to accommodate greater demands."

South Staffs Water did not provide any comments for use in this study.

5.4 Conclusions

Severn Trent Water have not identified any water supply constraints within Sandwell. It is noted in the STW comments that a large proportion of Sandwell is served by South Staffs Wate who have not commented on water supply within Sandwell. It is recommended that further consultation is undertaken with South Staffs during the Local Plan process to identify any water supply constraints in the area.

5.5 Recommendations

Table 5-1 Recommendations for water supply infrastructure

Action	Responsibility	Timescale
Undertake network modelling to ensure adequate provision of water supply is feasible.	Water companies, Sandwell MBC	Ahead of planning applications
Sandwell MBC and Developers should engage early with water companies to ensure supply infrastructure is in place prior to occupation.	Water companies, Sandwell MBC, developers	Ongoing
Developers should engage early with water companies to ensure that the capacity of distribution systems is adequate prior to development coming forward	Water companies, developers	Ongoing

6 Wastewater Collection

6.1 Sewerage undertakers

Severn Trent Water is the Sewerage Undertaker (SU) for the study area. The role of the sewerage undertaker includes the collection and treatment of wastewater from domestic and commercial premises, and in some areas, it also includes the drainage of surface water from building curtilages to combined or surface water sewers. It excludes, unless adopted by the SU, systems that do not connect directly to the wastewater network, e.g., Sustainable Drainage Systems (SuDS) or highway drainage.

Increased wastewater flows into collection systems due to growth in populations or per-capita consumption can lead to an overloading of the infrastructure, increasing the risk of sewer flooding and, where present, increasing the frequency of discharges from storm overflows. Seasonal and yearly variations in weather and infiltration can reduce headroom at WwTW.

Headroom at Wastewater Treatment Works (WwTW) can be eroded by growth in population or per-capita consumption, requiring investment in additional treatment capacity. As the volumes 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 consented effluent consents to achieve a “load standstill”, i.e., ensuring that as effluent volume increases, the pollutant discharged does not increase. Again, this would require investment by the water company to improve the quality of the treated effluent. Consents can also be tightened to prevent a deterioration in water quality due to growth, or to achieve environmental objectives.

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 the removal of surface water connections and reducing infiltration. This can most readily be achieved during the redevelopment of brownfield sites which have combined sewerage systems, where there is potential to discharge surface waters via sustainable drainage systems (SuDS) to groundwater, watercourses or surface water sewers.

STW are supportive of the use of SuDS and SuDS principles to manage surface water run-off. They recommend that the Drainage Hierarchy is used to direct surface water to natural outfall routes such as infiltration to the ground or into watercourses, before utilising sewers, as supported by paragraph 167 of the NPPF. Surface water should also not be permitted to connect to a foul sewer.

6.2 Assessment of Drainage and Wastewater Management Plans (DWMPs)

6.2.1 Severn Trent Water DWMP

Severn Trent Water's DWMP (Severn Trent c, 2023) sets out how they plan to extend, improve, and maintain robust and resilient drainage and wastewater systems. Alongside the common, national planning objectives, Severn Trent Water sets out strategic outcomes focussed on lowering the risk of flooding and pollution, protecting and enhancing the

environment, and supporting a more circular economy. These strategic outcomes outline targets to help reach goals by 2050, including by 2030:

- To deliver 100% monitoring coverage of storm overflows and treatment works (already met)
- For STW operations to not be the reason for rivers not achieving "good" status based on EA RNAGs
- To reduce storm overflow activations to an average of 20 per year by 2025
- To improve 50km of rivers in Warwickshire and Shropshire, creating 15km of bathing water quality rivers by 2025
- To work with other sectors to deliver the Government's 25yr Environment Programme and to reduce process emissions by 70%

These targets are set out to help STW achieve the following key goals by 2050:

- For no storm overflow to operate more than 10 times per year or cause harm as defined by EA Storm Overflow Guidance
- To reduce the risk of properties flooding up to 1 in 50-year return period storm event
- To achieve zero serious pollutions caused by STW assets or operations

There are 2,647 storm overflows in the Severn Trent Water region, and by 2050, 1097 of them are predicted to be classed as high priority activating higher than 10 times per year, which is above the national annual allowance. By 2030 STW aim to align to the Storm Overflow Discharge Reduction Plan by addressing 39% of high priority storm overflows causing harm and 26% of all overflows activating more than 10 times a year. Reducing storm overflow operation can be achieved by upgrading WwTWs or the sewer network ensuring that storm overflows only operate in unusually heavy rainfall.

The Severn Trent Water DWMP is split into Strategic Planning Areas closely aligning with River Basin Management Catchments at the Level 2 stage. Sandwell MBC's boundary falls into the Middle Severn and Central Strategic Planning Areas (SPAs).

The Central SPA is STW's largest, containing 23.6% of the company's total population and 25 WwTWs. Two large sewer catchments within this SPA, Ray Hall and Minworth (the largest STW catchment) serve the Sandwell area. Risk Based Catchment Screening for the Minworth catchment triggered 12 of 17 indicators and the Ray Hall catchment triggered 9 of 17 indicators. The Middle Severn SPA serves roughly 9% of STW's total population and contains the Roundhill and Lower Gornal WwTW catchments, which serve areas of Sandwell. The Roundhill catchment triggered 10 of the 17 indicators in Risk Based Catchment Screening, while the Lower Gornal catchment triggered 5 of the 17 indicators. These results meant that each WwTW catchment serving Sandwell progressed to the Baseline Risk and Vulnerability (BRAVA) stage.

The DWMP moves on to option development and appraisal. It identifies 'investment opportunities' to alleviate internal sewer flooding and spills from storm overflows. These investments would incorporate separation to remove surface water from combined sewers. Further investment is identified to reduce harm from storm overflows including improving screening for pollutants and addressing high priority storm overflows.

Maximising blue-green nature-based solutions was focussed on to work towards a more sustainable approach to reducing the inflow of surface water in the sewer network. The main solution for this was using SuDs.

Overall, there is a focus on reduction of storm overflow operations, upgrading WwTW and creating more sustainable water management options, such as SuDS.

As part of the level 2 DWMP, STW have identified collaborative working opportunities and schemes for each SPA. For the SPAs within Sandwell, the Rea Catchment Partnership and the Severn Catchment Partnership have been identified alongside detailed schemes for delivery. Additionally, as part of the BRAVA consultation period and dDWMP workshops, STW have worked with stakeholders to identify future partnership working opportunities.

6.3 Storm overflows

Storm overflows are an essential component in the sewer network – however when they operate, they can cause environmental damage. They occur on combined sewer systems where the sewer takes both foul flow (sewage from homes and offices) and rainwater runoff. In normal conditions (Figure 6-1) all of this flow passed through the sewer network and is treated at a wastewater treatment works.

In periods of exceptional rainfall (Figure 6-2), the capacity in a combined sewer may be used up by the additional flow from rooftops and storm drains. Once the capacity is exceeded, wastewater would back up into homes, businesses and on to roads. A storm overflow acts as a relief valve, preventing this from happening.

Storm overflows become problematic when they operate frequently in moderate or light rainfall, or for long periods as a result of groundwater infiltration in the sewerage system – possibly in breach of their permit.

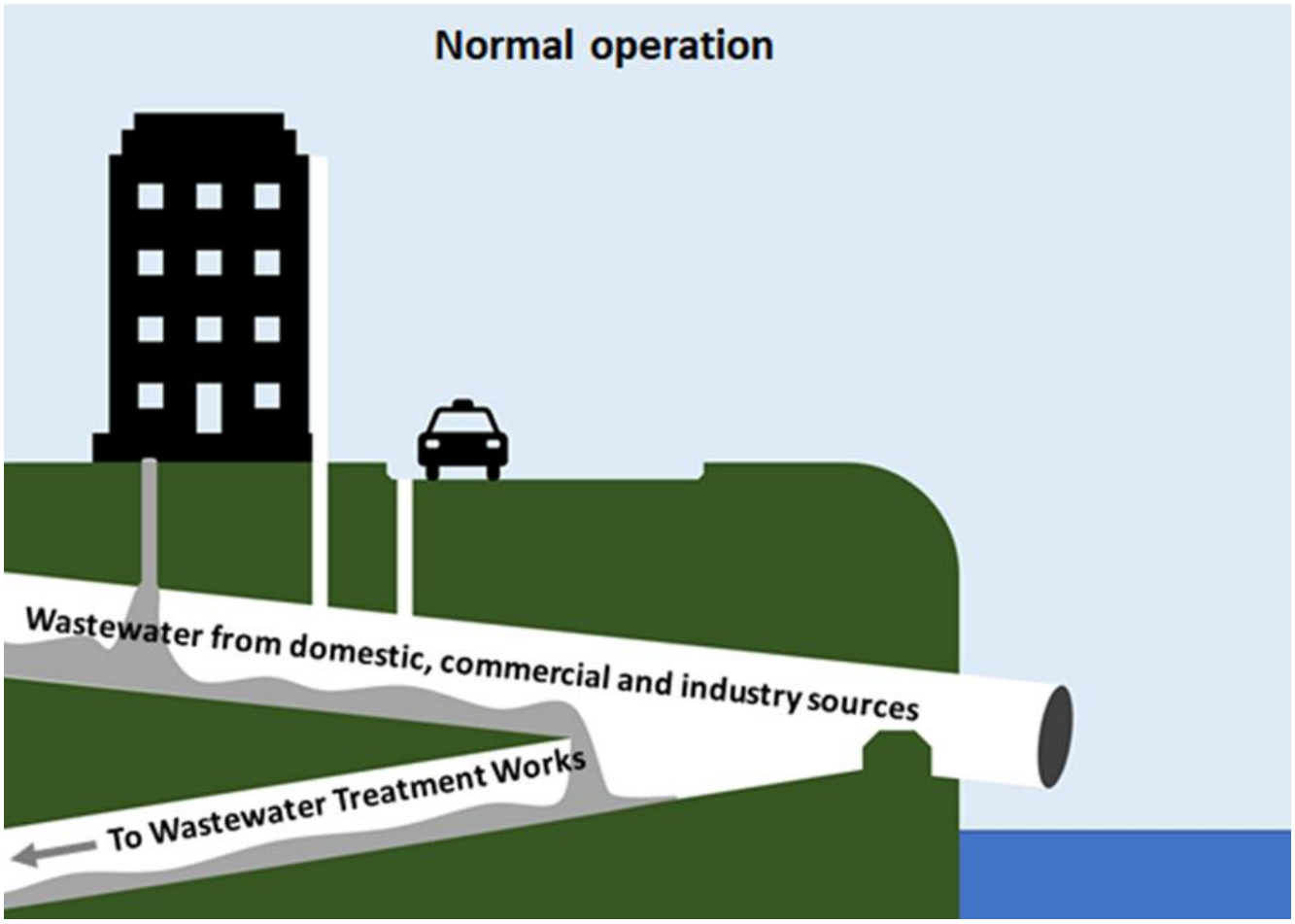


Figure 6-1 Storm overflow operation in normal conditions

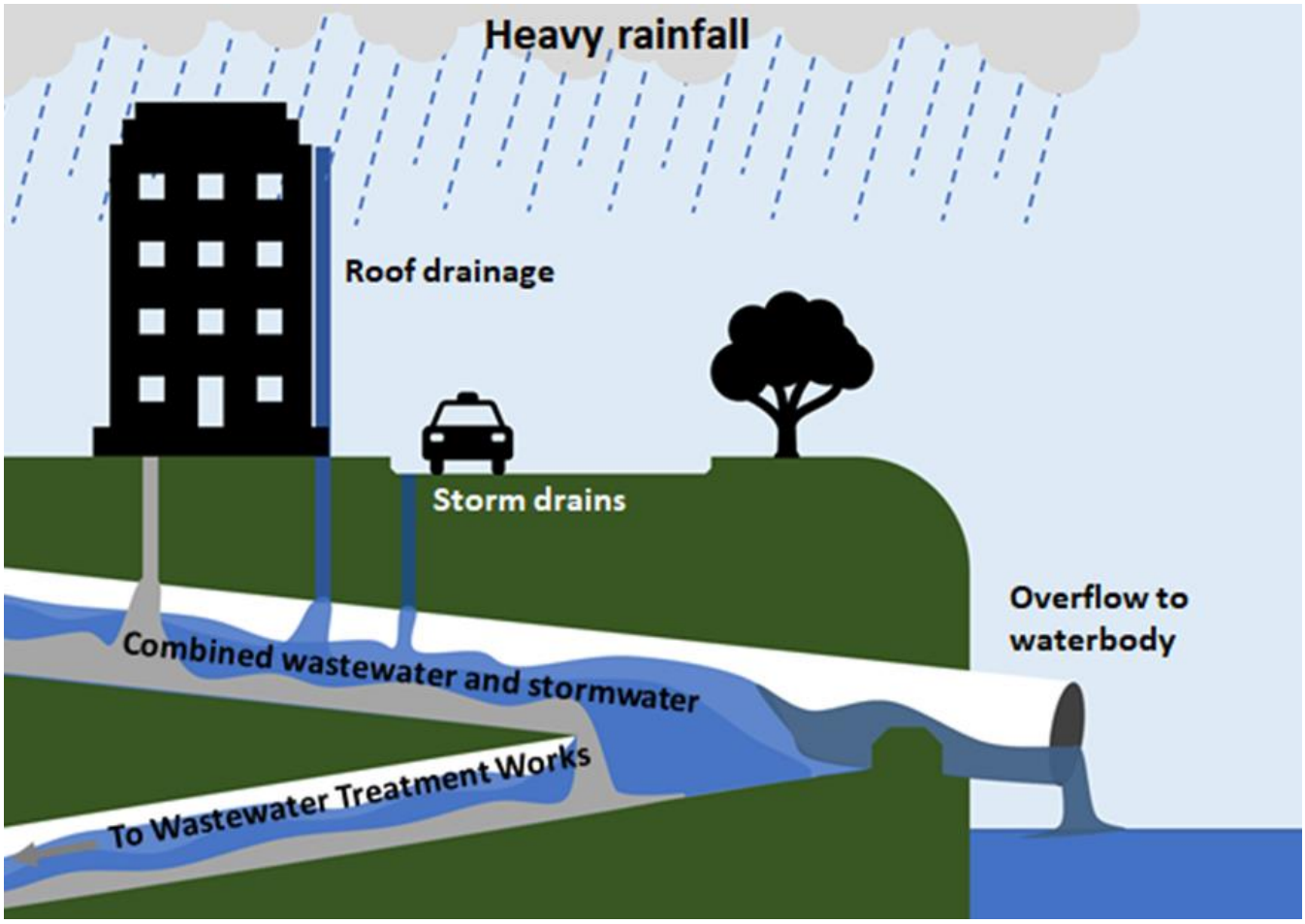


Figure 6-2 Storm overflow operation in exceptional rainfall

6.4 Methodology

6.4.1 Sewerage System Capacity Assessment

New residential developments and new employment land add pressure to the existing sewerage systems. An assessment is required to identify the available capacity within the existing systems, and the potential to upgrade overloaded systems to accommodate future growth. The scale and cost of upgrading works may vary significantly depending upon the location of the development in relation to the network itself and the receiving WwTW.

It may be the case 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 an increase in its capacity. New infrastructure may be required if, for example, a site is not served by an existing system. Such new infrastructure will normally be secured through private third-party agreements between the developer and utility provider.

Sewerage Undertakers must consider the 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 development only when planning permission has been granted, although growth allocated in Local Plans is used to forward plan

investment. Additional sewerage capacity to service windfall sites, smaller infill development or to connect a site to the sewerage network across third party land is normally funded via developer contributions, as third-party arrangements between the developer and utility provider.

Severn Trent Water were provided details of the preferred allocations and asked to assess the impact of these sites on the wastewater network. The following red/amber/green definition was used by the water companies to score each site:

Key	Potential impact on sewerage infrastructure (Foul / Surface Water)
Low Risk	Capacity Improvements are not anticipated to be required to accommodate the development.
Medium Risk	Capacity improvements may be required to accommodate the proposed development.
High Risk	Capacity Improvements are likely to be required to accommodate the proposed development.

6.4.1.1 Results

Table 6-1 below shows the results of Severn Trent Water's sewer network assessments, considering impact on both the foul sewer network and surface water network.

Table 6-1 Severn Trent Water network assessment of Sandwell Local Plan sites

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
SH41	North Smethwick Canalside	Housing	8.77	500	Minworth	Medium	Low	No Change in Risk
SH53	Grove Lane/Cranford Street/London Street (392 dwellings)	Housing	0.81	392	Minworth	Medium	Low	Increase in Risk from Low to Medium
SH53	Grove Lane/Cranford Street/London Street (115 dwellings)	Housing	0.81	115	Minworth	Low	Low	No Change in Risk, although if constructed in addition to the above, would be a medium risk
SH8	Alma Street, Wednesbury	Housing	0.52	23	Minworth	Low	Low	Not Previously Assessed
181_SAH102	Grove Lane/Cranford Street/London Street	Housing	1.23	108	Minworth	Low	Low	
95_SAH081	North Smethwick Canalside	Housing	8.7	400	Minworth	Medium	Low	
191_SAH086	Former Sunlight Laundry	Housing	0.73	33	Minworth	High	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
192_SA H101	Thandi Coach Station	Housing	0.71	58	Minworth	Low	Low	
56_SA H206	Perott Street/Kitchener Street	Employment	1.39	49	Minworth	Low	Low	
182_SA H077	Cranford Street / Heath Street / Canal	Housing	5	115	Minworth	Low	Low	
183_SA H085	Cape Arm Cranford Street	Housing	2.13	170	Minworth	Low	Low	
184_SA H281	Moilliett Street Park - Grove Lane masterplan	Housing	0.77	31	Minworth	Low	Low	
185_SA H084	Grove Street/MMUH/School - Grove Lane MP	Housing	2.18	85	Minworth	Low	Low	
186_SA H280	Abberley Street Grove Lane Master Plan	Housing	2.48	140	Minworth	Low	Low	
28_SA H103	The Phoenix Collegiate, Friar Park Road, Wednesbury	Housing	4.8	84	Ray Hall	Low	Low	
55_SA H091	STW/SMBC Land	Housing	26.6	630	Ray Hall	High	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
69_SA H092	Friar Street, Wednesbury	Housing	1.01	38	Minworth	Low	Low	
62_SA H074	28-64 High Street, West Bromwich	Housing	0.6	58	Ray Hall	Low	Low	
60_SA H093	Tatbank Road Oldbury	Housing	1.15	40	Ray Hall	Low	Low	
48_SA H094	Langley Maltings, Western Road, Langley	Housing	2.72	95	Ray Hall	Low	Low	
75_SA H087	Land to east of Black Lake, West Bromwich	Housing	2.45	86	Ray Hall	High	Low	
77_SA H075	Bank Street (West), Hateley Heath	Housing	0.85	43	Ray Hall	High	Low	
25_SA H083	Swan Lane	Housing	3.77	147	Ray Hall	Low	Low	
32_SA H284	Sandwell District & General Hospital	Housing	0.82	121	Ray Hall	High		
90_SA H229	Brades Road, Oldbury	Housing	1.2	54	Ray Hall	High	Low	
59_SA H227	Dudley Road East	Housing	2.65	106	Ray Hall	High	Low	
76_SA H099	Summerton Road, Oldbury	Housing	0.89	32	Ray Hall	High	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
87_SA H100	Edwin Richards Quarry, Portway Road, Rowley Regis	Housing	10.1	526	Ray Hall	High	High	
33_SA H286	FM Springfield & Brickhouse Neighbourhood Office	Housing	0.65	26	Roundhill	High	Low	
54_SA H282	Land Adj to Droicon Estate, Portway Road, Rowley Regis	Housing	0.7	28	Ray Hall	Low	High	
85_SA H088	Rattlechain Site Land to the north of Temple Way	Housing	14.8	518	Ray Hall	High	Low	
57_SA H070	Land at Horsley Heath, Alexandra Road, and Lower	Housing or Employment	1.9	60	Ray Hall	Low	Low	
78_SA H073	Wellington Road, Tipton	Housing	0.91	31	Ray Hall	Low	Low	
68_SA H089	Site surrounding former Post office and Telephone Exchange	Housing	1.16	42	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
86_SA H098	Land between Addington Way and River Tame, Temple	Housing	0.9	32	Ray Hall	Low	Low	
168_SA H288	Site Of Nos 118-152	Housing	0.41	20	Ray Hall	Low	Low	
47_SA H096	Silverthorne Lane/Forge Lane Cradley Heath	Housing	1.05	74	Roundhill	High	Low	
58_SA H072	Elbow Street, Old Hill	Housing	0.77	25	Roundhill	High	Low	
79_SA H228	Brandhall Golf Course	Housing	36.9	190	Ray Hall	Low	Low	
65_SA H080	Bradleys Lane / High Street, Tipton	Housing	5.6	230	Ray Hall	Medium	Low	
12_EM P1-4	Land adjacent To Asda Wolverhampton Road, Oldbury	Housing or Employment	1.6	62	Ray Hall	Low	Low	
18_EM P3-22	Hale Trading Estate, Tipton	Housing or Employment	2.73	120	Ray Hall	Low	Low	
23_3467	Lower High Street (Station hotel &	Housing or	0.28	20	Roundhill	High	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
	Dunns Site)	Employment						
63_5643	Site between Dudley St & Victoria St Wednesbury	Housing or Employment	1.18	41	Ray Hall	Medium	Low	
66_SAH076	Lower City Road, Oldbury	Housing or Employment	1.83	63	Ray Hall	Low	Low	
70_SAH090	Used Car Sales site on corner of Lower Church Lane	Housing or Employment	0.56	20	Ray Hall	Low	Low	
91_CfS275	Chances Glass Works	Housing or Employment	0.64	22	Ray Hall	Low	Low	
118_3112 OS	Constance Avenue Open Space	Assume Housing	1.6	64	Ray Hall	Low	Low	
120_5013 OS	Darby's Hill Open Space	Assume Housing	3.8	114	Ray Hall	Low	Low	
132_3088 OS	Lily Street Open Space	Assume Housing	3.8	114	Ray Hall	High	Low	
137_30	Poppy Drive Open	Assume	0.8	32	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
09 OS	Space	Housing						
140_5082 OS	Timbertree Crescent Open Space	Assume Housing	0.5	20	Roundhill	High	Low	
142_5029 OS	Wylde Crescent Open Space	Assume Housing	0.5	20	Ray Hall	Low	Low	
1_EMP3-181	Varney Business Park, Varney Avenue, West Bromwich	Employment	0.73	26	Ray Hall	Low	Low	
2_EMP4-1	Zion Street, Tipton	Employment	2.43	85	Ray Hall	Low	Low	
4_EMP3-99	Providence Street, Cradley Heath various sites (30	Employment	6.33	222	Roundhill	High	Low	
7_EMP3-46	Droicon Ind Est, Portway Road	Employment	0.87	30	Ray Hall	Low	High	
9_EMP3-36	Silverthorne Lane	Employment	1.05	100	Roundhill	High	Low	
10_EMP3-29	Site off Richmond St, West Bromwich	Employment	1.1	39	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
52_EMP3-79	Land off Overend Road, Cradley Heath Business Park	Employment	3	105	Roundhill	High	Low	
89_EMP3-66	Soho Foundry	Employment	12.6	441	Minworth	Medium	Low	
98_EMP1-3	Land at Birchley Island, Junction 2 of M5, Oldbury	Employment	1	35	Ray Hall	Low	Low	
3_EMP3-9	Alexandra Ind Est, Locarno Rd/Alexandra Rd, Tipton	Employment	1.87	75	Ray Hall	Low	Low	
8_EMP3-175	Coneygre Rd, Burnt Tree, Tipton	Employment	1.02	75	Ray Hall	Low	Low	
11_EMP3-148	Castle St, Tipton (2938)	Employment	1.49	60	Ray Hall	Medium	Low	
13_EMP4-4	Soho Triangle	Employment	1.71	60	Minworth	Low	Low	
14_EMP3-191	Oldfield Trading Estate, Cradley Heath	Employment	1.76	70	Roundhill	High	Low	
15_EMP4-3	70-74 Crankhall Lane	Employment	1.78	50	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
17_EMP3-189	Waterfall Lane, Cradley Heath	Employment	1.78	50	Roundhill	High	Low	
19_EMP3-40	Newlyn Road, Cradley Heath	Employment	3.4	102	Roundhill	High	Low	
20_EMP1-9	Severn Trent, Land off Roway Lane	Employment	3.65	128	Ray Hall	Low	Low	
16_EMP3-133	Brymill Industrial Estate, Brown Lion St, Tipton	Employment	1.97	56	Ray Hall	Low	Low	
5_EMP3-87	Brown Lion Street	Housing	0.46	20	Ray Hall	Low	Low	
24_SAH071	Mill Street, Great Bridge	Housing	0.86	30	Ray Hall	Low	Low	
26_2227	The Boat Gauging House & Adjoining Land, Factory Road	Housing	0.57	50	Ray Hall	Medium	Low	
29_6475	Star and Garter, 252 Duchess Parade, West Bromwich	Housing	0.05	60	Ray Hall	High	Low	
40_6901	Metro House 410-416 High Street West Bromwich	Housing	0.38	34	Ray Hall	High	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
46_7082	5 Lombard Street West Bromwich	Housing	0.16	44	Ray Hall	High	High	
53_SAH285	Cradley Heath Factory Centre, Woods Lane, Cradley Heath	Housing	5.41	160	Roundhill	Low	Low	
94_cfs112	Langley Swimming Centre, Vicarage Road, Oldbury	Housing	0.49	20	Ray Hall	Low	Low	
166_SAH224	Land of Tanhouse Avenue, Great Barr	Housing	1.66	46	Minworth	Low	Low	
92_CFS115	Land to West of Thomas Street	Housing	0.28	30	Ray Hall	Low	Low	
34_5939	John Dando House, 235 Hamstead Road, Great Barr	Housing	0.86	26	Minworth	Low	Low	
35_7198	Intersection House, 110 Birmingham Road, West Bromwich	Housing	0.8	136	Ray Hall	Low	Low	
36_6916	Vacant Land Off Friardale Close, School Road, Carr	Housing	0.76	30	Ray Hall	Low	High	
170_regen	Groveland, Oldbury	Housing	2.26	58	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
171_evans halshaw	Evans Halshaw car showroom	Mixed	0.89	140	Ray Hall	High	Low	
172_st johns st	St Johns St, Carters Green	Housing	0.82	33	Ray Hall	High	Low	
173_army reserve	Army Reserve, Carters Green	Mixed	1.17	63	Ray Hall	High	Low	
174_tentec, guns lane	Tentec, Guns Lane	Housing	0.6	129	Ray Hall	High	Low	
175_providence place, br	Providence Place/Bratt Street	Housing	1.32	70	Ray Hall	High	Low	
176_cultural quarter	Cultural Quarter, West Bromwich	Mixed	1.09	52	Ray Hall	High	High	
178_west bromwich central	West Bromwich Central	Mixed	3.84	343	Ray Hall	Medium	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
177_queens square living	Queens Square Living	Mixed	2.84	396	Ray Hall	High	Low	
180_george street living	George Street Living	Housing	1.54	327	Ray Hall	Medium	Low	
179_overend st	Overend Street, West Bromwich	Housing	0.71	70	Ray Hall	High	Low	
198_EMP1-7	Site off Bilport Lane, Wednesbury	Employment	5.3	186	Ray Hall	Low	Low	
193_SA-0030-SAN	Whitehall Road, Tipton	Employment	5.29	185	Ray Hall	Low	Low	
194_EMP1-8	Legacy 43, Ryder Street, West Bromwich	Employment	0.88	31	Ray Hall	Low	Low	
195_SA-0026-SAN	Land at Coneygre, Newcomen Drive, Tipton	Employment	6.9	242	Ray Hall	Medium	Low	
196_EMP1-6	Land off Brandon Way, West Bromwich	Employment	3	105	Ray Hall	Low	Low	

LPA Ref	Site Name	Proposed Use	Site Size (Ha)	Updated Number of Dwellings	WwTW Catchment	Potential Impact on Foul/Combined Network	Potential Impact on Surface Water Network	Comment
197_EMP1-2	British Gas, Land off Dudley Road, Oldbury	Employment	1	35	Ray Hall	High	Low	
199_	Lion Farm	Mixed	2	70	Ray Hall	Low	Low	
200_2908	Site of 30-144 Mounts Road, Wednesbury	Housing	1.07	22	Ray Hall	Low	Low	

6.4.2 Storm overflow assessment

The Environment Act now requires water companies to report and monitor storm overflows as well as reduce the harm caused to the rivers they discharge to. There are 64 network storm overflows and no WwTW storm tank overflow present in Sandwell, the location of these are shown in Figure 6-5.

The Storm Overflow Taskforce[15] has agreed a long-term goal to end the damaging pollution caused by the operation of storm overflows. An important component of this is the monitoring of overflows, and a target has been set to monitor the frequency and duration of operation at all storm overflows by 2023[16]. This is called Event Duration Modelling (EDM). The EDM dataset (which contains performance data on the 16,791 storm overflows monitored in 2022) has been used to provide information on storm overflows in Sandwell. Severn Trent Water have confirmed that work is currently underway to investigate storm overflows with the long-term aim of reducing the number of operations of the storm overflows.

In comparison to some urban areas or large cities, Sandwell has relatively few storm overflows. The Storm Overflow Assessment Framework (SOAF) set a threshold of 60 operations in a year (based on 1 years data, 50 if based on 2 years data, and 40 if based on 3 years), above which a storm overflow should be investigated. The Environment Agency state that a revised SOAF methodology will be realised to coincide with the Environment Act obligation on storm overflows, which will require all overflows to ensure that they are not causing adverse ecological harm. The overflows identified in Sandwell were assessed on the average number of operations over three years. As shown in Appendix A, one of the overflows exceeded the 40 operations per year threshold averaged over 2021 to 2023.

The Storm Overflow Reduction Plan[17] which was published in August 2022 sets an objective that "storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050". 19 of the 64 monitored storm overflows are operating on average above 10 times per year so may require action to meet the long-term target. In this report storm overflows associated with WwTWs have been moved to the section on wastewater treatment.

Unmitigated development within Sandwell could cause the frequency or duration of operation of storm overflows to increase.

There are opportunities through the planning system to ease pressure on the wastewater network by separating foul and storm flow in existing combined systems, and not allowing new

15 Made up of Defra, the EA, Ofwat, Consumer Council for Water, Blueprint for Water and Water UK

16 Event Duration Monitoring – lifting the lid on storm overflows, Environment Agency (2021). Accessed online at: https://environmentagency.blog.gov.uk/2021/03/31/event-duration-monitoring-lifting-the-lid-on-storm-overflows/ on: 20/06/2023.

17 Storm overflow reduction plan, Environment Agency (2022). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1101686/Storm_Overflows_Discharge_Reduction_Plan.pdf on: 20/06/2023.

surface water connections. Surface water can also be better managed by retrofitting SuDS in existing residential areas, and in new development, ensuring SuDS are incorporated into designs at the master planning stage to maximise the potential benefits.

Sewer Overflows RAG Score	Number of operations per year (average of available data)	Commentary
Green	0-10	Overflow is currently operating within the long-term (2050) target. Need to ensure that this is maintained in the long-term considering upstream development, climate change and urban creep.
Amber	11 - 39 (based on three years data) 11 - 49 (based on two years data) 11 - 59 (based on one year's data)	An investigation is not required at present, but improvements will need to be made in the network and/or catchment to meet the long-term target.
Red	40+ (based on three years data) 50+ (based on two years data) 60+ (based on one year's data)	The overflow may already be operating beyond the threshold which would trigger an investigation. Upstream development could further increase the discharge frequency, so mitigation should be required prior to significant development.

According to Water UK, there are 63 storm overflows in the study area (Water UK, 2024) (which includes overflows on the network and at WwTW). Analysis in this report shows 64, which may be because there is an additional overflow now monitored since the Water UK data was published. Of these, 35 have improvements planned aimed at reducing the number of spills.

15 of the storm overflows in the area have the potential to be improved by a method involving nature-based solutions, which could include retrofitted sustainable drainage systems (SuDS) and wetland treatment systems.

The current plan is expected to prevent 407 spills by 2030 and 566 spills by 2050, a 46% and 63% reduction respectively, relative to a 2020 baseline.

The new minimum requirement for all overflows is that they meet a ‘rainfall target’ of 10 spills per year. Figure 6-3 shows the percentage of storm overflows in the study area meeting this target now and (forecast) in the period up to 2050 as improvements are made. Other improvements may occur at the same time, as necessary, to further reduce spills. Present-day statistics are based on EDM coverage in 2022 when 90% of storm overflows had monitoring. Coverage by monitoring in 2022 varied by water company. At the end of 2023 there was 100% coverage. Figure 6-4 shows the corresponding number of spills as improvements are made.

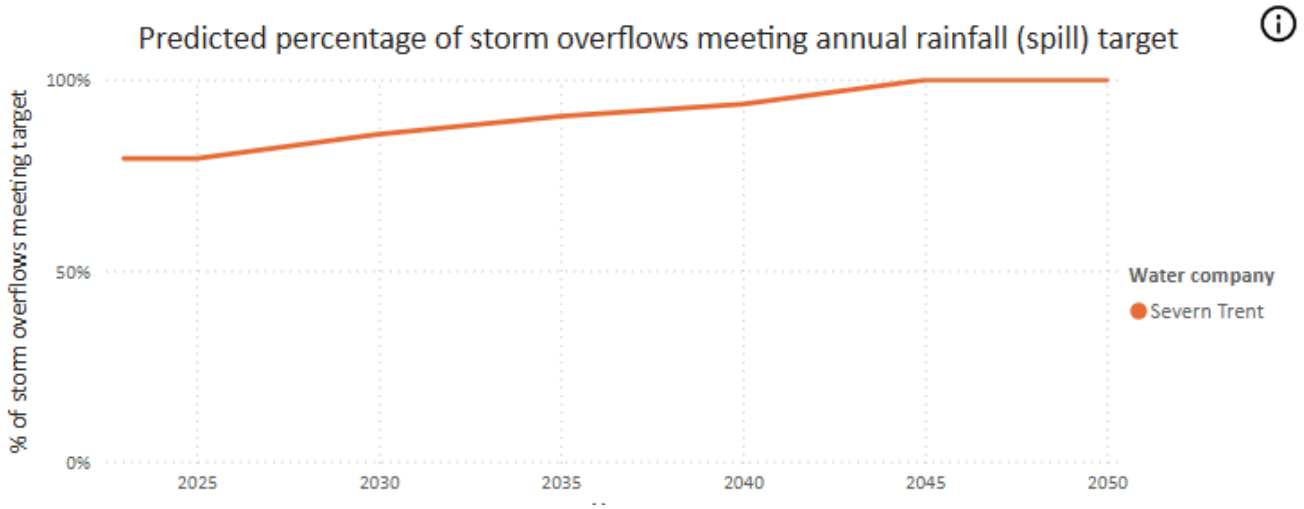


Figure 6-3 Percentage of storm overflows in study area meeting annual spill targets
© Water UK

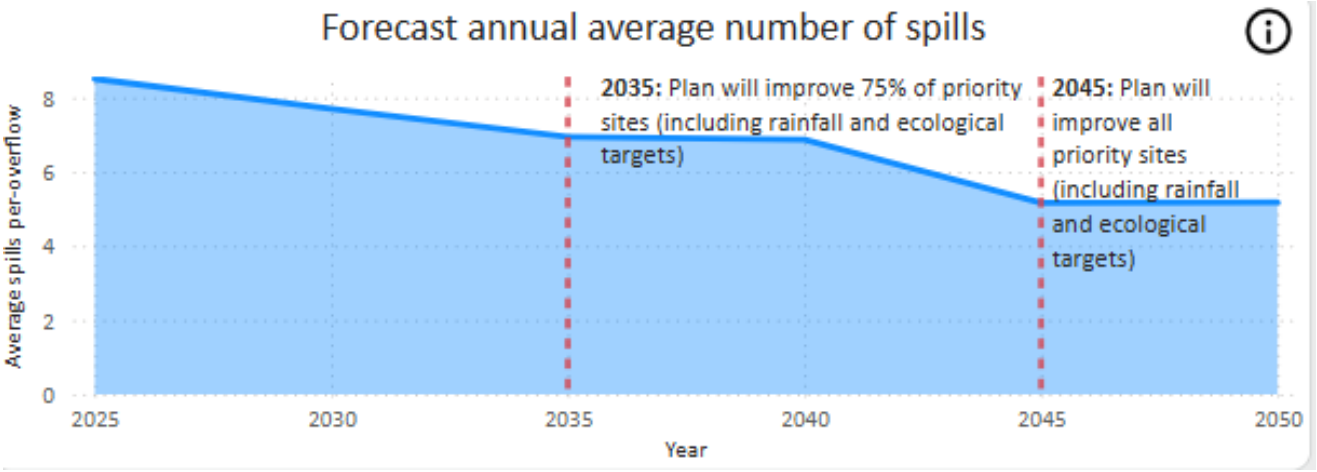


Figure 6-4 Forecast number of spills

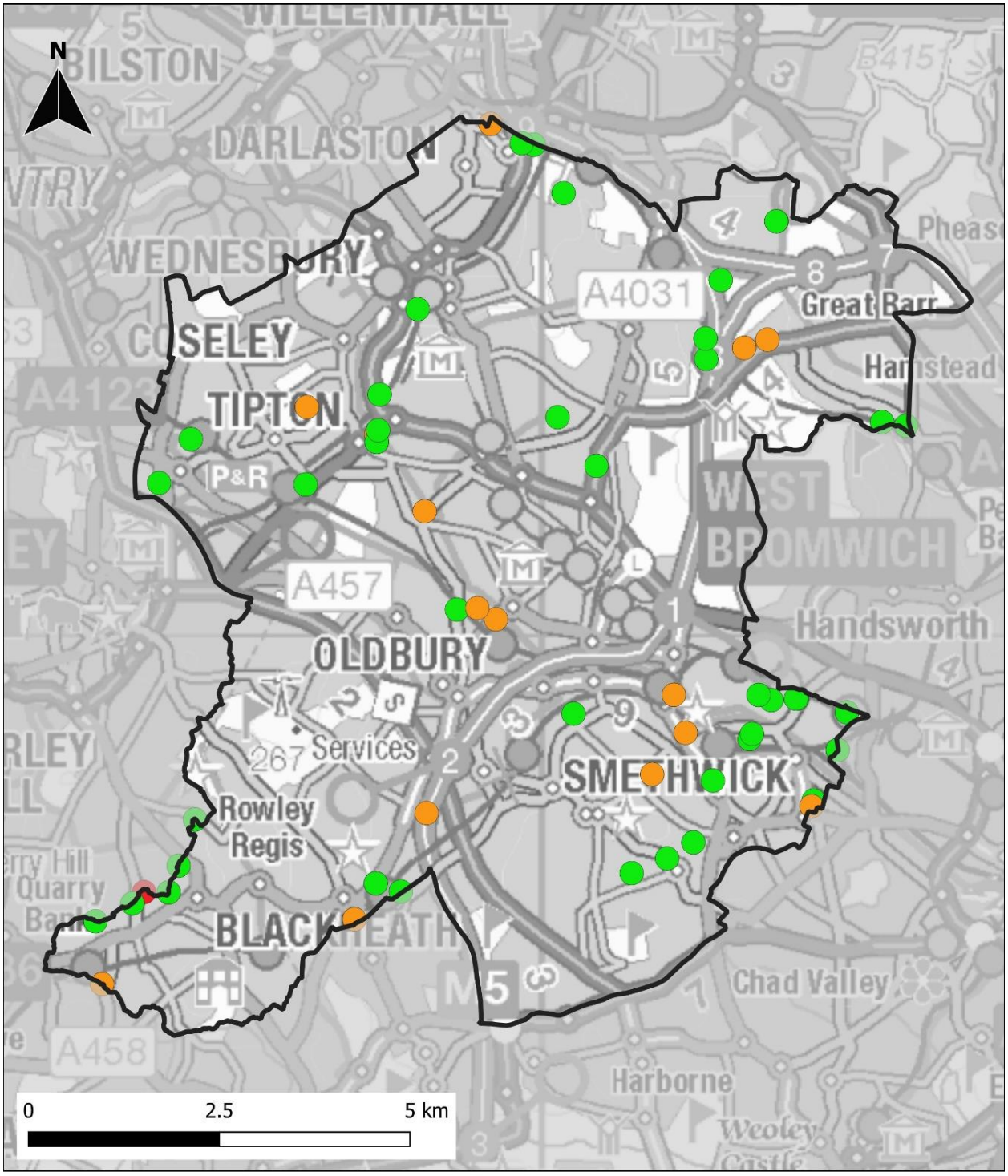


Figure 6-5 Storm overflow network (average of available data)

6.5 Conclusions

Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on customers, and increasing the likelihood of storm overflow operation. Early engagement with developers and Severn Trent Water is required, and further modelling of the network may be required at the planning application stage.

The Environment Act now requires water companies to report and monitor storm overflows as well as reduce the harm caused to the rivers they discharge to. There are 64 storm overflows in recorded in the study area.

The SOAF set a threshold of 60 operations in a year (based on 1 years' data, 50 if based on 2 years data, and 40 if based on 3 years), above which a storm overflow should be investigated. 1 of the storm overflows were operating above this threshold between 2021 and 2023. The Storm Overflow Reduction Plan which was published in 2022 sets an objective that "storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050". A further 19 storm overflows are operating on average above 10 times per year so may require action to meet the long-term target.

There are opportunities through the planning system to ease pressure on the wastewater network by separating foul and storm flow in existing combined systems, and not allowing new surface water connections. Surface water can also be better managed by retrofitting SuDS in existing residential areas, and in new development, ensuring SuDS are incorporated into designs at the master planning stage to maximise the potential benefits

Early engagement between developers, the council, and Severn Trent Water and is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.

6.6 Recommendations

Table 6-2 Recommendations from wastewater network assessment

Action	Responsibility	Timescale
Early engagement between Sandwell MBC and Severn Trent Water is required to ensure that where strategic infrastructure is required, it can be planned in by Severn Trent Water, and will not lead to any increase in discharges from sewer overflows.	Sandwell MBC, Severn Trent Water	Ongoing
Take into account wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker.	Sandwell MBC, Severn Trent Water	Ongoing
Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an	Sandwell MBC, Severn Trent	Ongoing

Action	Responsibility	Timescale
Outline Drainage Strategy for sites. The Outline Drainage strategy should demonstrate the wastewater assets required, their locations including points of connection to the public foul sewerage, whether the site drainage will be adopted by the water company and if any sewer requisitions will be required.	Water, Developers	
Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA.	Sandwell MBC as LLFA, developers	Ongoing

7 Wastewater Treatment

7.1 Wastewater Treatment Works in Sandwell

Severn Trent Water provides wastewater services for development in Sandwell. Severn Trent Water refer to their wastewater processing plants as Wastewater Treatment Works (WwTW) They may also be referred to as Sewage Treatment Works (STW) in some documents and data sources. The location of the WwTWs that serve Sandwell are shown in Figure 7-1 below.

Sites already allocated in the adopted local plan, or already in the planning system (commitments) as well as an allowance for windfall, were assigned to a WwTW using the sewerage drainage area boundaries provided by each SU to set a baseline for WwTW capacity. Actual connection of a development site to a particular WwTW may be different and will depend on the capacity of the receiving works, and the local sewer network.

Very small developments in rural areas may be suitable for on-site treatment and discharge, however the Environment Agency will not usually permit this where there is a public sewerage system within a distance calculated as 30m per dwelling. There is therefore a localised risk to water quality if all of these small developments were to be served by septic tanks, especially where there are clusters of small-scale new development. It needs to be noted that the Environment Agency have stated they 'would also object to a proposal which included septic tanks if they were within a 'sewered area''.

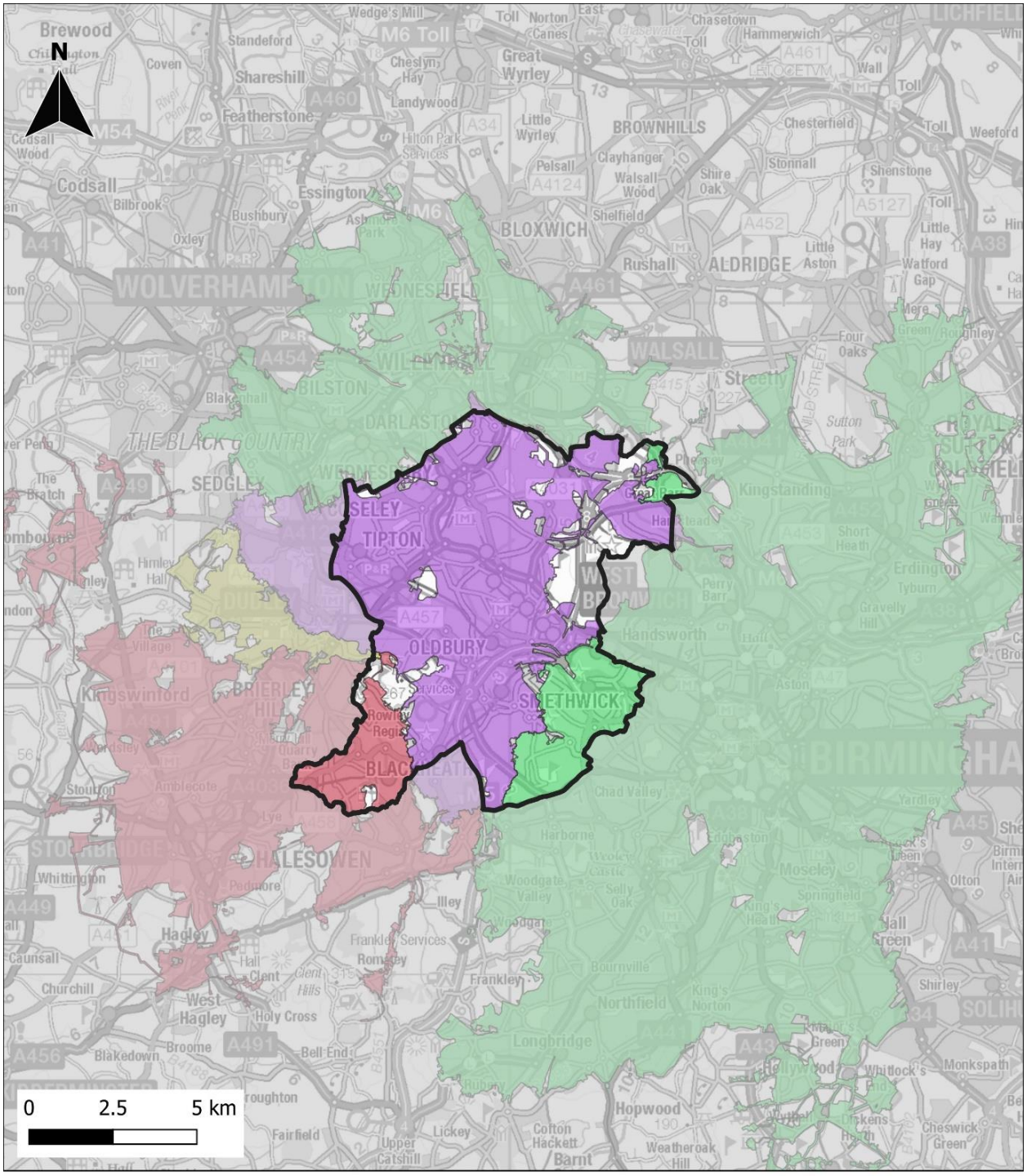


Figure 7-1 Severn Trent Water WwTWs serving Sandwell

7.2 Wastewater Treatment Works Flow Permit Assessment

7.2.1 Introduction

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.

Figure 7-2 summarises the different types of wastewater releases that might take place, although precise details vary from works to works depending on the design.

During dry weather, the final effluent from the WwTW should be the only discharge (1). With rainfall, the storm tanks fill and eventually start discharging to the watercourse (2) and Combined Sewer Overflows (CSOs) upstream of the storm tanks start to operate (3). The discharge of storm sewage from treatment works is allowed only under conditions of heavy rain or snow melt, and therefore the flow capacity of treatment systems is required to be sufficient to treat all flows arising in dry weather and the increased flow from smaller rainfall events. After rainfall, storm tanks should be emptied back to full treatment as soon as reasonably possible, freeing their capacity for the next rainfall event.

Environmental permits are used alongside water quality limits as a means of controlling the pollutant load discharged from a WwTW to a receiving watercourse. Sewage flow rates must be monitored for all WwTWs where the permitted discharge rate is greater than 50 m^3/day in dry weather.

Permitted discharges are based on a statistic known as the Dry Weather Flow (DWF). As well as being used in the setting and enforcement of effluent discharge permits, the DWF is used for WwTW design, as a means of estimating the ‘base flow’ in sewerage modelling and for determining the Flow to Full Treatment, (FFT), the minimum flow which must undergo full treatment, and above which additional flow is permitted to pass to the storm tanks (Figure 7-2).

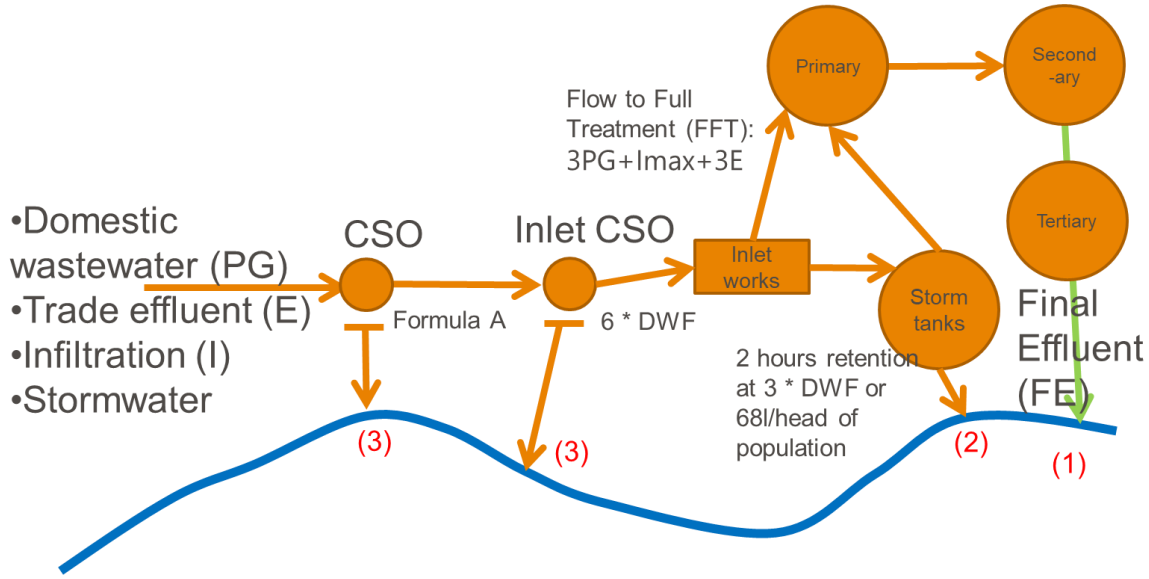


Figure 7-2 Overview of typical combined sewerage system and WwTW discharges

WwTW Environmental Permits also consent for maximum concentrations of pollutants, in most cases Suspended Solids (SS), Biochemical Oxygen Demand (BOD) and Ammonia (NH_4). Some works (usually the larger works) also have permits for Phosphorous (P). These are determined by the Environment Agency with the objective of ensuring that the receiving watercourse is not prevented from meeting its environmental objectives, with specific regard to the Chemical Status element of the Water Framework Directive (WFD) classification.

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 in flow consents.

In the case of failures in flow consents, it needs to be considered that even if there is sufficient headroom there could also be separate issues related to the capacity of the receiving watercourse to cope from an environmental point.

7.2.2 Methodology

An assessment of WwTW capacity was carried out by JBA using measured flow data supplied by the water companies. The process was as follows:

- Severn Trent Water provided their calculated 80th percentile exceedance flow statistic for each WwTW.
- Development sites within the growth scenario including windfall and neighbouring authority growth 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 (Table 7-1), 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.

- For employment sites, wastewater demand was estimated based on the predicted number of new employees. Floor space, employment use types, and employment densities were used to estimate the number of employees.
- The current and estimated future flow was then compared to the permitted flow obtained from the Environment Agency “Consented Discharges to Controlled Waters with Conditions” database.
- Headroom (expressed the number of homes that could be accommodated before the permit is exceeded) was estimated by calculating the difference between the current and permitted flow and using the occupancy and per capita consumption for the WRZ the sewer catchment is in to provide an estimate for the number of houses.
- A red/amber/green score was then assigned to each WwTW based on whether it was likely to exceed its permitted flow.
- The following red/amber/green traffic light definition was used to score each WwTW:

GREEN	AMBER	RED
Likely to be sufficient capacity to accommodate growth	Likely to be close to or exceed permit during plan period. Upgrades and / or a change to permit limit may be required. No significant constraints have been identified. (Based on less than 10% headroom remaining)	WwTW Capacity may be a constraint to growth (defined by Water Company)

Table 7-1 Per capita consumption values used in water demand calculations

Water Company and Water Resource Zone	Occupancy rate (persons per dwelling)	Per capita residential consumption (m^3/person/day)	Per capita employment consumption (m^3/person/day)
South Staffordshire Water - South Staffs	2.2	0.186	0.1
Severn Trent Water - Strategic Grid	2.2	0.120	0.1
Severn Trent Water - Wolverhampton	2.1	0.117	0.1

7.2.3 Results

Severn Trent Water provided an assessment of the preferred allocations. The results of this assessment are presented below by WwTW in Table 7-2.

Table 7-2 Severn Trent Water comments on WwTW capacity

WwTW	Estimated Spare Capacity	Watercourse Constraints	Notes
Minworth	Medium	High	Keep monitoring performance. Scoping the work necessary to increase capacity has not commenced. We expect this will be an AMP9 (2030-2035) investment. Based on expansion of capacity at our other largest sites, the investment at Minworth could be upwards of £200M.
Lower Gornal	Low	Low	No growth identified for this catchment. Growth can be accommodated without investment.
Ray Hall	Low	Low	Capacity at Ray Hall to remain as is with growth at the catchment to be accommodated at Minworth. AMP8 (2025-2030) scheme planned to address incoming tighter total phosphorous permit and control average daily flow to ensure WFD river water quality status for Phosphorous and other specific chemicals. The scheme will be completed by the end of AMP8 with an indicative cost of £20M.
Roundhill	High	Very High	Ongoing pressure with growth in the catchment. Keep monitoring performance of the works. We will need more information and timeline for the planned development to allow us time to plan ahead and identify options for increasing capacity. Scoping the work necessary to increase longer term capacity has not commenced. We expect this will be an AMP9 or later investment. There is an AMP7 (2020-2025) scheme ongoing which will ensure treatment capacity to accommodate known growth within the catchment to 2035 and meet new permit limits for Phosphorous and ammonia to be introduced December 2024. The scheme will be completed by the end of AMP7 at an expected cost of £32M.

Table 7-3 shows the results of the WwTW capacity assessment by STW, and Table 7-3 shows the JBA headroom assessment based on a comparison of current flow to the permit level.

Minworth and Roundhill WwTWs are likely to be close to or exceed their permit during the plan period. An increase in flow permit, and/or upgrades to treatment capacity will be required at these WwTW. The headroom assessment therefore shows a negative figure for the estimated capacity remaining at the end of plan period. This highlights the need for additional capacity equivalent to approximately that number of houses. The capacity assessment is based on the 80th exceedance percentile. Permit compliance is assessed by the Environment Agency using the 90th percentile statistic which results in a lower value than the 80th percentile - used in this assessment. Compliance at WwTW is not within the scope of the WCS and the assessment below should not be used to infer non-compliance.

In the headroom assessment, Lower Gornal and Ray Hall WwTWs are expected to have capacity for the growth planned throughout the plan period. However, for Ray Hall, this is contradicted by STW's comment provided as part of the Infrastructure Delivery Plan response where they state that "Ray Hall can treat a certain amount of load; therefore, any future growth will be diverted to and accommodated by Minworth works." This highlights the fact that although there is theoretical headroom before the permitted flow is reached, there are limitations in treatment capacity. An additional scenario was also tested as part of the capacity assessment where all new growth in the Ray Hall WwTW catchment was diverted to Minworth WwTW. STW state that they currently anticipate additional capacity being provided at Minworth WwTW in AMP9 (2030-35). Early engagement with STW is recommended in order to make sure that this additional capacity is in place to accommodate growth in Sandwell (alongside growth in other LPAs served by Minworth).

Where a WwTW is likely to exceed its permit, the permit would be reviewed by the EA and if a higher flow consent was agreed, a tighter permit limit for substance concentrations is very likely to be required. In some cases, this may not be technically feasibly possible if that means concentrations tighter than the Technically Accepted Limit (TAL) which is 0.25 mg/l for phosphate for example.

Table 7-3 Results of the WwTW capacity assessment

WwTW name	Predicted housing during LP period (no. dwellings)	Predicted employment during LP period (sqm)	Estimated remaining capacity at end of Local Plan period (dwellings)	Capacity assessment
Minworth WwTW	77,336	270,780	-39,499	AMBER - Likely to be close to or exceed permit during plan period. Upgrades and / or a change to permit limit may be required. No significant constraints have been identified.

WwTW name	Predicted housing during LP period (no. dwellings)	Predicted employment during LP period (sqm)	Estimated remaining capacity at end of Local Plan period (dwellings)	Capacity assessment
Roundhill WwTW	7,256	44,400	-8,257	AMBER - Likely to be close to or exceed permit during plan period. Upgrades and / or a change to permit limit may be required. No significant constraints have been identified.
Ray Hall WwTW	10,585	168,426	180,103	GREEN - Likely to be sufficient capacity to accommodate growth
Lower Gornal WwTW	1,090	1,600	5,342	GREEN - Likely to be sufficient capacity to accommodate growth

7.3 Storm tank overflows

Appendix A presents performance of storm tanks at WwTWs serving growth in the Sandwell Local Plan, including those located outside of the Borough boundary. Figure 7-3 shows 1 storm tank overflow at Roundhill WwTW that needs investigation based on the average of available data.

Where a storm tank overflow is operating in periods of moderate or light rainfall, or even in dry conditions it indicates either an infiltration problem within the network, the WwTW or its storm tanks are undersized for the population served, or that there are potential operational issues at the WwTW. Further development within a catchment that has a poorly performing storm tank overflow is likely to exacerbate the issue.

The local plan can contribute to this by encouraging the use of SuDS to divert storm water away from the sewer network, reducing the volume that reaches the WwTW. This opportunity is greatest at brownfield sites connected to existing combined sewerage systems.

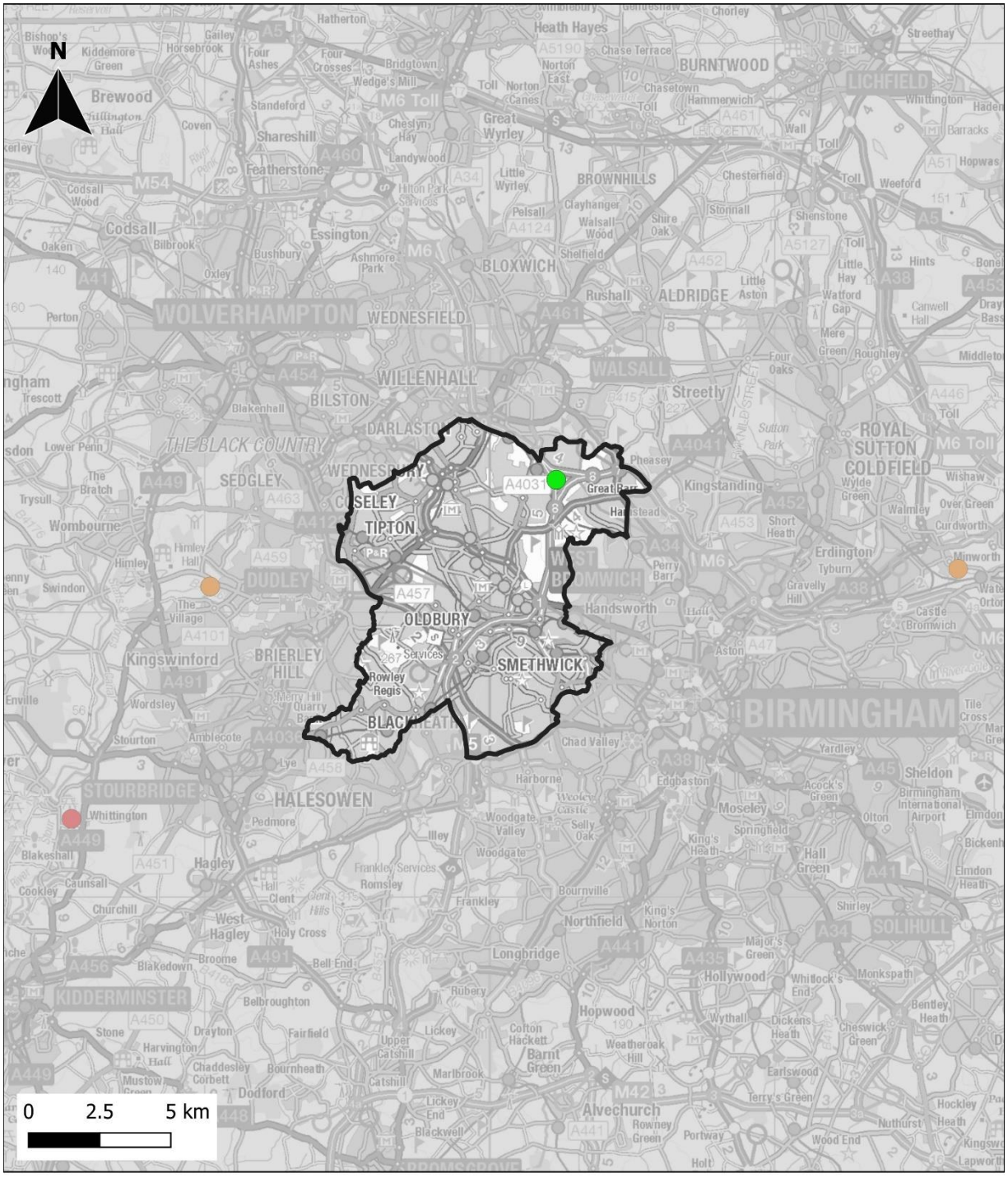


Figure 7-3 Storm Tank Overflows RAG Assessment

7.4 Wastewater Treatment Works Odour Assessment

7.4.1 Introduction

WwTWs have a typical range where odour is experienced. Where developments encroach upon this range, there may become a cause for nuisance and complaints from residents. Managing odour at WwTWs can add considerable capital and operational costs, particularly when retro fitted 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 nuisance.

7.4.2 Methodology

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 areas that the sewerage undertaker considers may be at risk from odour nuisance due to encroachment on an existing WwTW. For Severn Trent Water, this is defined as 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 than an odour impact assessment is needed.

7.4.3 Results

There are two Local Plan allocations within 800m of a WwTW which have been given an amber RAG rating in Table 7-4. The location of these is shown in Figure 8.1. An odour assessment is recommended at these sites as part of the planning process (to be funded by the developer). Consideration should also be given to the layout of these sites where only part of the site boundary lies within the 800m buffer zone. In some cases, only part of a larger site may be at risk, in which case zoning of lower impact land uses (e.g., landscaping, amenity, parking) closer to sources of odour may be sufficient to address this risk.

Table 7-4 Sites at risk of nuisance odour from WwTWs

Local Plan Allocations	RAG rating
Wyndmill Crescent, West Bromwich	AMBER
Cradley Heath Factory Centre	AMBER

Figure 7-4 Severn Trent Water 800m WwTW odour assessment buffer

7.4.4 Conclusions

The odour screening assessment has identified the areas an odour impact assessment would be recommended if development is proposed within the buffered region. Odour impact assessments for sites subsequently indicated to be potentially at risk of experiencing odour nuisance, should be undertaken by site developers.

7.4.5 Recommendations

Action	Responsibility	Timescale
Carry out an odour impact assessment for sites which fall within the buffer zone of WwTW.	Sandwell MBC, developers	Ongoing

7.5 Conclusions

A headroom assessment was carried out comparing the current flow from each WwTW, making allowance for growth already planned, with the permit limit. This provides an estimate of the spare capacity in wastewater treatment infrastructure in Sandwell.

Some of the WwTWs in the study area are expected to be close to or exceeding their permit during the Local Plan period. An increase in the permit limit, and / or upgrades to treatment capacity may be required at these WwTWs in order to accommodate further growth.

Consideration should be given to using capacity in existing permits as this provides a lower carbon cost than upgrading capacity at existing WwTW or building new treatment works.

Where new infrastructure or upgrades to existing infrastructure may be required, engagement between SMBC and the water company is required to ensure that delivery of this infrastructure is aligned with delivery of development sites. Grampian conditions may be sought by the water company should development be in advance of the necessary infrastructure.

There is one poorly performing storm tank overflows at Roundhill WwTW serving Sandwell. Growth within this catchments could result in an increase in the operations of this overflows contributing to a worsening of water quality in the area. Action should be taken by the water companies to address these overflows prior to an increase in wastewater demand being generated by new development.

New development proposed within Severn Trent Water's WwTW odour buffer zones are recommended to undergo an odour impact assessment.

7.6 Recommendations

Table 7-5 Recommendations for wastewater treatment

Action	Responsibility	Timescale
Early engagement with Severn Trent Water is required to ensure that provision of WwTW capacity is aligned with delivery of development.	Sandwell MBC	Ongoing
Provide Annual Monitoring Reports to Severn Trent Water detailing projected housing growth.	Sandwell MBC	Ongoing
Severn Trent Water to assess growth demands as part of their wastewater asset planning activities and feedback to the Council if concerns arise.	Severn Trent Water	Ongoing

8 Water Quality

8.1 Introduction

An increase in the discharge of effluent from Wastewater Treatment Works (WwTW) as a result of development and growth in the area in which they serve can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD), a watercourse is not allowed to deteriorate from its current WFD classification (either as an overall watercourse or for individual elements assessed).

It is Environment Agency (EA) policy to model the impact of increasing effluent volumes on the receiving watercourses. Where the scale of development is such that a deterioration is predicted, a variation to the Environmental Permit (EP) may be required for the WwTW to improve the quality of the final effluent, so that the increased pollution load will not result in a deterioration in the water quality of the watercourse. This is known as "no deterioration" or "load standstill". The need to meet river quality targets is also taken into consideration when setting or varying a permit.

The Environment Agency operational instructions on water quality planning and no-deterioration are currently being reviewed. Previous operational instructions[18] (now withdrawn but with no published replacement) set out a hierarchy for how the no-deterioration requirements of the WFD should be implemented on inland waters. The potential impact of development should be assessed in relation to the following objectives:

- **Could the development cause a greater than 10% deterioration in water quality?** This objective is to ensure that all the environmental capacity is not taken up by one stage of development and there is sufficient capacity for future growth.
- **Could the development cause a deterioration in WFD class of any element assessed?** This is a requirement of the Water Framework Directive to prevent a deterioration in class of individual contaminants. The "Weser Ruling"[19] by the European Court of Justice in 2015 specified that individual projects should not be permitted where they may cause a deterioration of the status of a water body. If a water body is already at the lowest status ("bad"), any impairment of a quality element was considered to be a deterioration. Emerging practice is that a 3% limit of deterioration is applied.
- **Could the development alone prevent the receiving watercourse from reaching Good Ecological Status (GES) or Potential?** Is GES possible with current technology or is GES technically possible after development with any potential WwTW upgrades.

18 Water Quality Planning: no deterioration and the Water Framework Directive, Environment Agency (2012). Accessed online at: http://www.fwr.org/WQreg/Appendices/No_deterioration_and_the_WFD_50_12.pdf on: 10/02/2023.

19 PRESS RELEASE No 74/15, European Court of Justice (2015). Accessed online at: https://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf on: 10/02/2023.

The overall WFD classification of a water body is based on a wide range of ecological and chemical classifications. This assessment focuses on three physio-chemical quality elements; Biochemical Oxygen Demand (BOD), Ammonia, and Phosphate which are key to Water Framework Directive compliance.

BOD – Biochemical Oxygen Demand

BOD is a measure of how much organic material – sewage, sewage effluent or industrial effluent – is present in a river. It is defined as the amount of oxygen taken up by micro-organisms (principally bacteria) in decomposing the organic material in a water sample stored in darkness for 5 days at 20°C. Water with a high BOD has a low level of dissolved oxygen. A low oxygen content can have an adverse impact on aquatic life.

Ammonia

Nitrogen is an essential nutrient required by all plants and animals for the formation of amino acids. In its molecular form nitrogen cannot be used by most aquatic plants, and so it is converted into other forms. One such form is ammonia (NH3). This may then be oxidized by bacteria into nitrate (NO3) or nitrite (NO2). Ammonia may be present in water in either the unionized form NH3 or the ionized form NH4. Taken together these forms are called Total Ammonia Nitrogen.

Although ammonia is a nutrient, in high concentrations it can be toxic to aquatic life, in particular fish, affecting hatching and growth rates.

The main sources in rivers include agricultural sources, (fertilizer and livestock waste), residential sources (ammonia containing cleaning products and septic tank leakages), industrial processes and WwTWs.

Phosphate

Phosphorus is a plant nutrient and elevated concentrations in rivers can lead to accelerated plant growth of algae and other plants. Its impact on the composition and abundance of plant species can have adverse implications for other aspects of water quality, such as oxygen levels. These changes can cause undesirable disturbances to other aquatic life such as invertebrates and fish.

Phosphorus (P) occurs in rivers mainly as Phosphate (PO4), which are divided into Orthophosphates (reactive phosphates), and organic Phosphates.

Orthophosphates are the main constituent in fertilizers used in agriculture and domestic gardens and provide a good estimation of the amount of phosphorus available for algae and plant growth and is the form of phosphorus that is most readily utilized by plants.

Organic phosphates are formed primarily by biological processes and enter sewage via human waste and food residues. Organic phosphates can be formed from orthophosphates in biological treatment processes or by receiving water biota.

Although it is phosphorus in the form of phosphates that is measured as a pollutant, the term phosphorus is often used in water quality work to represent the total phosphorus containing pollutants.

8.2 Water quality modelling

8.2.1 General approach

SIMCAT is used by the Environment Agency to model water bodies and identify where permit changes are needed to prevent deterioration or improve water quality as well as supporting decision making to guide development to locations where environmental deterioration will be reduced. SIMCAT is a 1D model which represents inputs from both point-source effluent discharges and diffuse sources, and the behaviour of solutes in the river.

SIMCAT can simulate inputs of discharge and water quality data and statistically distribute them from multiple effluent sources along the river reach. It uses the Monte Carlo method for distribution that randomly models up to 2,500 boundary conditions. The simulation calculates the resultant water quality as the calculations cascade further downstream.

Once the distribution results have been produced, an assessment can be undertaken on the predicted mean and ninetieth percentile concentrations or loads compared to the Environmental Quality Standards.

The study area is covered by the Thames, Wash and East Anglia SIMCAT models.

Within SIMCAT, the determinands modelled were Biochemical Oxygen Demand (BOD), Ammonia (NH4) and Phosphorus (P). In fresh waterbodies, phosphate is usually the limiting nutrient for algal growth. However, in marine environments, nitrogen is considered to be the limiting nutrient.

The methodology followed is summarised in Figure 8-1 below. In this flow chart, all of the questions in the top row must be answered.

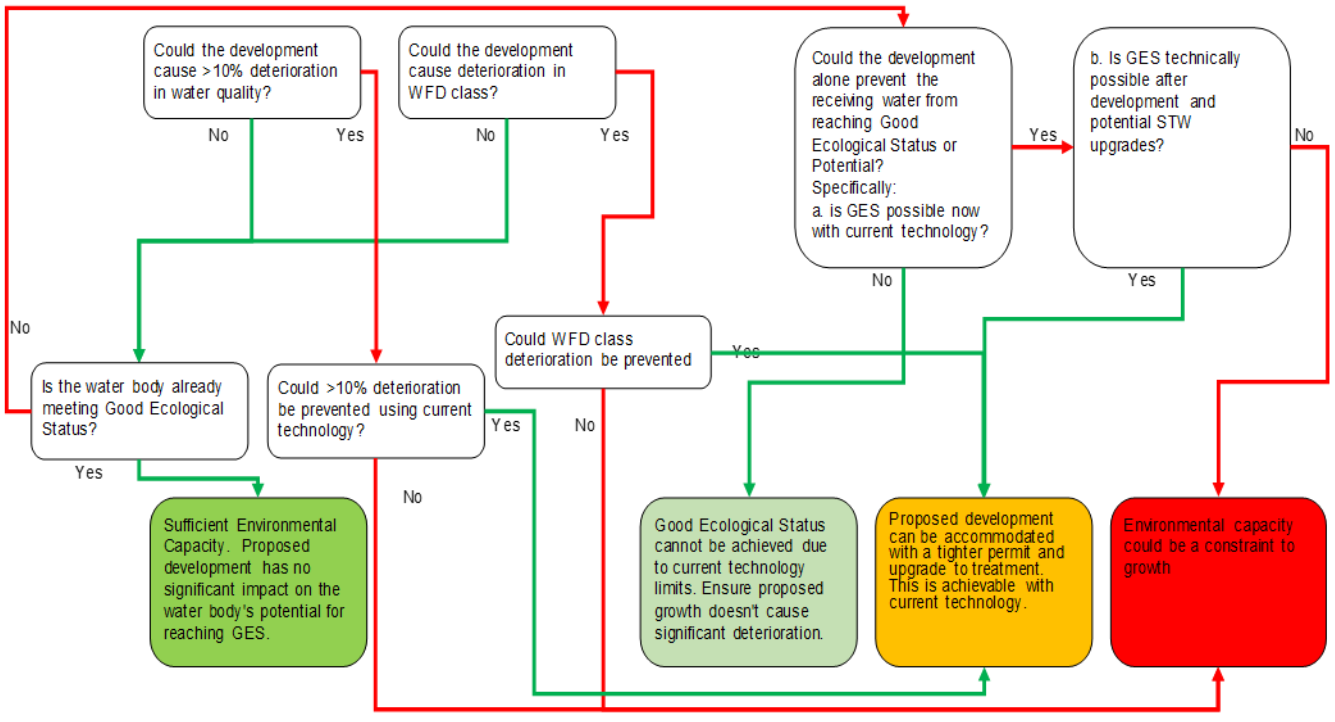


Figure 8-1: Water quality impact assessment following EA guidance

Where modelling indicated growth may lead to a deterioration in the watercourse, or where the watercourse is not currently meeting at least a 'Good' class for each determinant, the models were used to test whether this could be addressed by applying stricter discharge limits. In such cases, a Technically Achievable Limit (TAL) was considered.

The EA advised that the following permit values are achievable using treatment at TAL, and that these values should be used for modelling all WwTW potential capacity irrespective of the existing treatment technology and size of the works:

- Ammonia (90%ile): 1 mg/l
- BOD (90%ile): 5 mg/l
- Phosphorus (mean): 0.25 mg/l

This assessment did not take into consideration whether it is feasible to upgrade each existing WwTW to TAL due to constraints of costs, timing, space, carbon costs etc.

8.2.2 Methodology

The study area is covered by the Severn and Trent SIMCAT models developed by the Environment Agency. The models have been largely based on observed flow and quality data for the period 2014-2020. A widespread update of the models, and the resultant recalibration were not within scope of this project. It was therefore agreed with the EA to update just the effluent flow at WwTWs receiving growth in the study area. Consequently, the modelling work presented should be used to identify areas at risk of water quality deterioration, but not for permit setting.

Flow data from the last three years for each WwTW in the study area was supplied by Severn Trent Water and used to update the model. Several of the WwTWs in the study area already had upgrades completed in AMP6 or planned in AMP7, which would be expected to improve water quality at those locations. These were therefore factored into the model by applying the updated permit limit where it was less than the current discharge in the model. The model was then run in its updated form to set a 2024 baseline. It is expected that further upgrades to WwTWs will be planned in AMP8 (2025-30) which will be defined in the AMP8 WINEP and the business plans for STW. As these documents have not yet been published, AMP8 schemes have not been factored into the modelling.

Additional effluent flow from growth during the Local Plan Update period was added to current flow at WwTWs receiving growth and the model re-run as a future scenario.

No deterioration test

The results from the baseline and future versions of the model were compared to assess the predicted percentage deterioration for each of the modelled determinands. WFD targets for each river reach were provided by the EA and used to determine if there was a risk of a class deterioration.

Where a deterioration of 10% or greater was predicted or a change in class (considered to be a significant deterioration under WFD) a further test was conducted to see if this deterioration

could be prevented by upgrades to treatment processes. This used another version of the model with each WwTW set to operate at their Technically Achievable Limit (TAL).

Good ecological status assessment

Where treatment at TAL and reductions in diffuse sources in the present day could improve water quality to achieve Good Ecological Status (GES), it is important to understand whether this could be compromised as a result of future growth within the catchment.

Guidance from the EA suggests breaking this down in to two questions:

a) Is GES possible now with current technology?

b) Is GES technically possible after development and any potential WwTW upgrades?

If the answer to questions a) and b) are both 'Yes' or both 'No' then the development can be assessed as having no significant impact on the water bodies potential for reaching GES, i.e., the development alone is not preventing GES from being achieved.

If the answer to a) is 'Yes' and the answer for b) is 'No' then development is having a significant impact, i.e., before development GES could be achieved with upstream improvements, and after growth the additional effluent from growth prevents GES being achieved.

The possible answers are summarised in Table 8-1.

Run type 9 within SIMCAT was used which assumes that upstream flow at each treatment works is at good ecological status. This simulates improvements being made in upstream water quality. The water quality of the discharge from each WwTW in order to maintain GES is then calculated by the model.

Table 8-1: Possible GES assessment results

Predicted to achieve GES after growth	Could achieve GES today with improvements in upstream water quality? (a)	Could achieve GES in the future with improvements in upstream water quality? (b)	Assessment Result
YES	N/A	N/A	GREEN - Sufficient environmental capacity. Proposed development has no significant impact on the water body's potential for meeting GES.
NO	YES	YES	AMBER - Proposed development can be accommodated with a tighter permit and upgrade to treatment. This is achievable with current technology.

Predicted to achieve GES after growth	Could achieve GES today with improvements in upstream water quality? (a)	Could achieve GES in the future with improvements in upstream water quality? (b)	Assessment Result
NO	NO	NO	YELLOW - Good ecological status cannot be achieved due to current technology limits. Ensure proposed growth doesn't cause significant deterioration.
NO	YES	NO	RED - Environmental capacity could be a constraint to growth.

8.2.3 Results

The first test applied compares the future scenario to the baseline and assesses whether a significant deterioration in water quality occurs – either a 10% deterioration in water quality or a deterioration in WFD class. Where, a significant deterioration is predicted, the TAL scenario then assesses whether this deterioration could be prevented by improvements in treatment processes.

Table 8-2 below summarises the results of the water quality assessments. Where a "green" score is given, deterioration was less than 10% for each determinand, and no change in WFD class is predicted. Where an "amber assessment is given, a 10% deterioration or change in WFD class is predicted, but this could be prevented by improvements in treatment technology. In these cases, upgrades may therefore be required at that WwTW or at WwTW upstream.

A "red" assessment would be given where a significant deterioration in water quality is predicted, and it cannot be prevented by improvements in treatment processes.

All four WwTWs serving growth during the plan period are predicted to experience a moderate deterioration, with a less than 10% deterioration in all determinands predicted. No changes in class are predicted as a result of the additional growth.

In this assessment, improvements in treatment processes have been modelled by assuming the WwTW is operating at TAL. It has not investigated the feasibility of upgrading individual WwTWs. This should be performed by Severn Trent Water who have the detailed knowledge of their assets, and the Environment Agency who are responsible for setting permit limits at WwTW. STW in their response to the SMBC Local Plan sites identified the following water quality schemes being undertaken during this AMP period and planned for future AMP periods.

- Lower Gornal – scheme currently underway in AMP7 (2020-25).

- Ray Hall – scheme planned for AMP8 to address incoming tighter total phosphorous permit and control average daily flow to ensure WFD river water quality status.
- Roundhill -scheme currently underway in AMP7 (2020-25). A new phosphorous and ammonia permit will be introduced in December 2024.

Further capacity upgrades are proposed up to and during AMP9 at Minworth and Roundhill WwTWs.

Appendix B maps the predicted deterioration in water quality visually for Ammonia, BOD and Phosphate in the future, and the predicted deterioration if WwTWs were performing at the technically achievable limit.

The first set of maps in Appendix B.1 shows the modelled results if wastewater discharges increased by the volume predicted during the Local Plan period. They show a result at the point of mixing (i.e., where the WwTW discharges) and the results downstream in the river. These are colour coded based on whether deterioration is greater (red) or less than (amber) 10%. Areas where no deterioration is predicted are coloured green.

The second set of maps in Appendix B.2 shows the modelled results in the TAL scenario, where each WwTW has been upgraded to the technically achievable limit. This shows areas where deterioration could not be prevented. In each case this is less than 10%.

The growth stated in Table 8-1 includes recent completions and neighbouring authority growth as well as growth from within Sandwell District.

Table 8-2: WFD assessment results

WwTW	Could the development cause a greater than 10% deterioration in water quality for one or more of Ammonia, BOD, or Phosphate?	Could the development cause a deterioration in WFD class of any element?	Can a deterioration of >10% or in class be prevented by treatment at TAL
Ray Hall STW	No	No	Yes
Minworth STW	No	No	Yes
Lower Gornal STW	No	No	Yes
Roundhill STW	No	No	Yes

Table 8-3 summarises the results of the GES assessment outlined in section 8.2.2. Four different assessments are possible which are shown in Table 8-1 above.

- If good ecological status is predicted to be achieved within the receiving waterbody following growth during the plan period, a green assessment is given. In this case, it can be said that there is environmental capacity to accommodate growth.

- Where GES is not currently being achieved but could be achieved if upstream water quality were improved, then an amber score is given – growth could be accommodated without preventing a waterbody achieving GES in the future.
- Where GES cannot be achieved either today or in the future, despite upgrades in treatment processes, and improvements in upstream water quality, then a yellow assessment is given – and it can be said that GES cannot be achieved due to the limits of current technology. Growth alone is not predicted to prevent GES being achieved in the future.
- Should GES be achievable today, but not in the future due to growth, a red assessment would be given, and it can be said that environmental capacity could be a constraint to growth, i.e., growth alone could prevent good ecological status being achieved in the future.

Table 8-3: GES assessment results

WwTW	Ammonia assessment	Biochemical Oxygen Demand (BOD) assessment	Phosphate assessment
Minworth STW	GREEN-Sufficient environmental capacity. Proposed development has no significant impact on the water body's potential for meeting GES.	GREEN-Sufficient environmental capacity. Proposed development has no significant impact on the water body's potential for meeting GES.	AMBER-Proposed development can be accommodated with a tighter permit and upgrade to treatment. This is achievable with current technology
Ray Hall STW	AMBER-Proposed development can be accommodated with a tighter permit and upgrade to treatment. This is achievable with current technology	GREEN-Sufficient environmental capacity. Proposed development has no significant impact on the water body's potential for meeting GES.	YELLOW-Good ecological status cannot be achieved due to current technology limits. Ensure proposed growth doesn't cause significant deterioration
Roundhill STW	AMBER-Proposed development can be accommodated	GREEN-Sufficient environmental capacity. Proposed	YELLOW-Good ecological status cannot be achieved due to current

WwTW	Ammonia assessment	Biochemical Oxygen Demand (BOD) assessment	Phosphate assessment
	with a tighter permit and upgrade to treatment. This is achievable with current technology	development has no significant impact on the water body's potential for meeting GES.	technology limits. Ensure proposed growth doesn't cause significant deterioration
Lower Gornal STW	YELLOW-Good ecological status cannot be achieved due to current technology limits. Ensure proposed growth doesn't cause significant deterioration	AMBER-Proposed development can be accommodated with a tighter permit and upgrade to treatment. This is achievable with current technology	YELLOW-Good ecological status cannot be achieved due to current technology limits. Ensure proposed growth doesn't cause significant deterioration

The results of the water quality modelling show that additional growth is unlikely to cause a significant deterioration in water quality or a change in WFD class at and downstream of the WwTW discharge locations. At all WwTWs, the proposed growth does not prevent GES being achieved and is not a constraint to growth.

As part of STWs assessment of WwTW treatment, Ray Hall WwTW can only treat a 'certain amount of load' and as such future growth will be 'diverted and accommodated by Minworth WwTW'. It is unclear how much of Sandwell's growth can be accommodated at Ray Hall and how much wastewater would be transferred to Minworth. For the water quality results presented above and, in the appendices, it was assumed that Ray Hall could accommodate Sandwell's additional growth and the growth of neighbouring authorities. However, this scenario may not be feasible if capacity at Ray Hall is limited.

As such an additional future scenario has been run with the additional demand from commitments, allocations and windfall expected to be served by Ray Hall during the Local Plan period applied to Minworth WwTW. This represents a future scenario where only completions between 2022-2023 are assigned to Ray Hall WwTW and all commitment and allocation growth is assigned to Minworth WwTW. In reality, some of this growth may be able to be accommodated at Ray Hall. This scenario represents a worst case scenario.

Results show that the additional flow does not significantly impact the deterioration at Minworth WwTW and environmental sites downstream which remains <10%. Good Ecological Status (GES) will remain.

Whilst this assessment shows that deterioration would be prevented, Severn Trent Water have not confirmed whether this additional growth can be accommodated at Ray Hall. The feasibility of connecting new developments to Minworth or diverting flow have also not been assessed in this study.

8.3 Water Framework Directive Overview

The Water Framework Directive (WFD) aims to ensure "no deterioration" in the environmental status of rivers and sets objectives to improve rivers to meet "good" status. LPAs must have regard to the WFD and associated statutory objectives as implemented in the EA's River Basin Management Plans (RBMPs).

Figure 8-2 shows the overall WFD classification (2019) for waterbodies in Sandwell. This is broken down into the determinands usually assessed in WCSs for each of the waterbodies that are predicted to receive additional effluent from growth during the plan period.

Within Sandwell only the Grand Union Canal (Wendover) has an overall status of "good", the majority have “moderate” and "poor" status, and two (Wye - source to High Wycombe fire station, and Summerstown Ditch/ Launton and Cutters Brook) have a classification of "bad" - which is the lowest status possible.

The overall WFD status is made of Ecological and Chemical status, which are further broken down into sub-elements, the measurement of which is prioritised for each waterbody based on its characteristics and risk, hence not all elements are reported for each river. The WFD classification for invertebrates shows a wide variation across the study area with some waterbodies classed as "high" (the highest status possible) and one classified as Bad (Summerstown Ditch/ Launton and Cutters Brook). Invertebrate status is an indicator of the overall health of the aquatic ecology and other biological elements.

Maps showing the WFD Overall Status, Ecological Status, Fish Status and Invertebrates status of the waterbodies in Buckinghamshire are also shown below in Figure 8-1 to Figure 8-4. Invertebrate and fish statuses are used within the WFD as indicators of the overall health of the aquatic ecology and water quality.

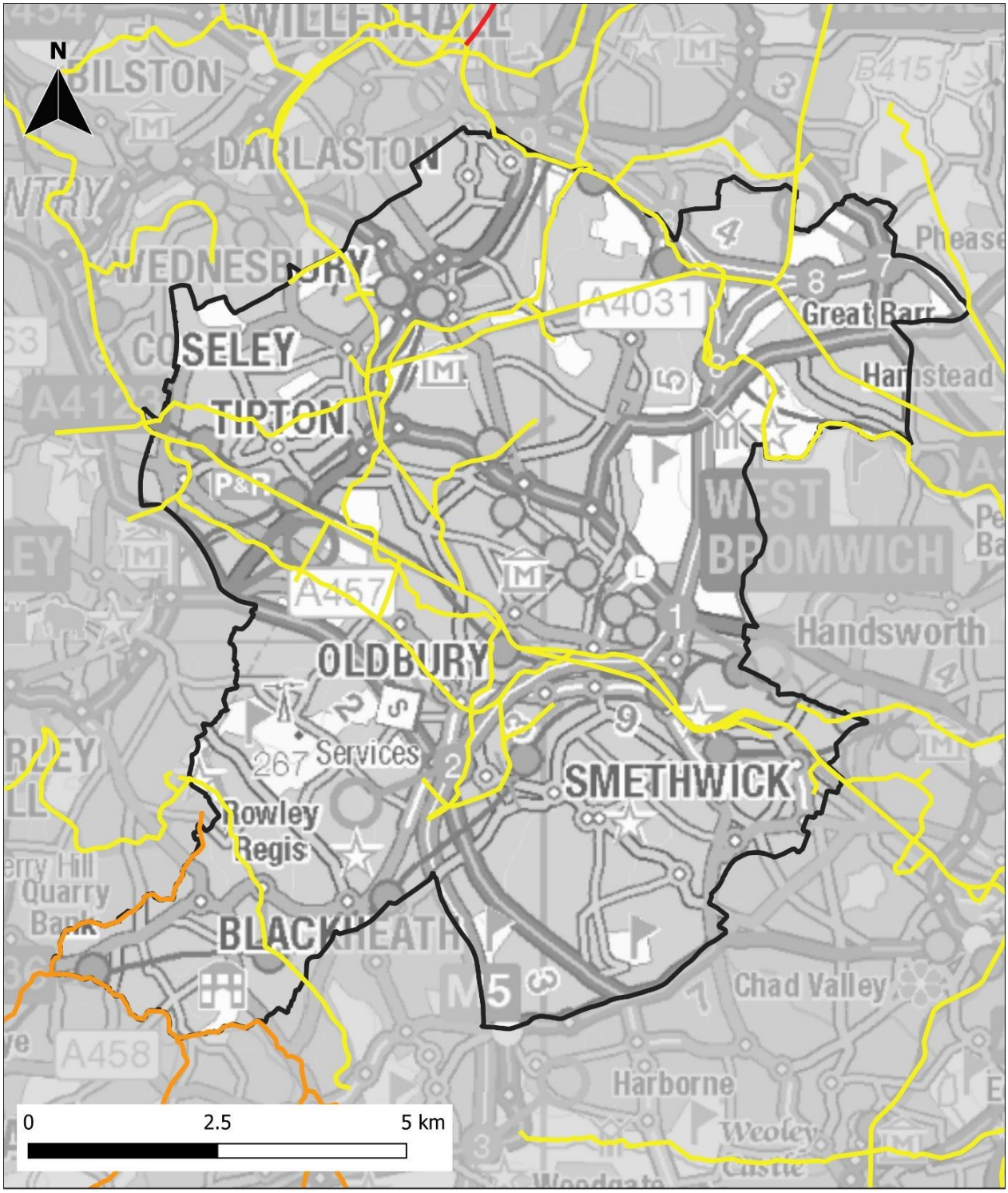
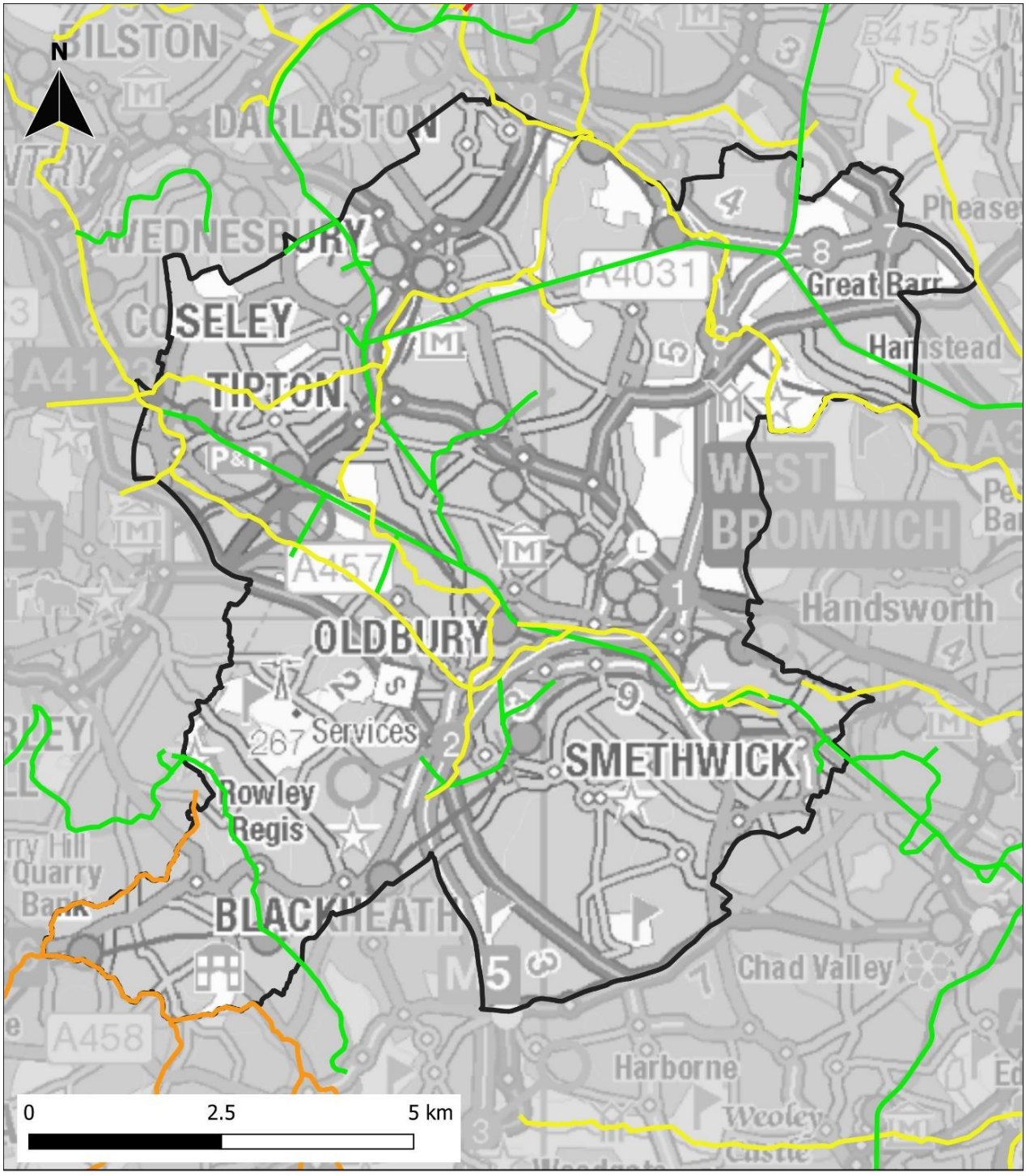


Figure 8-2 Overall WFD status for waterbodies in Sandwell



Sandwell MBC boundary

WFD waterbodies - Ecological Status

- Good
- Moderate
- Poor
- Bad

Figure 8-3 WFD Ecological status for waterbodies in Sandwell

Figure 8-4 WFD Fish status for waterbodies in Sandwell

Sandwell MBC boundary

WFD waterbodies - Invertebrates

Moderate

Poor

Bad

Figure 8-5 WFD Invertebrate status for waterbodies in Sandwell

8.4 Reasons for Not Achieving Good (RNAG)

The latest Water Framework Directive assessment data shows that the majority of watercourses in Sandwell have “moderate” and "poor" status. The EA reasons for not achieving good (RNAG) dataset indicates that the water industry (sewage discharges) and (Urban and Transport) Urbanisation - urban development are the main reasons for watercourses not achieving good status in this area.

8.5 Priority substances

As well as the physico-chemical water quality elements (BOD, Ammonia, Phosphate etc.) addressed above, a watercourse can fail to achieve Good Ecological Status due to exceeding permissible concentrations of hazardous substances. Currently 33 substances are defined as hazardous or priority hazardous substances, with others under review. Such substances may pose risks both to humans (when contained in drinking water) and to aquatic life and animals feeding in aquatic life. These substances are managed by a range of different approaches, including EU and international bans on manufacturing and use, targeted bans, selection of safer alternatives and end-of-pipe treatment solutions. There is considerable concern within the UK water industry that regulation of these substances by setting permit values which require their removal at wastewater treatment works will place a huge cost burden upon the industry and its customers, and that this approach would be out of keeping with the "polluter pays" principle.

We also consider how the planning system might be used to manage priority substances:

- Industrial sources – whilst this report covers potential employment sites, it doesn't consider the type of industry and therefore likely sources of priority substances are unknown. It is recommended that developers should discuss potential uses which may be sources of priority substances from planned industrial facilities at an early stage with the EA and, where they are seeking a trade effluent consent, with the sewerage undertaker.
- Agricultural sources - There is limited scope for the planning system to change or regulate agricultural practices. UK water companies are involved in a range of “Catchment-based Approach” schemes aimed at reducing diffuse sources of pollutants, including agricultural pesticides.
- Surface water runoff sources - some priority substances e.g., heavy metals, are present in urban surface water runoff. It is recommended that future developments would manage these sources by using SuDS that provide water quality treatment, designed following the CIRIA SuDS Manual. This is covered in more detail in Sections 9.5.2 and 9.5.3.
- Domestic wastewater sources - some priority substances are found in domestic wastewater as a result of domestic cleaning chemicals, detergents, pharmaceuticals, pesticides, or materials used within the home. Whilst an increase in the population due to housing growth could increase the total volumes of such substances being discharged to the environment, it would be more appropriate to manage these substances through

regulation at source, rather than through restricting housing growth through the planning system.

No further analysis of priority substances will be undertaken as part of this study.

8.6 WINEP

The actions from the Water Industry National Environment Programme that relate to water quality are presented in Appendix 0 and show that most WwTWs in the study area have an action against them. In most cases these include monitoring of storm overflows and the volume of sewage being treated. In many, a permit condition to limit the concentration of phosphorus and ammonia in the treated effluent is being applied in order to improve downstream water quality.

8.7 Conclusions

The EA reasons for not achieving good (RNAG) dataset indicates that the water industry (sewage discharges) and urbanisation are the main reasons for watercourses not achieving good status in this area. Growth during the local plan period will also increase the discharge of treated wastewater from WwTWs in Sandwell. There is a potential for this to cause a deterioration in water quality in the receiving watercourses and this must be carefully considered.

The modelling indicates the growth during the Local Plan period would not result in a significant deterioration (10% or over or deterioration in class) in water quality at any of the modelled WwTWs. In all cases, this deterioration could be prevented by improvements in treatment. Some tightening of permit limits may already be planned in AMP8 but details have not yet been published.

Growth alone will not prevent good ecological status being prevented in the future should improvements in upstream water quality be made.

An additional modelling scenario was run where the additional demand from growth expected to be served by Ray Hall was diverted to Minworth and this showed no significant deterioration in water quality and does not prevent GES from being achieved.

Where a WwTW is shared with a neighbouring authority, coordination of growth plans in collaboration with Severn Trent Water is essential to ensure that infrastructure is in place prior to development to prevent a breach of the environmental permit.

8.8 Recommendations

Table 8-4 Recommendations for water quality

Action	Responsibility	Timescale
Provide annual monitoring reports to TW and AW detailing projected housing growth in the Local Authority	SMBC	Ongoing
Take into account the full volume of growth (From UDC and neighbouring authorities) within the catchment	STW	Ongoing

9 Environmental Opportunities and Constraints

9.1 Introduction

Development has the potential to cause an adverse impact on the environment through a number of routes, such as worsening of air quality, pollution to the aquatic environment or disturbance to wildlife. In the context of a Water Cycle Study, the impact of development on the aquatic environment is assessed. This chapter considered both water quantity (impact of abstraction) and water quality (impact of wastewater discharge and runoff) on protected sites.

A source-pathway-receptor approach can be taken to investigate the risk and identify where further assessment or action is required.

In Stage 1, a screening exercise was conducted to identify protected sites (such as SSSIs) that could be impacted by changes in Water Quality. The Stage 2 analysis builds on this and links it to the water quality results presented in section 8, as well as identifying protected sites that could be impacted by increases in abstraction.

The Stage 1 report also outlined the benefits of SuDS and Natural Flood Management which offer opportunities to manage surface water to achieve multiple benefits. The recommendations from that section have been reproduced in Stage 2.

9.2 Impact of abstraction

9.2.1 Overview

Abstraction of water within a catchment, either from groundwater or surface water sources, is necessary to provide a public water supply, for industrial processes and for agriculture. When the volume of water being abstracted becomes too high, it can cause environmental damage by reducing river flow, or lowering the water table.

Changes in river flow can impact sensitive ecosystems, for example Trout require a clean gravel bed to lay their eggs. A reduction in river flow can cause sediment to build up, blocking the spaces the fish require to lay their eggs impacting their reproductive cycle. Changes in groundwater levels can also affect the flow regime in rivers and can cause drying of wetland sites.

The precise location of abstraction points for public water supply in England is not available for reasons of national security. Furthermore, water demand within a WRZ can be met by anywhere within that WRZ, or from a neighbouring WRZ if the transfer between WRZs is used to provide some of the water available for use. It is therefore not possible to trace an impact of an individual development site back to a particular

water abstraction and therefore to an environmental impact. The assessments in this report therefore rely on information in the public domain.

9.2.2 Methodology

Sandwell is served by South Staffordshire Water via its single WRZ, and by Severn Trent Water via its Strategic Grid and Wolverhampton WRZs. Abstraction either from surface water sources or from groundwater sources can occur anywhere within these zones. However, the impact of the abstraction could be felt outside of the WRZ within the same groundwater body, or downstream in surface waterbodies. In both cases this could be well outside the LPA boundary.

Groundwater dependent ecosystems

Figure 9-1 shows a schematic of how GWDTEs were identified. The LPA boundary is within a WRZ. Water abstracted anywhere within that WRZ could be used to serve growth within the LPA. In the diagram below, there are two abstraction points. Abstraction 1 could impact an area outside of the both the LPA boundary and the WRZ. However, there are no protected sites within that groundwater body. Abstraction 2 also impacts an area both within and outside of the LPA boundary. Protected site A is within the WRZ, but may not be impacted directly by an abstraction. Protected site B is outside of the WRZ and outside of the groundwater body containing an abstraction and is therefore unlikely to be impacted by growth. Protected site 3 is within a groundwater body containing an abstraction. There is a risk that an increase in abstraction could impact the protected site.

The location of abstraction points within the study area is not known, and so the approach must be taken that GWDTE anywhere within the combined extent of the WRZ and groundwater bodies overlapping the WRZ could be impacted by an increase in abstraction.

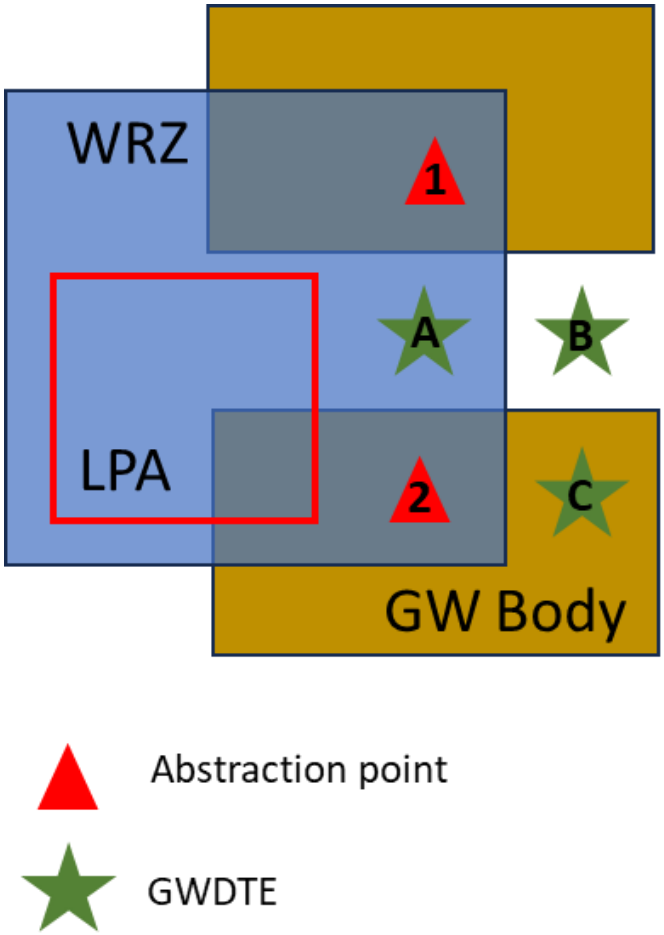


Figure 9-1 Definition of groundwater study area

The following procedure was followed:

- Define study area for Sandwell - based on extent of WRZ and WFD Groundwater bodies that overlap with the WRZs.
- Identify Groundwater Dependent Terrestrial Ecosystems (GWDTE) within the study area using the EA's GWDTE dataset.
- Identify GWDTEs that are within groundwater bodies with flow identified as a Significant Water Management Issue (SWMI).

Surface water based ecosystems

Figure 9-2 shows a schematic of how protected sites on surface waterbodies were identified. As in the groundwater example, water could be abstracted from anywhere within the WRZ. Protected site A is downstream of an abstraction and so could be impacted by changes in river flow resulting from the abstraction. Protected site B whilst further downstream in the river basin, it is on a tributary not connected with the WRZ, abstraction is unlikely to have an impact. Protected site C is upstream of the abstraction so would not be impacted.

As with the groundwater abstractions, their location was not available as part of this study. The approach is therefore taken that any protected site directly on a waterbody

that flows through or is downstream of the WRZ could be impacted by abstraction. Protected sites upstream or on tributaries that have not flowed through the WRZ are ignored.

In order to identify protected sites that may be at risk, Flood Zone 2 from the Risk of Flooding from Rivers and the Sea mapping was used to define an area that was either adjacent to a river or could be reasonably expected to receive surface water from a river.

The following procedure was followed:

- Define study area for Sandwell - based on extent of WRZ and WFD Surface water bodies that overlap with the WRZs.
- Identify protected sites within the study area.
- Filter these based on their proximity to waterbodies within the study area defined using flood zone 2 as a proxy.
- Identify the protected sites within a catchment where flow is recorded as a significant water management issue.

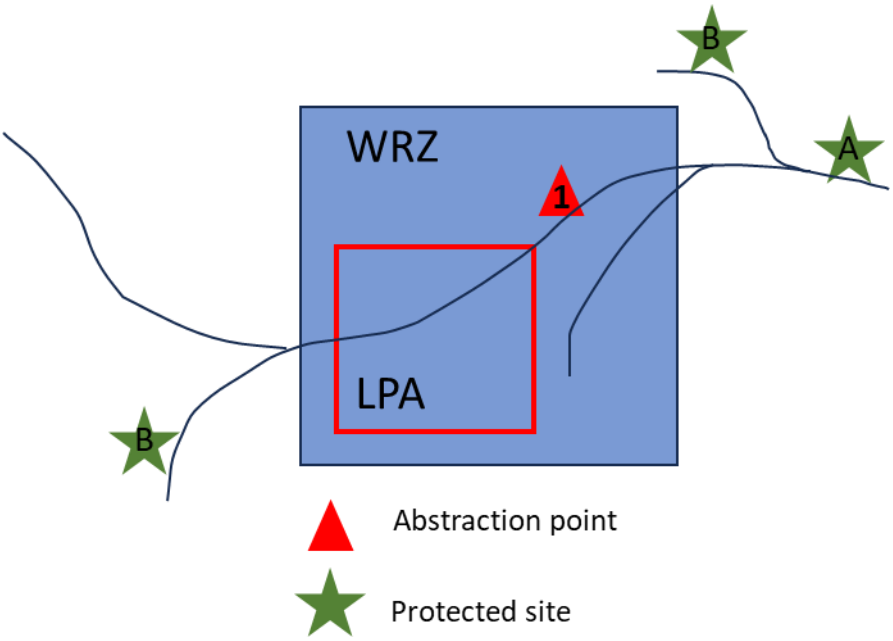


Figure 9-2 Definition of surface water study area

9.2.3 Results

There are 407 Groundwater Dependent Terrestrial Ecosystems (GWTDEs) that are within a groundwater body that overlaps with WRZs serving growth across Sandwell MBC's Local Plan period. These are shown in Figure 9-3 and presented in Appendix D. 42 of these are in groundwater bodies where flow is noted as a significant water management issue (SWMI) - either due to groundwater or surface water abstraction.

There are 311 SSSIs that are adjacent to waterbodies within the WRZs serving growth across the Local Plan period and downstream of Sandwell. There are also 24 SPA and RAMSAR sites, and 37 SACs. These are shown in Figure 9-4 and presented in Appendix E. 50 of these have flow abstraction (from surface water) identified as a significant water management issue.

Some of the SSSIs are also designated as Ramsar sites, SACs or SPAs and are also included in Appendix E.

Figure 9-3 GWDTE within and downstream of WRZs serving growth in Sandwell MBC's Local Plan

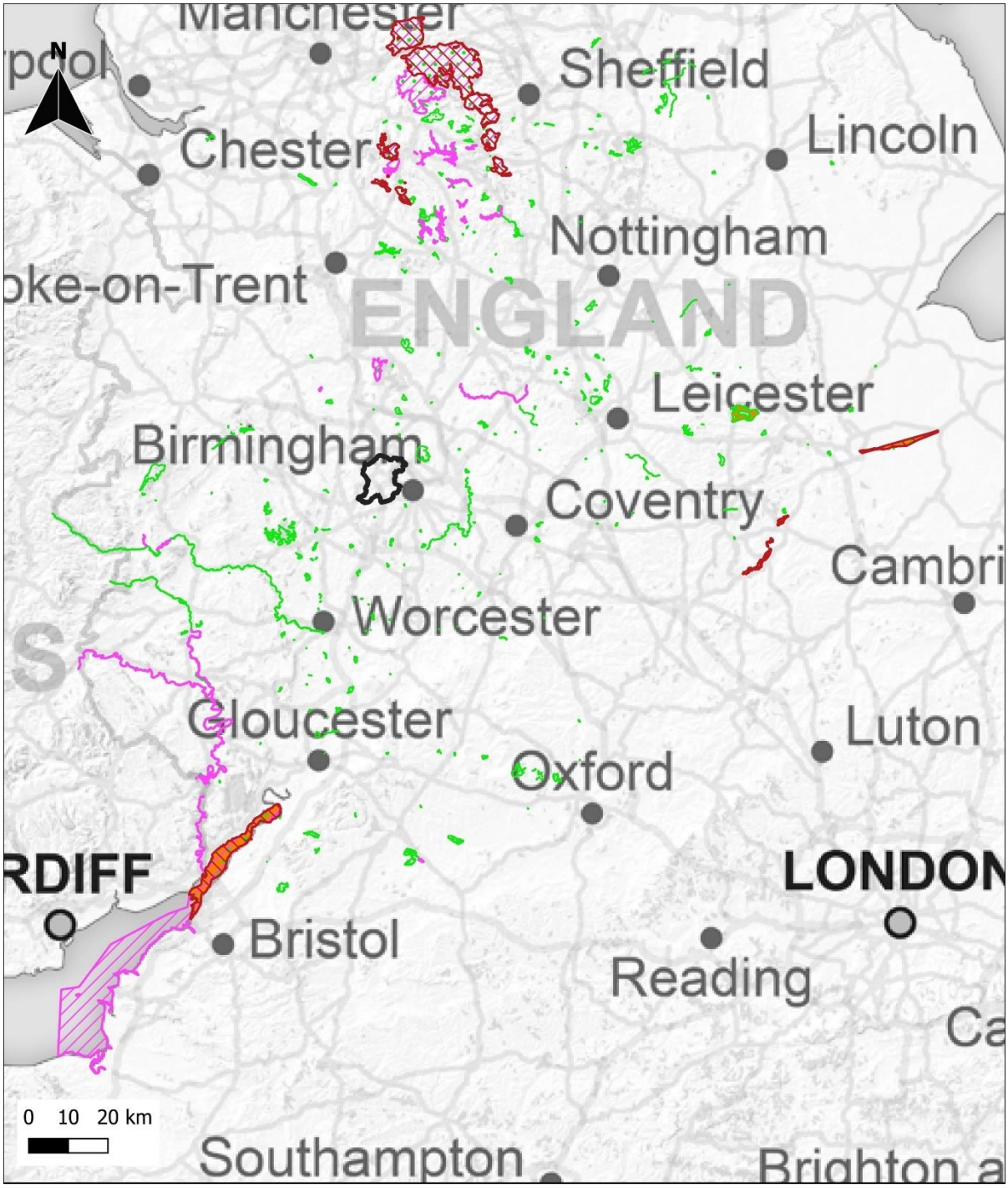


Figure 9-4 Protected areas within or downstream of WRZs serving growth in Sandwell MBC's Local Plan

9.3 Water quality impact

9.3.1 Sources of pollution

Water pollution is usually categorised as either diffuse or point source. Point source sources come from a single well-defined point, an example being the discharge from a WwTW.

Diffuse pollution is defined as “unplanned and unlicensed pollution from farming, old mine workings, homes and roads. It includes urban and rural activity and arises from industry, commerce, agriculture and civil functions and the way we live our lives.”

Examples of diffuse sources of water pollution include:

- Contaminated runoff from roads – this can include metals and chemicals
- Drainage from housing estates
- Misconnected sewers (foul drains to surface water drains)
- Accidental chemical/oil spills from commercial sites
- Surplus nutrients, pesticides and eroded soils from farmland
- Septic tanks and non-mains sewer systems

The most likely sources of diffuse pollution from new developments include drainage from housing estates, runoff from roads and discharges from commercial and industrial premises. The pollution risk posed by a site will depend on the sensitivity of the receiving environment, the pathway between the source of the runoff and the receiving waters, and the level of dilution available. After or during heavy rainfall, the first flush of water carrying accumulated dust and dirt is often highly polluting.

Whilst the threat posed by an individual site may be low, a number of sites together may pose a cumulative impact within the catchment.

Runoff from development sites should be managed by a suitably designed SuDS scheme. More information on SuDS can be found in section 9.5.2. Potential impacts on receiving surface waters include the blanketing of riverbeds with sediment, a reduction in light penetration from suspended solids, and a reduction in natural oxygen levels, all of which can lead to a loss in biodiversity.

9.3.2 Pathways

Pollutants can take a number of different pathways from their source to a “receptor” – a habitat or species that can be impacted. This could be overland via surface water flow paths, via the river system, or via groundwater or a combination of all three. For the purpose of this study, it should be assumed at any protected site has the potential to be impacted by surface runoff from adjacent development sites. Linkages between development sites and protected sites will be explored further in Section 9.4.

9.3.3 Receptors

A receptor in this case is a habitat or species that is adversely impacted by a pollutant. Both the rivers and groundwater as well as being pathways, can also be considered to be receptors. Groundwater bodies are also given a status under the WFD which is reported in section 4.2.2 for the groundwater bodies across Buckinghamshire.

Within the study area and downstream are many sites with environmental designations such as:

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Ramsar sites (Wetlands of International Importance)
- Priority Habitats and Priority Headwaters

Protected sites within Sandwell can be seen in Section 9.2.3.

9.4 Assessment of Point Source Risk

9.4.1 Methodology

In order to identify which of the protected sites may be at risk, Flood Zone 2 from the Risk of Flooding from Rivers and the Sea mapping was used to define an area that was either beside a river or could be reasonable expected to receive surface water from a river during times of flood. Where a WwTW serving growth in the plan period was present in the catchment upstream of the protected site, this site was taken forward for further assessment.

Where there were no WwTW serving growth upstream, these protected sites were discounted as no deterioration would be predicted in a water quality model, and the impact would be expected to be minimal. However, in these cases the overall catchment water quality should be considered where for example they are designated for migratory fish species that may spend part of their lifecycle elsewhere in the catchment.

Whilst deterioration in water quality may not always lead to a significant impact at a protected site such as a SSSI, modelled deterioration can be used to highlight areas of risk for further analysis in the Habitats Regulations Assessment.

9.4.2 Results

There are no significant deteriorations in water quality predicted at environmental sites downstream of WwTWs serving growth from Sandwell.

There are two SACs within proximity of the Stourbridge Canal and the Cannock Extension Canal which both flow through Sandwell downstream. Following correspondence with the Habitat Regulation Assessment (HRA) consultant, there are possible interactions between the canals and watercourses in the vicinity of these

sites and there are believed to be several discharges into the canals. The details of these discharges are unknown and not believed to be from the watercourses discharging from the study area, as they are located downstream of the sites. As the SIMCAT WQ modelling does not include canals and only models the water quality along rivers the impact on water equality in the Canals within Sandwell or around the SAC sites cannot be modelled. Based on the results of the water quality modelling there is no significant deterioration as a result of the proposed growth and as such it is not believed that these SAC sites would be impacted if the canals and rivers were hydraulically linked.

A summary of the percentage deterioration in watercourses adjacent to environmental sites is presented in Appendix F.

9.5 Protection and mitigation

9.5.1 Groundwater Protection

Groundwater is an important source of water in England and Wales.

The Environment Agency is responsible for the protection of “controlled waters” from pollution under the Water Resources Act 1991. These controlled waters include all watercourses and groundwater contained in underground strata.

The zones are based on an estimate of the time it would take for a pollutant which enters the saturated zone of an aquifer to reach the source of abstraction or discharge point (Zone 1 = 50 days, Zone 2 = 400 days, Zone 3 is the total catchment area). The Environment Agency will use Source Protection Zones (SPZs) alongside other datasets such as the Drinking Water Protected Areas (DrWPAs) and aquifer designations as a screening tool to show:

- Areas where the EA would object in principle to certain potentially polluting activities, or other activities that could damage groundwater,
- Areas where additional controls or restrictions on activities may be needed to protect water intended for human consumption,
- How it prioritises responses to incidents.

The EA have published a position paper[20] outlining its approach to groundwater protection which includes direct discharges to groundwater, discharges of effluents to ground and surface water runoff. This is of relevance to this water cycle study where a development may manage surface water through SuDS.

Sewage and Trade Effluent

Discharge of treated sewage of 2m^3 per day or less to ground are called small sewage discharges (SSDs). The majority of SSDs do not require an environmental permit if they comply with certain qualifying conditions. A permit will be required for all SSDs in source protection zone 1 (SPZ1).

For treated sewage effluent discharges, the EA requires the use of shallow infiltration systems, which maximise the attenuation within the drainage blanket and the underlying unsaturated zone. Whilst some sewage effluent discharges may not pose a risk to groundwater quality individually, the cumulative risk of pollution from aggregations of discharges can be significant. Improvement or pre-operational conditions may be imposed before granting an environmental permit. The EA will only agree to developments where the addition of new sewage effluent discharges to

20 The Environment Agency’s approach to groundwater protection, Environment Agency (2018). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf on: 10/02/2023.

ground in an area of existing discharges is unlikely to lead to an unacceptable cumulative impact.

Generally, the Environment Agency will only agree to developments involving release of sewage effluent, trade effluent or other contaminated discharges to ground if it is satisfied that it is not reasonable to make a connection to the public foul sewer. The EA would normally expect to only permit new private discharges where the distance to connect to the nearest public sewer exceeds the number of dwellings multiplied by 30m. So, for example, a development of 100 dwellings would need to be more than 3km from a public sewer. The developer would have to provide evidence of why the proposed development cannot connect to the foul sewer in the planning application. This position will not normally apply to surface water run-off via sustainable drainage systems and discharges from sewage treatment works operated by sewerage undertakers with appropriate treatment and discharge controls.

Deep infiltration systems (such as boreholes and shafts) are not generally accepted by the EA for discharge of sewage effluent as they bypass soil layers and reduce the opportunity for attenuation of pollutants.

Discharges of surface water run-off to ground at sites affected by land contamination, or from sites for the storage of potential pollutants are likely to require an environmental permit. This could include sites such as garage forecourts and coach and lorry parks. These sites would be subject to a risk assessment with acceptable effluent treatment provided.

Discharge of Clean Water

“Clean water” discharges such as runoff from roofs or from roads, may not require a permit. However, they are still a potential source of groundwater pollution if they are not appropriately designed and maintained.

Where infiltration SuDS schemes are proposed to manage surface runoff they should:

- Be suitably designed;
- Meet Government non-statutory technical standards[21] for sustainable drainage systems – these should be used in conjunction with the NPPF and PPG; and
- Use a SuDS management treatment train

A hydrogeological risk assessment is required where infiltration SuDS is proposed for anything other than clean roof drainage in a SPZ1.

Source Protection Zones in Sandwell

21 Sustainable Drainage Systems: non-statutory technical standards, Department for Environment, Food & Rural Affairs (2015). Accessed online at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards
on: 10/02/2023.

Source protection zones (SPZs) form a key part of the Environment Agency's approach to controlling the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants.

The Environment Agency's Manual for the Production of Groundwater Source Protection Zones[22], details position statements which provide information about the Environment Agency's approach to managing and protecting groundwater.

Proposed development locations within or close to Source Protection Zones, should be assessed in relation to the relevant Environment Agency position statements. These are listed in Table 9-1.

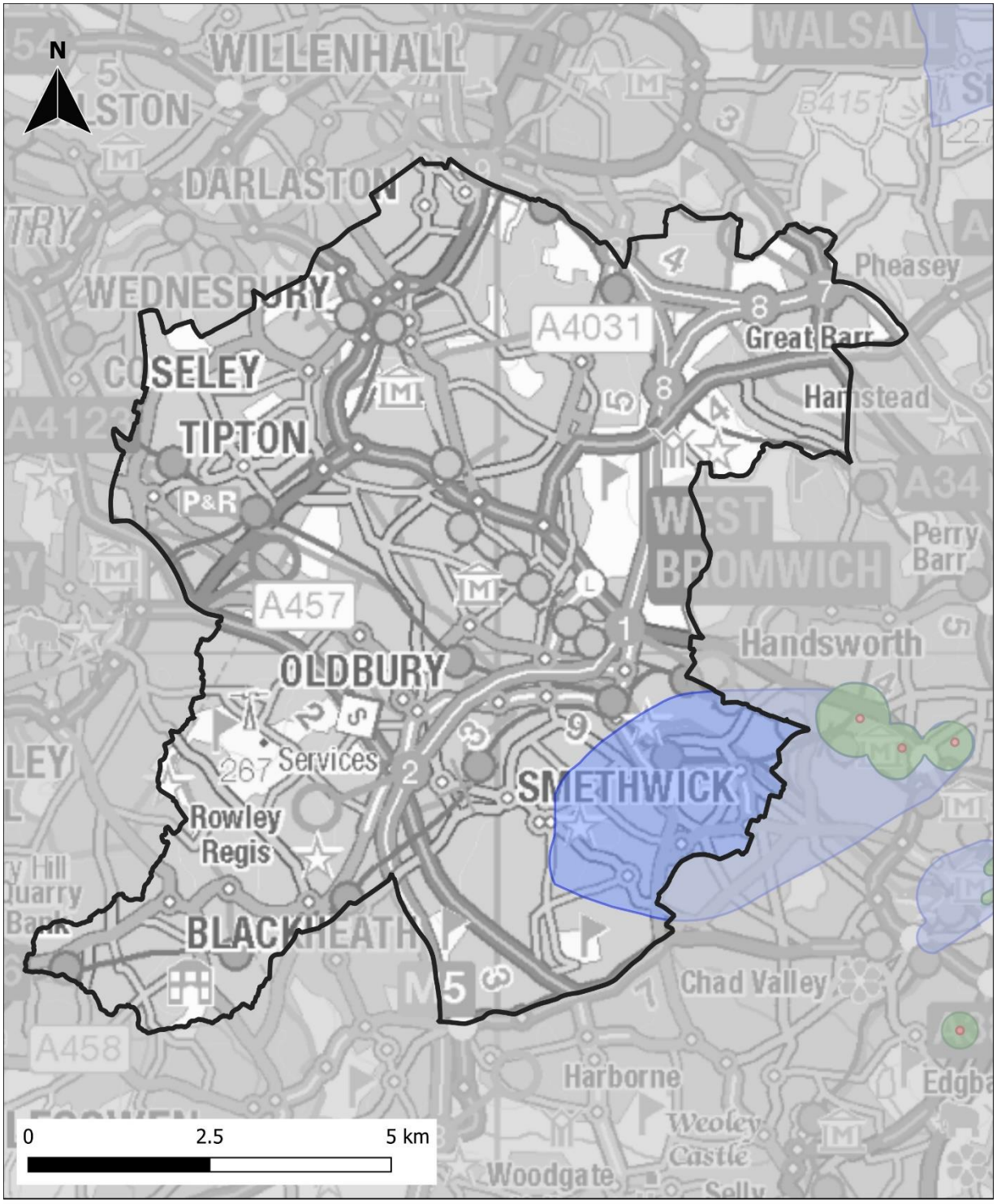
Table 9-1 Potential allocations within SPZs

Source Protection Zone	Sites	Management advice / EA position statement
Zone 1 – Inner Protection Zone	No allocations identified	G2 – Inside SPZ1 all sewage effluent discharges to ground must have an environmental permit. G4 – Inside SPZ1 the EA will object to any new trade effluent, storm overflow from sewage system or other significantly contaminated discharges to ground where the risk of groundwater pollution is high and cannot be adequately mitigated. G12 – Discharge of clean roof water to ground is acceptable both within and outside SPZ1, provided all roof water down-pipes are sealed against pollutants entering the system from surface runoff, effluent disposal or other forms of discharge. The method of discharge must not create new pathways for pollutants to groundwater or mobilise contaminant already in the ground. No permit is required if these criteria are met. G13 – Where infiltration SuDS are proposed for anything other than clean roof drainage in a SPZ1, a hydrogeological risk assessment should be undertaken, to ensure that the

22 Manual for the Production of Groundwater Source Protection Zones, Environment Agency (2019). Accessed online at: https://www.gov.uk/government/publications/groundwater-source-protection-zones-spz-production-manual on: 10/02/2023.

Source Protection Zone	Sites	Management advice / EA position statement
		system does not pose an unacceptable risk to the source of supply. SuDS schemes must be suitably designed.
Zone 2 – Outer Protection Zone	No allocations identified	A hydrogeological risk assessment is not a requirement for SuDS schemes, however they should still be “suitably designed”, for instance following best practice guidance in the CIRIA SuDS Design Manual.
Zone 3 – Total Catchment	North Smethwick Canalside, Thandi Coach Station, Grove Lane/Cranford Street/London Street, Cranford Street/Heath Street/ Canal, Cape Arm Cranford Street, Abberley Street, Grove Street/MMUH/School, Moilliet Street Park	A hydrogeological risk assessment is not a requirement for SuDS schemes, however they should still be “suitably designed”, for instance following best practice guidance in the CIRIA SuDS Design Manual.

The Source Protections Zones (SPZs) that are present within Sandwell are shown on Figure 9-5.



Sandwell MBC boundary
Source Protection Zone 1 (inner)
Source Protection Zone 2 (outer)
Source Protection Zone 3 (total catchment)

Figure 9-5 Source Protection Zones in Sandwell

9.5.2 Surface Water Drainage and SuDS

Since April 2015[23], management of the rate and volume of surface water has been a requirement for all major development sites, through the use of Sustainable Drainage Systems (SuDS).

Lead Local Flood Authorities (LLFAs) are the statutory consultees to the planning system for surface water management within major development, which covers the following development scenarios:

- 10 or more dwellings
- a site larger than 0.5 hectares, where the number of dwellings is unknown
- a building greater than 1,000 square metres
- a site larger than 1 hectare

SuDS are drainage features which attempt to replicate natural drainage patterns, through capturing rainwater at source, and releasing it slowly into the ground or a water body. They can help to manage flooding through controlling the quantity of surface water generated by a development and improve water quality by treating urban runoff. SuDS can also deliver multiple benefits, through creating habitats for wildlife and green spaces for the community. SuDS also have the advantage of providing effective Blue and Green infrastructure and ecological and public amenity benefits when designed and maintained properly.

National standards on the management of surface water are outlined within the Defra Non-statutory Standards for Sustainable Drainage Systems[24]. The CIRIA C753 SuDS Manual[25] and Guidance for the Construction of SuDS[26] provide the industry best practice guidance for design and management of SuDS.

23 House of Commons: Written Statement (HCWS161) Written Statement made by: The Secretary of State for Communities and Local Government (Mr Eric Pickles) on 18 Dec 2014. Accessed online at: https://www.parliament.uk/documents/commons-vote-office/December%202014/18%20December/6.%20DCLG-sustainable-drainage-systems.pdf on: 10/02/2023.

24 Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, DEFRA (2015). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf on: 10/02/2023.

25 CIRIA Report C753 The SuDS Manual, CIRIA (2015). Accessed online at: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx on: 10/02/2023.

26 Guidance on the Construction of SuDS (C768), CIRIA (2017), Accessed online at: https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK on: 10/02/2023.

Local guidance, provided by the Lead Local Flood Authorities covering the study area, is detailed below:

- Sandwell MBC is the LLFA and plays a key role in ensuring that the proposed drainage schemes for all new developments comply with technical standards and policies in relation to SuDS.

The UK Government is in the process of implementing Schedule 3 of the Flood and Water Management Act. In January 2023, the UK Government released their report setting out the findings of a review into the implementation of Schedule 3 of The Flood and Water Management Act 2010, which outlined the possibility of LLFAs becoming SuDS Approving Body (SAB). This would create a new process for the approval and adoption of SuDS, separate to the planning system.

Enactment of Schedule 3 would also remove the automatic right to connect surface water into the public sewer network. Instead, the right to connect would become conditional upon the drainage system being approved by the SAB, in consultation with the Water and Sewerage Companies, before construction can commence.

9.5.3 Use of SuDS in Water Quality Management

SuDS allow the management of diffuse pollution generated by urban areas through the sequential treatment of surface water reducing the pollutants entering lakes and rivers, resulting in lower levels of water supply and wastewater treatment being required. This treatment of diffuse pollution at source can contribute to meeting WFD water quality targets, as well as national objectives for sustainable development.

This is usually facilitated via a SuDS Management Train of a number of components in series that provide a range of treatment processes delivering gradual improvement in water quality and providing an environmental buffer for accidental spills or unexpected high pollutant loadings from the site. Considerations for SuDS design for water quality are summarised in Table 9-2 below.

Table 9-2 Considerations for SuDS Design for Water Quality

Manage surface water close to source	Where practicable, treatment systems should be designed to be close to source of runoff. It is easier to design effective treatment when the flow rate and pollutant loadings are relatively low. Treatment provided can be proportionate to pollutant loadings and sensitivity receptor. Accidental spills or other pollution events can be isolated more easily without affecting the downstream drainage system. Encourages ownership of pollution. Poor treatment performance or component damage/ failure can be dealt with more effectively without impacting on the whole site.
Treat surface water runoff on the surface	Where practicable, treatment systems should be designed to be on the surface Where sediments are exposed to UV light, photolysis and volatilisation processes can act to break down contaminants. If sediment is trapped in accessible parts of the SuDS, it can be removed more easily as part of maintenance. It enables use of evapotranspiration and some infiltration to the ground to reduce runoff volumes and associated total contamination loads (provided risk to groundwater is managed appropriately). It allows treatment to be delivered by vegetation. Sources of pollution can be easily identified. Accidental spills or misconnections are visible immediately and can be dealt with rapidly. Poor treatment performance can be easily identified during routine inspections, and remedial works can be planned efficiently.
Treat surface water runoff to remove a range of contaminants	SuDS design should consider the likely presence and significance of any contaminant that may pose a risk to the receiving environment. The SuDS component or combination of components selected should include treatment processes that, in combination, are likely to reduce this risk to acceptably low levels.
Minimise risk of sediment remobilisation	The SuDS design should consider and mitigate the risks of sediments (and other contaminants) being remobilised and washed into receiving surface waters during events greater than those which the component has been specifically designed for.
Minimise impacts from accidental spills	By using several components in series, SuDS can help ensure that accidental spills are trapped in/on upstream component surfaces, facilitating contamination management and removal. The selected SuDS components should deliver a robust treatment design that manages risks appropriately - considering the uncertainty and variability of pollution loadings, sensitivity of receptors and treatment processes.

Managing pollution close to its source can help keep pollutant levels and accumulation rates low, allowing natural processes to be more effective. Treatment can often be delivered within the same components that are delivering water quantity design criteria, requiring no additional cost or land-take.

SuDS designs should control the 'first flush' of pollutants (usually mobilised by the first 5mm of rainfall) at source, to ensure contaminants are not released from the site. Best practise is that no runoff should be discharged from the site to receiving watercourses or sewers for the majority of small (e.g., less than 5mm) rainfall events.

Infiltration techniques will need to consider Groundwater Source Protection Zones and are likely to require consultation with the Environment Agency. Early consideration of SuDS within master planning will typically allow a more effective scheme to be designed.

Further guidance on designing SuDS to reduce phosphorus[27] and nitrogen[28] in surface water runoff can be found in the relevant CIRIA guidance documents.

9.5.4 Benefits of SuDS

Flood Risk

The Sandwell Level 1 SFRA contains recommendations for SuDS to manage surface water on development sites, with the primary aim of reducing flood risk.

SuDS are most effective at reducing flood risk for relatively high intensity, short and medium duration events, and are particularly important in mitigating potential increases in surface water flooding, sewer flooding and flooding from small and medium sized watercourses resulting from development.

Water Resources

A central principle of SuDS is the use of surface water as a resource. Traditionally, surface water drainage involved the rapid disposal of rainwater, by conveying it directly into a sewer or wastewater treatment works.

SuDS techniques such as rainwater harvesting, allow rainwater to be collected and re-used as non-potable water supply within homes and gardens, reducing the demand on water resources and supply infrastructure.

27 CIRIA (2022) Using SuDS to reduce phosphorus in surface water runoff (C808F). Accessed online at: Using SuDS to reduce phosphorus in surface water runoff (ciria.org) on: 05/12/2023.

28 CIRIA (2022) Using SuDS to reduce nitrogen in surface water runoff (C815F). Accessed online at: New guidance for Using SuDS to reduce nitrogen in surface water runoff (ciria.org) on: 05/12/2023.

Climate Resilience

Climate projections for the UK suggest that winters may become milder, and wetter and summers may become warmer, but with more frequent higher intensity rainfall events, particularly in the south east. This would be expected to increase the volume of runoff, and therefore the risk of flooding from surface water, and diffuse pollution, and reduce water availability.

SuDS offer a more adaptable way of draining surfaces, controlling the rate and volume of runoff leaving urban areas during high intensity rainfall, and reducing flood risk to downstream communities through storage and controlled release of rainwater from development sites.

Through allowing rainwater to soak into the ground, SuDS are effective at retaining soil moisture and groundwater levels, which allows the recharge of the watercourses and underlying aquifers. This is particularly important where water resource availability is limited, and likely to become increasingly scarce under future drier climates**.**

Biodiversity

The water within a SuDS component is an essential resource for the growth and development of plants and animals, and biodiversity benefits can be delivered even by very small, isolated schemes. The greatest value can be achieved where SuDS are planned as part of a wider green landscape, providing important habitat, and wildlife connectivity. With careful design, SuDS can provide shelter, food, foraging and breeding opportunities for a variety of species including plants, amphibians, invertebrates, birds, bats and other animals.

Amenity

Designs using surface water management systems to help structure the urban landscape can enrich its aesthetic and recreational value, promoting health and well-being and supporting green infrastructure. Water managed on the surface rather than underground can help reduce summer temperatures, provide habitat for flora and fauna and act a resource for local environmental education programmes and working groups and directly influence the sense of community in an area. Although there are few comparative studies, the sites compared in available studies indicate that SuDS are more cost-effective than traditional drainage systems[29].

Kingsbrook, Aylesbury - SuDS Case Study

As part of the Kingsbrook new village outside Aylesbury, Barratt Homes and David Wilson Homes worked with the RSPB and the former Aylesbury Vale District Council to deliver a SuDS scheme which created habitats for wildlife, while improving the quality of life for the new community. The design included a network of swales to

29 Susdrain (2023) Comparisons of costs and benefits. Available at: Comparison of costs and benefits (susdrain.org)

collect and convey surface water runoff along the ground surface, which then discharged into a series of storage ponds. It also included the creation of the wetland habitat of Oakfield Lake Nature reserve. Footpaths, benches and viewing platforms were designed to overlook the water features. The banks of the ponds were planted with native wildflowers, and less than one year after the first ponds were installed, the RSPB recorded egrets and several species of dragonfly[30].

Figure 9-6: Seating area and footpath overlooking water feature at Kingsbrook development site, Aylesbury (Credit: JBA)

Figure 9-7: Homes overlooking drainage feature in Kingsbrook, Aylesbury (Credit: JBA)

30 Ponds and streams: information for Kingsbrook residents. Available at: 4-suds-information-sheet-v4.pdf (kingsbrook-aylesbury.co.uk)

9.5.5 Suitable SuDS Techniques

The hydraulic and geological characteristics of each property development site across Sandwell should be assessed to identify the most appropriate forms of surface water management and any constraining factors to the utilisation of SuDS. These assessments are designed to inform the early-stage site planning process and should be followed up the site-specific detailed drainage assessments.

Appropriate SuDS techniques have been categorised into five main groups, as shown in Table 9-3, with further details provided on the Susdrain website. Further site-specific investigation should be conducted to determine what SuDS techniques could be used on a particular development, informed by detailed ground investigations.

Table 9-3 Summary of SuDS Categories

SuDS Type[31]	Technique
Source Control	Green Roof, Rainwater Harvesting, Pervious Pavements, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance[32]	Dry Swale, Under-drained Swale, Wet Swale

9.5.6 Natural Flood Management

Natural Flood Management (NFM) is used to protect, restore, and re-naturalise the function of catchments and rivers to reduce flood risk. A wide range of techniques can be used that aim to reduce flooding by working with natural features and processes in order to store or slow down flood waters before they can damage flood risk receptors (e.g., people, property, infrastructure, etc.).

Techniques and measures, which could be applied in Sandwell include:

- Peatland and moorland restoration in upland catchments
- Offline storage areas
- Re-meandering streams

31 SuDS components overview (susdrain.org)
32 Swales & conveyance channels overview (susdrain.org)

- Targeted woodland planting
- Reconnection and restoration of functional floodplains
- Restoration of rivers and removal of redundant structures
- Installation or retainment of large woody material in river channels
- Improvements in management of soil and land use
- Creation of rural and urban SuDS

In 2017, the Environment Agency published an online evidence base[33] to support the implementation of NFM and with JBA produced maps showing locations with the potential for NFM measures[34]. These maps are intended to be used alongside the evidence directory to help practitioners think about the types of measure that may work in a catchment and the best places in which to locate them. There are limitations with the maps; however, it is a useful tool to help start dialogue with key partners.

9.5.7 Multiple Benefits of NFM

In addition to flood risk benefits, there are also significant benefits in other areas such as habitat provision, air quality, climate regulation and water quality.

Many NFM measures have the ability to reduce nutrient and sediment sources by reducing surface runoff flows from higher ground, reducing soil erosion, trapping sediment at the edge of agricultural land, or encouraging deposition of sediments behind natural dams upstream in watercourses.

Suitable techniques may include:

- Leaky dams
- Woodland planting
- Buffer strips
- Runoff retention ponds
- Land management techniques (soil aeration, cover crops etc.)

Case Study - Black Brook Slow the Flow

Four engineered log dams were installed on Black Brook at an estimated cost of £2,000, funded by Natural England and the Environment Agency to restore Stanley Bank SSSI. The scheme aimed to improve habitat and reduce the risk of flooding. However, the scheme also resulted in reduced levels of phosphate and nitrate in

33 Working with natural processes to reduce flood risk, Environment Agency (2018). Accessed online at: https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk on: 10/02/2023.

34 Mapping the potential for working with natural process, Environment Agency and JBA (2017). Accessed online at: https://www.arcgis.com/home/item.html?id=7315f943998847e2b3797a85665f5438 on: 10/02/2023.

Black Brook, with phosphate concentrations falling by 3.6mg/l. By 2035, it is predicted that 792m^3 of sediment will be stored in three ponds retained by the dams.

Reproduced from Case Study 17. Black Brook Slow the Flow, St Helens, Norbury, Rogers and Brown, EA WwNP Evidence Base 2017. Photograph taken on 8 May 2015; courtesy of Matthew Catherall

9.5.8 Integrated Constructed Wetlands

An integrated constructed wetland (ICW) is an artificial wetland created for the purpose of treating polluted water, whether this is municipal wastewater, grey water from residential properties, or agricultural runoff.

They are usually unlined, free surface flow wetlands, designed to contain and treat influents within emergent vegetated areas.

Defra carried out a systematic review of the effectiveness of various wetland types, including ICWs for mitigating agricultural pollution such as phosphate and nitrate. The overall conclusion was that all wetland types are very effective at reducing major nutrients and suspended sediments, with the exception of nitrite in ICWs. Nitrate is only reduced when passing through overland buffer strips and through constructed wetlands with vegetation, where the systematic review showed a mean reduction of 29% across the evidence included in the study.

The mean reduction in Total Phosphorus across the evidence base was 78%.

It needs to be noted that in some cases where P is especially high the effectiveness of removal may be less certain. Although the reduction in total phosphorus is beneficial,

stakeholders need to ensure the excess nutrients are dealt with at source, such as storm overflows and at a policy level.

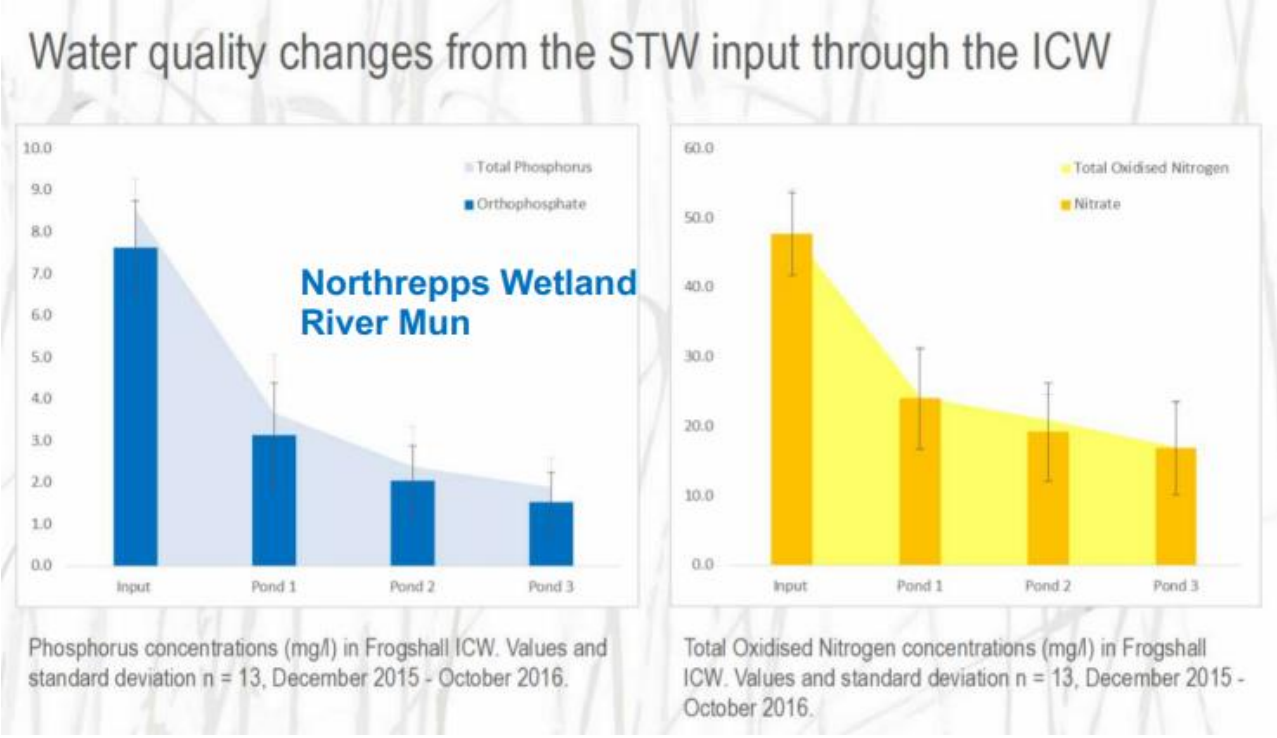
Other techniques to manage nutrients are possible such as catchment nutrient balancing, where excess nutrients are managed at a catchment level, as well as catchment permitting. These techniques are recommended where environmental capacity is restrictive to growth. TW is not eligible for this due to a low Environmental Performance Assessment (EPA) rating. The situation for Anglian Water and Affinity Water are unknown.

Case Study - Frogshall ICW

The Upper River Mun in Norfolk was experiencing chronic pollution, and a loss in biodiversity in the river. Investigation found that nutrients from a Sewage Treatment Works upstream were contributing to this issue.

A pilot ICW was created consisting of three shallow ponds, filled with 18,000 emergent aquatic plants, and the outfall from the treatment works was diverted to pass through the wetland.

Early monitoring has shown that 90% of the phosphate is being removed by the wetland, and a large increase in biodiversity downstream observed.



Reproduced from "Stripping the Phosphate" a presentation by the Norfolk Rivers Trust (2018). https://www.theriverstrust.org/media/2018/08/2.-Stripping-the-phosphate-David-Diggens-Norfolk-Rivers-Trust.pdf

9.5.9 Agricultural Management

The Environment Agency's 'Reason for Not Achieving Good' database indicates that one of the reasons for some of the watercourses in the area are not meeting 'Good' WFD standards can be related to agriculture and rural land use. The cause of this includes pollution from fertilisers, manures, pesticides and soils washing into streams when it rains or percolating into the groundwater. Other pressures from agriculture include deepening, widening or re-routing of streams for land drainage, gravel removal and bankside erosion.

There is a big potential to improve water quality by interventions aimed at agricultural sources, especially considering the measures already taken by the water companies to reduce their contribution to phosphate load.

Potential schemes could include:

- Buffer strips
- Cross slope tree planting
- Runoff retention basins
- Contour ploughing
- Cover crops

There is considerable overlap with NFM measures, and the challenges are also very similar. Exact impacts are difficult to measure, although modelling tools such as Farmscoper[35] exist to help with this. Once a scheme is implemented it relies on the landowner to continue to maintain it in order to maintain the mitigation benefit.

Funding for agricultural interventions could come from Catchment Sensitive Farming or a Payment for Ecosystem Services approach.

Case Study - Wessex Water - EnTrade

Wessex Water catchment team used EnTrade to invite farmers to bid to grow cover crops over winter to reduce the nitrogen leaching into the watercourse.

This avoided the need to upgrade Dorchester WwTW to provide the same nitrogen removal capacity.

A trial auction was held in 2015, and two further auctions have since taken place attracting 557 bids from 63 farmers to save 153 tonnes of nitrogen.

35 Farmscoper webpage, ADAS (2020). https://www.adas.uk/Service/farmscoper Accessed on 10/02/2023.

“Using EnTrade to create a market in measures to deliver reductions in nitrogen has delivered a 30% saving for Wessex Water compared to traditional catchment approaches.” - Ruth Barden, Director of Environmental Strategy, Wessex Water

9.5.10 Barriers

Whilst there are many benefits to implementing NFM and constructed wetlands, or modifying agricultural practises, the impact of these techniques is hard to quantify, and relies on ongoing maintenance to maintain that benefit. Where a potential scheme is not on a development site it will also require permission and support of the landowner. It may not be possible to influence this through planning policy.

9.5.11 Conclusions

- The potential impact of development on a number of protected sites such as SAC and SSSIs within, or downstream of the study area should be carefully considered in future plan making.
- There is one groundwater Source Protection Zones (SPZs) within Sandwell. The impact of future development on groundwater should be investigated fully.
- Development sites within the study area could be sources of diffuse pollution from surface runoff.
- SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development.
- Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity.

- Sandwell MBC should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors.
- In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation.

9.5.12 Recommendations

Table 9-4 Recommendations for Environmental Constraints and Opportunities

Action	Responsibility	Timescale
Consider the environmental impact of development on protected sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	Sandwell MBC	Local Plan Development
The Local Plan should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated, in consultation with Natural England (for national and international designations and priority habitats).	Sandwell MBC	Ongoing
The Local Plan should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	Sandwell MBC	Ongoing
In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	Sandwell MBC, Severn Trent Water, South Staffs Water Environment Agency	Ongoing
Developers should include the design of SuDS at an early stage to maximise the benefits of the scheme.	Developers	Ongoing

Action	Responsibility	Timescale
Work with developers to discourage connection of new developments into existing surface water and combined sewer networks. Prevent connections into the foul network, as this is a significant cause of sewer flooding.	Sandwell MBC, developers	Ongoing
Opportunities for Natural Flood Management that include schemes aimed at reducing / managing runoff should be considered to reduce nutrient and sediment pollution within Sandwell.	Sandwell MBC, Environment Agency, Natural England	Ongoing

10 Summary and overall conclusions

10.1 Conclusions

Assessment	Conclusion
Water resources	Sandwell receives its water from South Staffordshire Water and Severn Trent Water. Sandwell is largely within the South Staffs WRZ, with smaller areas falling into the Strategic Grid and Wolverhampton Water Resource Zones (WRZ). In all WRZs, the forecast percentage growth in the WRMP is lower than the expected growth during the Local Plan period. In those WRZs where the water company forecast is lower than the Local Plan review, assurance should be sought from the company that the Council's growth forecast can be accommodated. The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are planned or underway to ensure that abstraction of water from both groundwater and rivers, is not leading to unsustainable reductions in flow. Development and population growth can increase abstraction, and so Sandwell MBC have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development. It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings. Water resources in the UK are under considerable pressure. The Environment Agency have stated that "the scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand." The National Water Resources Framework sets the objective to reduce the average per capita consumption in the UK to 110l/p/d by 2050. This is now part of the Environmental Improvement Plan and water companies WRMPs. Within Defra's Plan for Water is the commitment to review Building Regulations and a target of 100l/p/d in

Assessment	Conclusion
	water stress areas is suggested. The Future Homes Hub, who are supporting Defra to produce a roadmap to greater water efficiency propose a stages reduction in PCC, with a target of 100l/p/d in water stressed areas in place from 2025, and a reduced target of 90l/p/d in place by 2030 (depending on market conditions and customer acceptance). This study recommends that as a minimum the proposed new Building Regulations target of 100l/p/d outlined in Defra's Plan for Water be adopted across the study area. This should be achieved using a fittings-based approach. This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard. The Local Plan should allow for a future reduction in the Building Regulations target to 90l/p/d in 2030. This is supported by South Staffs Water and Severn Trent Water incentives for water efficient design in new builds outlined in Section 4.7 where significant incentives are offered to reduce design consumption below 100l/p/d.

Assessment	Conclusion
Wastewater collection	Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on customers, and increasing the likelihood of storm overflow operation. Early engagement with developers and Severn Trent Water is required, and further modelling of the network may be required at the planning application stage. The Environment Act now requires water companies to report and monitor storm overflows as well as reduce the harm caused to the rivers they discharge to. There are 64 storm overflows in recorded in the study area. The SOAF set a threshold of 60 operations in a year (based on 1 years' data, 50 if based on 2 years data, and 40 if based on 3 years), above which a storm overflow should be investigated. 1of the storm overflows were operating above this threshold between 2021 and 2023. The Storm Overflow Reduction Plan which was published in 2022 sets an objective that "storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050". A further 19storm overflows are operating on average above 10 times per year so may require action to meet the long-term target. There are opportunities through the planning system to ease pressure on the wastewater network by separating foul and storm flow in existing combined systems, and not allowing new surface water connections. Surface water can also be better managed by retrofitting SuDS in existing residential areas, and in new development, ensuring SuDS are incorporated into designs at the master planning stage to maximise the potential benefits Early engagement between developers, the council, and Severn Trent Water and is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.
Wastewater treatment assessment	A headroom assessment was carried out comparing the current flow from each WwTW, making allowance for growth already planned, with the permit limit. This provides an estimate of the spare capacity in wastewater treatment infrastructure in Sandwell. Some of the WwTWs in the study area are expected to be close to or exceeding their permit during the Local Plan period. An increase in the permit limit, and / or upgrades to treatment capacity may be required at these WwTWs in order to accommodate further growth. Consideration should be given to using capacity in

Assessment	Conclusion
	existing permits as this provides a lower carbon cost than upgrading capacity at existing WwTW or building new treatment works. Where new infrastructure or upgrades to existing infrastructure may be required, engagement between SMBC and the water company is required to ensure that delivery of this infrastructure is aligned with delivery of development sites. Grampian conditions may be sought by the water company should development be in advance of the necessary infrastructure. There is one poorly performing storm tank overflows at Roundhill WwTW serving Sandwell. Storm tanks at Growth within this catchments could result in an increase in the operations of these overflows contributing to a worsening of water quality in the area. Action should be taken by the water companies to address these overflows prior to an increase in wastewater demand being generated by new development. New development proposed within Severn Trent Water's WwTW odour buffer zones are recommended to undergo an odour impact assessment.
Water quality	The modelling indicates the growth during the Local Plan period would not result in a significant deterioration. In call cases, deterioration could be prevented by improvements in treatment. Some tightening of permit limits may already be planned in AMP8 but details have not yet been published. Growth alone will not prevent good ecological status being prevented in the future should improvements in upstream water quality. An additional modelling scenario was run where the additional demand from growth expected to be served by Ray Hall WwTW was applied to Minworth WwTW rather than Ray Hall. The results from this scenario show no significant deterioration in water quality. Where a WwTW is shared with a neighbouring authority, coordination of growth plans in collaboration with Severn Trent Water is essential to ensure that infrastructure is in place prior to development to prevent a breach of the environmental permit.
Environmental constraints and opportunities	The potential impact of development on a number of protected sites such as SAC and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There is one groundwater Source Protection Zones (SPZs) within Sandwell. The impact of future

Assessment	Conclusion
	development on groundwater should be investigated fully. Development sites within the study area could be sources of diffuse pollution from surface runoff. SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development. Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity. Sandwell MBC should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors. In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation.

10.2 Recommendations

Aspect	Action	Responsibility	Timescale
Water resources	Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	South Staffordshire Water, Severn Trent Water	Ongoing
Water resources	Provide yearly updates of projected housing growth to water companies to inform WRMP updates.	Sandwell MBC	Ongoing
Water resources	The council should consider a domestic water efficiency target of 100l/p/d for	Sandwell MBC	In Sandwell LP

Aspect	Action	Responsibility	Timescale
	all new homes, and work with water suppliers to incentivise even lower consumption. This should be achieved using a fittings-based approach.		
Water resources	Use planning policy to require new build non-residential development to achieve at least 3 credits in the Wat01 Measure for water in the BREEAM New Construction standard.	Sandwell MBC	In Sandwell LP
Water resources	The concept of water neutrality has the potential to provide a benefit in improving resilience to climate change and enabling all waterbodies to be brought up to Good status. Explore further with the water companies and the Environment Agency how the Council's planning and climate change policies can encourage this approach. This approach could have particular application in strategic sites.	Sandwell MBC, Environment Agency, Severn Trent Water, South Staffs Water	In Sandwell LP

Aspect	Action	Responsibility	Timescale
Water resources	Larger residential developments and commercial developments should consider incorporating greywater recycling and/or rainwater harvesting into development at the master planning stage in order to reduce water demand.	Sandwell MBC, Severn Trent Water, South Staffs Water	In Sandwell LP
Water resources	Water companies should advise Sandwell MBC of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	Sandwell MBC, Severn Trent Water, South Staffs Water	Part of Sandwell LP process
Water Resources	Review this section of the WCS following publication of the final Water Resource Management Plans for 2024.	Sandwell MBC, Severn Trent Water, South Staffs Water	In Sandwell LP
Water supply	Undertake network modelling to ensure adequate provision of water supply is feasible.	Water companies, Sandwell MBC	Ahead of planning applications

Aspect	Action	Responsibility	Timescale
Water Supply	Sandwell MBC and Developers should engage early with water companies to ensure supply infrastructure is in place prior to occupation.	Water companies, Sandwell MBC, developers	Ongoing
Wastewater network	Early engagement between Sandwell MBC and Severn Trent Water is required to ensure that where strategic infrastructure is required, it can be planned in by Severn Trent Water, and will not lead to any increase in discharges from sewer overflows.	Sandwell MBC, Severn Trent Water	Ongoing
Wastewater network	Take into account wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker.	Sandwell MBC, Severn Trent Water	Ongoing
Wastewater network	Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an Outline Drainage Strategy for sites. The Outline Drainage strategy should demonstrate the wastewater assets required, their locations	Sandwell MBC, Severn Trent Water, Developers	Ongoing

Aspect	Action	Responsibility	Timescale
	including points of connection to the public foul sewerage, whether the site drainage will be adopted by the water company and if any sewer requisitions will be required.		
Wastewater network	Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA.	Sandwell MBC as LLFA, developers	Ongoing
Wastewater treatment	Early engagement with Severn Trent Water is required to ensure that provision of WwTW capacity is aligned with delivery of development.	Sandwell MBC	Ongoing
Wastewater treatment	Provide Annual Monitoring Reports to Severn Trent Water detailing projected housing growth.	Sandwell MBC	Ongoing
Wastewater treatment	Severn Trent Water to assess growth demands as part of their wastewater	Severn Trent Water	Ongoing

Aspect	Action	Responsibility	Timescale
	asset planning activities and feedback to the Council if concerns arise.		
Water quality	Provide annual monitoring reports to TW and AW detailing projected housing growth in the Local Authority	Sandwell MBC	Ongoing
Water quality	Take into account the full volume of growth (from Sandwell and neighbouring authorities within the catchment when considering WINEP schemes or upgrades at WwTWs	Severn Trent Water	Ongoing
Environmental impact	Consider the environmental impact of development on protected sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	Sandwell MBC	Local Plan Development
Environmental impact	The Local Plan should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated, in consultation with	Sandwell MBC	Ongoing

Aspect	Action	Responsibility	Timescale
	Natural England (for national and international designations and priority habitats).		
Environmental impact	The Local Plan should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	Sandwell MBC	Ongoing
Environmental impact	In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	Sandwell MBC, Severn Trent Water, South Staffs Water Environment Agency	Ongoing
Environmental impact	Developers should include the design of SuDS at an early stage to maximise the benefits of the scheme.	Developers	Ongoing
Environmental impact	Work with developers to discourage connection of new developments into existing surface water and combined sewer networks. Prevent connections into the foul network, as this is a significant cause of sewer flooding.	Sandwell MBC, developers	Ongoing

Aspect	Action	Responsibility	Timescale
Environmental impact	Opportunities for Natural Flood Management that include schemes aimed at reducing / managing runoff should be considered to reduce nutrient and sediment pollution within Sandwell.	Sandwell MBC, Environment Agency, Natural England	Ongoing

Appendices

A Storm Overflows

Table 0-1 Network Strom Overflows in Sandwell

Overflow	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Long Term Average number of operations	Above threshold for investigation? (Y/N)
Baldwin Street CSO	2	0.6	25	18.7	13	9	13.3	N
Bannister ST CSO	71	228	39	28	45	69	51.7	Y
Bescot Road CSO	3	8.5	4	12.9	4	16.6	3.7	N
Blackheath- Oldbury/ Station Rd CSO	18	17.7	9	13	60	283	29.0	N
Blackheath- STN road storm tanks CSO	0	0	0	0	0	0	0	N
Booth Street CSO	5	1.9	9	2.6	9	2.7	7.7	N
Great Bridge CSO	4	4.5	2	3.7	1	0.4	2.3	N
BROMFORD LANE CSO	8	6	6	47.8	10	9.7	8.0	N
BLACKHEATH - CAKEMORE ROAD (CSO)	0	0	0	0	0	0	0.0	N
SMETHWICK - CAPE HILL (CSO)	21	11.4	19	11.3	34	7.5	24.7	N
CEMETERY RD-VICTORIA RD CSO	6	5.8	3	4.3	7	4.8	5.3	N
CHARLEMONT ROAD CSO	0	0	0	0	0	0	0.0	N
CHESTER ROAD (CRADLEY ROAD 2) CSO	44	199.2	30	73.3	35	59.8	36.3	N

Overflow	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Long Term Average number of operations	Above threshold for investigation? (Y/N)
CORNWALL ROAD CSO	1	0.5	0	0	0	0	0.3	N
CRADLEY ROAD 1 CSO	N/A	N/A	0	0	0	0	0	N
CSO AT FORMER TITFORD PS	21	35	8	10.5	10	16	13.0	N
DEVON ROAD	0	0	0	0	0	0	0.0	N
DOWNING STREET CSO	1	0.6	0	0	1	0.1	0.7	N
DUDLEY PORT - HORSELEY HEATH (CSO)			1	1.4	1	6.3	0.7	N
DUDLEY STREET CSO	0	0	0	0	0	0	0.0	N
ELMBANK ROAD CSO	6	6	11	2.3	20	2.2	12.3	N
FARLEY STREET CSO	1	0.7	1	3.5	3	2.6	1.7	N

Overflow	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Long Term Average number of operations	Above threshold for investigation? (Y/N)
GAWNE LANE CSO	0	0	2	0.1	0	0	0.7	N
GREAT BARR - BISHOPS ASBURY CRES (CSO)	19	17	18	12.2	19	16.1	18.7	N
GREAT BARR - PEAR TREE SPS	31	198	16	39	34	64.8	27.0	N
GROVE STREET CSO	8	30.2	3	2.5	6	4.5	5.7	N
HALFORDS LANE/BRASSHOUSE LANE CSO	33	18.6	41	17.5	40	14.8	38.0	N
HAMSTEAD PUMPING STATION	N/A	N/A	N/A	N/A	8	0.3	8	N
HAMSTEAD ROAD / WALCOT DRIVE CSO	0	0	1	0.2	0	0	0.3	N
IZONS LANE CSO	23	32.3	15	13.3	30	33.1	22.7	N
LONDONDERRY LANE CSO	10	7.6	5	3.1	8	3.8	7.7	N
LONG LANE STORM SEWAGE OVERFLOW	12	5.9	21	33.7	10	10.2	14.3	N
LYNDON/GRAFTON RD JUNCTION CSO	2	0.4	1	0.3	0	0	1.0	N
MARKET PLACE CSO	1	0.2	2	0.1	0	0	1.0	N
MILDRED ROAD CSO	7	3	4	2.2	6	1	5.7	N
MYVOD ROAD CSO	8	4.7	9	28.8	7	2.6	8.0	N

Overflow	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Long Term Average number of operations	Above threshold for investigation? (Y/N)
NEWTOWN LANE CSO	1	0.1	5	3.1	6	1	4.0	N
NORMAN ROAD COMBINED SEWER OVERFLOW	3	1	3	1	1	0.4	2.3	N
OFF PERROTT STREET CSO	3	0.7	0	0	0	0	1.0	N
OLD HILL COMBINED SEWER OVERFLOW	2	0.8	1	1	0	0	1.0	N
OLD HILL TRINITY CSO	11	116.9	0	0	0	0	3.7	N
POPLAR ROAD CSO	10	12.8	11	14.5	12	11.3	11.0	N
RABONE LANE (NO.1) CSO	22	65.4	4	1.3	12	9.8	12.7	N
RABONE LANE (NO.2) CSO	9	6.5	8	2.9	6	2.3	7.7	N
RAY HALL COMBINED SEWER OVERFLOW	1	2.3	0	0	4	19.7	1.7	N
REDDAL HILL ROAD CSO	6	2.1	0	0	0	0	2.0	N
SMETHICK - HIGH ST./WATER LN. CSO	1	7.4	5	3.8	4	11.9	3.3	N
STANHOPE ROAD/DAVISON ROAD JCT CSO	8	6			3	2.5	3.7	N
STONY LANE CSO	34	1.2	27	0.6	0	0	20.3	N
SUSSEX AVENUE CSO	5	5.9	3	3.9	1	0.9	3.0	N
THIMBLEMILL ROAD CSO	1	0.4	0	0	1	0.2	0.7	N

Overflow	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Long Term Average number of operations	Above threshold for investigation? (Y/N)
TIPTON - DENBIGH ROAD (CSO)	1	0.8	0	0	13	199.5	4.7	N
TIPTON - TOLL END (SSO)	0	0	3	5.8	3	4.7	2.0	N
TIPTON CEMETERY CSO	36	75	32	61.2	43	94.1	37.0	N
WATER LANE CSO	1	7.4	14	65.7	0	0	5.0	N
WEDNESBURY - WODEN ROAD WEST (CSO)	1	0.2	0	0	0	0	0.3	N
WELLINGTON ROAD/VILLIERS STREET CSO	9	3.4	3	0.3	4	1.5	5.3	N
WELLINGTON ST/FRANKLIN ST JCT CS0	2	0.7	0	0	0	0	0.7	N
WEST BROMWICH - LAMBERT END CSO	16	13.7	10	5	11	7	12.3	N
WEST BROMWICH STREET CSO	9	11.3	4	8.2	6	9.6	6.3	N
WHITEHALL ROAD CSO	1	0.8	0	0	0	0	0.3	N
WOOD STREET 26 CSO	2	0.1	2	1.6	1	0.3	1.7	N
YEW TREE - BRACKENDALE DRIVE CSO	1	0	1	8	0	0	0.7	N

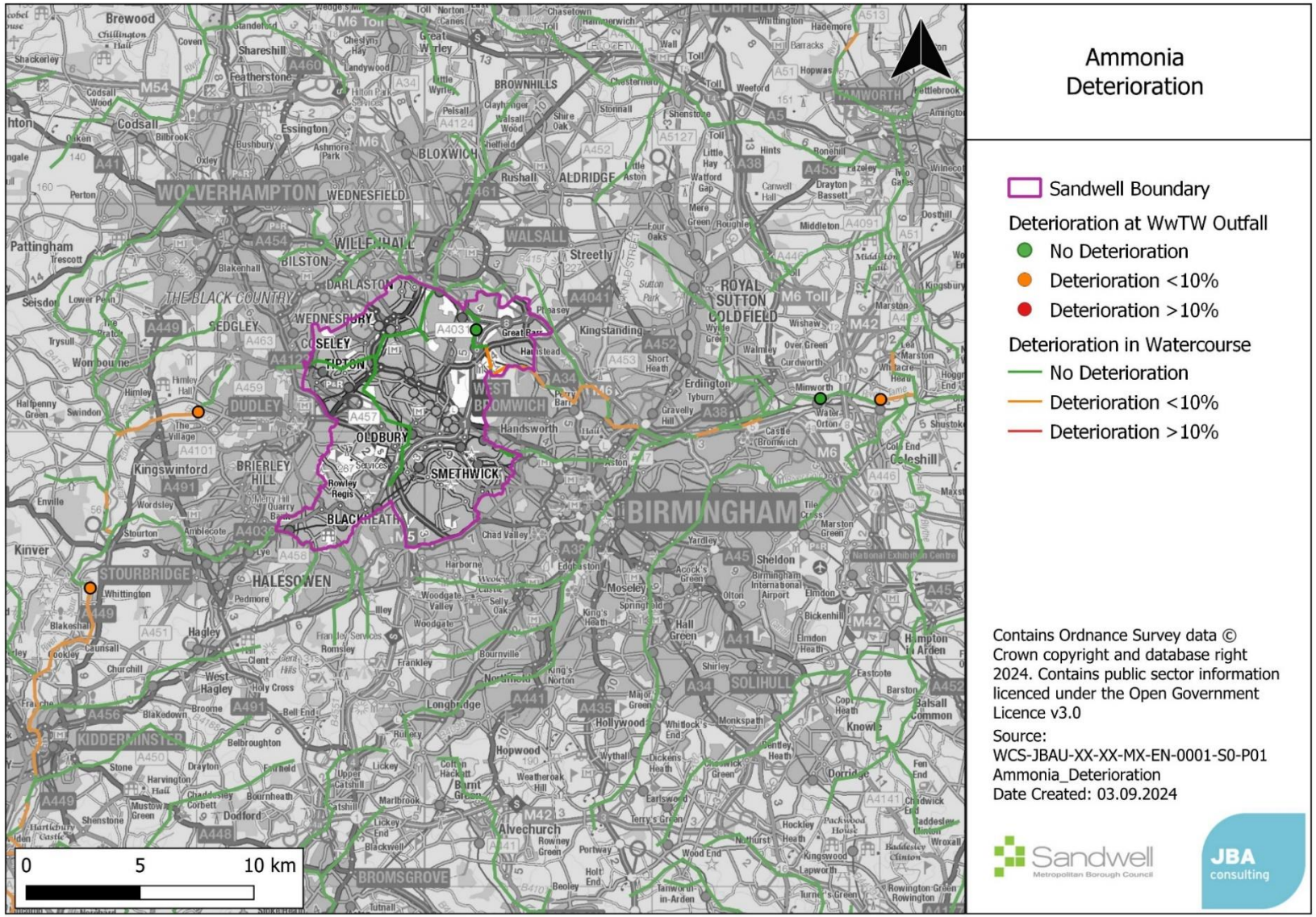
Table 0-2: WwTW storm overflow frequency of operation and duration

WwTW	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Above threshold for investigation? (Y/N)
Minworth	No data	No data	No data	No data	41	347	N/A
Roundhill	73	486	53	271	18	83.2	Y
Ray Hall	1	2.3	0	0	4	19.7	N
Lower Gornal	14	8	5	3	6	2.1	N

B Water Quality Mapping

B.1 Future scenario

The set of maps below show the modelled results if wastewater discharges increased by the volume predicted during the Local Plan period. They show a result at the point of mixing (i.e., where the WwTW discharges) and the results downstream in the river. These are colour coded based on whether deterioration is greater (red) or less than (amber) 10%. Areas where no deterioration is predicted are coloured green.


Ammonia
Deterioration
Sandwell Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
0
5
10 km
WOLVERHAMPTON
WEDNESFIELD
WALSALL
BIRMINGHAM
DUDLEY
STOURBRIDGE
HALESOWEN
SMETHWICK
OLDBURY
BLACKHEATH
WEST BROMWICH
SOLIHULL
BROMSGROVE
KIDDERMINSTER
THE BLACK COUNTRY
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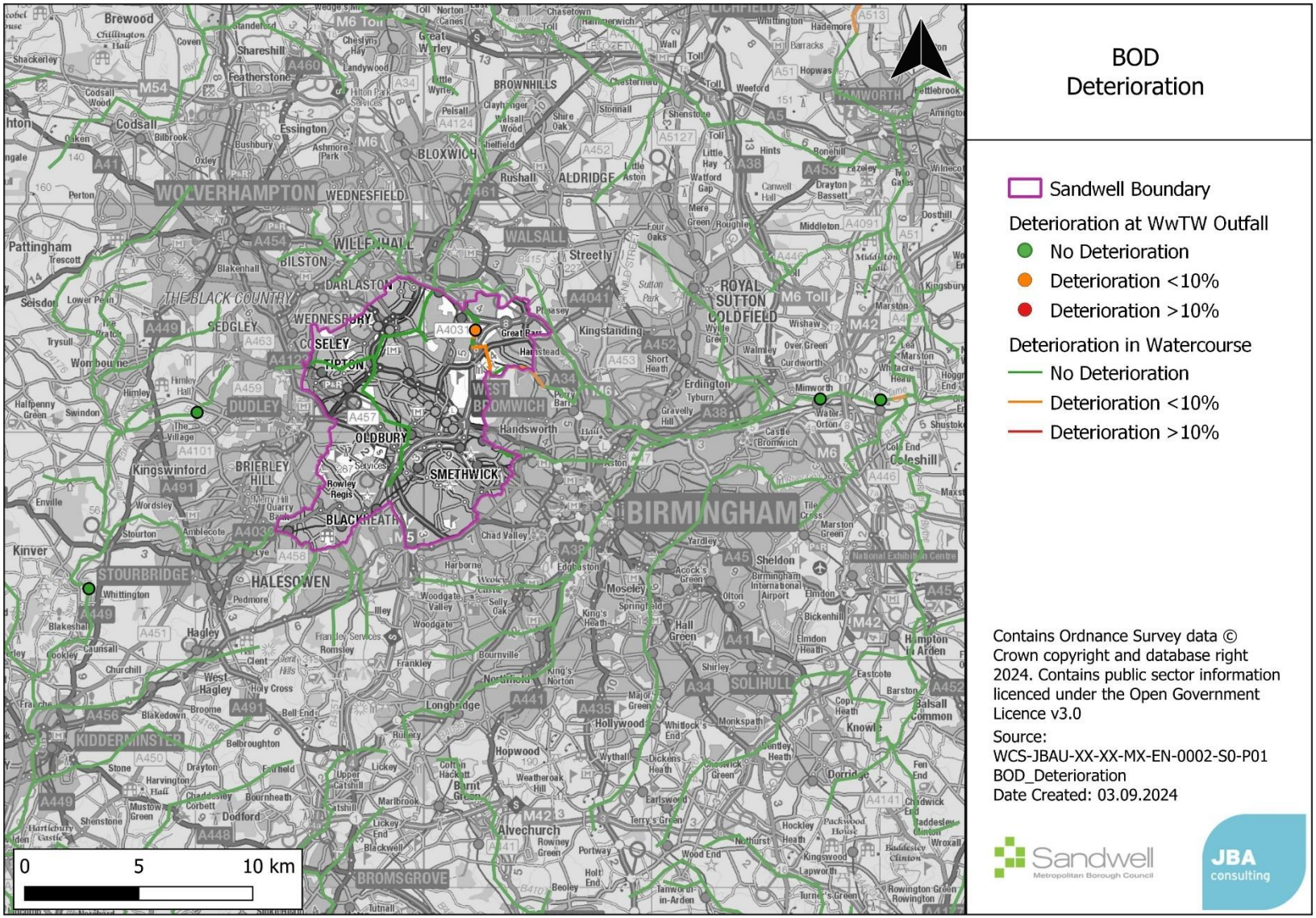
Source:
WCS-JBAU-XX-XX-MX-EN-0001-S0-P01 Ammonia_Deterioration
Date Created: 03.09.2024
Sandwell
Metropolitan Borough Council
JBA consulting


BOD
Deterioration
Sandwell Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
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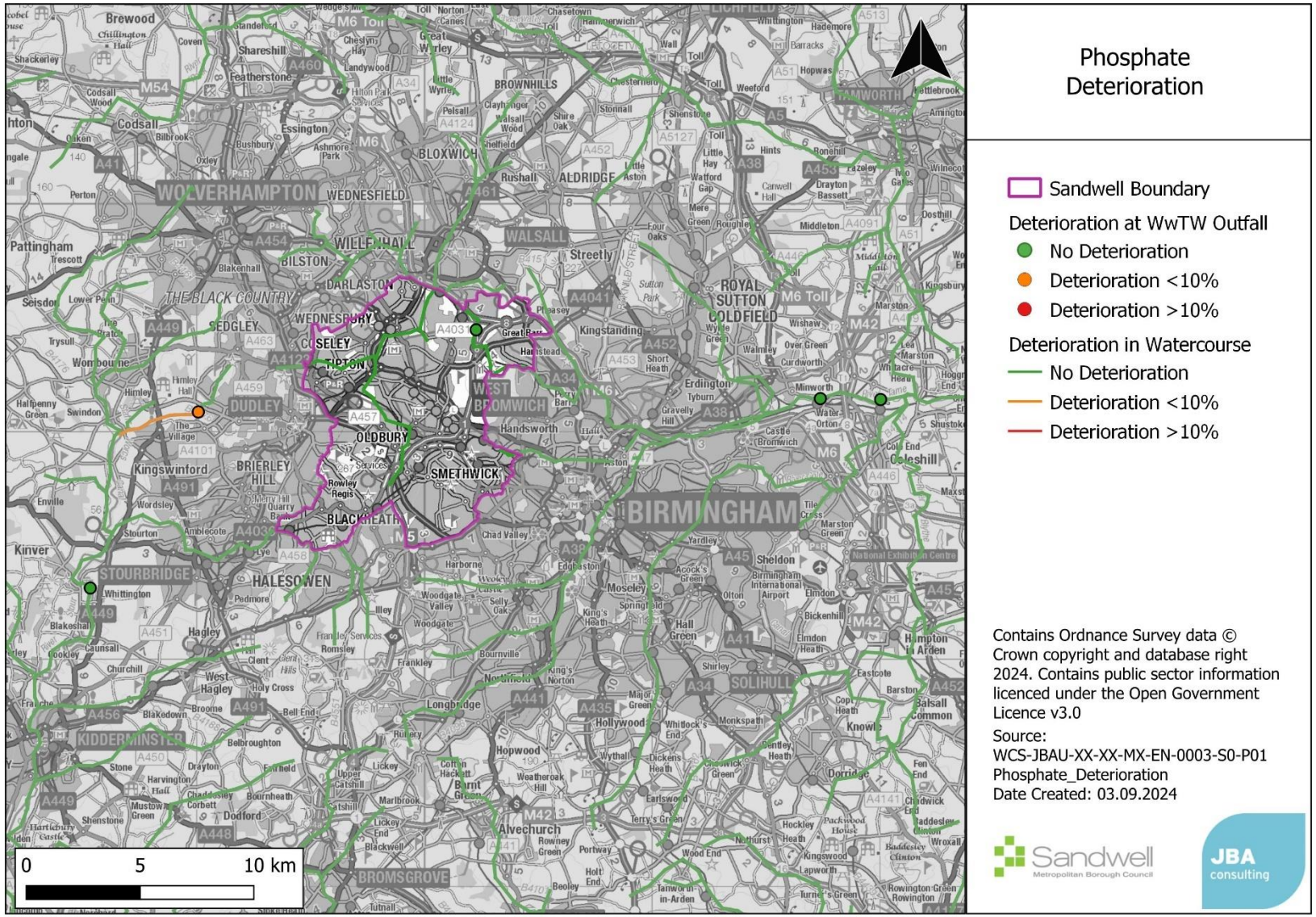
Source:
WCS-JBAU-XX-XX-MX-EN-0002-S0-P01
BOD_Deterioration
Date Created: 03.09.2024
0
5
10 km
WOLVERHAMPTON
WEDNESFIELD
WALSALL
DUDLEY
BIRMINGHAM
SMETHWICK
OLDBURY
BLACKHEATH
HALESOWEN
STOURBRIDGE
SOLIHULL
BROMSGROVE
KIDDERMINSTER
Sandwell
Metropolitan Borough Council


Phosphate Deterioration
Sandwell Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
0
5
10 km
WOLVERHAMPTON
WALSALL
BIRMINGHAM
DUDLEY
SMETHWICK
OLDBURY
BLACKHEATH
HALESOWEN
STOURBRIDGE
SOLIHULL
BROMSGROVE
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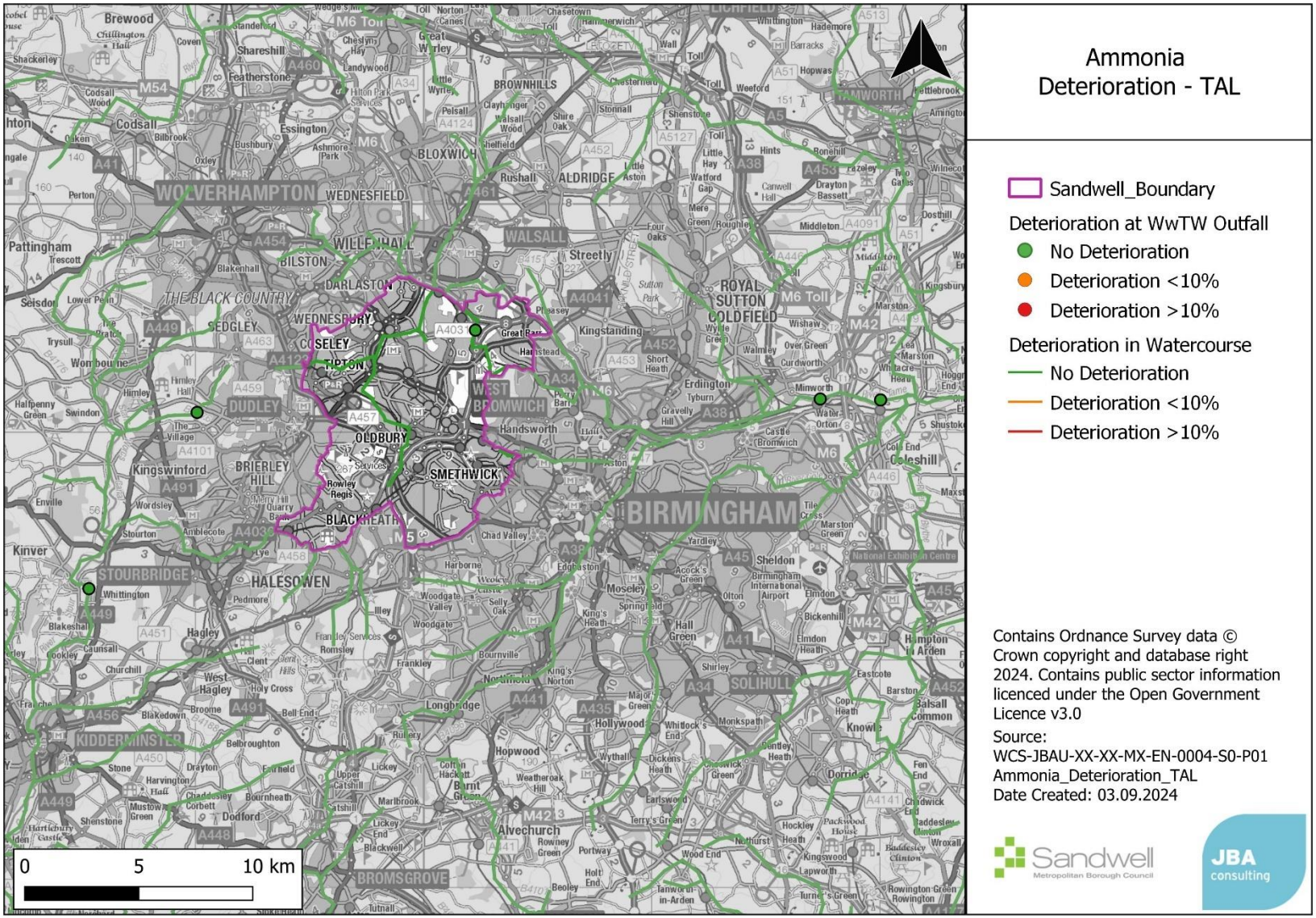
Source:
WCS-JBAU-XX-XX-MX-EN-0003-S0-P01 Phosphate_Deterioration
Date Created: 03.09.2024
Sandwell
Metropolitan Borough Council
JBA consulting

B.2 TAL scenario

This second set of maps show the modelled results in the TAL scenario, where each WwTW has been upgraded to the technically achievable limit (TAL). This shows areas where deterioration could not be prevented. In each case this is less than 10%.


Ammonia
Deterioration - TAL
Sandwell_Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
0
5
10 km
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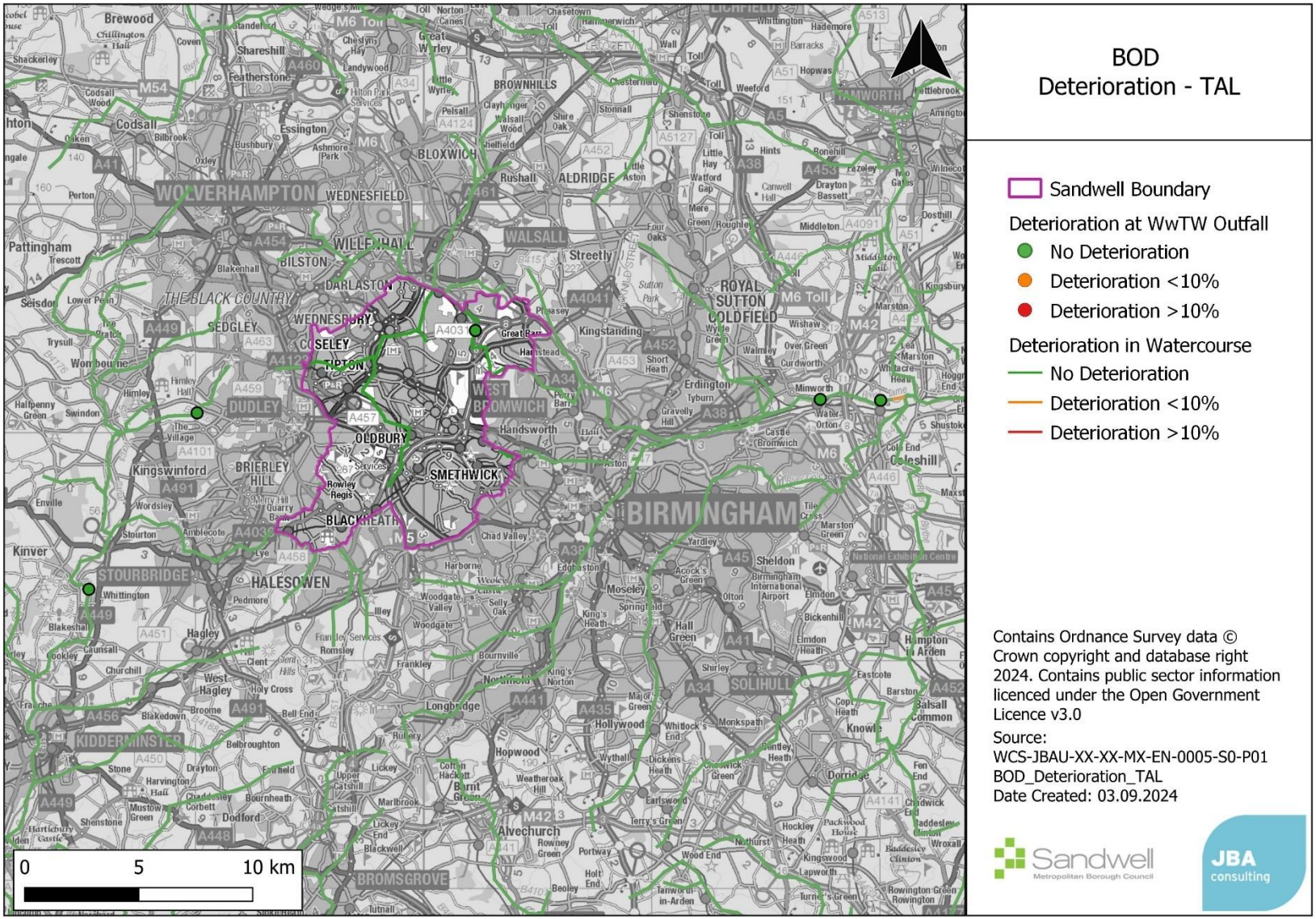
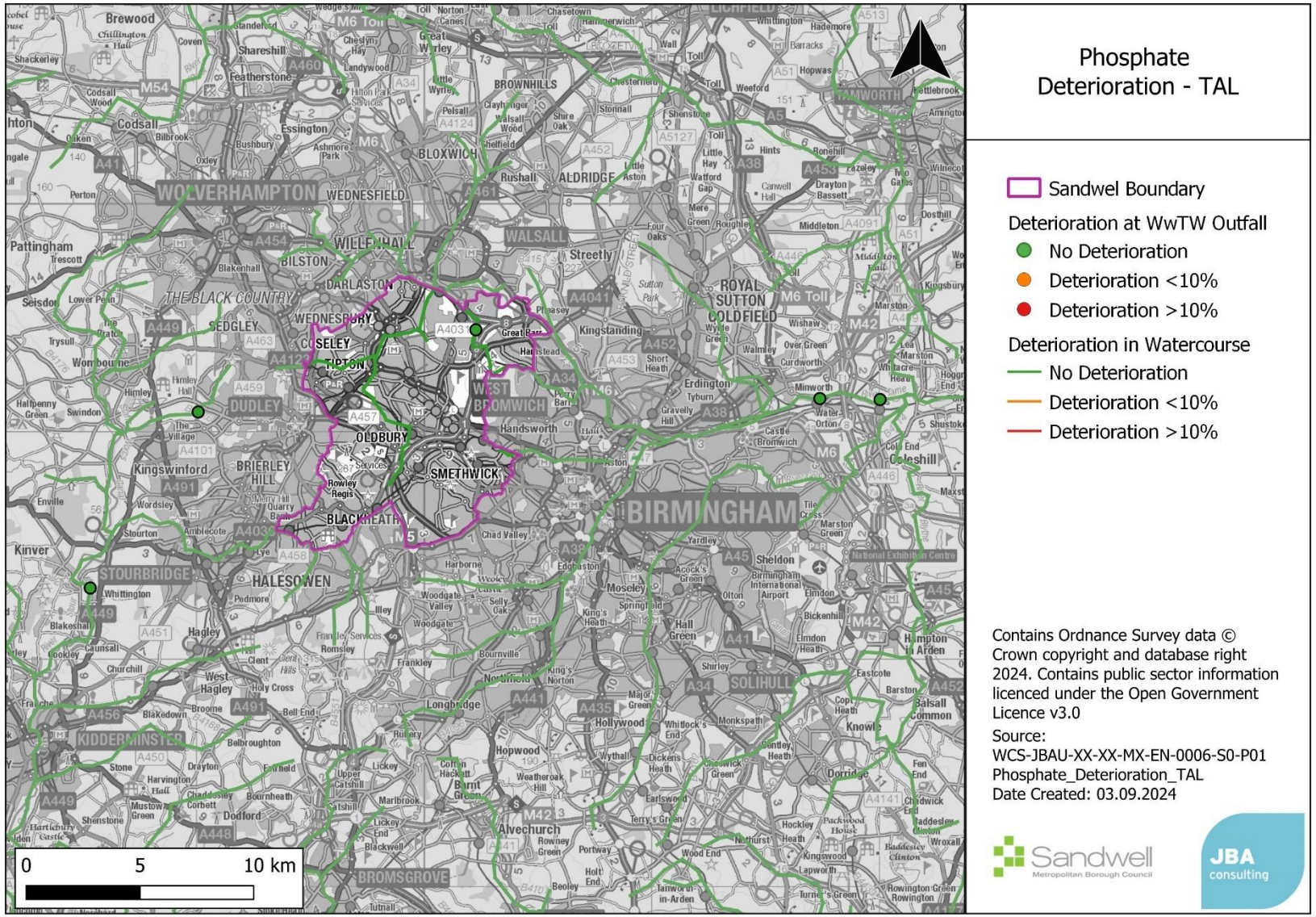
Source:
WCS-JBAU-XX-XX-MX-EN-0004-S0-P01
Ammonia_Deterioration_TAL
Date Created: 03.09.2024
Sandwell
Metropolitan Borough Council
JBA consulting


BOD
Deterioration - TAL
Sandwell Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
Contains Ordnance Survey data © Crown copyright and database right 2024. Contains public sector information licenced under the Open Government Licence v3.0
Source:
WCS-JBAU-XX-XX-MX-EN-0005-S0-P01
BOD_Deterioration_TAL
Date Created: 03.09.2024
0
5
10 km
WOLVERHAMPTON
WEDNESFIELD
WALSALL
DUDLEY
BIRMINGHAM
SMETHWICK
OLDBURY
BLACKHEATH
HALESOWEN
STOURBRIDGE
SOLIHULL
BROMSGROVE
ALDRIDGE
BLOXWICH
BROWNHILLS
TAMWORTH
COLESHILL
KIDDERMINSTER


Phosphate
Deterioration - TAL
Sandwel Boundary
Deterioration at WwTW Outfall
No Deterioration
Deterioration <10%
Deterioration >10%
Deterioration in Watercourse
No Deterioration
Deterioration <10%
Deterioration >10%
Contains Ordnance Survey data © Crown copyright and database right 2024. Contains public sector information licenced under the Open Government Licence v3.0
Source:
WCS-JBAU-XX-XX-MX-EN-0006-S0-P01
Phosphate_Deterioration_TAL
Date Created: 03.09.2024
0
5
10 km
WOLVERHAMPTON
BIRMINGHAM
DUDLEY
WALSALL
SOLIHULL
BROMSGROVE
HALESOWEN
STOURBRIDGE
KIDDERMINSTER
SMETHWICK
OLDBURY
BLACKHEATH
BRIERLEY HILL
DARLASTON
WEDNESBURY
TIPTON
COSELEY
WILLENHALL
BLOXWICH
ALDRIDGE
BROWNHILLS
TAMWORTH
COLESHILL
SHELDON
ROYAL SUTTON COLDFIELD
THE BLACK COUNTRY

C WwTW Deterioration

C.1 Ammonia

WwTW (SIMCAT name)	Baseline concentration (mg/l)	Future concentration (mg/l)	Percentage deterioration (%)	TAL concentration (mg/l)	TAL Percentage deterioration (%)	Baseline Class	Future Class	TAL Class
RAY HALL STW "	0.8220	0.8242	0%	0.7261	-12%	MODERATE	MODERATE	MODERATE
MINWORTH STW Outlet 1 "	0.5900	0.5926	0%	0.5782	-2%	GOOD	GOOD	GOOD
MINWORTH STW Outlet 2 "	0.5560	0.5588	1%	0.5097	-8%	GOOD	GOOD	GOOD
LOWER GORNAL STW "	1.2658	1.2897	2%	0.8699	-31%	POOR	POOR	MODERATE
ROUNDHILL STW "	0.9200	0.9372	2%	0.4645	-50%	MODERATE	MODERATE	GOOD

C.2 BOD

WwTW (SIMCAT name)	Baseline concentration (mg/l)	Future concentration (mg/l)	Percentage deterioration (%)	TAL concentration (mg/l)	TAL Percentage deterioration (%)	Baseline Class	Future Class	TAL Class
RAY HALL STW "	4.5400	4.5641	1%	4.336	-4%	GOOD	GOOD	GOOD
MINWORTH STW Outlet 1 "	3.6500	3.6613	0%	3.6583	0%	HIGH	HIGH	HIGH
MINWORTH STW Outlet 2 "	3.4400	3.4542	0%	3.4493	0%	HIGH	HIGH	HIGH
LOWER GORNAL STW "	7.4004	7.3595	-1%	5.6004	-24%	POOR	POOR	MODERATE
ROUNDHILL STW "	3.7649	3.7704	0%	3.6762	-2%	HIGH	HIGH	HIGH

C.3 Phosphate

WwTW (SIMCAT name)	Baseline concentration (mg/l)	Future concentration (mg/l)	Percentage deterioration (%)	TAL concentration (mg/l)	TAL Percentage deterioration (%)	Baseline Class	Future Class	TAL Class
RAY HALL STW "	0.722	0.71366	-1%	0.22976	-68%	POOR	POOR	POOR
MINWORTH STW Outlet 1 "	0.364	0.36265	0%	0.23643	-35%	POOR	POOR	POOR
MINWORTH STW Outlet 2 "	0.35	0.34722	-1%	0.23932	-32%	POOR	POOR	POOR
LOWER GORNAL STW "	0.25501	0.25698	1%	0.22183	-13%	POOR	POOR	POOR
ROUNDHILL STW "	0.33712	0.33732	0%	0.29938	-11%	POOR	POOR	POOR

D Groundwater Dependent Terrestrial Ecosystems

SSSI Code	SSSI Name	Groundwater Body	SWMI
1002798	Lower Woods (SSSI)	Avonmouth Mercia Mudstone	No
1000072	Hawkesbury Meadow (SSSI)	Avonmouth Mercia Mudstone	No
1002054	Yarley Meadows (SSSI)	Avonmouth Mercia Mudstone	No
1003718	Bishop's Hill Wood (SSSI)	Avonmouth Mercia Mudstone	No
1002284	Severn Estuary (SSSI)	Avonmouth Mercia Mudstone	No
1001413	Bestmoor (SSSI)	Banbury Jurassic	No
1002538	Puckham Woods (SSSI)	Burford Jurassic	No
1000634	Brassey Reserve & Windrush Valley (SSSI)	Burford Jurassic	No
1000477	Taynton Quarries (SSSI)	Burford Jurassic	No
1003528	Winson Meadows (SSSI)	Burford Jurassic	No
1000292	Alvescot Meadows (SSSI)	Burford Jurassic	No
1000720	Cleeve Common (SSSI)	Burford Jurassic	No
1003681	Wychwood Forest (SSSI)	Burford Jurassic	No
1001395	Crickley Hill & Barrow Wake (SSSI)	Burford Jurassic	No
1003691	Glyme Valley (SSSI)	Burford Jurassic	No
1006358	Cockleford Marsh (SSSI)	Burford Jurassic	No
1000143	Salmonsbury Meadows (SSSI)	Chipping Norton Jurassic	No
1005689	Middle Barton Fen (SSSI)	Chipping Norton Jurassic	No
1001583	Bould Wood (SSSI)	Chipping Norton Jurassic	No
2000110	Little Tew Meadows (SSSI)	Chipping Norton Jurassic	No
1004529	Lee Farm Meadow (SSSI)	Derwent - Carboniferous Limestone	No

SSSI Code	SSSI Name	Groundwater Body	SWMI
1005477	Gang Mine (SSSI)	Derwent - Carboniferous Limestone	No
1003309	Masson Hill (SSSI)	Derwent - Carboniferous Limestone	No
1000145	Topley Pike & Deep Dale (SSSI)	Derwent - Carboniferous Limestone	No
1003711	Lathkill Dale (SSSI)	Derwent - Carboniferous Limestone	No
1003861	Monks Dale (SSSI)	Derwent - Carboniferous Limestone	No
1000209	Cromford Canal (SSSI)	Derwent - Carboniferous Limestone	No
2000504	Hurdlow Meadows (SSSI)	Derwent - Carboniferous Limestone	No
2000181	Rose End Meadows (SSSI)	Derwent - Carboniferous Limestone	No
1005757	Tideslow Rake (SSSI)	Derwent - Carboniferous Limestone	No
1001029	Longstone Moor (SSSI)	Derwent - Carboniferous Limestone	No
2000186	Wye Valley (SSSI)	Derwent - Carboniferous Limestone	No
1004059	Stoney Middleton Dale (SSSI)	Derwent - Carboniferous Limestone	No
1005517	Bonsall Leys (SSSI)	Derwent - Carboniferous Limestone	No
1002643	Castleton (SSSI)	Derwent - Carboniferous Limestone	No
1003009	Via Gellia Woodlands (SSSI)	Derwent - Carboniferous Limestone	No
2000054	Ballidon Dale (SSSI)	Derwent - Carboniferous Limestone	No
1003783	Long Dale & Gratton Dale (SSSI)	Derwent - Carboniferous Limestone	No
1002696	Clough Woods (SSSI)	Derwent - Secondary Combined	No
1000522	Morley Brick Pits (SSSI)	Derwent - Secondary Combined	No
1000538	Ogston Reservoir (SSSI)	Derwent - Secondary Combined	No
1003953	Yarncliff Wood, Padley (SSSI)	Derwent - Secondary Combined	No
1001834	Abney & Bretton Cloughs (SSSI)	Derwent - Secondary Combined	No
1004459	Bradwell Meadows (SSSI)	Derwent - Secondary Combined	No

SSSI Code	SSSI Name	Groundwater Body	SWMI
1002841	Goyt Valley (SSSI)	Derwent - Secondary Combined	No
1001215	Shining Cliff Woods (SSSI)	Derwent - Secondary Combined	No
1003028	The Dark Peak (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1000343	Crabtree Wood (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1004516	Wentbridge Ings (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1001866	Teversal Pastures (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1000570	Roche Abbey Woodlands (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1000723	Totley Wood (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1005892	Pye Flatts Meadows (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1007006	Moss Valley Woods (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1001489	Brockadale (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1004522	Moss Valley Meadows (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1000381	Moss Valley (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1004401	Denaby Ings (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1003972	Dovedale Wood (SSSI)	Don & Rother Millstone grit & Coal Measures	No
2000354	Eastern Peak District Moors (SSSI)	Don & Rother Millstone grit & Coal Measures	No
1002787	Dove Valley & Biggin Dale (SSSI)	Dove - Carboniferous Limestone	No
2000144	Long Dale, Hartington (SSSI)	Dove - Carboniferous Limestone	No
1004504	Bees Nest & Green Clay Pits (SSSI)	Dove - Carboniferous Limestone	No
1003878	Caldon Dales (SSSI)	Dove - Carboniferous Limestone	No
1000447	Hipley Hill (SSSI)	Dove - Carboniferous Limestone	No
1001024	Old River Dove, Marston on Dove (SSSI)	Dove - Mercia Mudstone	No
1000495	Hulland Moss (SSSI)	Dove - Mercia Mudstone	No

SSSI Code	SSSI Name	Groundwater Body	SWMI
1007149	Saltersford Lane Meadows (SSSI)	Dove - Mercia Mudstone	No
1007135	Churnet Valley (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1002911	Hamps & Manifold Valleys (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1003862	Bath Pasture (SSSI)	Dove - Millstone Grit/ Coal Measures	No
2000137	Whiston Eaves (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1003770	Leek Moors (SSSI)	Dove - Millstone Grit/ Coal Measures	No
2000357	Froghall Meadow and Pastures (SSSI)	Dove - Millstone Grit/ Coal Measures	No
2000209	Wetley Moor (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1003081	Thorncliffe Moor (SSSI)	Dove - Millstone Grit/ Coal Measures	No
2000108	Colshaw Pastures (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1003901	Moss Carr (SSSI)	Dove - Millstone Grit/ Coal Measures	No
1005567	Mercaston Marsh & Muggington Bottoms (SSSI)	Dove - PT Sandstone Mayfield	No
1001324	Stanton Pastures & Cuckoocliff Valley (SSSI)	Dove - PT Sandstone Mayfield	No
1007136	Dimmings Dale & The Ranger (SSSI)	Dove - PT Sandstone Mayfield	No
1000682	Dyscarr Wood (SSSI)	Idle Torne - Magnesian Limestone	No
1000403	Ginny Spring, Whitwell Wood (SSSI)	Idle Torne - Magnesian Limestone	No
1000605	Maltby Low Common (SSSI)	Idle Torne - Magnesian Limestone	No
1001020	Misson Line Bank (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000680	Sandall Beat (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000664	Clumber Park (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes

SSSI Code	SSSI Name	Groundwater Body	SWMI
1001749	River Idle Washlands (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000999	Mattersey Hill Marsh (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1001902	Thoresby Lake (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000771	Hills & Holes & Sookholme Brook, Warsop (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000536	Hatfield Moors (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1001706	Rainworth Lakes (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1001467	Thorne, Crowle & Goole Moors (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
2000213	Hatfield Chase Ditches (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1000669	Potteric Carr (SSSI)	Idle Torne - PT Sandstone Nottinghamshire&Doncaster	Yes
1006376	Honeybrook Farm (SSSI)	Inferior Oolite and Bridport Sands	
1003186	Upton Coombe (SSSI)	Inferior Oolite and Bridport Sands	
1005472	Monkswood Valley (SSSI)	Inferior Oolite and Bridport Sands	
1000159	Cleaves Wood (SSSI)	Inferior Oolite and Bridport Sands	
2000059	St Catherine's Valley (SSSI)	Inferior Oolite and Bridport Sands	
1002832	Midger (SSSI)	Inferior Oolite and Bridport Sands	
2000682	Annesley Woodhouse Quarries (SSSI)	Lower Trent Erewash - Coal Measures	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1002878	Bagthorpe Meadows (SSSI)	Lower Trent Erewash - Coal Measures	
1005978	Robbinetts (SSSI)	Lower Trent Erewash - Coal Measures	
1001832	Sledder Wood Meadows (SSSI)	Lower Trent Erewash - Coal Measures	
1000193	Breadsall Railway Cutting (SSSI)	Lower Trent Erewash - Coal Measures	
1003494	Bogs Farm Quarry (SSSI)	Lower Trent Erewash - Coal Measures	
1000713	Friezeland Grassland (SSSI)	Lower Trent Erewash - Coal Measures	
1001822	Sellers Wood (SSSI)	Lower Trent Erewash - PT Sandstone Wollaton	Yes
1000126	Harby Hills Wood (SSSI)	Lower Trent Erewash - Secondary Combined	
2000332	Lea Marsh (SSSI)	Lower Trent Erewash - Secondary Combined	
1003316	Muston Meadows (SSSI)	Lower Trent Erewash - Secondary Combined	
1002189	Eastoft Meadow (SSSI)	Lower Trent Erewash - Secondary Combined	
1001660	Orston Plaster Pits (SSSI)	Lower Trent Erewash - Secondary Combined	
1001992	Wilford Claypits (SSSI)	Lower Trent Erewash - Secondary Combined	
1000737	Gamston & Eaton Woods & Roadside Verges (SSSI)	Lower Trent Erewash - Secondary Combined	
1001040	Newhall Reservoir Meadow (SSSI)	Lower Trent Erewash - Secondary Combined	
1000930	Laxton Sykes (SSSI)	Lower Trent Erewash - Secondary Combined	
1001209	Messingham Sand Quarry (SSSI)	Lower Trent Erewash - Secondary Combined	
1000300	Ashton's Meadow (SSSI)	Lower Trent Erewash - Secondary Combined	
1001728	Redgate Woods & Mansey Common (SSSI)	Lower Trent Erewash - Secondary Combined	
2000480	Humber Estuary (SSSI)	Lower Trent Erewash - Secondary Combined	
1003260	Messingham Heath (SSSI)	Lower Trent Erewash - Secondary Combined	
1003427	Barnstone Railway Cutting (SSSI)	Lower Trent Erewash - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1001900	Scotton Beck Fields (SSSI)	Lower Trent Erewash - Secondary Combined	
1000357	Scotton & Laughton Forest Ponds (SSSI)	Lower Trent Erewash - Secondary Combined	
1000826	Holme Pit (SSSI)	Lower Trent Erewash - Secondary Combined	
1005742	Kirton Wood (SSSI)	Lower Trent Erewash - Secondary Combined	
1002006	Willwell Cutting (SSSI)	Lower Trent Erewash - Secondary Combined	
1001980	Terrace Hills Pasture, Eaton (SSSI)	Lower Trent Erewash - Secondary Combined	
1003408	Attenborough Gravel Pits (SSSI)	Lower Trent Erewash - Secondary Combined	
1000431	Hilton Gravel Pits (SSSI)	Lower Trent Erewash - Secondary Combined	
1003182	Manton & Twigmoor (SSSI)	Lower Trent Erewash - Secondary Combined	
1001050	Normanton Pastures (SSSI)	Lower Trent Erewash - Secondary Combined	
2000300	Besthorpe Meadows (SSSI)	Lower Trent Erewash - Secondary Combined	
1003532	Castle Hill Wood (SSSI)	Lower Trent Erewash - Secondary Combined	
1000873	Kinoulton Marsh & Canal (SSSI)	Lower Trent Erewash - Secondary Combined	
1000704	Eakring & Maplebeck Meadows (SSSI)	Lower Trent Erewash - Secondary Combined	
1000905	Lount Meadows (SSSI)	Lower Trent Erewash - Secondary Combined	
1002803	Huddersfield Narrow Canal (SSSI)	Manchester and East Cheshire Carboniferous Aquifers	
1005664	Roe Park Woods (SSSI)	Manchester and East Cheshire Carboniferous Aquifers	
1007196	South Pennine Moors (SSSI)	Manchester and East Cheshire Carboniferous Aquifers	
2000505	Lower Peaslows Farm Meadow (SSSI)	Manchester and East Cheshire Carboniferous Aquifers	
1002836	Compstall Nature Reserve (SSSI)	Manchester and East Cheshire Carboniferous	

SSSI Code	SSSI Name	Groundwater Body	SWMI
		Aquifers	
1001694	Juniper Hill, Edgeworth (SSSI)	Severn Vale - Jurassic Limestone Cotswold Edge South	
1003794	Bushley Muzzard, Brimpsfield (SSSI)	Severn Vale - Jurassic Limestone Cotswold Edge South	
1003561	Woodchester Park (SSSI)	Severn Vale - Jurassic Limestone Cotswold Edge South	
1003801	Cotswold Commons & Beechwoods (SSSI)	Severn Vale - Jurassic Limestone Cotswold Edge South	
1000673	Chaceley Meadows (SSSI)	Severn Vale - Secondary Combined	
2000102	River Teme (SSSI)	Severn Vale - Secondary Combined	
1005774	Micklefield Meadow (SSSI)	Severn Vale - Secondary Combined	
1002513	Innsworth Meadow (SSSI)	Severn Vale - Secondary Combined	
2000162	Clarke's Pool Meadow (SSSI)	Severn Vale - Secondary Combined	
1003511	Walmore Common (SSSI)	Severn Vale - Secondary Combined	
1004370	Earl's Croome Meadow (SSSI)	Severn Vale - Secondary Combined	
1001180	Mutlow's Orchard (SSSI)	Severn Vale - Secondary Combined	
1000857	Little Byefields Meadow (SSSI)	Severn Vale - Secondary Combined	
1007247	Avenue Meadow (SSSI)	Severn Vale - Secondary Combined	
1004354	Duke of York Meadow (SSSI)	Severn Vale - Secondary Combined	
1002192	Rye Street Meadows (SSSI)	Severn Vale - Secondary Combined	
1003857	Hucclecote Meadows (SSSI)	Severn Vale - Secondary Combined	
1007248	Napleton Meadow (SSSI)	Severn Vale - Secondary Combined	
1001604	Upton Ham (SSSI)	Severn Vale - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1003303	Brotheridge Green Meadows (SSSI)	Severn Vale - Secondary Combined	
1003100	Hall Wood (SSSI)	Severn Vale - Secondary Combined	
2000256	Grange Meadow (SSSI)	Severn Vale - Secondary Combined	
1001017	The Malvern Hills (SSSI)	Severn Vale - Secondary Combined	
1000789	Coombe Hill Canal (SSSI)	Severn Vale - Secondary Combined	
1007244	Tudor Cottage Meadow (SSSI)	Severn Vale - Secondary Combined	
1001367	Pennsylvania Fields, Sedbury (SSSI)	Severn Vale - Secondary Combined	
2000178	Range Farm Fields (SSSI)	Severn Vale - Secondary Combined	
1003434	Castlemorton Common (SSSI)	Severn Vale - Secondary Combined	
1001783	New Inn Meadow (SSSI)	Severn Vale - Secondary Combined	
1002458	Upper Severn Estuary (SSSI)	Severn Vale - Secondary Combined	
1000526	Ashleworth Ham (SSSI)	Severn Vale - Secondary Combined	
1001493	Frampton Pools (SSSI)	Severn Vale - Secondary Combined	
1001214	Malthouse Farm Meadows (SSSI)	Severn Vale - Secondary Combined	
1007243	Starling Bank (SSSI)	Severn Vale - Secondary Combined	
1007245	Merries Farm Meadows (SSSI)	Severn Vale - Secondary Combined	
1001966	Poolhay Meadows (SSSI)	Severn Vale - Secondary Combined	
2000253	Burley Dene Meadows (SSSI)	Severn Vale - Secondary Combined	
1001315	Ashmoor Common (SSSI)	Severn Vale - Secondary Combined	
1003827	Dymock Woods (SSSI)	Severn Vale - Secondary Combined	
1002445	Nagshead (SSSI)	Severn Vale - Secondary Combined	
1003724	Barn Meadow (SSSI)	Severn Vale - Secondary Combined	
1004216	Aston Ingham Meadows (SSSI)	Severn Vale - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1003591	Coombhill Meadows (SSSI)	Severn Vale - Secondary Combined	
1007262	Penorchard & Spring Farm Pastures (SSSI)	Shropshire Middle Severn - Coal Measures Dudley	
1006623	Romsley Manor Farm (SSSI)	Shropshire Middle Severn - Coal Measures Dudley	
1002670	Illey Pastures (SSSI)	Shropshire Middle Severn - Coal Measures Dudley	
1003757	Fens Pools (SSSI)	Shropshire Middle Severn - Coal Measures Dudley	
1007263	Romsley Hill (SSSI)	Shropshire Middle Severn - Coal Measures Dudley	
1001608	Tick Wood & Benthall Edge (SSSI)	Shropshire Middle Severn - Secondary Combined	
2000212	Areley Wood (SSSI)	Shropshire Middle Severn - Secondary Combined	
1000265	Lydebrook Dingle (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007235	Buckeridge Meadow (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007237	Bliss Gate Pastures (SSSI)	Shropshire Middle Severn - Secondary Combined	
1000022	Chorley Covert & Deserts Wood (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007234	Ranters Bank Pastures (SSSI)	Shropshire Middle Severn - Secondary Combined	
1001712	Wenlock Edge (SSSI)	Shropshire Middle Severn - Secondary Combined	
1002720	Muxton Marsh (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007238	Brown's Close Meadow (SSSI)	Shropshire Middle Severn - Secondary Combined	
1001585	The Wrekin & The Ercall (SSSI)	Shropshire Middle Severn - Secondary Combined	
1000580	The Wilderness & Vermin Valley (SSSI)	Shropshire Middle Severn - Secondary Combined	
1003199	Whitwell Coppice (SSSI)	Shropshire Middle Severn - Secondary Combined	
1000010	Bush Wood & High Wood (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007232	Teddon Farm (SSSI)	Shropshire Middle Severn - Secondary Combined	
1007236	Showground Meadow, Callow Hill (SSSI)	Shropshire Middle Severn - Secondary Combined	
1004198	Wyre Forest (SSSI)	Shropshire Middle Severn - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1002689	Beacon Hill, Hangingstone & Outwoods (SSSI)	Soar - Secondary Combined	
1002040	Twenty Acre Piece (SSSI)	Soar - Secondary Combined	
1000094	Groby Pool & Woods (SSSI)	Soar - Secondary Combined	
1003431	Bradgate Park & Cropston Reservoir (SSSI)	Soar - Secondary Combined	
1003785	Croxton Park (SSSI)	Soar - Secondary Combined	
1001884	Sheet Hedges Wood (SSSI)	Soar - Secondary Combined	
1001112	Owston Woods (SSSI)	Soar - Secondary Combined	
1002070	Wymondham Rough (SSSI)	Soar - Secondary Combined	
1002661	Barrow Gravel Pits (SSSI)	Soar - Secondary Combined	
1000968	Narborough Bog (SSSI)	Soar - Secondary Combined	
1002254	Loughborough Meadows (SSSI)	Soar - Secondary Combined	
1001129	Pasture & Asplin Woods (SSSI)	Soar - Secondary Combined	
1003405	Botcheston Bog (SSSI)	Soar - Secondary Combined	
1000146	Holwell Mouth (SSSI)	Soar - Secondary Combined	
1003563	Charnwood Lodge (SSSI)	Soar - Secondary Combined	
1003912	Swithland Wood & The Brand (SSSI)	Soar - Secondary Combined	
1004512	Frisby Marsh (SSSI)	Soar - Secondary Combined	
1002060	Ulverscroft Valley (SSSI)	Soar - Secondary Combined	
1000029	Grace Dieu & High Sharpley (SSSI)	Soar - Secondary Combined	
1000882	Lockington Marshes (SSSI)	Soar - Secondary Combined	
2000693	Chasewater And The Southern Staffordshire Coalfield Heaths (SSSI)	Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1003939	Pasturefields Salt Marsh (SSSI)	Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures	
1002337	Chartley Moss (SSSI)	Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures	
2000245	Stowe Pool and Walk Mill Clay Pit (SSSI)	Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures	
1005764	Gentleshaw Common (SSSI)	Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures	
1005758	Big Hyde Rough (SSSI)	Staffordshire Trent Valley - Merica Mudstone West	
1003768	Allimore Green Common (SSSI)	Staffordshire Trent Valley - Merica Mudstone West	
1001006	Doxey & Tillington Marshes (SSSI)	Staffordshire Trent Valley - Merica Mudstone West	
1000057	Cop Mere (SSSI)	Staffordshire Trent Valley - Merica Mudstone West	
1002612	Mottey Meadows (SSSI)	Staffordshire Trent Valley - Merica Mudstone West	
1000348	Stafford Brook (SSSI)	Staffordshire Trent Valley - PT Sandstone Staffordshire	Yes
1000283	Maer Pool (SSSI)	Staffordshire Trent Valley - PT Sandstone Staffordshire	Yes
1003845	Baswich Meadows (SSSI)	Staffordshire Trent Valley - PT Sandstone Staffordshire	Yes
1004497	Cannock Chase (SSSI)	Staffordshire Trent Valley - PT Sandstone Staffordshire	Yes
1001338	Rawbones Meadow (SSSI)	Staffordshire Trent Valley - PT Sandstone Staffordshire	Yes
1007138	Jockey Fields (SSSI)	Tame Anker Mease - Coal Measures Black Country	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1001541	Stubbers Green Bog (SSSI)	Tame Anker Mease - Coal Measures Black Country	
1003040	Clayhanger (SSSI)	Tame Anker Mease - Coal Measures Black Country	
1000981	Swan Pool & The Swag (SSSI)	Tame Anker Mease - Coal Measures Black Country	
1001574	Sutton Park (SSSI)	Tame Anker Mease - PT Sandstone Birmingham Lichfield	Yes
1000942	Bittell Reservoirs (SSSI)	Tame Anker Mease - PT Sandstone Birmingham Lichfield	Yes
1000278	Carver's Rocks (SSSI)	Tame Anker Mease - PT Sandstone Burton	
2000078	Birches Barn Meadows (SSSI)	Tame Anker Mease - PT Sandstone Burton	
1001283	Sheepy Fields (SSSI)	Tame Anker Mease - Secondary Combined	
1001033	Newton Burgoland Marshes (SSSI)	Tame Anker Mease - Secondary Combined	
1005718	Windmill Naps Wood (SSSI)	Tame Anker Mease - Secondary Combined	
1001509	Edgbaston Pool (SSSI)	Tame Anker Mease - Secondary Combined	
1003916	Kendall's Meadow (SSSI)	Tame Anker Mease - Secondary Combined	
1006055	Berkswell Marsh (SSSI)	Tame Anker Mease - Secondary Combined	
1001216	Coleshill & Bannerly Pools (SSSI)	Tame Anker Mease - Secondary Combined	
1007264	Berry Mound Pastures (SSSI)	Tame Anker Mease - Secondary Combined	
1001772	River Blythe (SSSI)	Tame Anker Mease - Secondary Combined	
2000080	Brook Meadow, Darley Green (SSSI)	Tame Anker Mease - Secondary Combined	
1003680	Coalville Meadows (SSSI)	Tame Anker Mease - Secondary Combined	
1001109	Bentley Park Wood (SSSI)	Tame Anker Mease - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1002847	Bickenhill Meadows (SSSI)	Tame Anker Mease - Secondary Combined	
1001494	Clowes Wood & New Fallings Coppice (SSSI)	Tame Anker Mease - Secondary Combined	
1001744	Monkspath Meadow (SSSI)	Tame Anker Mease - Secondary Combined	
1002159	Hoar Park Wood (SSSI)	Tame Anker Mease - Secondary Combined	
2000269	Marked Ash Meadows (SSSI)	Teme - Secondary Combined	
1001146	Monkwood Green (SSSI)	Teme - Secondary Combined	
2000271	Prince's Rough (SSSI)	Teme - Secondary Combined	
1004330	Downton Gorge (SSSI)	Teme - Secondary Combined	
1004366	Dumbleton Dingle (SSSI)	Teme - Secondary Combined	
1004349	Shelve Pool (SSSI)	Teme - Secondary Combined	
1007258	Nine Holes Meadows (SSSI)	Teme - Secondary Combined	
1007240	Lord's Wood Meadows (SSSI)	Teme - Secondary Combined	
1000821	Leigh Brook Valley (SSSI)	Teme - Secondary Combined	
1000345	Flat Coppice (SSSI)	Teme - Secondary Combined	
1001623	Titterstone Clee (SSSI)	Teme - Secondary Combined	
1000386	Stocking Meadows, Oreton (SSSI)	Teme - Secondary Combined	
1003344	Burrington Meadow (SSSI)	Teme - Secondary Combined	
1004080	Long Mynd (SSSI)	Teme - Secondary Combined	
1003558	Derrington Meadow (SSSI)	Teme - Secondary Combined	
1003544	Hay Wood & Tinkers' Coppice (SSSI)	Teme - Secondary Combined	
1001507	Broad Green (SSSI)	Teme - Secondary Combined	
1007242	Quarry Farm Meadow (SSSI)	Teme - Secondary Combined	
1003146	Catherton Common (SSSI)	Teme - Secondary Combined	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1003534	Pennerley Meadows (SSSI)	Teme - Secondary Combined	
1007241	Hillend Meadow & Orchard (SSSI)	Teme - Secondary Combined	
1006000	Hill Houses & Crumpsbrook Meadows (SSSI)	Teme - Secondary Combined	
1000027	Hanley Dingle (SSSI)	Teme - Secondary Combined	
1002195	The Stiperstones & The Hollies (SSSI)	Teme - Secondary Combined	
1003740	Frog End Meadow (SSSI)	Teme - Secondary Combined	
1000360	Rhos Fiddle (SSSI)	Teme - Secondary Combined	
	Black Venn Pasture	Teme - Secondary Combined	
32WEA	RIVER TEME	Teme - Secondary Combined	
32WZF	WHITE GRIT MEADOWS	Teme - Secondary Combined	
1000092	Hewell Park Lake (SSSI)	Warwickshire Avon - PT Sandstone Bromsgove South	Yes
2000258	Lower Saleway Farm Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007253	Dormston Church Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1005617	Bugbrooke Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007255	Stock Wood Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007254	Rookery Cottage Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1004320	Misterton Marshes (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1005052	Herald Way Marsh (SSSI)	Warwickshire Avon - Secondary Mudrocks	
2000358	Welford Field (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1000148	Ipsley Alders Marsh (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002620	Badby Wood (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1000925	Long Meadow, Thorn (SSSI)	Warwickshire Avon - Secondary Mudrocks	

SSSI Code	SSSI Name	Groundwater Body	SWMI
2000348	Railway Meadow, Langley (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1004455	Foster's Green Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1003442	Ullenhall Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007250	Rectory Farm Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1006626	Baynhall Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002348	Whichford Wood (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1006625	Yellow House Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1004480	Grafton Wood (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007249	Great Blaythorn Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
2000249	Racecourse Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1000459	Wylde Moor, Feckenham (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1005946	Cooksholme Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1001617	Merriman's Hill Farm Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1003656	Dagnell End Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1003549	Cave's Inn Pits (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1000932	Calcutt Locks Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002454	Midsummer Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
2000079	Drybank Meadow, Cherington (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1003066	Tiddesley Wood (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1001298	Draycote Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1001151	Brandon Marsh (SSSI)	Warwickshire Avon - Secondary Mudrocks	
2000251	Oak Tree Farm Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
2000248	Lobbington Hall Farm Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1006459	Sherbourne Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007256	Trickses Hole (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1006624	Portway Farm Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002202	Salt Meadow, Earl's Common (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002171	Bosworth Mill Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007252	Naunton Court Meadows (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1005547	River Itchen (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002460	Loxley Church Meadow (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1007251	Dean Brook Valley Pastures (SSSI)	Warwickshire Avon - Secondary Mudrocks	
1002139	Southorpe Meadow (SSSI)	Welland Limestone Unit A	Yes
1004415	Empingham Marshy Meadows (SSSI)	Welland Limestone Unit A	Yes
1003241	Whitewater Valley (SSSI)	Welland Limestone Unit A	Yes
1000112	Bonemills Hollow (SSSI)	Welland Limestone Unit A	Yes
1000412	Porter's Lodge Meadows (SSSI)	Welland Limestone Unit A	Yes
1003893	Southorpe Paddock (SSSI)	Welland Limestone Unit A	Yes
1003825	Wansford Pasture (SSSI)	Welland Limestone Unit A	Yes
1004378	Tickencote Marsh (SSSI)	Welland Limestone Unit A	Yes
1001247	Greetham Meadows (SSSI)	Welland Limestone Unit A	Yes
1001268	Shacklewell Hollow (SSSI)	Welland Limestone Unit A	Yes
1001220	Rutland Water (SSSI)	Welland Limestone Unit A	Yes
1002363	Sutton Heath & Bog (SSSI)	Welland Limestone Unit A	Yes
1004276	Bulwick Meadows (SSSI)	Welland Limestone Unit A	Yes
1003851	West, Abbot's & Lound Woods (SSSI)	Welland Limestone Unit A	Yes

SSSI Code	SSSI Name	Groundwater Body	SWMI
1006052	Seaton Meadows (SSSI)	Welland Lower Jurassic Unit	
2000360	Saddington Reservoir (SSSI)	Welland Lower Jurassic Unit	
1000080	Great Bowden Borrowpit (SSSI)	Welland Lower Jurassic Unit	
1006390	Burley & Rushpit Woods (SSSI)	Welland Lower Jurassic Unit	
1003619	Chater Valley (SSSI)	Welland Lower Jurassic Unit	
1004087	Moor Closes (SSSI)	Witham Lias	
1001930	Debdale Meadow, Muston (SSSI)	Witham Lias	
1001829	Allington Meadows (SSSI)	Witham Lias	
1003735	Cribbs Lodge Meadows (SSSI)	Witham Lias	
1001125	Monk Wood (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1001994	Feckenham Forest (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1007261	Oakland Pasture (SSSI)	Worcester Middle Severn - Mercia Mudstone	
2000428	Lyppard Grange Ponds (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1004509	Grimley Brick Pits (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1003218	Westwood Great Pool (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1002655	Northwick Marsh (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1003130	Upton Warren Pools (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1007260	Little Royal Farm Pastures (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1007259	Hurst Farm Pasture (SSSI)	Worcester Middle Severn - Mercia Mudstone	
1000702	Hurcott & Podmore Pools (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1000001	Checkhill Bogs (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1002918	Shrawley Wood (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1003010	Stourvale Marsh (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes

SSSI Code	SSSI Name	Groundwater Body	SWMI
1000046	Hartlebury Common & Hillditch Coppice (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1002234	Puxton Marshes (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1003227	Wilden Marsh & Meadows (SSSI)	Worcestershire Middle Severn - PT Sandstone	Yes
1000107	Hill Hole Dingle (SSSI)	Wye Secondary Devonian ORS	
1004297	Dinmore Hill Woods (SSSI)	Wye Secondary Devonian ORS	
1001227	Pikes Farm Meadows (SSSI)	Wye Secondary Devonian ORS	
1003396	Cage Brook Valley (SSSI)	Wye Secondary Devonian ORS	
1002817	Wellington Wood (SSSI)	Wye Secondary Devonian ORS	
2000547	The Bury Farm (SSSI)	Wye Secondary Devonian ORS	
1003358	Bushy Hazels & Cwmma Moors (SSSI)	Wye Secondary Devonian ORS	
1003105	Upper Welson Marsh (SSSI)	Wye Secondary Devonian ORS	
1000437	Wormbridge Common (SSSI)	Wye Secondary Devonian ORS	
1003610	The Flits (SSSI)	Wye Secondary Devonian ORS	
1002361	Moseley Common, Pembridge (SSSI)	Wye Secondary Devonian ORS	
2000725	Lugg And Hampton Meadows (SSSI)	Wye Secondary Devonian ORS	
1000887	Littlemarsh Common (SSSI)	Wye Secondary Devonian ORS	
1001356	Berrington Pool (SSSI)	Wye Secondary Devonian ORS	
1006344	Queestmoor Meadow (SSSI)	Wye Secondary Devonian ORS	
2000205	The Sturts (SSSI)	Wye Secondary Devonian ORS	
1005756	Caeiron Meadow (SSSI)	Wye Secondary Devonian ORS	
1000718	Lea & Pagets Woods (SSSI)	Wye Secondary Devonian ORS	
1001635	Black Mountains (SSSI)	Wye Secondary Devonian ORS	
1004314	Coughton Wood & Marsh (SSSI)	Wye Secondary Devonian ORS	

SSSI Code	SSSI Name	Groundwater Body	SWMI
1000840	Swanpool Wood & Furnace Grove (SSSI)	Wye Secondary Devonian ORS	
1004355	Haugh Wood (SSSI)	Wye Secondary Devonian ORS	
1006343	Bishon Meadow (SSSI)	Wye Secondary Devonian ORS	
1001817	Olchon Farm Meadows (SSSI)	Wye Secondary Devonian ORS	
1005456	Quebb Meadow (SSSI)	Wye Secondary Devonian ORS	

E Protected sites adjacent to rivers within WRZs serving Wiltshire

E.1 SSSIs

SSSI Name	SSSI Code	Catchment Name	SWMI
Cromford Canal	1000209	Amber from Alfreton Brook to Derwent	No
Ogston Reservoir	1000538	Amber from Source to Press Brook	No
Alvecote Pools	1003784	Anker from River Sence to River Tame	No
Birches Barn Meadows	2000078	Anker from River Sence to River Tame	No
Bittell Reservoirs	1000942	Arrow - source to Spernall Hall Fm, Studley	No
Dagnell End Meadow	1003656	Arrow - source to Spernall Hall Fm, Studley	No
Dark Peak	1003028	Ashop from Alport to Derwent	Yes
Rowlee Bridge	1003478	Ashop from Alport to Derwent	Yes
Brandon Marsh	1001151	Avon - ClaycotonYelvertoft Bk to conf R Sowe	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Cave's Inn Pits	1003549	Avon - ClaycotonYelvertoft Bk to conf R Sowe	No
Severn Ham, Tewkesbury	1002725	Avon - Tolsey Lane to conf R Severn	No
Guy's Cliffe	1003325	Avon (Warks) - conf R Sowe to conf R Leam	No
Bosworth Mill Meadow	1002171	Avon (Warks) - source to Claycoton-Yelvertoft Bk	No
Stanford Park	1001950	Avon (Warks) - source to Claycoton-Yelvertoft Bk	No
Lazy Meadow	2000861	Avon conf Workman Br, Evesham to conf R Severn	No
Rectory Farm Meadows	1007250	Avon conf Workman Br, Evesham to conf R Severn	No
Upham Meadow and Summer Leasow	1005981	Avon conf Workman Br, Evesham to conf R Severn	No
Racecourse Meadow	2000249	Avon- Tramway Br Stratford to Workman Br Evesham	No
Welford Field	2000358	Avon- Tramway Br Stratford to Workman Br Evesham	No
Eastern Peak District Moors	2000354	Bar Brook	No
Eastern Peak District Moors	2000354	Barlow Brook from Source to River Drone	No
Hewell Park Lake	1000092	Batchley Bk - source to conf R Arrow	Yes
Ballidon Dale	2000054	Bentley Brook Catch (trib of Dove)	No
Bradbourne Mill Meadows	2000715	Bentley Brook Catch (trib of Dove)	No
Hipley Hill	1000447	Bentley Brook Catch (trib of Dove)	No
Wall Lands	2000718	Bentley Brook Catch (trib of Dove)	No
Blackbrook Reservoir	1003378	Black Brook from Source to Grace Dieu Brook	No

SSSI Name	SSSI Code	Catchment Name	SWMI
One Barrow Plantation	1006571	Black Brook from Source to Grace Dieu Brook	No
Shepshed Cutting	1001903	Black Brook from Source to Grace Dieu Brook	No
Jumble Coppice	1003941	Blackleach Brook from Source to Bar Brook	No
Hurcott and Podmore Pools	1000702	Blakedown Bk - source to conf R Stour	Yes
Hurcott Pasture	2000016	Blakedown Bk - source to conf R Stour	Yes
Puxton Marshes	1002234	Blakedown Bk - source to conf R Stour	Yes
Stourvale Marsh	1003010	Blakedown Bk - source to conf R Stour	Yes
Blithfield Reservoir	1003858	Blithe - Tad Bk to R Trent	No
Clowes Wood & New Fallings Coppice	1001494	Blythe from Source to Cuttle Brook	No
Monkspath Meadow	1001744	Blythe from Source to Cuttle Brook	No
River Blythe	1001772	Blythe from Source to Cuttle Brook	No
Berkswell Marsh	1006055	Blythe from Temple Balsall Brook to Patrick Bridge	No
Edgbaston Pool	1001509	Bourn Brook from Source to R Rea	No
Gentleshaw Common	1005764	Bourne-Bilson Brook Catchment (trib of Trent)	No
Salt Meadow, Earl's Common	1002202	Bow Bk - Lett's Mill to Shell	No
Tiddesley Wood	1003066	Bow Bk - Shell to conf R Avon	No
Long Dale & Gratton Dale	1003783	Bradford Catchment (trib of Lathkill)	No
Burley Dene Meadows	2000253	Bushley Longdon Bk - source to conf R Severn	No
Malthouse Farm Meadows	1001214	Bushley Longdon Bk - source to conf R Severn	No
Aileshurst Coppice	1005535	Careys Bk - source to conf R Severn	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Calke Park	1005792	Carr-New Brook from Source to Ramsley Brook	No
Dimminsdale	1005587	Carr-New Brook from Source to Ramsley Brook	No
Ticknall Quarries	1001240	Carr-New Brook from Source to Ramsley Brook	No
Luffenham Heath Golf Course	1000909	Chater - Lower	No
Chater Valley	1003619	Chater - Upper	No
Bestmoor	1001413	Cherwell (Nell Bridge to Bletchingdon)	No
Kirtlington Quarry	1002700	Cherwell (Nell Bridge to Bletchingdon)	No
Bush Wood and High Wood	1000010	Chorley Bk - source to conf Borle Bk	No
Chorley Covert and Deserts Wood	1000022	Chorley Bk - source to conf Borle Bk	No
Cotswold Water Park	1006005	Churn (Baunton to Cricklade)	Yes
Elmlea Meadows	1005543	Churn (Baunton to Cricklade)	Yes
North Meadow, Cricklade	1002417	Churn (Baunton to Cricklade)	Yes
Wildmoorway Meadows	1003112	Churn (Baunton to Cricklade)	Yes
Churnet Valley	1007135	Churnet from Consall to River Dove	Yes
Dimmings Dale & The Ranger	1007136	Churnet from Consall to River Dove	Yes
Froghall Meadow and Pastures	2000357	Churnet from Consall to River Dove	Yes
Churnet Valley	1007135	Churnet from Endon Brook to Consall	Yes
Leek Moors	1003770	Churnet from Source to Meerbrook	No
Railway Meadow, Langley	2000348	Claverdon Bk - source to conf R Alne	No
Berry Mound Pastures	1007264	Cole from Source to Springfield	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Cotswold Water Park	1006005	Coln (from Coln Rogers) and Thames (Coln to Leach)	No
Whelford Meadow	1003804	Coln (from Coln Rogers) and Thames (Coln to Leach)	No
Winson Meadows	1003528	Coln (from Coln Rogers) and Thames (Coln to Leach)	No
Puckham Woods	1002538	Coln (Source to Coln Rogers)	No
Brook Meadow, Darley Green	2000080	Cuttle Brook from Source to River Blythe	Yes
Kinoulton Marsh and Canal	1000873	Dalby Brook Catchment (trib of Smite)	No
Holly Banks	1002695	Dane (Cow Brook to Wheelock)	No
Madams Wood	1005786	Dane (Cow Brook to Wheelock)	No
River Dane	1006002	Dane (Cow Brook to Wheelock)	No
Leek Moors	1003770	Dane (Source to Clough Brook)	No
Dean Brook Valley Pastures	1007251	Dean Bk - source to conf Bow Bk	No
Lower Saleway Farm Meadows	2000258	Dean Bk - source to conf Bow Bk	No
Lobbington Hall Farm Meadow	2000248	Dene - Butlers Marston to conf R Avon	No
Oxhouse Farm	1002143	Dene - Butlers Marston to conf R Avon	No
Chatsworth Old Park	2000325	Derwent from Westend to Wye	No
Coombs Dale	1002717	Derwent from Westend to Wye	No
Eastern Peak District Moors	2000354	Derwent from Westend to Wye	No
Stoney Middleton Dale	1004059	Derwent from Westend to Wye	No
Yarncliff Wood, Padley	1003953	Derwent from Westend to Wye	No
Clough Woods	1002696	Derwent from Wye to Amber	No
Masson Hill	1003309	Derwent from Wye to Amber	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Matlock Woods	1000510	Derwent from Wye to Amber	No
Shining Cliff Woods	1001215	Derwent from Wye to Amber	No
Via Gellia Woodlands	1003009	Derwent from Wye to Amber	No
Croxton Park	1003785	Devon from Source to Smite	No
Salmonsbury Meadows	1000143	Dikler (Source to Wyck Rissington)	Yes
Doe Lea Stream Section	1002792	Doe Lea from Source to Hawke Brook	No
Dovedale Wood	1003972	Doe Lea from Source to Hawke Brook	No
Whitacre Heath	1002177	Dog Lane Brook from Source to R Tame	No
Sprotbrough Gorge	1003224	Don from River Dearne to Mill Dyke	No
Dove Valley and Biggin Dale	1002787	Dove - conf R Manifold to conf R Churnet	No
Old River Dove, Marston on Dove	1001024	Dove - R Churnet to R Trent	Yes
Hamps and Manifold Valleys	1002911	Dove from Source to River Manifold	No
Hamps and Manifold Valleys	1002911	Dove from Source to River Manifold	No
Leek Moors	1003770	Dove from Source to River Manifold	No
Ranters Bank Pastures	1007234	Dowles Bk - source to conf R Severn	No
Wyre Forest	1004198	Dowles Bk - source to conf R Severn	No
Mount Pleasant	2000717	Ecclesborne Catchment (trib of Derwent)	No
Aston Ingham Meadows	1004216	Ell Bk - source to conf R Leadon	Yes
Attenborough Gravel Pits	1003408	Erewash from Gilt Brook to Trent	No
Kirkby Grives	1000896	Erewash from Source to Nethergreen Brook	No
Compstall Nature Reserve	1002836	Etherow (Glossop Brook to Goyt)	No
Dark Peak	1003028	Etherow (Woodhead Res. to Glossop Bk.)	No
Bould Wood	1001583	Evenlode (Bledington to Glyme confluence)	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Holly Court Bank	1003700	Evenlode (Bledington to Glyme confluence)	No
Reed Hill	1000169	Evenlode (Bledington to Glyme confluence)	No
Stonesfield Common, Bottoms & Banks	1000384	Evenlode (Bledington to Glyme confluence)	No
Sturt Copse	1000428	Evenlode (Bledington to Glyme confluence)	No
Whitehill Wood	1001188	Evenlode (Bledington to Glyme confluence)	No
Blenheim Park	1001566	Evenlode (Glyme to Thames)	No
Frisby Marsh	1004512	Eye / Wreake from Langham Brook to Soar	No
River Eye	1001178	Eye / Wreake from Langham Brook to Soar	No
Eye Brook Reservoir	1004428	Eye Brook	No
Leighfield Forest	1000270	Eye Brook	No
Chasewater And The Southern Staffordshire Coalfield Heaths	2000693	Ford Brook from Source to River Tame	No
Clayhanger	1003040	Ford Brook from Source to River Tame	No
Swan Pool & The Swag	1000981	Ford Brook from Source to River Tame	No
Allington Meadows	1001829	Foston Beck	Yes
Lugg And Hampton Meadows	2000725	Frome - conf Tedstone Bk to conf R Lugg	No
Juniper Hill, Edgeworth	1001694	Frome - source to Ebley Mill	No
Upper Severn Estuary	1002458	Gilgal Bk - source to Severn R Estuary	No
Eastnor Park	1000829	Glynch Bk - source to conf R Leadon	Yes
Coalville Meadows	1003680	Grace Dieu Brook Catchment (trib of Black Brook)	No
Grace Dieu and High Sharpley	1000029	Grace Dieu Brook Catchment (trib of Black Brook)	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Feckenham Forest	1001994	Hadley Bk - source to conf R Salwarpe	Yes
Brownend Quarry	1002635	Hamps from Source to R Manifold	No
Hartlebury Common and Hillditch Coppice	1000046	Hartlebury Bk - source to conf R Severn	Yes
Innsworth Meadow	1002513	Hatherley Bk - source to conf R Severn	Yes
Lockington Marshes	1000882	Hemington Brook Catchment (trib of the Soar)	No
Abney & Bretton Cloughs	1001834	Highlow Brook Catchment (trib of Derwent)	No
Eastern Peak District Moors	2000354	Highshore Clough Catchment (trib of Derwent)	No
Eastern Peak District Moors	2000354	Hipper from Source to River Rother	No
Wilden Marsh and Meadows	1003227	Hoo Bk - source to conf R Stour	No
River Derwent at Hathersage	1005545	Hood Brook Catchment (Trib of Derwent)	No
Kingscote and Horsley Woods	1001720	Horsley Str - source to conf Nailsworth Str	No
Hill Hole Dingle	1000107	Humber Bk - source to conf R Lugg	No
Sutton and Lound Gravel Pits	2000458	Idle from Maun/Poulter to Tiln	Yes
Misson Line Bank	1001020	Idle from Ryton to Trent	Yes
Mother Drain, Misterton	1006392	Idle from Ryton to Trent	Yes
River Idle Washlands	1001749	Idle from Ryton to Trent	Yes
Chesterfield Canal	1005589	Idle from Tiln to Ryton	Yes
Sutton and Lound Gravel Pits	2000458	Idle from Tiln to Ryton	Yes
Southfield Farm Marsh	1004156	Ise - Lower	No
River Ise and Meadows	1004261	Ise - Upper	No
River Itchen	1005547	Itchen - source to conf with R Stowe	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Nine Holes Meadows	1007258	Kyre Bk - source to conf R Teme	No
Wymondham Rough	1002070	Langham Brook from Whissendine Brook to Eye	No
Middleton Pool	1002103	Langley Bk - source to conf R Tame	No
Kilby - Foxton Canal	1000224	Langton Brook	No
Saddington Reservoir	2000360	Langton Brook	No
Lathkill Dale	1003711	Lathkill from Source to Bradford	No
Upper Lathkill	1003846	Lathkill from Source to Bradford	No
Leigh Brook Valley	1000821	Leigh-Cradley Bk - conf Suckley Bk to Teme	No
Damery Road Section	1002626	Little Avon - Ozleworth Bk to conf Tortworth Bk	No
Bishop's Hill Wood	1003718	Little Avon R - source to conf Ozleworth Bk	No
Lower Woods	1002798	Little Avon R - source to conf Ozleworth Bk	No
Breedon Cloud Wood and Quarry	1003433	Long Whatton Brook Catchment (trib of Soar)	No
Lugg And Hampton Meadows	2000725	Lugg - conf R Arrow to conf R Wye	No
River Lugg	1006616	Lugg - conf R Arrow to conf R Wye	No
River Wye	1006327	Lugg - conf R Arrow to conf R Wye	No
The Bury Farm	2000547	Lugg - conf R Arrow to conf R Wye	No
Grange Meadow	2000256	Madresfield Bk - source to conf R Severn	No
Ecton Copper Mines	2000309	Manifold - source to conf R Dove	No
Hamps and Manifold Valleys	1002911	Manifold - source to conf R Dove	No
Leek Moors	1003770	Manifold - source to conf R Dove	No
Kedleston Park	2000180	Markeaton Brook from Source to Mackworth Brook	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Mercaston Marsh and Muggington Bottoms	1005567	Markeaton Brook from Source to Mackworth Brook	No
River Mease	2000416	Mease from Gilwiskaw Bk to Hooborough Brook	No
River Mease	2000416	Mease from Hooborough Brook to Trent	No
River Mease	2000416	Mease from Hooborough Brook to Trent	No
Leek Moors	1003770	Meerbrook - source to R Churnet	No
Brotheridge Green Disused Railway Line	1003289	Mere Bk - source to conf Pool Bk	No
Creswell Crags	1003950	Millwood Brook Catchment (trib of Poulter)	No
Hollinhill and Markland Grips	1000466	Millwood Brook Catchment (trib of Poulter)	No
Monk's Dale	1003861	Monk's Dale Catchment (trib of Wye)	No
Thatchers Wood and Westwood Covert	1001114	Mor Bk - conf Beaconhill Bk to conf R Severn	No
Bassenhally Pit	1000060	Mortons Leam	No
Woodchester Park	1003561	Nailsworth Stream - source to conf R Frome	No
Upper Nene Valley Gravel Pits	2000494	Nene - conf Ise to Islip	No
Castor Flood Meadows	1000293	Nene - Islip to tidal	No
Nene Washes	1002071	Nene - Islip to tidal	No
Upper Nene Valley Gravel Pits	2000494	Nene - Islip to tidal	No
Wadenhoe Marsh and Achurch Meadow	1001648	Nene - Islip to tidal	No
Wansford Pasture	1003825	Nene - Islip to tidal	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Bradwell Dale and Bagshaw Cavern	1001953	Noe from Peakshole Water to Derwent	No
Castleton	1002643	Noe from Peakshole Water to Derwent	No
Edale	1002805	Noe from Source to Peakshole Water	Yes
Lower Hollins	2000714	Noe from Source to Peakshole Water	Yes
Severn Estuary	1002284	Oldbury Naite Rhine	No
Flat Coppice	1000345	Onny - conf R E Onny to conf R Teme	No
Long Mynd	1004080	Onny - conf R E Onny to conf R Teme	No
Onny River Section	1004193	Onny - conf R E Onny to conf R Teme	No
Belvide Reservoir	1003826	Penk - Saredon Bk to Whiston Bk	No
Grafton Wood	1004480	Piddle Bk - source to conf Whitsun Bk	No
Long Meadow, Thorn	1000925	Piddle Bk - source to conf Whitsun Bk	No
Naunton Court Meadows	1007252	Piddle Bk - source to conf Whitsun Bk	No
Yellow House Meadow	1006625	Piddle Bk - source to conf Whitsun Bk	No
Sutton Park	1001574	Plants Brook Catchment (trib of Tame)	No
Welbeck Lake	1001932	Poulter from Millwood Brook to Maun	Yes
Oak Tree Farm Meadows	2000251	Preston Bagot Bk - source to conf R Alne	No
Stowe Pool and Walk Mill Clay Pit	2000245	Pyford Brook Catchment (trib of Trent)	No
Bradgate Park and Cropston Reservoir	1003431	Quorn Brook Catchment (trib of Soar)	No
Swithland Wood and The Brand	1003912	Quorn Brook Catchment (trib of Soar)	No
Ulverscroft Valley	1002060	Quorn Brook Catchment (trib of Soar)	No
Combs Reservoir	1000334	Randall Carr Brook	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Eastern Peak District Moors	2000354	Rivelin from Source to River Loxley	No
Botcheston Bog	1003405	Rothley Brook Catchment (trib of Soar)	No
Groby Pool and Woods	1000094	Rothley Brook Catchment (trib of Soar)	No
Grantham Canal	1000045	Rundle Beck Catchment (trib of Whipling)	No
Clumber Park	1000664	Ryton from Anston Brook to Idle	No
Ginny Spring,Whitwell Wood	1000403	Ryton from Anston Brook to Idle	No
Lindrick Golf Course	1000123	Ryton from Anston Brook to Idle	No
Upton Warren Pools	1003130	Salwarpe - source to conf Elmbridge Bk	Yes
Stowe Pool and Walk Mill Clay Pit	2000245	Saredon Brook from Source to River Penk	No
Ashby Canal	1001311	Sence - Ibstock Bk to R Anker	No
Sheepy Fields	1001283	Sence - Ibstock Bk to R Anker	No
Newton Burgoland Marshes	1001033	Sence from Source to Ibstock Brook	No
Ashleworth Ham	1000526	Severn - conf R Avon to conf Upper Parting	No
Chaceley Meadow	1000673	Severn - conf R Avon to conf Upper Parting	No
Coombe Hill Canal	1000789	Severn - conf R Avon to conf Upper Parting	No
Old River Severn, Upper Lode	1003255	Severn - conf R Avon to conf Upper Parting	No
Wainlode Cliff	1003500	Severn - conf R Avon to conf Upper Parting	No
Grimley Brick Pits	1004509	Severn - conf R Stour to conf RIver Teme	No
Hartlebury Common and Hillditch Coppice	1000046	Severn - conf R Stour to conf RIver Teme	No
Hartlebury Common and Hillditch Coppice	1000046	Severn - conf R Stour to conf RIver Teme	No
Northwick Marsh	1002655	Severn - conf R Stour to conf RIver Teme	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Shrawley Wood	1002918	Severn - conf R Stour to conf RIver Teme	No
Ashmoor Common	1001315	Severn - conf R Teme to conf R Avon	No
River Teme	2000102	Severn - conf R Teme to conf R Avon	No
Upton Ham	1001604	Severn - conf R Teme to conf R Avon	No
Areley Wood	2000212	Severn - conf R Worfe to conf R Stour	No
Wyre Forest	1004198	Severn - conf R Worfe to conf R Stour	No
Buildwas River Section	1001199	Severn conf M Wenlock-Farley Bk to conf R Worfe	No
Tick Wood and Benthall Edge	1001608	Severn conf M Wenlock-Farley Bk to conf R Worfe	No
Eastern Peak District Moors	2000354	Sheaf from Source to River Don	No
Totley Wood	1000723	Sheaf from Source to River Don	No
Hughley Brook	1002181	Sheinton Bk - source to conf R Severn	No
Sheinton Brook	1004309	Sheinton Bk - source to conf R Severn	No
Whitwell Coppice	1003199	Sheinton Bk - source to conf R Severn	No
Sherbourne Meadows	1006459	Sherbourne Bk - source to conf R Avon	No
Checkhill Bogs	1000001	Smestow Bk - Wom-Penn Bk to conf R Stour	No
Combe Pool	1001242	Smite Bk - source to conf R Sowe	No
Lockington Marshes	1000882	Soar from Long Whatton Brook to Trent	No
Barrow Gravel Pits	1002661	Soar from Rothley Brook to Long Whatton Brook	No
Buddon Wood and Swithland Reservoir	1003516	Soar from Rothley Brook to Long Whatton Brook	No
Cotes Grassland	1003698	Soar from Rothley Brook to Long Whatton	No

SSSI Name	SSSI Code	Catchment Name	SWMI
		Brook	
Loughborough Meadows	1002254	Soar from Rothley Brook to Long Whatton Brook	No
Croft Pasture	1003760	Soar from Soar Brook to Thurlaston Brook	No
Narborough Bog	1000968	Soar from Thurlaston Brook to Sence	No
Rutland Water	1001220	South Gwash	No
Checkhill Bogs	1000001	Spittle Bk - source to conf Smestow Bk	Yes
Stanton Pastures & Cuckoocliff Valley	1001324	Stanton/Wootton/Ellastone Catch (trib of Dove)	No
Kendall's Meadow	1003916	Stoke Golding Brook from Source to R Sence	No
Great Blaythorn Meadow	1007249	Stoulton Bk - source to conf Bow Bk	No
River Stour Flood Plain	1005983	Stour (Worcs) - conf Smestow Bk to conf R Severn	No
Wilden Marsh and Meadows	1003227	Stour (Worcs) - conf Smestow Bk to conf R Severn	No
Illey Pastures	1002670	Stour (Worcs) source to conf Smestow Bk	No
Dark Peak	1003028	Strines Dyke from Source to River Loxley	No
Braken Hurst	1003871	Swarbourn Catcment (trib of Trent)	No
Misterton Marshes	1004320	Swift source to conf Avon	No
Burrington Sections	1004280	Teme - conf R Clun to conf R Onny	No
Downton Gorge	1004330	Teme - conf R Clun to conf R Onny	No
River Teme	2000102	Teme - conf R Clun to conf R Onny	No
Lord's Wood Meadows	1007240	Teme - conf R Onny to conf R Severn	No
Osebury Rock	1001849	Teme - conf R Onny to conf R Severn	No

SSSI Name	SSSI Code	Catchment Name	SWMI
Teme Bank	1004451	Teme - conf R Onny to conf R Severn	No
Temeside	1006333	Teme - conf R Onny to conf R Severn	No
Moss Valley	1000381	The Moss from Source to River Rother	No
Moss Valley Meadows	1004522	The Moss from Source to River Rother	No
Moss Valley Woods	1007006	The Moss from Source to River Rother	No
Toddbrook Reservoir	1001257	Todd Brook	No
River Mease	2000416	Trent - R Tame to R Dove	No
Haxey Grange Fen	1002307	Trent from Carlton-on-Trent to Laughton Drain	No
Lea Marsh	2000332	Trent from Carlton-on-Trent to Laughton Drain	No
Spalford Warren	1004326	Trent from Carlton-on-Trent to Laughton Drain	No
Cannock Chase	1004497	Trent from River Sow to Moreton Brook	No
Stafford Brook	1000348	Trent from River Sow to Moreton Brook	No
Holme Pit	1000826	Trent from Soar to The Beck	No
Oak Dingle	1004119	Tugford Brook	No
Hatton's Hey Wood, Whittle's Corner and Bank Rough	1002658	Weaver (Dane to Frodsham)	No
Warburton's Wood and Well Wood	1003642	Weaver (Dane to Frodsham)	No
Cowbit Wash	2000265	Welland - conf Greatford Cut to tidal	No
Deeping Gravel Pits	1002919	Welland - conf Greatford Cut to tidal	No
Doley Common	1003618	Whiston Bk	Yes
Mottey Meadows	1002612	Whiston Bk	Yes
Brassey Reserve and Windrush Valley	1000634	Windrush (Slade Barn Stream to Dikler)	Yes

SSSI Name	SSSI Code	Catchment Name	SWMI
Ducklington Mead	1001826	Windrush and tributaries (Little Rissington to Thames)	No
Wychwood	1003681	Windrush and tributaries (Little Rissington to Thames)	No
Bardney Limewoods, Lincolnshire	2000014	Witham - conf Catchwater Drain to conf Bain	No
Cribb's Lodge Meadows	1003735	Witham - headwaters to conf Cringle Bk	No
Beacon Hill, Hangingstone and Out Woods	1002689	Wood Brook Catchment (trib of Soar)	No
Bigsweir Woods	1003764	Wye - conf Walford Bk to Bigsweir Br	No
Brooks Head Grove	1003872	Wye - conf Walford Bk to Bigsweir Br	No
Park Wood	1001872	Wye - conf Walford Bk to Bigsweir Br	No
River Wye	1006327	Wye - conf Walford Bk to Bigsweir Br	No
Swanpool Wood and Furnace Grove	1000840	Wye - conf Walford Bk to Bigsweir Br	No
Upper Wye Gorge	1003580	Wye - conf Walford Bk to Bigsweir Br	No
Capler Wood	1003421	Wye - Hampton Bishop to conf Kerne Br	No
Cressbrook Dale	1002731	Wye from Monk's Dale to Derwent	No
The Wye Valley	2000186	Wye from Monk's Dale to Derwent	No
Goyt Valley	1002841	Wye from Source to Monk's Dale	No
Monk's Dale	1003861	Wye from Source to Monk's Dale	No
The Wye Valley	2000186	Wye from Source to Monk's Dale	No
Topley Pike and Deep Dale	1000145	Wye from Source to Monk's Dale	No

E.2 SACs

SAC Name	SAC Code	Catchment name	SWMI
Cannock Chase	UK0030107	Trent from River Sow to Moreton Brook	No
Downton Gorge	UK0012735	Teme - conf R Clun to conf R Onny	No
Mottey Meadows	UK0030051	Whiston Bk	Yes
Nene Washes	UK0030222	Mortons Leam	No
North Meadow & Clattinger Farm	UK0016372	Churn (Baunton to Cricklade)	Yes
Peak District Dales	UK0019859	Dove - conf R Manifold to conf R Churnet	No
Peak District Dales	UK0019859	Lathkill from Source to Bradford	No
Peak District Dales	UK0019859	Wye from Monk's Dale to Derwent	No
Peak District Dales	UK0019859	Bradford Catchment (trib of Lathkill)	No
Peak District Dales	UK0019859	Hamps from Source to R Manifold	No
Peak District Dales	UK0019859	Derwent from Wye to Amber	No
Peak District Dales	UK0019859	Manifold - source to conf R Dove	No
Peak District Dales	UK0019859	Derwent from Westend to Wye	No
Peak District Dales	UK0019859	Bentley Brook Catch (trib of Dove)	No
Peak District Dales	UK0019859	Monk's Dale Catchment (trib of Wye)	No
River Clun	UK0030250	Clun - conf R Unk to conf R Teme	No
River Mease	UK0030258	Mease from Hooborough Brook to Trent	No
River Mease	UK0030258	Mease from Gilwiskaw Bk to Hooborough Brook	No
River Mease	UK0030258	Trent - R Tame to R Dove	No
River Wye	UK0012642	Lugg - conf R Arrow to conf R Wye	No
River Wye	UK0012642	Wye - conf Walford Bk to Bigsweir Br	No
Severn Estuary	UK0013030	Oldbury Naite Rhine	No

SAC Name	SAC Code	Catchment name	SWMI
South Pennine Moors	UK0030280	Strines Dyke from Source to River Loxley	No
South Pennine Moors	UK0030280	Ashop from Alport to Derwent	Yes
South Pennine Moors	UK0030280	Etherow (Woodhead Res. to Glossop Bk.)	No
South Pennine Moors	UK0030280	Rivelin from Source to River Loxley	No
South Pennine Moors	UK0030280	Wye from Source to Monk's Dale	No
South Pennine Moors	UK0030280	Barlow Brook from Source to River Drone	No
South Pennine Moors	UK0030280	Sheaf from Source to River Don	No
South Pennine Moors	UK0030280	Hipper from Source to River Rother	No
South Pennine Moors	UK0030280	Dove from Source to River Manifold	No
South Pennine Moors	UK0030280	Meerbrook - source to R Churnet	No
South Pennine Moors	UK0030280	Dane (Source to Clough Brook)	No
South Pennine Moors	UK0030280	Hipper from Source to River Rother	No
South Pennine Moors	UK0030280	Bar Brook	No
South Pennine Moors	UK0030280	Derwent from Westend to Wye	No
Wye Valley Woodlands	UK0012727	Wye - conf Walford Bk to Bigsweir Br	No

E.3 SPAs and Ramsar

Site Name	Code	Catchment name	SWMI
Upper Nene Valley Gravel Pits	UK9020296	Nene - conf Ise to Islip	No
Upper Nene Valley Gravel Pits	UK9020296	Nene - Islip to tidal	No
Severn Estuary	UK9015022	Oldbury Naite Rhine	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Strines Dyke from Source to River Loxley	No
Peak District Moors (South Pennine Moors	UK9007021	Etherow (Woodhead Res. to Glossop	No

Site Name	Code	Catchment name	SWMI
Phase 1)		Bk.)	
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Rivelin from Source to River Loxley	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Wye from Source to Monk's Dale	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Barlow Brook from Source to River Drone	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Sheaf from Source to River Don	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Meerbrook - source to R Churnet	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Churnet from Source to Meerbrook	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Hipper from Source to River Rother	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Bar Brook	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Derwent from Westend to Wye	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Dane (Source to Clough Brook)	No
Peak District Moors (South Pennine Moors Phase 1)	UK9007021	Manifold - source to conf R Dove	No
Nene Washes	UK9008031	Nene - Islip to tidal	No
Upper Nene Valley Gravel Pits	UK11083	Nene - conf Ise to Islip	No

Site Name	Code	Catchment name	SWMI
Upper Nene Valley Gravel Pits	UK11083	Nene - Islip to tidal	No
Nene Washes	UK11046	Nene - Islip to tidal	No
Severn Estuary	UK11081	Oldbury Naite Rhine	No
Rutland Water	UK11062	South Gwash	No

F Environmental sites water quality impact

F.1 SSSIs

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Ashleworth Ham	SO829258	Extra Plot Point - Reach 1034 No 2 "	0%	0%	0%	-36%	-1%	-41%
Ashleworth Ham	SO834261	Extra Plot Point - Reach 1034 No 2 "	0%	0%	0%	-36%	-1%	-41%
Ashleworth Ham	SO830264	Extra Plot Point - Reach 1034 No 2 "	0%	0%	0%	-36%	-1%	-41%
Ashmoor Common	SO852466	KERSWELL GRE "	0%	0%	0%	-31%	-1%	-39%
Attenborough Gravel Pits	SK514335	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK520339	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK526346	Extra Plot Point - Reach	0%	0%	0%	-22%	-3%	-43%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
		699 No 3 "						
Attenborough Gravel Pits	SK524349	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK529353	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK526353	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK528354	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Attenborough Gravel Pits	SK523345	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Chaceley Meadow	SO857305	FS Severn Deerhurst "	0%	0%	0%	-38%	-1%	-41%
Checkhill Bogs	SO851879	Extra Plot Point - Reach 381 No 2 "	0%	0%	0%	-13%	-5%	-20%
Checkhill Bogs	SO856877	Extra Plot Point - Reach 381 No 2 "	0%	0%	0%	-13%	-5%	-20%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Checkhill Bogs	SO859874	Extra Plot Point - Reach 381 No 2 "	0%	0%	0%	-13%	-5%	-20%
Coombe Hill Canal	SO869269	Extra Plot Point - Reach 1034 No 2 "	0%	0%	0%	-36%	-1%	-41%
Coombe Hill Canal	SO872271	Extra Plot Point - Reach 1034 No 2 "	0%	0%	0%	-36%	-1%	-41%
Damery Road Section	ST705942	Little Avon - conf Tortworth Bk to mo "	0%	0%	0%	0%	0%	0%
Grimley Brick Pits	SO840614	CSO 908 "	1%	0%	0%	-19%	0%	-37%
Grimley Brick Pits	SO840607	Extra Plot Point - Reach 407 No 1 "	1%	0%	0%	-20%	0%	-37%
Grimley Brick Pits	SO840598	Start Of Reach 437 "	1%	0%	0%	-19%	0%	-36%
Hartlebury Common and Hilldtch Coppice	SO819704	WQ 23249180 "	0%	0%	0%	0%	0%	0%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Hartlebury Common and Hillditch Coppice	SO816706	WQ 23314180 "	0%	0%	0%	-26%	-1%	-19%
Hartlebury Common and Hillditch Coppice	SO816704	WQ 23314180 "	0%	0%	0%	-26%	-1%	-19%
Hartlebury Common and Hillditch Coppice	SO816705	WQ 23314180 "	0%	0%	0%	-26%	-1%	-19%
Haxey Grange Fen	SK737972	Extra Plot Point - Reach 834 No 8 "	0%	-1%	0%	-39%	-4%	-43%
Holme Pit	SK536345	Extra Plot Point - Reach 699 No 3 "	0%	0%	0%	-22%	-3%	-43%
Innsworth Meadow	SO850215	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Lea Marsh	SK817871	Extra Plot Point - Reach 834 No 1 "	-1%	0%	0%	-34%	-3%	-43%
Lea Marsh	SK8178	GAINSBOROU	0%	0%	0%	-40%	-4%	-43%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
	67	GH TIDAL "						
Lockington Marshes	SK487304	CSO 1770 "	-1%	0%	0%	-23%	-3%	-43%
Lockington Marshes	SK483305	CSO 1770 "	-1%	0%	0%	-23%	-3%	-43%
Lockington Marshes	SK490300	CSO 1770 "	-1%	0%	0%	-23%	-3%	-43%
Lockington Marshes	SK486297	CSO 1770 "	-1%	0%	0%	-23%	-3%	-43%
Lockington Marshes	SK482306	CSO 1770 "	-1%	0%	0%	-23%	-3%	-43%
Middleton Pool	SP189982	Extra Plot Point - Reach 103 No 1 "	-1%	-2%	0%	-7%	-2%	-29%
Northwick Marsh	SO835579	Extra Plot Point - Reach 443 No 1 "	1%	0%	0%	-18%	0%	-36%
Oak Tree Farm Meadows	SP189667	Extra Plot Point - Reach 748 No 2 "	0%	0%	0%	0%	0%	-7%
Old River Severn, Upper Lode	SO881330	Mythe WTW "	0%	0%	0%	-33%	-1%	-41%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Old River Severn, Upper Lode	SO879328	Mythe WTW "	0%	0%	0%	-33%	-1%	-41%
Puxton Marshes	SO829779	WQ 23320580 "	2%	0%	0%	-38%	-1%	-17%
Puxton Marshes	SO827775	WQ 23320580 "	2%	0%	0%	-38%	-1%	-17%
Puxton Marshes	SO826774	WQ 23320580 "	2%	0%	0%	-38%	-1%	-17%
Puxton Marshes	SO827777	WQ 23320580 "	2%	0%	0%	-38%	-1%	-17%
River Blythe	SP212887	WQ 59009850 "	1%	1%	-1%	-7%	1%	-32%
River Blythe	SP210909	WQ 59009850 "	1%	1%	-1%	-7%	1%	-32%
River Mease	SK206117	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Mease	SK195137	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Mease	SK269111	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
River Mease	SK237113	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Mease	SK218113	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Mease	SK320119	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Mease	SK293125	Extra Plot Point - Reach 154 No 3 "	0%	-1%	-1%	-20%	-5%	-46%
River Stour Flood Plain	SO824730	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
River Teme	SO796531	GB109054049144 Boundary "	0%	0%	0%	-32%	0%	-41%
Severn Estuary	ST599952	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Severn Estuary	ST622970	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Severn Estuary	ST594920	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Severn Estuary	ST603939	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Severn Ham, Tewkesbury	SO885325	Mythe WTW "	0%	0%	0%	-33%	-1%	-41%
Shrawley Wood	SO807662	ASTLEY HAMPS "	2%	0%	0%	-19%	0%	-37%
Shrawley Wood	SO813655	ASTLEY HAMPS "	2%	0%	0%	-19%	0%	-37%
Spalford Warren	SK832680	CSO 1500 "	-1%	0%	0%	-38%	-4%	-44%
Spalford Warren	SK832677	CSO 1500 "	-1%	0%	0%	-38%	-4%	-44%
Stourvale Marsh	SO831781	WQ 23320580 "	2%	0%	0%	-38%	-1%	-17%
Upper Severn Estuary	SO738056	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Upper Severn Estuary	SO726056	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Upper Severn Estuary	SO713044	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Upper Severn Estuary	SO735063	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Upper Severn Estuary	SO712048	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Upper Severn Estuary	SO729061	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%
Upton Ham	SO859400	HOLLY GREEN STW "	0%	0%	0%	-34%	-1%	-42%
Wainlode Cliff	SO845257	Start Of Reach 1039 "	0%	0%	0%	-35%	-1%	-40%
Whitacre Heath	SP209927	Extra Plot Point - Reach 99 No 1 "	0%	-1%	0%	-5%	-1%	-30%

SSSI name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Wilden Marsh and Meadows	SO827741	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO829743	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO827738	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO827735	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO826732	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO826735	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%
Wilden Marsh and Meadows	SO824735	Start Of Reach 387 "	0%	0%	0%	-34%	-2%	-17%

F.2 SACs

SAC name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
River Mease	UK0030258	Extra Plot Point - Reach 288 No 8 "	0%	0%	0%	-22%	-2%	-7%
Severn Estuary	UK0013030	GB109054032560 Boundary "	0%	0%	0%	-6%	-2%	-55%

F.3 SPAs

SPA name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Severn Estuary	UK9015022	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%

F.4 Ramsar sites

Ramsar name	Reference ID	SIMCAT Model Point	Ammonia Deterioration	BOD Deterioration	Phosphate Deterioration	Ammonia Deterioration TAL	BOD Deterioration TAL	Phosphate Deterioration TAL
Severn Estuary	UK11081	Extra Plot Point - Reach 1041 No 2 "	0%	0%	0%	-35%	-1%	-40%

G Severn Trent Water Comments on IDP 1 and IDP 2 of Sandwell Local Plan

Sewerage Treatment Works Name	Estimated Spare Capacity	Watercourse Constraints	Notes
Minworth	Medium	High	IDP1 Comment - Sufficient spare capacity to accommodate projected growth IDP2 Comment - Keep monitoring performance Scoping the work necessary to increase capacity has not commenced. We expect this will be an AMP9 (2030-2035) investment. Based on expansion of capacity at our other largest sites, the investment at Minworth could be upwards of £200M.
Lower Gornal	Low	Low	IDP1 Comment - AMP7 quality scheme in progress the design of which has allowed for known proposed developments IDP2 Comment - No growth identified for this catchment Growth can be accommodated without investment.
Ray Hall	Low	Low	IDP1 Comment - Ray Hall can treat a certain amount of load; therefore, any future growth will be diverted to and accommodated by Minworth works. An AMP8 quality scheme is planned in. IDP2 Comment - Capacity at Ray Hall to remain as is with growth at the catchment to be accommodated at Minworth AMP8 (2025-2030) scheme planned to address incoming tighter total phosphorous permit and control average daily flow to ensure WFD river water quality status for Phosphorous and other specific chemicals. The scheme will be completed by the end of AMP8 with an indicative cost of £20M.
Roundhill	High	Very High	IDP1 Comment - AMP7 quality scheme in progress the design of which has allowed for known proposed developments IDP2 Comment - Ongoing pressure with growth in the catchment. Keep monitoring performance of the works. We will need more information and timeline for the planned development to allow us time to plan ahead and identify options for increasing capacity Scoping the work necessary to increase longer term capacity has not commenced. We expect this will be an AMP9 or later investment. There is an AMP7 (2020-2025) scheme ongoing which will ensure treatment capacity to accommodate known growth within the catchment to 2035 and meet new permit limits for Phosphorous and ammonia to be introduced December 2024. The scheme will be completed by the end of AMP7 at an expected cost of £32M.

H WINEP

Table 0-3 WINEP Actions relating to water quality

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes	Completion date
Bobs-Holbeche Bk - source to conf Smestow Bk	WMD00724 WMD00982 WMD01365 WMD01366	7ST201110 7ST201368 7ST201742 7ST201743	LOWER GORNAL (STW)	U_INV2 – Investigation to confirm if any existing front end flow monitor or the back end MCERTS flow monitor can be used to measure PFF to full treatment at a WwTW. Existing front end monitors must be considered first and where they can be MCERTS certified to measure PFF they should be used to provide data within AMP7. Where there is no front end monitor or it cannot be MCERTS certified investigate whether the back end flow monitor can be MCERTS certified to measure PFF. If it can, then use it to provide data within AMP7. If neither can be MCERTS certified then a new inlet MCERTS flow monitor will be required under a PR24 driver. U_MON3 – Install EDM on WwTW overflows to storm tanks at those WwTW where existing monitors cannot be used to be confident that the permitted FFT setting is being complied with WFD_IMPg – Measures to reduce ammonia, phosphorus, BOD or nitrogen at STWs in order to meet WFD standards in rivers, transitional or coastal waters. Measure to meet a Good standard for the element. There may also be situations where a WFD biological element fails its water body objective due ammonia and/or dissolved oxygen (i.e. reason for not achieving good status (RNAG) is confirmed as ammonia and/or dissolved oxygen), but the ammonia and/or dissolved oxygen element at the designated monitoring location achieved good status. This may be due to circumstances such as different monitoring sites used for chemistry and biology. There must be a confirmed link between the water company asset and the observed effect for measures to improve biology. A phosphorous permit of 0.3mg/l is proposed. WFD_IMPg – Measures to reduce ammonia, phosphorus, BOD or nitrogen at STWs in order to meet WFD standards in rivers, transitional or coastal waters. Measure to meet a Good standard for the element. There may also be situations where a WFD biological element fails its water body objective due ammonia and/or dissolved oxygen (i.e. reason for not achieving good status (RNAG) is confirmed as ammonia and/or dissolved oxygen), but the ammonia and/or dissolved oxygen element at the designated monitoring location achieved good status. This may be due to circumstances such as different monitoring sites used for chemistry and biology. There must be a confirmed link between the water company asset and the observed effect for measures to improve biology. A ammonia permit of 1.5mg/l is proposed.	31/03/2022 31/03/2021 22/12/2024 22/12/2024

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes	Completion date
Tame - R Rea to R Blythe	WMD00737 WMD00995	7ST201123 7ST201381	MINWORTH (STW)	U_MON4 – Install MCERTS flow monitoring as close to the overflow as practicable to record FFT at WwTW where the existing DWF MCERTS flow monitoring, or other installed flow monitoring, cannot be readily used to confirm the permitted FFT setting is being complied with when the overflow to storm tanks operates U_MON3 – Install EDM on WwTW overflows to storm tanks at those WwTW where existing monitors cannot be used to be confident that the permitted FFT setting is being complied with	31/03/2021 31/03/2022
Stour (Worcs) - conf Smestow Bk to conf R Severn	WMD00773 WMD01031 WMD01411 WMD01554	7ST201159 7ST201417 7ST201782 7ST300220	ROUNDHILL (STW)	U_MON4 – Install MCERTS flow monitoring as close to the overflow as practicable to record FFT at WwTW where the existing DWF MCERTS flow monitoring, or other installed flow monitoring, cannot be readily used to confirm the permitted FFT setting is being complied with when the overflow to storm tanks operates U_MON3 – Install EDM on WwTW overflows to storm tanks at those WwTW where existing monitors cannot be used to be confident that the permitted FFT setting is being complied with WFD_IMPg – Measures to reduce ammonia, phosphorus, BOD or nitrogen at STWs in order to meet WFD standards in rivers, transitional or coastal waters. Measure to meet a Good standard for the element. There may also be situations where a WFD biological element fails its water body objective due ammonia and/or dissolved oxygen (i.e. reason for not achieving good status (RNAG) is confirmed as ammonia and/or dissolved oxygen), but the ammonia and/or dissolved oxygen element at the designated monitoring location achieved good status. This may be due to circumstances such as different monitoring sites used for chemistry and biology. There must be a confirmed link between the water company asset and the observed effect for measures to improve biology. A phosphorous permit of 0.25mg/l is proposed. WFD_ND – Scheme to meet requirement s to prevent deterioration in ammonia. A ammonia permit of 12mg/l is proposed.	31/03/2021 31/03/2022 22/12/2024 31/03/2025

Offices at

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Dublin
Edinburgh
Exeter
Glasgow
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Leeds
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