Draft Water Resources Management Plan 2024

ESP Water Limited

Updated - June 2023

Contents

Document Control

Version history				
Version	**Date**	**Author**	**Reason for new version**	**Sections affected**
0.01	03/10/22	Catherine Fearon	First draft	N/A
0.02	17/11/22	Catherine Fearon	Second draft following initial review by Defra/EA for public consultation	Included contact details in section 2.4 and addition of Appendix 1.
0.03	30/11/22	Catherine Fearon	Final version for public consultation.	Updated with signatures.
0.04	01/06/23	Catherine Fearon	Updated version with Statement of Response	Numerous sections. See Statement of Response

Approval - Signed:

Stephen Morris
Water Managing Director

Date: 01 June 2023

0 Governance

Board Assurance

In conjunction with the requirements of the Water Industry Act 1991, Section 37A to D, our first Water Resource Management Plan (WRMP) has been compiled with ESP Water's Board and following internal presentations on the detail of this plan it has received full approval.

The Board are satisfied that:

- we have met all regulatory obligations in developing our plan.
- our plan reflects relevant regional and incumbent plans.
- our plan is a best value plan for managing water supply and demand relevant to our appointed areas.

Signed:

Kevin O'Connor
Chief Executive, ESP Utilities Group

Security Statement

In publishing our Water Resources Management Plan and in accordance with section 37B (3) of the Water Industry Act 1991, this security statement confirms that no information has been excluded from our plan on the grounds of national security.

Signed:

Simon Lees
ESPUG Operations Director

1 Introduction

1.1 This Water Resources Management Plan

This is a draft of ESP Water's (ESPW) first Water Resources Management Plan (WRMP) since appointment as a water and sewerage undertaker in July 2022. It considers sites for which we have an appointment or variations to that appointment as of 01 May 2023 and is an updated version of our draft, which was published for public consultation on 01 December 2022. We expect that further variations to our appointment will be granted before our final plan is published and consequently these additional sites will be included when it is published later in 2023.

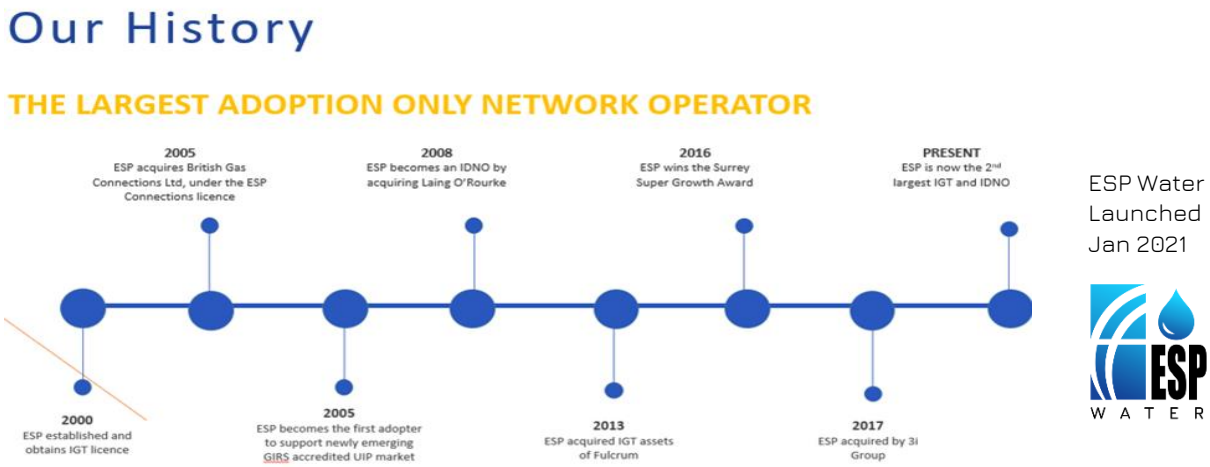
We confirm that we have adequate provision on all development sites to cater for long term planning horizons.

1.2 ESPW

ESP Water (ESPW) is a NAV company (New appointment and Variation) who provides water and wastewater services under an appointment granted by Ofwat, the water industry financial regulator, as set out in the Water Industry Act 1991.

ESPW was founded in 2021 and is part of the ESP Utilities group (ESPUG), which has been providing Gas & Electricity to properties for over 20 years as an asset adoption company. ESPUG have over 950,000 utility connections on residential, industrial and commercial networks across the UK.

ESPUG is partly owned by 3i Investments PLC, and our history is summarised in the diagram below. Further details on the company structure can be found on our website www.espwater.co.uk and www.espug.com.



We were granted our first NAV appointment on 24 July 2022 for a site in Salford, Manchester called Merchant's Wharf. Subsequently variations to this appointment have been granted for a further twenty-two sites. At the time of the submission of this updated draft WRMP to Environment Agency (EA) we have a few customers on 3 of these sites with 5 sites in supply.

1.3 ESPW sites

With the introduction of competition within the water industry, and following amendments to the Water Act 2003, the opportunity was created for the independent provision of water and sewerage services by new independent licence holders.

New Appointments and Variations (NAVs) allow companies to offer water and/or sewerage services within a specified geographic area instead of the existing appointee. As a result, developers and large non-household customers can choose their supplier for these services and enjoy the benefits of a more competitive market.

ESPW is a water and sewerage undertaker and variations to our appointment are granted by OFWAT following a period of consultation and subject to the applicant satisfying certain criteria to ensure the interests of the customers are protected.

We have been granted variations to provide water and wastewater services in place of the existing appointed Water Companies. Since July 2022, variations have been granted in areas previously supplied by United Utilities (UU), Northumbrian Water (NWL) Yorkshire Water (YW), Severn Trent Water (STW), South West Water (SWW), Anglian Water (AW) and Thames Water (TW) regions. We expect, over time, to have appointments in most of the incumbent areas across England. We currently do not have any sites in Wales, however, should this change we are aware of the need to comply with associated regulatory requirements of Wales.

The table below includes the sites to which we are currently appointed. We do not anticipate that there is a risk to the security of supply for customers in these zones since negotiations through the bulk supply agreement (BSA) process with the incumbent water company have already taken place. Tables 1.1 – 1.7 below list the sites by incumbent water company area.

For the purposes of this draft plan, a cut-off date was imposed for inclusion of sites in the planning tables. Those sites currently granted on or before 01 May 2023 are included. As previously explained, any sites granted between the submission of the updated draft plan and the final submission of the plan will be included. Only 5 of the sites shown here are currently in supply.

Table 1.1 – ESPW NAVs within the United Utilities region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
Merchant's Wharf	Salford	UU Strategic	Dual	26/07/22	To be advised	Indefinite
Bridgewater Wharf	Salford	UU Strategic	Water only	08/09/22	To be advised	Indefinite
Bhailok Court	Preston	UU Strategic	Dual	05/10/22	To be advised	Indefinite
Varsity Quarter	Manchester	UU Strategic	Dual	21/10/22	26/10/22	Indefinite
Sydney Road	Crewe	UU Strategic	Water only	15/02/23	To be advised	Indefinite
Southport Road	Thornton	UU Strategic	Water only	22/03/23	To be advised	Indefinite

Table 1.2 – ESPW NAVs within the Yorkshire Water Limited region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
Sylvester Street	Sheffield	YW Grid	Dual	05/09/22	To be advised	Indefinite
Latitude Purple	Leeds	YW Grid	Dual	22/09/22	To be advised	Indefinite
Halifax Road	Penistone	YW Grid	Water only	03/10/22	To be advised	Indefinite
Springwell Gardens	Leeds	YW Grid	Dual	16/12/22	To be advised	Indefinite
Latitude Blue	Leeds	YW Grid	Dual	14/02/23	To be advised	Indefinite
Back Lane	Sowerby	YW Grid	Dual	22/03/23	To be advised	Indefinite

Table 1.3 - ESPW NAVs within the Northumbrian Water region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
Bracks Farm	Bishops Auckland	NW - Kielder	Dual	05/09/22	26/12/22	Indefinite
Burdon Lane	Sunderland	NW - Kielder	Dual	18/11/22	01/04/23	Indefinite

Table 1.4 - ESPW NAVs within the Severn Trent Water Limited region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
Wrottesley Park	Perton	STW Shelton	Dual	08/09/22	To be advised	Indefinite
Station Road	Newport	STW Shelton	Dual	24/11/22	28/03/23	Indefinite
Bromyard Road	Worcester	STW – Strategic Grid	Dual	12/12/22	To be advised	Indefinite

Whitford Road	Bromsgrove	STW – Strategic Grid	Dual	11/01/23	To be advised	Indefinite
New Garden Square	Birmingham	STW – Strategic Grid	Dual	06/04/23	To be advised	Indefinite

Table 1.5 - ESPW NAVs within the South West Water Limited region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
The Grange	Bideford	SWW – Roadford	Dual	11/11/22	01/04/23	Indefinite

Table 1.6 - ESPW NAVs within the Anglian Water Limited region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
Malabar Farm	Daventry	AW – Ruthamford North	Dual	26/01/23	To be advised	Indefinite

Table 1.7 - ESPW NAVs within the Thames Water Limited region

Site name	Location	Incumbent WRZ	Service	Date Granted	Date Commenced	Contract Length
The Maltings	Aylesbury	TW – Slough, Wycombe, Aylesbury	Dual	08/03/23	To be advised	Indefinite

1.4 ESPW's Approach to Water Resources

We do not own or operate water sources. All our supplies are through bulk connections from the local incumbent water company. However, we can project our demand requirements based on our 25-year forecast of growth and test this against various scenarios using basic industry recognised supply and demand forecasting techniques demonstrating sufficiency of supply into the future. Our baseline year is also known as the Dry Year Annual Average (DYAA), which is defined as the average daily demand in a dry year (a period of low rainfall) where there are no constraints on demand. See section 3 for more detail on our demand forecasting.

We have negotiated Bulk Supply Agreements (BSAs) with the incumbent water companies for each of the sites. These agreements are designed to secure adequate supplies for our customers throughout the 25-year planning period, including sufficient headroom to allow for uncertainties in demand forecasts. Also, the BSA agreed supply volume is an annual average, so covers periods of higher and lower demand throughout the year. Both factors ensure that customers will not be placed at any risk greater than if supplied directly by the incumbent. We are confident in the WRMP's of the relevant incumbent companies, with suitable mitigation measures in

place where any deficits are forecast, and we regularly meet with their water resources teams to keep abreast of any changes.

Our approach does however include an option for re-negotiating our bulk supply agreements should we need to and there is a clause in the contract to allow us to do so. The steps in this process are summarised in the Table 1.8 below:

Table 1.8 Bulk supply agreements negotiation

Step	Detail
1 – Initial application	ESP applies to the relevant incumbent with expected demand that includes an estimate for headroom and UFW.
2 – WRMP Annual review	Supply-demand assessment undertaken to ensure no deficit. Check occupancy rates used. If in deficit – approach incumbent to re-negotiate the BSA.
3 – WRMP 5-year cycle	Full supply-demand balance undertaken to ensure no deficit. Check occupancy rates used. If in deficit – approach incumbent to re-negotiate the BSA.
4 - Emergency	Speak to incumbent directly about increases to volumes in BSA. This may be a temporary measure.

1.5 Our targets and this WRMP

In conjunction with the wider water industry, our target is to reduce per capita consumption (PCC) to 110 litres per head per day (l/h/d) by 2050. A reduction in demand will also contribute to our commitment to reduce carbon emissions. We will also ensure leakage is less than 5% on our sites.

This document is split into 3 further main sections. In Section 2, we will summarise the requirements of a WRMP and our strategies in meeting those requirements and in Section 3, we explain how we have calculated ESPW's Supply and Demand Balance. Section 4 then gives further details on all our Water Resource Zones.

1.6 Security Considerations

As a NAV company who is reliant on supplies from incumbent suppliers, we regularly liaise with the incumbent water companies concerning security considerations. Before agreeing to a BSA with us, we model our water requirements and ensure we have robust security arrangements in place for our own infrastructure.

2. The requirement for and background to Water Resources Management Plans

2.1 The Role of a WRMP

A water resources management plan (WRMP) sets out how a water company intends to maintain the balance between the supply and demand for water over a 25-year period. It shows how the company expects the demand for water to grow over the planning period and how it plans to meet those forecast demands.

2.2 Legal Requirements

The Water industry Act 1991 (as amended) requires water undertakers to prepare and maintain a WRMP. Defra and the Welsh Assembly Government expect the water companies in England and Wales to follow sections 37A-D of the Water industry Act 1991, the WRMP Regulations 2007 and directions given by government. Compliance to the WRMP (England) Direction 2022, is summarised in Appendix 1.

The statutory process sets out defined stages for consultation. The three principal stages are:

1. Pre-draft consultation with statutory consultees and licensed water suppliers.
2. Consultation with the Environment Agency's regional planners and Ofwat during the preparation of the draft WRMP.
3. Consultation following publication of the draft WRMP with specified organisations, customers, and others likely to be affected by the plan.

The company is then required to produce a 'Statement of Response' to stakeholders' comments on the draft WRMP setting out:

1. The consideration we have given to those representations.
2. Any changes that have been made to the draft WRMP because of these considerations.
3. An explanation of where changes have not been made following the consultees comments.

This updated draft accompanies our Statement of Response, which has been published on our website (www.espwater.co.uk).

2.3 Timescales

Water companies in England and Wales have a statutory requirement to prepare a WRMP every five years; the final plan will be submitted for approval to the Secretary of State in late 2023 ready for 2024. This updated draft WRMP includes 22 sites however, additional developments are expected to be gained, so it is expected that the plan will grow over future iterations.

2.4 Consultation

The statutory process for the preparation of WRMP sets out defined stages for consultation as described in Section 2.2.

In July and August 2022, we undertook pre-consultations with the EA, Ofwat, and the incumbent water companies we take a supply from. Following submission of our draft plan to the EA and the Secretary of State, we consulted on our plan with the following statutory and non-statutory consultees.

- The Water Services Regulation Authority (OFWAT),
- Natural England,
- Incumbent water companies we take a supply from,
- The Drinking Water Inspectorate (DWI),
- The Consumer Council for Water (CC Water),
- Other interested parties via our website.

In future iterations of our WRMP, our customer base will also be consulted. The full consultation of our draft plan lasted for just over 8 weeks from 01 December 2022 until 01 February 2023 and is now being followed by an assessment of any comments and the publication of a Statement of Response as per regulatory requirements, within 26 weeks of publication.

2.5 ESPW's Strategy

We have negotiated bulk-supply agreements with incumbent water companies at all our appointed sites, with the intention of ensuring that no supply-demand balance is in deficit under baseline demand conditions as well as allowing a reasonable headroom should estimates be too low. Further details on our supply and demand forecasting are contained in Section 3.

Our Drought Plan published separately (see www.espwater.co.uk), will set out the short-term operational steps we will take to maintain supplies in the event of a severe drought. This is required six months after the first appointment and a draft was submitted to Defra on 27 January 2023. This is now out to public consultation from 24 April 2023 until 09 June 2023, and any learning will also be included in our final WRMP if appropriate.

Our Strategy for maintaining a positive supply-demand balance can be summarised as follows:

1. Monitor actual demand as sites are developed to their full potential and develop a database of historic demand data to aid future demand planning.
2. Implement a targeted programme of leakage monitoring and control (based on metering data) to maintain levels of leakage at or below the sustainable economic level.
3. Implement efficiency measures to reduce per capita consumption (PCC) to 110 l/h/d target levels consistent with the aims and objectives set out in the CFSH (Code for Sustainable Homes) and the water industry commitments.
4. If available headroom is below target headroom, then options will be considered to reduce the supply/demand deficit. This will entail one or both of the following:
    a. review the quantities specified in bulk supply agreements or
    b. implement demand management measures if these have not yet reached their optimum level of performance.

Demand management measures could include:

- Increasing levels of education, marketing and communications to encourage a reduction in demand. This could be in conjunction with incumbent companies.
- Provision of water saving devices to customers.
- Assistance for customers to fix issues with supply pipe and plumbing losses, however customer side leakage is unlikely to be identified until smart meters are installed

We are also committed to achieving high levels of water-use efficiency. This involves formulating a long-term strategy with developers to reduce water consumption on new domestic and commercial developments.

This strategy involves innovation and the development of strategic policies by:

a. Promoting efficient water use in domestic properties.
b. Encouraging a reduction in per capita consumption, especially in those areas that have not been constructed to a 110l/h/d standard.
c. Developing customer communication and an awareness of ESPW codes of practice to deliver reliable and sustainable supplies of water and wastewater services.
d. Implementing AMR (Automated meter reading) metering technology for all domestic and commercial supplies with a plan to move to a full AMI (Advanced metering infrastructure) system by 2050.
e. Managing leakage to maintain low levels at our sites.
f. Considering environmental solutions and emerging technical solutions to meet specific water demand requirements for each NAV appointed development.

Further detail on our demand reduction strategy can be found in Section 3.

2.6 Problem Characterisation

To understand the scale and complexity of the planning problem and our vulnerabilities to various strategic issues, risks and uncertainties, we have used the problem characterisation steps of UKWIR's Decision Making Process Guidance[1]. [1]This ensures we develop a proportionate response in terms of effort and cost and helps us develop our best value plan.

The guidance proposes 4 phases to the decision-making framework with the problem characterisation phase being within the first one:

- Data phase
- Modelling phase
- Refinement phase
- Reporting phase

There are two elements to the problem characterisation assessment:

The first element is to identify the "Strategic Needs – How big is the problem?".

Table 2.1 below includes the main risks for a NAV company when considering how big the problem is. This could vary by incumbent company.

[1] UKWIR WRMP 2019 Methods – Decision Making Process

Table 2.1 Main Risks to a NAV

Element	NAV risk
S – Supply side risks	Reliability (both sufficiency and quality) of bulk supplies
D – Demand side risks	Consumer Consumption Challenge, controlling leakage and demand associated with climate change.
I – Investment programme risks	Indirect investment risks from incumbents not delivering their plans

The second element is to identify the Complexity Factors – How difficult is the problem to solve?. Table 2.2 and 2.3 summarises these elements and the risks to ESPW.

Table 2.2 Supply side complexity factors

Element	NAV risk
S (a) – current supply system performance	Have levels of service been triggered?
S (b) – future supply system performance	Incumbents anticipate future concerns – need solutions to provide supplies
S (c) – stepped changes	Impact on NAVs from regulator changes, or significant climate events, population changes.
S (d) – inaccurate forecasting	Incumbents have incorrect data

Table 2.3 Demand side complexity factors

Element	NAV risk
D (a) – current changes in demand	Correct occupancy rates, impact on PCC of small sites. Customer behaviour and education. Water efficient products removed, differing house build standards
D (b) – forecasts incorrect	Lack of data required to accurately forecast. ESP is a new company with no data.
D (c) – simple dry year / normal year is incorrect	Lack of data to establish simple dry year. Baseline wrong

Using this methodology, we have scored each Water Resource Zone within each incumbent region and arrived at an assessment of risk, which is where we should direct resources and effort in meeting our supply -demand profile. Table 2.4 below provides the final assessment.

Anglian Water, South West Water and Severn Trent Water's Shelton WRZs are the highest concern to us (shown in red) and therefore these regions will be targeted for water efficiency measures.

ESPW Water Resource Zone	Strategy risks	Supply side risks	Demand side risks	Total	Risk
AW - Ruthamford North	2	5	3	10	
NW - Kielder	0	1	3	4	
STW - Shelton	1	5	4	10	
STW - Strategic Grid	1	4	4	9	
SWW - Roadford	2	5	4	11	
TW - Slough, Wycombe, Aylesbury (SWA)	1	4	3	8	
UU - Strategic	0	1	3	4	
YW - Grid	0	5	3	8	

Table 2.4 ESPW Problem characterisation

2.7 Levels of Service

A water company's target level of service is the standard of service (effectively the reliability of supply) that a customer can expect to receive and is a form of contract between a water company and its customers. Due to the nature of our sites, our levels of service are aligned to those of the incumbent water companies.

A water company's success in delivering its stated levels of service long term depends on the combined effectiveness of its WRMP and Drought Plan. It is accepted within the water industry that it would not be economically justified, or environmentally sustainable, to develop long-term plans that removed completely the need to periodically introduce restrictions on customer's non-essential use during more extreme drought events. The target level of service is therefore the average frequency with which restrictions on water use is expected to be applied to customers. This frequency should be considered appropriate both in terms of customer expectation, impact on the environment and cost implications. The quantity of water to be supplied under the bulk supply agreements allow for unconstrained demand in each site to be supplied both now and in the future.

However, the agreements also allow for reductions in bulk supply to be applied during times of drought. Our levels of service are therefore effectively aligned to those of the incumbent water companies and the annual risk will be regularly reviewed throughout the planning period. These are the restrictions on water use that we will apply as drought severity increases (categorised according to incumbent supplier) (Tables 2.4 – 2.11). The data has been taken from each companies' Drought Plan 2022.

Table 2.5 – ESPW's levels of services for Strategic WRZ in United Utilities Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Appeal for restraint	n/a	n/a
2	Temporary use bans	1 in 20 years	5%
3	Drought permits	1 in 20 years	5%
3	Drought orders – non essential use	1 in 80 years	1.25%
4	Emergency Drought Orders	1 in 200 years	0.5%

Table 2.6 – ESPW's levels of services for Yorkshire Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Voluntary reductions	n/a	n/a
2	Temporary use bans	1 in 25 years	4%
3	Drought permits and orders	1 in 80 years	1.3%
4	Emergency drought orders	1 in 500 years	0.2%

Table 2.7 – ESPW's levels of services for Northumbrian Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Appeal for restraint	1 in 20 years	5%
2	Temporary use bans	1 in 150 years	0.66%
3	Drought orders	1 in 200 years	0.5%
4	Rota cuts	1 in 250 years	0.4%

Table 2.8 – ESPW's levels of services for Severn Trent Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Appeal for restraint	N/A	N/A
2	Temporary use bans	3 in 100 years	3%
3	Drought orders	3 in 100 years*	3%*
4	Emergency Restrictions	< 1 in 500 years	< 0.2%

*While listed as the same frequency as Temporary Use Bans, would only be used following an existing Temporary Use Ban.

Table 2.9 – ESPW's levels of services for South West Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Appeal for restraint	1 in 10 years	10%
2	Temporary use bans	1 in 20 years	5%
3	Supply side Drought orders	1 in 20 years	5%
3	Demand side Drought orders	1 in 40 years	2.5%
	Emergency Drought Orders	>1 in 200 years	0.5%

Table 2.10 – ESPW's levels of services for Anglian Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Appeal for restraint	n/a	n/a
2	Temporary use bans	1 in 10 years	10%
3	Drought orders	1 in 40 years	2.5%
4 <2025	Rota Cuts	1 in 100 years	1%
4 >2025	Rota Cuts	1 in 200 years	0.5%

Table 2.11 – ESPW's levels of services for Thames Water Limited region

Level	Action	Frequency of implementation (drought severity)	Annual risk of Restriction
1	Intensive media campaign	1 in 5 years	20%
2	Temporary use bans	1 in 10 years	10%
3	Drought orders	1 in 20 years	5%
4	Emergency Restrictions	Never or 1 in 100 years	1%

2.8 Stakeholder Engagement

As we take bulk supplies from incumbent's, it is important that we have an engagement plan with these incumbents and also the Regional Water Resources Groups. There are 5 regional groups across England and Wales as shown in Figure 2 below and we, as part of the Independent Networks Association (INA), which represents NAV companies, have recently joined these groups. Going forward this will enable us to understand the water resource planning in the region and be included in the discussion about demand management. With regards to the Incumbent's, ESP is now communicating with all 7 Incumbent's water resources teams to enable us to have consistent approaches to water resource management, to ensure sufficient supplies for our customers.

Figure 2 – Regional Water Resources Groups

2.9 Non-Drought Hazards

As our supplies are derived from bulk supply contracts (BSAs) and we do not own any water above ground infrastructure the non-drought hazards are minimal. However, we reviewed the potential hazards as detailed in the UKWIR Guidance 2013[2] on our network and the following were identified as presenting a very low risk to our supply resilience and have been factored into our assessments. These are:[2]

- Freeze-Thaw.
- Landslip / subsidence.
- Third Party – emptying inappropriate material into manholes.
- Geological processes
- SEMD Hazards

Note SEMD hazards in this context are risks to our assets and infrastructure, not to the supply from the incumbent as these risks will be included in their WRMPs.

2.10 Greenhouse Gas Emissions

We understand that the environment and society are facing a climate emergency and the water sector, is a significant contributor to greenhouse gas emissions (GHG). The water sector, through Water UK, has committed to net zero operational carbon by 2030. Carbon dioxide (CO_2) makes up the vast majority of GHG in the water sector and carbon valuation of incumbent options in their WRMPs is part of their decision-making process to seek out the most cost-effective opportunities to reduce carbon.

We obtain water from bulk supplies and do not abstract, treat or store water. Neither do we currently have any pumping stations on our clean water networks. Although we install polyethylene pipes, the production of greenhouse gases resulting from the manufacture and transport of these products is assessed by the manufacturer rather than the end-use to prevent double counting. We have a small fleet of company vehicles and consider our vehicle emissions to be negligible; this will be evaluated on an ongoing basis as the business grows. Consequently, we assess our contribution to Carbon Dioxide equivalent emissions to be negligeable.

However, we have estimated in the table below the carbon cost to produce water in each water resource zone by reviewing the draft WRMPs of the Incumbents and assuming on average 1m^3 of water abstracted, treated and distributed is 1.74kg CO_2 from a study by Danfoss[3]. This information is provided in Table 2.12 below.

[2] UKWIR Managing through Drought: Code of Practice and guidance for companies on water use restrictions 2013
[3] Danfoss 2021 – The Carbon footprint of potable water.

ESPW Water Resource Zone	Volume (m3/d) - HH & NHH	Carbon Emissions (CO2) kg/d
AW - Ruthamford North	496.2	861.80
NW - Kielder	542.95	943.00
STW - Shelton	224.09	389.20
STW - Strategic Grid	339.75	590.08
SWW - Roadford	92.16	160.06
TW - Slough, Wycombe, Aylesbury (SWA)	123.01	213.64
UU - Strategic	507.28	881.05
YW - Grid	616.19	1070.20
Total	2941.63	5109.04

Table 2.12 – Carbon emissions estimate

We will support incumbent initiatives in reducing this carbon cost. Also, ESP Water is part of ESP Utilities Group and as a group we are committed to reducing greenhouse gas emissions and playing our part to achieve net zero.

2.11 Climate Change

Adaptation to future climate challenges is fundamental to WRMPs and the options both for the incumbent water companies and ESPW should help climate adaptation. As we take a bulk supply from incumbents for our sites we are reliant on their choice of options taking climate change into account. Climate change is predicted to lead to wetter winters and hotter, drier summers, along with an increase in the frequency and intensity of extreme weather. Consequently, in our forecast of demand we have modelled some scenarios taking climate change into account. This is discussed further in Section 3.1.

2.12 Current Situation Regarding Development of Supply Areas

Table 2.13 below shows the expected number of connected customers at full development together with the actual numbers of connected customers on submission of this draft WRMP for all our sites.

Table 2.13 Current and final levels of development at ESPW appointed sites

Site	No. of connections Domestic		No. of connections – NHH	
	Current	Final	Current	Final
Merchant's Wharf	0	196	0	1
Bracks Farm	20	201	0	0
Sylvester Street	0	335	0	1
Wrottesley Park	0	220	0	0
Bridgewater Wharf	0	376	0	10
Latitude Purple	0	463	0	2
Halifax Road	0	400	0	0
Bhailok Court	0	200	0	4
Varsity Quarter	20	224	0	0

The Grange	0	225	0	0
Burdon Lane	0	950	0	4
Station Road	10	301	0	0
Bromyard Road	0	120	0	0
Springwell Gardens	0	224	0	2
Whitford Road	0	370	0	2
Malabar Farm	0	1110	0	10
Latitude Blue	0	488	0	1
Sydney Road	0	146	0	0
The Maltings	0	273	0	0
Back Lane	0	64	0	0
Southport Road	0	206	0	0
New Garden Square	0	398	0	2

2.13 The Scope of the Plan

We have followed the relevant guidance when creating our WRMP and the main components of a WRMP are summarised below:

- Use of the problem characterisation approach to understand levels of concern over our supply -demand balance.
- A baseline forecast of demand for the 25-year planning period, using a projection of growth by number of connections on ESP Sites up until 2025 using the dry year annual average as a baseline year. baseline forecast of the available water supplies over the same period making assumptions about current resources and future known changes by incumbent water resource zone
- From these forecasts, prepare a baseline supply-demand balance by computing whether there is a water surplus or deficit in each year of the planning period.
- Assess the cost and benefits of a range of demand options and provide justification for the proposed preferred solutions.
- Prepare a final-supply demand balance, taking the preferred water demand solutions into account.

As mentioned in section 1.4, all our NAV site supplies are bulk transfers, therefore there is no requirement to carry out a deployable output assessment, nor the associated assessment of how sustainability reductions might affect supplies. These risks are born by the donor company, although in times of drought our customers will have to share the impact of any supply restrictions on an equitable basis.

3. The Supply-Demand Balance

3.1 Introduction

This section describes the general methodology used to compute the supply-demand balance, the data available and the assumptions made. Detailed balances for each of the WRZs covered by this plan are presented and discussed in section 4. These will be revisited as data on actual consumption and water delivery become available. Assumed or estimated values can then be substituted with actual data. The opportunity to do this arises with each annual review of the plan with a new and revised plan due after five years.

To determine whether we have enough water for our customers we need to understand our bulk supplies and the water demand on our housing developments. This is illustrated in the diagram below.

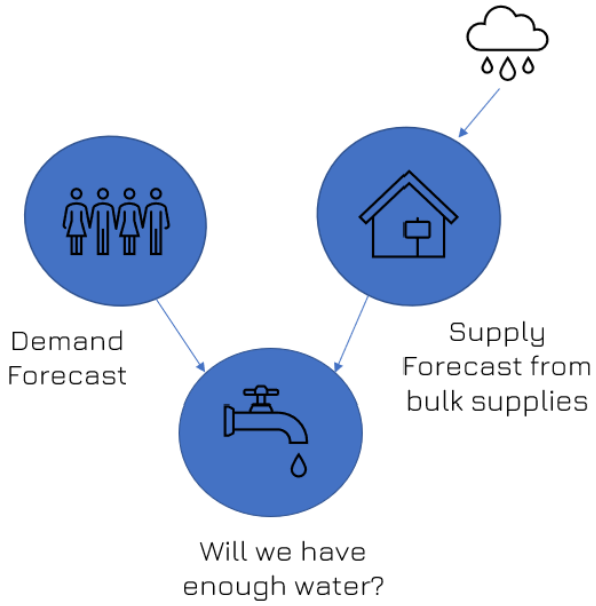


Figure 3.1 – Calculating how much water we need.

Our demand is determined from the forecast of our projected sites over a 30-year period, and we have considered a number of scenarios. Scenario 1 is based on an average PCC of 125 l/h/d over the 30-year period. 125l/h/d has been used as this is the current house building design standard. The Future Homes standard are proposing a 110l/h/d design, which will introduce more water efficient products to homes. See section 3.2.1 for further detail on this.

Scenario 2 is where demand management options are deployed, and PCC is reduced to 110l/h/d and/or the house design standard is reduced to 110l/h/d. And the third scenario assumes 5 hot summers, when PCC increases by 15l/h/d to consider climate change. We also recognise that changes in society behaviour as seen during the Covid pandemic such that more people are working from home can change forecasts but as ESPW's sites have all been developed since this time it has not been considered here as a separate scenario.

We are predicting an additional 15000 plots connected annually from 2027 over the next 25 years. This gives us a portfolio of around 384000 properties by 2050.

The graph (Figure 3.2) below demonstrates that for all these scenarios the total bulk supply volumes is not exceeded.

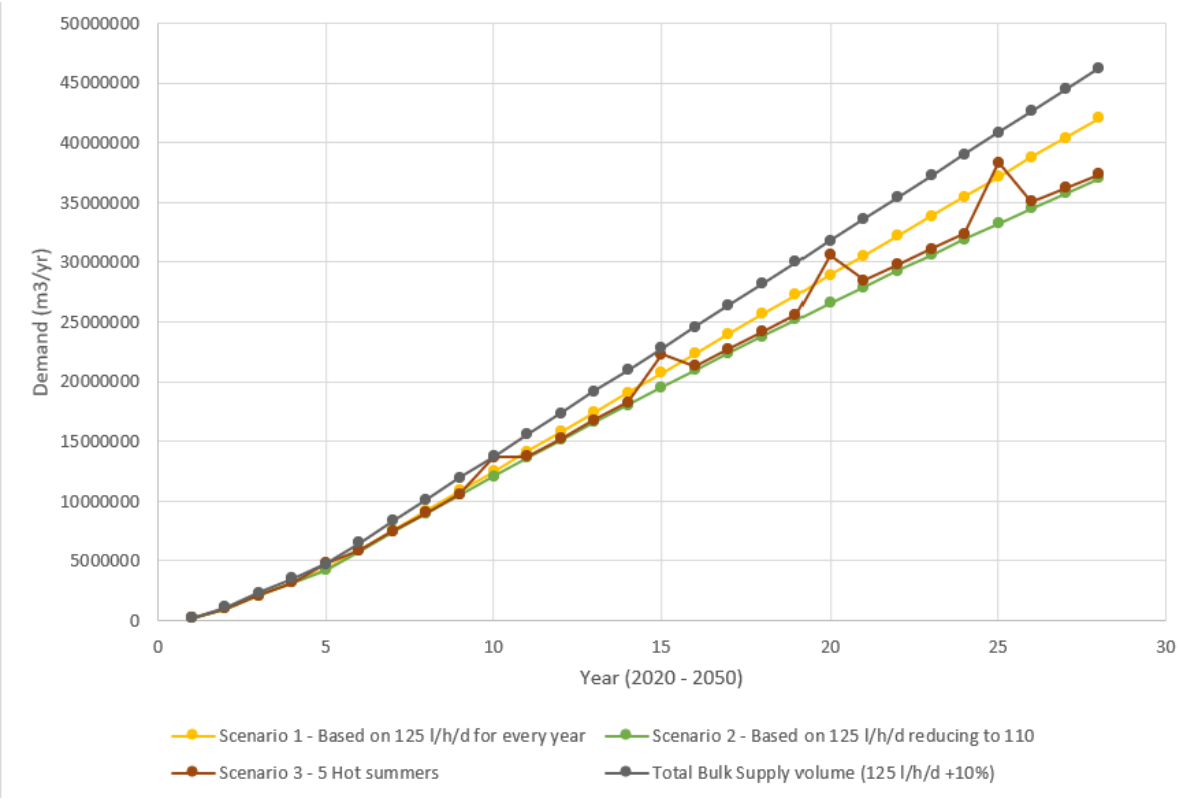


Figure 3.2 – Forecast scenarios

3.1.1 Deployable Output

We do not own or operate water supply sources of its own. All supplies are bulk transfers from the incumbent water companies. There are no exports out of our supply areas. In general, the quantity of water to be made available at each site has been negotiated with the incumbent water company such that no supply-demand deficit is envisaged within the 25-year planning horizon. Quantities are based on estimates of the total water requirement (baseline demand and operating losses) in each inset area at projected final build out, i.e., after all the currently proposed development is complete.

Quantities are defined in terms of an annual maximum volume in m3 /year, a maximum daily volume in m3 /day and a maximum instantaneous flow in l/s. The maximum instantaneous flow calculation methodology varies between incumbent companies whilst keeping in line with UKWIR guidance; it generally uses a peaking factor provided by the incumbent that is multiplied by the average volume. We always request 125l/h/d using our occupancy rate calculations plus 5% Unaccounted for Water and 5% for Headroom.

Values are set out in separate bulk supply agreements between ESPW and incumbent water companies. (Tables 3.1.1 – 3.1.7).

Table 3.1.1 Agreed limits to the bulk supply within the United Utilities Limited region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
Merchant's Wharf	10	77.00	28105
Bridgewater Wharf	21	143.82	52493
Varsity Quarter	3	112.41	41029
Bhailok Court	4	72.18	26346
Sydney Road	2	78.10	28506
Southport Road	3	110.41	40301

Table 3.1.2 Agreed limits to the bulk supply within the Yorkshire Water Limited region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
Sylvester Street	4	94.12	34352
Latitude Purple	19	120.07	43827
Halifax Road	5	200.98	73358
Springwell Gardens	4	81.67	29809
Latitude Blue	6	150.61	54974
Back Lane	1	36.16	13200

Table 3.1.3 Agreed limits to the bulk supply within the Northumbrian Water Limited region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
Bracks Farm	3.1	100.27	36599
Burdon Lane	17	567.83	207257

Table 3.1.4 Agreed limits to the bulk supply within the Severn Trent Limited region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
Wrottesley Park	2.6	92.83	33884
Station Road (Phase 1)	3.5	152.58	55692
Bromyard Road	1.5	51.38	18754
Whitford Road	3.7	137.42	50158
New Garden Square	3.9	147.82	53954

Table 3.1.5 Agreed limits to the bulk supply within the South West Water region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
The Grange	2.5	96.30	35148

Table 3.1.6 Agreed limits to the bulk supply within the Anglian Water region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
Malabar Farm	13.5	747.15	272710

Table 3.1.7 Agreed limits to the bulk supply within the Thames Water region

Site	Maximum Instantaneous flow l/s	Maximum daily volume m3/d	Maximum annual volume m3/yr
The Maltings	4.9	156.20	57013

When expressed as a daily rate, the maximum annual volume represents the average rate of transfer that can be maintained over the year. There are peaks of demand within this, normally in summer months and/or dry years when high temperatures lead to temporary highs in consumption. The maximum allowable daily transfer is at a higher rate than the annual volume to take these peaks into account. The maximum daily and annual volumes will be supplied by incumbent water companies save in exceptional circumstances when supplies could be reduced. The incumbent water companies are entitled to reduce bulk supplies in cases of Emergency or 'Force Majeure'. Droughts are considered an emergency as is highlighted below; by this we mean the classification of Drought made by the Incumbent, which varies according to their WRMP and Drought Plan.

Force Majeure is defined in our BSAs as any circumstances beyond the reasonable control of either party, namely, strikes, lock-outs, act of God, war, riot, civil commotion, terrorist activity, radioactive contamination, malicious damage, compliance with any law or governmental order, rule, regulation, fire, drought or an Emergency.

3.1.2 Outage

Outage is a temporary, short-term loss in deployable output caused by unforeseen or unavoidable events affecting any part of the water supply system. The supply failure would normally last at least 24 hours before being considered a legitimate outage event. However, interruptions longer than 3 months would be considered reductions in deployable output rather than outage. As we do not operate any sources or treatment works, any outage events upstream of the point of connection for the bulk supply will therefore be considered in incumbent company's assessment of Water Available for Use (WAFU), but not ESPW's. Any issues relating to the reliability of the bulk transfer are allowed for under Headroom.

3.2 Demand

In line with Government policy, all new properties will be metered using AMR metering technology for domestic and commercial supplies. These meters are 'smart ready' and capable of being connected in the future to suitable communications networks to enable automatic, higher granularity of data. Table 2.13 shows the number of properties that have been built to date and therefore the number of AMR meters installed.

Existing data on water consumption is heavily influenced by the volume of water used during construction at each site for building supplies, batching plants, water mains testing, commissioning of waste water networks, road sweeping, and gully cleaning.

A reasonable period of 'normal' consumption is needed, free from construction activities, before usable data on actual consumption can be obtained. In the

meantime, demand must be estimated using industry-standard or average rates for the water industry, or typical values recorded elsewhere in the region, particularly in neighbouring areas.

Nevertheless, it is important to take account of key differences between inset areas and the surrounding region. For example, all properties in the inset areas are new and built to modern standards of water efficiency. All will be built after the latest amendments to Building Regulations which came into force in October 2009 to the 125l/h/d standard. Metering is generally believed to lower per capita consumption and so the fact that all properties in the insets will be metered is an important consideration.

3.2.1 Domestic Demand

Domestic demand is estimated as the product of the number of properties times their occupancy (number of people per property) times the rate of per capita consumption (PCC – expressed in litres/person/day or l/h/d). Our occupancy rate assumptions are summarised in the table 3.18 below.

Property Type	Estimated Occupancy
1 Bed	2
2BF/2BT	3
2BS/2BD/3BT/3BF	3
3BS/2BB	4
3BD/3BB	4
4BD/4BT/4BS	5
5BD, 5BS, 6BD	6

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

Table 3.2.1 Occupancy Rates

The Government's water strategy for England sets out a vision for the year 2030 which includes, "Reduced per capita consumption of water through cost effective measures, to an average of 130 l/h/d by 2030, or possibly even 120 l/h/d depending on new technological developments and innovation." (Defra 2008) New housing (which forms the whole of our asset base) should be built to the 125 l/h/d/standard. It might be expected that over time, and with our commitment to aim for the highest levels of water efficiency, it will be possible to achieve lower PCC rates. Moreover, we are committed to achieving the water industry target of 110l/h/d by 2050.

However, for initial planning purposes we have assumed that the PCC is the same for domestic demand throughout the planning period. This has been calculated based on the types of properties in these resource zones and the anticipated occupancy and subsequent PCC of these properties. Going forward estimates will be based on actual measured metered consumption. The number of domestic connections at full development in each inset area has been defined by the developers (Table 2.5) although there is uncertainty about the rate of development and when full build-out will be achieved. This will depend on the rate of house sales which in turn will depend to a large extent on the 'economic recovery' and the state of the national and local economy.

For demand forecasts, we have used the expected build rate from the developer. This rate will undoubtedly vary from year to year but as it is thought that the development of new sources of supply within the planning period will not be necessary, the rate of house building is not critical unless more than one bulk supply connection needs to be made. With the number of domestic and commercial properties at full development already known, the only uncertainty in numbers of population served is in the occupancy levels. With smaller families and a tendency for more people to live alone, occupancy levels across the country are falling. Occupancy levels within the inset areas will not be known until customers begin to move into the new homes, so are estimated in our calculations.

3.2.2 Non-Domestic Demand

The number of non-domestic connections at full development in each inset area has been defined by the developers (Table 2.5). The developments include a small number of non-household (commercial) properties. The initial areas supplied contain a small number of commercial properties. Water demand in commercial developments is related to internal floor area and the number of people working or living there. The property mix can vary enormously, as can water consumption expressed per person or per square metre. Commercial demand therefore has been calculated separately for each WRZ and going forward will use metered consumption.

3.2.3 Water efficiency

Water efficiency is an integral part of resource planning, and we have a statutory duty to promote the efficient use of water. Key to this is support for customer behavioural change. We believe that it is important to support and assist customers with these changes and this will be the key strand of our work during the period including collaboration with the incumbents, along with promoting our service level targets.

All new buildings will be designed with water efficiency in mind and all our properties are metered. Customer consumption from meter reads is monitored to either investigate for leakage or to issue letters to customers advising that we are high users along with tips on being water wise. Our company publication entitled “Using water wisely at home” sets out a programme of water efficiency initiatives that focus on education, advice and raising awareness. This publication is provided free to every new customer and is available to view on our web site. We are considering publishing Summer and Winter newsletters with our bills to all our domestic customers which include details on detecting leaks and water wise tips. Call centre agents are trained on how to discuss / direct customers to their water wise sections of the website and how to talk customers through leak detection techniques.

During the next 5 years, we will monitor and utilise site-specific consumption data to target the delivery of water-efficiency messages to their customers in specific zones, focusing on water stressed areas and use metering data to evaluate the efficacy of these messages. During the event of drought and any restrictions to supply, we will align communications with the incumbent companies to ensure that all customer experience equal restrictions.

3.2.4 Metering Strategy

As we have explained earlier, we are installing "smart ready" AMR meters on all new properties both household and non-household. A summary of our current strategy and future strategy is in table 3.19 below.

	Current Strategy	Future Strategy
Type of meter	Diehl Altair V4 meters with an integrated IZAR G4 AMR module so that they are smart ready.	Add an IZAR AMI network installing Diehl IZAR R4 receivers, which utilises the existing Diehl AMR meters.
Strategy	All new properties will have AMR meters.	Using the same meters - Trials in water stressed areas, within next 5 years with a move to full smart meter network by 2050. This will also include a rolling stock change as they are due to be replaced.
Length of life	15 years	15 years
Cost	£49.10 a unit	£15000 per site (200-300 plots)
Total Cost (22 sites and 7490 plots)	£367750	£330,000 additional cost
Timescales	Ongoing	Trial – 5 years – 2029 New sites by 2034 Retrofit start 2039 Full – 25 years - 2049

Table 3.2.4 – Metering Strategy

Diehl Altair V4 meter

3.3 Leakage and Unaccounted for Water (UFW)

Some degree of leakage from the distribution network is unavoidable. It may occur from storage facilities, transmission mains and distribution mains (often called 'distribution' or 'company-side' losses) or from service connections up to the customers' meter (sometimes called USPL or 'Underground Supply Pipe Leakage'). The latter are also referred to as 'customer-side losses'.

Leakage is normally the largest component of losses from a water supply system, but it is not the only component. Illegal connections may constitute real losses from the system while meter inaccuracies may give rise to 'apparent' losses. Together with

leakage, these 'real' and 'apparent' losses make up the 'unaccounted-for water' component (UFW).

Leakage performance can be expressed in several ways. Customer-side leakage is often expressed in litres/property/day while distribution leakage may be more appropriately expressed in m3 /kilometre/day. The former allows for different densities of housing while the latter takes account of the length of distribution main from source works to customer. Leakage is also often expressed in terms of % of water put into distribution. All these indicators can be useful for comparing the performance of similar systems although care must be taken when comparing values from different systems or areas with widely varying characteristics. In our NAV applications we have agreed target rates for "unaccounted-for-water" of 5% of distribution input. Most of this will be leakage and the terms 'leakage' and 'unaccounted-for water' are taken as synonymous in the context of their supply-demand balance. On the basis that we are constructing and operating only brand new all welded plastic systems and all supplied properties are new, water efficient and metered, UFW rates less than5% are expected to be achievable. Also, a proportion of our developments are high rise blocks of flats and leakage is assumed to be lower than traditional residential developments.

However, as the network ages we will endeavour to ensure leakage does not increase above 5% and will keep it as low as practicably possible,. We are developing systems to assess UFW more accurately and will use this data in future WRMPs once we are confident of its robustness and as we expand our portfolio of sites and build our knowledge of network performance. We have assumed that we will be able to maintain distribution losses at less than 5% of distribution input towards the end of the planning period. This target for UFW includes a small % for meter inaccuracy.

Apparent losses will not be seen until metered data becomes available so are not currently included in the plan.

We have contracted WRc to carry out an estimate of Unavoidable Annual Real Losses (UARL) with the UKWIR recommended estimates for assessing leakage in good condition networks[3], and these results have been used for the purposes of planning. There are several incumbent companies near the assessed UARL level, so this is seen as a very reasonable expectation for a new network to be maintained at. We only adopt newly constructed networks and currently do not own or operate any pipeline systems older than 1 year; as we mostly deploy pipes made from MDPE or HDPE, with quality controlled welded joints to connect pipes, we believe we can achieve low levels of leakage. To maintain this, we will regularly send teams out to visually inspect the region identifying areas of wet ground for potential leaks. We are also in the unique position of having boundary meters at the bulk supply connection and meters on all properties within the inset. This enables us to actively monitor any losses with real data rather than models of assumption. Any anomalies can be investigated and rectified. We will also look to adopt a leakage maintenance strategy as the network ages where we will use acoustic techniques to help identify and rectify leaks. As stated previously, all the sites are at an early stage of development and the connected population is initially low. Meaningful assessments of unaccounted-for supply pipe background leakage and operational usage will therefore be difficult to make until several years of operational metering data are available; in the meantime, regular monitoring of demands and trends in readings from bulk meters will continue.

The Diehl metering technology employed will provide for close management of night flows through the meters enabling the rapid identification of changes in patterns of use or potential bursts in the system. Domestic leakage can be detected by leakage alarms triggered during meter reading downloads on routine drive-by. When development on each site becomes significant, an assessment of the company's Sustainable Environmental Level of Leakage (SELL) will be undertaken as well as the impact this has on the supply/demand balance if leakage were to rise to this level.

3.4 Target Headroom

Headroom is a planning allowance that is used to provide a buffer in the forecast supply demand balance. Target Headroom is defined as follows (UKWIR 1998), "The minimum buffer that a prudent water company should allow between supply (including raw-water imports and excluding raw-water exports) and demand to cater for specified uncertainties (except those due to outages) in the overall supply-demand balance. Introducing this into the overall supply-demand balance will help to ensure that the water company's chosen level of service can be achieved."

Available headroom is the difference between demand and WAFU (the water available for use) at any given time. It will vary with time as demand increases, new supplies are brought on-line to meet increasing demand and uncertainty increases the further into the future you go. If Available Headroom is greater than or equal to Target Headroom, then the desired level of service should be achieved. If Available Headroom falls below the target value, the water company will face the risk of not achieving its stated

[3] UKWIR 2011 Managing Leakage

level of service. We have used a value of 5% for these sites which reflects uncertainty in demand.

Our headroom assumption of 5% aims to incorporate the following factors and uncertainties:

- Change of consumer behaviour due to significant risk such that more people are working from home for example e.g., pandemic
- Changes in local weather patterns such that use is different e.g., hot summers and use of hot tubs
- Housing stock water efficiency promises are not realised, or water efficient appliances are removed.

3.4.1 Effect of Climate Change

As explained earlier, an increase in target headroom resulting from climate change has not been added to our supply model, since the water is supplied by a point of connection to an incumbent water supply. However, we have looked at the incumbent's assessment of the impact of climate change in the WRZs we are taking a supply from and included their assessment in our projections. The agreed bulk supply agreements will not change because of climate change and the contracted quantities are not restricted by a change in demand, which is a consequence of climate change.

3.5 Demand Reduction Strategy

In summary, as we grow as a company, we will develop plans in the following areas to ensure we meet our target of 110l/h/d by 2050.

- Future consideration of smart metering (AMI) as communication technology matures – Introduction has the potential to reduce usage by 10%. See section 3.2.4 for our methodology.
- Leakage Management – Keeping leakage as low as possible, below 5%. See section 3.3 for our methodology.
- Consumption Strategy – made up of customer behaviour change and water efficient homes – replacing leaky loos could account for 6%, etc. This will also include supporting the Future Homes Standard through the INA. We have also started working with incumbent companies on sharing water efficiency initiatives and intend to provide our consumers with water saving devices.

This strategy is illustrated further in the schematic (Figure 3.3) below:

Figure 3.3 – Demand Reduction Strategy -

4. Details of the Water Resources Zones

4.0 Introduction

The methodology and assumptions used to construct the supply-demand balance are described in section 3. However, the balance itself is different for each WRZ and some of the values used to estimate demand also vary. The detailed supply-demand balance for each WRZ is discussed in the following sub-sections. Our WRZ's are aligned to the incumbents and can contain more than one ESPW site.

As previously discussed, all the sites discussed here are bulk supplies, with agreements made in perpetuity to ensure continuity of supply. All domestic and non-domestic properties are new and will be fully metered, with no unmetered properties.

4.1 United Utilities Strategic WRZ

Six sites are included within this water resource zone The United Utilities Strategic resource zone is assessed as having a low baseline risk, potentially increasing to medium risk if the Severn-Thames Transfer were to be implemented. This zone is the largest WRZ of United Utilities supplying 98% of its population.

4.1.1 Merchant's Wharf

4.1.1.1 Introduction

Merchant's Wharf, Salford is situated in the United Utilities region. The development is 0.46 hectares and is a high-rise development, which will have 196 properties. There will be one non-household customer on the development. The site has been assessed as having a very low flood risk, is on a brownfield site and has no environmental concerns.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.1.1. This is very close to another ESPW site, Bridgewater Wharf, which is shown at section 4.1.1.2.

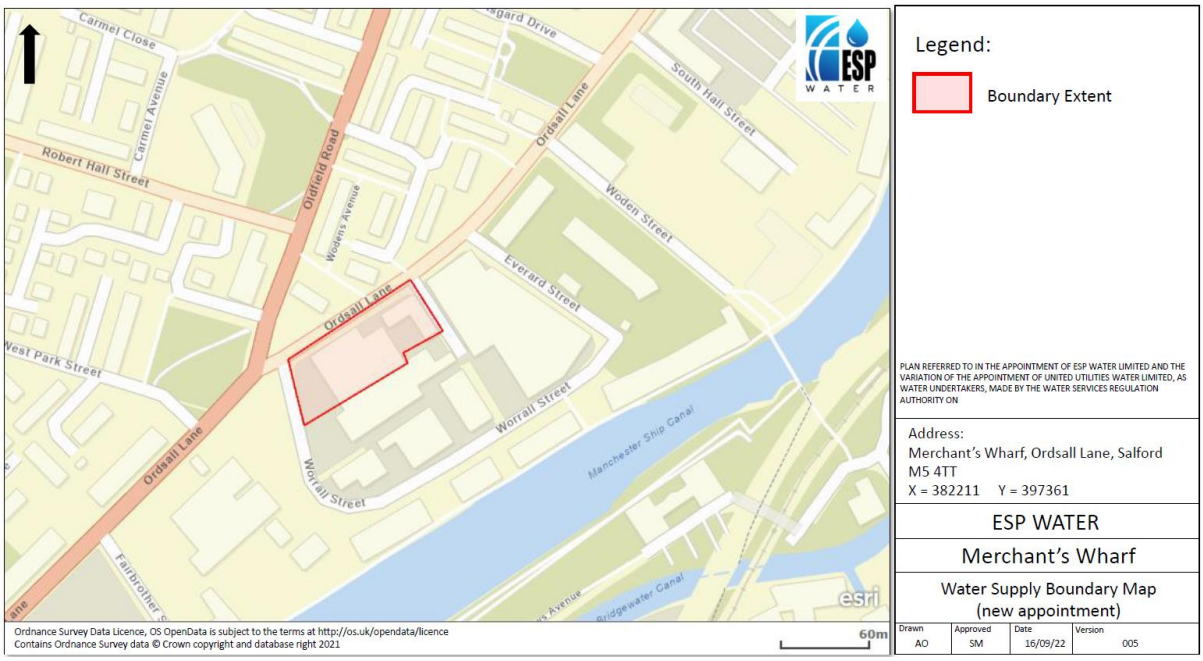


Figure 4.1.1 Location of Merchant's Wharf development

4.1.1.2 Incumbent information

The site is situated within the United Utilities region in the Strategic WRZ. Bulk supply agreements have been reached with United Utilities to supply the properties with 28105m^3/year indefinitely. United Utilities have confirmed that the receiving Wastewater Treatment Works is Salford WWTW and that they can take the FFT (Full flow to treatment). The site has separate foul and surface water networks and three SuDS (Sustainable Urban Drainage System) attenuation tanks that can hold a 1 in 100-year storm plus climate change.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.2 Bridgewater Wharf

4.1.1.2 Introduction

Bridgewater Wharf, Salford is situated in the United Utilities region. The development is 1.08 hectares and is a high-rise development, which will have 201 properties. There will be 10 non-household customers on the development. ESP only provides water services on this site. United Utilities are responsible for sewerage and surface water drainage.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the

development is shown in Figure 4.1.2. This is very close to another ESPW site, Merchant's Wharf, which is shown in section 4.1.1.1.

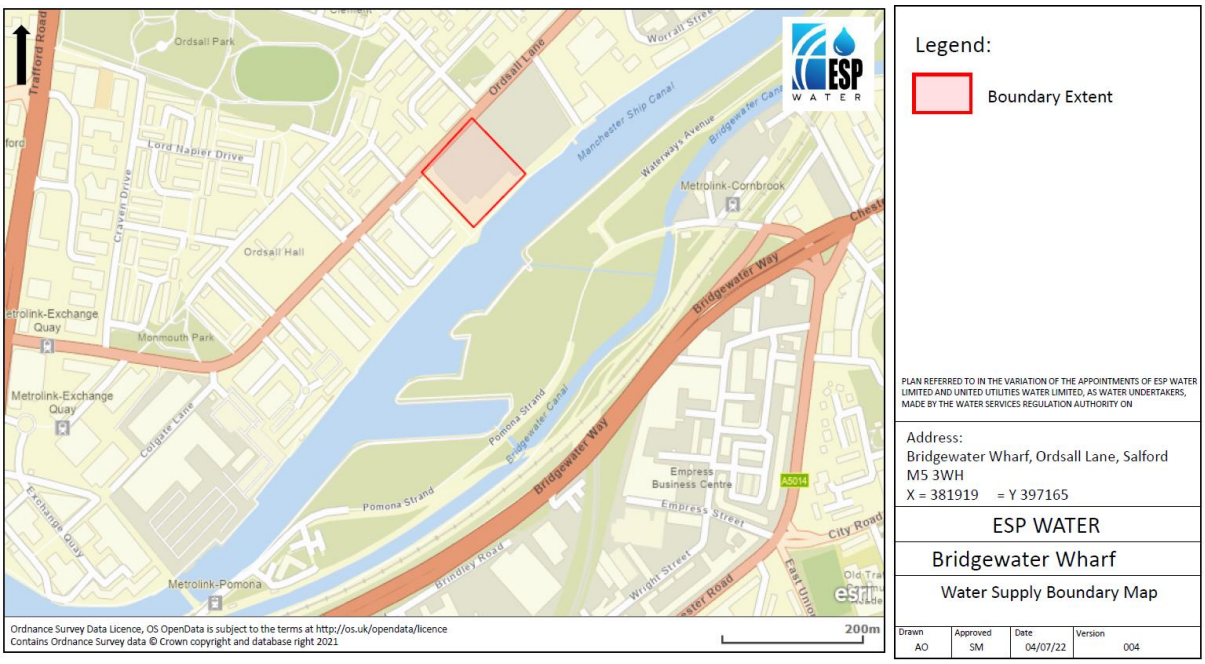


Figure 4.1.2 Location of Bridgewater Wharf development

4.1.2.2 Incumbent information

The site is situated within the United Utilities region in the Strategic WRZ. Bulk supply agreements have been reached with United Utilities to supply the properties with 52493 m^3/year indefinitely.

As described previously, our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.3 Bhailok Court

4.1.3.1 Introduction

Bhailok Court, Preston is situated in the United Utilities region. The development is 0.18 hectares and is a residential development will have 200 properties. There will be 4 non-household customers on the development. The site has been assessed as having a very low flood risk, is on a brownfield site and has no environmental concerns.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.1.3.

Figure 4.1.3 Location of Bhailok Court development

4.1.3.2 Incumbent information

The site is situated within the United Utilities region in the Strategic WRZ. Bulk supply agreements have been reached with United Utilities to supply the properties with 26346 m^3/year indefinitely. United Utilities have confirmed that the receiving Wastewater Treatment Works is Leyland WWTW and that they can take the FFT (Full flow to treatment). The site has separate foul and surface water networks and one SuDS attenuation tanks can hold a 1 in 100-year storm plus climate change.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.4 Varsity Quarter

4.1.4.1 Introduction

Varsity Quarter, Manchester is situated in the United Utilities region. The development is 7.54 hectares and is a residential development, which will have 224 properties. There are no non-household customers on the development following an old college being demolished. The site has been assessed as having a very low flood risk, is on a brownfield site and has no environmental concerns.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.1.4.

Figure 4.1.4 Location of Varsity Quarter development

4.1.4.2 Incumbent information

The site is situated within the United Utilities region in the Strategic WRZ. Bulk supply agreements have been reached with United Utilities to supply the properties with 41029 m^3/year indefinitely. United Utilities have confirmed that the receiving Wastewater Treatment Works is Davyhulme WWTW and that they can take the FFT (Full flow to treatment). The site has a separate foul and surface water networks and a surface water pumping wet well that pumps into the incumbent's surface water network. Some properties also have soak aways.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.5 Sydney Road

4.1.5.1 Introduction

Sydney Road, Crewe is situated in the United Utilities region. The development is 12 hectares and is a residential development will have 146 properties. There are no non-household customers on the development. The site is a greenfield site and is a water only site. United Utilities are responsible for sewerage on this site.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.1.5.

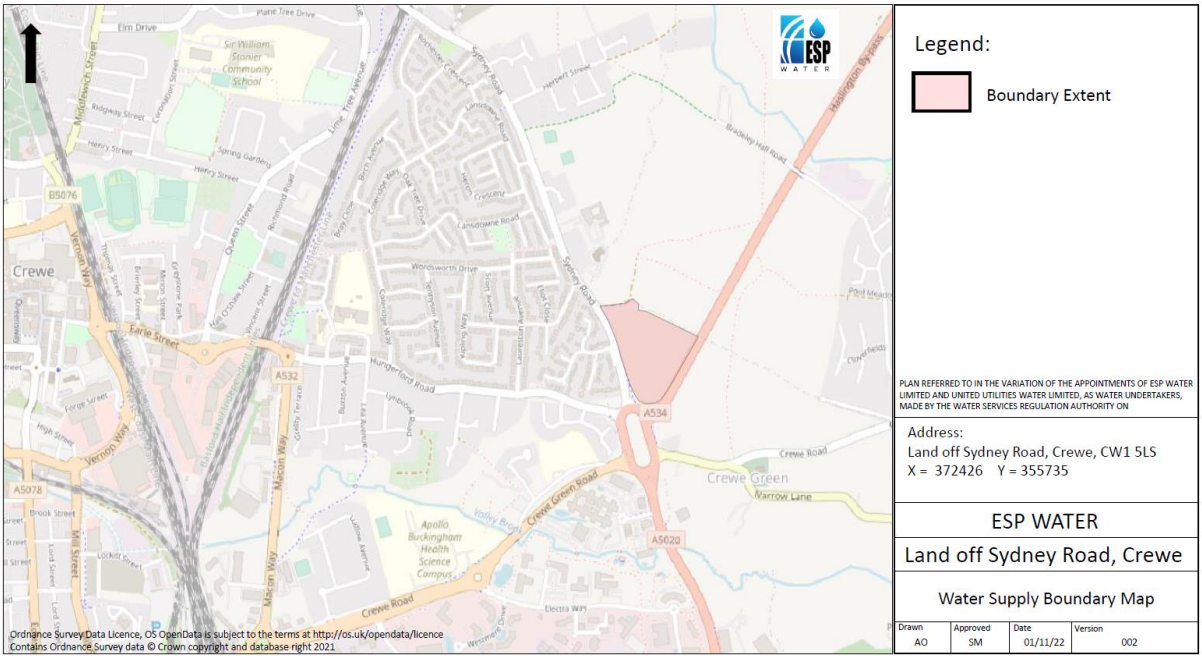


Figure 4.1.5 Location of Sydney Road development

4.1.1.2 Incumbent information

The site is situated within the United Utilities region in the Strategic WRZ. Bulk supply agreements have been reached with United Utilities to supply the properties with 28506 m^3/year indefinitely.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.6 Southport Road

4.1.6.1 Introduction

Southport Road, Thornton is situated in the United Utilities region. The development is 4 hectares and is a residential development will have 206 properties. There is no non-household customer on the development. This is a water only site. United Utilities are responsible for sewerage on this site.

The new network will consist of new polyethylene (PE) pipes and, in line with government policy, all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.1.6.

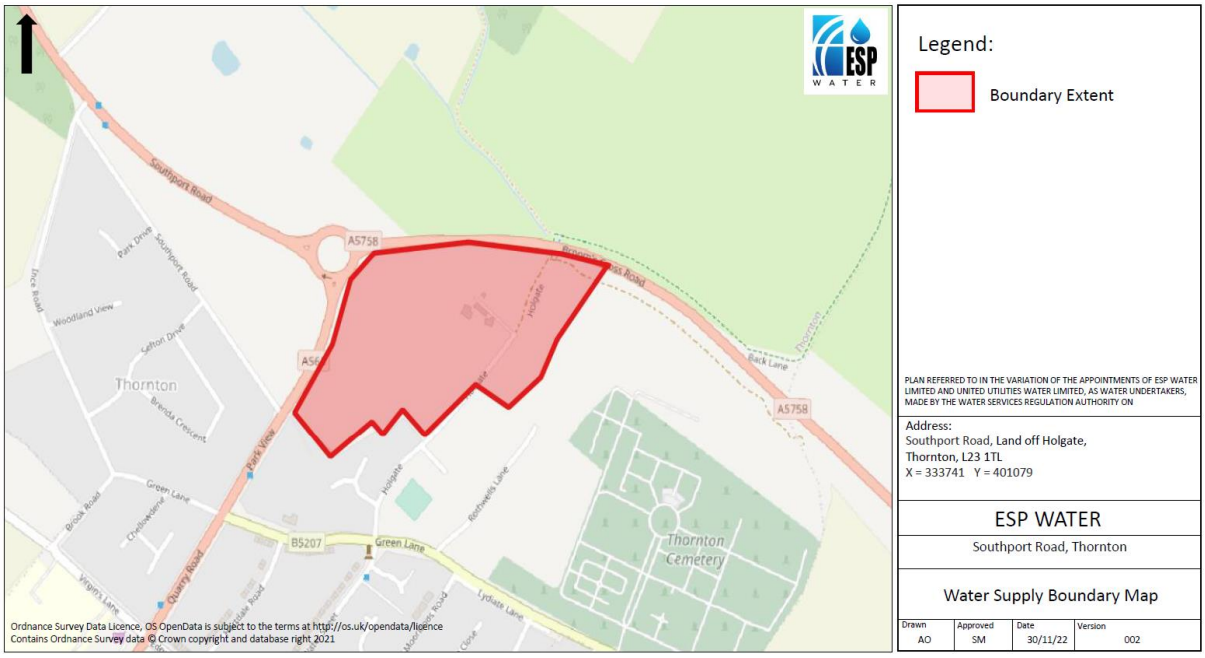


Figure 4.1.6 Location of Southport Road development

4.1.1.2 Incumbent information

The site is situated within the United Utilities region in the Strategic Resource Zone. Bulk supply agreements have been reached with United Utilities to supply the properties with 40301 m^3/year indefinitely.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as United Utilities and are shown in Table 2.5. A Drinking Water Safety Plan (DWSP) has been developed for the site and there are no known significant water quality issues in the area.

4.1.2 Property Details

The overall distribution of properties in the UU-Strategic WRZ are shown below in Table 4.1.1. Specific details for sites are provided in the following sections.

Table 4.1.1 United Utilities-Strategic WRZ Property Types

Property Type	Number – Six sites	Estimated Occupancy
1 Bed	398	2
2BF/2BT	325	3
2BS/2BD/3BT/3BF	194	3
3BS/2BB	91	4
3BD/3BB	185	4
4BD/4BT/4BS	155	5
5BD/5BS/6BD	0	6

*B-Bed, BB- Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 4232 people with an average PCC of around 120l/h/d. This independent estimation is made based on the stated water efficiency targets by the developers and the expected occupancy of the properties.

4.1.2.1 Merchant's Wharf Property Details

The development will contain 196 properties and is forecast to be completed in 2024. Properties have not been constructed to the reduced 110l/h/d standard, so in line with buildings regulations are 125l/h/d.

4.1.2.2 Bridgewater Wharf Property Details

The development will contain 376 properties and is forecast to be completed in 2024. Properties have not been constructed to the reduced 110l/h/d standard, so in line with buildings regulations are 125l/h/d.

4.1.2.3 Bhailok Court Wharf Property Details

The development will contain 200 properties and is forecast to be completed in 2027. Properties have not been constructed to the reduced 110l/h/d standard, so in line with buildings regulations are 125l/h/d.

4.1.2.4 Varsity Quarter Wharf Property Details

The development will contain 224 properties and is forecast to be completed in 2027. Properties have been constructed to the reduced 110l/h/d standard although this will need to be verified once data is collected.

4.1.2.5 Sydney Road Property Details

The development will contain 146 properties and is forecast to be completed in 2027. Properties have not been constructed to the reduced 110l/h/d standard, so in line with buildings regulations are 125l/h/d.

4.1.2.6 Southport Road Property Details

The development will contain 206 properties and is forecast to be completed in 2027. Properties have not been constructed to the reduced 110l/h/d standard, so in line with buildings regulations are 125l/h/d.

4.1.3 Supply Demand Balance

As previously documented, this WRZ currently consists of six sites. The 1348 domestic properties have been calculated to require 504.28m^3/day with an additional 3m^3/day for the 15 non-household properties. The bulk supply agreements with United Utilities provides 593.92m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[4] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet for each site. This estimate will be refined when customers move into the properties and average

[4] UKWIR Managing Leakage 2011

pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the sites.

No assumptions have currently been made with regards to void properties, however if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.1.2. This is also shown graphically in figure 4.1.7. Values shown in the table are shown to decimal places, resulting in a 0.01m^3/day discrepancy.

Table 4.1.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	593.92
Domestic Consumption	505.29
Non-domestic Consumption	3.00
Leakage	7.54
Other demand	0.00
Headroom	25.41
Total	**+52.68**

As the network ages, we will closely monitor leakage to ensure it doesn't increase, using the incumbent inlet meter and individual property metering. Also, two of the developments consist of multi occupancy buildings with short lengths of mains pipe feeding the building; therefore, any leakage is expected to be low. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Due to the nature of the properties, there are no expectations of significantly increased demand due to climate change in this plan. Supply and demand have been forecast up until 2050 as shown below with a target reduction of PCC to 110l/h/d by 2050.

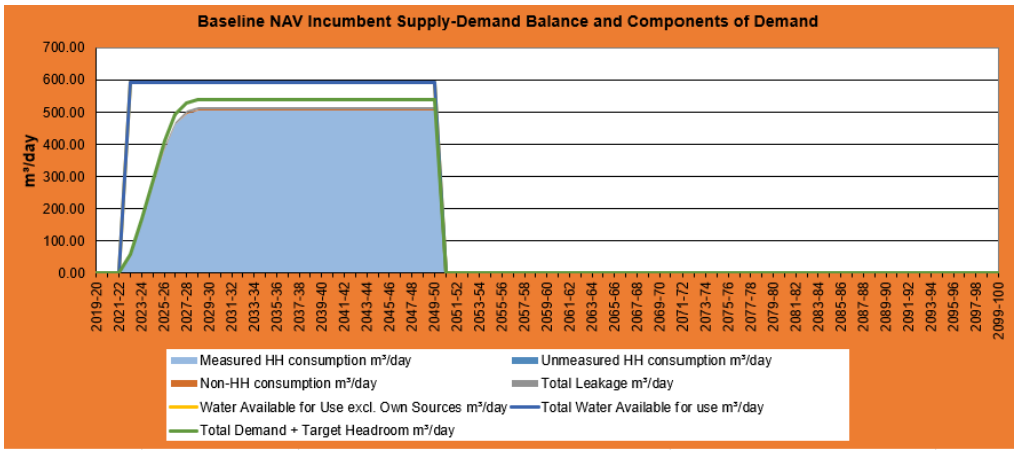


Figure 4.1.7 Preliminary Supply Demand Balance

4.2 Yorkshire Water Grid WRZ

Six sites are included here within this water resource zone, The Yorkshire Water Grid (YW-Grid) Resource Zone does have a forecast deficit below headroom, however we are confident that Yorkshire Water's proposed transfer from Northumbrian Water will address this issue.

4.2.1 Sylvester Street

4.2.1.1 Introduction

Sylvester Street is situated in central Sheffield in the Yorkshire Water Region. The development is 0.65 hectares and is mid-construction and will have 335 domestic properties consisting of flats. There will be one non-household property on the development. It is a brownfield site with one portion of the site being assessed as having a high surface water flood risk. However onsite surface water drainage and storage has been put in place to mitigate this risk. There are no other environmental concerns.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.1.

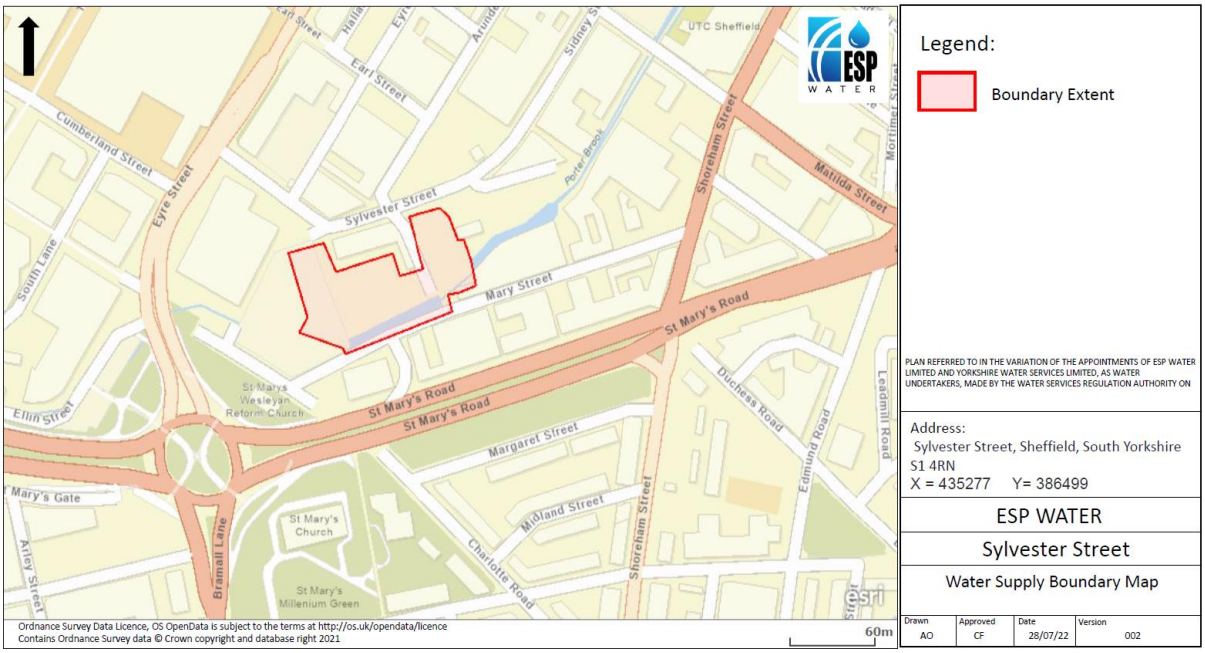


Figure 4.2.1 Location of Sylvester Street development

4.2.1.2 Incumbent information

The site is situated within Yorkshire Water's region in the J793 DMA. Bulk supply agreements have been reached with Yorkshire Water to supply the properties with

34,352m^3/year indefinitely. The downstream wastewater treatment works is Blackburn Meadows STW, and no issues are expected due to the new development.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.2 Latitude Purple

4.2.2.1 Introduction

Latitude Purple is situated in central Leeds in the Yorkshire Water Region. It is in the same area as the Latitude Blue and Springwell Gardens sites. The development is 0.53 hectares and is mid-construction and will have 463 domestic properties consisting of flats. There will be 2 non-household properties on the development. It is a brownfield site and is assessed as having a low surface water and river flood risk. The site will have separate foul and surface water networks with the latter flowing into an attenuation tank before discharging to a water course.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.2.

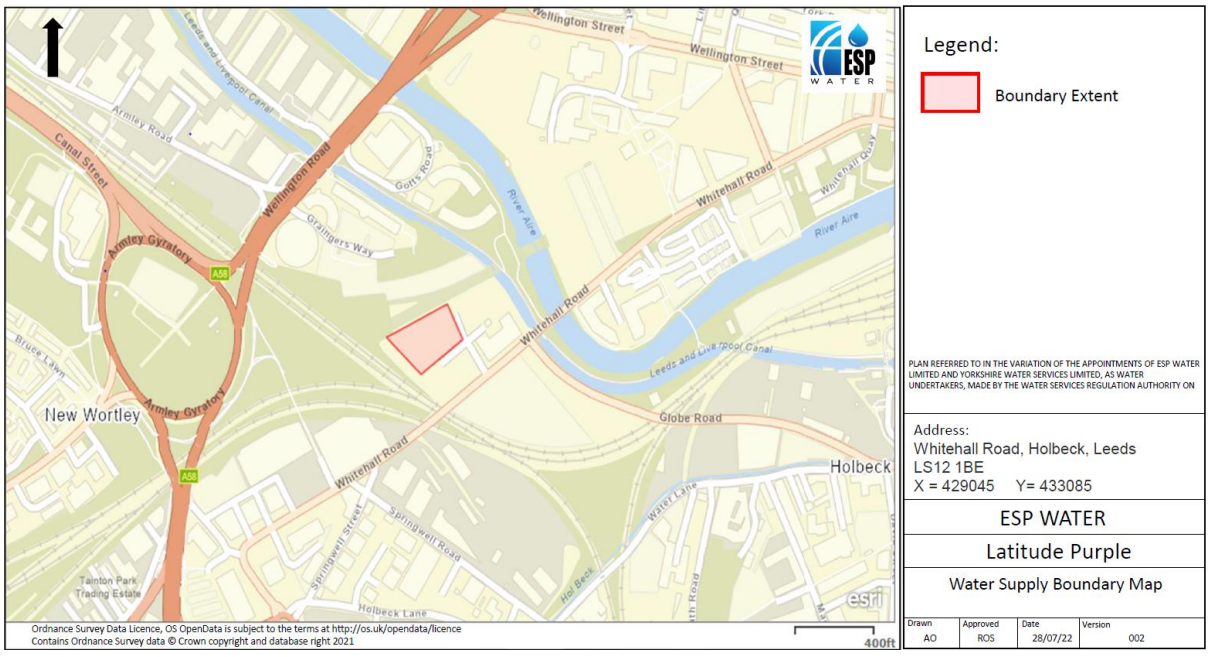


Figure 4.2.2 Location of Latitude Purple development

4.2.1.2 Incumbent information

The site is situated within Yorkshire Water's region in the J793 DMA. Bulk supply agreements have been reached with Yorkshire Water to supply the properties with 43,827m^3/year indefinitely. The downstream wastewater treatment works is Knostrop Low Level STW, and no issues are expected due to the new development.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.3 Halifax Road

4.2.3.1 Introduction

Halifax Road is situated in Penistone in the Yorkshire Water Region. The development is 15 hectares on a greenfield site, is mid-construction and will have 400 domestic properties. There will be one no non-household properties on the development. ESP is only responsible for water services on this site. The sewerage is the responsibility of Yorkshire Water.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.3.

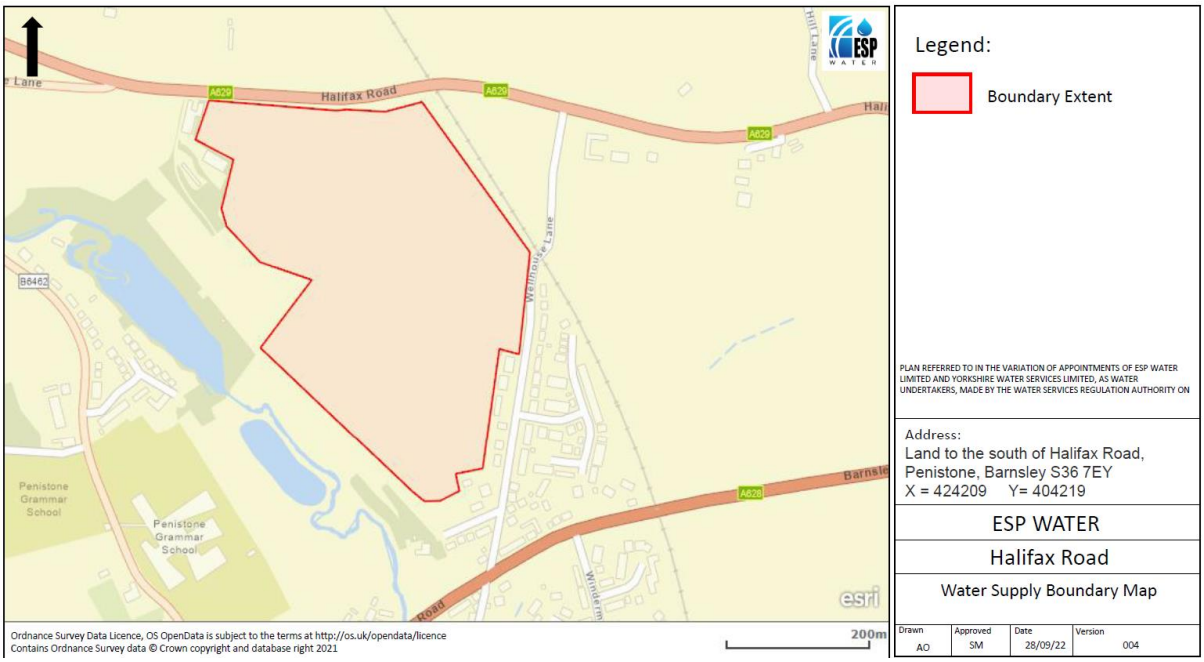


Figure 4.2.3 Location of Halifax Road development

4.2.3.2 Incumbent information

The site is situated within Yorkshire Water's region and Bulk supply agreements have been reached with Yorkshire Water to supply the properties with 73,358m^3/year indefinitely.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.4 Springwell Gardens

4.2.4.1 Introduction

Springwell Gardens is situated in central Leeds in the Yorkshire Water Region. It is in the same area as the Latitude Purple and Latitude Blue sites. The development is 0.43 hectares and is mid-construction and will have 224 domestic properties consisting of flats. There will be 2 non-household properties on the development. It is a brownfield site with a low flood risk and separate foul and surface water drainage networks. There are no other environmental concerns.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.4.

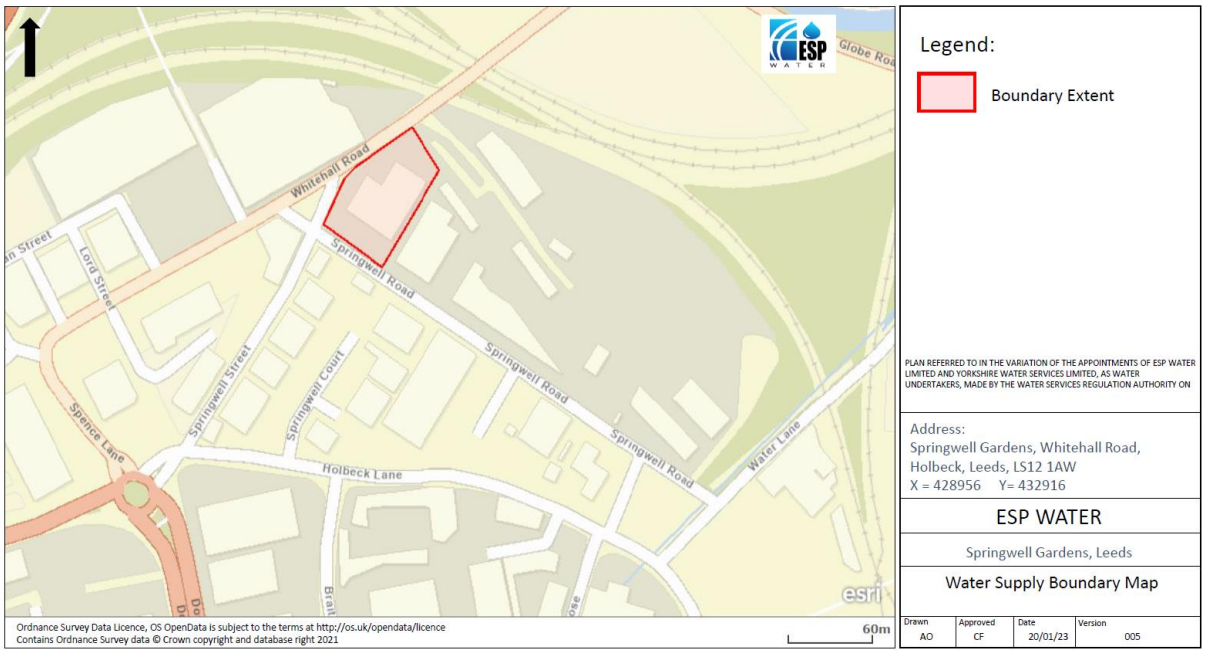


Figure 4.2.4 Location of Springwell Gardens development

4.2.4.2 Incumbent information

The site is situated within Yorkshire Water's region in Leeds. Bulk supply agreements have been reached with Yorkshire Water to supply the properties with 29809m^3/year indefinitely. The downstream wastewater treatment works is Knostrop Low Level STW, and no issues are expected due to the new development.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.5 Latitude Blue

4.2.5.1 Introduction

Latitude Blue is situated in central Leeds in the Yorkshire Water Region. It is in the same area as the Latitude Purple site and Springwell Gardens. The development is 0.4 hectares and is mid-construction and will have 488 domestic properties consisting of flats. There will be one non-household property on the development. It is a brownfield site with a low risk of surface water flood risk. The site has separate foul and surface water drainage networks. There are no other environmental concerns.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.5.

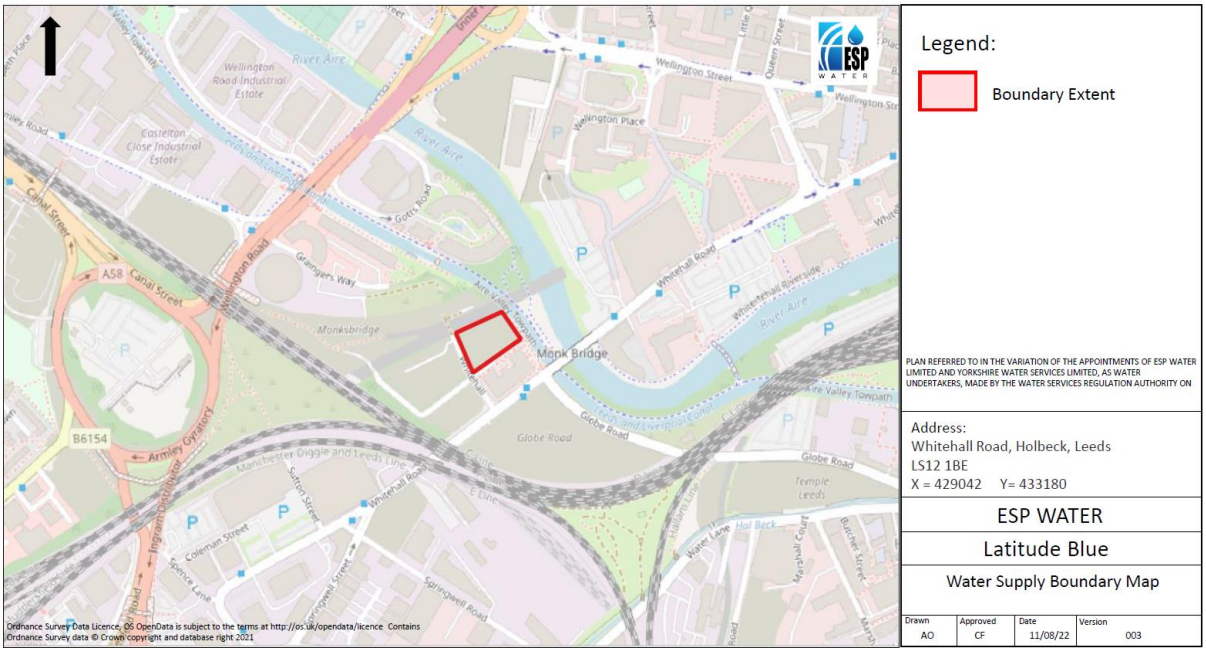


Figure 4.2.5 Location of Latitude Blue development

4.2.5.2 Incumbent information

The site is situated within Yorkshire Water's region in Leeds. Bulk supply agreements have been reached with Yorkshire Water to supply the properties with 54,974m^3/year indefinitely. The downstream wastewater treatment works is Knostrop Low Level STW, and no issues are expected due to the new development.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.6 Back Lane

4.2.6.1 Introduction

Back Lane is situated in Sowerby in the Yorkshire Water Region. The development is 2 hectares and is mid-construction and will have 64 domestic properties. There will be no non-household properties on the development. It is a brownfield site and is low risk for surface water and river flooding. There are no other environmental concerns.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.2.6.

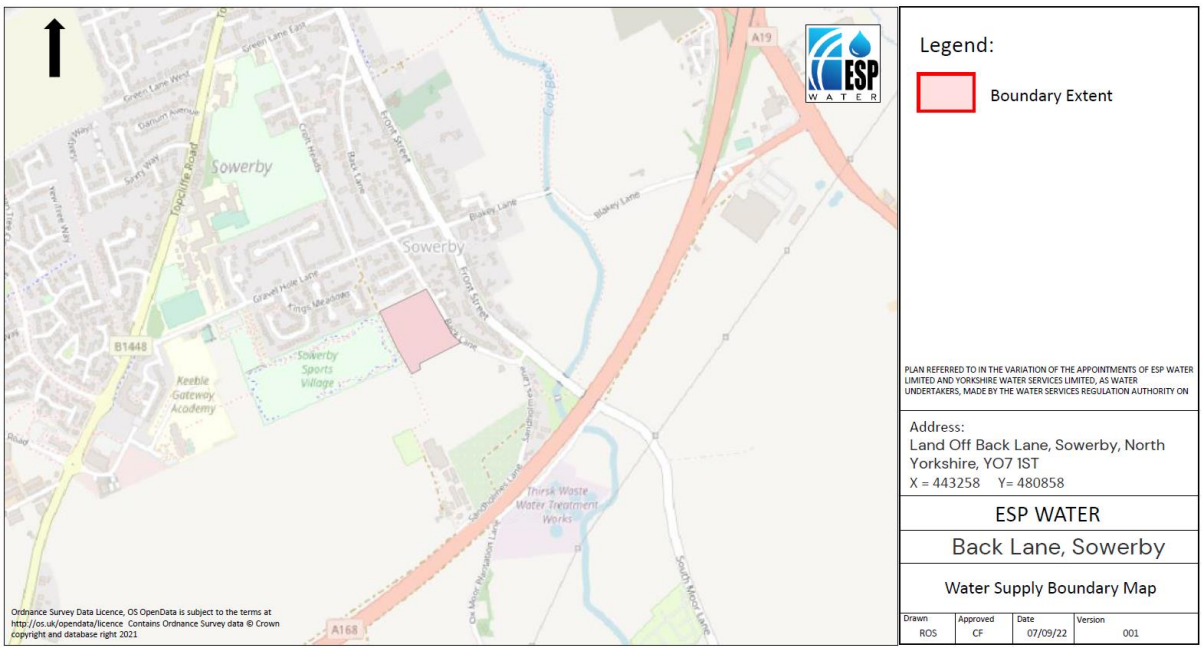


Figure 4.2.6 Location of Back Lane development

4.2.6.2 Incumbent information

The site is situated within Yorkshire Water's region. Bulk supply agreements have been reached with Yorkshire Water to supply the properties with 13200m^3/year indefinitely. The downstream wastewater treatment works is Sowerby STW, and no issues are expected due to the new development.

As described previously our levels of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Yorkshire Water and are shown in Table 2.6. A DWSP has been developed for this site and there are no known water quality issues in the area.

4.2.2 Property Details

The overall distribution of properties in the YW-Grid resource zone are shown below in Table 4.2.1. Specific details for sites are provided in the following sections.

Table 4.2.1 Yorkshire Water Grid Property Types

Property Type	Number – Six sites	Estimated Occupancy
1 Bed	832	2
2BF/2BT	591	3
2BS/2BD/3BT/3BF	187	3
3BS/2BB	31	4
3BD/3BB	149	4
4BD/4BT/4BS	184	5
5BD/5BS/6BD	0	6

*B-Bed, BB- Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 5638 people with an average PCC of 112l/h/d and a total customer demand of 223570m^3/yr.

4.2.2.1 Sylvester Street Property Details

The development will contain 335 properties and will be constructed by 2024. Properties have been constructed to the 110l/h/d standard which has been used for estimating consumption. There is additionally one commercial property on the site.

4.2.2.2 Latitude Purple Property Details

The development will contain 463 properties and will be constructed by 2024. Properties have been constructed to the 110l/h/d standard, which has been used for estimating consumption. There are additionally two commercial properties on the site.

4.2.2.3 Halifax Road Property Details

The development will contain 400 properties and will be fully constructed by 2028. Properties have been constructed to the 110l/h/d standard, which has been used for estimating consumption.

4.2.2.4 Springwell Gardens Property Details

The development will contain 224 properties and is being constructed in FY 23/24. Properties have been constructed to the 125l/h/d standard, which has been used for estimating consumption. There are two commercial properties on the site.

4.2.2.5 Latitude Blue Property Details

The development will contain 488 properties and is being constructed in FY 23/24. Properties have been constructed to the 110l/h/d standard which has been used for estimating consumption. There is additionally one commercial property on the site.

4.2.2.6 Back Lane Property Details

The development will contain 64 properties and will be constructed by 2025. Properties have been constructed to the 110l/h/d standard, which has been used for estimating consumption.

4.2.3 Supply Demand Balance

As previously documented, this resource zone currently consists of six developments The 1974 domestic properties have been calculated to require 614.99m^3/day with an additional 1.2m^3/day for the 6 non-domestic property. The bulk supply agreement with Yorkshire Water provides 683.62m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[5] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.2.2. This is also shown graphically in figure 4.2.7.

Table 4.2.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	683.62
Domestic Consumption	612.52
Non-domestic Consumption	1.2
Leakage	9.94
Other demand	0.00
Headroom	30.69
Total	**+ 29.27**

[5] UKWIR Managing Leakage 2011

As the network ages, leakage will be closely monitored using the incumbent inlet meter and individual property metering to ensure it does not increase. Also, three developments consist of multi occupancy buildings with short lengths of mains pipe feeding the building; therefore, any leakage is expected to be low. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Due to the nature of the properties, there is no expectation of significantly increased demand due to climate change. Supply and demand have been forecast up until 2050 as shown below.

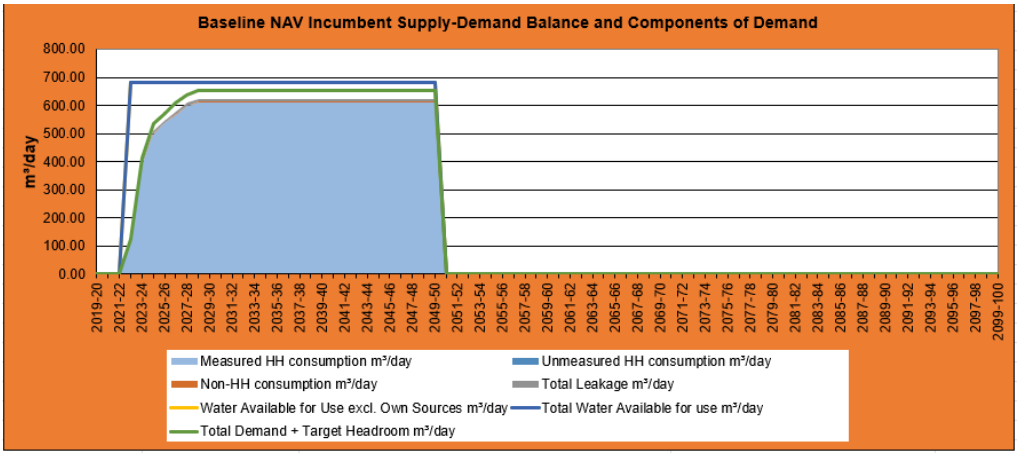


Figure 4.2.7 Preliminary Supply Demand Balance

4.3 Northumbrian Water – Kielder WRZ

Only one ESPW site is currently inside this resource zone. Northumbrian Water's Kielder resource zone has a large, predicted surplus up to 2050, so no resource constraints are foreseen throughout the current planning period or going forward.

4.3.1 Bracks Farm

4.3.1.1 Introduction

Bracks Farm is situated Bishops Auckland, between Durham and Darlington in the Northumbrian Water Region. The development is 10.8 hectares and is still in the early stages of construction and will have 201 houses when completed. There will be no commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.3.1.

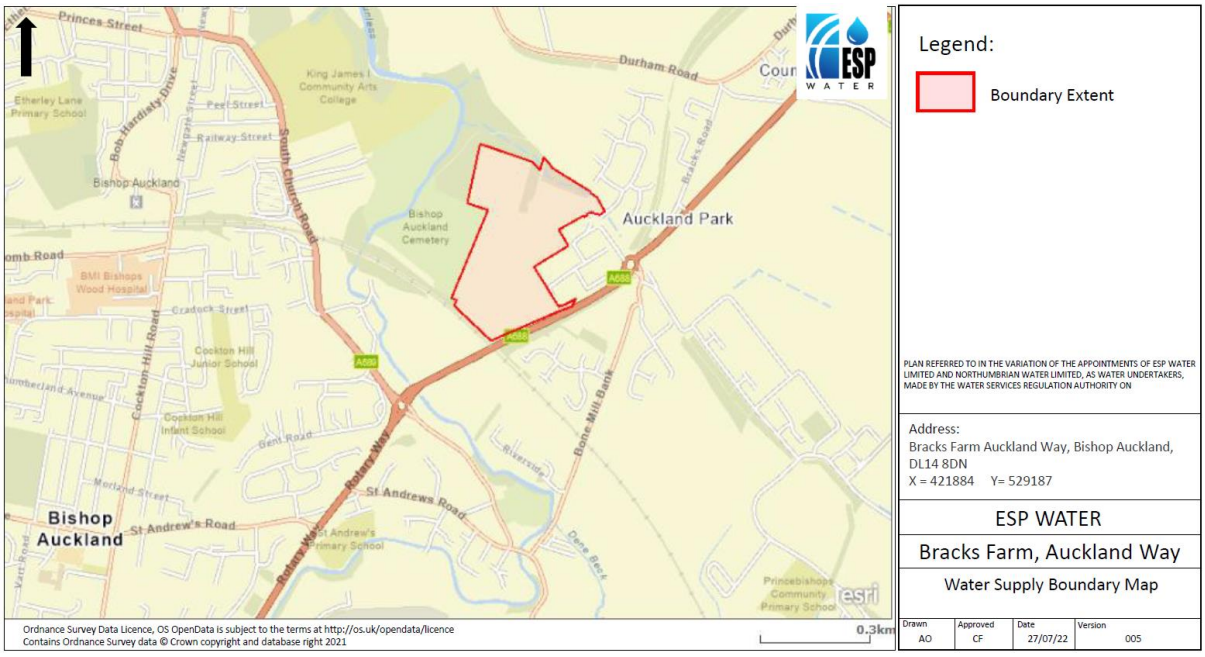


Figure 4.3.1 Location of Bracks Farm development

4.3.1.2 Incumbent information

Bulk supply agreements have been reached with Northumbrian Water to supply the properties with 36,599m^3/year indefinitely. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Northumbrian Water's level of service and are shown in Table 2.7.

4.3.2 Burdon Lane

4.3.2.1 Introduction

Burdon Lane is situated in Sunderland in the Northumbrian Water Region. The development is 50 hectares and is still in the early stages of construction and will have 950 houses when completed. There will be 4 commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified. There are separate foul and surface water drainage networks and two discharge points for the surface water via attenuation tanks.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.3.2.

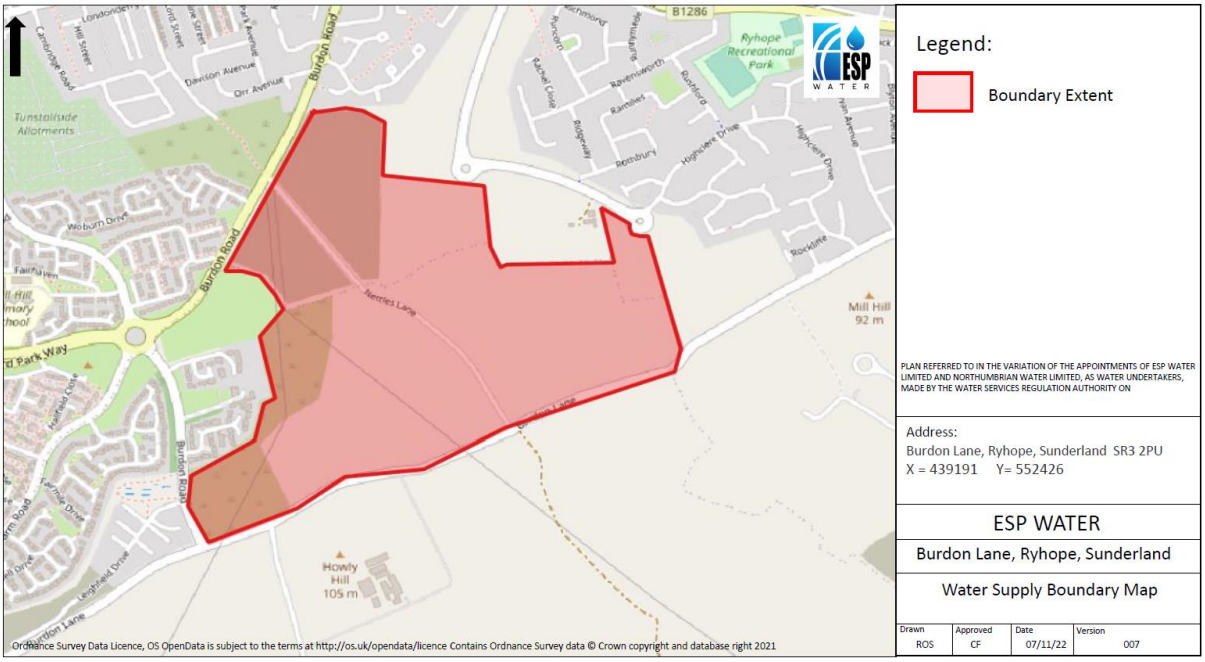


Figure 4.3.2 Location of Burdon Lane development

4.3.2.2 Incumbent information

Bulk supply agreements have been reached with Northumbrian Water to supply the properties with 207257m^3/year indefinitely. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Northumbrian Water's level of service and are shown in Table 2.7.

4.3.3 Property Details

The overall distribution of properties in the NWL Kielder WRZ are shown below in Table 4.3.1. Specific details for sites are provided in the following sections.

Table 4.3.1 Northumbrian Water – Kielder WRZ Property Types

Property Type	Number – Two sites	Estimated Occupancy
1 Bed	0	2
2BF/2BT	0	3
2BS/2BD/3BT/3BF	134	3
3BS/2BB	396	4
3BD/3BB	57	4
4BD/4BT/4BS	438	5
5BD, 5BS, 6BD	126	6

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 5160 people with an average PCC of 107l/h/d and a total customer demand of 197885m^3/yr.

4.3.2.1 Bracks Farm Property Details

The development will contain 201 properties and is due for completion in 2027. Properties have been constructed to the 125l/h/d standard, however due to the distribution of property types the estimated PCC is predicted to be lower at 111l/h/d.

4.3.2.2 Burdon Lane Property Details

The development will contain 950 properties and is due for completion in 2029. Properties have been constructed to the 125l/h/d standard, however due to the distribution of property types the estimated PCC is predicted to be lower at 104l/h/d.

4.3.3 Supply Demand Balance

As previously documented, this resource zone currently consists of two developments. The 1151 domestic properties have been calculated to require 542.2m^3/day with 4 non-household properties. The bulk supply agreement with Northumbrian Water provides 668.1m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[6] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

[6] UKWIR Managing Leakage 2011

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.3.2. This is also shown graphically in figure 4.3.3.

Table 4.3.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	668.10
Domestic Consumption	542.15
Non-domestic Consumption	0.8
Leakage	7.01
Other demand	0
Headroom	27.15
Total	**+90.99**

As the network ages, leakage will be monitored closely using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Both developments are expected to use less than 110l/h/d, so we have not assumed any further reductions through water efficiency measures. Supply and demand have been forecast up until 2050 as shown below.

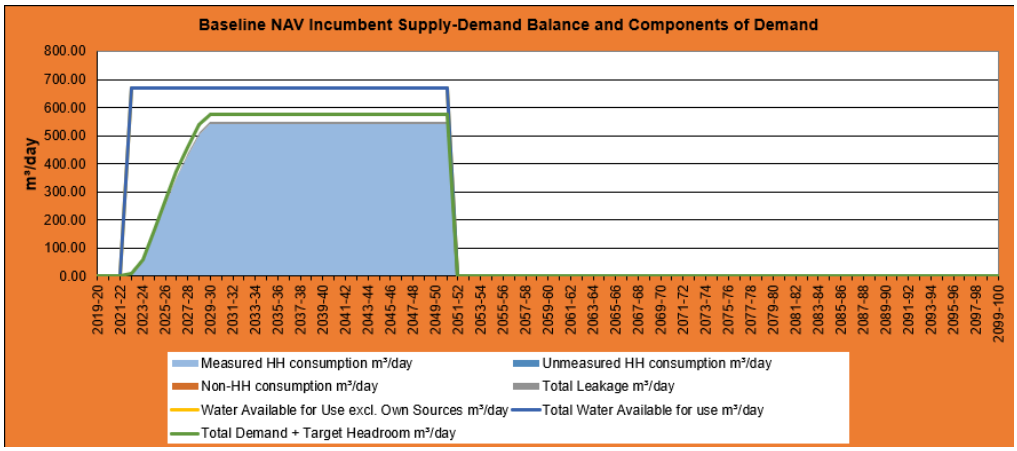


Figure 4.3.3 Preliminary Supply Demand Balance

4.4 Severn Trent Water – Shelton WRZ & Strategic Grid WRZ

Shelton WRZ

ESPW has five sites in the Severn Trent Water region with two developments being within Severn Trent's Shelton WRZ. This WRZ is restricted by availability of water in Shropshire and Severn Trent Water are planning schemes to support supplies in this region.

4.4.1 Wrottesley Park

4.4.1.1 Introduction

Wrottesley Park is situated in Perton, in the Severn Trent Water Region. The development is 8.43 hectares and is still in the early stages of construction and will have 220 houses when completed. There will be no commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.4.1.

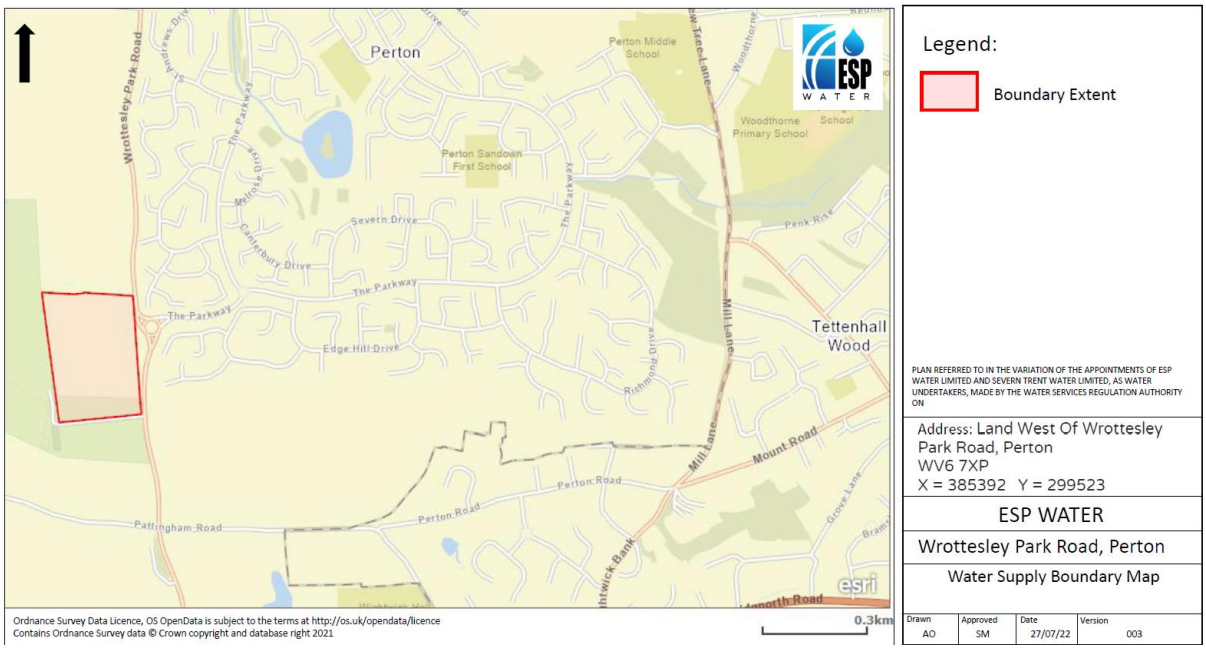


Figure 4.4.1 Location of Wrottesley Park development

4.4.1.2 Incumbent information

Bulk supply agreements have been reached with Severn Trent Water to supply the properties with 33884m^3/year indefinitely. Severn Trent Water has confirmed the downstream wastewater treatment works to be Barnhurst STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Severn Trent Water's level of service and are shown in Table 2.8.

4.4.2 Station Road

4.4.2.1 Introduction

Station Road is situated in Newport, in the Severn Trent Water Region. The development is 13.1 hectares and is still in the relatively early stages of construction and will have 301 houses when completed. There are currently no commercial users of water on the site but there are plans for a second phase to this development to include a care home. The site has been assessed as having a very low flood risk except where the SuDS basin is to be constructed and has a separate foul and surface water drainage network. No other environmental concerns have been identified.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.4.2.

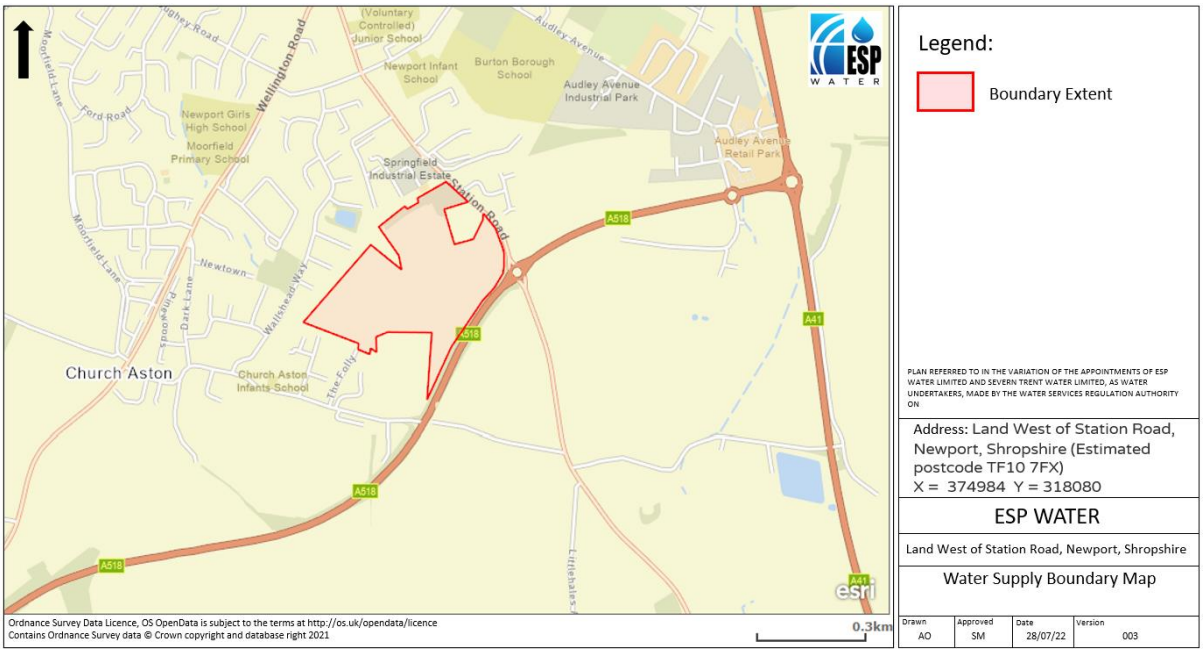


Figure 4.4.2 Location of Station Road development

4.4.2.2 Incumbent information

Bulk supply agreements have been reached with Severn Trent Water to supply the properties with 55692m^3/year indefinitely. Severn Trent Water has confirmed the downstream wastewater treatment works to be Newport STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Northumbrian Water's level of service and are shown in Table 2.8.

4.4.2 Property Details

The overall distribution of properties in the STW Shelton water resource zone are shown below in Table 4.4.1. Specific details for sites are provided in the following sections.

Table 4.4.1 Severn Trent Water – Shelton WRZ Property Types

Property Type	Number – Two sites	Estimated Occupancy
1 Bed	10	2
2BF/2BT	21	3
2BS/2BD/3BT/3BF	145	3
3BS/2BB	149	4
3BD/3BB	33	4
4BD/4BT/4BS	151	5
5BD/5BS/6BD	12	

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 521 people with an average PCC of 112l/h/d and a total customer demand of 81792m^3/yr.

4.4.2.1 Wrottesley Park Property Details

The development will contain 220 properties and is due for completion in 2027. Properties have been constructed to the 110l/h/d standard.

4.4.2.1 Station Road Property Details

The development will contain 301 properties and is due for completion in 2028. Properties have been constructed to the 110l/h/d standard.

4.4.3 Supply Demand Balance

As previously documented, this resource zone currently consists of two developments. The 521 domestic properties have been calculated to require 224.09m^3/day with no non-household properties. The bulk supply agreement with Severn Trent Water provides 245.41m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[7] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand

[7] UKWIR Managing Leakage 2011

surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.4.2. This is also shown graphically in figure 4.3.2.

Table 4.4.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	245.41
Domestic Consumption	224.09
Non-domestic Consumption	0.00
Leakage	1.715
Other demand	0.00
Headroom	11.20
Total	**+8.41**

As the network ages, leakage will be monitored closely using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. As the properties in these properties have been designed to achieve a 110 l/h/d we are not predicting a further reduction in consumption although this will be monitored. Supply and demand have been forecast up until 2050 for the whole Severn Trent Water region in a later diagram.

Strategic Grid WRZ

ESPW has five sites in the Severn Trent Water region with three developments being within Severn Trent's Strategic Grid WRZ. This WRZ supplies most Severn Trent Water customers and is within a water stressed area.

4.4.3 Bromyard Road

4.4.3.1 Introduction

Bromyard Road is situated in Worcester, in the Severn Trent Water Region. The development is 4.5 hectares and is still in the early stages of construction and will have 120 houses when completed. There will be no commercial users of water in the area. There will be separate foul and surface water drainage networks. It is a greenfield site with a low flood risk. No other environmental concerns have been identified.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.4.3.

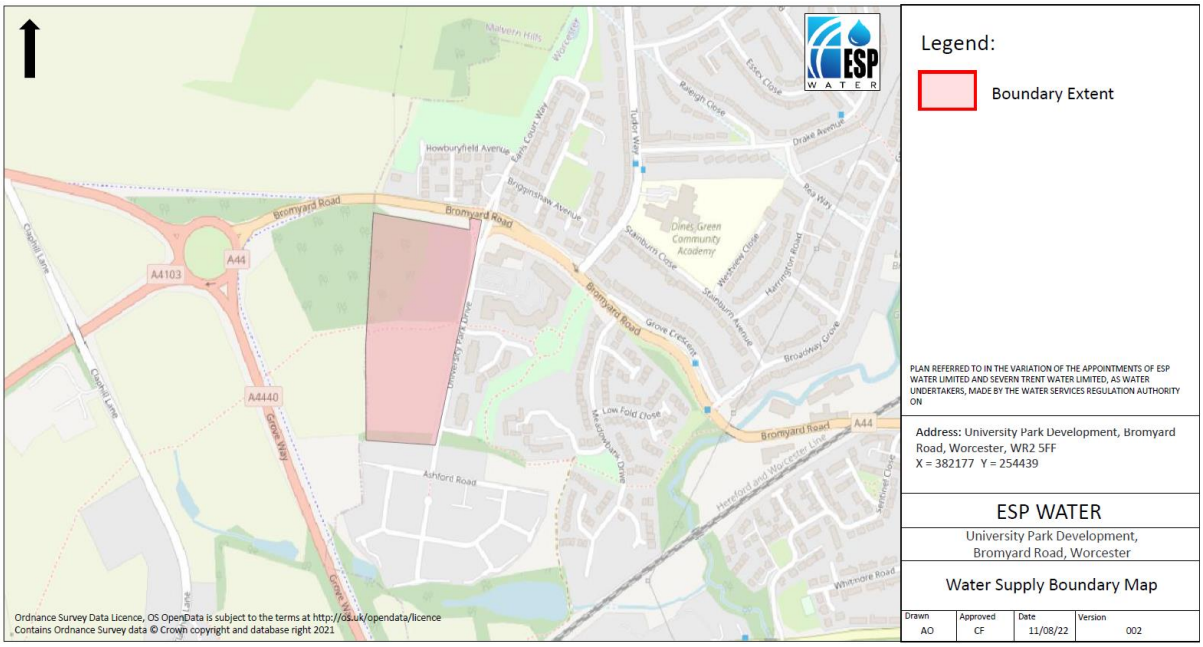


Figure 4.4.3 Location of Bromyard Road development

4.4.3.2 Incumbent information

Bulk supply agreements have been reached with Severn Trent Water to supply the properties with 18754m^3/year indefinitely. Severn Trent Water has confirmed the downstream wastewater treatment works to be Worcester Bromwich Road STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Severn Trent Water's level of service and are shown in Table 2.8.

4.4.4 Whitford Road

4.4.4.1 Introduction

Whitford Road is situated in Bromsgrove, in the Severn Trent Water Region. The development is 17.3 hectares and is still in the early stages of construction and will have 370 houses when completed. There will be two commercial users of water in the area. There will be a separate foul and surface water drainage network, with latter draining into a SuDS feature before discharging to a water course. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.4.4.

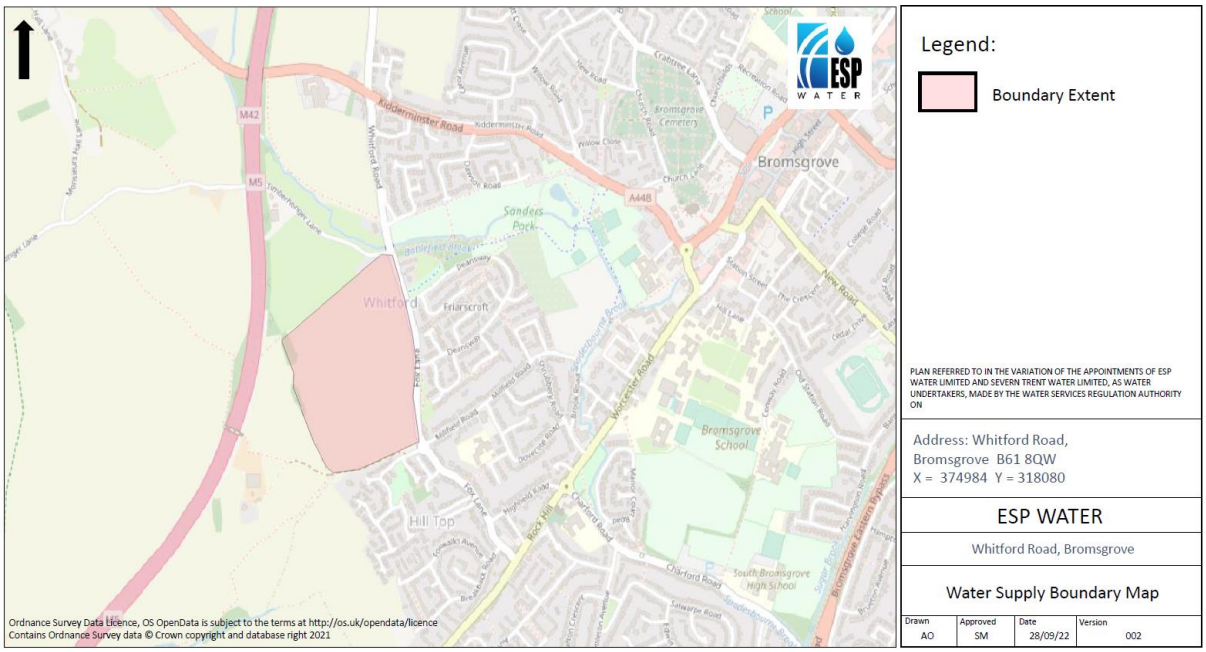


Figure 4.4.4 Location of Whitford Road development

4.4.4.2 Incumbent information

Bulk supply agreements have been reached with Severn Trent Water to supply the properties with 50158m^3/year indefinitely. Severn Trent Water has confirmed the downstream wastewater treatment works to be Bromsgrove STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Severn Trent Water's level of service and are shown in Table 2.8.

4.4.5 New Garden Square

4.4.5.1 Introduction

New Garden Square is situated in Birmingham, in the Severn Trent Water Region. The development is 1.1 hectares and is a high-rise development consisting of three blocks. It is still in the early stages of construction and will have 398 flats when completed. There will be two commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified. The site will have a separate foul and surface water drainage network.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.4.5.

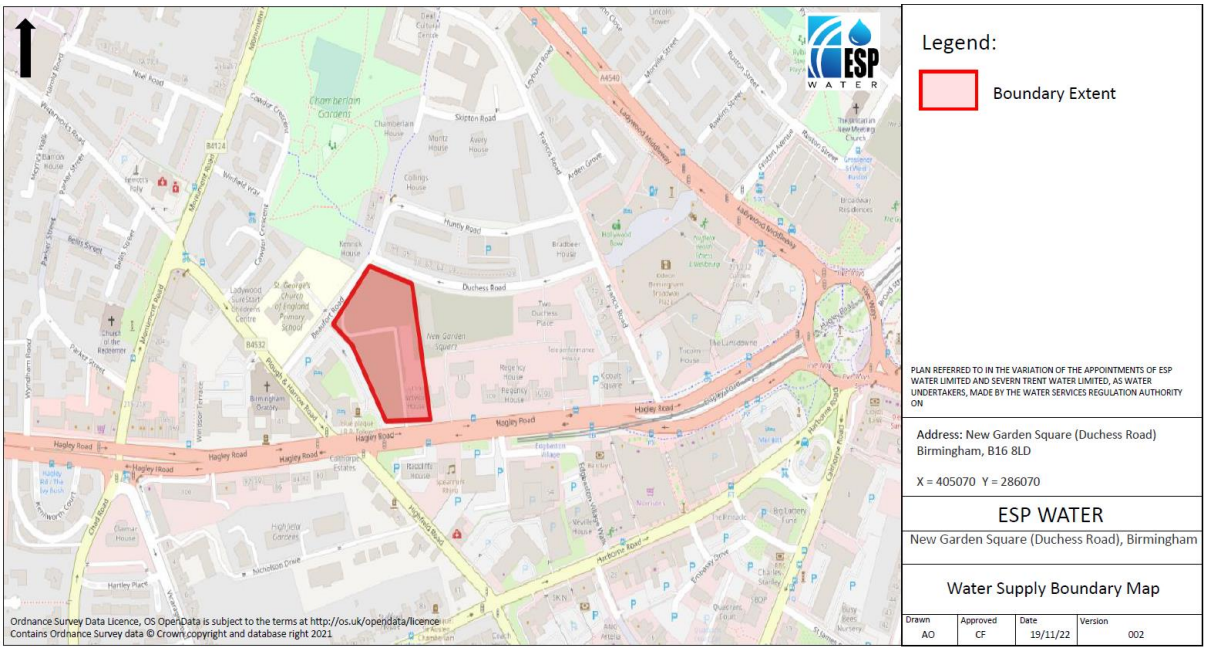


Figure 4.4.5 Location of New Garden Square development

4.4.3.2 Incumbent information

Bulk supply agreements have been reached with Severn Trent Water to supply the properties with 53954m^3/year indefinitely. Severn Trent Water has confirmed the downstream wastewater treatment works to be Minworth STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Severn Trent Water's level of service and are shown in Table 2.8.

4.4.4 Property Details

The overall distribution of properties in the STW Strategic Grid WRZ are shown below in Table 4.4.3. Specific details for sites are provided in the following sections.

Table 4.4.3 Severn Trent Water – Strategic Grid WRZ Property Types

Property Type	Number – Three sites	Estimated Occupancy
1 Bed	236	2
2BF/2BT	255	3
2BS/2BD/3BT/3BF	52	3
3BS/2BB	57	4
3BD/3BB	160	4
4BD/4BT/4BS	96	5
5BD/5BS/6BD	32	6

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 2933 people with an average PCC of 116l/h/d and a total customer demand of 123718m^3/yr.

4.4.4.1 Bromyard Road Property Details

The development will contain 120 properties and is due for completion in 2027. Properties have been constructed to the 110l/h/d standard.

4.4.4.2 Whitford Road Property Details

The development will contain 370 properties and is due for completion in 2027. Properties have been constructed to the 125l/h/d standard, however due to the distribution of property types the estimated PCC is predicted to be lower at 104l/h/d. There are many large properties on this site (160 3bed, 85 4bed and 32 5/6 bed), so we have estimated a high population of 1517. This will need to be verified. If 2.4 was used as a multiplier then the population would be nearly half this at 888, giving very different results.

4.4.4.3 New Garden Square Property Details

The development will contain 398 flats and is due for completion in 2024. Properties have been constructed to the 125l/h/d standard

4.4.5 Supply Demand Balance

As previously documented, this resource zone currently consists of three developments. The 888 domestic properties have been calculated to require 339m^3/day with 4 non-household properties requiring 0.8m^3/day. The bulk supply agreement with Severn Trent Water provides 336.62m^3/day, which is lower than what is calculated to be required. We will monitor occupancy rates and water demand as people move into these sites and if necessary re-negotiate the BSA. As previously explained it is likely to do with the difference between

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[8] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.3.2. This is also shown graphically in figure 4.3.2.

[8] UKWIR Managing Leakage 2011

Table 4.4.4 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	336.62
Domestic Consumption	338.95
Non-domestic Consumption	0.80
Leakage	1.62
Other demand	0.00
Headroom	16.95
Total	**-21.70**

As the network ages, leakage will be monitored closely using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Supply and demand have been forecast up until 2050 as shown below.

4.4.6 All STW – Combined Supply Demand Balance

By combining the supply and demand projections for our sites in both the Shelton WRZ and Strategic Grid WRZ we have the following supply demand balance for this incumbent. We expect this deficit to be associated with the different occupancy rates that we use, compared to Severn Trent Water, when agreeing our bulk supply agreement maximum volume. However, we will gain data on occupancy as people move in and monitor demand to ensure security of supply. If necessary, we will re-negotiate the appropriate BSA and are already talking to Severn Trent Water about this option.

Table 4.4.5 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	582.03
Domestic Consumption	563.04
Non-domestic Consumption	0.80
Leakage	9.266
Other demand	0.00
Headroom	28.19
Total	**- 19.27**

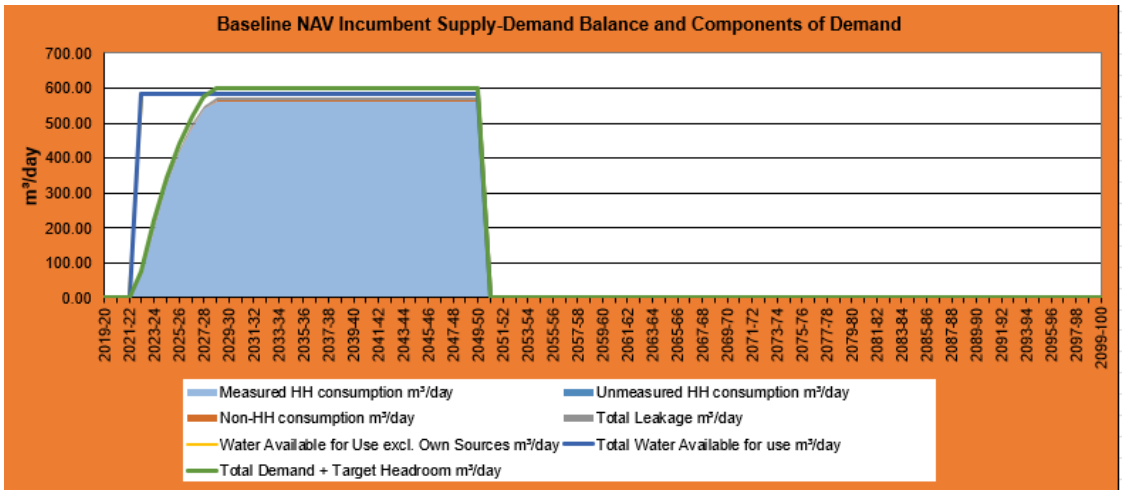


Figure 4.4.6 Preliminary Supply Demand Balance

4.5 South West Water – Roadford WRZ

Only one ESPW site is currently inside this resource zone. South West Water's Roadford water resource zone has some challenges regarding supply and therefore is one of our high-risk zones.

4.5.1 The Grange

4.5.1.1 Introduction

The Grange is situated in Bideford in the South West Water Region. The development is 7.23 hectares and is still in the early stages of construction and will have 225 houses when completed. There will be no commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified. The site will have separate foul and surface water drainage networks with the surface water drainage draining into a nearby river via a SuDS attenuation tank.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.5.1.

Figure 4.5.1 Location of The Grange development

4.5.1.2 Incumbent information

Bulk supply agreements have been reached with South West Water to supply the properties with 35148m^3/year indefinitely. The downstream wastewater treatment

works is Cornborough STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as South West Water's level of service and are shown in Table 2.9. Currently this site has a Temporary Use Ban (TUB) in place.

4.5.2 Property Details

The overall distribution of properties in the SWW-Roadford WRZ are shown below in Table 4.5.1. Specific details for sites are provided in the following sections.

Table 4.5.1 South West Water Roadford WRZ Property Types

Property Type	Number – The Grange	Estimated Occupancy
1 Bed	12	2
2BF/2BT	64	3
2BS/2BD/3BT/3BF	50	3
3BS/2BB	66	4
3BD/3BB	8	4
4BD/4BT/4BS	22	5
5BD/5BS/6BD	3	

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 790 people with an average PCC of 116l/h/d and a total customer demand of 33638m^3/yr.

4.5.2.1 The Grange Property Details

The development will contain 225 properties and is due for completion in 2025. Properties have been constructed to the 125l/h/d standard, however due to the distribution of property types the estimated PCC is predicted to be lower at 116l/h/d.

4.5.3 Supply Demand Balance

As previously documented, this resource zone currently consists solely of the Grange site. The 225 domestic properties have been calculated to require 92.16m^3/day with no non-household properties. The bulk supply agreement with South West Water provides 96.3m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[9] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand

[9] UKWIR Managing Leakage 2011

surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.5.2. This is also shown graphically in figure 4.5.2. This supply demand balance is also estimating a deficit and we are in discussion with South West Water currently to agree a way forward. The difference is likely to be around the way we are calculating occupancy rate compared to the incumbent. This will be monitored as people move into the properties.

Table 4.5.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	96.30
Domestic Consumption	92.16
Non-domestic Consumption	0.00
Leakage	1.37
Other demand	0.00
Headroom	4.61
Total	**-1.84**

As the network ages, leakage will be closely monitored using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Supply and demand have been forecast up until 2050 as shown below.

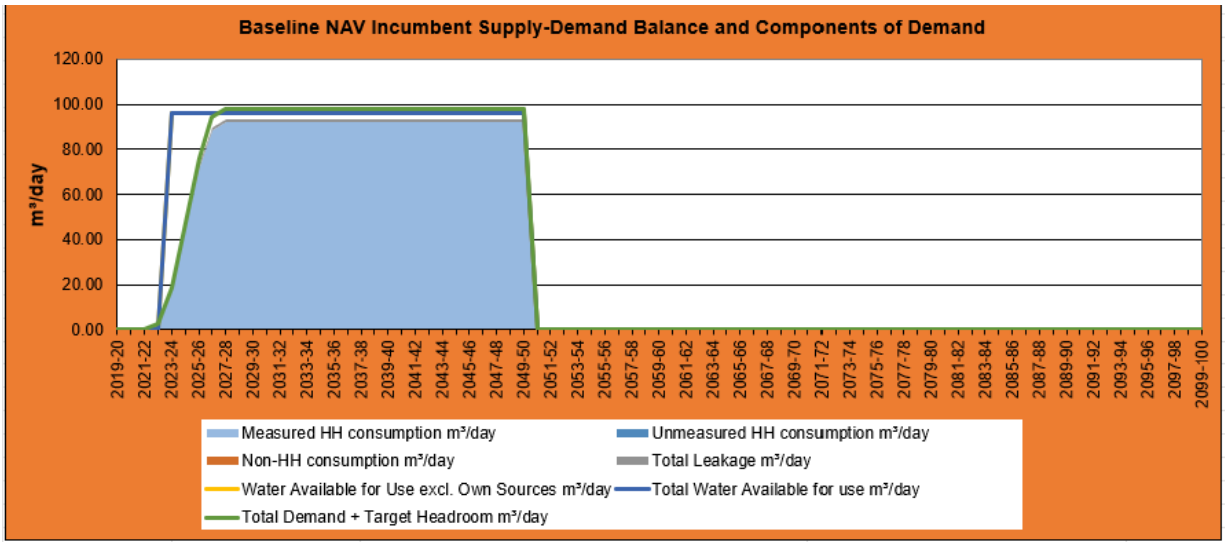


Figure 4.5.2 Preliminary Supply Demand Balance

4.6 Anglian Water – Ruthamford North WRZ

Only one ESPW site is currently inside this resource zone. Anglian Water's Ruthamford North water has some challenges with relation to water supplies and consequently their best value plan includes some additional supplies to ensure they don't go into deficit..

4.6.1 Malabar Farm

4.6.1.1 Introduction

Malabar Farm is situated in Daventry in the Anglian Water Region. The development is still in the relatively early stages of construction and will have 1110 houses and 1 NHH when completed. The site has been assessed as having a low river and surface water flood risk. It is however, in a water stressed area.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.3.1.

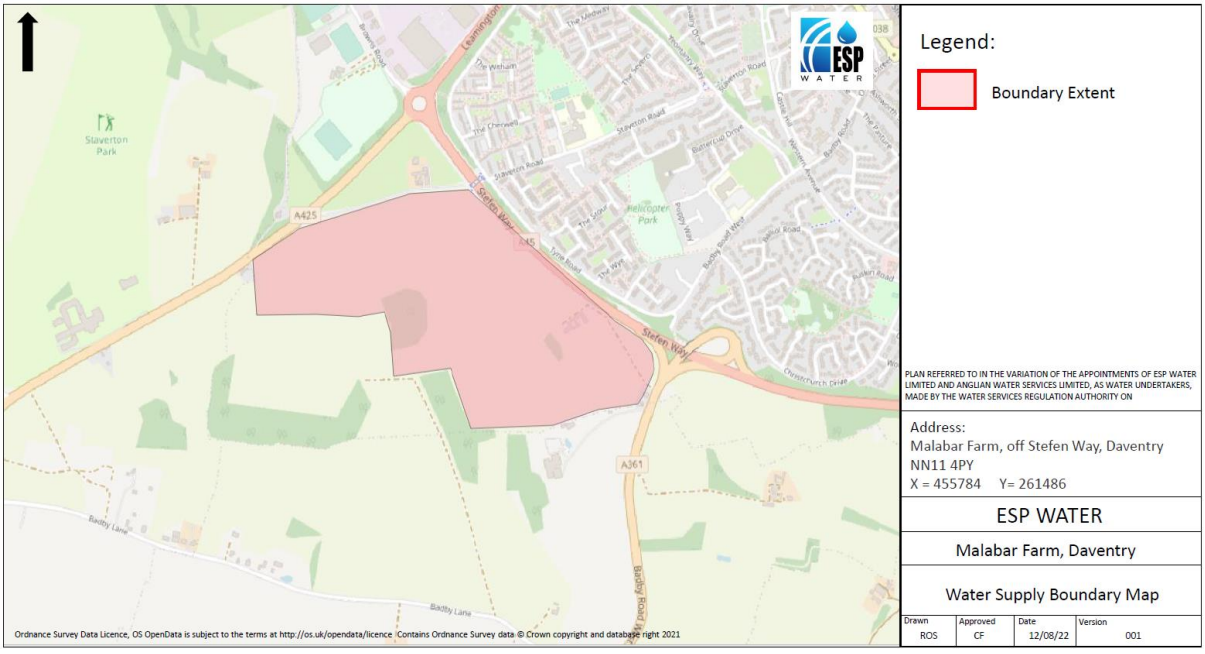


Figure 4.6.1 Location of Malabar Farm development

4.6.1.2 Incumbent information

Bulk supply agreements have been reached with Anglian Water to supply the properties with 272710 m^3/year indefinitely. Anglian Water has confirmed the downstream wastewater treatment works is Whilton STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously, our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Anglian Water's level of service and are shown in Table 2.10.

4.6.2 Property Details

The overall distribution of properties in the AW Ruthamford North WRZ are shown below in Table 4.6.1. Specific details for sites are provided in the following sections.

Table 4.6.1 Anglian Water Ruthamford North WRZ Property Types

Property Type	Number – Malabar Farm only	Estimated Occupancy
1 Bed	47	2
2BF/2BT	200	3
2BS/2BD/3BT/3BF	55	3
3BS/2BB	280	4
3BD/3BB	138	4
4BD/4BT/4BS	326	5
5BD, 5BS, 6BD	64	6

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 4545 people with an average PCC of 109l/h/d and a total customer demand of 180952m^3/yr.

4.6.2.1 Malabar Farm Property Details

The development will contain 1110 properties and is due for completion in 2032. The distribution of properties is shown in table 4.6.1. Properties have been constructed to the 110l/h/d standard as the site is within a water stressed area.

4.6.3 Supply Demand Balance

As previously documented, this resource zone currently consists solely of the Malabar Farm site. The 1110 domestic properties have been calculated to require 495.76 m^3/day with 1 non-household property using 0.2m3/day. The bulk supply agreement with Anglian Water provides 747.15m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[10] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

[10] UKWIR Managing Leakage 2011

A summary table of the balance when fully built and occupied is shown below in table 4.6.2. This is also shown graphically in figure 4.6.2.

Table 4.6.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	747.15
Domestic Consumption	495.76
Non-domestic Consumption	0.2
Leakage	6.20
Other demand	0.00
Headroom	24.79
Total	**+220.2**

As the network ages, leakage will be closely monitored using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Given the substantial uncertainty regarding occupancy when fully operational, climate change has not been factored into demand estimates, nor have improvements in water efficiency. We do not expect any significant changes due to these variables. Supply and demand have been forecast up until 2050 as shown below.

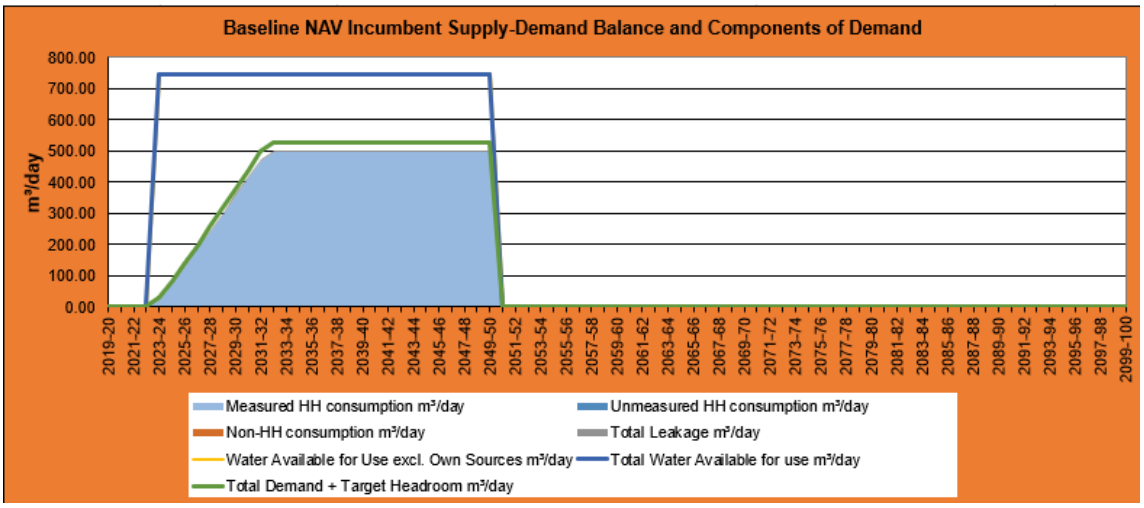


Figure 4.6.2 Preliminary Supply Demand Balance

4.7 Thames Water – Slough, Wycombe and Aylesbury (SWA) WRZ

Only one ESPW site is currently inside this resource zone. Thames Water's SWA water covers the area of Slough, Wycombe and Aylesbury to the west of Thames water region and is derived from twelve groundwater sources with pressure on abstraction licences.

4.7.1 The Maltings

4.7.1.1 Introduction

The Maltings is situated in Aylesbury in the Thames Water Region. The development is 13.1 hectares and is still in the early stages of construction and will have 273 houses when completed. There will be no commercial users of water in the area. The site has been assessed as having a very low flood risk and no other environmental concerns have been identified. It is a greenfield site and will have separate foul and surface water drainage networks.

The new network will consist of new polyethylene (PE) pipes and in line with government policy all properties will be metered. All meters will be Diehl AMR enabled meters, enabling frequent meter reads to be made. The location and scope of the development is shown in Figure 4.7.1.

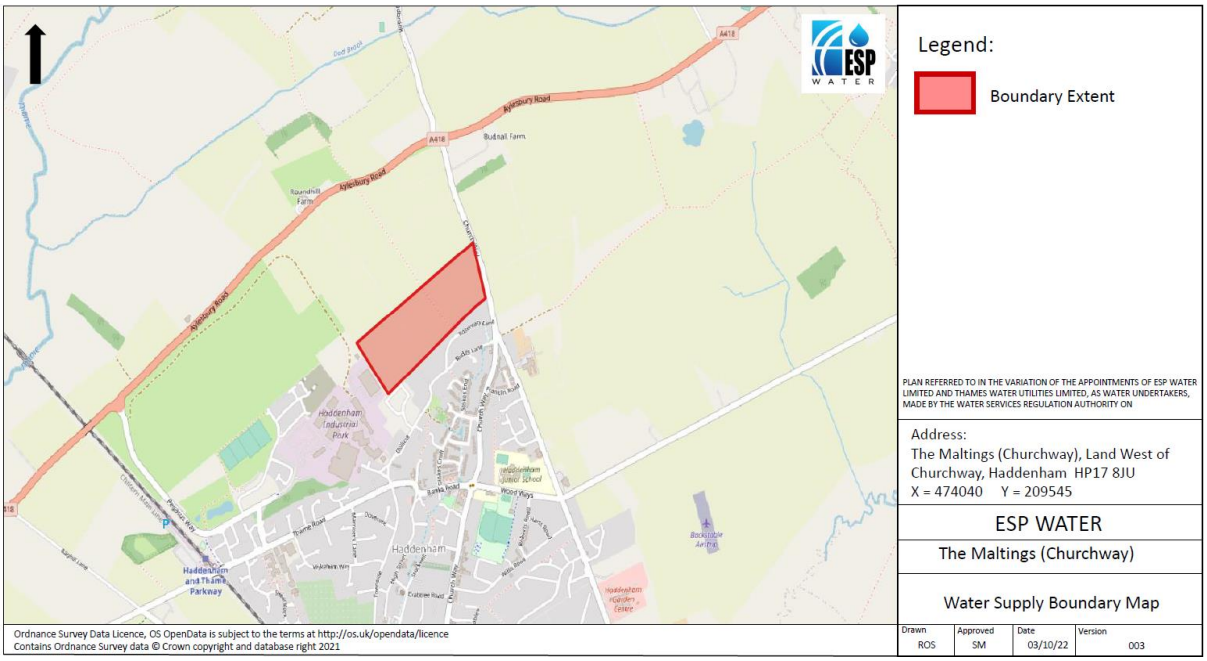


Figure 4.7.1 Location of The Maltings development

4.7.1.2 Incumbent information

Bulk supply agreements have been reached with Thames Water to supply the properties with 57013m^3/year indefinitely. The downstream wastewater treatment plant is Haddenham STW. A DWSP has been developed for the site and there are no known water quality issues in the area.

As described previously our level of service and potential mitigation measures in the event of drought are aligned to the incumbent company. As a result, these will be the same as Thames Water's level of service and are shown in Table 2.11.

4.7.2 Property Details

The overall distribution of properties in the TW-SWA resource zone are shown below in Table 4.7.1. Specific details for sites are provided in the following sections.

Table 4.7.1 Thames Water – SWA WRZ Property Types

Property Type	Number – The Grange	Estimated Occupancy
1 Bed	10	2
2BF/2BT	20	3
2BS/2BD/3BT/3BF	37	3
3BS/2BB	39	4
3BD/3BB	47	4
4BD/4BT/4BS	119	5
5	1	6

*B-Bed, BB – Bungalow, F-Flat, T-Terrace, S-Semi, D-Detached

This results in a total of estimated population of 1136 people with an average PCC of 108l/h/d and a total customer demand of 44900m^3/yr.

4.7.2.1 The Maltings Property Details

The development will contain 273 properties and is due for completion in 2028. The distribution of properties is shown in table 4.7.1. Properties have been constructed to the 110l/h/d standard.

4.7.3 Supply Demand Balance

As previously documented, this resource zone currently consists solely of The Maltings site. The 273 domestic properties have been calculated to require 123.01m^3/day with no non-household properties. The bulk supply agreement with Thames Water provides 156.2m^3/day.

Leakage has been estimated using the UARL (Unavoidable Annual Real Losses) methodology using UKWIR[11] developed values for good condition networks, this has been combined with a linear pressure correction assuming a 35m inlet. This estimate will be refined when customers move into the properties and average pressure and network performance can be assessed. Other sources of non-revenue water have not been included here due to the nature of the site.

[11] UKWIR Managing Leakage 2011

No assumptions have currently been made with regards to void properties, if significant voids are present then this will lead to an increased supply-demand surplus. This will be assessed using metered consumption data when available, to produce a more accurate forecast going forward in future.

A summary table of the balance when fully built and occupied is shown below in table 4.7.2. This is also shown graphically in figure 4.7.2.

Table 4.7.2 Preliminary Supply Demand Balance

Contribution	Daily Volume m^3/day
Available Bulk Supply	156.20
Domestic Consumption	123.01
Non-domestic Consumption	0.00
Leakage	1.74
Other demand	0.00
Headroom	6.15
Total	**+ 25.3**

As the network ages, leakage will be closely monitored using the incumbent inlet meter and individual property metering to ensure it does not increase. If leakage is identified, then we will assign the appropriate resources to address any leaks rapidly. Supply and demand have been forecast up until 2050 as shown below.

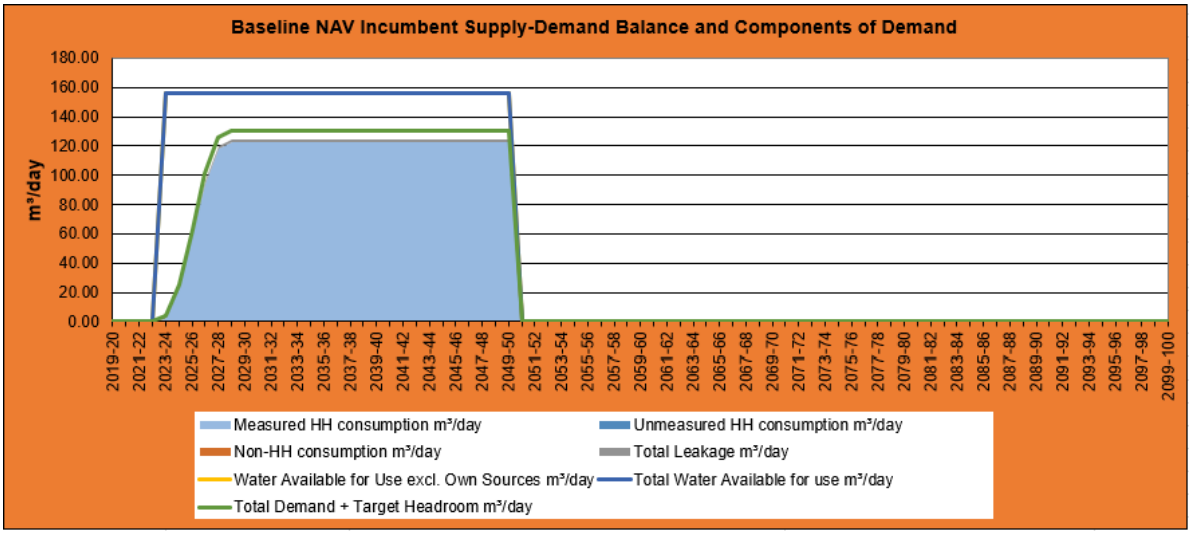


Figure 4.7.2 Preliminary Supply Demand Balance

5. National Environment Programmes and Water Framework Directive

We will work closely with the incumbent water company as required in assessing the potential impact of licensed abstraction in designated or environmentally sensitive areas under the terms of the Habitats Directive; the Environment Agency's Restoring Sustainable Abstractions (RSA) programme, local environment programme sustainability investigations; biodiversity action plans; Catchments Abstraction Management Strategies (CAMS). However, given that we will not be operating any of its own water sources in this initial WRMP it is not considered to be a major issue requiring significant addressing within the plan.

6. Strategic Environmental Assessment

The SEA process enables all options considered by us during the formulation of the preferred strategy, to be appraised against our own environmental objectives. This process thereby allows us to demonstrate how it has considered the most environmentally favourable solutions within its overall strategy. However, while the company will work closely with the incumbent water company as appropriate, given that it will not be operating any abstraction sources it is not considered necessary to consider environmental mitigation specifically within this draft Plan.

7. Appendix 1 – Compliance with WRMP (England) Direction 2022

This table confirms which matters to be addressed in a WRMP according to WRMP (England) Direction 2022 are applicable to us as a NAV or whether a response is included in this document.

Matter – 3 (1) a-n	Section or not applicable?
a) the appraisal methodologies which it used in choosing the measures which it has identified in accordance with section 37A(3)(b) and its reasons for choosing those measures.	Our demand reduction strategy methodologies are included in Section 3.
b) for the first 25 years of the planning period, its estimate of the average annual risk, expressed as a percentage, that it may need to impose prohibitions or restrictions on its customers in relation to the use of water under each of the following (i) section 76 (**b**). (ii) section 74(2)(b) of the Water Resources Act 1991(**c**); and (iii) section 75 of the Water Resources Act 1991, and how it expects the annual risk that it may need to impose prohibitions or restrictions on its customers under each of those provisions to change over the course of the planning period as a result of the measures which it has identified in accordance with section 37A(3)(b).	The levels of service by incumbent are included in Section 2.7. An assessment of risk by incumbent area is also included in Section 2.6. We have used the UKWIR Problem Characterisation methodology to calculate risk.
(c) the assumptions it has made to determine the estimates of risks under sub-paragraph (b), including but not limited to drought severity.	This is also included in Section 2.6.
d) in respect of greenhouse gas emissions - (i) the emissions of greenhouse gases which are likely to arise as a result of each measure which it has identified in accordance with section 37A(3)(b) unless that information has been reported and published elsewhere and the water resources management plan states where that information is available. (ii) how those greenhouse gas emissions will contribute individually and collectively to its greenhouse gas emissions overall. (iii) any steps it intends to take to reduce those greenhouse gas emissions.	We have included a Section at 2.8 on GHG and estimated the CO_2 kg/d used to abstract, treat and distribute potable water to our sites.

(iv) how these steps will support the delivery of any net zero greenhouse gas emissions commitment made by it: and (v) how these steps will support delivery of the UK government's net zero greenhouse gas emissions targets and commitments.	
(e) the assumptions it has made as part of the supply and demand forecasts contained in the water resources management plan in respect of— (i) the implications of climate change, including in relation to the impact on supply and demand of each measure which it has identified in accordance with section 37A(3)(b). (ii) household demand in its area, including in relation to population and housing numbers, except where it does not supply, and will continue not to supply, water to domestic premises; and (iii) non-household demand in its area, except where it does not supply, and will continue not to supply, water to non-domestic premises or to an acquiring licensee.	Our supply and demand assumptions for the areas we supplied are included in Section 3, which covers (ii) and (iii), Climate change is also covered in this section.
(f) its intended programme for the implementation of domestic metering including— (i) the proportion of smart meters to other meters. (ii) if it does not intend to install smart meters, the reasons for this. (iii) its estimate of the cost of that programme, including the costs of installation and operation of meters;	Metering is covered in Section 3.2. We will be using AMR meters initially, but these meters are 'smart ready' and can be linked to a Bluetooth connection, so that a display is available in the future.
(g) its estimate of the total number of meters installed to record water supplied to domestic premises at the commencement of the relevant planning period and including a breakdown of— (i) the number of smart meters. (ii) the number of meters that are not charged by reference to volume. (iii) the number of meters that are charged by reference to volume including— (aa) optant metering. (bb) change of occupancy metering. (cc) new build metering. (dd) compulsory metering; and (ee) selective metering.	All our new properties will have AMR meters. This is discussed in Section 3.2. We will have 100% metering.

(h) its estimate of the total number of domestic premises which will become subject to domestic metering during the planning period and including a breakdown of— (i) the number of domestic premises with smart meters. (ii) the number of domestic premises with meters that will not be charged by reference to volume. (iii) the number of domestic premises with meters that will be charged by reference to volume including— (aa) optant metering. (bb) change of occupancy metering. (cc) new build metering. (dd) compulsory metering; and (ee) selective metering.	As above, we will have 100% coverage of metering.
(i) its estimate of the impact on demand for water in its area of any increase in the number of premises subject to domestic metering.	This is not applicable to us as a new NAV.
(j) its assessment of the cost-effectiveness of domestic metering as a mechanism for reducing demand for water by comparison with other measures which it might take to meet its obligations under Part III of the Act;	All our properties will be metered, however as a new NAV we cannot do this assessment.
(k) its intended programme to manage and reduce leakage, including anticipated leakage levels and how those levels have been determined.	Leakage is covered in Section 3.3.
(l) if leakage levels are expected to increase at any time during the planning period, why any increase is expected and if so, the proposed plan of works that will be undertaken to mitigate this.	This is also covered in the leakage Section 3.3.
(m) how its intended programme to manage and reduce leakage will contribute to— (i) a reduction in leakage by 50% from 2017/18 levels by 2050; and (ii) any leakage reduction commitment it has made in respect of its appointment area.	This is covered in Section 3.3.
(n) In respect of any relevant regional water resources plan— (i) how this plan has been considered and reflected in its water resources management plan; or	This is covered in the Stakeholder Management Section 2.8 and used in the problem characterisation matrix.

(ii) where the plan has not been considered and reflected in its water resources management plan, the reasons for this.	