love every drop
anglianwater

Revised Draft WRMP24
Technical Document

Water Resource Zone summaries

August 2023

1. Introduction

1.1 About our company
Anglian Water is the largest water and wastewater company in England and Wales geographically, covering 20% of the land area. We operate in the East of England, the driest region in the UK, receiving two-thirds of the national average rainfall each year; that's approximately 600mm.
Our region has over 3,300km of rivers and is home to the UK's only wetland national park, the Norfolk Broads. Between 2011 and 2021, our region experienced the highest population increase in England. Despite this, we are still putting less water into our network than we did in 1989.

1.2 Planning for the long term
Our company Purpose is ***"to bring environmental and social prosperity to the region we serve through our commitment to Love Every Drop"***.
This purpose is at the heart of our business, having been enshrined in our Articles of Association in 2019. Central to delivering this purpose is planning for the long term; one of the strategic planning frameworks we use to achieve this is the Water Resources Management Plan (WRMP), which details how we will ensure resilient water supplies to our customers over the next 25 years. A WRMP looks for low regret investments for our region, giving flexibility to adapt to future challenges and opportunities such as technological advances, climate change, demand variations, and abstraction reductions.

1.3 What is a Water Resources Management Plan
We produce a WRMP every five years. It is a statutory document that sets out how a sustainable and secure supply of clean drinking water will be maintained for our customers. Crucially it takes a long-term view over 25 years, allowing us to plan an affordable, sustainable pathway that provides benefit to our customers, society and the environment.
Our previous WRMP, WRMP19, had an ambitious twin track strategy, combining an industry leading smart meter roll out and leakage ambition with a strategic pipeline across our region, bringing water from areas of surplus to areas of deficit.
This WRMP focusses on the period 2025 to 2050, and is known as WRMP24. We have developed it by following the Water Resources Planning Guideline (WRPG), as well as other relevant guidance, in order to meet statutory requirements.

1.4 Developing our WRMP
Our WRMP24 has been progressed following processes detailed in the WRPG. We start by determining the extent of the challenges we face between 2025 and 2050.
We achieve this by developing forecasts to establish the amount of water available to use (supply forecast) and the amount of water needed (demand forecast) in our region.
When these forecasts are combined, a baseline supply-demand balance is created. This tells us whether we have a surplus of water or a deficit, establishing our water needs for the planning period. An appraisal for both demand management options and supply-side options is undertaken.
We environmentally assess both demand management and supply-side options so we can understand their potential environmental impacts and what could be put in place to mitigate them.
The next step is for the water savings associated with the chosen demand management options to be added into our baseline supply-demand balance to determine if our region's water needs are met. If the demand management options savings do not solve the need, supply-side options are added into the modelling process and solution development.

1.5 Best value plan
To ensure we developed the right solution for our region's water needs, we have focussed on 'best value'. To us, best value is looking beyond cost and seeking to deliver a benefit to customers and society, as well as the environment, whilst listening and acting on the views of our customers and stakeholders.

1.6 Our revised draft WRMP24
Our best value plan, the revised draft WRMP24, has been produced following a public consultation on our draft WRMP24. This consultation ran from December 2022 to March 2023.

1.7 Strategic context of the revised draft WRMP24
Our revised draft WRMP24 aligns with our Purpose, as well as internal and external strategic plans and initiatives. We have worked collaboratively with internal and external stakeholders, regulators and other water abstractors to achieve this.

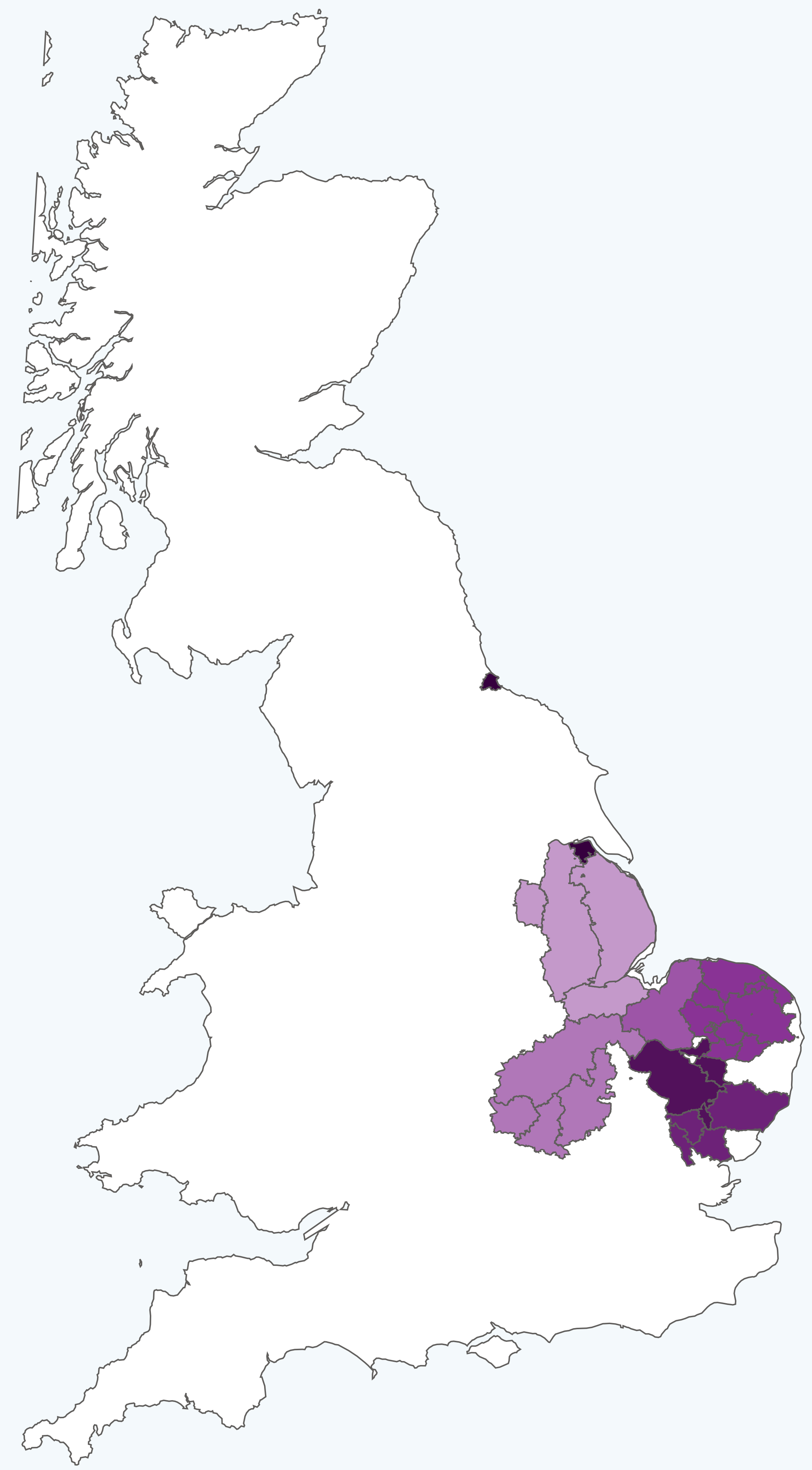
1.8 Guide to our draft WRMP24 submission
Our final submission comprises a non-technical customer and stakeholder summary, our main report and nine technical supporting documents and non-technical supporting documents.

Introduction

1.9 This report is concerned with the WRMP24 water resource zone summaries non-technical supporting document. The report summarises key supply and demand data for the 27 Water Resource Zones (WRZs) characterised in the WRMP24.
These WRZs have been grouped by region according to our problem characterisation analysis.

Resource Zone	Area
Suffolk Ixworth	Cambridgeshire & West Suffolk
Suffolk Sudbury	Cambridgeshire & West Suffolk
Suffolk Thetford	Cambridgeshire & West Suffolk
Suffolk West & Cambs	Cambridgeshire & West Suffolk
Essex Central	East Suffolk & Essex
Essex South	East Suffolk & Essex
Suffolk East	East Suffolk & Essex
Fenland	Fenland
Hartlepool	Hartlepool
Lincolnshire Bourne	Lincolnshire & Nottinghamshire
Lincolnshire Central	Lincolnshire & Nottinghamshire
Lincolnshire East	Lincolnshire & Nottinghamshire
Lincolnshire Retford and Gainsborough	Lincolnshire & Nottinghamshire
Norfolk Aylsham	Norfolk
Norfolk Bradenham	Norfolk
Norfolk East Dereham	Norfolk
Norfolk East Harling	Norfolk
Norfolk Happisburgh	Norfolk
Norfolk Harleston	Norfolk
Norfolk North Coast	Norfolk
Norfolk Norwich & the Broads	Norfolk
Norfolk Wymondham	Norfolk
Ruthamford Central	Ruthamford
Ruthamford North	Ruthamford
Ruthamford South	Ruthamford
Ruthamford West	Ruthamford

Anglian Water WRMP24 water resource zones



2. Strategic Overview

Fenland

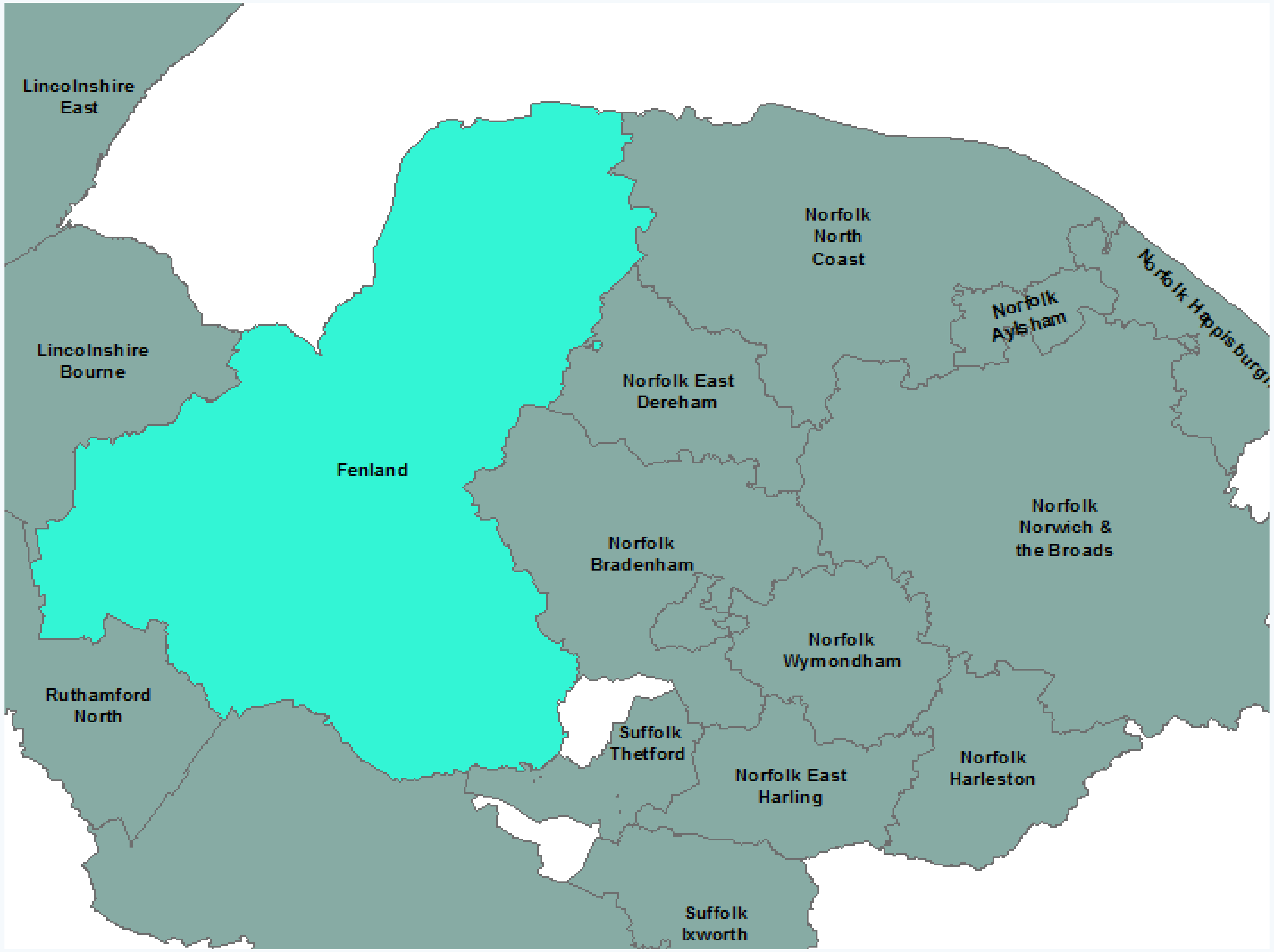
2.1Strategic risk and issues

Fenland will benefit from additional connectivity provided by our AMP7 strategic grid investment. The area is vulnerable to 1:500 drought because it has a direct intake (Stoke Ferry) without storage.

Without mitigation actions, there is potential for sustainability reductions to cause small deficits in Environmental Destination scenarios. Vulnerable catchments include:

- North West Norfolk
- Broadland Rivers

Figure 1 Problem Characterisation Area

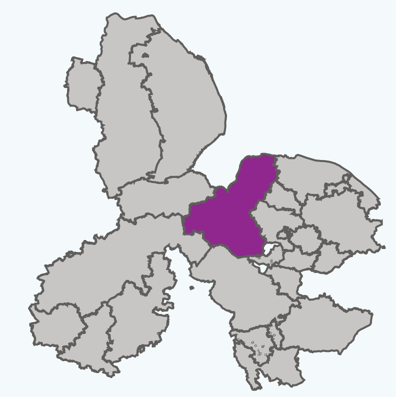


Choose area

Cambridgeshire & West Suffolk	Fenland	Lincolnshire & Nottinghamshire	Ruthamford
East Suffolk & Essex	Hartlepool	Norfolk	

3. Deployable Output summary
DYAA

Fenland



3.1 Resource Zone geography: Fenland:
The Fenland WRZ covers an area of 1768 sq. km and lies to the south of the Wash. It is based on the supply systems of Wisbech, Kings Lynn, Snettisham and Hunstanton. Water is supplied from a combination of groundwater abstractions in the Norfolk Chalk and a surface water abstraction from the River Nar.

3.2
Baseline deployable output (including 1:500 drought): *42.9 Ml/d*

Deployable output reductions

Restoring sustainable abstraction (recent actual average): *-12.5* Ml/d

Reductions to achieve environmental destination (BAU+): *-14.5 Ml/d* by 2040.

Climate change: -1.3 Ml/d by 2050.

Baseline deployable output reduces by a total of *-28.2* Ml/d by 2050 a reduction of 65.8%.

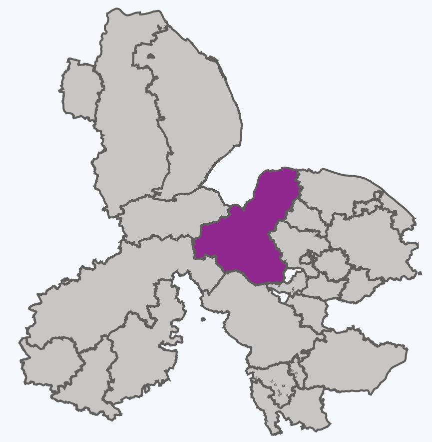
Table 3: supply characteristics (all values are Ml/d)

	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
DO pre forecast changes	42.9	42.9	42.9	42.9	42.9
Change in DO due to climate change	-0.9	-1.0	-1.1	-1.2	-1.3
DO reductions to restore sustainable abstraction	-7.1	-12.5	-12.5	-12.5	-12.5
DO reductions for Environmental Destination	0.0	0.0	0.0	-14.5	-14.5
Change in DO from drought measures	0.0	0.0	0.0	0.0	0.0
Final DO	35.0	29.5	29.4	14.8	14.7
Raw water losses (-ve)	-1.4	-1.4	-1.4	-1.4	-1.4
Outage Allowance (-ve)	-0.7	-0.7	-0.6	-0.6	-0.6
WAFU (own sources)	32.9	27.4	27.4	12.8	12.7
Net Transfers	15.0	10.8	-30.2	-16.9	-18.0
Other benefits	14.87	22.56	56.94	56.94	56.94
Total Water Available for Use	62.9	60.9	54.3	52.9	51.8

3.3 The baseline Deployable Output data presented in this section represents the Environment Agency's preferred sustainability reduction licence cap scenario. This includes recent actual average caps to time limited licences in 2022-24 and caps to all other permanent licences by 2030. The impact of 1:500 drought resilience has also been applied from 2025 rather than the preferred scenario of 2039/2040. These factors apply to the baseline forecast only. For the final plan forecast we have applied our best value scenario for licence caps, which was developed following an iterative process to deliver licence caps as early as possible. The transition to 1:500 drought resilience occurs in 2039/40 in the final plan forecast.
Further information is available in the WRMP24 Decision Making technical supporting document, section 6.

4. Population & Housing

Fenland



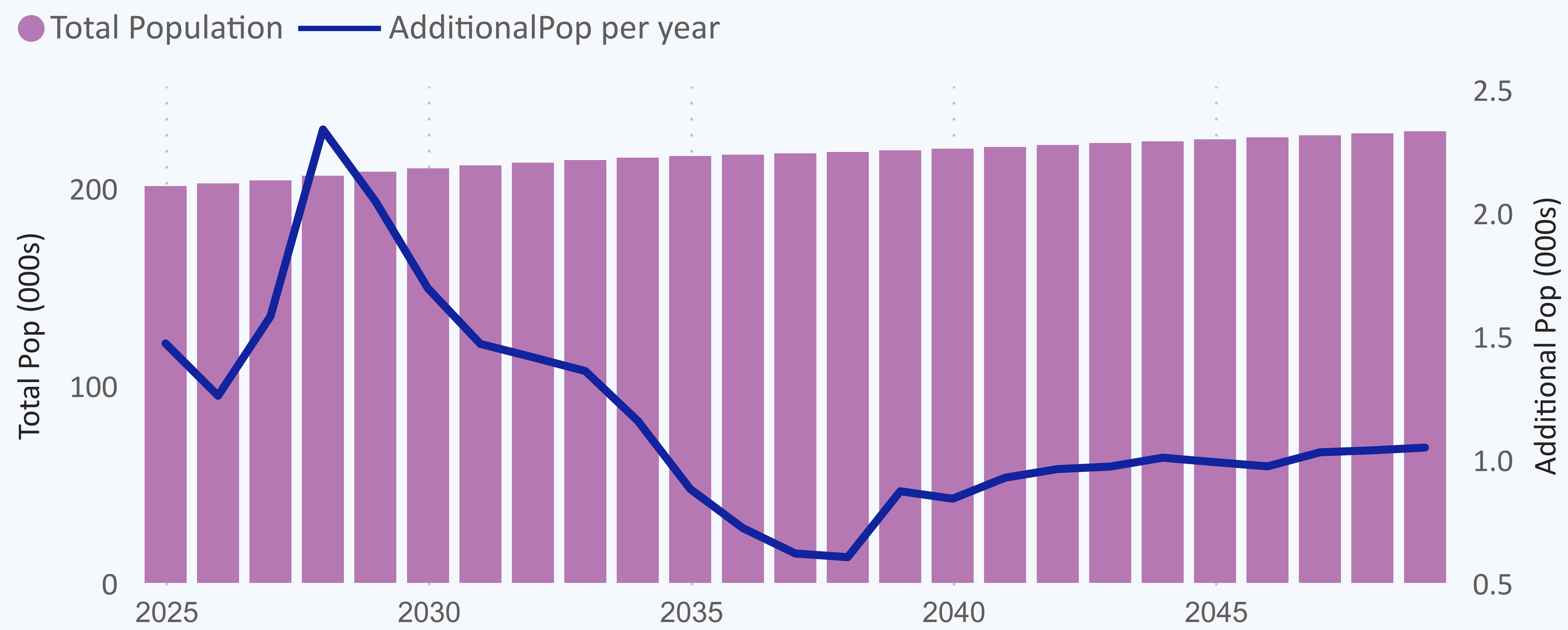
Fenland

4.1 Over the WRMP period, population in **Fenland** is set to increase from **200933** in 2025 to **228720** in 2049-50 - this is an increase of **13.8 %** over the 25 years.

Table 4a: Population totals (cumulative) by AMP

Year	Total Population (000s)
2029-30 (end of AMP8)	208.154
2034-35 (end of AMP9)	215.243
2039-40 (end of AMP10)	218.939
2044-45 (end of AMP11)	223.645
2049-50 (end of AMP12)	228.720

Figure 2: Total Resource Zone Population

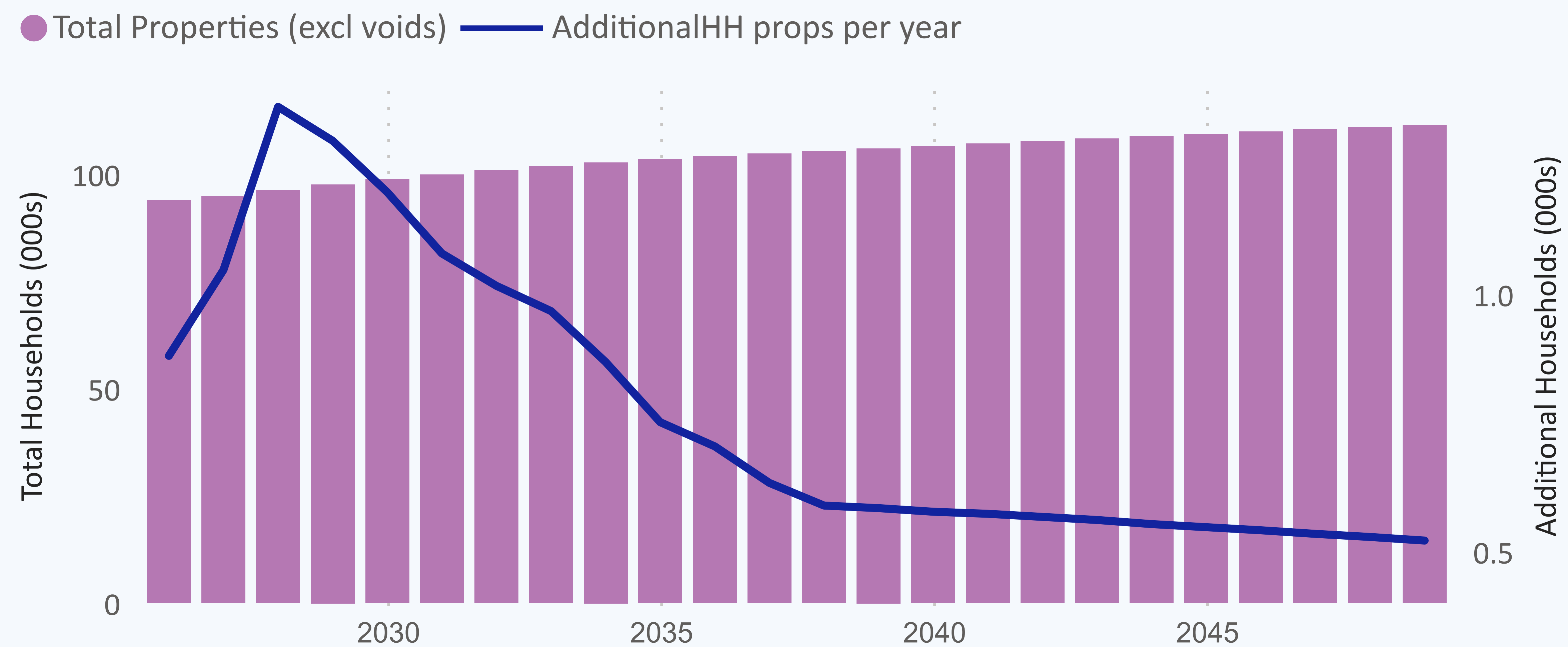


4.2 Over the WRMP period, property numbers in **Fenland** are set to increase from **93104** in 2025 to **111608** in 2049-50 - this is an increase of **19.9 %** over the 25 years.

Table 4b: Property totals (cumulative) by AMP

Year	Total Properties-excl voids (000s)
2029-30 (end of AMP8)	97.697
2034-35 (end of AMP9)	102.830
2039-40 (end of AMP10)	106.096
2044-45 (end of AMP11)	108.932
2049-50 (end of AMP12)	111.608

Figure 3: Total Resource Zone Properties (excl. voids)



5. Baseline Supply Demand Balance
DYAA

Fenland

Fenland

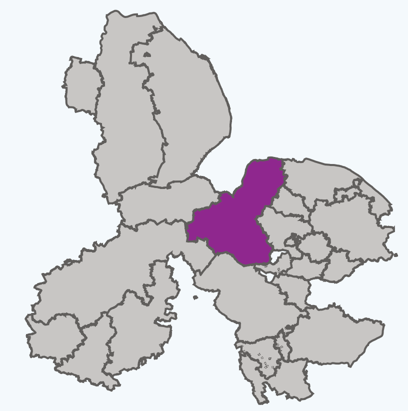


Figure 4: Fenland baseline supply demand balance to 2050 for Dry Year Annual Average conditions

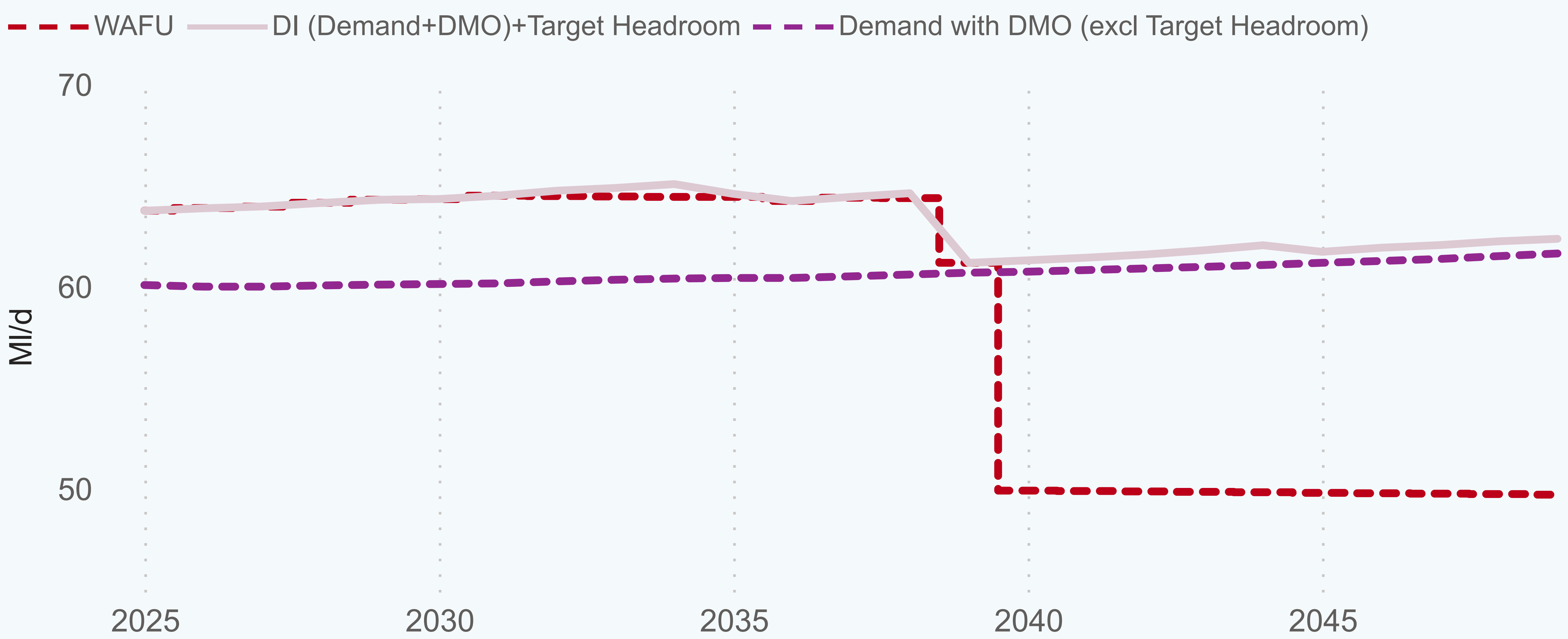


Table 5a: Baseline supply demand balance 2025 - 2050 for DYAA conditions

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water Available For Use	33.0	32.9	27.4	27.4	12.8	12.7
Net Transfers	30.8	31.4	37.0	33.8	37.0	37.0
Total Water Available For Use	63.8	64.3	64.4	61.2	49.8	49.7
Distribution Input	60.1	60.1	60.4	60.7	61.1	61.6
Target Headroom	3.7	4.2	4.7	0.5	1.0	0.7
Supply Demand Balance	0.0	0.0	-0.6	0.0	-12.2	-12.7

Table 5b: Baseline demand forecast (without preferred demand management options)

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water delivered measured household	23.3	24.7	26.4	27.9	29.2	30.1
Water delivered unmeasured household	6.2	5.1	4.1	3.3	2.6	2.4
Total Leakage	8.9	8.9	8.9	8.9	8.9	8.9
Water delivered measured non-household	21.5	21.2	20.8	20.4	20.2	20.0
Water delivered unmeasured non-household	0.1	0.1	0.1	0.1	0.1	0.1
Distribution Input	60.1	60.1	60.4	60.7	61.1	61.6

5.1 DYAA BL supply demand summary: Fenland

Baseline Supply Demand Balance: This zone is expected to go into deficit by 2027 (under the preferred baseline scenario - as described in section 3.3).

- Demand Forecast: Baseline household demand (measured and unmeasured) is forecast to change from 29.5 Ml/d in 2025 to 32.5 Ml/d in 2050, a percentage change of 10.1 %.
- Baseline Leakage: is forecast to change from 8.9 Ml/d in 2025 to 8.9 Ml/d by 2050.
- Baseline Non-Household demand: is expected to change from 21.5 Ml/d to 20.0 Ml/d.
- Baseline Distribution Input: is expected to change from 60.1 Ml/d to 61.6 Ml/d by 2050.

Nb. 'Deficit' is one outcome of the calculation WAFU minus Distribution Input (including Target Headroom).

6. Baseline Supply Demand Balance DYCP

Fenland

Fenland

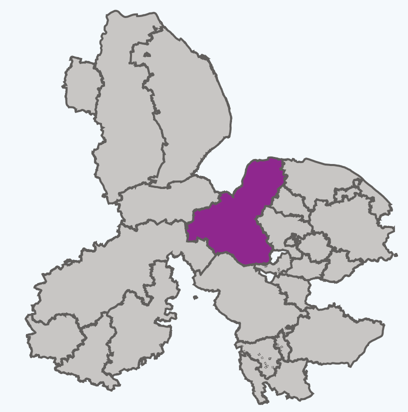


Figure 5: Fenland baseline supply demand balance to 2050 for Dry Year Critical Period conditions

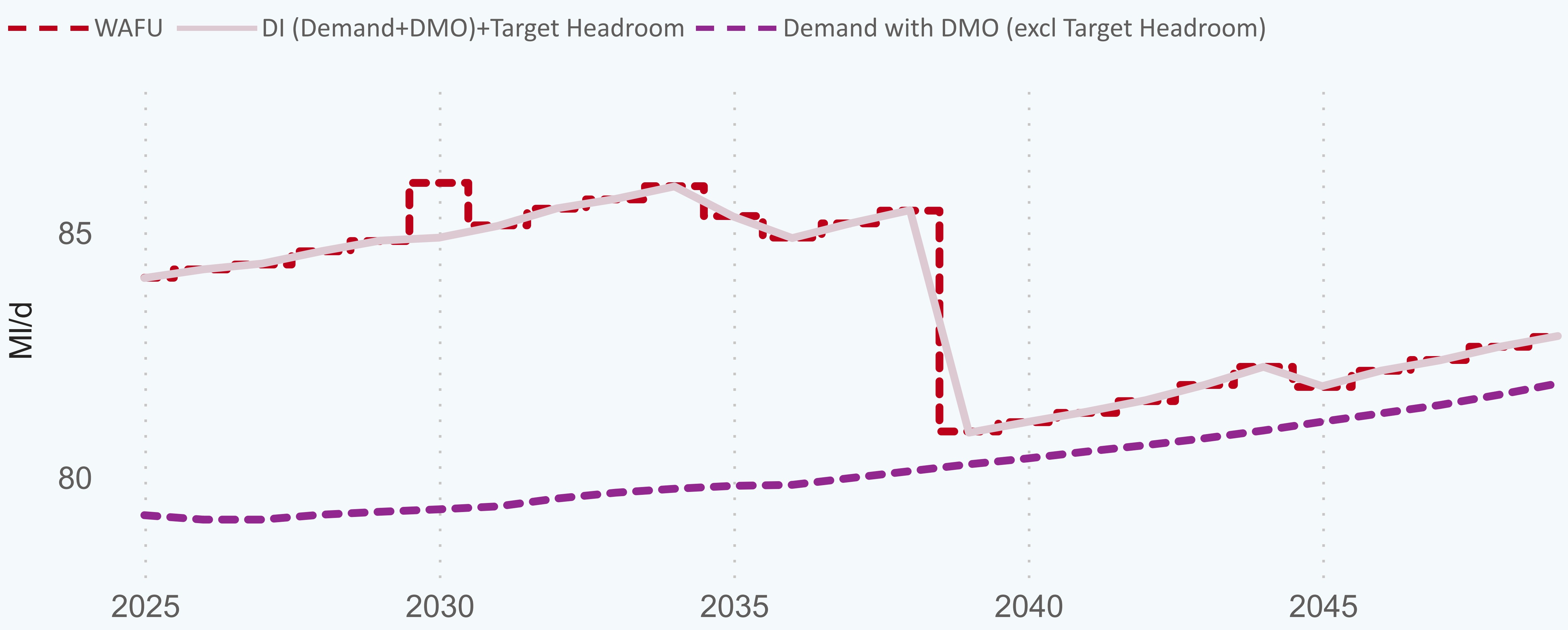


Table 6a: Baseline supply demand balance 2025 - 2050 for DYCP conditions

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water Available For Use	67.5	67.5	67.5	67.5	67.5	58.7
Net Transfers	16.6	17.4	18.5	13.5	14.8	24.2
Total Water Available For Use	84.1	84.8	86.0	80.9	82.3	82.9
Distribution Input	79.2	79.3	79.8	80.3	81.0	81.9
Target Headroom	4.8	5.5	6.2	0.6	1.3	1.0
Supply Demand Balance	0.0	0.0	0.0	0.0	0.0	0.0

Table 6b: Baseline demand forecast with DYCP conditions (without preferred demand management options)

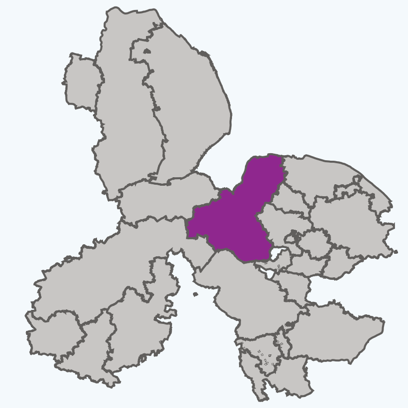
	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water delivered measured household	32.0	33.9	36.4	38.5	40.5	42.0
Water delivered unmeasured household	8.8	7.3	5.9	4.7	3.7	3.5
Total Leakage	8.9	8.9	8.9	8.9	8.9	8.9
Water delivered measured non-household	29.4	28.9	28.4	27.9	27.6	27.3
Water delivered unmeasured non-household	0.1	0.1	0.1	0.1	0.1	0.1
Distribution Input	79.2	79.3	79.8	80.3	81.0	81.9

6.1 DYCP BL supply demand summary: Fenland

Baseline Supply Demand balance: This zone will go into deficit immediately

- Demand Forecast: Baseline household demand (measured and unmeasured) is forecast to change from 40.8 Ml/d in 2025 to 45.4 Ml/d in 2050, a percentage change of 11.4 %.
- Baseline Leakage: is forecast to change from 8.9 Ml/d in 2025 to 8.9 Ml/d by 2050.
- Baseline Non-Household demand: is expected to change from 29.4 Ml/d to 27.3 Ml/d.
- Baseline Distribution Input: is expected to change from 79.2 Ml/d to 81.9 Ml/d by 2050.

Nb. 'Deficit' is one outcome of the calculation WAFU minus Distribution Input (including Target Headroom).



7. Demand forecast and PCC

Fenland

Figure 6: Fenland DYAA DI with and without demand management strategy

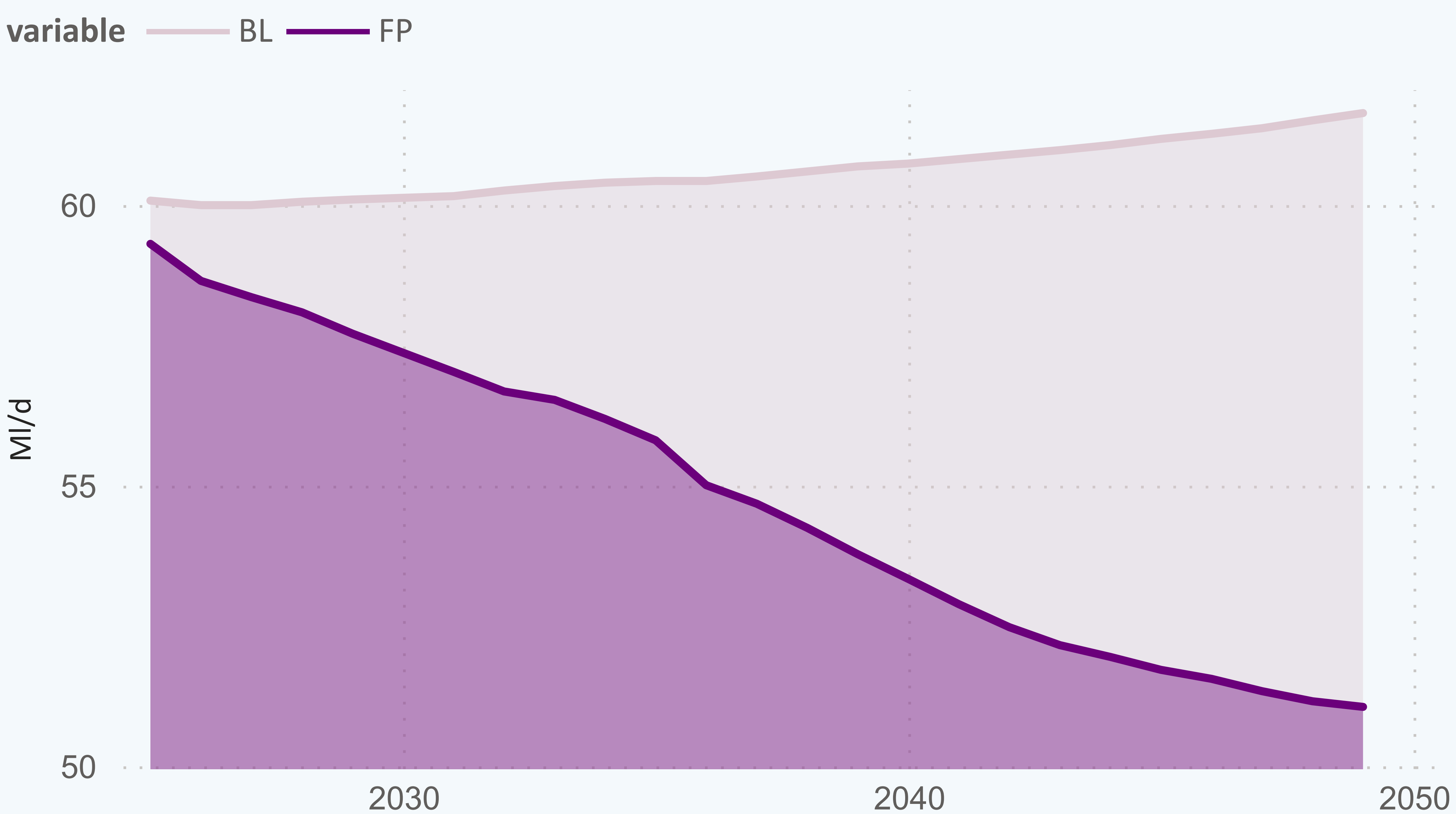


Table 7a: Demand - baseline and final plan

variable	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
BL	60.1	60.4	60.7	61.1	61.6
FP	57.7	56.2	53.8	52.0	51.1

7.2 Demand Fenland (see Table 7a)

Baseline demand is expected to increase from 60.1 (Ml/d) in 2025 to 61.6 (Ml/d) in 2050. With demand management options in place, demand is expected to be 51.1 (Ml/d).

7.1 PCC Fenland (see Table 7b)

Per Capita Consumption (PCC) in the base year 2025/26 is 130.6 (l/h/d) measured and 182.3 (l/h/d) unmeasured.

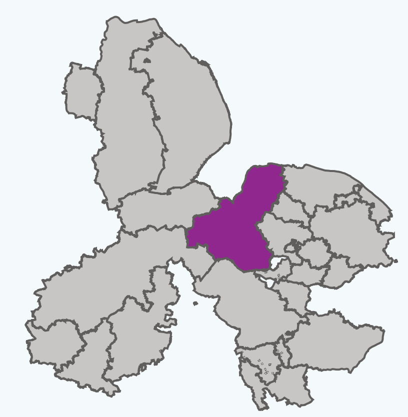
The weighted average PCC (l/h/d) comes in at 138.6 (l/h/d) in 2025/26. This is forecast to fall to 112.8 (l/h/d) in the Final Plan forecast as demand management option savings are realised and customers switch from unmeasured to measured status

Table 7b: DMO strategy Final Plan

	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
BL demand forecast(DYAA)	135.6	134.6	135.3	135.1	135.2
FP demand forecast(DYAA)	129.8	124.8	119.8	114.7	112.8
% change BL to FP	-4.3%	-7.2%	-11.5%	-15.1%	-16.5%

8. Demand management options

Fenland



8.1 Regional overview:

Across the entirety of the Anglian Water region our demand management strategy will comprise three strongly interlinked programs:

Water metering program:

- We intend to complete our current smart meter rollout which will replace our entire meter stock over 10 years (2 AMPs), noting that 1.1M smart meters will be installed across Anglian Water by 2025. The information resulting from 'smart metering' will help inform our customers regarding their water usage and will assist in our ability to influence this behaviour. It will also help with our ability to detect leakage, significantly reducing plumbing losses and customer supply pipe leaks.

Leakage reduction

- Our aim is to reduce leakage by more than 45Ml/d from 2025 to 2050 across the whole Anglian Water area, building upon our ambitious program of leakage reduction in AMP7 (14% reduction of more than 27Ml/d across the region by 2025).

Water efficiency measures

- New technologies and interventions will help promote the careful use of water. Additional water efficiency programs will include: the promotion of 'Smart' devices; further development of our Multi-utility web-portal; garden advice; support for vulnerable customers with plumbing loss and cspl; Community reward schemes. As part of our revised draft WRMP24 we have developed and included 'water efficiency visits' and leakage reduction measures for our Non-Household customers.

Figure 7: DMO strategy Final Plan for Fenland

For full chart key see table below

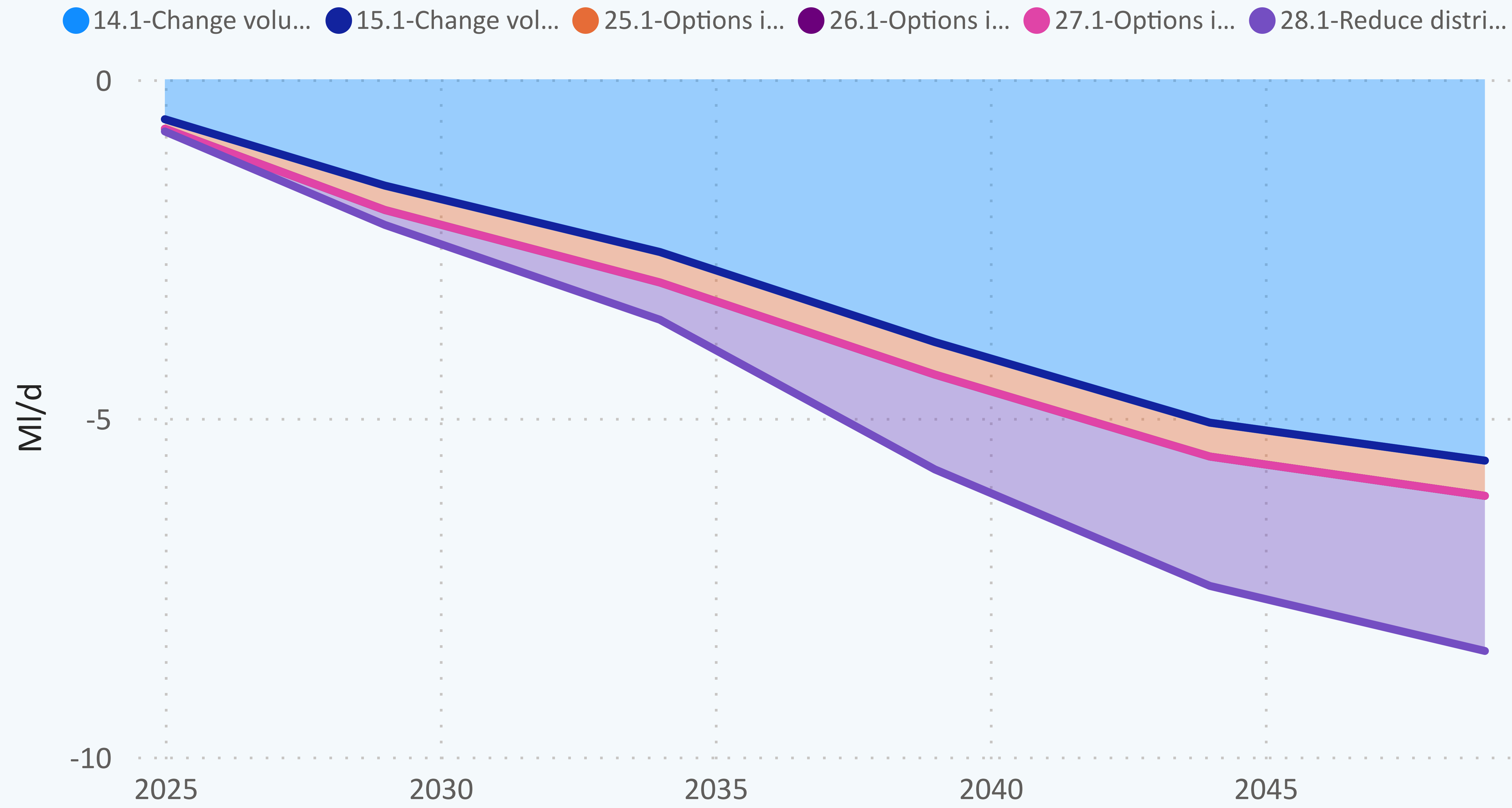


Table 8: DMO strategy Final Plan for Fenland

	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
14.1-Change volume delivered to measured households(-ve)	-1.6	-2.6	-3.9	-5.1	-5.6
15.1-Change volume delivered to unmeasured households(-ve)	0.0	0.0	0.0	0.0	0.0
25.1-Options impacting on measured Household - USPL (-ve)	-0.4	-0.5	-0.5	-0.5	-0.5
26.1-Options impacting on unmeasured Household - USPL (-ve)	0.0	0.0	0.0	0.0	0.0
27.1-Options impacting on Void properties - USPL (-ve)	0.0	0.0	0.0	0.0	0.0
28.1-Reduce distribution losses (-ve)	-0.2	-0.6	-1.4	-1.9	-2.3

9. Final Plan Supply Demand Balance DYAA

Fenland

Fenland

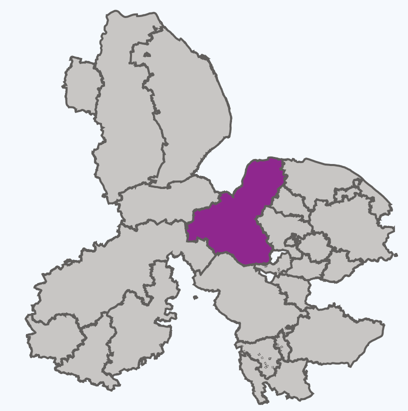


Figure 8: Fenland final plan SDB to 2050 for Dry Year Annual Average conditions

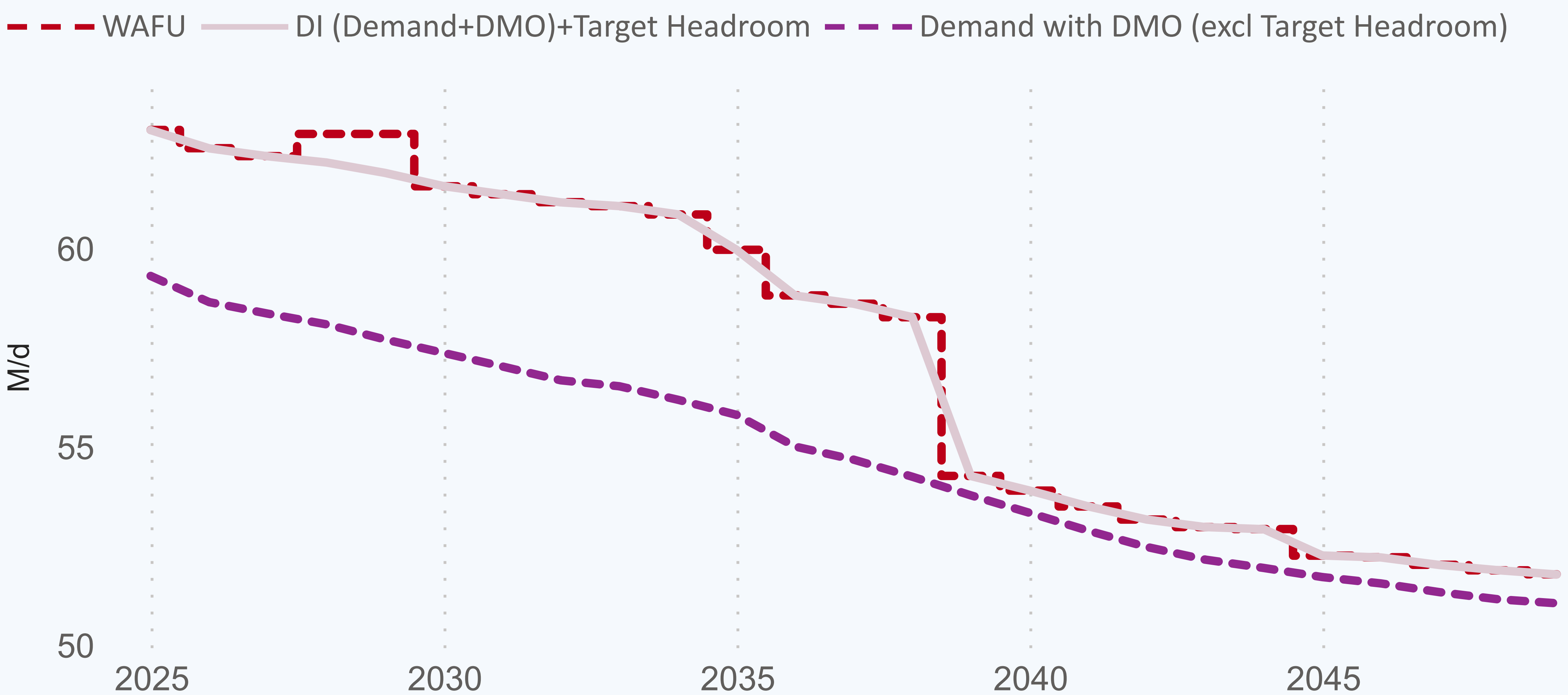


Table 9a: final plan SDB to 2050 for Dry Year conditions

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water Available For Use	47.9	47.9	50.1	84.4	69.9	69.8
Net Transfers	15.1	15.0	10.8	-30.2	-16.9	-18.0
Total Water Available For Use	63.0	62.9	60.9	54.3	52.9	51.8
Distribution Input	59.3	57.7	56.2	53.8	52.0	51.1
Target Headroom	3.7	4.2	4.7	0.5	1.0	0.7
Supply Demand Balance	0.0	1.0	0.0	0.0	0.0	0.0

Table 9b: Final Plan demand forecast for DYAA conditions (with preferred demand management options)

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water delivered measured household	22.7	23.1	23.8	24.0	24.1	24.5
Water delivered unmeasured household	6.2	5.1	4.1	3.3	2.6	2.4
Total Leakage	8.8	8.3	7.9	7.0	6.4	6.1
Water delivered measured non-household	21.3	20.6	19.6	18.8	18.0	17.3
Water delivered unmeasured non-household	0.1	0.1	0.1	0.1	0.1	0.1
Distribution Input	59.3	57.7	56.2	53.8	52.0	51.1

9.1 DYAA FP supply demand summary: Fenland

The zone is in balance.

- Demand Forecast: Final Plan household demand (measured and unmeasured) is forecast to change from 28.9 Ml/d in 2025 to 26.9 Ml/d in 2050, a percentage change of -7.1 %.
- Final Plan Leakage is forecast to change from 8.8 Ml/d in 2025 to 6.1 Ml/d by 2050.
- Final Plan Non-Household demand is expected to change from 21.3 Ml/d to 17.3 Ml/d.
- Final Plan Distribution Input is expected to change from 59.3 Ml/d to 51.1 Ml/d by 2050.

10. Final Plan Supply Demand Balance
DYCP

Fenland

Fenland

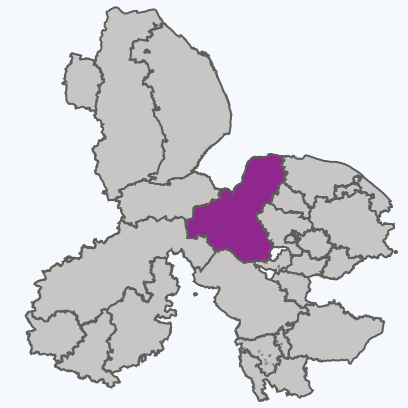


Figure 9: Fenland baseline supply demand balance to 2050 for Dry Year Critical Period conditions

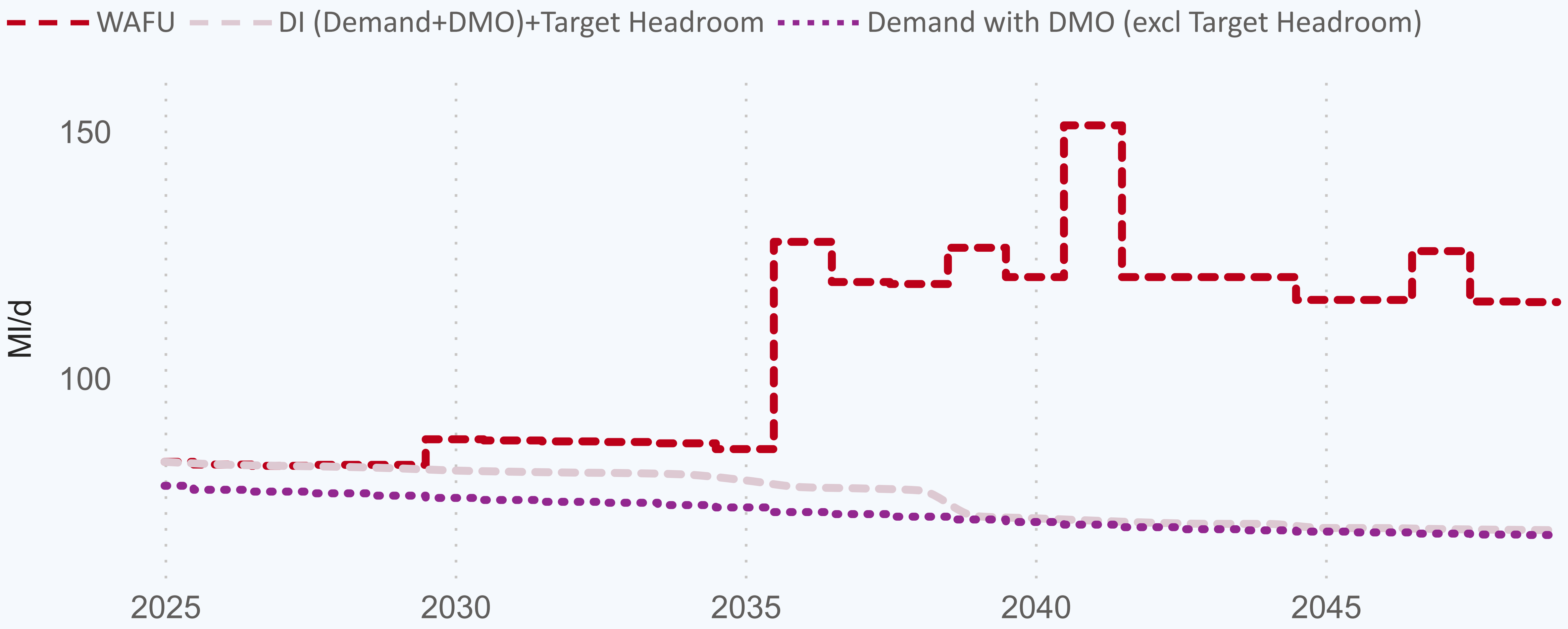


Table 10a: Final Plan supply demand balance 2025 - 2050 for DYCP conditions

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water Available For Use	67.5	67.5	75.6	124.4	124.4	115.6
Net Transfers	15.6	15.0	11.2	2.0	-3.9	-0.1
Total Water Available For Use	83.1	82.5	86.8	126.5	120.5	115.4
Distribution Input	78.2	76.2	74.3	71.4	69.2	68.3
Target Headroom	4.8	5.5	6.2	0.6	1.3	1.0
Supply Demand Balance	0.0	0.7	6.3	54.4	50.0	46.2

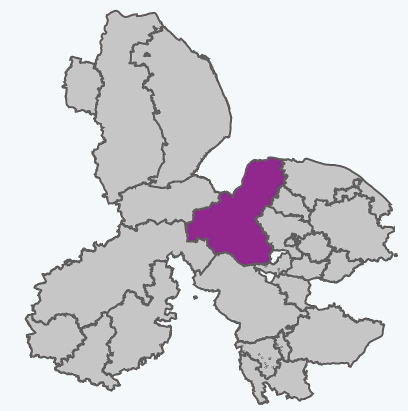
Table 10b: Final Plan demand forecast for DYCP conditions (with preferred demand management options)

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Water delivered measured household	31.2	31.8	33.0	33.3	33.6	34.2
Water delivered unmeasured household	8.8	7.3	5.9	4.7	3.7	3.5
Total Leakage	8.8	8.3	7.9	7.0	6.4	6.1
Water delivered measured non-household	29.2	28.1	26.9	25.7	24.7	23.7
Water delivered unmeasured non-household	0.1	0.1	0.1	0.1	0.1	0.1
Distribution Input	78.2	76.2	74.3	71.4	69.2	68.3

10.1 DYCP BL supply demand summary: Fenland

The zone is in balance.

- Demand Forecast: Final Plan household demand (measured and unmeasured) is forecast to change from 40.0 Ml/d in 2025 to 37.7 Ml/d in 2050, a percentage change of -5.8 %.
- Final Plan Leakage: is forecast to change from 8.8 Ml/d in 2025 to 6.1 Ml/d by 2050
- Final Plan Non-Household demand: is expected to change from 29.2 Ml/d to 23.7 Ml/d.
- Final Plan Distribution Input: is expected to change from 78.2 Ml/d to 68.3 Ml/d by 2050.



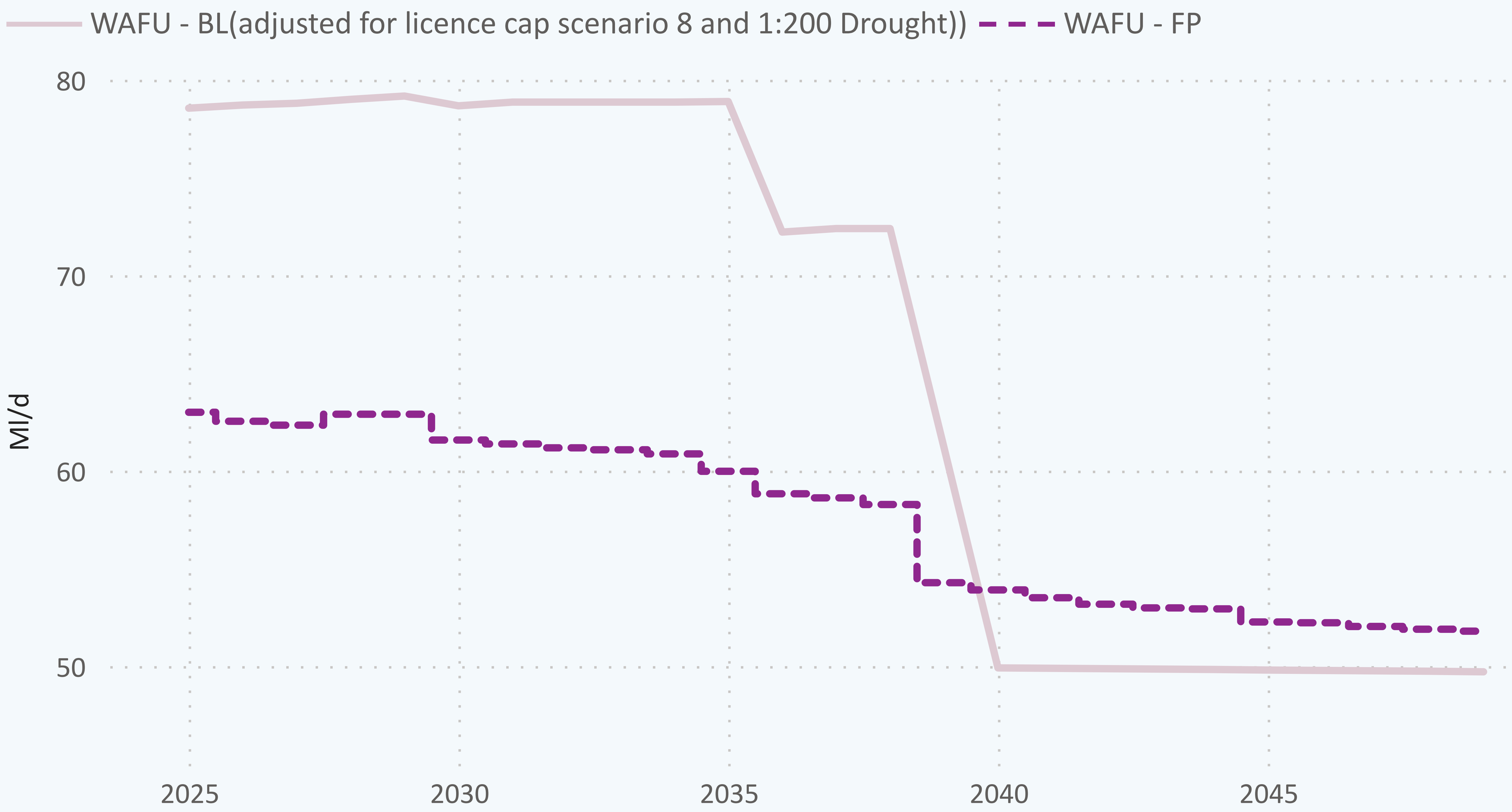
11. Supply Side Strategy

Fenland

Table 11a: Total Water Available for use Baseline and Final Plan

	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
WAFU - BL	79.2	78.9	61.2	49.8	49.7
WAFU - FP	62.9	60.9	54.3	52.9	51.8

Figure 10 Water Available for Use (WAFU) - baseline (BL) and final plan (FP)



11.1 Supply side strategy options.

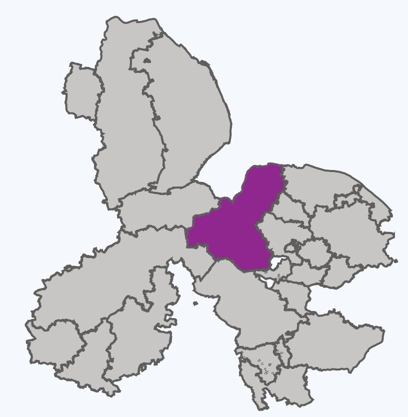
For details on the feasible options list for Fenland WRZ please refer to the Supply-Side Option Development technical supporting document.

Table11b: Preferred supply side options

Option ID	First Option Name
DA02	Adjustment to 1:200 drought
EE02	Adjustment to existing potable water export
EI03	Adjustment to existing potable water import
FND22	Marham abstraction relocation
FND26	Fenland WTW backwash water recovery
FND29	Fens reservoir 50 MCMD high yield
LC03	Adjustment for Licence cap scenario 8

12. Non-Household consumption

Fenland



12.1 Non-Household demand Fenland

In 2025, 21.4 Ml/d of Non-Household demand (measured and unmeasured) is expected. In 2049 it is expected to be 17.3 Ml/d, which is a -19.06% change between the years.

Figure 11: Non-Household demand forecast 2025-2050

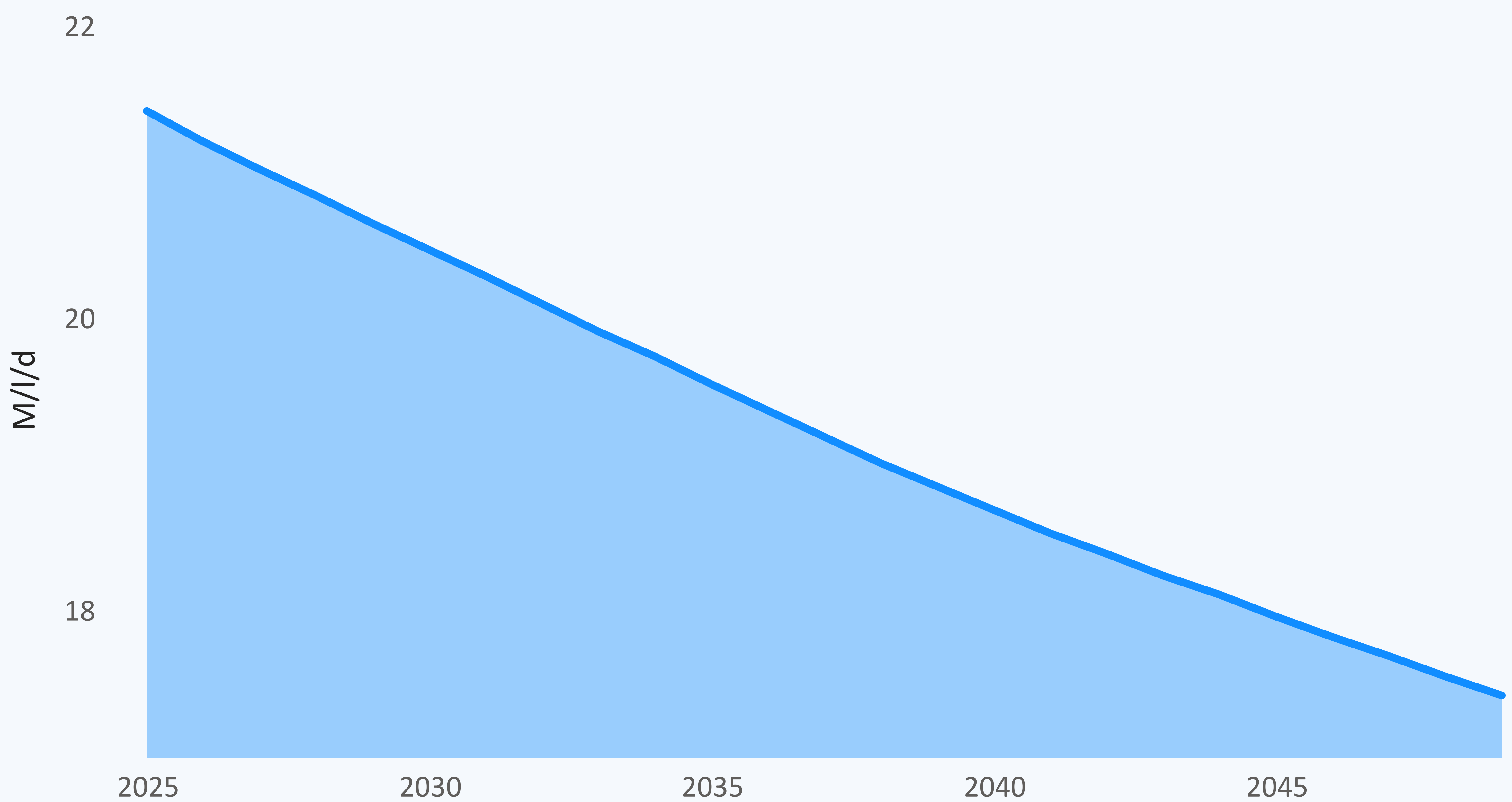


Figure 12: % Non-Household modelled sectors within resource zone