Problem Characterisation Review WRMP24 – SSW Region

Background

Problem characterisation is the beginning of the decision making process in risk based planning, it evaluates the size – how strategic the question is - and complexity of the planning problem for WRMP. Applying the UKWIR Decision Making Process assessment informs the selection of the decision making approach(s) used. (WRMP 2019 Methods – Decision Making Process: Guidance, UKWIR). We have applied this industry best practice to problem characterisation

There are two elements to the assessment:

- **Strategic Needs** - the size of the problem (3 Questions.)
- **Complexity Factors** - how difficult is it to solve (11 Questions.)

New challenges since WRMP19

For South Staffs Water the key challenges which have arisen since PR19 can be summarised as:

- Environmental pressure to reduce licence volumes – WFD No deterioration impacts, including changes to recent actual baseline
- Ensuring resilience to 1 in 500 drought, as per new water resource planning guidelines
- Impact of national framework scenarios on licence volumes in the future, and the uncertainty around the data for these assumptions and the timescales over which these could be applies
- Uncertainty around the level of environmental ambition as a region and as a company

Comparison of WRMP19 to WRMP24: new challenges and requirements

Impact		WRMP19: AMP7 investment	WRMP24: AMP8 and beyond
Growth	Baseline growth		
Sustainability reductions	Sustainability reductions (calculated using historic data)	**X**	**X**
	Further sustainability reductions required by climate change (NF BAU scenario)		**X**
	Further reductions to enhance the environment (NF Enhanced scenario)		**X**

	Setting scale of environmental destination, above regulatory requirements		X
Climate change	Historic climate change	X	
	Future climate change	X	X
Extreme drought	Increase resilience to 1-in-200	X	
	Increase resilience from 1-in-200 to 1-in-500		X

Problem Characterisation Tables

The following tables assess Strategic Needs and Complexity Factors for supply, demand and investment risks.These tables use S to denote Supply, D for demand and I for Investment when defining the risks.

The Guidance suggests how the questions should be scored, and we have followed this closely in our assessment. The Guidance also stresses that the assessment is 'necessarily subjective' and requires 'expert judgement' from within the water company.

No significant concerns (Score = 0)
Moderately significant concerns (Score = 1)
Very significant concerns (Score = 2)

Water Resources Zone (WRZ) Strategic Risks

The factors considered for this assessment can be summarised as follows.

Supply

- Potential licence reductions (could be significant)
- Scale of impact from raw water surface water and groundwater pollution, including localised sources (e.g. pesticide) and more general causes long term (e.g. climate change)
- Scale of impact of multi-season drought
- Understanding of system capability in 1 in 500 drought (new requirement)
- Limited flexibility to re-allocate water across the supply network
- Reductions in deployable output due to decreasing groundwater availability and quality

Demand

- Scale of South Staffs customer side leakage
- Impact of South Staffs meter penetration and options for compulsory metering
- Potential contribution from reuse resources
- Water efficiency strategy
- COVID impact on change of use and time profiles of demand requirements

Investment Planning

- Impact of proposed investments on customer bills
- Customer acceptability of environmental destination expenditure when potentially above statutory obligations
- Multi AMP period planning required
- More onerous expectations by regulators (i.e. DEFRA, Ofwat, EA) over time. For example upstream costing approach, resources pricing control, upstream market reform.

Strategic Risk factors

	Question	Score	Commentary
Strategic needs	S. Level of concern that customer service could be significantly affected by current or future supply side risks, without investment	1	It is likely that regional water resources challenges, as set out in the National Framework will result in sustainability reductions. Scale of environmental ambition yet to be determined, and timescales for any abstractions reductions also to be determined, which increases uncertainty Revised climate change projections and extreme drought implications will be a further pressure on the supply side. Drought resilience historically relies on surplus which will reduce with abstraction licence reductions. Moving to 1/500 drought resilience where system unlikely to be able to provide resilience to that standard without various options considered – severe drought risk prominent for Blithfield Timings of licence changes unknown Unforeseen WQ issues could have significant impact with reduced surplus & headroom Climate change and risk of extreme events e.g. flooding.
	D. Level of concern that customer service could be significantly affected by current or future demand side risks, without investment	1	Demand side options at PR19 are already stretching targets over planning period. Reduced supply headroom creates operational risk in meeting sudden increase at peak demand. Recent years have seen highest peak demands, (peak week, peak day) in response to weather and changing work patterns. Ageing level of customer infrastructure e.g. meters Low meter penetration limits impact on demand Large proportion of shared supplies limiting external meters which also misses supply pipe leakage
	I. Level of concern over the acceptability of the cost of the likely investment programme, and/or that the likely investment programme contains contentious options (including environmental/planning risks)	1	Potential scale of investment from options being considered may be significant inter-generational investment over multiple AMPs. Customer support for environmental ambition above and beyond statutory obligations

Supply Side Risk Complexity

	Question	Score	Commentary
Supply Complexity	S(a) Are there concerns about understanding of near term supply system performance, either because of recent Level of Service failures or because of poor understanding of system reliability/resilience under different or more severe droughts than those contained in the historic record? Is this exacerbated by uncertainties about the benefits of operational interventions contained in the Drought Plan?	1	System reliability unproven under extreme events Recent near misses which were potentially close to source failure need better understanding Drought resilience of Blithfield – further work required to review operational curves and reservoir capacity and operating regime, particularly in light of potential changes to Nethertown licence and Trent Recirc licence
	S(b) Are there concerns about understanding of future supply system performance, primarily due uncertain impacts of climate change on vulnerable supply systems, including associated source deterioration (water quality, catchments etc.)?	1	Awaiting results of 1/500 modelling but initial indications imply the system is not resilient to this level of drought. Still to understand scale and location of failures Hampton Loade River Severn abstraction water quality – bankside storage OK. However EA undertaking River Severn Regulation review and review of Shropshire Groundwater Scheme – impacts currently unknown
	S(c) Are there risks of 'stepped' changes in supply (e.g. sustainability reductions, bulk imports etc.) in the near or medium term that are currently very uncertain?	2	No det reductions not yet agreed – scale not yet fully understood Medium term sustainability changes resulting from environmental ambition scenarios could result in significant stepped changes to supply.
	S(d) Are there concerns that the 'DO' metric might fail to reflect resilience aspects that influence the choice of investment options (e.g. duration of failure), or are there conjunctive dependencies between new options (i.e. the amount of benefit from one option depends on the construction of another option – this is also referred to as a non-linear problem).	1	Less licence headroom at annual average resulting from licence caps and future sustainability changes will result in less flexibility within the WRZ across multiple sources of supply making up the aggregated DO. Single points of failure would become more critical to supply, and maintaining compliance. Potentially more dependency on inter-company solutions

Demand Side Risk Complexity

	Question	Score	Commentary
Demand Complexity	D(a) Has the nature of current or near term demand recently changed or is likely to change, e.g. because of large scale metering programmes or sudden changes in economics/demographics?	1	Current near-term demand has changed since March 2020 as a result of COVID-19 response, with a 2-3% likely impact increase on average demands. The summer of 2020 also saw the highest peak week and peak day demands on record. As the situation is very uncertain, we do not know how permanent the impact of demographic changes on demand will be. This creates complexity especially if using 2020-21 as the base year. PCC is impacted due to the move from NHH to HH use, this has impacted the Company performance commitment and may have a longer term impact on successive annual reduction forecasts made for WRMP19 Stable population base
	D(b) Does uncertainty associated with forecasts of demographic/economic changes over the planning period cause concerns over the level of investment that may be required?	1	As above, longer term impact of COVID not yet understood – various scenarios developed but further research to be undertaken to develop a clearer view
	D(c) Are there concerns that a simple 'dry year/normal year' assessment of demand is not adequate, e.g. because of high sensitivity of demand to drought (so demand under severe events needs to be understood), or because demand versus drought timing is critical.	0	No concerns. Further modelling to 1 in 500 year drought underway

Investment Risk Complexity

	Question	Score	Commentary
Investment Complexity	I(a) Are there concerns that capex uncertainty (particularly in relation to new or untested technologies) could compromise the company's ability to select a 'best value' portfolio over the planning period?	1	Demand management and compulsory metering due to limited current metering (lack of water stress classification). Ability for Demand Management limited in SS due to low meter penetration and ability to influence customer behaviour Significant variation in scale and phasing of possible options being considered for the metering programme Interim measures may be required, which may lead to risk of stranded assets
	I(b) Does the nature of feasible options mean that construction lead time or scheme promotability are a major driver of the choice of investment portfolio?	1	The potential for sustainability reductions reducing supply and increasing demand are likely to drive investment in supply-side options Phasing of options over successive AMP cycles – need to take long term view
	I(c) Are there concerns that trade-offs between costs and non-monetised 'best value' considerations (social, environment) are so complex that they require quantified analysis (beyond SEA) to justify final investment decisions?	1	Best value consideration will likely require further analysis to justify final investment decisions, in particular for: - Environmental enhancement ambitions an future sustainability reductions - Demand management strategy - Strategic option selection and design - Resilience
	I(d) Do uncertainties about relative opex or utilisation of resources cause concerns about the adequacy of a simple, deterministically derived investment portfolio?	1	Some uncertainty over opex. Utilisation of resources is heavily dependent on the scenario and will change in different drought conditions and environmental ambition scenarios Some uncertainty over future energy costs

Problem Characterisation Summary

	South Staffs WRZ Score
Strategic Needs	3
Total Complexity Factor (CF)	11
Supply CF	5
Demand CF	2
Investment Programme CF	4

		Strategic Needs Score ("How big is the problem")			
		0-1 (None)	2-3 (Small)	4-5 (Medium)	6 (Large)
Complexity Factors Score ("How difficult is it to solve")	Low (<7)				
	Medium (7-11)				
	High (11+)		SSW		

The implications of the problem characterisation results and subsequent discussions with SSC are that the following approach should be adopted:

- An enhanced decision making method
- Using an aggregated approach
- And risk composition 2, scenario based method using multi-criteria analysis.