Technical note

Project:	SSW PR19 Trading & Resources	**To:**	Ken MacDonald (SSW)
Subject:	Option screening and development methodology FINAL	**From:**	James Tradewell
Date:	11 Oct 2018	**cc:**	Peter Greenaway, Daniel Clark (SSW)

1. Introduction

Atkins has been commissioned by South Staffordshire Water (SSW) to support the supply-side options work in preparation of the 2019 Water Resources Management Plan (WRMP19) for both the South Staffs region (SST) and also the Cambridge Water (CAM) supply area.

In this role, Atkins has formed part of a wider consultant team, which includes Artesia (development of demand management options), Ricardo (Strategic Environmental Assessment) and Arup (development and running of the Decision Making Framework (DMF) investment model).

This technical note describes the approach taken to complete the following activities:

- Identify and assess the Unconstrained List of new supply-side options
- Carry-out a high-level strategic screening and develop the Constrained List of new supply-side options
- Develop the Constrained new supply-side options that eventually input to the DMF modelling.

These activities are undertaken alongside the Strategic Environmental Assessment (SEA), which is an integral part of the WRMP19 process.

2. Option screening

2.1. Staged screening approach

The approach taken adopts an iterative screening of options, starting with the initial Long List, ultimately through to selection of the Constrained List. Those options are then developed so that they can be assessed through DMF optimisation modelling.

The approach enables scheme development to be integrated with the SEA, Habitats Regulations Assessment (HRA) and Water Framework Directive (WFD) Compliance Assessment, including consultation with key internal and external stakeholders, principally the Environment Agency but also neighbouring water companies and other interested third parties.

The proposed approach can be summarised visually as shown in Figure 1 below.

Technical note

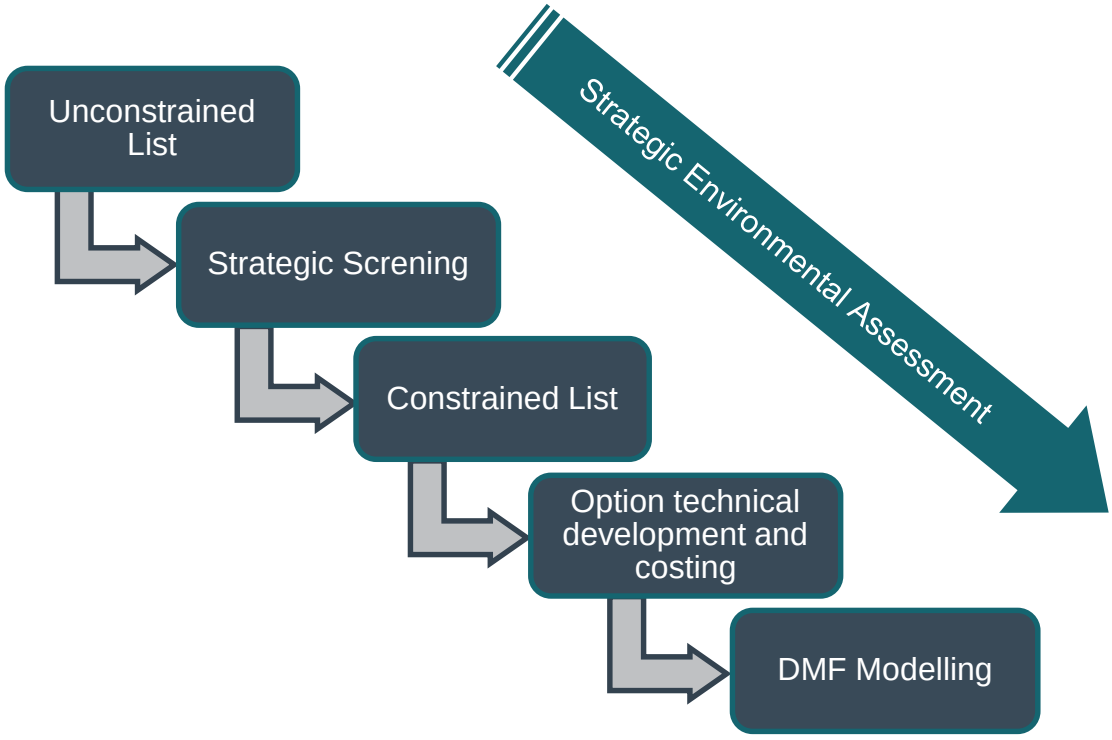

Figure 1. Schematic representation of the option screening process

2.2. Screening criteria

Unconstrained new supply side options are screened against the criteria presented in Table 1 below. The questions are phrased so that a positive response is a reason for retaining (i.e. screening in) an option. Overall, judgement is taken to appraise whether a negative response (or combination of negative responses) to any of the criteria is justification to screen out an option. The tabular format enables evidence to be clearly logged which is crucial for a robust audit trail.

In addition to the screening criteria shown in Table 1, the ability of the option to support peak output and improve resilience is also considered and recorded.

2.3. Stakeholder engagement

In order to answer these questions and understand whether options should be screened in or out, knowledge and experience was gathered from within SSW and from the wider project team. A series of meetings and workshops with key internal stakeholders were held for both SST and CAM regions. These sessions generated a good understanding of challenges and opportunities (e.g. existing infrastructure constraints and how they might be overcome) as well as bringing together a good deal of local knowledge. At the same time, the company has consulted the Environment Agency through regular meetings and correspondence, and this feedback also helped inform the screening process. Discussions with other water companies, including via the Water Resource East (WRE) programme, have also fed into the process.

Screening sheets for all new supply side Unconstrained options have been prepared in Excel spreadsheet format, with one workbook for SST options and one for CAM options.

Technical note

Table 1: Screening criteria (as included in option screening record sheet)

Ref	Criteria	Considerations
1	**Location of scheme benefits**	
1.1	Scale	Option DO is proportional to the estimated supply-demand deficit.
1.2	Location	Option is within, or can serve, the area of estimated supply-demand deficit
1.3	Future proofing	Ability to mitigate against future DO losses due to external events - climate change, licence reduction etc.
2	**Statutory / Regulatory / Legal Constraints**	
2.1	Planning and Environmental	Likely to be acceptable in terms of planning and statutory environmental constraints
2.2	WFD	Scheme does not cause deterioration of a WFD water body.
2.3	HRA	Scheme does not impact on Natura 2000 site.
3	**Meet customer / stakeholder needs**	
3.1	Customer	Scheme complies with customer experience targets and does not cause detriment to service standards. Avoidance of customer discrimination.
3.2	Internal Stakeholder	Compliments SST business plan, strategy and is in line with corporate objectives
3.3	External Stakeholder	Likely to be acceptable to third party group including local stakeholder groups.
4	**Option Robustness**	
4.1	Flexibility	Option can be scaled and flexed operationally to meet supply-demand needs
4.2	Favourable	Option is more favourable of all options identified for this water source
4.3	Viability	Option is technically feasible
4.4	Known technologies	Option is achievable without significant R&D / trials
4.4	Licensing	Abstraction licence is likely to be secured

3. Option development

3.1. Option criteria

Having screened the initial list of new supply-side options, the Constrained options were taken from initial concepts and developed to an appropriate level of detail to understand and document the following:

- **Technical feasibility** – can the option be implemented, what are the principal components, an estimate of delivery timescales and what is the deployable output benefit?
- **Delivery risks** – where is there uncertainty that could lead to increased costs, programme delays or ultimately prevent successful implementation?
- **Environmental constraints** – working with the SEA process, identifying potential blockers and ensuring adequate mitigation is considered and costed for where appropriate.
- **Costs** (CAPEX and OPEX) – to inform whole life costs appraisal.
- **Other criteria** – required as input data for the DMF tool.

3.2. Information and assumptions

A key step in the option development process was to engage with internal stakeholders. The initial series of meetings and workshops helped share understanding of existing assets and network operation. This included information on the output from existing sources, capacity of treatment works and pumping stations, location and size of trunk mains and a view of overall day to day operational preferences. This process also identified planned capital maintenance work at existing assets which would be captured as baseline options in the DMF modelling rather than as new supply-side options.

Technical note

The high-level technical appraisal undertaken used this information where available but in many cases it was necessary to make assumptions. Typically assumptions needed to be made around raw water quality in order to inform treatment process design. Elsewhere, for options that are little more than a concept (such as a new reservoir in the CAM region or a new SST groundwater source) a notional location was assumed so that associated pipeline lengths could be estimated. Such assumptions are appropriate for this stage of the WRMP process and would normally be verified during future feasibility design work, should the option be taken forward.

The assumed deployable output benefits of each option were discussed and agreed with SSW staff whilst defining the initial option concepts. For some options, the deployable output is based on maximising the existing licence or reinstating a site's former output. For others, an assumed or preferred output was proposed by SSW, typically driven by demand requirements and supported by professional judgement. In many cases these estimates were subsequently reviewed and refined through SSW's water resources modelling.

A number of third party options have been considered. In particular, having engaged with the Canal and River Trust (CRT), a number of potential options were proposed and two options were taken through to the SST Constrained List. CRT undertook the technical appraisal of these options and provided technical information and financial costings in a report issued to SSW. That report has been used as the basis of those options.

3.3. Costings

The financial cost information prepared for each option includes the following:

- CAPEX: including construction costs of new assets and any upgrades, replacement costs and frequencies, maintenance costs.
- OPEX: fixed and variable costs including power, abstraction, treatment, distribution and any other significant cost elements applicable.
- Scheme implementation cost profiles, including design, planning, construction and commissioning, typically considering either a 5 or 10 year delivery period (i.e. one or two AMP periods).
- Consideration of whole life costs over 80 years, including capital maintenance and replacement costs.

The cost estimating approach, including data sources and assumptions used, is covered in detail in Atkins' '*Methodology for Estimating Scheme Costs'* report which has been prepared separately.

3.4. Reporting

For each Constrained option, a brief report proforma report in a standardised format has been prepared. These reports present the essential information for each option and provide a record of what underlies the data that has been input to the DMF model.

- A description of the option, outlining the concept of how it could work
- Estimate of the scheme deployable output (and uncertainty)
- Any links or dependencies to other options
- Potential risks or uncertainties that may have an effect on implementation – such as engineering, environmental or planning
- Stakeholder considerations
- Key assumptions
- Costs (CAPEX and OPEX) and a summary of the main components costed
- Estimated timescales required to deliver the option.