Technical Stakeholder Meeting: Update on demand management and resource options to manage future water supply.

Date: Thursday 6 October 2016

Time: 10:00 to 15:00

Venue: Crowne Plaza Hotel, Caversham Bridge, Richfield Avenue, Reading, RG1 8BD

Meeting Minutes

Welcome and Introduction

Chris Lambert welcomed everyone to the meeting. Chris provided background information on the water resource challenges in the Thames Water (TW) supply area and the work underway by TW to develop a programme to address these challenges. Key points were:

- TW forecast a significant resource deficit in London WRZ of 414 Ml/d by 2040 (WRMP14). More recent work indicates that the deficit in London WRZ will grow to around 800 Ml/d over the 80 year planning period using the record of historic droughts 1920 - 2010.
- In the next 10 years the focus is on demand management measures, but there is broad agreement that there is a need to develop new resources to meet future challenges. The long lead time for resource development means that TW needs to start planning now.
- The focus of the meeting is on the work underway to explore demand management and resource options. TW will present the headlines of work completed to date, request comments at the meeting and also written feedback to Lesley.tait@thameswater.co.uk by 31 October 2016.

Demand management options

Tony Owen and Alex Nickson provided an update on work to explore options to manage demand. Key points were as follows:

- TW has completed a review of best practice initiatives, both in the UK and internationally, to ensure we build the learning into the delivery of our current programme and also future plans. TW commissioned Waterwise to review and contribute to this work.
- Competition in the water sector is a developing area. TW will not operate as a Retailer in the non-household sector, all existing non-household customers will transfer to Castle Water. Ofwat is developing the approach to Retail in the household sector (Report, June 2016). TW's Wholesale water business will retain ownership of the water meter and the commitments to deliver water efficiency, with the Retail business owning all interactions and contacts with customers. Consequently the Wholesale business will have to work with the Retail businesses to ensure water efficiency activity is maintained and delivered in the most efficient and economical way.

- TW has developed an incentive scheme for customers. This is considered to be a positive intervention and was developed following examination of sophisticated financial tariffs and feedback from customers that they considered financial tariffs to be a penalty measure, and that meter penetration needs to be sufficiently high to be considered fair. The incentive scheme is a reward based scheme and aims to incentivise and encourage greater awareness of efficient use of water and rewards actions to reduce water consumption. The scheme is being trialled in 3,000 metered households in Reading in Autumn 2016 and will then be rolled out more widely.
- On non-potable reuse, TW outlined the 4 main strands of work:
    - Research undertaken by Arup to assess the feasibility of non-potable reuse in London
    - Integrated water management strategies for key 'Opportunity Areas' in London
    - MSc research thesis into aquifer reuse
    - Development of the business case for inset companies to work with TW on new developments.

There are few incentives to encourage developers to install non-potable reuse, a key hurdle is the responsibility for installation and ongoing maintenance of such systems. From the work to date TW has identified 22 opportunity areas which could potentially deliver > 8 Ml/d of resource. The next steps include an assessment of the economics and risks of non-potable water reuse in London's Growth Areas, a report will be published in early 2017, discussions will progress with inset appointees and work will continue to explore aquifer recharge opportunities.

To complete this session TW outlined the process to develop and screen potential demand management (DM) options for WRMP19. TW also explained how programmes of DM options are developed and input to the programme appraisal. TW published this work and a draft constrained list on its website www.thameswater.co.uk/wrmp in August and requested feedback.

ICE: Have you considered opportunities for reuse beyond toilet flushing and irrigation.
TW: We have broadened the scope and this will be considered in the viability assessments.

GLA: Have you got in mind a % meter coverage before tariffs could be introduced.
TW: We have not completed this analysis but to address the fairness issue it is likely to be 65-70% coverage.

CIWEM sought clarification on tariffs and asked whether the 35% meter customers are already on a metered tariff.
TW confirmed that this was the case, the tariffs being explored are more sophisticated tariffs eg rising block tariffs.

Results for the incentive scheme were requested and also the target for reduction in water consumption that TW is aiming for.
TW: The purpose of the scheme is to understand if customers respond positively to a reward based scheme and if a sustained reduction in household consumption is achievable. The scheme in Reading will be launched this Autumn from which data will be recorded.

North Wessex Downs AONB: Could the current meter programme be rolled out faster?
TW: We have an ambitious programme of meter roll out with over 400k smart meters planned to be installed as part of the progressive meter programme by 2020.

GARD: With a forecast deficit of 800 Ml/d by 2100 do you have a target for demand management ?
TW: Over the next 10 years TW has a programme to deliver ~ 200 Ml/d via demand management which is ~ 50% of the whole programme. TW will determine the programme of demand management measures as part of the wider programme of measures in WRMP19.

WWF: Have you considered the use of the incentive tariffs in dry periods ?
TW: Yes TW is considering how the scheme could be adapted during dry period to promote communications and further incentivise behaviour.

Resource options

Introduction

Tony provided an overview of the 4-phase programme of work, to examine potential resource options, which started in 2015. TW has engaged with stakeholders throughout this process to ensure there is an understanding of the work underway and an opportunity to contribute to the work. Tony also outlined the documentation and reporting that will be produced. This meeting is focused on the output from Phase 2, the examination of a wide range of feasible options to produce a constrained set of options, on which TW is seeking comment from stakeholders.

Option Feasibility Reports methodology

Bill Hume-Smith from Motts then focused on the option feasibility reports. The purpose of these reports is to outline the range of options considered within an option type, and the process to screen options and achieve a feasible list of options. The methodology used in the feasibility reports had previously been presented at the May 2016 meeting and had been accepted by stakeholders. In summary it involves 3 stages:

- Stage 1 review of absolute and key constraints to understand if there are any blockers
- Stage 2 & 3 comparative performance of options against a range of criteria (qualitative)
- Stage 3 as above but with greater detailed assessment

Note not all the criteria apply to all the option types, and relevant criteria are used in the assessment.

GARD: Why do you not use resilience against drought as a criteria for the reservoir options?
TW: The assessment is comparative within an option type and therefore this would not help provide a differentiator between the reservoir options.

There were no further comments on the methodology and stakeholders accepted the methodology as sound**.**

Raw Water Transfers

Chris provided an overview of the work to assess raw water transfers. The transfers have been identified from previous work, via an OJEU notice and water company specific liaison, and engagement with stakeholders. The transfers have been considered in 2 parts – as the resource part and the conveyance part.

GARD: Would the transfer via Severn Trent Water (STW) involving Draycote reservoir be continuous?
TW confirmed that the option would not be continuous; there is sufficient resource available in the TW catchment during a normal year. Resource is only required in a dry year.

GARD: Would the transfer via STW using Minworth effluent provide a continuous resource?
TW confirmed that the resource would be provided on a variable basis, as required.

Chris provided an update on the unsupported transfer (UST) from the River Severn. Chris confirmed that this option was screened out due to the lack of available resource during a drought period and therefore was not considered to be a robust option in the long-term. This conclusion was independently supported by in the findings of the WaterUK long term study and associated expert peer review.

GARD disagreed with screening out the UST and stated that, based on their own modelling using some of worst droughts and climate change perturbations, the UST is a viable option and as such should not be screened out.
TW: The assessments completed by TW, and also as part of the WaterUK study, confirmed that unsupported transfers were not considered to be resilient and the amount of water required by donor companies for their own customers' needs to be factored into the assessment.

GARD requested the detail of this work and also information on the range of droughts.
TW agreed to provide access to the assessments completed by TW and would enquire on behalf of GARD about the WaterUK study and the availability of data. The response of the WaterUK project team to GARD's request for modelling data from the study is attached with the notes of the meeting.
Colin Fenn, WWF, acted as an independent reviewer for the WaterUK study, and Colin confirmed that the work completed was thorough and detailed, and considered a range of potential futures, the availability of resources in the donor region and potential transfer routes. Aquator models were used for the work in combination with bespoke model to facilitate regional connectivity. WaterUK has published a report and visibility of additional work and data would require approval from WaterUK as the IP sits with them and the acting consultants.

TW confirmed that transfers from Craig Goch had been screened out due to EU Birds Directive Regulations requirements and the availability of alternative options such as potential resource from Welsh Water.

GARD: The volume of 23 Ml/d cited is significantly lower than the volume potentially available from Great Springs.
Welsh Water confirmed that they will assess their own needs to ensure security of supply for their customers and will then provide information on potential resource available. TW and Welsh Water have on-going dialogue on opportunities.

The key options screened out at the stage 2 assessment were:

- Kielder due to the resource needs in the local area and lack of conveyance
- Middle Severn due to cost and poor performance compared to other options
- Construction of a new reservoir at Longdon Marsh to support Severn abstraction due mainly to flood plain encroachment and cost.
- Conveyance by pipeline from Deerhurst to Culham because the Deerhurst to Radcot pipeline route for the same capacity is significantly shorter and has similar performance for other criteria

GARD proposed that TW should retain a small transfer option to address a resource deficit in SWOX WRZ as this is the only significant option for SWOX. **GARD** suggested that in their view there are multiple sub-options which would enable a transfer from United Utilities (UU).
TW confirmed that a 180 Ml/d transfer from Lake Vyrnwy has passed through Stage 3.
GARD gave a view that to model a capacity of 180 Ml/d was too simplistic, there is surplus water at Lake Vyrnwy, and therefore there should be a more subtle operating arrangement. TW advised that discussions were underway with UU.
UU, later in the meeting, stated that 180 Ml/d is the reliable yield based on the 33/34 drought event. UU is also undertaking work to consider the spatial coherence of droughts which will help to narrow the parameters of the option.

GARD stated that in their view the environmental assessment of Lake Vyrnwy should be underway now and these studies needed to consider the magnitude and variability of the transfer.
TW advised that there is a full programme of work and these aspects will be considered.

TW confirmed that a new reservoir in the TW area is being investigated to support River Severn abstraction; work is progressing to understand the deployable output of a combined reservoir and Severn Thames Transfer option.

TW confirmed that further work is underway on the following resource elements - groundwater abstraction at Bradley; use of Netheridge STW effluent and use of Farmoor reservoir, and conveyance options including the use of the Cotswold canal.

TW outlined the main findings from the water quality and ecology study, completed by Cascade and HRW for TW, as follows:

- Abstraction from River Severn is viable and environmentally acceptable subject to low flow protection rules
- 600 Ml/d transfer option would be difficult to promote due to increased risk of adverse effects on the River Thames environment
- Transfers above Lechlade would adversely affect the relatively natural conditions of this part of the River Thames
- All transfers carry significant risk of transfer of the invasive non-native Quagga Mussel and Zebra Mussel (both difficult to remove through treatment) but a pipeline conveyance route rather than a canal is the less risky of the two conveyance routes.

The following issues were then discussed:

Volume of the transfer
GARD challenged the volume of transfer under investigation. GARD questioned the evidence to justify that 600 Ml/d was not feasible. GARD suggested that there are opportunities to have a transfer greater than 300 Ml/d. TW confirmed that the volume of a transfer is part of ongoing work to understand the maximum capacity, without causing damage to the River Thames. GARD also suggested that the modelling should therefore consider a pipe with a capacity larger than 300 Ml/d. **CIWEM** raised the size of the pipe that would discharge to Abingdon reservoir.

Discharge point
On the conveyance, a pipeline from Deerhurst to Radcot up to 300 Ml/d transfer is the preferred options.
ICE questioned whether data on condition of the Lower Severn in drought had been considered.

TW confirmed this was included and initially examined through an appropriate assessment analysis of the Lower Severn work to date has demonstrated that abstraction from the River Severn is unlikely to have a negative impact on the River.

Invasive non-native species
GARD questioned whether quagga mussels were already in the River Thames.
TW confirmed that they are in the lower reaches of Severn but not in the upper Thames. TW stated that the canal presented a higher risk of transfer based on the work of David Aldridge, University of Cambridge, with no effective mitigation, whereas the pipeline presents a lower risk and would be used on an intermittent basis

CCT suggested that whilst the canal could provide a corridor for invasive species equally it provides a corridor for biodiversity.

TW outlined the initial views from Natural England that had been provided on the water quality and ecology work which set out their preference for a piped transfer rather than the canal.
CCT stated that it had received contradictory views with others in NE supporting the canal route.
TW explained that they had been advised that the advice provided represented the formal organisation's views.

TW also set out that it considered the canal to be more complex route of conveyance and further work is underway to understand the costs of this option

GARD asked if TW would consider a dual conveyance route using both the canal and a pipeline. TW view was that this would substantially increase the costs.
CIWEM asked if wider benefits of canal restoration were included in terms of benefits to society and the country. TW explained that the recreational value of the canal would be considered as part of the conveyance option evaluation and assessment.

Sedimentation
GARD raised the issue of sedimentation and asked if work had been completed on this. CIWEM stated that when the NRA considered a transfer, settlement lagoons near Deerhurst were considered. TW confirmed that treatment would be required at the River Severn. Costs have been included for settlement for both the canal and pipeline conveyance.

Treatment
STW requested information on the treatment considered. **Motts** confirmed that this was ferric dosing and rapid gravity filters plus aeration at discharge point.

Other
GARD suggested that TW need to consider a smaller transfer from Minworth to serve SWOX in the situation that the main resource options taken forward for London are desalination and reuse.

Reservoirs

Cascade presented the work to review potential reservoir options. The findings of this work concluded that there are 3 feasible sites as follows: Abingdon; Marsh Gibbon; and Chinnor. With Abingdon performing well at all sizes, Marsh Gibbon performing well to 75 Mm^3 and Chinnor to 50 Mm^3.

GARD queried what Hands off Flow (HoF) was used and the level of emergency storage assumed.

TW confirmed that the HOF for UTR is based on flows at Culham of 1450 Ml/d, as agreed with the EA, and emergency storage assumed is 30 days.

CIWEM asked if the analysis takes account of greater severities of drought. Cascade confirmed that this work is based on the historic record. Work is underway to understand how future droughts might affect deployable output and this will be applied to all options

NFU raised the concerns of a landowner whose land is located in the safeguarded area close to Chinnor and criticised TW for the lack of communication. CCG supported the need for TW to communicate with local people who may be affected by its plans.
TW confirmed that it had safeguarded 3 sites in Oxfordshire for potential reservoirs as part of the Local Plan process. There had been consultation on the Local Plans by the relevant Local Authority. TW has also proactively spoken to Chinnor and Longworth Parish Councils and provided information on the work underway. To date TW has not proactively contacted individuals who may be affected by future schemes as the work underway is focused on shortlisting sites from a long list of options and it was felt that to contact people at this stage could potentially raise unnecessary concerns. TW has however separately spoken to individuals who have raised concerns. TW will be consulting affected communities and individuals as part of the engagement process.

North Wessex Downs AONB asked what consideration had been given to the impact on the designated area and specifically landscape and visual impact.
Cascade confirmed that this had been considered and information is included in the feasibility report.

Water reuse

Motts presented the work to review potential water reuse options and set out the feasible reuse options proposed to be taken forward. These were: Beckton STW; Crossness STW; Deephams STW; Mogden STW and Mogden South Sewer.

CIWEM asked whether Crossness would be reconsidered. Motts confirmed that it is not an infeasible option but several other options are preferable for reuse.

CIWEM referenced previous trials undertaken at Deephams and asked if the output of this was being considered.
Motts confirmed that this work has been fully taken into account.

GARD queried that following a trial of technologies at Deephams, how and when would this information be included in the decision making process, and would it affect decisions on long term investment?
Motts confirmed that the trial scale plant at Deephams would help to establish if a lower level of treatment was feasible and the adaptive pathway approach being followed by TW would enable this information to be included in decision making.

CIWEM asked if TW had defined an upper limit on reuse. **TW** confirmed that it had not set an upper limit. **GARD** followed this up and asked if TW did set an upper limit, how it would do this. **TW** confirmed that this would be analysed as part of the phase 3 detailed studies.

ESW asked if the Deephams option is direct river abstraction. **Motts** confirmed that it is a reuse option. **ESW** then asked for further information in respect of understanding the potential impact on ESW customers. **Motts** confirmed that the Deephams reuse option involves transfer to the Lee Valley

reservoirs and treatment at Coppermills WTWs prior to water supply which would potentially impact ESW customers. Further discussions need to happen between TW & ESW.

GARD asked how the scheme would be operated. **Motts** confirmed that work was ongoing to examine different operational modes including the costs of transitioning between different operational states.

ICE queried if options linked to the Wandle had been screened out. **TW** confirmed that options in the Beddington STW catchment had been rejected due to the potential impact on the River Wandle.

ICE asked what was driving the constraint at Deephams. TW confirmed that the constraint of 60Ml/d was due to the potential impact on Hackney Marshes as such it is not feasible to use more treated wastewater.

Desalination

Motts presented the potential desalination options and the shortlisted feasible options proposed to be taken forward. These were: Beckton, Thamesmead and Crossness.

GARD asked what operational rules were assumed and if TW referenced the Gateway plant in determining these? **TW** confirmed that the Gateway plant had been operated at full capacity as a short trial but to date long-term continuous operation has not been required. **Motts** confirmed that work was in progress to consider different operating states.

ESW raised the need to consider the impact on pipework from desalinated water.

GARD questioned wither TW were engaging with the GLA considering previous opposition to desalination as a resource option in London? **GLA** were present at the meeting and confirmed that they are engaging with the process.

Direct river abstraction

Motts presented the 3 stage process followed to review potential direct river abstraction options and set out the feasible options proposed to be taken forward. These were: River Lee (150 Ml/d); Culham (4.5 Ml/d) and Teddington (300 Ml/d)

ICE questioned if there were environmental implications of this option to the river downstream of Teddington Weir and if the EA had raised concerns.
TW confirmed that EA feedback to date had not raised concern but further comments are expected.

Catchment management

Cascade outlined the approach to consider water resource opportunities from catchment management schemes. This involved 1) review potential benefits of Thames Water's existing catchment management activities 2) review potential for catchment management approaches to overcome water quality constraints on source deployable output and 3) review potential for catchment management approaches to augment groundwater recharge and/or river base flows. This process identified 22 potential sites. Based on preliminary assessment of deployable output and potential wider catchment benefits these sites were further refined to 10 sites. These have been taken forward for further work. The types of measures which could be considered are swales, pesticide control, and vegetation. In total these are estimated to provide < 5 Ml/d.

CPRE: Many of the options identified to augment groundwater recharge have interest from wider groups and therefore could attract multi agency funding which could aid development of these options. **TW** recognise the opportunities for collaborative work and is holding a cross party workshop at the end of the month to explore opportunities.

GLA raised a project underway with the EA to consider catchment approaches for the River Lee with work to date focused on flood management. GLA proposed that this could be an option for further consideration by TW. **TW** agreed to follow this up with GLA. **WWF** asked if TW had considered reputational benefits of schemes and how this could be considered in the development of its plan. **EA** stated that it was currently scoping opportunities for the TW catchment and suggested that there may be opportunities for collaboration for example a specific area is the impact of land management practices on groundwater recharge.

Screening Report

Motts provided a recap of the fine screening methodology which had been previously presented to stakeholders, and changes to the approach including the longer planning horizon (up to 800 Ml/d deficit for London). An additional change to the method presented to stakeholders focused on cost and the use of AIC. AIC is considered to have shortcomings specifically in terms of comparison between options of different sizes, and the change proposed is to amend the threshold used for option size bands to reflect that if the option is a large capital scheme the costs are upfront whereas costs can be spread for small options.

GARD queried whether AIC or discounted costs will be used for programme appraisal. **TW** confirmed that discounted costs will be used.

Stakeholders supported the methodology and the methodological change related to cost.

Motts then presented the conclusions of the fine screening and the constrained options proposed to be taken forward to Phase 3, as presented in the accompanying presentation. Key discussion points are noted.

GARD stated that the transparency of costs is important when this has been used as a justification for screening, referencing the screening of Marsh Gibbon and Chinnor. Recognising costs are commercially confidential GARD requested that they are compartmentalised into components.

ICE raised concern about the inclusion of Teddington direct river abstraction due to potential environmental impacts on the stretch of river downstream of the Weir. ICE commented that TW should seek comments from the EA need on this option.

ICE raised concerns over high levels of abstraction from Deephams and the Lee for the reuse option proposing that when water quality has been improved due to STWs upgrades, this scale of abstraction is likely to cause environmental deterioration.

As a final point TW emphasised the need to consider all the information as a system which will be important in developing a resilient and optimised system. The next TSM on options will address this (January 2017)

WWF applauded the detailed work underway but flagged that with so many degrees of freedom – it is important to firm up on critical elements eg transfers from UU, Welsh Water & STW.

Welsh Water explained that there is a slightly different regulatory framework in Wales. Work is in progress but in the first instance they will understand their requirements and then will consider opportunities for trading, sharing resources which would provide a benefit to customers in Wales. Welsh Water has published a Trading and Procurement Code and is working with neighbouring companies to discuss opportunities.

STW explained they are following a similar process and work is in progress to understand their resource requirements after which they will use to define potential wider opportunities.

Dates of next meetings

- 27 October - Water Resources Forum, London
- 8 November – Technical Stakeholder Meeting on programme Appraisal, Reading
- 7 February – Technical Stakeholder Meeting on demand management and resource options

End

Attendees

Name	Organisation
Adam Comerford	Canal & Rivers Trust
Andrew Halliday	South East Water
Andrea Farcomeni	Affinity Water
Anne Heal	CCG
Chris Binnie	CIWEM
Colin Fenn	WWF
Dave Wardle	ICE
Gareth Old	CEH
Gerard Coll	Wycombe District Council
Graham Scholey	EA
Harry Hodgson	CCG/Federation of Small Businesses
Helen Tidridge	Natural Resources Wales
Henry Oliver	North Wessex Downs AONB
Ian Brown	Dŵr Cymru Welsh Water
John Lawson	Group Against Reservoir Development (GARD)
Kay Lacey	CCG/Pang Valley Flood Forum
Ken Burgin	Cotswold Canal Trust
Kevin Reid	GLA
Liz Cornwell	Bristol Water
Malcolm Jeffries	Albion Water
Mark Smith	United Utilities
Martin Lunn	Essex and Suffolk Water
Neil Edwards	RWE Generation UK
Pat Spain	Severn Trent Water
Peter Walker	Cotswold Rivers Trust
Richard Harding	CPRE
Robin Edwards	CCG/CLA
Sarah Goode	EA
Sarah Thomas	CCWater
Sarah Wardell	EA
Simon Harrow	Ofwat
Stuart Hanks	EA
Tom Ormesher	NFU