Project: Severn Thames Transfer Water Quality and Ecology Investigation
Meeting: Phase 2 study, Third Stakeholder Meeting
Location: Reading Town Hall, Reading
Date: 1100 – 1500, Wednesday 24th February 2016

Attendees:

Chris Lambert	TWUL	Steve Tuck	TWUL
Richard Milton	TWUL	Laura Beardsworth	TWUL
Kieran Conlan	Cascade	Trevor Wade	Cascade
Rob Hinks	Cascade	Caroline Hazlewood	HR Wallingford
Elfed Jones	HR Wallingford	Sarah Wardell	EA
Graham Scholey	EA	Phil Chatfield	Welsh Government
Helen Tidridge	NRW	Caroline Knight	DWI
Rebecca Tibbetts	NE	Kat Liney	UU
Bill Hume- Smith	Motts	Alice Mortimore	Motts
Peter Spillett	Thames Rivers Trust	Hanif Jetha	Ofwat
Nick Thompson	GARD	Colin Fenn	Hydro-Logic
Ken Burgin	CCT		

[DRAFT] MINUTES OF MEETING

		Action
1	**Session 1: Introduction** Chris Lambert (CL) welcomed everyone to the meeting and recapped on the investigation. Comments on the working draft of the Main Summary Report were welcomed from all stakeholders. Subject to EA sign-off of the revised Severn Flow Record project in mid-March, the draft final Summary Report and all technical appendices would be available at end of May/beginning of June 2016.	Stakeholders to submit comments by 24 March 2016.
2	**Session 2: Approach** Trevor Wade (TIW) outlined the approach to the assessment, re-capping on Phase 1, the key components of Phase 2, the transfer variants, risk areas, assessment topics and position of the Phase 2 investigation. <u>Variants</u> TIW explained that the supported transfer options had been revised in 2015, with the original Longdon Marsh reservoir	

	scheme being replaced by supported flows from Lake Vyrnwy. Phil Chatfield (PC) commented that the water quality and ecological impact of introducing additional flow into the River Severn from Lake Vyrnwy would need to be assessed, Nick Thompson (NT) shared the same view. TIW confirmed that that assessment fell outside of the scope of the current study, but CL confirmed that it would be assessed in further work. In addition TIW confirmed the canal option had been revised to include a 240Ml/d volume transfer in addition to the original 100Ml/d canal variant. Ken Burgin (KB) commented that canal transfers would require a sweetening flow, as well as any pipeline scheme. TIW explained that although the scheme variant map showed pipeline discharges at Cricklade and Culham, these are only the upstream and downstream extents of potential discharge locations and for assessment the pipeline discharge location could be anywhere in between these locations. KB also suggested that the same principle should be assumed for the canal transfer option which could be piped from the end of the canal network to a suitable discharge location on the River Thames other than Lechlade if required. TIW agreed and suggested this would be considered as a mitigation measure. <u>Risk Areas</u> TIW outlined the five risk areas and confirmed that although the Severn Estuary and Thames Tideway were included in the scope from the Phase 1 Scoping Investigation it was only to be included in the Phase 2 Investigation if analysis showed that there was a change to water quality in the upstream river risk areas in the River Severn (Risk Area A) and River Thames (Risk Area D). Current findings were showing negligible change in both Risk Areas A and D and so the Severn estuary and Thames Tideway were not currently being assessed. <u>Current Position</u> TIW outlined the current status of the investigation and noted that the receipt of the updated Severn Flow Record for inclusion in WARMS model runs would be key to progression of Part B of the investigation. CL confirmed that recent progress had been made by HR Wallingford/TWUL and the EA and that EA endorsement of the revised flow record was expected in mid-March. TIW explained that although it had been suggested at the second Stakeholder Meeting (May 2015) that the original flow record could be used for the investigation, he understood the original flow record was inaccurate by around 100Ml/d around the Hands off flow values controlling flow availability for (unsupported) transfers, and that was the reason why the investigation was waiting for the inclusion of the updated flow record. Steve Tuck (ST) confirmed that the updated flow record would provide a single flow record rather than an upper and lower band of flow, thus would improve accuracy for the investigation.	TWUL to assess impact of Lake Vyrnwy supporting flows on Severn water quality and ecology.

	TIW confirmed that the Part B assessment and report would be proforma based to allow for consistent comparison of the 14 scheme variants. KC asked whether stakeholders were familiar and in agreement with the scope. Graham Scholey (GS) responded that a transfer direct to Farmoor Reservoir should be considered, citing potential benefits of pre-treatment of the transferred water prior to discharge into the River Thames which may mitigate water quality issues currently being identified. CL confirmed that this would be considered within the WRMP option review. Otherwise there was no disagreement or suggested amendments.	TWUL to consider assessment for transfer to Farmoor option
3	**Session 3: Hydrology** TIW presented the hydrological scenarios for 300Ml/d unsupported pipeline transfer to Cricklade and 200Ml/d supported pipeline transfer to Culham operating under both TWUL and GARD derived operating conventions. TIW highlighted that for the 300Ml/d unsupported pipeline transfer to Cricklade scenario under TWUL operating convention when the transfer came online it was often at a period of increasing flow following a period of low flow (first flush conditions) in the Severn, providing water of poorer quality to the River Thames. The Cricklade plots highlighted that the transfer only operated and discharged water to the River Thames at Cricklade during low flow conditions which would mask the natural low flow regime. However by downstream of the Farmoor Reservoir intake the transfer would be observed to add water during periods (on top) of small peaks in flow. KB commented that it would be interesting to understand how the discharge would interact with the Thames flow regime under moderate years in addition to the dry year (2005) shown. TIW confirmed that this will be progressed once the revised Severn Flow Record is available. TIW highlighted how the 200Ml/d supported transfer to Culham under both operating conventions filled in the low flow gaps between peaks in flow locally and along the downstream River Thames. TIW reviewed the MAM7 statistics (annual minimum as averaged over 7-days), highlighting that as a proportion of average minimum annual flow at Cricklade, all transfer volumes (100-600Ml/d) would significantly change the low flow regime thus indicating that a transfer to Cricklade region may not be feasible from the perspective of river flow effects in addition to water quality effects. A 600Ml/d transfer would significantly alter low flow regimes at all sites with the exception of Windsor. GS commented that low flows are important for cyprinids, so masking of the low flow regime by the transfer would be an ecological issue. TIW agreed this would be part of the Part B fisheries assessment.	

	PC asked whether velocity downstream of Lechlade had been assessed. TIW confirmed that detailed assessment (eg CFD modelling) wasn't part of the assessment scope. KB commented that flow in the River Thames when the transfer was operating would still be less than average flow conditions. TIW commented that, from a navigation perspective, there would be a small step change in velocity local to the discharge location. GS commented that the management of levels around the Oxford distributions would be very hard to manage with an on-off intermittent transfer. TIW agreed that this should be considered.	Cascade to consider impact of intermittent transfer around Oxford.
4	**Session 4: Water Quality Modelling** Caroline Hazlewood (CH) provided an overview of the water quality modelling undertaken in support of the water quality and ecological investigation. PC asked if the model's outputs missing the spikes (shown by spot sampling data) causes any problems. CH and Elfed Jones (EJ) commented that the spot sample outliers could be erroneous or reflect events, however by its nature spot sampling was just as likely to miss events as capture them, therefore if the spot sampling data was persistently a degree of magnitude out of calibration with the model outputs then this would signify a problem, which it is not. PC asked whether AQMS continuous data was used for calibration, EJ confirmed that it wasn't. Kieran Conlan (KC) confirmed that it had been considered for inclusion, however (*i*) AQMS data was not available at as many sites as spot sample data in the upper Thames (only to Caversham presently), (*ii*) AQMS data upstream of Caversham was not available post 2010 due to the sites being mothballed so this would not provide calibration data for the 2011 year used in modelling, (*iii*) AQMS data is only generally available for temperature, dissolved oxygen and chlorophyll *a* of the parameters modelled, and (i*v*) there are concerns over the accuracy of dissolved oxygen and chlorophyll *a* AQMS data. However KC suggest that AQMS data, where available, could be used to calibrate modelled temperature runs. CF asked whether if the model used a longer period for the pipeline transfer (24hrs currently used) there would be a difference in the results. EJ answered that the model does not factor in a change in water quality for the water during its time within the pipeline, so the only change would be that the discharge water might reach the River Thames during a slightly different phase of flow compared to when it was abstracted from the River Severn. KC suggested that there could be an impact on chlorophyll *a* with a four day transfer causing die-off prior to discharge which was less likely to occur with a 24hr discharge. On review of the results handouts showing propagation of water quality downstream of discharges, TIW highlighted that counter to the other results, blue shading (signifying a	HR Wallingford to review calibration using AQMS temperature data where available. Effect of pipeline transfer on water quality to be assessed by Cascade

	reduction (improvement) on baseline) actually meant an adverse effect on dissolved oxygen.	
5	**Session 5: Water Quality Assessment** TIW presented the current findings of the water quality assessment and its influence on WFD classification. TIW outlined phosphorous findings and highlighted the potential of a transfer to increase concentrations in the River Thames, while according to the EA there were no plans in RBMP2 for significant capital projects to provide treatment improvements (in Severn or Thames) meaning that attainment of GES by 2020 may be unlikely. GS confirmed that treatment investment was on hold because the technology was not available to further improve phosphorous concentrations, however they might be by 2020 and that the EA were still striving to achieve GES by 2020. Peter Spillett (PS) asked whether the Severn had similar phosphorous concentrations to the Thames, TIW confirmed it did. KC asked if anyone else had any comments. NT commented that John Lawson was of the opinion that phosphorus in the Thames had improved over the last 20 years. TIW agreed but stated that it still wasn't good status and that the EA didn't predict that it would improve any further in the immediate future. GS commented that he viewed canals as sediment sources, and that experience with the Kennet & Avon Canal showed high loads of suspended solids being discharged into the Thames. GS would expect the flow induced by a transfer through the canal to mobilise sediment and discharge it into the Thames. TIW noted that the model does not consider in-canal process and an empirical assessment was being undertaken. PC commented that suspended solids were a persistent issue, and that once mobilised from a source such as a canal would be recirculated through the Thames. GS suggested that a review of the Kennet & Avon Canal should be undertaken. KB commented that the design of the canal restoration could be tailored to design out such impacts. NT asked whether the investigation would consider mitigation options. TIW confirmed that mitigation was part of the scope, however the WRMP work being undertaken by Motts requires mitigation information ahead of the extended Severn-Thames Transfer investigation programme and so Cascade and Motts would be working collaboratively on mitigation, with full details provided in Motts reporting and a summary provided in the Phase 2 Investigation.	Cascade and Motts to discuss sediment issue from a canal transfer option.
6	**Session 6: Ecology Assessment** Rob Hinks (RH) outlined the ecological assessment findings to date.	

	KC asked PS if he had any record of Topmouth Gudgeon in the Thames, PS said he hadn't but that he was aware that it was resistant to treatment programmes. PS asked if fish parasites specific to the Severn had been identified, RH commented that EA records made available and literature reviewed indicated that there were not any fish parasites or pathogens that were specific to the Severn and not found in the Thames also. Kat Liney (KL) asked about the inclusion of future baseline in the fisheries assessment, RH confirmed that it was included and that the likely influence of climate change and foreseeable changes in WFD status upon fisheries were being assessed. PS asked whether Zander were being assessed. RH confirmed that they had been considered in the baseline, and were considered present in both Severn and Thames. GS commented that he believed zander to only be present in the Oxford Canal. *Post Meeting Note:* *Zander occurs in the upper Thames, although based on EA fish data for Wallingford to Teddington from 1995 to 2014, it is only a minor component (<1%) of the upper Thames fish community. In the lower Thames zander is present in significant densities in Molesey and Teddington Locks, and is known to successfully spawn in the Tideway.* CL asked about mitigation measures for Topmouth Gudgeon, RH outlined potential mitigation measures, but highlighted that mitigation was not yet being assessed in detail until the full risk was understood (through inclusion of the updated Severn Flow Record in the assessment). CL asked Rebecca Tibbetts (RT) what Natural England would expect in terms of mitigation if the Cotswold Canal was restored without a Severn-Thames Transfer. RT didn't think potential mitigation measures were likely to be acceptable or viable. PS asked whether other species such as water vole had been included in the assessment in terms that the effect of potential water quality change might have upon such species. KC confirmed that they weren't scoped into the assessment during Phase 1. RT suggested the only likely impact would be physical disruption around the abstraction or discharge infrastructure. KB commented that eel used to be present in the upper River Thames at Lechlade when the canal was formerly open.	
7	**Session 7: Drinking Water Quality Assessment** TIW outlined the drinking water assessment approach and current findings. PS asked whether oestrogens had been included within the assessment, TIW confirmed that the assessment only included those substances identified by TWUL as of risk to their	

	drinking water safety plans, which did not include oestrogen. PS thought that water companies were now looking at oestrogen. PC confirmed that it was on a watch list and that certain chemical investigation programmes were reviewing it.	
8	**Session 8: Next Steps** TIW outlined the next steps for the investigation and CL confirmed a draft report was expected to be available for consultation at the end of May 2016.	
9	**AOB** KC asked for stakeholders general thoughts on the findings of the investigation to date and whether they were drawing to any conclusions. GS outlined his view that the canal transfer option introduced greater water quality risks than pipeline transfers (or a transfer to Farmoor Reservoir), which were inherent with canal river interactions in his view. KC commented that as yet there isn't an understanding of the water quality interactions <u>during</u> a pipeline or canal transfer, but that this is being undertaken as part of Phase 2. KB reiterated that the canal transfer could offer benefits, while the pipeline transfer could face large operational costs from having to mitigate bio-fouling. KB agreed that the option of a transfer to Farmoor Reservoir justified further review. NT asked whether the Ely-Ouse transfer was being considered as evidence, KC confirmed it was. NT highlighted that the 1st page of the working draft report stated that variants had been assessed as part of WRMP2009, which he thought was not the case. *Post Meeting Note:* *For clarification 2 variants were included in the draft WRMP09, and these replaced with 6 variants in the revised draft WRMP11. For clarity we will change the wording at that point to read:* *"Variants of the option were also considered for the previous 2009/2011 WRMP, which was the subject of a public inquiry during 2010"*	TWUL to consider review of option to transfer to Farmoor and respond. Cascade to amend Report Introduction.

Issued by Rob Hinks 10 March 2016