CONSULTATION DRAFT - June 2022

Utilisation of Public Water Supply Reservoirs for Flood Risk Benefit – DRAFT Operating Framework

Executive Summary

Consideration of using reservoirs for multiple purposes has been around for decades, if not centuries. While each reservoir will have a primary purpose, we want to ensure that, where possible, integrated decision-making leads to multiple benefits.

We want to make sure that careful consideration is given to opportunities to deliver those benefits and that we are not introducing adverse outcomes, such as unacceptably reducing the security of water supplies.

This operating framework has been developed to enable consistent local decision making, where the 'integrated' management of reservoirs for flood risk and water supply purposes presents a combined opportunity. The framework is designed to support engagement between the Environment Agency, Water Companies and other parties, aligning with existing good practice to enable a clear understanding of the technical, environmental, social and economic factors that support local decisions. Local decisions will need to take account of water management needs within the wider catchment, such that 'draw-downs' for the management of control curves remain flexible to meet competing and existing needs.

Alignment between water resources planning and flood risk appraisal is critical, so outcomes are practical, deliverable, legally compliant and can support clear communication with local stakeholders and interested parties. Opportunities should be considered within a strategic, catchment context, such that priorities align with Water Resource Management Plans (WRMP's), Flood Risk Management Plans (FRMPs) and Local Flood Risk Management Strategies (LFRMS).

Robust pre-feasibility work is required to avoid abortive costs, demonstrate sufficient flood risk benefits can be derived and prevent unacceptable impacts. 'High-Level Factors', such as reservoir safety and security of water supply issues are key gateways, which if not satisfied will bring investigations to a halt.

Agreements/arrangements should be clearly developed, transparently costed (in line with the Cost Protocol) and designed such that they meet the interests of all parties, reflecting the strategic context of managing water resources and flood risk collaboratively[1], whilst recognising different local drivers. Where a water resource management need exists, Section 20 Arrangements under the Water Resources Act 1991 can be utilised; where a water resources driver is not present, an alternative agreement will be necessary, applying a 'Model Agreement' or one developed on a bespoke basis.

This Framework can be applied to existing operational assets, assets identified for decommissioning and to support the assessment of new assets and associated infrastructure. It should be used in conjunction with existing tools and guidance, where applicable these are referenced in the text.

[1] A joint approach for how water companies should consider flood and coastal resilience in the context of their statutory roles and duties - Ofwat

Introduction

This Operating Framework deals with the key aspects that should be examined where the use of water supply reservoir assets for flood risk management are being considered and can be applied to new and existing assets and to those where decommissioning is planned.

It may be appropriate to evaluate their use as part of wider catchment-scale flood risk management considerations or as part of site-specific solutions. However, security of public water supply must be maintained and impacts on supply mitigated as part of FCERM costs before any scheme may be implemented. This Operating Framework should be read in conjunction with existing flood and coastal risk appraisal guidance (https://www.gov.uk/guidance/fcerm-appraisal-guidance), which provides detail on how to develop and appraise options for the management of flood risk and how wider impacts should be evaluated. Early engagement with Natural England will also be important from the outset.

This Operating Framework is for use with assets in England only: where investigations from a water resources or flood risk perspective impact or affect Wales, Natural Resources Wales must be consulted from the early stages of investigation and development, i.e., at concept development and before public consultation.

Reference should also be made to the report entitled 'Design, operation and adaption of reservoirs for flood storage' 2016.
(https://assets.publishing.service.gov.uk/media/60363fc08fa8f5480ff52469/Design__operation_and_adaptation_of_reservoirs_for_flood_storage_-_report.pdf)

It should be noted that this document groups together topic specific activity, rather than reflecting a formal process to follow. The user should refer to the elements of the framework pertinent to their current needs to avoid duplicating previous investigation/study.

An assessment of the FCERM opportunity of utilising water resource reservoirs for flood storage falls into five key phases:

I. Pre-feasibility
II. Feasibility studies
III. Impact Assessments
IV. Detailed Studies
V. Establishing agreements/arrangements and implementation

The flowchart in Appendix A shows the specific tasks (Boxes) that fit within these phases and identifies key decision points (red lines) where an assessment can be cut short because it has been found not to be feasible.

Text in the following sections corresponds with the flowchart. Underlined text indicates that this is a Task (boxes), text in **bold** indicates the key decision points (red lines).

1.0 Pre-feasibility

Pre-feasibility is required to identify reservoirs that have the potential to provide flood risk benefit. This process enables an initial identification of potential reservoirs against which an impact assessment on water resource planning, environmental and sustainability, social, and economic issues can be undertaken.

Initially a two-step screening process filters potential reservoirs allowing the process to focus on potential sites for further investigation.

1. Flood Attenuation. Assessing the ability of the reservoir (or group of reservoirs) to attenuate flood flows. This can be achieved by calculating the 1% Annual Exceedance Probability (AEP), commonly described as the one in one-hundred-year flood flow, using the Flood Estimation Handbook (FEH) statistical method based on catchment descriptors. Alternatively, if a more detailed analysis of flood flows has already been undertaken the outputs of that work should be used. The time for the 1% AEP flow to fill the top 1m of the reservoir (based on surface area) is then estimated. An index for the potential impact of the reservoir can then be assigned (0 if < 50, 1 if > 50, 2 if > 200 and 3 if > 500-minutes).

2. Properties at Risk. An assessment of the number of properties at flood risk during a 1 in 100-year flood event downstream of each reservoir should use Flood Zone 3 of the Flood Map for Planning. The length of the river reach downstream of each reservoir is capped at a maximum distance of 20km. However, it may be necessary to reduce this reach length because the river that the reservoir is on may flow into a significantly larger river downstream, or there may be more than two significant tributaries joining the river downstream, which reduce the attenuation benefit of the reservoir under assessment. An index for the number of properties can then be assigned (0 if < 5, 1 if > 5, 2 if > 30 and 3 if > 50-properties).

Output = Possible reservoirs. An overall score for each reservoir can then be calculated by multiplying the Flood Attenuation and Properties at Risk indexes together. Reservoirs with an overall score of 6 or 9 are considered to have the potential to provide flood benefits downstream and can be taken forward for further evaluation.

This Pre-Feasibility process is not detailed, but it can be applied simply and consistently as it relies on readily available data. The aim of the process is to quickly dismiss sites that will not provide flood risk benefit downstream, allowing directed 'feasibility' investigations of those sites where the greatest potential for flood risk benefit is likely to exist.

Decision point 1a. At this point those reservoirs that have the potential to provide the greatest FCERM benefit will have been identified.

High-level Factors.

It will be necessary to open initial dialogue with the reservoir owner (or owners) and the reservoir panel engineer (see 2.1.2) to identify any High-level Factors, which may impact feasibility prior to undertaking site specific studies as outlined in section 2.0. High-Level Factors, such as reservoir safety, reservoir flood plans, natural designations and environmental impacts influence the operational function and strategic fit. Engagement with the asset owner and the Environment Agency (EA) National Environment

Assessment and Sustainability (NEAS) team should be undertaken. Work should include an indicative Environmental Impact Assessment screening to help establish an early understanding of potential consenting routes and any necessary environmental assessment work (statutory or non-statutory) and how this may link to other catchment measures. It will also be important to understand any environmental dependencies and potential 'showstoppers', e.g. natural designations, WFD considerations, biodiversity, heritage, natural capital, climate change, adaptation and wider resilience issues. These High-Level Factors should be considered before undertaking detailed work, including hydraulic modelling.

Flood Hydrology.

This task aims to improve the understanding of flood risk in the catchment to focus effort on those assets that potentially provide the greatest benefit. An investigation of the feasibility of potential sites requires an assessment of the following as a minimum:

- the upstream catchment size and its runoff characteristics.
- the area of uncontrolled catchment downstream of the reservoir and its runoff characteristics.
- the number and size of the areas at flood risk downstream.
- the impact of the reservoir outflow arrangements on flood routing.

Up to this point of the pre-feasibility stage, design flood flows may have only been calculated based on the FEH statistical method using catchment descriptors. Although quick this method only provides an approximation of design flood flows and does not indicate the shape of flood hydrographs. Therefore, this task includes the following to improve the understanding of flood hydrology:

- Assessment of flow gauging station records in the catchment upstream and downstream of the reservoir.
- Updating the statistical flood flow estimates based on gauged records.
- Consideration of alternative flood estimation methods (such as the ReFH2).
- Calculation of flood hydrographs for the full range of return periods (2-years up to 1,000-years).

This work requires input from the FCRM function of the Environment Agency with expertise in hydrology and modelling. The use of design flood hydrographs in models for the flood risk area will allow an assessment of the existing standard of protection. Such models may include detailed hydraulic models (if available) or simpler hydrological routing model which can be setup based on limited data. Knowing the standard of protection, an analysis of the flood hydrographs will provide an initial estimate of the amount of storage required to make a significant contribution towards alleviating flooding.

The outputs from this task will feed into flood storage assessments during the feasibility stage.

Decision point 1b. Following this task, it will be possible to decide whether the reservoir has the potential to provide sufficient additional storage to make a significant contribution to flood alleviation in the catchment. If the reservoir cannot provide sufficient storage the study can be cut at this point.

Water Resource High-level Factors

Where a reservoir or group has potential to provide sufficient flood risk benefit, the water resource situation for the area served will be screened following the Appendix E Case Studies. This will include:

- Scrutiny of the published water company Water Resource Management Plan and Planning Tables covering the Water Resource Zone
- A high-level discussion with the water company regarding the role of the reservoir/group in its supply system and any potential infrastructure constraints that would require detailed investigation in subsequent phases.

Decision point 1c. Following this task, it will be possible to determine at high level whether the reservoir could be brought into flood alleviation use without unacceptable impact on the security of public water supply, whether additional infrastructure or supply measures are likely to be needed, or whether the reservoir is critical to supply and the resource irreplaceable. If the source is irreplaceable, the study must be cut at this point for public water supply resilience.

2.0 Feasibility studies

A thorough investigation of the feasibility of potential sites requires an assessment of the following as a minimum:

- the options for providing flood alleviation to areas at flood risk (including Natural Flood Management approaches).
- the environmental impact of alterations to the flow regime and changes to water levels – particular attention should be given to adverse impact under Habitats Directive or deterioration under Water Framework Directive. *(This will include the environmental impacts associated with a change in reservoir operation or storage capacity, to a level at which a comparison of options can be drawn and the best environmental option identified).*
- the impact of a proposal on the yield of a water supply reservoir and the identification of any local impacts within the company's water distribution network. (An initial assessment of public water supply resilience in the water resource zone will be made using the published Water Resource management Plan in section 1.0. More detailed assessment of impacts and possible mitigation measures will require detailed hydraulic modelling: this will need water company input, with FCERM funding, – see appendix C – and will be required early in the feasibility stage).
- how the reduction in reservoir yield will affect the company's Deployable Output in the context of its supply/demand balance (at a Water Resources Zone level) (This will require detailed hydraulic modelling – see appendix C – and will be required early in the feasibility stage).
- consideration of the impacts of climate change, both in terms of FCREM provision and water resource management – an adaptive pathway approach should be followed. (Supplementary guidance on how to consider climate change and carbon impacts is available here:

  https://www.gov.uk/government/collections/fcerm-projects-appraisal-supplementary-guidance)

It will also be important to consider potential effects on designated sites under The Conservation of Habitats and Species Regulations 2017 (as amended) or deterioration of waterbody status/potential under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

The above issues can be broadly grouped into studies of:

1. Reservoir operation and management – (to include reservoir safety aspects)

2. Flood risk management
3. Security of water supplies
4. Impact assessment (including water resources, environmental, heritage[i] and social)

It is anticipated that these strands of work would need to proceed in parallel because they depend on inputs from each other. However, they must draw upon the flood modelling undertaken in the pre-feasibility stage, such that we focus on those assets that are likely to provide the greatest flood risk benefit. The following sections outline the scope required of these studies.

Feasibility studies and development of potential options for consideration must be developed jointly between FCRM and Water Resources with input from Fisheries, Biodiversity and Geomorphology and the NEAS team in collaboration with the water company and, in the case of nationally or internationally designated sites, Natural England. They should bring together all evidence of the benefit of the flood risk opportunity, alongside any potential water resource or wider impacts (both positive and negative) and assess these against the costs of undertaking alternative management interventions or practices to create potential 'options' for consideration.

2.1 Reservoir operation and management

Reservoirs are heavily regulated so it will be necessary to involve an All-Reservoirs Panel Engineer and the asset owner/undertaker for the site to assess the scope for using the asset for FCERM benefit. The reservoir issues that will need to be considered at feasibility stage include: (Note that these issues will need to run in parallel).

2.1.1 Reservoir operation. This task encompasses investigating how the reservoir could be operated to provide FCERM benefit across a range of options available within the catchment to develop a viable scheme, addressing the following:

- what are the current operating rules for the reservoir? (Including safety during drawdown and the flood plan (Reservoirs Act 1975: The Flood Plan (Reservoirs Emergency Planning) Direction 2021 (publishing.service.gov.uk)) to prevent an uncontrolled escape of water)
- what storage is currently available in the reservoir and how much capacity could be available for floodwaters?
- what changes to the reservoir's operation (or enhancements) would be required to optimise attenuation without increasing the overall storage?
- will the operation be active (requiring input before and during an event) or passive (e.g. requiring minimal intervention in advance of predicted events)?
- the level of water in the dam at the beginning of the event
- the capacity of the discharge infrastructure
- impacts on the asset with a lowered top water level such as wave action, drying/cracking of embankments, instability in surrounding land or public safety issues.

Output from this task will feed into the storage assessment task under the flood risk management strand of the feasibility work.

Decision point 2a. It is possible that following this assessment it is concluded that it will not be possible to adjust the operation of the reservoir or group of reservoirs for FCERM benefit. If that proves to be the case, then the study can be cut short at this point.

2.1.2 Reservoir safety. The following must be considered when determining the suitability for a reservoir to provide flood attenuation benefits through modifications to the asset or operational arrangements:

- reference must be made to guidance for reservoirs owners and operators https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements
- reference must be made to 'Floods and Reservoirs Safety' guidance document', produced and published by the ICE https://www.icevirtuallibrary.com/isbn/9780727760067
- reference must be made to guidance on 'drawdown safety' to determine potential impacts on structures https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/guide-to-drawdown-capacity-for-reservoir-safety-and-emergency-planning)
- ensure the asset can accommodate PMF (Probable Maximum Flood)
- any alterations would need oversight of an All-Reservoirs Panel Engineer and the operator's own supervising engineers.

Decision point 2b. It is possible that following this assessment it is concluded that safety issues preclude the use of the reservoir or group of reservoirs for FCERM benefit. If that proves to be the case, then the study can be cut short at this point.

2.2 Flood risk management

This strand of the feasibility work aims to improve the understanding of flood risk in the catchment beyond that established in the pre-feasibility stage. This work needs to be undertaken in parallel with the assessment of security of supply strand of work (see section 2.3).

Comprehensive guidance on how to undertake flood and coastal risk appraisal is already available within published appraisal guidance https://www.gov.uk/guidance/fcerm-appraisal-guidance. It explains how to create a business case to support an application for FCERM funding in line with government policy.

This requires input from the FCRM function of the Environment Agency with expertise in hydrology, optioneering and preparing business cases. This strand of work includes a better definition of the areas at flood risk, the options for flood alleviation and optimising the way those options interact. The flood risk studies will involve an assessment of the following issue:

Flood storage. This stage is concerned with determining the amount of storage needed to alleviate flooding compared to that available in the reservoir. The task requires baseline modelling of the river and information from the reservoir operation task in the reservoir operation and management and strand of work. Therefore, the task involves the following:

- assessing the damages of the Do Nothing and Do Minimum options
- assessing the FCERM benefit that the reservoir already provides (drawing on historical evidence where available, including water company operational practice)
- how much flood storage is required to attenuate flood flows and provide protection to properties at flood risk?
- assessing the standard of protection provided by the available storage in the reservoir.

Decision point 2c. Following this task, it will be possible to decide whether there are enough properties at flood risk and the reservoir can provide sufficient additional storage to make a significant contribution to flood alleviation in the catchment (recognising that the reservoir will already provide attenuation of

flood peaks). If the reservoir cannot provide sufficient storage the study can be cut at this point. It will be important to develop an understanding of the available storage based on water resource constraints as outlined in section 2.3.

2.3 Security of Water Supplies and Consideration of impacts on security of supply

An assessment of the potential impact of a proposal on the security of water supplies must be undertaken (use flow chart – appendix 'B'). **Security of water supply must not be compromised as a result of a proposal being taken forward;** the water company's Levels of Service must be maintained without the need to resort to further drought options. To determine this, three steps of evaluation must take place:

1. Assess the impact of a proposal on the yield of a reservoir.
2. Consider how the reduction in yield will affect the company's supply/demand balance and its long-term planning solution.
3. Consider whether there are any additional water supply issues within the distribution network which may also impact on water supply resilience, e.g. identify any sub-zonal issues such as poor connectivity of sources which would compromise security of supply.

If the impacts on the supply demand balance and the ability to move water through a distribution network are assessed as being acceptable (using the approach shown below) then further consideration of the potential impacts of the proposal can take place and should include the following water resources management considerations:

- potential impacts on downstream protected water rights and lawful users
- environmental assessments of changes to flow regime
- reservoir and operational management assessment

Step 1) Assessment of impact on reservoir yield
This will be influenced by the design of the reservoir control rules which would dictate when releases are made. The water company will need to model and assess the potential impact on yield of the proposed change of use of the reservoir and on the required connectivity of sources within the water resource zone. Environment Agency Water Resources should review this assessment to critique/ scrutinise the quality of the modelling and the appropriateness of the water resource assessment.

Step 2) Consideration of the supply/ demand balance
Any reductions in yield need to be considered against the water company's existing statutory Water Resources Management Plan (WRMP) which will include an assessment of whether there is a surplus or deficit in the supply/ demand balance. This assessment of the impacts on the supply/demand balance will consider the impact of reduced yield on a company's deployable output and will consider the company's current available headroom and its target headroom. When looking at supply/demand balance, the water company's latest WRMP Annual Review submission will serve as a measure of where the company is now in relation to the delivery of the WRMP.

'Target headroom' represents the buffer that companies should plan to maintain between supply and demand for water to cater for current and future uncertainties. If the current available headroom (or forecast available headroom) is less than the target headroom, then there is a deficit.

This analysis will apply at a company level and at a water resource zone level. It should be noted that at this stage, this is just an assessment which will determine whether additional resource development to

maintain security of supply is required as mitigation for the progression of the flood alleviation scheme. It is not a formal inclusion of the additional resource development in the formal WRMP.

The three most likely scenarios are represented schematically in case studies (appendix E):

1. If, over the 25-year planning horizon of the WRMP, the reduced deployable output does not cause the water company to drop below its Target Headroom, then the proposal can continue to be considered.

2. If currently available headroom is greater than the required Target Headroom but, as a result of the proposal, it is forecast to fall below the Target Headroom during the planning horizon of the WRMP, then:

    - the scheme should be considered but only on a temporary basis until the target headroom ceases to be met (when the arrangement would cease), or
    - additional resource development comes online to off-set the impact (at which point the arrangement could continue).

3. If there is insufficient Target Headroom, then the proposal should be refused until such time that additional resource development takes place that puts the required Target Headroom in place.

If there is a need for additional resource or asset development, then the impact on yield will be incorporated into the baseline of the next water resources management plan and the resilience options for its replacement assessed in the WRMP, with inter-company options considered through Regional Plans. The Environment Agency will work with Ofwat to ensure that flood alleviation-driven actions are funded by the Environment Agency (FCRM) or beneficiaries; they will not be funded through the water company's Business Plan or its water customers' bills.

If, by exception, there is an urgent need to progress with the proposed flood risk scheme, then there is the ability to consider the requirement for additional resources as a 'material change of circumstances' to the water company's WRMP. This would trigger a restart of the planning cycle. It should be noted that there is an extremely strong presumption against triggering a material change to the WRMP, given the huge costs and resource requirements involved. To do this, a case must be put to Defra and agreed with the Secretary of State who would then direct the water company to undertake a review of the WRMP.

Step 3) Consideration of other operational constraints such as connectivity of sources
In addition to the assessment of the potential impact on its available water resources, the water company may also provide evidence that there are operational water supply issues which need to be resolved.

While there may be enough water within a zone to maintain security of supply from a proposal, there may still be infrastructure constraints which limit a company's ability to move water around its network, or it could be that there will be additional operating costs resulting from a need to undertake additional pumping. As Levels of Service must be maintained without resort to additional drought measures, the company needs to identify challenges and risks to ensure that these are addressed thoroughly and in a timely manner.

Again, at this stage, the assessment is to look at the issues and associated costs so that decisions can be made about the cost-benefit of the flood attenuation scheme.

Wider consideration of water resources issues

These will include consideration of:

- **Protection of existing water rights**
  As part of the implementation of a scheme, we would require a company to adhere to the conditions within its abstraction and impounding licences. For example, the compensation releases from a reservoir would still be needed as they are there to protect the water rights of downstream users and to protect the needs of the water environment.

- **Abstraction or impounding licence changes**
  If the promotion of a scheme involves a proposed amendment to the water company's abstraction or impounding licences, the licence determination process will still apply. This will consider any adverse impact on water rights as part of the application (i.e. the need to ensure that existing downstream abstractors are not adversely affected, or 'derogation agreements' are in place); and it will also consider the needs of the water environment. Any application to change a licence must go through a full determination process

- **Water availability in a catchment**
  Any impact on water availability in the abstraction licensing strategy and the risk that any heavily modified water body mitigation measures may be compromised.

- **Other relevant legislation**
  Consideration of any other legalisation on the operation of the catchment/reservoir such as historical by-laws etc.

Decision point 2d. If the impact on the supply demand balance is assessed as being unacceptable, including any demonstrated need to increase the connectivity of sources, then the proposal should be rejected until it includes funded plans to put additional resources or infrastructure in place to ensure that security of supply remains resilient. This decision point is likely to take place in parallel with Flood Risk Management Issues in section 2.2.

Gateway 1: Strategic Outline Business Case (SOC). At this point a Strategic Outline Case can be presented.

3.0 Impact Assessments

Impact Assessments must be undertaken jointly between different Environment Agency departments (led by FCRM, with input from Water Resources and Fisheries, Biodiversity and Geomorphology), National Environmental Assessment and Sustainability (NEAS) team, and in collaboration with the water company. They are needed to consider the water resource and environmental implications associated with a change in operations or function of water resource assets, the results will inform options appraisal and design, the selection of mitigation measures and inform the outcome. Consideration should also be given to cumulative effects.

The level of environmental assessment required will be determined by the NEAS team through a project EIA screening. Advice will be provided as to the potential consenting routes, necessary environmental assessment work, consultation with internal and external stakeholders, and key issues to consider. Environmental and sustainability opportunities will also be flagged for consideration. This advice should be used as the starting point for the environmental assessment work and may be updated throughout the lifecycle of the project as options become more defined.

Utilising water supply reservoirs for flood risk benefit would require additional releases of water (with any associated changes to discharge consent/ abstraction licence conditions) that may have downstream effects on the environment. Several elements of the downstream environment would need to be considered through the scoping of the environmental assessment; these include but are not limited to:

- channel morphology/sediments impacts
- changes to bank/bed stability
- degradation/erosion of beds or banks
- deposition/siltation
- change of bed slope
- loss of spill events
- change of planform/pattern
- disturbance to bed forms (pools, riffles)
- downstream erosion
- changed channel size
- changed suspended sediment load
- contaminated sediment releases
- impacts on habitats, flora and fauna (including fish)

The attenuation of water upstream may also have a significant impact on the need to build hard engineered structures (walls, embankments etc.) downstream, reducing the need for them, and therefore there may be positive benefits towards the achievement of Net Zero Carbon by 2030. However, changes in operational activity of other assets to offset lost yield may have associated carbon impacts that would need to be factored into the assessment.

Consideration should be given to:

1. Any changes to the downstream flow regime and to the flow duration curve on which any previous environmental assessments were completed (Habitats, SSSI, WFD) and any impacts on flora and fauna within and downstream of the reservoir.

2. The design of any monitoring programme to inform approach and assess trial approach if applicable. Components of assessment framework should include:
    - desk study: existing information; “red flags”
    - baseline monitoring: conditions under current operation of reservoir
    - monitoring for adaptive management: flow regime changes monitoring programme to be designed to feed into adaptive management and mitigation measures

3. Hydro-morphological impacts from releases to draw down a reservoir:
    - timing, relative to seasonal needs and downstream hydro-ecology, e.g. spawning and juvenile habitats

- erosion, if downstream channel not usually subject to such flows
- inundation, if channel already at or near capacity
- water quality: water released may carry sediment from the reservoir, plus stored water may have settled into layers, with temperatures and chemistries damagingly different to those in naturally flowing water

4. Reservoir and connected catchment modelling and assessments:
    - any impact on connected habitats which might rely on flood flows (e.g. offline wetlands)
    - any impact on hydraulic connectivity between the downstream wetted river channel and permeable materials
    - any changes in level that might impact fishing or other recreational amenities on the reservoir
    - the building block approach to reservoir releases so seasonal high flows are maintained *(see Chapter 6 of River Flow for Good Ecological Potential. Final Recommendations. UKTAG December 2013[2])*

5. Rights of recreational users of reservoirs:

    - any impact on access via Public Rights of Way
    - any impact on access via permissive paths
    - any impact on recreational clubs using the reservoir, e.g.: sailing, angling

6. Social, economic, heritage and cultural impacts.

3.1 Impact on Catchment

Having confirmed the feasibility of managing and operating the reservoir safely for FCERM benefit the next stage is to assess the impact on the catchment overall. This includes:

- how does the operation of storage for FCERM benefit interact with other flood alleviation options?
- how does/can the reservoir fit into the overall management of flood risk across the catchment?
- is there a backwater effect upstream due to increased levels in the reservoir for storage? (e.g. where dam crest heights might be raised)
- will compensation arrangements be necessary for impacts around the reservoir rim?
- outline assessment of impacts on water quality, sedimentation, geomorphology and environmental impacts

This should be jointly undertaken by Flood Risk Management and Water Resources with direct engagement with the asset owner.

[2] http://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20River%20Flow%20for%20GEP%20Final%2004122013.pdf

3.2 Options Assessment

By this stage, decision points for the feasibility study will have been passed. As such, there should be an understanding of how the reservoir can be operated to safely provide a significant amount of flood storage. The task will be run in conjunction with the impact on catchment task along with use of the modelling for each option investigated and will assess how the use of storage in the reservoir can be combined with other flood alleviation options in the catchment. The aim will be to determine the most likely combination of options that optimise the standard of protection.

In the context of utilising water resource reservoirs for flood risk benefit, consistency will be achieved providing:

- FCERM Appraisal guidance is followed https://www.gov.uk/guidance/fcerm-appraisal-guidance
- a clear understanding of timelines, linked to water resource asset function, Water Resource Management Planning cycles and that catchment-based management of water resources is considered through engagement with the water company
- consideration of future water resource asset provision, to include replacement of lost storage capacity is understood for any options/scenarios
- a clear understanding of costs is developed with the water company to ensure the Outline Business Case (OBC) and Final Business Case (FBC) reflects thoroughly costed options and scenarios, this can be achieved by following the 'costs protocol' provided (see Appendix D)
- long-term agreements on a preferred option may require trials or a temporary arrangement to test preferred option(s) and enable refinement

3.3 Business Case

This task represents the final stage of the feasibility study and involves an assessment of the costs/ benefits of the most likely combinations of flood alleviation options for the catchment. The task will include the following:

- assessment of the numbers of properties at flood risk under current conditions
- assessment of the numbers of properties at flood risk under different options
- estimation of benefits for different options against different durations
- estimation of costs for different options against different durations
- recommendations for options to be taken forward for detailed study

Decision point 3 (Gateway 2: Outline Business case (OBC)). At the end of this task, it will be possible to identify whether the potential cost-beneficial options for flood alleviation that include the use of the reservoir for FCERM benefit. This decision point will determine whether continued involvement from the water company or Reservoir Panel Engineer is required to take any flood alleviation scheme forward.

Design profiles for options may need to include asset improvement by a water company or changes to its operational practices (including FCERM funding for these), which may need approval from other regulators and bodies outside of flood risk management.

4.0 Detailed studies to inform the final business case

Detailed studies may include:

- ground investigations/surveys
- topographic/bathymetric surveys
- asset condition surveys
- environmental impacts
- geomorphological and sedimentation studies

4.1 Ground investigations

Geotechnical studies are a vital element in managing ground risk in construction. Such investigations normally take the form of a desk study, with significant benefit being added by a site walkover followed by targeted ground investigations. The desk study should be undertaken prior to the planning and scoping of any ground investigation. It is important that the preliminary studies and site walkover feed into the planning and scope of the ground investigation. The methods and scope of ground investigations will vary depending on the site and the project scale.

Ground investigations are critical to informing the design of a flood storage reservoir. In general terms the more extensive (and higher quality) the ground investigation, the lower the design and construction geotechnical risks. Various standards and guidance set out the need for, and principal features of, a geotechnical desk study for UK locations. These include:

- The 'ICE Manual of Geotechnical Engineering' (ICEMGE) highlights the importance of a preliminary study and provides some useful guidance and a list of hazards to consider at this initial stage. It also provides guidance on best practice for ground investigations.
- The 'UK Code of Practice for Ground Investigations' (BS5930:2015) (BSI 2015) states that a desk study is essential. It sets out the typical sources of information available and the types of information that are typically obtained. All investigations should be undertaken in accordance with the standard and related subsidiary standards
- All desk studies should include a site reconnaissance to inform the findings and to assist in planning future ground investigations. The ICEMGE (Burland et al. 2012) suggests that this should take place approximately two-thirds of the way through the period assigned for the preliminary investigation.
- Where land contamination is suspected (though this is unlikely in the case of a water supply reservoir), the preliminary studies should be carried out in accordance with 'Investigation of Potentially Contaminated Sites: Code of Practice' (BS 10175:2011+A1:2013) (BSI 2011).
- 'Geotechnical Engineering of Dams' (Fell et al. 2014) emphasises the importance of geotechnical inputs throughout the project planning and in particular the pre-feasibility and site selection phases.

Aspect's worthy of particular attention in relation to planning for a scheme where significant changes are proposed to the dam structure at the reservoir include:

- the ground model (part of the geotechnical triangle, as defined in the ICEMGE) including the geology, nature, disposition and continuity of strata; plus, the groundwater conditions

including the hydrogeological setting, groundwater levels and their likely fluctuations as well as piezometric profiles within the strata

- foundation conditions including strength, compressibility and watertightness
- requirements for foundation and/or abutment treatment for stability and/or watertightness
- material availability – it is normally preferable to win the embankment material from the reservoir area wherever feasible
- sourcing suitable borrow areas for embankment material (ideally with a short haul distance) if material is not being won from the reservoir basin area

4.2 Topographic surveys

For detailed design purposes, a full topographic survey providing spot levels of the site and incorporating all key surface features such as existing watercourses, manholes, service markers, overhead lines, trees and hedgerows should be undertaken. This survey will form the basis of all construction drawings and may provide the basis for cadastral mapping and quantity measurements during construction

4.3 Asset condition surveys

Adaptation works often involve changing the original design conditions placed on existing assets including embankments, foundation cut-offs, retaining walls, conduits and valves. In some cases, the performance of such structures under the original design conditions may be in doubt on account of material deterioration. It is therefore essential to first evaluate the existing condition of relevant structures and equipment to scope the design measures. Any trial testing of structures, if appropriate, must be done in a professional manner and with specialist advice to manage reservoir risk.

Following completion of any scheme clear maintenance objectives should be set to meet asset management requirements throughout the scheme's life.

4.4 Environmental impacts

Environmental issues are already considered at the pre-feasibility stage. However, any opportunities and constraints identified at that stage should be used to inform the decision-making process through the impact assessments and detailed analysis.

Collation of baseline background data should identify the site-specific constraints and opportunities. This will include the consideration of both statutory and non-statutory designations and current legislation requirements, such as the presence of internationally and nationally protected sites and species, as well as defining the user groups who may have a vested interest in the site.

To evaluate ecological constraints and impacts (both negative and positive), an early understanding of the habitats and species present is of paramount importance. This understanding should be sought through a Phase 1 Habitat Survey, reported in the form of a Preliminary Ecological Appraisal (PEA). The PEA should also include a desk study highlighting any protected sites and habitats and species of conservation importance. Ideally the results of the PEA should inform the options decision process. The objectives for doing this, where possible, at an early stage would be to:

- avoid ecological damages and adverse impacts by following the biodiversity mitigation hierarchy of 'avoid, minimize, mitigate'
- maximise potential positive effects to achieve biodiversity net gain
- include high level conservation drivers in the optioneering process

Environmental design principles should be considered in parallel with the technical design of a scheme to use an existing reservoir for flood risk benefit throughout the design and implementation process. Consideration should also be given to maintenance procedures and responsibilities including setting maintenance objectives to achieve potential environmental and sustainability benefits.

4.5 Geomorphological and sedimentation studies

Changes to the operation of a storage reservoir could alter the fluvial geomorphology and sediment regimes of the associated watercourse. For instance, drawing down levels can increase the turbidity of the water. A geomorphological assessment should be made during the planning phase so that the baseline situation is understood. Analysis will then be required at the detailed design stage to understand how the changed operation of the storage reservoir will alter factors such as the watercourse discharge, sediment load and the channel morphology.

Flood storage can also have adverse impacts on geomorphological process by altering the peak of flood events, thus reducing the ability of a watercourse to clean and maintain habitat. Control structures can also prevent gravels and sediment moving downstream. These impacts should be minimised by careful planning at the design stage.

The 'Guidebook of Applied Fluvial Geomorphology' (Sear et al. 2003) should be consulted for further detailed advice on channel design and assessment.

Gateway 3: Final Business case (FBC). At the end of this task presentation of a final business case should be possible. Shaping of the final agreement (see section 5.0) is likely to be required in parallel with the final business case.

5.0 Establishing agreements/arrangements and implementation

The development, establishment and implementation of arrangements/agreements will be informed by studies required to derive a preferred option and any requirements for a full business case that aligns with FCERM appraisal.

In some contexts, a full business case may not be required. Specifically, where the existing local operation of the reservoir already results in flood attenuation benefit and the costs and benefits have already been transparently assessed, and through small adjustments additional benefits can be derived, with further costs being met and justified locally.

It is critical that the duration and review period for any agreement/arrangement aligns with the full FCERM business case. Or where other provision has been made locally, a periodic review is scheduled to understand changes in costs or benefits.

In some instances, it may be necessary to provide draft agreements/arrangements in parallel with a full business case.

Agreements/arrangements can be established through two main routes (options), dependent on the existing primary function of the reservoir(s) and the existing mechanisms that govern the management of releases from the reservoir(s). The following simple decision tree summarises the options:

- **Option 1** – Establish *within* a Section 20 Arrangement (Water Resources Act 1991)

- Used where there is an existing or proposed water resource management driver.
- Where no water resource management driver exists use Option 2

- **Option 2** – either:
  - A) Use a 'Model agreement/arrangement'
    (Note: model agreement to be shaped as part of ongoing work)
  - B) A Bespoke Agreement
  - C) Use an agreement under Section 158 of the Water Resources Act (1991), which is linked to land ownership. This could be used where a driver relating to water resources would not be present throughout the lifetime of the flood attenuation scheme (i.e. the ability to use a Section 20 arrangement ceases). This could occur when a water company is decommissioning a reservoir from its supply network.

Note that Section 20A and Section 158 of the Water Resources Act could be used to formalise the benefits of multi-use reservoirs with entities other than water companies.

5.1 Key Considerations within agreements/arrangements

As a minimum, 'Heads of Terms' for operational agreements/arrangements should include:

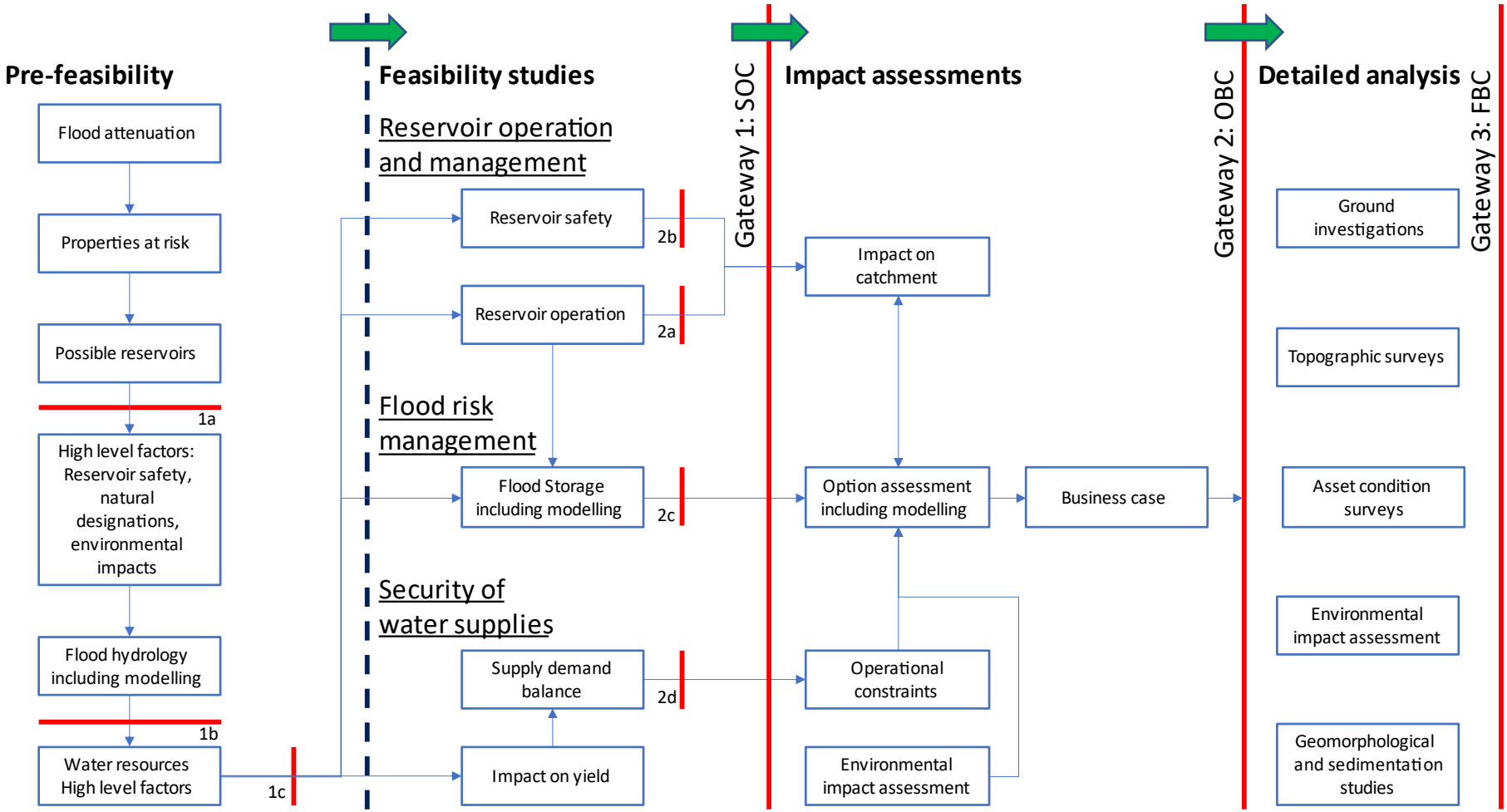
I. The specific actions required/expected, which are over and above conditions and requirements set out in abstraction and impoundment licences.
II. Any specific exclusions (e.g. must not automatically trigger justification for drought permits)
III. Payment arrangements covering:
   a. Allowed and Disallowed costs[3] (what is included/excluded) and the review mechanism
   b. The payment mechanism
   c. The timing of the payment
   d. How inflation, if relevant, is to be included
IV. The arbitration mechanism
V. The fixed end date of the arrangement (including considerations of the supply/demand balance deficit and other strategic activity) - where the arrangement is linked to a temporary supply/ demand balance surplus.
VI. The review period (including how this links to the WRMP cycle and other strategic activity to ensure water resource interest and protected)
VII. The mechanism for ending the arrangement if there is no fixed end date.
VIII. Agreed penalties for breach of terms, should agreements/arrangements not be followed by either party.
IX. Operational governance – (e.g., Establishment of a Board to oversee operation)

[3] These are likely to include the following: *capital costs, operational/maintenance costs, asset depreciation costs, water resources costs (e.g. loss of yield, and cost associated with operating supply networks differently.).*

X. Any conditions placed on each party.
XI. Any Warranties, Indemnities or Insurance required.
XII. Any maintenance and repair responsibilities for each party.
XIII. The permitted use and any mechanism for variation.
XIV. The Operational Agreement and any access requirements.
XV. Details of the Schedules of Condition of the asset.
XVI. The details of any reinstatement requirements.
XVII. Communication arrangements for normal operation and emergencies.
XVIII. Assignment of liability due to operation of scheme.

Appendix 'A'

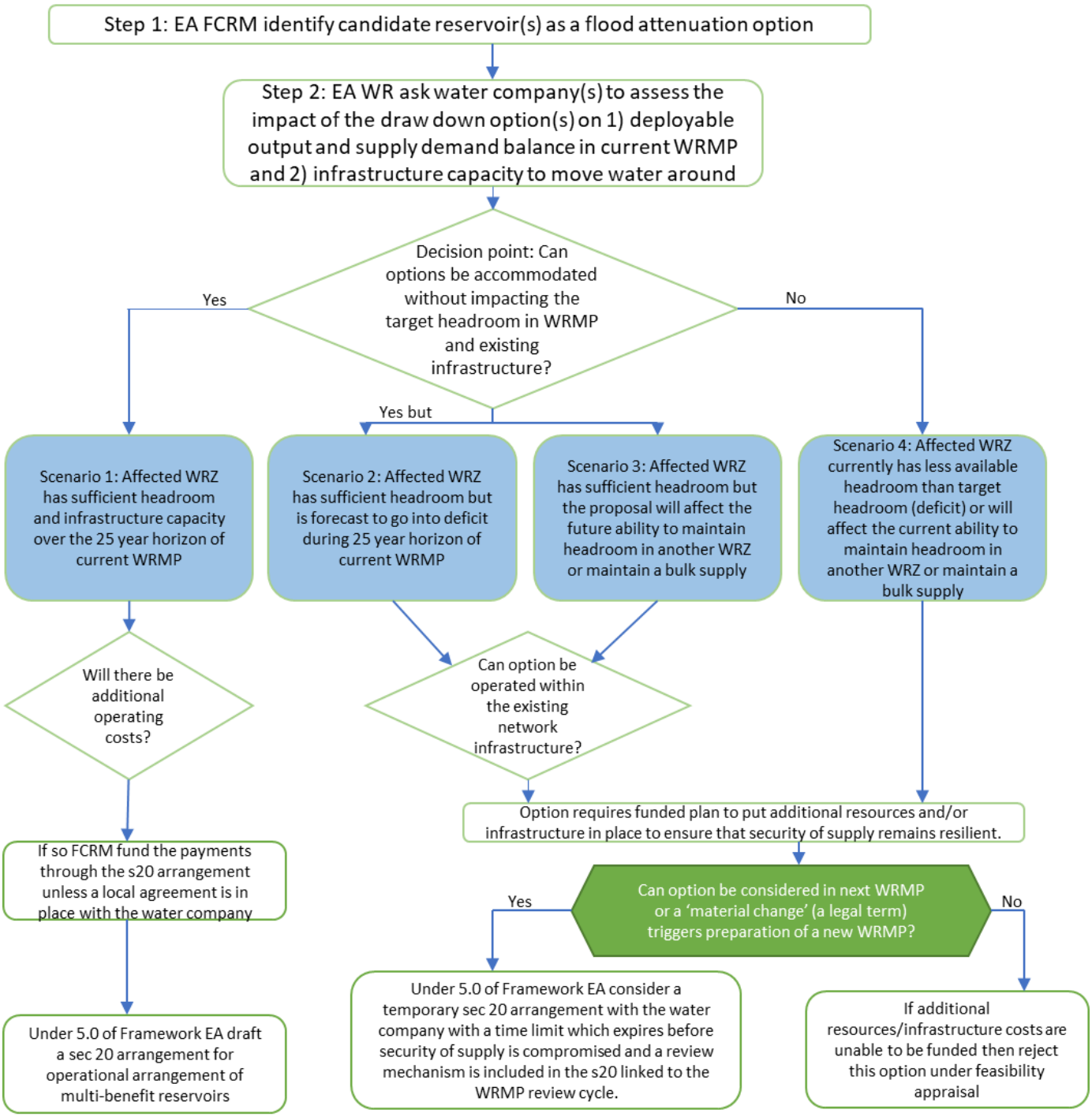
Flow Chart of overall process!



Appendix 'B'

Consideration of impacts on security of supply

Proposed flow chart for considering the impact of using water supply reservoirs for flood risk benefit on security of supply



Hydraulic modelling

Hydraulic modelling studies will be used to support the flood risk management studies outlined in the main text. This strand of work will require input from hydraulic modelling experts.

1. River flood model. This task concerns developing a flood model for the reservoir and the downstream river that can be used to assess flood risk during the subsequent baseline modelling and option modelling tasks.

In many cases it is anticipated that hydraulic models will already have been completed for the rivers in question. In this situation it will be necessary to review the model to check that it is fit for purpose and whether it needs to be updated to account for calibration against recent events. If so, these tasks should be undertaken to bring the model up to the necessary quality.

In cases where an existing hydraulic model is not available topographic survey will need to be commissioned and a new model built. The model will also need to be calibrated and validated (where possible) against previous flood events in the catchment.

2. Baseline modelling. This task concerns using the flood model to assess the existing flood risk in the catchment. The modelling allows the calculation of the existing standard of flood protection and the number of properties at flood risk. The task uses outputs from the flood hydrology task thus making use of the most up-to-date design flood hydrographs. Understanding the existing standard of protection feeds back into the flood storage task so that the amount of storage required to alleviate flooding can be compared with that available in the reservoir.

3. Option modelling. In this task the flood model is used to simulate the impact of different flood alleviation options on flood risk. It is anticipated that the task will involve significant interaction with the option assessment task as options for flood alleviation are gradually refined. Outputs from the task concerning the number of properties protected for each option will feed into the business case task.

Cost Protocol

Types of costs

Costs associated with the use of reservoirs for FCERM benefit include:

1. **Capital (*and carbon*) Costs** – including those associated with:
    a. Asset modification – e.g. modifying siphons and sluices connected with flow management/discharge provision or changes to the immediate downstream channel
    b. Provision for lost yield where new assets or infrastructure is required in conjunction with water resource provision in the medium and long-term and any associated distribution network issues
2. **Operation and Maintenance costs** (*inc. operational carbon*), including:
    a. Resourcing of operational regimes
    b. Operation of existing or new assets to provide water resources support to supply resilience
    c. Asset maintenance *(inc. Reservoir Act safety requirements)*
    d. Monitoring flows (*inc. data management*), receptor impacts (*e.g. downstream environment/other users*), reporting and evaluation
    e. Other 'compensatory costs' associated with impacts on other activity (*e.g. Hydro Electric Power generation, loss of amenity, recreation etc*)
    f. Costs associated with the establishment, administration, and auditing of formal arrangements
3. **Management of Supply Resilience**

How to assess costs?

Cost elements are site/asset specific and dependent on the design and operational capability of the reservoir, its setting and discharge arrangements for managing downstream needs. These should be transparently evaluated between parties in line with HM Treasury Guidance (the Green Book[4]) to ensure that agreements can be reached that reflect the true costs associated. The application of generalised % values should be avoided.

1. **Capital Costs**

Any physical asset modification to a reservoir and associated infrastructure to aid flood risk management function will likely require capital investment, *and associated carbon expenditure*, for construction or alteration. This *may* require a split of costs between the water company and the Environment Agency and/or other beneficiaries where modifications result in improvements.

Capital costs may be incurred by the Water Company where medium or long-term impacts on yield of the existing asset(s) must be offset by the construction of new water resource infrastructure and any associated distribution network issues. This *may* require a split of costs between the water company and the Environment Agency and/or other beneficiaries.

4 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063330/Green_Book_2022.pdf

Capital costs should be scoped and included in the cost profile for the proposed period of use or design life of the project.

2. **Operation and Maintenance costs**

Costs associated with the operation and maintenance of the asset should be clearly understood and specified transparently, such that it is clear how the split of costs between the water company the Environment Agency and/or other beneficiaries should be made.

Costs of resourcing operational changes to the management of the asset should be understood, alongside any additional maintenance needs associated with the changes proposed. Modifications to operational practices because of capital investment to automate actions *may* reduce operational or maintenance costs and should be factored into the assessment. These costs may change over time.

The costs of monitoring, reporting and evaluation, alongside any receptor impacts, should be fully scoped and provision made in the cost profile for the proposal. This may include the storage, management and processing of data to aid reporting on performance and to inform asset maintenance and operations.

Impacts downstream or on 'other-users' may need to be factored into the cost profile, particularly where downstream abstractors or other users may be impacted by changes to the discharge regime.

3. **Management of Supply Resilience**

The Water Company may experience costs associated with ensuring supply resilience and lost yield outside those mentioned or planned for as Capital elements. Such costs may be associated with reservoir control rules being reached earlier than anticipated to maintain security of supply. This may include additional costs associated with leakage control, demand management or the need to operate its supply network differently to cope with water being stored in different parts of its supply network. A risk factor should be applied to the costs to ensure provision is made in the costing estimates.

Cost apportionment between parties

It is important to ensure that costs are appropriately apportioned across the range of parties involved in any scheme where assets are used for multiple purposes.

A. The leading Risk Management Authority (RMA) (i.e., Environment Agency, Lead Local Flood Authority (LLFA) etc) should cover costs associated with:
   - drawdown for flood storage
   - capital costs associated with any FCERM scheme

B. The Water Company should cover costs associated with, e.g.
   - water supply
   - other profitable uses/or improvement associated with their water supply duties

C. Other parties should cover costs associated with:
   - enhancement or improvements associated with their own operations or duties

The apportionment of costs between parties can vary. In some cases, it may be appropriate for the costs to be fully paid by the leading RMA (e.g. Environment Agency, or LLFA) in other cases operating costs may

be proportioned between the RMA and the water company to take account of the percentage of yield that is used for flood attenuation rather than for direct supply purposes.

Costs associated with activities that provide for flood risk attenuation, should be covered by budgets specifically set aside by the Environment Agency for flood risk management purposes. Internal Environment Agency accounting arrangements, within areas, must clearly set out how this is being accounted for to ensure transparency.

Where existing legal arrangements are reviewed, then the cost arrangements within them must be reviewed to ensure that they align with this protocol.

Cost considerations within Agreements

Auditing and costs review

A process of in year auditing is required to ensure the costs represent the actual in year activity undertaken. This can be approached in several ways to meet project specific agreements. Examples include:

- yearly cost estimates are submitted before the start of an annual draw down period. Costs are predicted and paid on a quarterly basis dependent on the draw down regime and predicted operational need. During quarter 4 the water company determine the total cost over the year. Adjustments are then made to payments in quarter 4 based on actual in-year costs. Following the year end, the water company supplies to the Environment Agency a statement showing the calculation of the final cost. The statement is certified by the water company's external auditor. Further adjustment may be necessary post quarter 4 to reflect operational needs.

- some schemes only charge the Environment Agency for requested special releases. In these cases, actual costs are paid by the Agency relating to all releases over and above those that are made for water supply. Payment is due within one month of notification of the charge. These arrangements do not have an annual fee.

Supply Demand Balance Case Study/Scenarios

Water Supply Reservoirs and Flood Risk Management Schemes

Consideration of Water Resources Issues: Case Studies

March 2022

"No unacceptable reduction in security of supply"

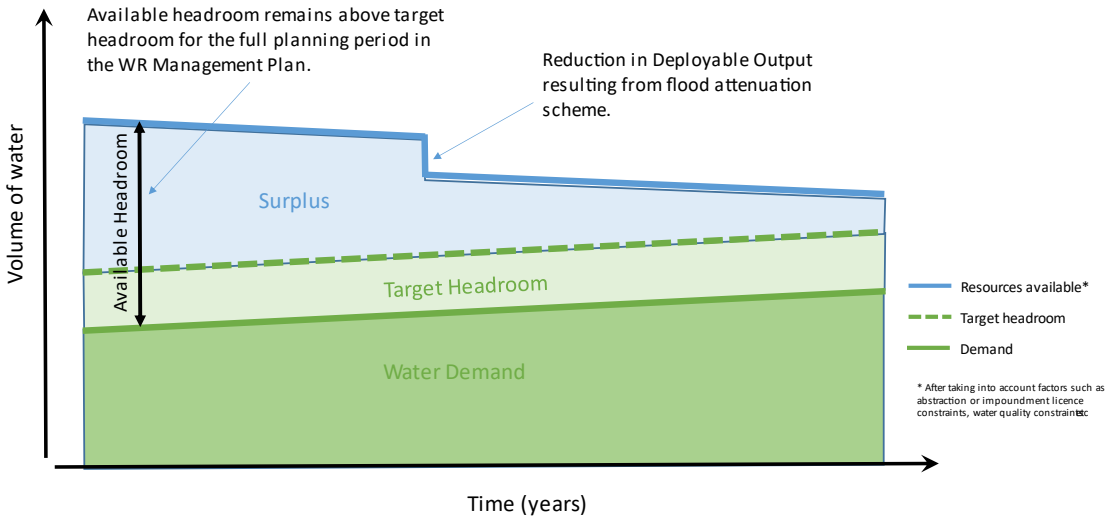
Consideration of water supply resilience

1. Water Resources supply demand balance

- Assessment of scheme impact on deployable output (yield)
- Uses existing process: Water Company Water Resources Management Plans
- Climate change impacts considered within WRMPs
- Diagrams on the following pages show the different scenarios
- Schemes supported if available headroom remains above target headroom for the duration of the planning cycle.
- Temporary schemes only, if there is a forecast deficit
- Schemes not supported if there is an existing deficit
- … unless there is funded resource development to off -set the lost deployable output (development costs are typically £8.1million per Ml/d*)

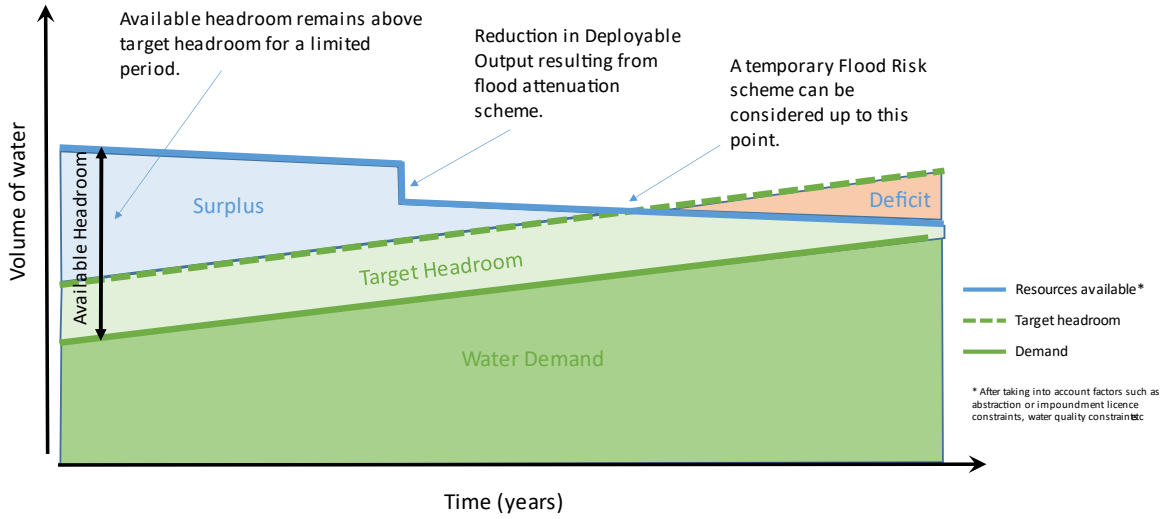
*From "ANALYSIS OF THE COSTS OF WATER RESOURCE MANAGEMENT OPTIONS TO ENHANCE DROUGHT RESILIENCE", Final Report for the National Infrastructure Commission.February 2018

Water Resources Zone Remains in Surplus = Carry on with Impact Assessments



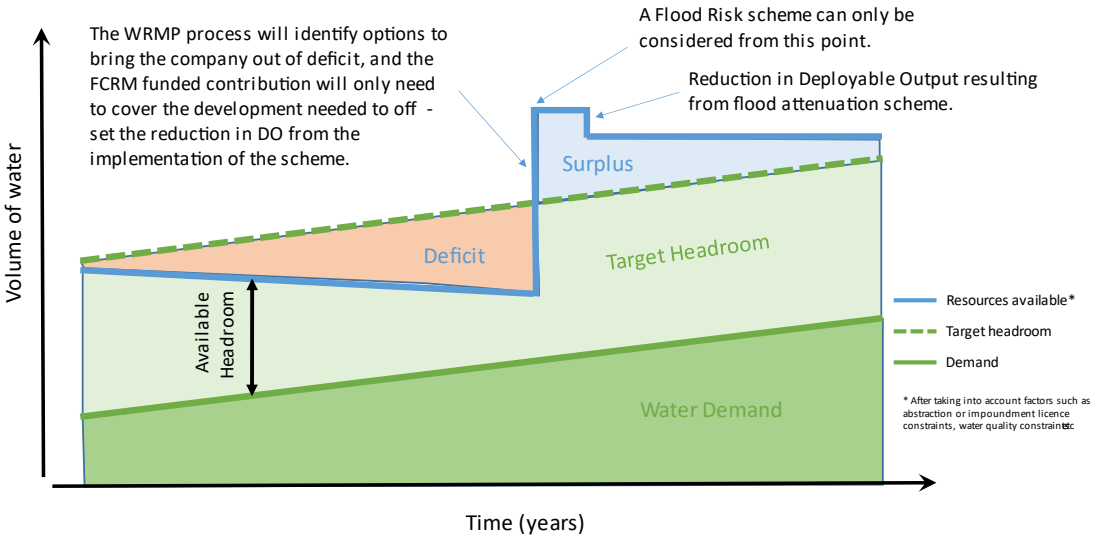
Note: This diagram represents water supply and water demand within a water company water resources zone; it is not a represen tation of the water levels within a reservoir system.

Water Resources Zone is forecast to enter into a deficit = **A temporary solution can be considered while a surplus remains. A permanent scheme can only be progressed once funded resource development is in place to off-set the reduction in Deployable Output.**



Note: This diagram represents water supply and water demand within a water company water resources zone; it is not a represen tation of the water levels within a reservoir system.

Water Resources Zone Forecast currently in deficit = A permanent scheme can only be progressed once funded resource development is in place to off-set the reduction in Deployable Output.



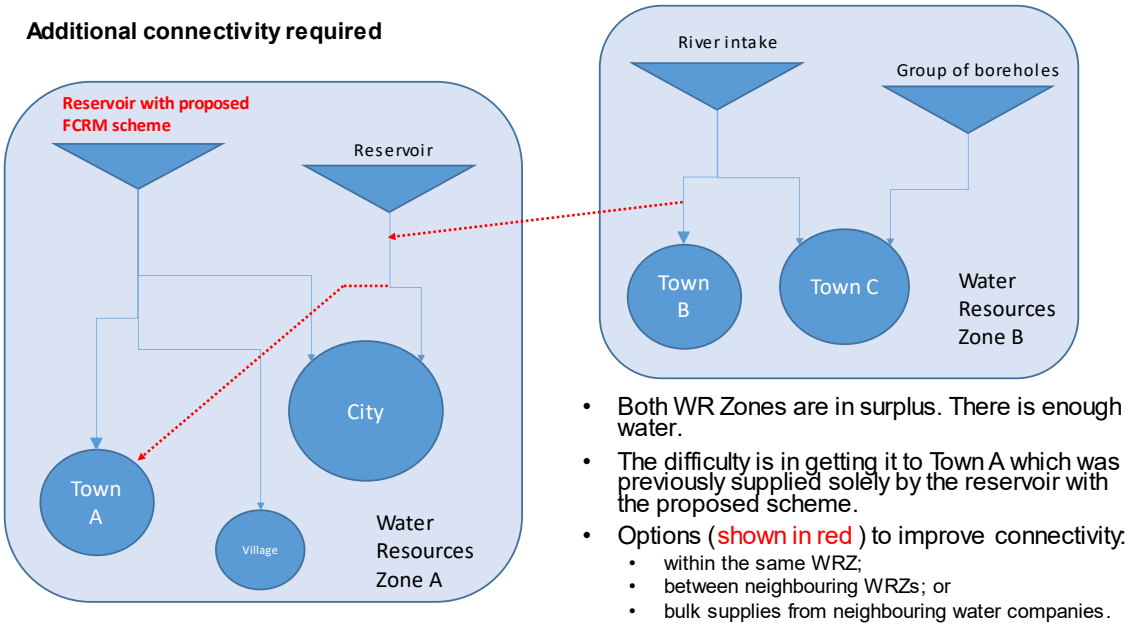
Note: This diagram represents water supply and water demand within a water company water resources zone; it is not a represen tation of the water levels within a reservoir system.

Consideration of water supply resilience

2. Distribution network constraints

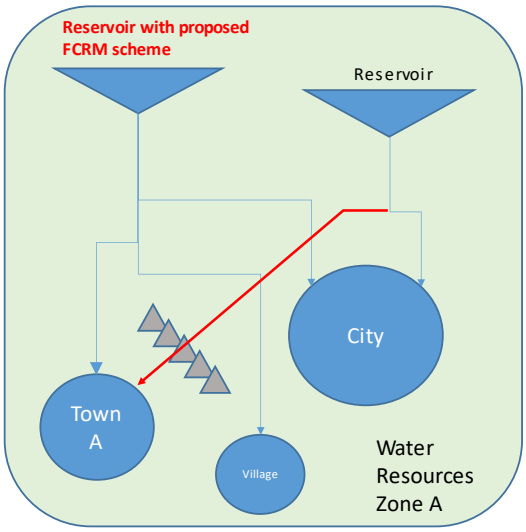
- The Water Resource supply-demand balance may be ok, but there could still be a need to improve connectivity and/or move water around the distribution network in a different way to ensure that supply resilience is maintained.
- This may require investment in infrastructure, and/or additional operational costs, to move water to where it is needed in order to off-set the impact of the Flood Risk scheme.
- Diagrams on the following pages highlight examples.

Additional connectivity required



- Both WR Zones are in surplus. There is enough water.
- The difficulty is in getting it to Town A which was previously supplied solely by the reservoir with the proposed scheme.
- Options (shown in red) to improve connectivity:
  - within the same WRZ;
  - between neighbouring WRZs; or
  - bulk supplies from neighbouring water companies.

Increased operational costs



- The additional pipeline has now been constructed.
- However, it requires water to be pumped over the local hills at additional cost when compared to the gravity-fed approach previously used.

Water supply resilience
Options assessment & funding

- Use existing Water Resource Management Plan to assess impact of potential scheme
- If scheme goes forward, use Options Appraisal phase of next WRMP to identify best value options
- Environment Agency to work with OfWat to ensure that flood risk management -driven actions are funded by FCRM (not by water company customers)

Water supply resilience: Summary

- We will assess the impacts of the proposal to ensure that water supply resilience is not compromised.
- The impact on deployable output (yield) must be modelled.
- This impact on supply-demand balance needs to be considered against water company Water Resources Management Plans.
- Proposed schemes may go on to the next stage of assessment if the impact does not turn a WRZ into deficit or require further development to improve connectivity.
- Proposed schemes will not be supported (or only temporarily supported) if there is a current or future deficit, unless funded resource development is put in place.
- Proposed schemes will not be supported (or only temporarily supported) if there is a distribution network issue that needs to be resolved, unless funded resource development is put in place.
- **By focusing on long -term investment, schemes will only progress where the company is able to retain or improve its expected level of supply resilience.**

Consideration of Drought Permits

Consideration of drought permit applications

- Previous slides show how the impact of a proposed scheme on water supply resilience will be addressed through investment in resource development and/ or infrastructure development
- This means that a company will retain (or even improve) its expected level of supply resilience.
- As a result, drought permit applications will continue to be considered against the legal requirement to demonstrate “an exceptional shortage of rainfall”.
- Drought permits will remain a useful drought management tool – only to be used in exceptional circumstances, linked to demand management / supply management activities by the water company, and will not be a release-valve where the impacts and risks from a flood attenuation scheme are transferred to the water environment and/or those with downstream water rights.

Abstraction and Impoundment Licences

Abstraction and impoundment licences

- The water company will remain responsible for meeting its licence conditions.
- Compensation releases from a reservoir will still be required as they are there to protect the needs of the environment and the water rights of downstream users.
- If, during consideration of a scheme, impact assessments indicate that environmental needs would still be protected with lower compensation releases, and 'derogation agreements' with downstream users could be reached, then the licence holder may apply to vary the compensation arrangements set out in the licence; this would be assessed as with any application to vary a licence.
- If the reservoir scheme is time-limited, then the licence condition variation could be time -limited in line with the period that the scheme is in place (see earlier slide).
- If the impact assessment shows that a reduced compensation is unacceptable, then the existing requirements would remain, the licence(s) would remain unchanged, and the need to comply with the conditions would continue.
- The content of legal arrangements does not over -ride the need to comply with licence conditions.

[i] https://historicengland.org.uk/images-books/publications/protocol-for-the-care-of-the-government-historic-estate/