Towards a Just Water Transformation: The SEA Imperative

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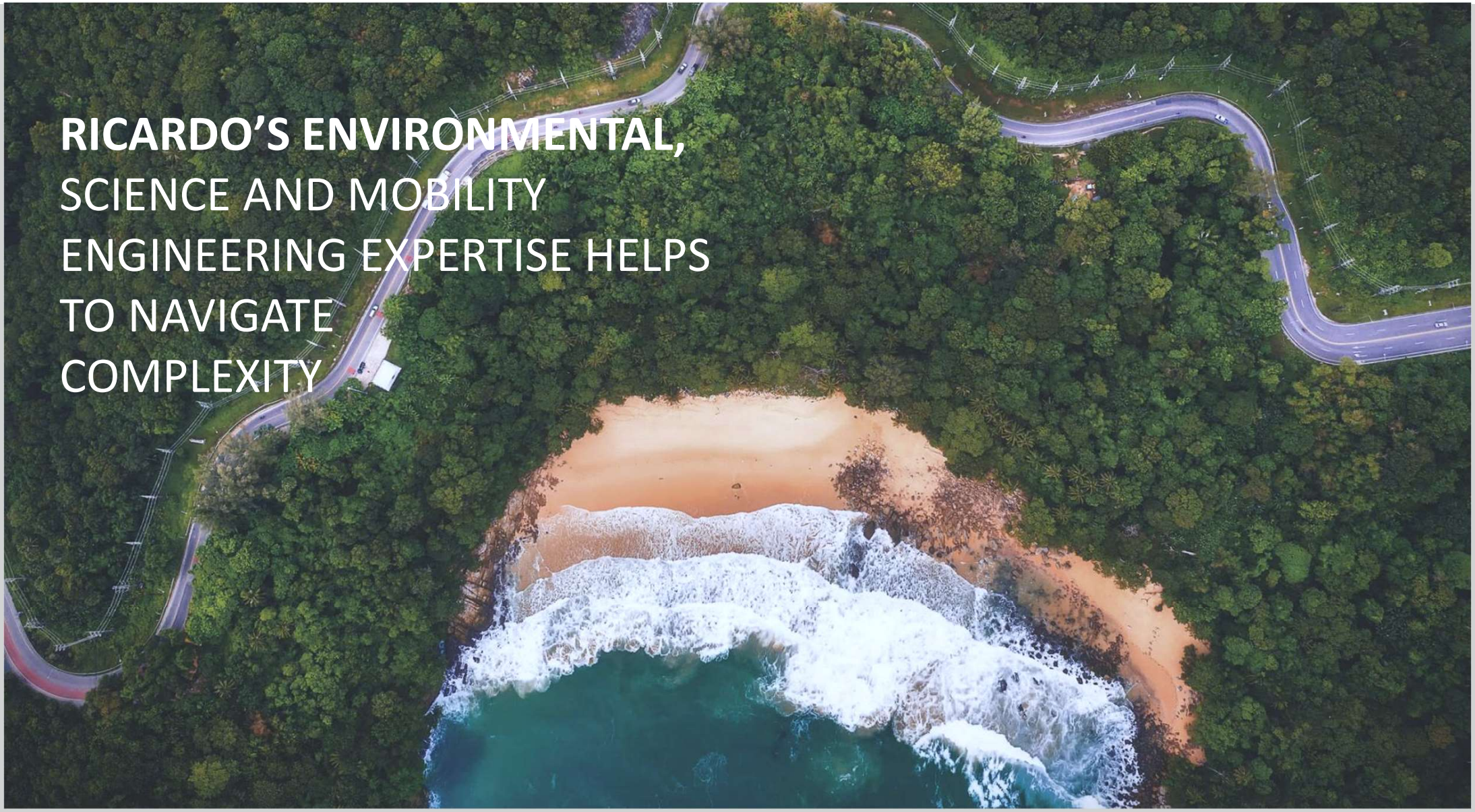
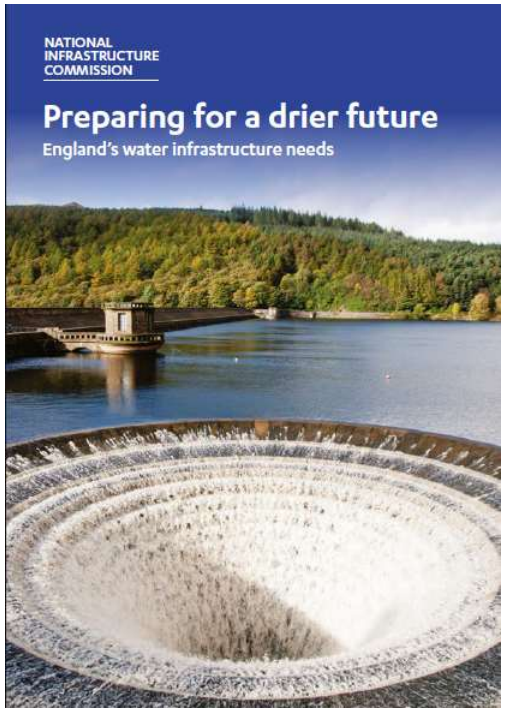

RICARDO'S ENVIRONMENTAL,
SCIENCE AND MOBILITY
ENGINEERING EXPERTISE HELPS
TO NAVIGATE
COMPLEXITY

Purpose of this presentation: an overview of SEA in Water Resource Management Plans (WRMPs) in England and Wales.

Process, Benefits, Challenges



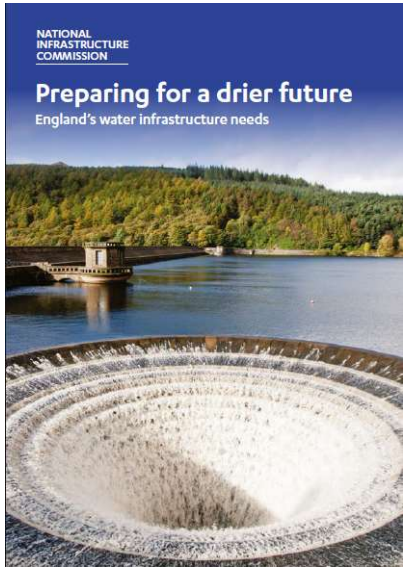
In 2018 The National Infrastructure Commission produced a report entitled 'Preparing for a Drier Future, England's Water Infrastructure needs' which stated that by 2050 an extra 4000Ml/d of water supply and demand reduction would need to be delivered by a combination of leakage reduction, demand side initiatives and water transfers. That's equivalent to:

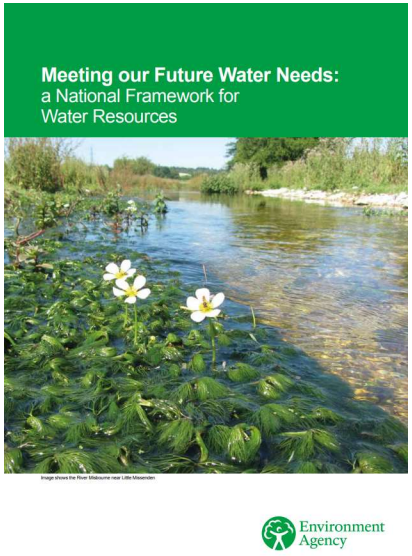
~7,042,253,521 ✕

per day!!

The Need for Water Plans and SEA – Why Plan?

- Increasing problems with water scarcity, climate change and increasing demand
- Move to more sustainable water resource policies
- Need to balance water supply for humans, industry, agriculture and the environment
- In the UK, SEA is statutory which allows potential for legal challenge…

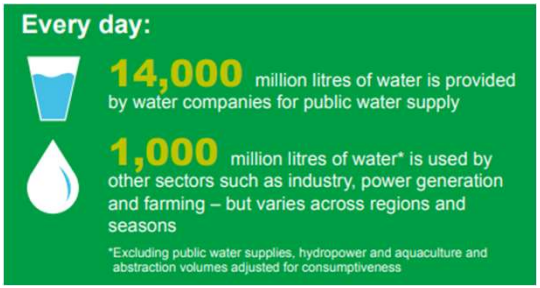




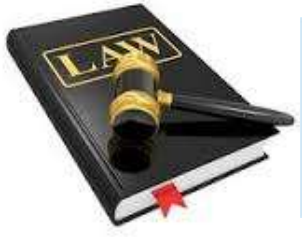
The National Framework explores England's long-term water needs. It sets out:

- the scale of action needed to ensure resilient water supplies are available to meet the needs of all users in the future
- a greater level of ambition for restoring, protecting and improving the environment that is the source of all our supplies

Explores England's long term water needs, setting out the scale of action needed to ensure resilient supplies and an improved water environment



Why do we undertake SEA?



Fundamentally SEA is a statutory obligation for qualifying plans

Better environmental protection, identifying potential unforeseen environmental effects

Improves plans by using an objectively, structured approach and integrating consideration of environmental and social effects

Improved decision making by providing evidence-based assessments of various alternatives, SEA supports informed decision-making processes, leading to more sustainable and effective water management strategies.

Enhanced communication and transparency in decision making. Aids consultation and makes it more meaningful to regulators and stakeholders

Exploration of reasonable alternatives with potential for wider benefits

Reducing long term costs by helping to avoid unforeseen environmental effects and minimise need for potential remedial action

Provides a robust platform for any later, detailed planning applications and EIA requirements

UK Water Resources

Water Company Investment

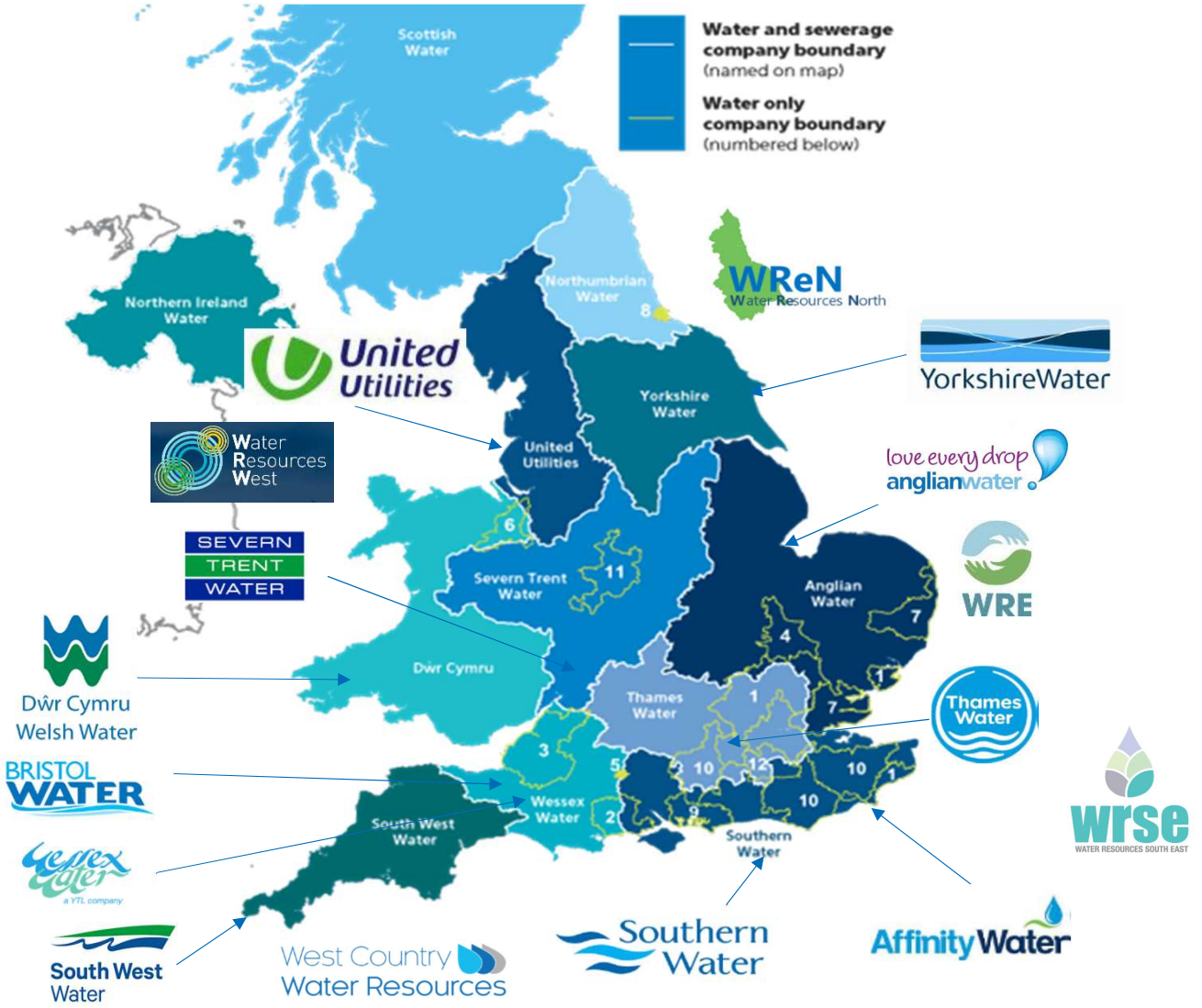
- Privatised Water (& Sewerage) Companies
- 5-year investment cycles (AMP7 £50Bn largest)
- Enhanced regulatory pressure & public scrutiny
- Increased focus on environmental improvement
- Climate change, population growth & price
- Consultancy framework agreements

Regional Water Resource Planning

- National resource planning framework 2019
- Identified water resource deficits (SE England)
- Building to 2050 ‘jaws of death’ scenario
- Driven need to plan at regional level (5 groups)
- Identified need to develop SROs

Strategic Resource Options

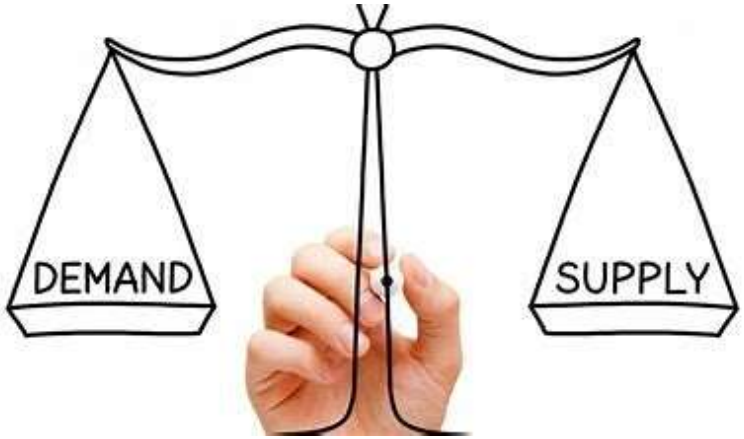
- 17 SROs for development during AMP7 2020-25
- £469M funding via PR19 split between partners
- New investment & scale of challenge
- Significant environmental service provision



Water Resource Management Plans (WRMPs)

Water companies in England and Wales have statutory duty every five years to:

- Assess the need for water resources
- Produce a plan (WRMP) for the required water resources:
  - Demand management first i.e. encourage minimal use of water resources e.g. water efficiency measures such as education or devices, metering, leakage
  - Forecasting water on basis of scenarios e.g. drought, industry
  - Determine likely supply requirements
  - Assessment to determine most suitable options
  - Detailed assessment of preferred option(s)

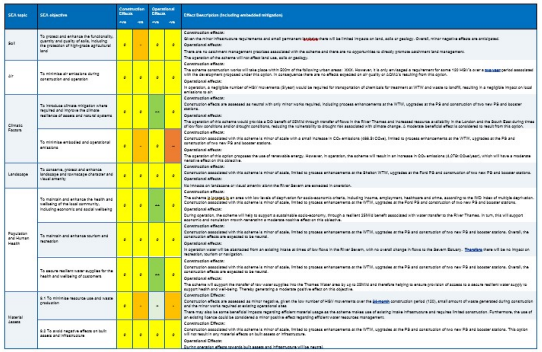


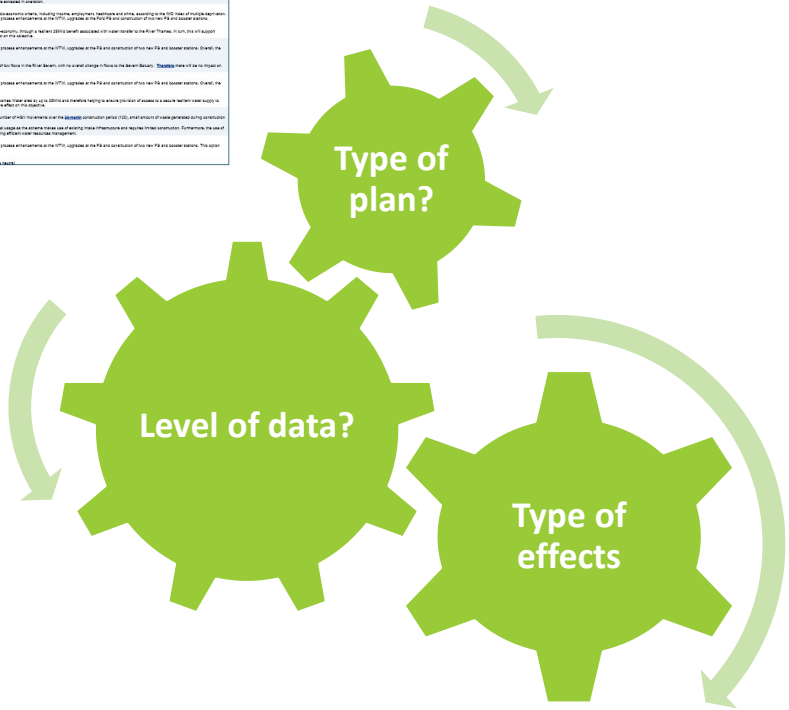
Water Supply Options - Examples

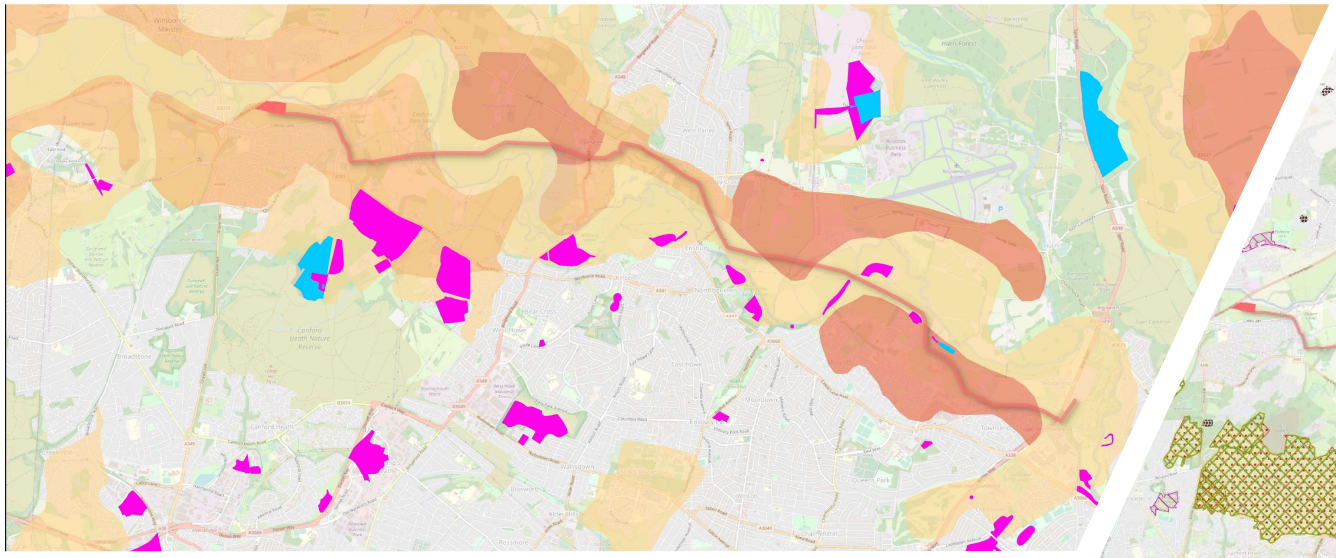
Differentiating the WRMP SEA….

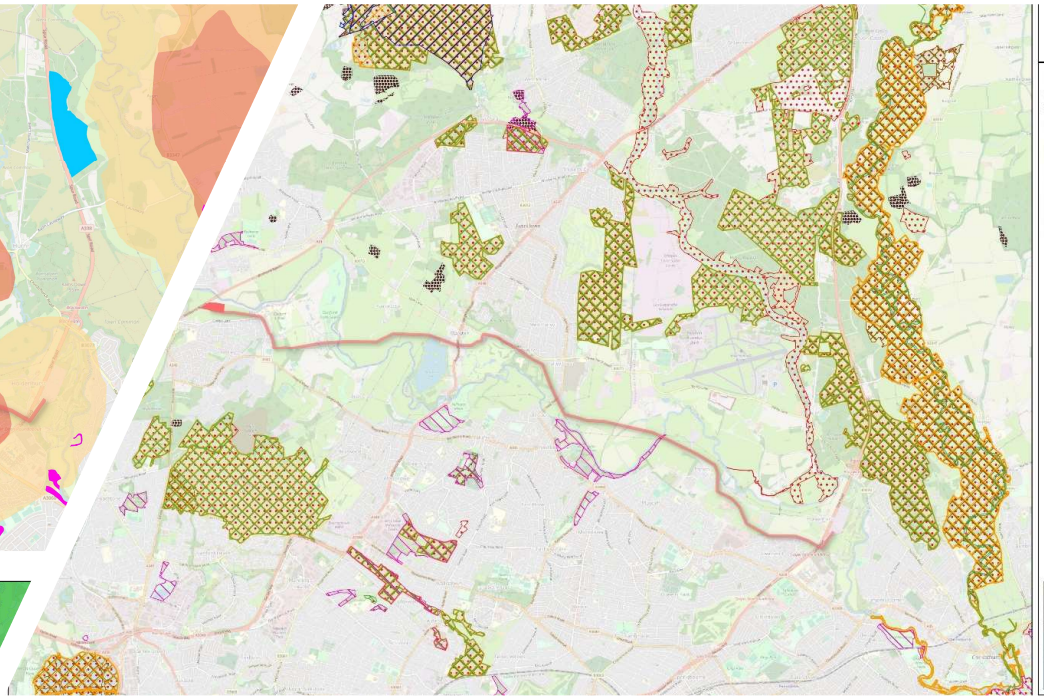
- **WRMP**
  - Range and scale of options to assess – can vary from small scale licence transfers to a large scale new reservoir, pipelines
  - More data such as Carbon, CAPEX, GIS
  - Other assessment information – can vary e.g. WFD and HRA assessments

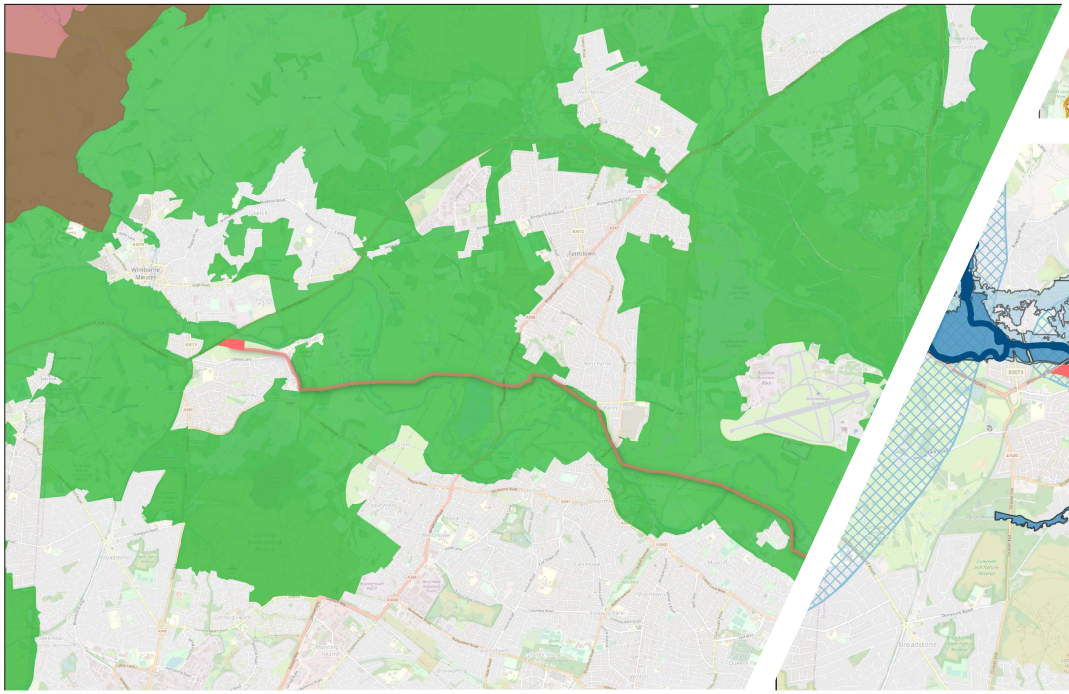
- Another example: **Scotland's Forestry Strategy**
  - Not spatial in the sense of WRMP
  - Vision and objectives e.g. *Increase the contribution of forests and woodlands to Scotland's sustainable and inclusive economic growth*
  - Priorities e.g. *Promote and develop the concept of sustainable forest management as it applies to Scotland*

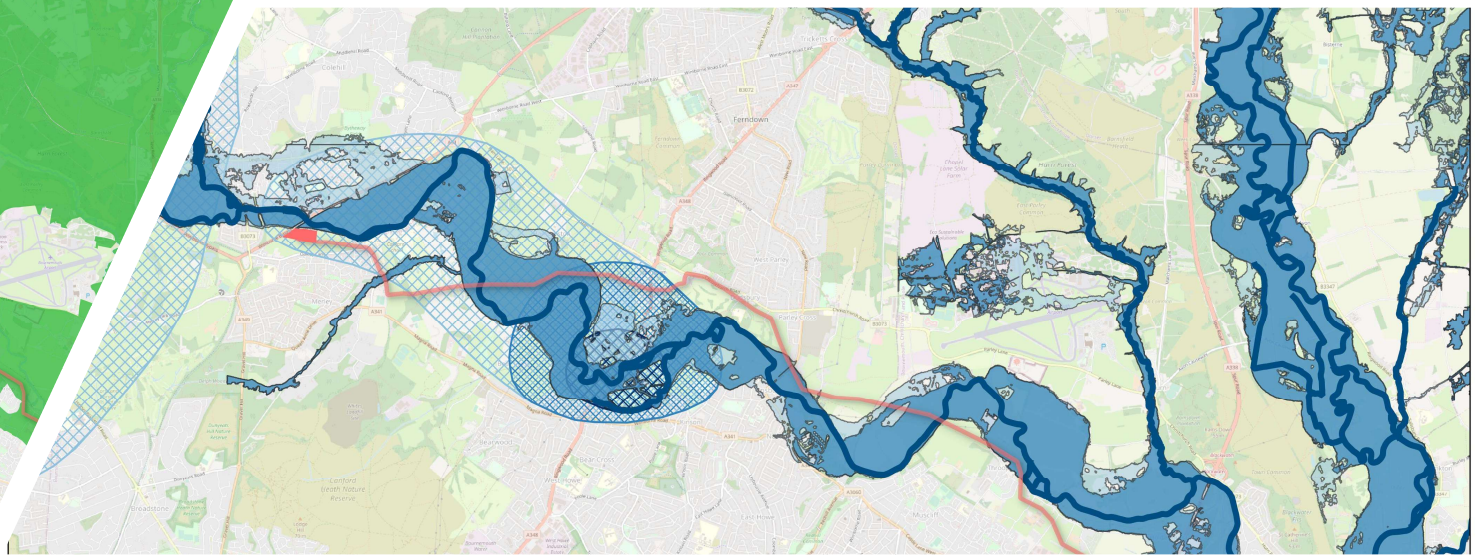












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Proposed WTW
Pipeline
Biodiversity
Special Areas of Conservation - SAC
Special Protection Areas - SPA
Ramsar
National Nature Reserves - NNR
Local Nature Reserves - LNR
Ancient Woodland
Sites of Special Scientific Interest - SSSI

WRMP SEAs - Assessing the effects in practice

Objective led approaches to assessment

SEA topic	SEA objective	Construction Effects +ve	Construction Effects -ve	Operational Effects +ve	Operational Effects -ve	Effect Description (including embedded mitigation)
Soil	To protect and enhance the functionality, quantity and quality of soils, including the protection of high-grade agricultural land	0	-	0	0	Construction effects: Given the minor infrastructure requirements and small permanent land take there will be limited impacts on land, soils or geology. Overall, minor negative effects are predicted. Operational effects: There are no catchment management practices associated with the scheme and there are no opportunities to directly promote catchment land management practices. The operation of the scheme will not affect land use, soils or geology.
Air	To minimise air emissions during construction and operation	0	0	0	0	Construction effects: The scheme construction works will take place within 200m of the following urban areas: XXXX. However, it is only envisaged a requirement for XXX with the development proposed under this option. In consequence there are no effects expected on air quality or ΔQM10's resulting from this option. Operational effects: In operation, a negligible number of HGV movements (5/year) would be required for transportation of chemicals for treatment at WTW and waste emissions to air.
Climatic Factors	To introduce climate mitigation where required and improve the climate resilience of assets and natural systems	0	0	++	0	Construction effects: Construction effects are assessed as neutral with only minor works required, including process enhancements at the WTW, upgrades at the PS and boster stations. Operational effects: The operation of this scheme would provide a DO benefit of 25Ml/d through transfer of flows in the River Thames and increased resource availability of low flow conditions and/or drought conditions, reducing the vulnerability to drought risk associated with climate change. A moderate beneficial effect is predicted.
	To minimise embodied and operational emissions	0	-	0	--	Construction effects: Construction associated with this scheme is minor of scale with a small increase in CO_2 emissions (699.5t CO_2e), limited to process enhancements at the WTW, upgrades at the PS and construction of two new PS and booster stations. Operational effects: The operation of this option proposes the use of renewable energy. However, in operation, the scheme will result in an increase in CO_2 emissions and therefore a negative effect on this objective.
Landscape	To conserve, protect and enhance landscape and townscape character and visual amenity	0	0	0	0	Construction effects: Construction associated with this scheme is minor of scale, limited to process enhancements at the Shelton WTW, upgrades at the Ford PS and construction of two new PS and booster stations. Operational effects: No impacts on landscape or visual amenity along the River Severn are expected in operation.
Population and Human Health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	++	0	Construction effects: The scheme is located in an area with low levels of deprivation for socio-economic criteria, including income, employment, healthcare and crime. Construction associated with this scheme is minor of scale, limited to process enhancements at the WTW, upgrades at the Ford PS and construction of two new PS and booster stations. Operational effects: During operation, the scheme will help to support a sustainable socio-economy, through a resilient 25Ml/d benefit associated with water transfer. Supporting economic and population growth generating a moderate positive effect on this objective.
	To maintain and enhance tourism and recreation	0	0	0	0	Construction effects: Construction associated with this scheme is minor of scale, limited to process enhancements at the WTW, upgrades at the PS and construction of two new PS and booster stations. Construction effects are expected to be neutral. Operational effects: In operation water will be abstracted from an existing intake at times of low flows in the River Severn, with no overall change in flows to the Severn. No effects on recreation, tourism or navigation.
	To secure resilient water supplies for the health and wellbeing of customers	0	0	++	0	Construction effects: Construction associated with this scheme is minor of scale, limited to process enhancements at the WTW, upgrades at the PS and construction of two new PS and booster stations. Construction effects are expected to be neutral. Operational effects: The scheme will support the transfer of raw water supplies into the Thames Water area by up to 25Ml/d and therefore helping to ensure provision of support health and well-being. Thereby generating a moderate positive effect on this objective.
Material Assets	9.1 To minimise resource use and waste production	0	-	+	-	Construction Effects: Construction effects are assessed as minor negative, given the low number of HGV movements over the 24-month construction period (120), and the minor works required at existing operational sites. There may also be some beneficial impacts regarding efficient material usage as the scheme makes use of existing intake infrastructure and re-uses an existing licence could be considered a minor positive effect regarding efficient water resources management.
	9.2 To avoid negative effects on built assets and infrastructure	0	0	0	0	Construction Effects: Construction associated with this scheme is minor of scale, limited to process enhancements at the WTW, upgrades at the PS and construction of two new PS and booster stations. It will not result in any material effects on built assets or infrastructure. Operational Effects: During operation effects towards built assets and infrastructure will be neutral.

Option	Stage	1. Biodiversity	2. Sustainable Natural Resources	3. INNS	4. Soils, Geodiversity and Land Use	5. Water Quantity	6. Water Quality	7. Flood Risk	8. Air Quality	9. Greenhouse Gas Emissions	10. Climate Resilience	11. Economy	12. Tourism and Recreation	13. Human Health and Well-being	14. Water Resource Use	15. Waste and Resource Use	16. Cultural Heritage	17. Landscape
Option 435	Construction (negative)	-/?	0	0	0	0	-	0	-/?	-/?	0	-/?	0	-	0	-	--	-
	Construction (positive)	0	0	0	+	0	0	0	0	0	0	+	0	0	0	0	0	0
	Operation (negative)	-/?	0	0	0	0	0	0	0	-/?	0	0	0	0	0	-/?	0	0
	Operation (positive)	0	0	0	0	0	0	0	0	0	+	+	0	+	0	0	0	0

Construction

Objective 1: Minor negative uncertain effect - There are two European sites within 20km of the option (Ensor's Pool SAC (13.2km) and the River Mease SAC (19.6km)). Neither of the European sites (or their interest features) will be exposed to the likely outcomes of the option due to the distance and absence of effect pathways (distance, up-catchment sites, characteristics of mobile species). The Humber Estuary SAC / SPA / Ramsar are the ultimate downstream receptors (>100km downstream via the River Trent). The HRA concludes that the effects of construction would be negligible (as no impact pathways, features not sensitive; etc.). Within 10km of the option there are: 9 SSSIs, the closest of which is approximately 0.4km away from the option (River Blythe SSSI); 16 LNRs, the closest of which is approximately 2.4km from the option; and, a number of areas of ancient woodland, the closest of which is approximately 2.2km away. There are also a number of priority habitats within 1km of the option, including where the option is located (Woodland Priority Habitat Network). Construction effects e.g. noise/vibration may have a negative effect on the features which are within close proximity to the option, however, envisaged that the solution will be confined within the boundaries of the existing STW site, therefore it is assumed that there will be no loss of habitat due to land take associated with the construction of the option. Construction activities near water courses may result in minor loss or degradation of non-designated aquatic habitat associated with short-term changes in water level, geomorphology or water quality. There could be a short term change in sediment dynamics associated with any construction activities near water, however , this is unlikely to alter geomorphological forms and processes which underpin physical habitat for aquatic ecosystems within the reservoir environment. Whitacre Reservoir is an offline reservoir, thus, these impacts are confined to Whitacre Reservoir.

Objective 2: Neutral effect - The construction activities may lead to a temporary change in land cover. However this is expected to have a neutral effect.

Objective 3: Neutral effect - Due to the construction activities required potentially resulting in increased distribution of terrestrial INNS. Risk considered to be neutral considering standard biosecurity measures during construction.

Objective 4: Minor positive effect - It is envisaged that the solution will be confined within the boundaries of the existing STW site, therefore it is assumed that this scheme will have a positive effect on land use with development being on previously developed land and that there would not be loss of best and most versatile agricultural land or impact upon soils.

Objective 5: Neutral effect - No construction activities associated with this option would have a discernible effect on river flows or groundwater levels. There could be a short term change in sediment dynamics within the reservoir associated with the construction of activities near water, however, this is expected to be minimal and will be confined to within the reservoir environment.

Objective 6: Minor negative effect - Construction activities near watercourses may have a minor effect on water quality within the reservoir which result in short-term or intermittent effects on receptors. The option would not lead to a change in WFD classification as Whitacre Reservoir is not a WFD water body.

Option	Stage	SEA Objectives 1. Biodiversity	2. Sustainable Natural Resources	3. INNS	4. Soils, Geodiversity and Land Use	5. Water Quantity	6. Water Quality	7. Flood Risk	8. Air Quality	9. Greenhouse Gas Emissions	10. Climate Resilience	11. Economy	12. Tourism and Recreation	13. Human Health and Well-being	14. Water Resource Use	15. Waste and Resource Use	16. Cultural Heritage	17. Landscape
Option 2.1.1.1: 40 Ml/d capacity raw water abstraction from the Trent to Blithfield	Construction (negative)	-/?	-	-	-	0	-	-	-/?	--	0	-	-	-	0	--	-	--
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	++	0	0	0	+	0	0
	Operation (negative)	-/?	0	---	?	-	-	0	-/?	---	0	0	0	0	0	-/?	0	0
	Operation (positive)	0	+	0	0	0	0	0	0	0	++	+++	0	+++	++	0	0	0
Option 2.2.1.1: Increase Storage at Blithfield Reservoir – Increase Dam height by 1m	Construction (negative)	--/?	0	-	--	0	-	--	-/?	---	0	-	---	-	0	---	-	--
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	+++	0	0	0	+	0	0
	Operation (negative)	-/?	0	-	0	-	0	0	-/?	0	0	0	0	0	0	-/?	-	-
	Operation (positive)	0	0	0	0	0	0	++	0	0	+	+	0	+	0	0	0	0
Option 2.2.2.1: Increase Storage at Blithfield Reservoir – Increase Dam height by 2m	Construction (negative)	--/?	0	-	--	0	-	--	-/?	---	0	-	---	-	0	---	-	--
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	+++	0	0	0	+	0	0
	Operation (negative)	-/?	0	-	0	-	0	0	-/?	0	0	0	0	0	0	-/?	-	-
	Operation (positive)	0	0	0	0	0	0	++	0	0	+	++	0	++	+	0	0	0
Option 2.3.1: Chelmarsh Reservoir 15 Ml/d <2m raising	Construction (negative)	--	0	-	--	0	-	0	-/?	--/?	0	0	--	-	0	--	0	--
	Construction (positive)	0	0	0	0	0	0	0	0	0	0	++	0	0	0	+	0	0
	Operation (negative)	--	0	-	0	0	0	0	0	0	0	0	0	0	0	-	0	-

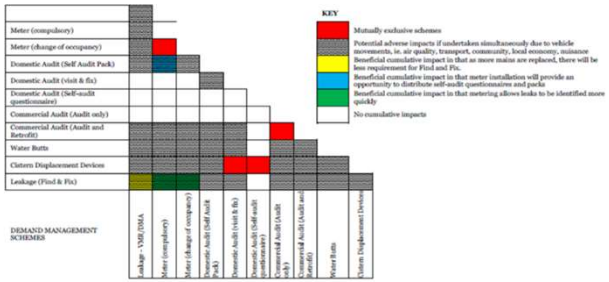
Cumulative Effects and Programme Level assessments (WRMP)

A cumulative effect can occur when two or more environmental effects combine to have a greater effect:

- from different actions within a plan
- from combined actions of a wider range of plans
- over space or time
- or arise from multiple individual effects on a single receptor

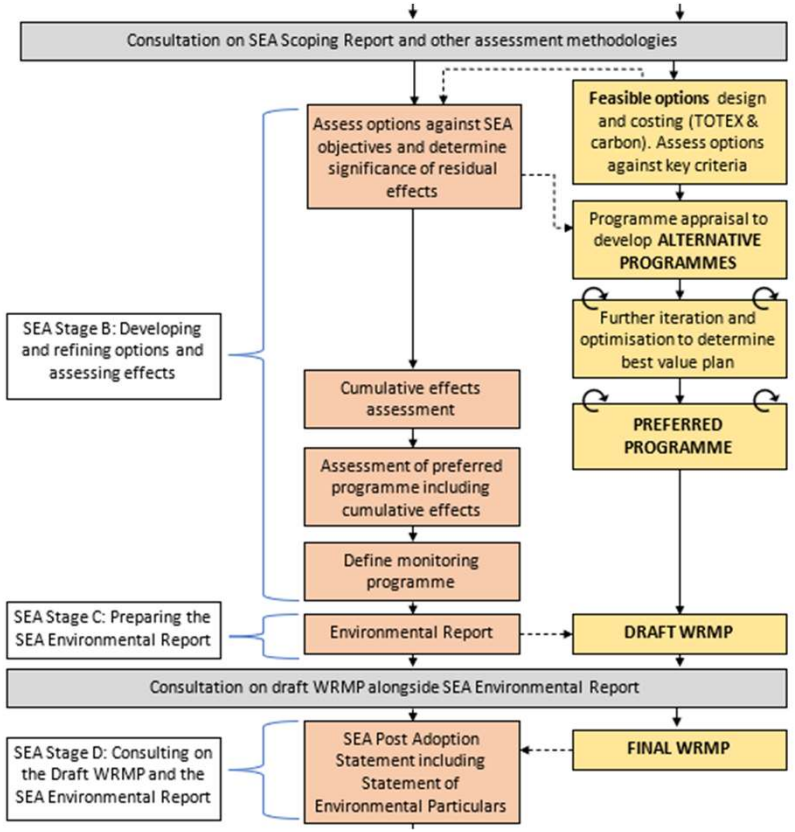
- For WRMPs - Water companies develop alternative programmes
- Programme-level assessment considers both the findings of the option-level SEA and any identified cumulative significance of effects

SEA Objective	Cumulative score	Commentary
1. To protect and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species, enhance ecosystem resilience and habitat connectivity and deliver a net biodiversity gain.	---/?	The construction and operation phases will lead to some effects due to loss of/disturbance of habitats and species. Likely significant effects or likely significant uncertain effects were assessed for seven supply options. Option 6 is surrounded by two European sites and three areas of ancient woodland are within the proposed boundary of storage increase, Option 31C and 31D will result in the permanent/partial loss of SSSIs designated for their geological features, Option 128Z intersects a number of SSSIs and areas of ancient woodland, Option 187C and 557 are in proximity to areas of ancient woodland and Option 190 also intersects ancient woodland and the HRA identified uncertainties and suggests scheme level investigations may be required. The HRA could not screen out operational effects on twelve options, however only Option 6 is anticipated to have significant effects. However, several options potentially affect the same designated sites and until the outcome of the various Stage 2 Appropriate Assessments are available, a cumulative significant negative uncertain effect is assessed.
2. To protect and enhance sustainable natural resources and the ecosystem services they provide.	+++/?	The BNG assessment identifies that there would be a temporary and permanent loss of habitat during the construction of the preferred programme of supply side options. However, it is assumed that in the operational phase there would then be a net gain leading to an overall net gain in biodiversity for the preferred programme. A significant positive score is assessed reflecting the scale of loss during the construction phase (that would then see a net gain in the operational phase). However, there is some uncertainty over the extent of the positive effects of the preferred programme of options.
3. To avoid and, where required, manage invasive and non-native species (INNS).	--	Overall, moderate negative effects are assessed for preferred programme with respect to INNS. The presence and extent of negative effect is uncertain given that the INNS risk assessment identifies minor or no risk for nearly all of the preferred programme of options. Option 169 is identified as having a moderate negative risk of creating transfer of INNS as the additional volume discharged from the Derwent valley reservoirs may impact physical environment conditions in favour of INNS as well as potentially increase propagule pressure in the downstream watercourse.
4. To protect and enhance		Construction and operation of water resources infrastructure could affect existing land uses due to land take associated with new development. This may result in clearance of vegetation and loss of soil levels leading



Benefits of SEA in the context of WRMPs

- **Holistic perspective:** An early view of the environmental and social effects of water management decisions across a range of topics. Integrates other assessments and data.
- **Early identification of issues:** Identifies potential risks and concerns at the planning stage, allowing mitigation measures to start to be considered into the plan from the outset.
  - Assists in the optioneering process – Informs and steers scheme design. Identifies showstoppers, assesses iterations of options
  - Informs decision makers – In context of engineering and cost
  - Further design and appraisal work develops the option concepts, including environmental impacts as part of the overall optimisation
- **Valuable consultation tool**
- **Long-term sustainability:** By assessing the long-term impacts of water management decisions, SEA helps plans to contribute to the sustainable use and protection of water resources.

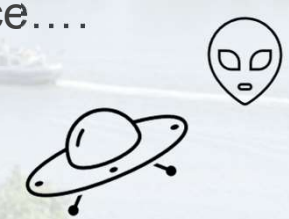


*Extract from UKWIR Guidance: Ricardo Energy & Environment (2020), UKWIR ENVIRONMENTAL ASSESSMENT GUIDANCE FOR WATER RESOURCES MANAGEMENT PLANS AND DROUGHT PLANS

Examples of Challenges / Opportunities in the context of WRMP SEAs

- Uncertainty
- Option iterations
  - Difficulties avoiding sensitive areas
  - Time consuming with time constraints
  - Tracking options and iterations
- Redaction for security purposes – all reference to location removed
- Proportionality
- Feedback from various stakeholders. Water industry, regulators, public – e.g. uncertainty and cumulative effects with respect to timing of e.g. inter-company transfers and adjoining and regional WRMPs

- Coordination
- Better collaboration
- Digital advancement– requires buy in from regulators, water companies and the public
- Automation opportunities
- Artificial Intelligence….



Challenges / Opportunities…. Navigating Changes to Legislation

The Future?

Statutory Instrument 2004 No.1633 The Environmental Assessment of Plans and Programmes Regulations 2004 (England) – The SEA Regulations.

The Levelling-up and Regeneration Act 2023 (LURA) enabled a new system of Environmental Outcome Reports (EOR) to replace EU derived EIA and SEA but Regulations are delayed until at least 2025.

Let’s continue the conversation!

Post questions and comments in the IAIA24 app.

Thank you !!

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