

United Utilities Sources – SEA Environmental Assessment Report

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Technical note:

Strategic Environmental Assessment of the United Utilities Sources Strategic Resource Option

1. Introduction

- 1.1.1 The United Utilities Sources (UUS) Strategic Resource Option (SRO) is being delivered by United Utilities (UU) and is one of three SROs the water company is participating in, the others being United Utilities Vyrnwy Aqueduct (UUVA) and Severn to Thames Transfer (STT). Although these schemes are separate SROs, they directly interface with each other to enable water to be transferred from North West England to the Midlands and South.
- 1.1.2 To meet the Regulators' Alliance for Progressing Infrastructure Development (RAPID) Gate 1 submission environmental requirements¹, the UUS SRO must be subject to a range of environmental assessments. As part of this process, UU commissioned Wood Environment and Infrastructure Solutions UK Ltd² (Wood) to undertake an initial assessment of the feasible options identified for the SRO that follows the principles of Strategic Environmental Assessment (SEA).
- 1.1.3 This Technical Note presents the findings of the initial SEA of the UUS SRO options being taken forward at Gate 1. It has used an assessment methodology applied to the water resource management options developed in support of UU's Water Resources Management Plan 2019 (WRMP19)³.

1.2 United Utilities Sources Strategic Resource Option

- 1.2.1 The UUS SRO is one of 17 schemes promoted by Ofwat in the PR19 Final Determination¹ to identify new strategic water resources to address the water needs set out in the National Framework for Water Resources⁴. The SRO programme is managed by RAPID and governed through a gated process during AMP7 with the purpose of selecting the strategic resource options which provide best value for customers for delivery in AMP8. The gates are:
- **Gate 1:** Initial concept design and decision making;
 - **Gate 2:** Detailed feasibility, concept design and multi-solution decision making;
 - **Gate 3:** Developed design, finalised feasibility, pre-planning investigations and planning applications;

¹ See Ofwat (2019) *PR19 final determinations: Strategic regional water resource solutions* and RAPID (2020) *Accelerated Gate One Assessment –summary of process and criteria Version 2*.

² Now Wood Group UK Ltd.

³ United Utilities (2019) *Final Water Resources Management Plan 2019*. Available from https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/wrmp-2019---2045/final-water-resources-management-plan-2019.pdf [Accessed March 2021].

⁴ Environment Agency (2020) *Meeting our future water needs: a national framework for water resources*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872759/National_Framework_for_water_resources_main_report.pdf [Accessed September 2020].

- **Gate 4:** Planning applications, procurement and land purchase.

- 1.2.2 Gate 1 of this process takes place in July 2021 and involves initial concept design and decision making. The Gate 1 decision, if supportive, will provide further funding for development of the schemes and the selected options will be included in the plan development process for the Regional Plans and Water Resources Management Plans 2024 (WRMP24s), as appropriate
- 1.2.3 The purpose of the UUS SRO, alongside the UOVA SRO, is to support the STT SRO proposal to transfer up to 180 mega litres per day (Ml/d) to the Thames Water region via the River Severn by maintaining supply resilience to UU customers if water were to be transferred out of region.
- 1.2.4 Source options for the UUS SRO have been evaluated in terms of their benefits and costs and subject to environmental assessment in accordance with RAPID's Gate 1 requirements. This process has informed the selection of a preferred list of 27 feasible options for the SRO including groundwater enhancement, improved reservoir release control, local interconnection and treatment, and river abstraction. The preferred list of feasible options is presented in **Section 2** of this Technical Note.
- 1.2.5 It should be noted that, at this stage, the preferred options for the UUS SRO have not been selected. The options will be selected by Gate 2 (October 2022) with those ultimately chosen being dependent upon further assessment (including SEA), investigation and the volume of water required for trading.

1.3 RAPID's Environmental Requirements

- 1.3.1 RAPID has requested environmental information from water companies to support their respective SROs as part of the Gate 1 submission (July 2021). To meet RAPID's Gate 1 submission requirements⁵, UU is to provide the following information for the UUS SRO options being taken forward:
- Initial option-level environmental assessments that meet local requirements and comply with SEA and Habitats Regulations Assessments (HRA) requirements, including consideration of in-combination effects and identification of environmental risks that need mitigating through the solution design and costing.
 - Initial environmental, social, and economic valuations (or metric benefits) consistent with principles in the National Planning Statement and Water Resource Planning Guidelines.
- 1.3.2 To meet RAPID's requirements, the following environmental assessments have been completed:
- Strategic Environmental Assessment⁶ (SEA);
 - Habitats Regulations Assessment⁷ (HRA) Review;
 - Water Framework Directive (WFD) Screening Assessment⁸;
 - Natural Capital Assessment (NCA);

⁵ See Ofwat (2019) *PR19 final determinations: Strategic regional water resource solutions* and RAPID (2020) *Accelerated Gate One Assessment –summary of process and criteria Version 2*.

⁶ *Statutory Instrument No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004*.

⁷ *Statutory Instrument No.1012 - Conservation of Habitats and Species Regulations 2017*.

⁸ *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the Water Framework Directive)*.



- Biodiversity Net Gain (BNG) Assessment;
- Invasive Non-native Species (INNS) Risk Assessment.

1.3.3 This Technical Notes relates to the SEA of the UUS SRO.

1.4 Strategic Environmental Assessment

Overview

1.4.1 SEA became a statutory requirement following the adoption of European Union Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive). This was transposed into legislation on 20 July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations)⁶. The objective of SEA, as defined in Directive 2001/42/EC, is:

"To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to contributing to sustainable development."

1.4.2 Throughout the course of the development of a plan or programme, SEA should seek to identify, describe and evaluate the likely significant effects on the environment of implementing the plan or programme and propose measures to avoid, manage or mitigate any significant adverse effects and to enhance any beneficial effects.

1.4.3 The UUS SRO is not a plan or programme in the context of the SEA Regulations. However, the options considered for the SRO will be included in WRMP24 and the Regional Plans that will themselves be subject to SEA. As outlined above, RAPID has also requested that a SEA be completed in support of water company Gate 1 submissions and the National Assessment Unit (NAU)⁹ and Natural Resources Wales (NRW) have confirmed that their Gate 1 expectations include for SEA requirements to be taken into account in the initial environmental assessments completed for the UUS SRO. The All Company Working Group (ACWG) has additionally developed guidance^{10,11} on environmental assessment for SROs. Regarding SEA, this sets out that:

"SEA compliant environmental assessment would commence from Gate 1 to inform initial concept design and decision making. An option level-assessment would be undertaken to assess concept options against SEA objectives to determine potential effects and identify mitigation or enhancement measures where relevant. This will aid optioneering for selection of the preferred option for the SRO."

1.4.4 In this context, UU has determined to undertake an initial assessment of the options identified for the UUS SRO that follows the principles of SEA. This approach recognises that:

- the UUS SRO is not a plan or programme in the context of the SEA Regulations;
- a preferred solution for the UUS SRO has not yet been identified meaning that the likely significant effects cannot yet be confirmed; and
- an assessment of the UUS SRO compliant with the SEA Regulations will be undertaken as part of WRMP24 and the Regional Plan development process.

⁹ The NAU includes representatives from the Environment Agency (EA) and Natural England (NE) and has been established to provide strategic advice and guidance to water companies on environmental matters pertaining to the SROs, including the UUS SRO.

¹⁰ Mott MacDonald (2020) *All Companies Working Group WRMP environmental assessment guidance and applicability with SROs*.

¹¹ Mott MacDonald (2020) *All Company Working Group Water Framework Directive: Consistent framework for undertaking no deterioration assessments*.



- 1.4.5 The assessment presented in this Technical Note does not, therefore, follow the stages of the SEA process detailed in the SEA Regulations but instead applies the methodology developed for WRMP19 to the UUS SRO options to:
- identify the potentially significant environmental effects of the options being considered for the UUS SRO;
 - help identify appropriate measures to avoid, reduce or manage adverse effects and to enhance beneficial effects;
 - provide the statutory SEA bodies and stakeholders information on the likely effects that the UUS SRO may have on their interests; and
 - inform UU's selection of the preferred solution for the UUS SRO.

SEA of the United Utilities Sources SRO

- 1.4.6 The SEA of the UUS SRO options has been undertaken in two phases:
- **Phase 1:** An assessment of the initial list of feasible options identified for the SRO, to assist UU in identifying those options to be taken forward at Gate 1¹²;
 - **Phase 2:** Further assessment of the preferred list of feasible options for the SRO to take into account regulator feedback and support UU's selection of the preferred solution post-Gate 1 (this report).

- 1.4.7 As noted above, this SEA is not the 'final' or 'full' assessment that will be undertaken for the SRO. In accordance with the ACWG guidance, the assessment will be refined at each gate to take into account further investigations/monitoring, developed design and/or mitigation and the preferred SRO solution. It is currently envisaged that this work will be undertaken concurrent with the wider WRMP24 and Regional Plan development process post-Gate 1.

1.5 This Technical Note

- 1.5.1 This Technical Note presents the findings of the SEA for the preferred list of UUS SRO feasible options. The remainder of this Technical Note is structured as follows:
- **Section 2:** Describes the options identified for the UUS SRO;
 - **Section 3:** Outlines the methodology for the assessment;
 - **Section 4:** Summarises the results of the assessment;
 - **Section 5:** Sets out the next steps in the assessment process.

2. The United Utilities Sources SRO Options

2.1 Overview

- 2.1.1 The options for the UUS SRO being taken forward at Gate 1 have been selected following a process of options identification and appraisal. UU initially identified a long list of possible options that

¹² Wood (2021) Strategic Environmental Assessment of the United Utilities Sources and Vyrnwy Aqueduct Strategic Resource Options.



were subject to screening (Primary Screening) to identify a total of 37 feasible options for the SRO. These feasible options were then assessed in terms of their Average Incremental Cost (AIC), modelled to determine their water resource benefit and subject to initial environmental assessment including SEA. Taking into account the AIC and the findings of the initial environmental assessments, as well as ongoing engagement with stakeholders, a preferred list of 27 feasible options for the UUS SRO has been identified.

2.2 United Utilities Sources SRO Options

2.2.1 The 27 UUS SRO options being taken forward by UU at Gate 1 are summarised in **Table 2.1**.

Table 2.1 UUS SRO options

Option Number	Gate 1 Ref	Option Name	Summary Description
STT019	24	Transfer from Wirral to Liverpool via Mersey Tunnel	[X]
STT029	6	River Lune Transfer	[X]
STT034	11	Hollingworth Lake	[X]
STT041	13	Heaton Park	[X]
WR001	14	River Alt to Prescot WTW	[X]
WR010	5	River Greta River Wenning to Lancaster	[X]
WR049b	9	Abstraction from Ribble (lower) - Rivington	[X]
WR076	25	New river abstraction, Upper Mersey (e.g. Bollin @ Lymm)	[X]
WR099b	8	Worsthorne BH	[X]
WR101	7	Franklaw BHs	[X]
WR102b	17	Widnes BH Group	[X]

Option Number	Gate 1 Ref	Option Name	Summary Description
WR102e	15	Bold Heath BHs	[✂]
WR105a	18	Lymm BH and WTW	[✂]
WR107b	12	Randles Bridge (Royal Oak).	[✂]
WR112	21	Bramhall Borehole	[✂]
WR113	19	Tytherington BH	[✂]
WR123	23	Helsby and Foxhill BHs PBD	[✂]
WR141	10	New river abstraction, River Irwell (e.g. Medlock)	[✂]
WR149	16	Lightshaw increased WTW capacity (SW)	[✂]
WR153	20	Simmonds Hill WTW (Manley Quarry BH)	[✂]
WR154	22	Sandiford Increased Capacity	[✂]
WR159	2	Individual Reservoirs Compensation Release Control	[✂]
WR810	3	Cow Green to Heltondale	[✂]
WR812	1	Kielder to Heltondale	[✂]
WR814a	26	Increased treatment capacity at At Huntington WTW	[✂]
WR815	4	Killington Reservoir to Thirlmere Aqueduct	[✂]



Option Number	Gate 1 Ref	Option Name	Summary Description
WR821	27	Llangollen Canal	[✂]

3. Assessment Methodology

3.1 Overview

- 3.1.1 The assessment of the UUS SRO options has used the same assessment methodology as that previously employed for UU's draft WRMP19 feasible options, as set out in detail in Section 4 of the associated Environmental Report¹³. This methodology uses an assessment framework comprising of SEA objectives and associated guide questions to assess the economic, social and environmental effects of options. By assessing each option against the objectives contained in the framework, it is more apparent where they will contribute to sustainability, where they might have a negative effect and where enhancements could be made.
- 3.1.2 This objectives-led approach is broadly consistent with the ACWG guidance on SEA and the topics considered in this SEA align with those in the guidance such that there is no material difference to the identification of significant effects.
- 3.1.3 It should be noted that the methodologies for the SEAs of the Water Resources West (WRW) Regional Plan and associated water company WRMP24s are (at the time of writing) currently being developed¹⁴, and which have taken into account all government¹⁵, regulator¹⁶ and industry¹⁷ guidance. In consequence, post-Gate 1, there will be a need to review the approach to the SEA of the UUS SRO options to ensure that there is consistency with the methodologies employed for the assessments of the Regional Plan and WRMPs. However, at this stage, it is not anticipated that any such review would substantially affect the findings of the assessment presented in this Technical Note.

3.2 Assessment Framework

- 3.2.1 The framework that has been used to assess the UUS SRO options is shown in **Table 3.1**. It consists of 12 SEA objectives and 57 guide questions that were developed as part of the preparation of the SEA Scoping Report and subject to consultation¹⁸ in late 2016. The performance of each option

¹³ Amec Foster Wheeler (2018) *Strategic Environmental Assessment of the Revised Draft Water Resources Management Plan 2019: Environmental Report*, August 2018

¹⁴ Scoping consultation ran from 8th April to 13th May 2021.

¹⁵ Office of the Deputy Prime Minister (ODPM), Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland (2005) *A Practical Guide to the SEA Directive and European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites* and Welsh Government (2015) *Strategic Environmental Assessment (SEA) in Wales*

¹⁶ EA, OfWAT and NRW (2020) *Water Resources Planning Guideline Draft for consultation – July 2020, and Technical Supplementary Guidance*

¹⁷ UKWIR (2021) *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans*. Report Ref. No. 21/WR/02/15

¹⁸ The Scoping Report was issued to the statutory consultation bodies (the Environment Agency, Natural England, Historic England, Natural Resources Wales, Cadw and the Welsh Government).



has been assessed against the 12 SEA objectives to ensure that the options are appraised in a robust and consistent manner.

Table 3.1 Assessment framework for the SEA of the UUS SRO options

Topic Area	SEA Objective	Guide Questions
Biodiversity	1. To protect and enhance biodiversity, key habitats and species, working within environmental capacities and limits.	<i>Will the option protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs)?</i>
		<i>Will the option protect and enhance non-designated sites and local biodiversity?</i>
		<i>Will the option provide opportunities for new habitat creation or restoration and link existing habitats as part of the development process?</i>
		<i>Will the option lead to a change in the ecological quality of habitats due to changes in groundwater/river water quality and/or quantity?</i>
		<i>Will the option protect, and enhance where appropriate, coastal and marine habitats and species?</i>
Geology and Soils	2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<i>Will the option prevent the spread/introduction of invasive non-native species?</i>
		<i>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</i>
		<i>Will the option utilise previously developed land?</i>
		<i>Will the option protect and enhance protected sites designated for their geological interest and wider geodiversity?</i>
		<i>Will the option minimise the loss of best and most versatile agricultural land?</i>
		<i>Will the option minimise conflict with existing land use patterns?</i>
Water – Quantity and Quality	3. To protect and enhance the quantity and quality* of surface and groundwater resources and the ecological status of water bodies.	<i>Will the option minimise land contamination?</i>
		<i>Will the option affect geomorphology?</i>
		<i>Will the option minimise the demand for water resources?</i>
		<i>Will the option protect and improve surface, groundwater, estuarine and coastal water quality?</i>
		<i>Will the option result in changes to river flows?</i>
		<i>Will the option result in changes to groundwater levels?</i>
		<i>Will the option prevent the deterioration of Water Framework Directive (WFD) waterbody status (or potential)?</i>
<i>Will the option support the achievement of protected area objectives?</i>		
		<i>Will the option support the achievement of environmental objectives set out in River Basin Management Plans?</i>

Topic Area	SEA Objective	Guide Questions
Water – Flood Risk	4. To reduce the risk of flooding.	<i>Will the option ensure a new activity or new physical modification does not prevent the future achievement of good status for a water body?</i>
		<i>Will the option have the potential to cause or exacerbate flooding in the catchment area now or in the future?</i>
		<i>Will the option have the potential to help alleviate flooding in the catchment area now or in the future?</i>
Air Quality	5. To minimise emissions of pollutant gases and particulates and enhance air quality.	<i>Will the option adversely affect local air quality as a result of emissions of pollutant gases and particulates?</i>
		<i>Will the option exacerbate existing air quality issues (e.g. in Air Quality Management Areas)?</i>
		<i>Will the option maintain or enhance ambient air quality, keeping pollution below Local Air Quality Management thresholds?</i>
		<i>Will the option reduce the need to travel or encourage sustainable modes of transport?</i>
Climate Change	6. To limit the causes and potential consequences of climate change.	<i>Will the option reduce or minimise greenhouse gas emissions?</i>
		<i>Will the option have new infrastructure that is energy efficient or make use of renewable energy sources?</i>
		<i>Will the option reduce vulnerability to the effects of climate change by appropriate adaptation?</i>
		<i>Will the option increase environmental resilience to the effects of climate change?</i>
Human Environment - Health	7. To ensure the protection and enhancement of human health.	<i>Will the option ensure the continuity of a safe and secure drinking water supply?</i>
		<i>Will the option affect opportunities for recreation and physical activity?</i>
		<i>Will the option maintain surface water and bathing water quality within statutory standards?</i>
		<i>Will the option adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</i>
Human Environment - Social and Economic Well-Being	8. To maintain and enhance the economic and social well-being of the local community.	<i>Will the option ensure sufficient infrastructure is in place for predicted population increases?</i>
		<i>Will the option ensure sufficient infrastructure is in place to sustain a seasonal influx of tourists?</i>
		<i>Will the option help to meet the employment needs of local people?</i>
		<i>Will the option ensure that an affordable supply of water is maintained and vulnerable customers protected?</i>
		<i>Will the option improve access to local services and facilities (e.g. sport and recreation)?</i>



Topic Area	SEA Objective	Guide Questions
		<i>Will the option contribute to sustaining and growing the local and regional economy?</i>
		<i>Will the option avoid disruption through effects on the transport network?</i>
		<i>Will the option be resilient to future changes in resources (both financial and human)?</i>
Material Assets and Resource Use - Water Resources	9. To ensure the sustainable and efficient use of water resources.	<i>Will the option lead to reduced leakage from the supply network?</i>
		<i>Will the option improve efficiency in water consumption?</i>
Material Assets and Resource Use – Waste and Resource Use	10. To promote the efficient use of resources.	<i>Will the option source and use recycled aggregates/materials in construction, ahead of using 'new' materials?</i>
		<i>Will the option promote the re-use and recycling of waste materials and reduce the proportion of waste sent to landfill?</i>
		<i>Will the option encourage the use of sustainable design and materials?</i>
		<i>Will the option reduce or minimise energy use?</i>
Cultural Heritage	11. To conserve and enhance cultural and historic assets.	<i>Will the option conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</i>
		<i>Will the option avoid or minimise damage to archaeologically important sites?</i>
		<i>Will the option avoid damage to important wetland areas with potential for palaeoenvironmental deposits?</i>
		<i>Will the option affect public access to, or enjoyment of, features of cultural heritage?</i>
Landscape	12. To conserve and enhance landscape character.	<i>Will the option avoid adverse effects on, and enhance where possible, protected/designated landscapes (including woodlands) such as National Parks or AONBs?</i>
		<i>Will the option protect and enhance landscape character, townscape and seascape?</i>
		<i>Will the option affect public access to existing landscape features?</i>
		<i>Will the option minimise adverse visual impacts?</i>

*Please note that water quality in this context does not concern drinking water quality but instead the quality of waterbodies.

3.3 Assessment Approach

- 3.3.1 Both the construction and operational effects of each UUS SRO option have been assessed against all of the SEA objectives. This approach recognises that many of the options under consideration are likely to be very different in nature in their construction and operational phases.
- 3.3.2 A matrix similar to that shown in **Table 3.2** has been used to capture the assessment of each option. A key to the meaning of the symbols is presented in **Table 3.3**. Each option has been scored against each SEA objective with commentary on performance.



Table 3.2 Assessment matrix

Option	Stage	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quantity	4. Flood Risk	5. Flood Risk	6. Climate Change	Etc...
Option Name	Construction	--	-	0	-	0	--/?	
	Operation	--/?	0	0	-	0	--	
Construction								
A description of the likely significant effects of the option on the SEA objectives during construction is included here.								
Operation								
A description of the likely significant effects of the option on the SEA objectives during operation is included here.								

Table 3.3 Assessment key

Score	Description	Symbol
Significant Positive Effect	Significant positive effect of the option on this objective	++
Minor Positive Effect	Positive effect of the option on this objective	+
Neutral	Overall neutral effect of the option on this objective	0
Minor Negative Effect	Negative effect of the option on this objective	-
Significant Negative Effect	Significant negative effect of the option on this objective	--
No Relationship	There is no clear relationship between the option and the achievement of the objective or the relationship is negligible.	~
Uncertain	The option has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?
Mixed Effect	Mixed positive and negative effect of the option on this objective	+/-

3.3.3 The following factors have been taken into account when identifying and assessing the likely effects of the options on the SEA objectives:

- the nature of the potential effect (what is expected to happen);
- the timing of the potential effect;



- the potential effect on vulnerable communities, sensitive habitats and/or ecosystems;
- the geographic scale of the potential effect (e.g. local, regional, national);
- the location of the potential effect; and
- the duration of the potential effect (e.g. short, medium or long term).

3.3.4 Specific guidance has also been used to inform what constitutes a significant effect, a minor effect or a neutral effect for each of the SEA objectives. These 'definitions of significance' help to ensure a consistent approach to interpreting the significance of effects and assist the reader in understanding the decisions made by the assessor. [✂]

3.3.5 The assessment has additionally taken into account the WFD Screening Assessment¹⁹ and HRA Review²⁰ of the UUS SRO options, particularly in terms of informing the assessment of the effects of the UUS SRO options on biodiversity (SEA Objective 1) and water quantity and quality (SEA Objective 3).

Incorporation of Regulator Comments

3.3.6 UU has undertaken extensive engagement with regulators (the Environment Agency (EA), NRW and Natural England (NE)) on the UUS SRO options. This included option workshops held on 2nd and 3rd December 2020 and monitoring workshops held on 23rd and 24th March 2021, alongside written feedback. [✂]

3.4 Cumulative Effects

3.4.1 This initial SEA of the UUS SRO options does not include a detailed assessment of possible cumulative effects, either between options or with other plans, projects or programmes. This is due to the number of options currently being considered for the SRO, the level of detail provided on them and the fact that a preferred solution has not yet been identified by UU. However, high-level commentary is provided on the potential cumulative effects of the UUS SRO in **Section 4.3** based on the assessment of individual options.

3.4.2 The potential for cumulative effects will be reviewed and assessed as the preferred options for the SRO are selected. A full and detailed cumulative effects assessment will be undertaken of the preferred UUS SRO solution prior to Gate 2.

3.5 Contribution of the United Utilities Sources SRO to Wales' Well-being Goals and the Objective for the Sustainable Management of Natural Resources

3.5.1 The Well-being of Future Generations (Wales) Act 2015²¹ places a duty on Welsh public bodies to carry out sustainable development aimed at achieving the seven well-being goals for Wales. The well-being goals established by the Act are as follows:

¹⁹ Wood (2021) *Technical Note: Water Framework Directive Screening Assessment of the United Utilities Sources Strategic Resource Option*

²⁰ Wood (2021) *United Utilities Sources Strategic Resource Options: Review of Options Against the Habitats Regulations*

²¹ Available from <https://www.legislation.gov.uk/anaw/2015/2/enacted> [Accessed April 2021].



- A prosperous Wales;
- A resilient Wales;
- A healthier Wales;
- A more equal Wales;
- A Wales of cohesive communities;
- A Wales of vibrant culture and thriving Welsh language; and
- A globally responsible Wales.

3.5.2 The Environment (Wales) Act 2016²², meanwhile, has established an objective for the sustainable management of natural resources (SMNR) *"to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—*

(a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and

(b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015".

3.5.3 UU is not a Welsh public body; however, it does operate in Wales. Further, the Well-being of Future Generations (Wales) Act 2015 notes (in section 6(3)) that the provisions of the Act can apply to other parties 'who exercise functions of a public nature' whilst the Environment (Wales) Act 2016 defines public authorities as including 'statutory undertakers'.

3.5.4 On this basis, commentary on the potential impact that the UUS SRO may have on the achievement of the seven well-being goals for Wales and the objective for SMNR is presented in **Section 4.4**.

3.6 Mitigation

3.6.1 High level consideration is given to possible mitigation and enhancement measures in **Section 4.5**. The measures have been identified taking into account the likely significant effects of the options, engagement with regulators and the findings of the other environmental assessments.

3.6.2 The mitigation and enhancements measures will be developed further post-Gate 1 following the identification of the preferred solution for the UUS SRO and taking into account more detailed scheme information, engagement with stakeholders, further environmental assessment, monitoring and investigations.

4. Assessment of Effects

4.1 Overview

4.1.1 This section presents the findings of the SEA of the UUS SRO feasible options being taken forward at Gate 1. **Section 4.2** provides a summary of the assessment of the effects of the options before consideration is given to the potential cumulative effects of the SRO in **Section 4.3** and its

²² Available from <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted> [Accessed April 2021].



contribution to Wales' well-being goals and the objective for SMNR in **Section 4.4**. High-level mitigation and enhancement measures are detailed in **Section 4.5**.

4.2 Summary of Effects

4.2.1 **Table 4.1** presents a summary of the assessment of the UUS SRO options; [✂]

4.2.2 All of the options have been assessed using the framework and approach set out in **Section 3** to identify the likely environmental effects. Each option has been assessed against the SEA objectives to identify its potential effects in both the short term (during construction) and medium/long term (during operation). The options have been assessed based on the nature of the effect, its timing and geographic scale, the sensitivity of the human or environmental receptor that could be affected, and how long any effect might last. Where quantified information was available from UU, the assessment has also been informed by reference to threshold values set out in the definitions of significance [✂]

Significant Construction Effects

4.2.3 With the exception of six options, all of the UUS SRO options are assessed as having a significant positive effect on wellbeing (SEA Objective 8). This reflects the substantial capital investment associated with the options that would be likely to generate a number of employment opportunities and supply chain benefits as well as increased spend in the local economy by contractors and construction workers (for the remaining six options, capital expenditure would be lower and therefore positive effects on SEA Objective 8 are assessed as minor or negligible). Construction activity, including the transportation of equipment/material, associated with the majority of the UUS SRO options has the potential to cause traffic disruption generating a minor negative effect on SEA Objective 8 and leading to an overall mixed score against the objective. [✂]

4.2.4 No further significant positive effects have been identified during the assessment of the UUS SRO options.

4.2.5 The majority of the UUS SRO options are assessed as having a negative effect on biodiversity (SEA Objective 1) during the construction phase. This reflects the potential for construction works associated with the options to result in the loss of/disturbance to habitats and species as a result of, for example, land take, emissions to air and noise.

4.2.6 [✂]. However, the HRA Review has identified that potential adverse effects could be avoided or mitigated by, for example, routing of pipeline works and utilising scheme specific mitigation in conjunction with best practice. Furthermore, it would be anticipated that scheme level investigations would be undertaken at the project stage should these options be taken forward. The feasibility of this mitigation will need to be considered post-Gate 1.

4.2.7 Construction activity associated with the majority of the UUS SRO options would take place within or proximate to Flood Zones 2/3 and works may therefore be vulnerable to flooding (depending on timing). [✂] are considered to be particularly vulnerable and have therefore been assessed as having a significant negative effect on flood risk (SEA Objective 4).

4.2.8 Construction activity would generate emissions to air associated with the use of plant and machinery as well as vehicle movements. The majority of the UUS SRO options have therefore been assessed as having negative effects on air quality (SEA Objective 5). A total of three options [✂] have been assessed as having a significant negative effect on this objective reflecting the likely volume of vehicle movements and/or potential for works to lead to traffic congestion.



- 4.2.9 Given the scale of construction activity, most UUS SRO options are assessed as having a significant negative effect on climate change (SEA Objective 6). This reflects the anticipated emissions of greenhouse gases from vehicle movements, construction plant and the embodied carbon in raw materials. Material use, energy requirements and waste generation would also be substantial and, therefore, these options are also assessed as having a significant negative effect on resource use (SEA Objective 10).
- 4.2.10 The development of water resources infrastructure including pipeline works has the potential to temporarily affect landscape character and/or visual amenity and all of the UUS SRO options have been assessed as having a negative effect on landscape (SEA Objective 12). Two options, Option [REDACTED] have been assessed as having a significant negative effect on this objective owing to the scale of construction activity associated with these options and their location within designated sites including (inter alia) the [REDACTED]
- 4.2.11 No further significant negative effects have been identified during the assessment of the UUS SRO options.

Significant Operational Effects

- 4.2.12 The UUS SRO options will support the STT, helping to ensure the continuity of water supplies in the South East of England and resilience of supply to UU's own customers. All options have therefore been assessed as having a positive effect on health (SEA Objective 7) and wellbeing (SEA Objective 8). For 17 of the UUS SRO options with benefit volumes greater than 10 MI/d, positive effects on these objectives have been assessed as significant.
- 4.2.13 [REDACTED] would reuse final effluent, delivering a yield benefit without the need for additional abstraction of water. Option WR159 (Individual Reservoirs Compensation Release Control), meanwhile, would increase efficiency in respect of conserving reservoir storage. Both options have therefore been assessed as having a significant positive effect on water resources (SEA Objective 9).
- 4.2.14 No further significant positive effects have been identified during the assessment of the UUS SRO options.
- 4.2.15 A total of 14 options are assessed as having significant or potentially significant negative effects on biodiversity (SEA Objective 1) due to the possibility of adverse effects on designated nature conservation sites such as (amongst others) [REDACTED]. This is principally associated with the abstraction/transfer of water. The remaining options are assessed as having either negative or neutral effects on this objective. In most cases, where both significant and minor negative effects are identified, uncertainty remains



with respect to the likelihood of adverse effects occurring and/or their magnitude. Resolving this uncertainty will require further investigation with appropriate mitigation implemented where possible; for many options, there is a need to confirm the availability of water for abstraction and operating parameters.

- 4.2.16 The majority of the UUS SRO options involve the development of new infrastructure within Flood Zones 2/3 and new infrastructure may therefore be vulnerable to flooding. [REDACTED] are considered to be particularly vulnerable and have therefore been assessed as having a significant negative effect on flood risk (SEA Objective 4).
- 4.2.17 The operation of the UUS SRO options would require energy and generate greenhouse gas emissions related to the pumping and/or treatment of water. Emissions associated with Options [REDACTED] would generate in excess of 1,000 tCO₂e during operation and consistent with the definitions of significance contained [REDACTED] they have been assessed as having a significant negative effect on climate change (SEA Objective 6) and resource use (SEA Objective 10).
- 4.2.18 No further significant negative effects have been identified during the assessment of the UUS SRO options.
- 4.2.19 It should be noted that the majority of options have been assessed as having negative and/or uncertain effects on water quantity and quality (SEA Objective 3). This reflects the potential for abstraction to affect either (i) deterioration of WFD status and/or (ii) the ability of a water body to attain its target status. Taking into account feedback from the EA and NRW, the WFD Screening Assessment has identified that further investigation and assessment is required in respect of the majority of the options to confirm the potential impacts on WFD waterbodies and the requirements, or otherwise, for bespoke mitigation in order to ensure that WFD objectives are not compromised.



Table 4.1 Summary of assessment of the UUS SRO options (please refer to Table 3.3 for the assessment key)

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
[✂]	[✂]	C	-	0/?	0	-	--	--	-	+/-	0	--	-	-
		O	0	0	0	0	0	-	+	+	0	-	0	0
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	-	0	-	++	++	0	-	0	-
[✂]	[✂]	C	-	0	0	0	-	--	-	+/-	0	--	0	-
		O	--/?	0	-/?	0	0	0	+	+	0	0	0	0
[✂]	[✂]	C	-/?	-	0	--/?	-/?	--	-	++/-	0	--	-/?	-/?
		O	-/?	0	-/?	--/?	0	-	++	++	0	-	0	0
[✂]	[✂]	C	-	0	0	0	-	--	0	++/-	0	--	-	-

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
		O	--/?	0	-/?	0	0	0	++	++	0	0	0	0
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-
		O	?	0	?	0	0	-	++	++	0	-	0	-
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	0	0	-	++	++	0	-	0	0
[✂]	[✂]	C	-	-	0	--	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	--	0	-	++	++	0	-	-	-
[✂]	[✂]	C	-	+	0	0	0	--	0	0	0	--	0	-
		O	?	0	-/?	0	0	0	+	+	0	-	0	0

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
[✂]	[✂]	C	0	-	0	-	-	--	-	++/-	0	--	0	-
		O	-/?	0	-/?	-	0	-	++	++	0	-	0	-
[✂]	[✂]	C	-	-	0	-	-	--	-	+/-	0	--	0	-
		O	--/?	0	-/?	-	0	--	++	++	0	--	0	-
[✂]	[✂]	C	-	+	0	0	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	0	0	-	+	+	0	-	0	0
[✂]	[✂]	C	-	-	0	0	-	--	-	++	0	--	0	-
		O	?	0	-/?	0	0	0	+	+	0	0	0	-
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
		O	?	0	-/?	-	0	-	++	++	0	-	0	0
[✂]	[✂]	C	-	-	0	0	-	--	-	++/-	0	--	-	-
		O	0	0	0	0	0	-	+	+	0	-	0	-
[✂]	[✂]	C	0	+	0	0	-	--	-	0	0	--	-	-
		O	0	0	?	0	0	0	+	+	0	0	0	0
[✂]	[✂]	C	-	0	0	0	-	--	-	++	0	--	0	-
		O	--/?	0	-	0	0	0	+	+	0	0	0	-
[✂]	[✂]	C	-	0	0	-	-	--	-	++/-	0	--	-	-
		O	-/?	0	-/?	-	0	-	+/?	+	++	-	0	0

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
[✂]	[✂]	C	-	+	0	-	-	--	-	++/-	0	--	0	-
		O	--/?	0	-/?	-	0	-	++	++	0	-	0	0
[✂]	[✂]	C	-	+	0	0	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	0	0	0	++	++	0	0	0	0
[✂]	[✂]	C	0	+	0	0	0	-	-	++	0	-	0	-
		O	--/?	0	-/?	0	0	0	+	+	0	0	0	0
[✂]	[✂]	C	-	+	0	-	0	-	-	+	0	-	-	-
		O	0/?	0	?	0/?	0	+	++	++	++	0	0	0
[✂]	[✂]	C	--/?	0	0	-	--	--	-	++/-	0	--	-	--

		Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water Quantity and Quality	4. Flood Risk	5. Air Quality	6. Climate Change	7. Health	8. Wellbeing	9. Water Resources	10. Waste and Resource Use	11. Cultural Heritage	12. Landscape
		O	--/?	0	?	-	0	--	++	++	0	--	0	-
[✂]	[✂]	C	--/?	-	0	-	--	--	-	++/--	0	--	-/?	--
		O	--/?	0	0	0	0	--	++/?	++	0	--	0	-
[✂]	[✂]	C	-	-	0	0	-	--	-	++/-	0	--	-	-
		O	0/?	0	?	0	0	0	++	++	0	0	-	-
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-
		O	?	0	-/?	-	0	0	++	++	0	0	0	-
[✂]	[✂]	C	-	-	0	-	-	--	-	++/-	0	--	-	-
		O	--/?	0	-/?	0	0	0	++	++	0	-	-	-

4.3 Cumulative Effects

- 4.3.1 As UU has yet to identify the preferred solution for the UUS SRO, it is not possible to complete a detailed assessment of cumulative effects at this stage. However, based on the assessment of the individual UUS SRO options, high level commentary on the possible significant in-combination effects of the UUS SRO options, and of the UUS SRO with other plans and projects, is provided below.
- 4.3.2 A detailed assessment of cumulative effects will be undertaken once the preferred solution for the UUS SRO has been identified prior to Gate 2.

Likely Significant Cumulative Effects of the United Utilities Sources SRO

- 4.3.3 The following sub-sections consider the likely significant cumulative effects of the UUS SRO, based on the assessment of the individual SRO options presented in **Section 4.2**, during both construction and operation.

Significant Construction Effects

- 4.3.4 Capital investment associated with the UUS SRO will generate supply chain benefits, employment opportunities and increased spend in the local economy by contractors and construction workers. It is likely that, in-combination, the scale of investment associated with the preferred options ultimately selected for the SRO would be substantial and in consequence, the UUS SRO is likely to have an overall significant positive effect on wellbeing (SEA Objective 8).
- 4.3.5 No further cumulative significant positive effects have been identified at this stage.
- 4.3.6 Construction activities associated with the UUS SRO are likely to have a range of adverse effects across the majority of the SEA objectives. However, given the distance between the SRO options and the potential for effects to be mitigated, cumulative significant negative effects (beyond those associated with the individual options) are generally not anticipated at this stage.
- 4.3.7 The HRA Review has identified a number of European designated nature conservation sites which have the potential to be affected by the construction of more than one UUS SRO option (depending on which preferred options are selected and the timing of their implementation). The HRA Review notes that these potential in-combination effects will be considered in detail following Gate 1, once the preferred options for the UUS SRO have been selected. Notwithstanding this, it concludes that there is nothing to suggest that particular combinations of options will result in unavoidable adverse effects 'in combination' on any sites, and in most instances the effects of individual options will be localised and minor with limited risks of notable interaction with other.
- 4.3.8 The combined carbon emissions arising from embodied carbon (in, for example, construction materials) in addition to plant operation and vehicle movements is likely to have a cumulative significant negative effect on climate change (SEA Objective 6). Implementation of the UUS SRO would also require raw materials, fuel for vehicles and plant and generate waste. On the basis of the assessment of the individual options, this is likely to have a significant negative effect on resource use (SEA Objective 10).
- 4.3.9 No further cumulative significant negative effects have been identified at this stage.

Significant Operational Effects

- 4.3.10 The UUS SRO will provide water to UU's customers who would otherwise be affected by the bulk transfer of water from Vyrnwy reservoir to the Thames, ensuring supply resilience when the transfer

is operational. In-turn, this will support the STT, helping to ensure the continuity of water supplies in the South East of England. Overall, this is expected to have a cumulative significant positive effect on health (SEA Objective 7) and wellbeing (SEA Objective 8).

- 4.3.11 No further cumulative significant positive effects have been identified at this stage.
- 4.3.12 The potential for the UUS SRO options to act in-combination to generate significant negative operational effects is most likely to be associated with biodiversity (SEA Objective 1) and water quantity and quality (SEA Objective 3) and, particularly, where water is abstracted from the same waterbody and/or catchment.
- 4.3.13 The HRA Review has identified a number of European designated nature conservation sites which have the potential to be affected by the operation of more than one option (depending on which preferred options are selected) including, for example, [REDACTED]. These potential in-combination effects will be considered in detail following Gate 1, once the preferred options for the UUS SRO have been selected. However, as with the cumulative construction effects outlined above, the HRA Review concludes that there is nothing to suggest that particular combinations of options will result in unavoidable adverse effects 'in combination' on any sites, and in most instances the effects of individual options will be localised and minor with limited risks of notable interaction with other options.
- 4.3.14 The WFD Screening Assessment has also identified where two or more options may affect the same waterbody and where options are located in multiple water bodies within one operational catchment. This provides an initial view of where there is the potential for cumulative effects on WFD waterbodies. For example, a relatively large number of options may affect waterbodies in the [REDACTED]. Again, more detailed in-combination assessments will need to be undertaken post-Gate 1 for those options which have the potential to propagate downstream impacts with respect to the quantity and dynamics of flow, water quality and hydroecology.
- 4.3.15 The operation of the UUS SRO would require energy and generate greenhouse gas emissions associated with the pumping and/or treatment of water. Subject to the preferred options taken forward, total combined emissions are likely to be in excess of 1,000 tCO₂e and consistent with the definitions of significance contained [REDACTED], this would have a significant negative effect on climate change (SEA Objective 6) and resource use (SEA Objective 10).

Likely Significant Cumulative Effects of the United Utilities Sources SRO In-combination with Other Plans and Programmes

- 4.3.16 The UUS SRO may have effects in-combination with other plans and programmes, in particular UU's WRMP and Drought Plan, as well as the WRW and Water Resources South East (WRSE) Regional Plans, other water company WRMPs and other SROs. The cumulative effects of the UUS SRO in-combination with other plans and programmes is, however, difficult to meaningfully assess at this stage. This is due to the number of options currently identified for the SRO and because the preferred solution has not yet been identified. Further, WRMP24, the Regional Plans and the other SROs are currently in development such that there is insufficient information currently available to permit an assessment of cumulative effects.
- 4.3.17 It should be noted that the preferred UUS SRO solution will be included in the WRW and WRSE Regional Plans and associated WRMP24s. In consequence, the in-combination effects of the UUS SRO with other options being considered for these plans (including the STT SRO and UOVA SRO)



will be considered as part of the respective SEAs and presented in the Environmental Reports prior to Gate 2.

4.3.18

On this basis, the initial review of in-combination effects presented in **Table 4.2** has considered the potential for the UUS SRO to give rise to significant negative cumulative effects in-combination with other published plans, namely UU's WRMP19 and Drought Plan 2018 and other water company WRMPs and Drought Plans. This is to provide an early indication in terms of where additional assessment and investigation may be required, depending on the options ultimately taken forward for the SRO.

Table 4.2 Review of potential in-combination effects

Plan/Programme	Potential for Significant Negative Cumulative Effects?	Commentary/Rationale
United Utilities Water Resources Management Plan 2019	No	As the preferred plan for WRMP19 does not contain resource management options, it is not anticipated that there would be adverse cumulative effects in-combination with the UUS SRO.
United Utilities Drought Plan 2018	Yes	<p>The Drought Plan 2018 includes a number of resource management actions and drought permit order/sites that potentially affect the sources being considered for the UUS SRO, as follows:</p> <ul style="list-style-type: none"> • [REDACTED] • [REDACTED] • [REDACTED] • [REDACTED] <p>Implementation of both the Drought Plan 2018 and UUS SRO options could, therefore, result in significant negative effects on, in particular, biodiversity and water quality/quantity. This should be investigated further post-Gate 1 should the options above be taken forward as part of the preferred SRO solution.</p>
Other Water Company Water Resources Management Plans	No	A review of the proposals in neighbouring water company areas (Dŵr Cymru Welsh Water, Severn Trent Water/Dee Valley Water, Yorkshire Water, Northumbrian Water and Scottish Water) has been completed. None of the current published WRMPs have included options to draw water supply from resources in the UU region and in consequence, no cumulative effects are expected to occur.
Other Water Company Drought Plans	Yes	The EA has identified a need to consider the [REDACTED]. In this context, there is the potential for in-combination effects on water quality and quantity and, potentially, biodiversity. This should be investigated further post-Gate 1 should [REDACTED] be taken forward as part of the preferred SRO solution.



4.4 Contribution of the United Utilities Sources SRO to Wales' Well-being Goals and the Objective for the Sustainable Management of Natural Resources

- 4.4.1 UU operates in Wales and therefore it is important to consider the contribution that the UUS SRO will make to the well-being goals for Wales contained in the Well-being of Future Generations (Wales) Act 2015 and the objective for SMNR established in the Environment (Wales) Act 2016.
- 4.4.2 The majority of the UUS SRO options are unlikely to have any significant impact on the achievement of the well-being goals for Wales or the objective for SMNR. This is because the construction and operation of the options would not have any significant environmental effects in Wales, a reflection of their location and lack of hydrological connectivity with Welsh water bodies.
- 4.4.3 [REDACTED].

4.5 Mitigation and Enhancement

- 4.5.1 The potential effects of the UUS SRO options are described in **Section 4.2**. In some cases, there is an opportunity to reduce the potential negative effects and to enhance positive effects associated with the construction and operation of the options.
- 4.5.2 [REDACTED], the other environmental assessments completed for the SRO and regulator feedback, a number of high-level mitigation and enhancement measures have been identified and these are listed in **Table 4.3**.

Table 4.3 Mitigation and enhancement measures

SEA Objective	Mitigation and Enhancement Measure
1. Biodiversity	<ul style="list-style-type: none"> Scheme specific mitigation measures and established best practice should be adopted to minimise and/or prevent significant and/or adverse construction effects on both local wildlife features and designated conservation areas during construction. Further detail concerning opportunities to mitigate adverse effects on European designated sites specifically is contained in the HRA Review. The works programme and requirements should be determined at the earliest opportunity to allow investigation schemes, protected species surveys and mitigation to be appropriately scheduled and to provide sufficient time for consultations with NE and/or NRW. Bio-security measures should be implemented during construction and operational phases. Design measures to mitigate the risk of adverse effects on aquatic flora and fauna should be identified and implemented including, for example: fish passages and intake pipe screens. Where a river crossing cannot be avoided, the design and engineering of the crossing should be undertaken in accordance with best practice guidance. The loss of habitat should be minimised and opportunities to deliver biodiversity net gain and improve natural capital should be identified. These opportunities are considered further in the NCA and BNG Assessment.

SEA Objective	Mitigation and Enhancement Measure
	<ul style="list-style-type: none"> Opportunities should be explored to deliver catchment-based enhancement measures working with key stakeholders.
2. Geology and Soils	<ul style="list-style-type: none"> Appropriate construction methods should be employed to minimise the risk of contamination. Where appropriate, opportunities to support peatland [§] should be explored.
3. Water Quantity and Quality	<ul style="list-style-type: none"> Construction activities should be undertaken in accordance with relevant best practice pollution prevention guidance and appropriate mitigation implemented (such as dust suppression, soil containment and emergency response procedures). Opportunities to deliver nature-based solutions should be considered to a) ensure water quality b) mitigate the impacts of abstraction in a way that is also of business and environment benefit and c) reduce UU's carbon footprint. Where possible, UU should seek to improve existing [§].
4. Flood Risk	<ul style="list-style-type: none"> An appropriate Flood Risk Assessment (FRA) should be undertaken prior to the implementation of options with appropriate mitigation measures identified to ensure that flood risk is minimised. Measures may include sustainable drainage approaches and planting as well as flood storage. Infrastructure should, where possible, be located outside the 1 in 100 year indicative flood plain. Where this is not possible due to operational requirements, the infrastructure should be designed such that it can continue to operate under flood conditions and not increase flood risk elsewhere. Opportunities to enhance natural flood management should be identified.
5. Air Quality	<ul style="list-style-type: none"> HGV movements should, where possible, be timed so as to avoid peak traffic periods e.g. between 7am-9am and 4pm-6pm. Measures to mitigate air quality impacts arising from construction activities should be considered within a Construction and Environmental Management Plan. These measures may include, for example, dust suppression, use of lower emissions plant and vehicles, and monitoring.
6. Climate Change	<ul style="list-style-type: none"> Measures to reduce greenhouse gas emissions during construction should be considered (including, for example, the use of low emission plant), aligned with UU's wider commitment to Water UK's Net Zero 2032 Route Map. Where appropriate, the design of new infrastructure should incorporate renewable energy provision. Adopt appropriate design to ensure the long-term resilience of infrastructure to the effects of climate change.
7. Health	<ul style="list-style-type: none"> Construction should adopt practices which seek to reduce noise/air quality impacts (such as those practices outlined under the Considerate Constructors' Scheme). Construction activities should be undertaken so as to minimise short term adverse effects on recreational areas, such as footpaths, and on landscape and biodiversity. Opportunities should be sought to enhance existing open space and recreational opportunities. Care should be taken during construction regarding the potential for contaminants such as silt, concrete or fuel oil to pollute water courses via surface run off. This can be mitigated by undertaking all construction activities in accordance with relevant best practice pollution prevention guidance.
8. Wellbeing	<ul style="list-style-type: none"> Where possible, UU and any contractors should seek to utilise local labour. Where possible, UU and any contractors should seek to appoint local contractors/sub-contractors and utilise locally sourced materials.
9. Water Resources	None identified.
10. Waste and Resource Use	<ul style="list-style-type: none"> Opportunities to utilise reused/recycled materials during construction should be considered where appropriate. Construction and operational wastes should be reused/recycled where possible. Where appropriate, the design of new infrastructure should incorporate the use of energy efficient materials and building techniques.



SEA Objective	Mitigation and Enhancement Measure
11. Cultural Heritage	<ul style="list-style-type: none"> Careful consideration should be given to the location/layout of new infrastructure including pipelines to avoid impacts on heritage assets and their settings. Construction methods could adopt practices which seek to avoid or reduce potential adverse impacts to heritage assets. Archaeological watching briefs could be put in place during construction to identify, record and protect heritage assets. Opportunities should be sought to enhance the settings of heritage assets where possible (e.g. through landscaping). Where appropriate, consideration should be given to enhancing access to assets.
12. Landscape	<ul style="list-style-type: none"> Construction activity should be screened where possible so as to avoid/minimise adverse landscape/visual impacts. High quality design principles should be adopted (e.g. new structures utilising local building styles) Landscaping schemes (e.g. tree/ hedge planting) should be incorporated. Careful consideration should be given to the location of new infrastructure including pipelines to avoid, or minimise impacts on, designated landscapes. Opportunities to enhance landscape character and visual amenity should be explored (for example, improved screening of existing facilities).

4.5.3 It is anticipated that, following the selection of the preferred solution for the UUS SRO, project-specific measures will be identified and developed post-Gate 1 and beyond. These measures will be informed by ongoing environmental assessment (including project-level assessments), the outcomes of investigations and monitoring activities (see below) and through engagement with stakeholders.

Resolving Uncertainties

4.5.4 For a large proportion of the UUS SRO options, the assessment presented in **Section 4.2** has identified that adverse effects on biodiversity and water in particular are uncertain. In terms of biodiversity, in most cases this reflects the potential for construction works and/or increased abstraction from surface and ground water sources to affect designated nature conservation sites. With regard to water, this reflects uncertainty with regard to the availability of water.

4.5.5 In this context, (at the time of writing) UU is preparing an Environmental Monitoring Plan for submission at Gate 1. Taking into account regulator feedback and the findings of the environmental assessments, the Plan will detail the investigations to be completed prior to Gate 2 (and beyond) in response to the issues/uncertainties identified in the SEA and to inform the selection of the preferred solution for the UUS SRO. The Environmental Monitoring Plan will be a 'live' document that is developed over time and its implementation will be reviewed in liaison with the NAU and NRW.

5. Next Steps

5.1.1 This Technical Note has presented the findings of the initial SEA of the UUS SRO options being taken forward at Gate 1. It has used an assessment methodology applied to the water resource management options developed in support of WRMP19 in order to:

- identify the potentially significant environmental effects of the options being considered for the UUS SRO;
- help identify appropriate measures to avoid, reduce or manage adverse effects and to enhance



beneficial effects;

- provide the statutory SEA bodies and stakeholders information on the likely effects that the UUS SRO may have on their interests; and
- inform UU's selection of the preferred solution for the UUS SRO.

5.1.1 In accordance with the ACGW guidance, further SEA of the options will be undertaken prior to Gate 2 and will:

- reflect the SEA methodologies developed for the WRW Regional Plan and WRMP24;
- take account of the further investigations to be undertaken prior to Gate 2, as detailed in the Environmental Monitoring Plan;
- draw upon further, ongoing engagement with regulators and other stakeholders; and
- reflect the most recent available information from UU on the options for the UUS SRO.

5.1.2 Further to the selection by UU of the option(s) that will comprise the preferred solution for the UUS SRO, the SEA at Gate 2 will additionally include a detailed assessment of cumulative effects and further, option-level consideration of mitigation and enhancement measures.



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