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Strategic Environmental Assessment (SEA) Environmental Report ANNEX 1: APPENDICES A - G

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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Contents

A. SEA Process Task

SEA Stage	SEA Task	Task Purpose
Stage A Setting the context and objectives, establishing the baseline and deciding on the scope	A1: Identifying other relevant plans, programmes, and environmental protection objectives	To establish how the plan or programme is affected by outside factors, to suggest ideas for how any constraints can be addressed, and to help to identify SEA objectives.
	A2: Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives.
	A3: Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring.
	A4: Developing SEA objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed.
	A5: Consulting on the scope of SEA	To ensure that the SEA covers the likely significant environmental effects of the plan or programme. This is a statutory five-week consultation period, as a minimum.
Stage B Developing and refining alternatives and assessing effects	B1: Testing the plan or programme objectives against the SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan or programme and the SEA objectives and help in developing alternatives.
	B2: Developing strategic alternatives	To develop and refine strategic alternatives.
	B3: Predicting the effects of the draft plan or programme, including alternatives	To predict the significant environmental effects of the plan or programme and alternatives.
	B4: Evaluating the effects of the draft plan or programme, including alternatives	To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme.
	B5: Considering ways of mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered.
	B6: Proposing measures to monitor the environmental effects of plan or programme implementation	To detail the means by which the environmental performance for the plan or programme can be assessed.
Stage C Preparing the Environmental Report	C1: Preparing the Environmental Report	To present the predicted environmental effects of the plan or programme, including alternatives, in a form suitable for public consultation and use by decision-makers.
Stage D Consulting on the draft plan or programme and the Environmental Report	D1: Consulting on the draft plan or programme and Environmental Report	To give the public and the Consultation Bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme. There is no set time period for consultation. The SEA Directive states that the Consultation Bodies and the public '*shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report before the adoption of the plan or programme or its submission to the legislative procedure'*. The Environmental Report will be consulted upon alongside the draft WRMP. To gather more information through the opinions and concerns of the public.
	D2: Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan or programme at this stage are assessed and taken into account.
	D3: Decision making and providing information	To provide information on how the Environmental Report and consultees' opinions were taken into account in deciding the final form of the plan or programme to be adopted.
Stage E Monitoring implementati	E1: Developing aims and methods for monitoring	To track the environmental effects of the plan or programme to show whether they are as predicted; to help identify adverse effects.

SEA Stage	SEA Task	Task Purpose
on of the plans or programme	E2: Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified.

B. Review of Relevant Policies and Programmes

Policy, Plan or Programme	Topic	Key Summary
International		
Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	Biodiversity	The aims are to conserve wild flora and fauna and their natural habitats and to promote European cooperation. Particular importance is placed on the need to protect endangered natural habitats and endangered vulnerable species, including migratory species.
Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)	Biodiversity	The Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range.
Convention on Biological Diversity (1992)	Biodiversity	The Biodiversity Convention has three main aims which are to conserve biological diversity; to ensure the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
Ramsar Convention - The Convention on Wetlands of International Importance (1971)	Biodiversity	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The aim is 'the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world'. The Convention uses a broad definition of the types of wetlands covered, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fishponds, rice paddies, reservoirs, and salt pans.
UN Framework Convention on Climate Change (1992)	Climatic Factors	The stated objective is to achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.
Kyoto Protocol to the UN Framework Convention on Climate Change (1997)	Climatic Factors	The Kyoto Protocol was adopted in 1997 and ratified in 2005. It commits its parties to limit climate change by setting internationally binding targets for emission reductions. Covering the six main GHGs, it required the UK to reduce emissions by 12.5% in the first commitment period (2008-2012). This was successfully achieved, and a second commitment period has been agreed whereby European Union (EU) countries will aim to achieve a joint 20% reduction compared to 1990 levels.
Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002)	Climatic Factors	Adopted at the World Summit on Sustainable Development in 2002 and built upon earlier declarations made at previous conferences and summits. It commits nations to take a collective responsibility to build a human, equitable and caring global society cognisant of the need for human dignity for all. The Declaration also reinforces the three pillars of sustainable development: environmental, economic and social development at the local, national, regional and global level.
Paris Agreement (2015)	Climatic Factors	The Paris Agreement came out of the COP21 and aims to limit global temperature rises to 1.5ºC to 2ºC above pre-industrial levels. It brings together 196 parties from across the world into a common cause and requires all parties to put forward nationally determined contributions to strengthen efforts in the years ahead. It also aims to strengthen the ability of countries to deal with the impacts of climate change.

Policy, Plan or Programme	Topic	Key Summary
Charter for the Protection and Management of Archaeological Heritage (1990)	Historic Environment	The charter lays down principles relating to the different aspects of archaeological heritage management. These include the responsibilities of public authorities and legislators, principles relating to the professional performance of the processes of inventorisation, survey, excavation, documentation, research, maintenance, conservation, preservation, reconstruction, information, presentation, public access and use of the heritage, and the qualification of professionals involved in the protection of the archaeological heritage. The Charter states that policies for the protection of archaeological heritage should constitute an integral component of policies relating to land use, development, and planning as well as of cultural, environmental and educational policies.
The World Heritage Convention (1972)	Historic Environment	The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. It also sets out the duties of states in identifying potential sites and their role in preserving them.
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)	Population and Human Health	The Aarhus Convention was created to give empowerment to citizens and civil society organisations in relation to environmental matters and is founded on the principles of participative democracy. It provides for access to environmental information; public participation in environmental decision making; and access to justice.
European[1]		
Ambient Air Quality Directive (2008/50/EC)	Air	It establishes ambitious, cost-effective targets for improving human health and environmental quality up to 2020. The EU objective on air quality is 'to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment'.
Thematic Strategy on Air Pollution (2005)	Air	The Strategy recognises the impact of air pollution on human health and the environment. It establishes interim objectives for air pollution in the EU and proposes appropriate measures for achieving them.
Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)	Biodiversity	Advice from the International Council for the Exploration of the Sea (ICES) in 2006 indicated that the stock of the European eel (Anguilla anguilla) is outside safe biological limits across European waters. The population has declined significantly, reducing to 5% of the original 1980s stock levels. In response to this advice, the European Union adopted Council Regulation (EC) No 1100/2007, which requires Member States to undertake a series of measures aimed at the recovery of eel stock. The goal is to achieve 40% escapement of adult eels, relative to that in absence of anthropogenic factors, to sea to spawn. The EU Regulation was transposed into UK law under The Eels (England and Wales) Regulations 2009. Eleven Eel Management Plans have been prepared, one for each River Basin identified in England and Wales. The plans outline the current situation and how we intend to achieve the targets required by the European Regulation. Such measures include a reduction in fishing pressure, improving access and habitat quality, and reducing the impacts of entrainment. The measures that will require the installation of passes at obstructions and screens at abstraction and discharge points that prevent the migration of eels.

[1] It is acknowledged that the UK has left the European Union. However, European law and policy has formed the basis for UK environmental laws and contributed to the direction of UK policy in these areas for many years. As such, they are considered to remain a useful contextual frame as part of the policies, plans and programmes review.

Policy, Plan or Programme	Topic	Key Summary
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)	Biodiversity	Strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help Europe reach its goal. The six targets cover: Full implementation of EU nature legislation to protect biodiversity Better protection for ecosystems, and more use of green infrastructure More sustainable agriculture and forestry Better management of fish stocks Tighter controls on invasive alien species A bigger EU contribution to averting global biodiversity loss The strategy is in line with two commitments made by EU leaders in March 2010. The first is the 2020 headline target: 'Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss'; the second is the 2050 vision: 'By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided'.
Fresh Water Fish Directive (2006/44/EC)	Biodiversity	The Directive concerns the quality of fresh waters and shall apply to those waters designated by the Member States as needing protection or improvement in order to support fish life. This directive shall not apply to waters in natural or artificial fishponds used for intensive fish-farming.
Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)	Biodiversity	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended). This Directive ensures far-reaching protection for all of Europe's wild birds, identifying 194 species and sub-species among them as particularly threatened and in need of special conservation measures. There are a number of components to this scheme: Member States are required to designate SPAs for 194 particularly threatened species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC. A second component bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds (with a few exceptions). A third component establishes rules that limit the number of bird species that can be hunted (82 species and subspecies) and the periods during which they can be hunted. It also defines hunting methods which are permitted (e.g. non-selective hunting is banned).
Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)	Biodiversity	The main aim of the Habitats Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. While the Directive makes a contribution to the general objective of sustainable development; it ensures the conservation of a wide range of rare, threatened or endemic species, including around 450 animals and 500 plants. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. The Directive provides for a ban on the downgrading of breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions. The

Policy, Plan or Programme	Topic	Key Summary
		Habitats Directive also establishes the EU wide Natura 2000 ecological network of protected areas. For these areas it provides a high level of safeguards against potentially damaging developments. Together with the Birds Directive, the Habitats Directive forms the backbone of EU nature protection legislation.
Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)	Biodiversity	The Directive sets out rules on animal health concerning aquaculture animals and related products which apply to the marketing, importation and transit of such products. It also establishes measures aimed at the prevention and control of diseases in aquaculture animals as well as making further provisions regarding the authorisation to aquaculture production businesses and processing establishments.
Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007)	Climatic Factors	This a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. The targets are: 20% reduction in GHGs 20% of EU energy from renewables 20% improvement in energy efficiency
A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)	Climatic Factors	The long-term strategy sets out Europe's commitment to lead in global climate action and to present a vision that can lead to achieving net-zero greenhouse gas emissions by 2050 through a socially-fair transition in a cost-efficient manner. It looks into the portfolio of options available for Member States, business and citizens, as well as into how these can contribute to the modernisation of our economy and improve the quality of life of Europeans, protect the environment, and provide for jobs and growth.
Promotion of the use of energy and renewable sources Directive (2009/28/EC)	Climatic Factors	The Directive sets ambitious targets that the EU will reach a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector. It also sets out to improve the legal framework for promoting renewable energy.
Energy Act 2013	Climatic Factors	The Act makes provides a framework for delivering secure, affordable and low carbon energy. It includes provisions for decarbonisation and the duties in relation to it.
Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development	Cross-cutting	The Renewed EU Sustainable Development Strategy (2006) deals in an integrated way with economic, environmental and social issues and lists the following seven key challenges: 1. Climate change and clean energy; 2. Sustainable transport; 3. Sustainable consumption and production; 4. Conservation and management of natural resources; 5. Public health; 6. Social inclusion, demography and migration; and 7. Global poverty

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European Commission Environmental Liability Directive (2004/35/EC)	Cross-cutting	The Directives relates to the prevention and remedying of environmental damage (ELD) and establishes a framework based on the polluter pays principle to prevent and remedy environmental damage. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil.
Directive on the assessment of the effects of certain plans and programmes on the environment (2001/42/EC)	Cross-cutting	The Directive, known as the SEA Directive, sets out the requirement for the assessment of certain plans and programmes on the environment. An SEA is mandatory for plans/programmes which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, telecommunications, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive. SEA is also required where plans/programmes have been determined to require an assessment under the Habitats Directive.
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985)	Historic Environment	The Convention sets out to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage conservation and is designed to foster practical co-operation among the Parties. It establishes the principles of "European co-ordination of conservation policies" including consultations regarding the thrust of the policies to be implemented.
The European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992)	Historic Environment	The Convention aims to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study.
The European Landscape Convention (2006)	Landscape	The Convention is also known as the Florence Convention and it aims to promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues.
The Environmental Noise Directive (2002/49/EC)	Population and Human Health	The Directive is the EU's main instrument to identify noise pollution levels and covers the following three key action areas: the determination of exposure to environmental noise; ensuring that information on environmental noise and its effects is made available to the public; and preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good. It applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.
European Soils Charter (2003)	Soil	The Charter sets out to protect soil as a complex natural resource which is fundamental to life. It recognises that: Soil is a precious asset Soil is a limited resource which is easily destroyed Land has a wide variety of uses and a proper planning policy is needed by Governments for urban development and civil engineering projects Farmers and foresters must preserve the soils quality Soil must be protected from erosion and pollution Further research and collaboration is required to ensure the wise use and conservation of soil

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Thematic Strategy for Soil Protection (2006)	Soil	The Strategy aims to protect soil and promote its sustainable use. It is based on the following guiding principles: Preventing further soil degradation and preserving its functions Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil
The Nitrates Directive (91/676/EEC)	Water	The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. This Directive forms integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures.
The Water Framework Directive (WFD) (2000/60/EC)	Water	The WFD has the following key aims: Expanding the scope of water protection to all waters, surface waters and groundwater Achieving 'good status' for all waters by a set deadline Water management based on river basins 'Combined approach' of emission limit values and quality standards Getting the prices right Getting the citizen involved more closely Streamlining legislation There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.
Urban Wastewater Treatment Directive (91/271/EEC)	Water	The objective of this Directive is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors. The Directive concerns the collection, treatment and discharge of such wastewater.
Drinking Water Directive (1998/83/EC)	Water	The Drinking Water Directive sets out the following objectives: Sets quality standards for drinking water quality at the tap (microbiological, chemical and organoleptic parameters) and the general obligation that drinking water must be wholesome and clean. Obliges Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to-date information on their drinking water quality. Member States may exempt water supplies serving less than 50 persons or providing less than 10 m3 of drinking water per day as an average and water in food-processing undertakings where the quality of water cannot affect the wholesomeness of the foodstuff in its finished form.
Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	Water	The overall objective of the Directive remains the protection of public health whilst bathing, but the revised Directive also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe and aims to set more stringent water quality standards and also puts a stronger emphasis on beach management and public information.

Policy, Plan or Programme	Topic	Key Summary
Groundwater Directive (2006/118/EC)	Water	This directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive thus represents a proportionate and scientifically sound response to the requirements of the WFD as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions. The groundwater directive complements the WFD. It requires: Groundwater quality standards to be established by the end of 2008 Pollution trend studies to be carried out by using existing data and data which is mandatory by the WFD (referred to as 'baseline level' data obtained in 2007-2008) Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD Measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015 Reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States)
Marine Strategy Framework Directive (2008/56/EEC)	Water	The aim of the Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve Good Environmental Status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use.
Directive on the Assessment and Management of Flood Risks (2007/60/EC)	Water	Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.
Blueprint to Safeguard Europe's Water Resources (2012)	Water	The Blueprint outlines actions in relation to improved implementation of current water legislation and the integration of water policy objectives into other policies, and also aims to fill the gaps in regard to water quantity and efficiency. The objective is to ensure that a sufficient quantity of good quality water is available for people's needs, the economy and the environment throughout the EU. It is closely linked to EU's 2020 Strategy and the 2011 Resource Efficiency Roadmap, however the analysis spans up to 2050 and is therefore expected to drive EU water policy over the long term.
National		

Policy, Plan or Programme	Topic	Key Summary
The Eels (England & Wales) Regulations 2009 (as amended)	Biodiversity	Transposed from the European Directive (1100/2007) into UK law, the Regulations aim to establish measures for the recovery of the stock of European eel. The Regulations will help implement delivery Eel Management Plans.
Salmon and Freshwater Fisheries Act 1975	Biodiversity	The Act sets out the legal framework in which salmon and freshwater fisheries are regulated. It covers regulation on fishing methods and related offences, obstructions to fish passage, salmon and freshwater fisheries administration and law enforcement.
UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)	Biodiversity	The purpose of the Framework is to set a broad enabling structure for action across the UK between now and 2020: To set out a shared vision and priorities for UK-scale activities, in a framework jointly owned by the four countries, and to which their own strategies will contribute. To identify priority work at a UK level which will be needed to help deliver the Aichi targets and the EU Biodiversity Strategy. To facilitate the aggregation and collation of information on activity and outcomes across all countries of the UK, where the four countries agree this will bring benefits compared to individual country work. To streamline governance arrangements for UK-scale activity.
Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)	Biodiversity	The report aims to answer the following questions: Do England's wildlife sites comprise a coherent and resilient ecological network? If not, what needs to be done? The report concludes that the approaches required to achieve a coherent and resilient ecological network are varied, and 24 wide-ranging recommendations are presented. Five themes unite them: We need to continue the recent progress in improving the management and condition of wildlife sites, particularly our SSSIs. We also make recommendations for how these should be designated and managed in ways that enhance their resilience to climate change. We need to properly plan ecological networks, including restoration areas. Restoration needs to take place throughout England. However, in some areas, both the scale of what can be delivered to enhance the network, and the ensuing There are a large number of surviving patches of important wildlife habitat scattered across England outside of SSSIs, for example in Local Wildlife Sites. We need to take steps to improve the protection and management of these remaining wildlife habitats. 'Protection' will usually be best achieved through incentive-based mechanisms, but at times may require designation. We need to become better at deriving multiple benefits from the ways we use and interact with our environment. There are many things that society has to do that may seem to have rather little to do with nature conservation, but could have, or even should have if we embrace more radical thinking; flood management by creating wetlands is an obvious example. We need to exploit these 'win-win' opportunities to the full. Being better at valuing a wider range of ecosystem services would help this process. We will not achieve a step-change in nature conservation in England without society accepting it to be necessary, desirable, and achievable. This will require strong leadership from government and significant improvements in collaboration between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, landowners and other land-managers and individual citizens.

Policy, Plan or Programme	Topic	Key Summary
Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011)	Biodiversity	The Strategy builds on the Natural Environment White Paper and sets out how the UK is implementing the international and EU commitments. The mission for this strategy is as follows: 'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people'.
The Conservation of Habitats and Species Regulations (2010) (as amended)	Biodiversity	The Conservation of Habitats and Species Regulations 2010 apply in the terrestrial environment and in territorial waters out to 12 nautical miles. The EU Habitats and Wild Birds Directives are transposed in UK offshore waters by separate regulations. The new regulations do not make any substantive changes to existing policies and procedures other than the establishment of the Marine Management Organisation. The Marine Management Organisation takes on certain licensing functions from Natural England to ensure consistency with the approach in the Marine and Coastal Access Act 2009. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)	Biodiversity	This instrument provides changes to those parts of the 2017 conservation of habitats and species regulations which would no longer work when the UK leaves the EU.
Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)	Biodiversity	Known as the "Ecosystems Approach Action Plan" (EAAP)), it was first published in 2007 and was then updated in 2010. It sets out the concept and framework of ecosystem services, and describes how this could be translated into "an ecosystems approach" to policy and decision making that could be applied at all levels of Government.
The Invasive Alien Species (Enforcement and Permitting) Order 2019	Biodiversity	The Order brings into force the EU Invasive Alien Species Regulation (1143/2014) on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species.
The Great Britain Invasive Non-Native Species Strategy, Defra (2015)	Biodiversity	The Strategy builds on the first which was published in 2008 and sets out a series of aims and objectives to underpin action until 2020. It aims to address the issues of INNS in the UK to protect biodiversity, quality of life and economic interests.
A narrative for conserving freshwater and wetland habitats in England, Natural England (2016)	Biodiversity	Provides a narrative as to why the natural ecosystem system function is important for freshwater and wetland wildlife and recognises the ecosystem service benefits. It aims to provide a strategic framework for decision making for conserving these important habitats.
Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)	Biodiversity	The Strategy sets out how Natural England aim to contribute to the ambition set out the in Defra's strategy to 2020 and how they can work together with others to deliver this shared ambition. The Strategy is based on the following three principles: Creating resilient landscapes and seas Putting people at the heart of the environment Growing natural capital
State of Natural Capital Annual Report 2020, Natural Capital Committee (2020)	Biodiversity	The Nature Capital Committee's seventh annual report on the state of natural capital. The report recognises the importance that nature-based interventions will have on achieving net zero by 2050 targets. The report makes recommendations for the Government to take forward and outlines key points for inclusion within the Environment Bill.

Policy, Plan or Programme	Topic	Key Summary
Standing Advice on Protected Species, Natural England (2016)	Biodiversity	Provides guidance on reviewing planning applications which might have an affected on protected species.
Climate Change Act 2008	Climatic Factors	The Act sets out a legal framework to commit the Government to tackling climate change and climate change adaptation is also covered in the Act as it provides a legal framework for adaptation policy. The Act sets out a target of net zero by 2050 based on 1990 levels.
UK Climate Change Risk Assessment, Defra (2017)	Climatic Factors	Identifies the key climate change risks and opportunities for the UK which are as follows: Flooding and coastal change risks to communities, businesses and infrastructure Risks to health, well-being and productivity from high temperatures Risks of shortages in the public water supply for agriculture, energy generation and industry Risks to natural capital including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity Risks to domestic and international food production and trade New and emerging pests and diseases and invasive non-native species affecting people, plants and animals
The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)	Climatic Factors	This is the second National Adaptation Programme (NAP) and sets out the Government's response to the second Climate Change Risk Assessment (CCRA). It also outlines the actions that will be taken to address the climate change issues identified in the CCRA across the following key sectors: Natural environment; Infrastructure; People and the built environment; Business and industry; and Local government.
National Planning Policy Framework (NPPF) (2019)	Cross-cutting	The updated NPPF sets out government's planning policies for England and how these are expected to be applied. Achieving sustainable development is at the heart of the NPPF whereby it has three overarching objectives in the social, economic and environmental spheres.
A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)	Cross-cutting	The 25 Year Plan sets out the Governments actions for improving the health of the natural environment. It includes six actions in order achieve clean air, plentiful and clean water, thriving plants and wildlife, reduced harm from environmental hazards, sustainable resource use and enhanced beauty, heritage and engagement with the natural environment: Using and managing land sustainably Recovering nature and enhancing the beauty of landscapes Connecting people with the environment to improve health and wellbeing Increasing resource efficiency, reducing pollution and waste Securing clean, productive and biologically diverse seas and oceans Protecting and improving the global environment
Environment Act 2021	Cross-cutting	The Environment Bill was first introduced to parliament in October 2019 and then reintroduced in January 2020. The Bill formally received Royal Assent in 2021 where it became established as the Environment Act 2021. The Environment Act will support the 25 Year Environment Plan and brings about urgent and meaningful action to combat the environmental issues that the UK is facing. It sets out a requirement for biodiversity net gain which includes at least a 10% improvement in biodiversity value for new development. It also includes details on: Creating a new governance framework for the environment

Policy, Plan or Programme	Topic	Key Summary
		A new direction for resources and waste management Improving air quality Securing our water services Enhancing our green spaces Updating laws on chemicals (REACH) The Act also introduces a new statutory requirement to produce locally-led Nature Recovery Strategies every five years, with an aim to create a Nature Recovery Network of 500,000 ha of additional habitat in England.
Securing the Future – Delivering the UK Sustainable Development Strategy (2005)	Cross-cutting	The Strategy for sustainable development aims to '…enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.' Guiding principles: Living within environmental limits Ensuring a strong, healthy, and just society Achieving a sustainable economy Promoting good governance Using sound science responsibly UK priorities for immediate action Sustainable consumption and production Climate change and energy Natural resource protection and environmental enhancement Sustainable communities
The Natural Choice: Securing the Value of Nature, Defra (2011)	Cross-cutting	The White Paper outlines the Government's vision for the natural environment for the next 50 years.
Marine and Coastal Access Act (2009)	Cross-cutting	The Act sets out to protect marine functions, activities and wildlife. It commits the UK to ambitions actions and sets out the provisions for Marine Conservation Zones (MCZs), a Marine Planning system, reform of inshore fishers, amongst others.
The Wildlife and Countryside Act 1981 (as amended)	Cross-cutting	The Wildlife and Countryside Act is the main Act which protects animals, plans and habitats in the UK. It implements the Bern Convention and the Birds Directive and contains details of European and national designated sites, protection for designated species.
Environment Protection Act 1990	Cross-cutting	The Act aims to set out provisions for the control of pollution to the environment (air, water and land) by regulating the management of waste and emissions. It places a duty of care on any business or person who produces waste to do so carefully and in line with requirements.
Countryside and Rights of Way (CROW) Act	Cross-cutting	The Act was introduced in 2000 with the intention to give greater freedom for people to explore open countryside and contains provisions to introduce a new statutory right of access for open-air recreation to mountain, moor, heath, down

Policy, Plan or Programme	Topic	Key Summary
		and registered common land. It also includes a power to extend the right to coastal land by order and enables landowners voluntarily to dedicate irrevocably any land to public access.
The Natural Environment and Communities Act 2006 (NERC Act)	Cross-cutting	The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government policy. It is about conserving and enhancing places and nature and helping people to enjoy them – taking a wider view, pursuing environmental management which encompasses access and recreation, and aiming where possible to achieve economic and social outcomes alongside conservation goals.
Creating a better place: Our ambition to 2020, Environment Agency (2018)	Cross-cutting	This aims to protect and improve natural resources in the UK and sits alongside Defra's 25 Year Environment Plan. It sets out the Environment Agency's vision, principles and purpose until 2020 as well as how they aim to deliver against the 25 Year Environment Plan.
UK National Ecosystem Assessment Follow-on (2014)	Cross-cutting	The 2011 UK National Ecosystem Assessment (UK NEA) which identified that the natural world and its ecosystems are important to our well-being and economic prosperity, however they are consistently undervalued. This follow on provides new information and tools to help decision makers integrate the value of ecosystems into decision making.
National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)	Cross-cutting	Sets out the Government's plans for economic infrastructure over the next 5 years to support delivery of housing and social infrastructure. The Plan recognises that water services are likely to come under increasing pressure because of population growth and a changing climate. The Plan sets out the following key objectives for water: Start of construction on the Thames Tideway Tunnel Reductions in average bills of about 5% in real terms Further expenditure from 2020 with the start of Asset Management Period 7
Fixing the foundations: Creating a more prosperous nation, HM Government (2015)	Cross-cutting	The reports sets out the importance of productivity and the Government's vision to delivering a UK economy which is the richest of all major economies by 2030. It includes two pillars for raising productivity: Encouraging long term investment in economic capital, including infrastructure, skills and knowledge. Promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use.
Environment Act 1995	Cross-cutting	The Act set out provisions for the creation of a number of government agencies including the Environment Agency and the Scottish Environment Protection Agency (SEPA). It also set out new standards for environmental protection.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	Cross-cutting	The Regulations seek to ensure action is taken put any environmental damage right and are based on the 'polluter pays principle'. It transposes the European Commission Environmental Liability Directive into UK law. The Regulations require action in response to the most significant cases, covering specific types of: damage to species and habitats; damage to water; or risks to human health from contamination of land.
Environmental Assessment of Plans and Programmes Regulations 2004	Cross-cutting	The regulations transpose the SEA Directive into UK law which requires an assessment of the effects of certain plans and programmes on the environment. Article 3 (2b) states that SEA is required for plans and programmes which are prepared for water management, set the framework for development consents, and/or are likely to have a significant environmental effect.

Policy, Plan or Programme	Topic	Key Summary
Department for Environment, Food and Rural Affairs Outcome Delivery Plan: 2021 to 2022, Defra (2021)	Cross-cutting	The Defra group sets out make air purer, water cleaner, land greener and food more sustainable, and their mission is to restore and enhance the environment for the next generation, and to leave the environment in a better state. There are four priority outcomes by which they will deliver the plan: Improve the environment through cleaner air and water, minimised waste, and thriving plants and terrestrial and marine wildlife; Reduce greenhouse gas emissions and increase carbon storage in the agricultural, waste, peat and tree planting sectors to help deliver net zero; Reduce the likelihood and impact of flooding and coastal erosion on people, businesses, communities and the environment; and Increase the sustainability, productivity and resilience of the agriculture, fishing, food and drink sectors, enhance biosecurity at the border and raise animal welfare standards.
Planning (Listed Buildings and Conservation Areas) Act 1990	Historic Environment	An Act of Parliament that altered the laws on granting of planning permission for building works, notably including those of the listed building system in England and Wales
The Ancient Monuments and Archaeological Areas Act 1979	Historic Environment	This Act is concerned with the provisioning, investigation, recording and the preservation and protection of archaeological sites and ancient monuments.
Climate Change and the Historic Environment, English Heritage (2008)	Historic Environment	The statement recognises the climate change impacts the UK is facing and how this poses a risk to the historic environment.
Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)	Historic Environment	Provides guidance on SEA in relation to the historic environment.
The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, Historic Environment (2017)	Historic Environment	Sets out guidance on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas, and landscapes, against the backdrop of the NPPF. It gives general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as advice on how views contribute to setting.
Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014)	Landscape	Sets out guiding principles for considerations when developments affect ancient woodlands or veteran trees. Ancient woodland is defined as an irreplaceable habitat which is important for wildlife, soils, recreational value and cultural, historical and landscape value. Ancient tree is one which attributes include the following: great age, size, condition, biodiversity, cultural heritage and value. The guidance also states that all ancient trees are veteran trees but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing which contribute to its biodiversity, cultural and heritage value. When making decisions the following should be considered: conserving and enhancing biodiversity reducing the level of impact of the proposed development on ancient woodland and ancient and veteran trees

Policy, Plan or Programme	Topic	Key Summary
Our Waste, Our Resources: A Strategy for England, HM Government (2018)	Material Assets	The Strategy recognises that natural capital is one of our most valuable assets and sets out how the Government plans to preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. They also set out how they aim to minimise damage to the natural environment and is aligned to the Government's 25 Year Environment Plan. This is our blueprint for eliminating avoidable plastic waste over the lifetime of the 25 Year Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050.
Safeguarding our Soils - A strategy for England, Defra (2009)	Soil	The Strategy recognises that soil is fundamental resource and sets out a 2030 vision for the sustainable management of soil where degradation threats are tackled successfully. It aims to improve the quality of England's soils and safeguard their ability to provide essential services for future generations.
Water Resources Act 1991	Water	The Act sets out the functions of National Rivers Authority (now the Environment Agency) and introduced water quality classifications and objectives for the first time.
Water Industry Act 1991	Water	The Act sets out the main powers and duties of the water and sewerage companies, thus replacing those set out in the Water Act 1989, and defined the powers of the Director General of Water Services (now the Water Services Regulation Authority (Ofwat)).
Water Act 2003 (as amended)	Water	The Act amends the Water Resources Act and Regulations 1991 and the Water Industry Act 1991. The Act has the following four broad aims: the sustainable use of water resources strengthening the voice of consumers a measured increase in competition the promotion of water conservation
Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018)	Water	Sets out the National Infrastructure Commission's advice on how to address England's water supply challenges and deliver the appropriate level of resilience for the long term. It recognises that water shortages is a risk in England and that climate change alongside an increasing population (especially in the drier South and east) and the need to protect the environment will result in further challenges.
Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)	Water	The draft National Policy Statement for Water Resources Infrastructure (NPS) sets out the need and government's policies for the development of nationally significant infrastructure projects relevant to water resources in England. It is aligned with the goal of clean and plentiful water as set out in the UK Government's 25 Year Environment Plan and recognises that a twin track approach is required to secure resilient water supplies.
Water for Life White Paper, Defra (2011)	Water	This White Paper sets out a vision for future water management in which the water sector is resilient; water companies are more efficient and customer focused; and water is valued as the precious and finite resource it is. It explains that everyone has a part to play in the realisation of this vision. It sets out the principles and timetable for an overhaul of the abstraction regime, which governs how and when water can be taken from the environment for use by business, agriculture and the public; and explains how improved interconnections between water catchments will allow water to be moved more easily around the country to areas of need. It details Government policy on charging for water and providing help to those who struggle to afford their bills.

Policy, Plan or Programme	Topic	Key Summary
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended)	Water	The Regulations transpose the EC WFD in UK law. They will help implement the WFD requirement in England and Wales. They aim to protect and enhance the quality of: Surface freshwater (including lakes, streams and rivers) Groundwaters Groundwater dependant ecosystems Estuaries Coastal waters out to one mile from low-water
Protect groundwater and prevent groundwater pollution, Environment Agency (2017)	Water	It aims to avoid negative impacts on groundwater sources including impacts of pollution by providing guidance on discharging or abstracting from groundwater sources.
Groundwater protection technical guidance, Environment Agency (2017)	Water	It aims to avoid negative effects on the quality and quantity of groundwater resources by providing guidance on the inputs of substances and pollutants to groundwater, discernibility of hazardous substances and when geological formations can be determined permanently unsuitable for other purposes.
The Environment Agency's approach to groundwater protection, Environment Agency (2018)	Water	These position statements describe the Environment Agency's approach to managing and protecting groundwater. They update Groundwater protection: principles and practice (GP3).
The Groundwater (England and Wales) Regulations 2009	Water	The Regulations transpose the EU Groundwater Directive (2006/118/EC) into UK law. The Regulations set out to protect groundwater from being polluted by hazardous substances.
Flood and Water Management Act 2010	Water	The Act seeks to address the threat of flooding and water scarcity. The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and places new responsibilities on the Environment Agency, local authorities and others to manage the risk of flooding. Climate projections suggest extreme weather will happen more frequently in the future and this Act is central to reducing the flood risk associated with extreme weather.
National Flood and Coastal Erosion Risk Management Strategy for England, Environment Agency (2020)	Water, Climatic Factors, Population, Human Health	The Strategy sets out the long-term delivery objectives the nation should take over the next 10 to 30 years as well as shorter term, practical measures risk management authorities should take working with partners and communities. It includes the following long term vision: 'a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100', and includes the following three long-term ambitions: Climate resilient places Today's growth and infrastructure resilient in tomorrow's climate A nation ready to respond and adapt to flooding and coastal change
The Flood and Coastal Erosion Risk Management Policy Statement, Defra (2020)	Water, Climatic Factors, Population, Human Health	The Policy Statement sets out the long-term goal of the Government to create a nation which is resilient to future flood and coastal erosion, and therefore protects people, the environment and the economy. The National Flood and Coastal Erosion Strategy has helped to inform this policy statement. It identifies five key areas for action which include: Upgrading and expanding our national flood defences and infrastructure Managing the flow of water more effectively

Policy, Plan or Programme	Topic	Key Summary
		Harnessing the power of nature to reduce flood and coastal erosion risk and achieve multiple benefits Better preparing our communities Enabling more resilient places through a catchment-based approach
Flood risk assessments: climate change allowances, Environment Agency (2016)	Water, Climatic Factors	The guidance sets out how climate change should be accounted for when local authorities prepare strategic flood risk assessment as well as when developers and their agents when they prepare flood risk assessments for planning applications, and development consent orders for nationally significant infrastructure projects. The guidance provides allowances for anticipated change of the following and are aligned to each river basin in some cases: peak river flow; peak rainfall intensity; sea level rise; and offshore wind speed and extreme wave height.
The Water Resources Management Plan Regulations 2007	Water	The regulations set out the statutory duty for water companies to prepare and publish a WRMP.
Water Resources Planning Framework (2015-2065), Water UK (2016)	Water	The project aims to develop a high-level strategy and framework for the long-term management and planning of water resources in England and Wales. It identifies the challenges facing water resources including climate change, resilience to droughts and demand growth and presents options to mitigate the issues.
Water Supply (Water Quality) Regulations 2016 (as amended)	Water	The regulations consolidate legislation concerning the quality of water supplies for human consumption in England. They also apply in Wales where the water undertaker or licensee is primarily based in England.
National Policy Statement for Wastewater (2012)	Water	National Policy Statement (NPS) sets out Government policy for the provision of major wastewater infrastructure. It aims to make existing policy and practice clear and transparent in relation to nationally significant wastewater infrastructure.
Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)	Water, Climatic Factors	The report explores different ways in which the possible impacts of climate change could be incorporated into Water Resource Management Plans (WRMPs) in England and Wales. A number of improvements are suggested, but not limited to: Undertaking vulnerability assessments to evaluate Water Resource Zones (WRZs) vulnerability to current and future climate and using the outcomes to determine the level of modelling required to assess future impacts of climate change. Alternative methods to scaling the impacts of climate change from the base year to the 2030s and beyond. Headroom assessment should clearly distinguish between climate and non-climate risks and report outputs for specific reference levels of headroom.
Drought response: our framework for England, Environment Agency (2017)	Water, Climatic Factors	The document outlines the national framework for how drought is managed by the Environment Agency, the government and water companies to reduce the effects on the people, business and the environment. It sets out how drought affects different areas of England, who is involved in management drought and how those stakeholders, and how drought is manged, monitored and reported on.
Future Water: the Government's water strategy for England, Defra (2008)	Water	The Strategy sets Defra's vision for the water sector up to 2030 and outlines the steps they will implement to achieve that vision. Their vision is where rivers, canals, lakes and seas have improved for people and wildlife, with benefits for angling, boating and other recreational activities, and with continued provisions for excellent quality drinking water. It is

Policy, Plan or Programme	Topic	Key Summary
		structured around water supply and demand, water quality in the natural environment, surface water drainage, river and coastal flooding, greenhouse gas, water charging, the regulatory framework and innovation.
Water Resources Planning Guideline, Various (2022)	Water	The guideline was published by the Environment Agency, Natural Resources Wales and Ofwat. It is relevant to water companies in England and Wales and also to those producing regional plans. It provides guidance on how to produce a Plan (WRMP or Regional Plan), taking into account all the relevant statutory requirements and government policy. The guidance sets out the national, regional and local planning context, how to form and develop a WRMP, forecasting supply and demand, uncertainty allowances, option identification and developing a best value plan.
The Urban Waste Water Treatment (England and Wales) Regulations 1994	Water	The Regulations transpose the EU Urban Waste Water Treatment Directive (91/271/EEC) and sets out to regulate the disposal of sewage.
The Nitrate Pollution Prevention Regulations 2015	Water	The Regulations transpose EU Nitrates Directive (91/676/EEC) into UK law and aim to reduce the pollution in the water environment from nitrates.
Managing Water Abstraction, Environment Agency (2016)	Water	Sets out how the Environment Agency manage water resources in England and outlines the technical, legal and policy requirements behind the abstraction licensing strategies.
Marine Plans – South West Inshore, South West Offshore, South Inshore, South Offshore (Marine Management Organisation)	Water	A marine plan: Sets out priorities and directions for future development within the plan area Informs sustainable use of marine resources Helps marine users understand the best locations for their activities, including where new developments may be appropriate. Each of the 11 marine plan areas will have a marine plan with a long-term (20 years) view of activities and will be reviewed every three years. There will be ten marine plans as the North West will have a single plan following requests to have a single process and one plan for these areas. All marine plan areas are scheduled to have a plan by 2021.
UK Marine Policy Statement (2011)	Water	The UK Marine Policy Statement (MPS) provides the policy framework for the marine planning system. It provides the context for marine plans. Marine plans put into practice the objectives for the marine environment that are identified in the MPS alongside the National Planning Policy Framework (NPPF) and the Localism Act 2011. Where there is no marine plan in place, the MPS sets the direction for decisions that affect the marine areas, such as granting licences for all public bodies.
Chalk Stream Restoration Strategy 2021, CaBa (2021)	Water, Ecology	Catchment Based Approach (CaBa) Chalk Stream Restoration Group released its first Chalk Stream Strategy to recommend actions on how to improve the environmental status of the chalk streams in England. This Strategy is backed by an analysis of the issues threatening the country's chalk streams and how the ecological pressures are assessed and regulated. The document provides direction and guidance to governments, businesses, water companies, Rivers Trusts and stakeholder. The key recommendation of the Strategy is for an overarching level of protection and priority status for chalk streams and their catchments.

Policy, Plan or Programme	Topic	Key Summary
Water UK Net Zero 2030 Routemap (2020)	Water, Climatic Factors	The water sector in the UK has committed to delivering Net Zero emissions for their water supply by 2030. This document aims to provide direction for the sector on the path to decarbonisation, illustrating various possible futures through three pathways and a more likely pathway. The routemap seeks to help water companies engage more strategically with the sector's regulators, supply chain, and the UK government to achieve net zero.
Water Industry Strategic Environmental Requirements	Water	The Water Industry Strategic Environmental Requirements (WISER) is a set of requirements describing the environmental, resilience and flood risk obligations to be considered when developing water company business plans. It is designed to help understand the statutory obligations and regulator's expectations that apply. It aims to set out detail on aims and objectives for the water industry, as well as relevant legislation, duties and expectations as environmental regulators. It also translates the environmental ambitions from the Government's 25 Year Environment Plan with regards to the Water Industry.
Water Industry National Environment Programme	Water	The Water Industry National Environment Programme (WINEP) is a water company regulatory requirement for delivery within and across Asset Management Plan (AMP) cycles. WINEP represents a set of actions that the Environment Agency has requested from all 20 water companies operating in England, to complete between 2020 and 2025, in order to contribute towards meeting their environmental obligations.
Regional and Local		
Site Improvement Plans for Natura 2000 Sites, Natural England	Biodiversity	Site Improvement Plans (SIPs) have been developed for each Natura 2000 site in England as part of the Improvement Programme for England's Natura 2000 Sites (IPENS). Natura 2000 sites is the combined term for sites designated as Special Areas of Conservation (SAC) and Special Protected Areas (SPA). There are 41 SACs and 11 SPAs within the SWW region. The plan provides a high level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site(s) and outlines the priority measures required to improve the condition of the features. It does not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.
Local Development Plans (Various)	Cross-cutting	Local Development Plans or Core Strategies are the main framework for planning in a local authorities and set out the long-term spatial vision to guide sustainable development. They include policies on key area such as housing, transport, the natural environment, employment and economic development, carbon reduction and resources, amongst others. The following local authorities are within the SWW region: Bournemouth, Christchurch and Poole (BCP), City of Plymouth, Cornwall, Devon (which encompasses 8 district authorities), Somerset (which encompasses 4 district authorities), Isles of Scilly, New Forest District, Test Valley District, and Wiltshire.
Public Rights of Way Improvement Plans (ROWIPs)	Cross-cutting	ROWIPs outline how local authorities aim to improve public rights of way within their local area in order to ensure improved accessibility, connectivity and quality of the network for all.
Local level Green Infrastructure Plans and Strategies	Cross-cutting	Green Infrastructure Strategies set out how local authorities will improve provision of and access to quality green spaces.

Policy, Plan or Programme	Topic	Key Summary
Local Flood Risk Management Strategies	Water	These flood risk management strategies set out ways in which the local authorities will manage and mitigate flood risks within their areas.
National Natural Capital Atlas: Mapping Indicators, Natural England (2020)	Cross-cutting	The state of the natural capital in England is outlined in this report through a series of maps and indicators to show the quality, quantity and location of natural assets as well as the ecosystem services that they provide. Quantity indicators are divided into eight broad habitat type categories including freshwater; farmland; grasslands; mountain, moor and heath; woodland; urban; coastal; and marine. Quality indicators are also split out into broad categories which cover vegetation; nutrient and chemical status; soil / sediment process; species composition; vegetation; and cultural. These indicators are designed to inform decision making and to help to achieve the commitments set out in the 25 Year Plan, and also acts a baseline to measure change.
AONB Management Plans	Landscape	The Management Plans summarise the key issues facing the AONBs and outline the management policies and actions required to conserve these areas. The following Plans are relevant to the SWW region: The Cornwall AONB Management Plan 2016-2021 – key issues for the site in relation to water include climate change; the need to maintain and enhance water quality; ensure efficient use of water resources; reducing the risk and impact of flooding; protecting coastal communities in a changing climate; and maintaining and enhancing the integrity and extent of the area's biodiversity including coastal and maritime habitats. South Devon AONB Management Plan 2019-2024 - key issues for the site in relation to water include localised extreme weather events as a result of climate change; increased development in water catchment areas which increase nutrient loadings, storm water runoff rates, siltation and pollution; growing pressure for commercial activities and intensive recreational use and erosion around coastal sites; habitat degradation and fragmentation at rivers and estuaries due to increase in hard built environments. North Devon Coast AONB Management Plan 2019-2024 – key issues for the site in relation to water include climate change and its effects on water quality, quantity and flows; pressure for development in the Estuary and adjacent settlements; potential impacts of marine plans; coastal erosion and sea level rise; INNS and pests; changing land management practices; intensive farming; pollution and littering. Tamar Valley AONB Management Plan 2019-2024 – key issues for water include the increased effect of climate change on habitats, structures and water flow; loss of quays and landing points; long-term sustainability of flood defences; lack of riparian management; INNS; decline in fish stocks, and a desire for greater public access to the riverbank; diffuse pollution; historical land contamination from legacy mining activities; soil erosion; Water Framework Directive (WFD); and land-use within the whole river catchment. East Devon AONB Management Plan (Partnership Plan) 2019-2024 – key issues for the site in relation to water include climate change; an eroding coastline; increased pressure for new development; changing agricultural practices and policy, including governmental policy (i.e. post-Brexit environmental legislation); waste management; increasing the awareness of marine pollution/littler and enhancing public perception and understanding of AONBs overall. Blackdown Hills AONB Management Plan 2019-2024 – key issues for the site in relation to water include climate change, leading to increased pests and diseases and extreme weather events; the requirement to take a catchment approach for land management; droughts and floods; pollution; water quality, especially for the rivers Exe, Otter, Sid and Axe; nitrate loss from agriculture.

Policy, Plan or Programme	Topic	Key Summary
		Dorset AONB Management Plan 2019-2024 – key issues for the site in relation to water include nutrient loading from agriculture and sewage; impacts of nutrients and eutrophication; climate change including increased extreme weather events such as floods and droughts; habitat destruction and disruption of ecological services such as water purification. Cranborne Chase AONB Partnership Plan 2019-2024 – key issues for the site in relation to water include climate change; INNS, pests and diseases; intensive or changing land management practices; wildlife species decline and fragmented and isolated habitats including in chalk grasslands and rivers; the limited means to conserve and enhance natural environment, habitats and species; pollution and water quality. North Wessex Downs AONB Management Plan: 2019-2024 – key issues for the site include habitat fragmentation, uncertainties over future land use and land management which would impact on agricultural practices (e.g. agricultural intensification); degradation and loss of river and wetland habitats due to pollution, inappropriate management, increasing water demand, and climate change; decline in fish stocks and quality of fisheries; major development in urban areas; pollution on River Kennet generated by poor quality and boat traffic on the Kennet and Avon Canal; overabstraction of groundwater and water from the chalk aquifer. Isles of Scilly AONB Management Plan 2021-2025 – key issues for the site in relation to water include growing population inducing potential negative impacts on biodiversity and increasing pressure on drinking water resources for new developments; increased nutrients entering local catchments; climate change; hydrological changes as a result of climate change and human intervention along with pollution; INNS; intensification of agriculture.
National Character Area (NCA) Profiles, Natural England	Landscape	The profiles for each outline the characteristics which are unique to that area and help to form distinctive sense of place. There are 18 NCAs within the SWW region which include: Exmoor Vale of Taunton and Quantock Fringes Blackdowns Devon Redlands The Culm Dartmoor South Devon Cornish Killas Bodmin Moor Hensbarrow
South West River Basin Management Plan (2015)	Water	The purpose of a river basin management plan is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning. The following have been identified as key pressures for the basin: Physical modifications - affecting 22% of water bodies in this river basin district Pollution from waste water – affecting 33% of water bodies in this river basin district Pollution from towns, cities and transport - affecting 4% of water bodies in this river basin district Changes to the natural flow and level of water - affecting 3% of water bodies in this river basin district

Policy, Plan or Programme	Topic	Key Summary
		Negative effects of invasive non-native species - affecting 1% of water bodies in this river basin district Pollution from rural areas - affecting 44% of water bodies in this river basin district
South East River Basin Management Plan (2015)	Water	The purpose of a river basin management plan is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning. The following have been identified as key pressures for the basin: Physical modifications - affecting 43% of water bodies in this river basin district Pollution from waste water – affecting 40% of water bodies in this river basin district Pollution from towns, cities and transport - affecting 9% of water bodies in this river basin district Changes to the natural flow and level of water - affecting 7% of water bodies in this river basin district Negative effects of invasive non-native species - affecting 2% of water bodies in this river basin district Pollution from rural areas - affecting 30% of water bodies in this river basin district
South West River Basin Management Plan (2022)	Water	The South West RBMP describes the challenges that threaten the water environment and how these challenges can be managed. The 2022 version of the Plan includes updates to: Current condition and environmental objectives Challenges for the water environment Summary programmes of measures Updated maps and data River basin planning process overview and progress report. *Note: The current draft WRMP24 WFD assessments have been undertaken under the 2015 version of the South West RBMP, this will be updated in line with the 2022 version for the next iteration.*
Catchment Flood Management Plans (2009): South West Basin South East River Basin	Water	CFMPs have been produced to assess inland flood risk across England and Wales. The CFMPs relevant to the WRMP are detailed in the column to the left. The CFMPs consider all types of inland flooding: from rivers, ground water, surface water and tidal flooding (but not coastal flooding, which is covered by Shoreline Management Plans. The role of the CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. CFMPs should be used to inform planning and decision making by key stakeholders such as the Environment Agency, local authorities, Internal Drainage Boards, water companies and other utilities; transportation planners; land owners, farmers and land managers; the public and businesses to enhance their understanding of flood risk and how it will be managed. The CFMPs identify six generic flood risk management policies: Policy 1- Areas of little or no flood risk where the EA will continue to monitor and advise: this policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible. Policy 2 - Areas of low to moderate flood risk where the EA can generally reduce existing flood risk management actions: this policy will tend to be applied where the overall level of risk to people and property is low to moderate.

Policy, Plan or Programme	Topic	Key Summary
		Policy 3 - Areas of low to moderate flood risk where the EA are generally managing existing flood risk effectively: this policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. Policy 4 - Areas of low, moderate or high flood risk where the EA are already managing the flood risk effectively but where they may need to take further actions to keep pace with climate change: this policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. Policy 5 - Areas of moderate to high flood risk where the EA can generally take further action to reduce flood risk: this policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Policy 6 - Areas of low to moderate flood risk where the EA will take action with others to store water or manage run-off in: locations that provide overall flood risk reduction or environmental benefits. This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. To select the most appropriate policy, the CFMPs consider how the social, economic and environmental objectives are affected by flood risk management activities under each policy option. The policies identified in the CFMPs will be delivered through a range of delivery plans, projects and actions.
Catchment Abstraction Management Strategies (CAMS) (2016)	Water	The Catchment Abstraction Management Strategy (CAMS) set out how the EA will manage water abstraction. They outline where water is available, and also, if relevant, where the EA needs to reduce current rates of abstraction. Each CAMS provides an overview of the catchment area and characteristics, including abstractions, geology, hydrology, hydrometry, water quality and discharges, ecology and conservation, recreation and navigation. The CAMS make information on water resources and licensing practice publicly available and allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties. CAMS are also the mechanism for managing time limited licences by determining whether they should be renewed and, if so, on what terms.
Meeting our Future Water Needs: a National Framework for Water Resources, Environment Agency (2020)	Water	The Framework explores the long-term needs of all sectors that depend on a secure supply of water, taking into account the commitments set out in the UK Government's 25 Year Plan. It sets out the principles, expectations and challenges for the five regional groups which cover England's water supply in order to take a collaborative approach to address the current and future challenge of water resource planning. The importance of regional planning is paramount to address the following challenges: Resilience to drought Greater environmental improvement Reducing water use in the long-term Leakage reduction Reducing the use of drought permits and drought orders Increasing supplies

Policy, Plan or Programme	Topic	Key Summary
		Moving water to where it is needed
Long-term water resources environmental destination, Environment Agency (2020)	Water	Regional water resources plans provide the opportunity to deliver an environmental destination for water resources where environmental issues related to water supply and demand are addressed in the long term. The document provides guidance for regional groups and water companies to help to integrate the long-term environmental water resources needs when developing their regional plans. It sets out a standard approach to allow for both consistency whilst allowing for flexibility depending on specific needs and issues. It sets out the following: What the environmental destination should look like: Enable environmental resilience and protection for water resources up to at least 2050 through a variety of actions. Stages needed to propose a long-term environmental destination: Review national policy, use scenarios, engage with stakeholders, develop environmental destination and carry out testing. Defining a long-term environmental destination: Use the scenarios from the National Framework to support and inform the destination development. What a long-term environmental destination should include: Meet current regulatory requirements for abstraction and integrate future needs. Actions to meet an environmental destination: Resilience to climate change, integrates stakeholder views, considers costs and scale, supports wider government ambitions, prioritises the most vulnerable and protected sites, integrates a catchment approach and nature based solutions, supports net gain principles, uses the best data and is not constrained by previous decisions. The guidance also includes reference to how to carry out engagement, set milestones and outlines the governance for implementing a long-term environmental destination.
Cornwall and Isles of Scilly: Environment Growth Strategy 2020-2065 (2021)	Cross-cutting	This strategy provides a long-term framework for how Cornwall and the Isles of Scilly will conserve and regenerate nature in response to the biodiversity crisis. The overall ambition is to create a cleaner, greener Cornwall and the Isles of Scilly to support a thriving society, prosperous economy and abundance of wildlife. The strategy builds on the 2015 strategy and enhances the focus by underlining 10 interrelated pillars and associated objectives for the next five years. It also sets out how partners will work together to help Cornwall's transition to sustainable food, land and seas.
Cornwall Nature Recovery Strategy (Pilot Draft v1.5): A Statement of Biodiversity Priorities (2021)	Ecology	The Nature Recovery Strategy builds up from the broader Environmental Growth Strategy by determining specific priorities over the next five years for the recovery of nature.
West Country Water Resources (WCWR) Draft Regional Plan, WCWR (2023)	Water	WCWR have developed a draft Regional Plan to secure resilient and sustainable water supplies for future generations through a collaborative, regional approach. The Plan covers the Western Peninsula of the UK from Bristol and Wiltshire down to Devon and Cornwall. The WCWR regional plan aims to take a long-term view to water resource planning across the region to 2050 in order to secure a sustainable and resilient water supply. The key aims of the draft WCWR Regional Plan are: Meet future resilience to water scarcity Secure future Public Water Supply (PWS) and non PWS needs. Ensure commitment to environmental improvements and environmental destination abstraction reduction.

Policy, Plan or Programme	Topic	Key Summary
		Develop scenarios that meet the adaptive target for a 50% reduction in leakage and achieve water efficiency of 110l per capita consumption by 2050. Ensure the Regional Plan meets the aims of the National Framework. Produce a Regional Water Resource Plan that gives value for customers and provides additional benefits to customers and stakeholders.
WCWR Method Statement: Options (2022)	Water	This document sets out the methodology for the development of potential options to include in the WCWR regional plan, and those identified as potential regional strategic options by RAPID. This ensures that options are developed in a consistent manner across the regional group and member companies.
WCWR Method Statement: Supply forecasting (2020)	Water	This method statement provides guidance on how WCWR would undertake supply forecast assessments using a consistent approach in terms of water available for use (WAFU) for each of the six water resource zones in the West Country region for the period to 2080.
WCWR Method Statement: Demand forecasting (2020)	Water	This method statements explains the approach that would be used to derive demand forecasts for use in WCWR regional planning activities. This includes forecasts of future demand to 2080 for the region along with population and property forecasts.
WCWR Method Statement: Environmental Ambition (2020)	Water	This method statement sets out how WCWR will develop the environmental programme contained in its regional plan in line with the expectations set out within Environment Agency's National Framework regarding the requirement for regional plans to proactively enhance the environment in the area.
WCWR Method Statement: Decision-making (2020)	Water	This method statement explains the approach for WCWR to consider how resources may be used most effectively across the region and inter-regionally, balancing the needs of different sectors with environmental requirements and the need for resilience to more severe droughts. Ultimately, this will enable the regional plan to identify a preferred investment plan for the region.
WCWR Method Statement: Stakeholder Engagement (2020)	Water	This document explains how WCWR will ensure that the relevant stakeholders are included in the development of the regional plan. This highlights the relevant stakeholders such as customers and other water abstractors, and the different activities that could be used to engage with them.
Forward programme 2021-22, RAPID (2021)	Water	The Regulator's Alliance for Progressing Infrastructure Development (RAPID) is a partnership formed of Ofwat, the Environment Agency and the Drinking Water Inspectorate with Natural Resources Wales involved in an advisory capacity for Welsh schemes. To achieve the vision for high quality, resilient and environmentally beneficial water resources which meet customer needs, Strategic Resource Options (SROs) are required and involve collaboration and complex arrangements between water companies and regions. Funding was allocated to water companies to develop these SRO infrastructure supply solutions and RAPID were established to support their development. RAPID undertakes the following roles: Gated process: The first role of RAPID is to provide oversight to the gated process which has been developed to ensure SROs are on track and meet needs in a cost and environmentally efficient way. Gate 1 submission has already taken place with Gate 2 due to complete in October 2022. Water Resources National Framework: RAPID acts as an enabler for the National Framework, supporting the co-ordination of the five regional groups and helping to shape regional plans.

Policy, Plan or Programme	Topic	Key Summary
		Regulatory and commercial framework: Thirdly, RAPID are developing the regulatory and commercial framework to support the timely delivery of water resources infrastructure. For the period 2021-2022, RAPID have identified the following five key delivery areas: developing a positive culture and driving performance; providing effective oversight of the strategic solutions engaging people and organisations; achieving effective long-term water resources resilience; and exploring and addressing regulatory and commercial opportunities, gaps and barriers.
South West Marine Plan, Marine Management Organisation (2021)	Water	The South West inshore marine plan area stretches from the River Severn border with Wales to the River Dart in Devon, covering approximately 2,000 kilometres of coastline, taking in a total of approximately 16,000 square kilometres of sea. Wales, and its marine area, and the South inshore marine plan area border the South West inshore marine plan area. The area overlaps with 16 local authorities, Exmoor National Park, and five Areas of Outstanding Natural Beauty. The South West offshore marine plan area covers a total of approximately 68,000 square kilometres of sea and contains England's only deep-water habitats as well as the Isles of Scilly, which is the only oceanic archipelago in the UK. The Plan sets out specific policy areas which include, but not limited to, co-existence, aquaculture, water quality, climate change, fisheries, marine litter, biodiversity, and net gain and natural capital. There are three key objectives, each of which have further aims associated with them: Achieving a sustainable marine economy Ensuring a strong, healthy and just society Living within environmental limits.
South Marine Plan, Marine Management Organisation (2018)	Water	The area of Bournemouth is adjacent to the South marine plan area which covers both South inshore and South offshore areas. The South marine plan covers 1,000 km of coastline from Folkestone to the River Dart, and stretches across an area of 20,000 square kilometres of inshore and offshore waters. The 20-year Plan will safeguard environments such as the UNESCO-recognised Jurassic coast, protect and enhance essential natural defences against climate change and flooding, and further support the growth of socio-economic activities such as tourism and trading in the area, which will be achieved through its 12 objectives.
Cornwall Climate Change Action Plan (2019)	Climatic Factors	This action plan sets out Cornwall Council's plans to become carbon neutral by 2030 in response to the Climate Emergency. The Plan will align with the key principles of supporting a just transition and of transparency when working with partners and residents. It is noted that greater emphasis will need to be placed on reducing emissions from transport, agriculture, heating, and waste, and increasing the carbon draw down from the natural environment.
Draft Interim Devon Carbon Plan (2020)	Climatic Factors	This Plan presents a roadmap for Devon to achieve net-zero carbon by 2050, with an interim target of 50% reduction to below 2010 levels by 2030. The Plan has gone through public consultation and has completed a Citizens' Assembly where more controversial climate topics were considered. A public consultation on actions developed in response to the Assembly is currently being developed. The Plan proposes five-year carbon budgets that set a declining emissions cap between now and 2050 for Devon to remain on track to meet these targets. It outlines how everyone in Devon can take action to reduce carbon emissions and highlights barriers to overcome, and where collaborative action with the national government is needed. The co-benefits and opportunities the proposed actions are also presented in the Plan.

Policy, Plan or Programme	Topic	Key Summary
Draft Climate and Ecological Emergency Action Plan, Bournemouth, Christchurch and Poole Council (2021)	Climatic Factors	This Plan is being drafted to meet the commitments of the Climate and Ecological Emergency Declaration that the Council made in 2019. It has gone through an initial round of consultation in 2021, the survey results of which are currently under evaluation and review. The following actions for the Council have been recommended in the Plan: Endorse the Plan as the basis for public consultation with a final report back to the Council Take the proposed commitments into account in setting the Medium Term Financial Plan, with a view to additional financial support being added to the Climate Change Reserve and Salix Fund (£120k each) Continue their commitment to participate in the Global Covenant of Mayors for Climate and Energy, single-use plastic reduction initiatives and work towards a plastic-free Council Develop a new overarching Environment Strategy, to include Climate Change adaptation, mitigation, ecology, and other relevant issues.
Towards a Climate Resilient Somerset – Somerset's Climate Emergency Strategy (2020)	Climatic Factors	Somerset's Climate Emergency Strategy has been developed jointly by the five Somerset local authorities and sets out three overarching goals: To decarbonise Local Authorities, the wider public sector estates and reduce the County's carbon footprint To make Somerset a Carbon Neutral County by 2030 To build up resilience and adapt to the impacts of climate change. The Strategy lays out the evidence for the impacts of climate change at various geographical scales, outlines the challenges and the measures and opportunities to adapt Somerset to climate change.
Hampshire County Council Climate Change Strategy 2020-2025 (2018)	Climatic Factors	This Strategy presents the Council's approach to delivering a strategic focus on implementing climate resilience and mitigation actions across key policies and sectors across the communities in Hampshire. The targets for this strategy include meeting carbon neutrality by 2050 and preparing the community for resilience to the impacts of a two-degree Celsius temperature rise. There are six key principles that underpin the approach taken by Hampshire County Council to deliver the county's climate change targets: Following the Carbon Management Hierarchy Prioritise actions that deliver co-benefits Ensure actions adhere to the principles of proportionality, affordability, and be equitable Take any opportunity to accelerate delivery to reach carbon neutrality sooner than 2050 Incorporate National Government action and adapt to the changes to the national policy and landscape, including a clear funded roadmap to 2050 and gain support for action at a local level Actively prioritise the development and delivery of innovation and digital to support the climate change agenda.
Wiltshire Draft Climate Strategy (2021)	Climatic Factors	This Draft Strategy identifies areas of focus for climate action for the period 2022-2027. Wiltshire Council has pledged to become carbon neutral by 2030, and this strategy sets out a framework for reducing emissions over the next five years in Wiltshire, and improve the county's resilience to climate impacts. The strategy will influence other key council strategies and plans.
SWW		

Policy, Plan or Programme	Topic	Key Summary
SWW's Climate Change Adaptation Report (2021)	Climatic Factors	SWW produced the climate change adaptation plan to reflect customer priorities in mitigating the effects of climate change. The company aims to continuously assess the impacts of climate change and possible mitigations across all operations, assets and networks, identifying 60 material risks using its Corporate Risk Framework. Key risks identified include poor water quality, risks to the natural environment and biodiversity, an increased demand for water and a reduction in water resources due to heatwaves and droughts, and sea level rises and coastal erosion increasing inundation at sewage treatment works and sewage pumping stations. Actions to mitigate and adapt to climate change impacts that were identified include: Reducing leaks and helping customers to use less water and reduce leakage by 50% by 2050 Extending catchment management to make the environment more resilient Assessing future strategic options for future water supply resilience Developing long term strategies to mitigate climate change risks across all parts of operation Leading the way in natural carbon sequestration through peatland restoration Moving to full smart metering and smart self-healing networks Ensuring no wastewater discharges are the reasons for rivers not achieving good ecological status by 2030.
Environment Policy (2019)	Cross-cutting	The Policy sets out SWW's commitment and vision on being the leading community-focussed water company, protecting the environment, preventing pollution and complying with environmental regulations. The continuous monitoring and improvement of its environmental performance will be achieved by: Complying with all relevant legal requirements and standards, including creating appropriate procedures and internal policies to reflect best environmental practice Acting to mitigate climate change and to prevent pollution Openly communicating with internal and external stakeholders on environmental performance through Annual Performance Reports Maintaining sustainable abstraction procedures Fostering an understanding of key environmental issues amongst employees, suppliers, contractors, customers and the public Promoting and supporting catchment-sensitive farming and land management with restoration of lands Achieving a biodiversity net gain across all relevant sites Promoting conservation access and recreation at relevant sites.
SWW& Bournemouth Water Final Water Resources Management Plan (2019)	Water	The WRMP19 sets out how SWW will provide a reliable, resilient, efficient and affordable water supply to customers over a period of 25 years and beyond. It aims to balance the availability of water with the demand and recognises the important role population growth and climate change will play in achieving this balance. The bulk of SWW's water supply is from reservoirs, river intakes, and some groundwater sources predominantly in East Devon, while water resources in the Bournemouth water area are largely made up from river abstraction with some groundwater. The following are key topics addressed in the Plan: Customer research and stakeholder engagement

Policy, Plan or Programme	Topic	Key Summary
		Overall approach to water resource planning Forecast water supply Forecast water demand Impact of climate change and more extreme droughts Target headroom Assessing baseline position and possible options Scenario analysis SWW's proposed water resource strategy and plan Alternative plans.
Revised Draft Drought Management Plan (2021)	Water	The Drought Management Plan aims to provide an operational guide for staff and sets out a commitment to SWW's customers on how water resources will be managed during periods of drought. The new Plan takes into account feedback and aims to engage with customers sooner and take earlier action before resources become stretched and environmental stresses become apparent. The new approach puts the customers and environment at its heart. Actions to help reduce the effects of droughts are split out into the following three areas: Actions to reduce demand – communication and engagement programmes, and leakage reduction Actions to protect the environment – sustainability reductions, environmental monitoring, license provision, temporary abstraction reductions, and river restoration projections Actions to maintain supply – identification of underperforming sources, groundwater resting and transfers with other water companies The Plan also sets out SWW's approach to identifying and monitoring droughts to allow them to know when to activate the various measures outlined above. This includes monitoring resources, understanding drought triggers and forecasting resources. There are three main drought triggers along with additional environmental drought triggers which include specific actions for when that trigger is reached.
Devon and Cornwall Area Drought Plan, Environment Agency (2017)	Water	This document outlines how drought will be planned for and managed in the Devon and Cornwall area. It includes: The drought management structure and drought monitoring Drought management actions and triggers for these actions How the area deals with drought permit and drought order applications The area's drought communications actions and A range of information, links and maps. This Plan was withdrawn in September 2022. As a new Plan has not yet been released, this has been retained as it reflects the most recent version.
Drought Plan: Isles of Scilly (2021)	Water	This report presents the first application of a drought planning approach on the Isles of Scilly. It has been included as a separate section to SWW's Drought Management Plan due to the islands' geographically remote location and disconnection from the mainland water supply systems, while also taking into account the different nature of the

Policy, Plan or Programme	Topic	Key Summary
		hydrology of the islands compared to the mainland. The structure of the document follows that of the main Drought Plan with sections setting out the drought plans for each island.
Our Promise to the Planet: Carbon-busting Net Zero Plan, SWW (n.d.)	Climatic Factors	SWW has a goal to achieve Net Zero carbon by 2030 for its operational emissions, and by 2045 for all other carbon emissions. Its strategy is founded across three pillars: Sustainable Living – changes to operational practices Championing Renewables – maximising self-generation from renewables across its sites Reversing Carbon Emissions – Reverse carbon emissions from core activities.
West Country South Strategic Resource Options (SROs), Gate 1 Submission Documents (2021)	Water	SWW are developing two SROs alongside Southern Water and Wessex Water. These inter-regional transfers are required to meet customer needs and due to the significant infrastructure associated with them, they require long-term planning. As such, these SROs may be required from 2025 and beyond. These SROs have now completed the Gate 1 Stage which demonstrates their viability and progress, with RAPID overseeing their delivery. Gate 2 activities for these SROs were planned to start in October 2022. The two SROs are: West Country South sources and transfers: involves potable transfer from Roadford reservoir to WSX centre, and raw transfer from Poole STW to River Stour. West Country South – Southern Water transfer: involves potable transfer from WSX centre to Testwood, and raw transfer from River Stour to Testwood.
Upstream Thinking Report (2020)	Water	SWW developed Upstream Thinking (UST) as a catchment management programme focusing on protecting surface and groundwater resources from detrimental landscape impacts and developing their catchments' Natural Capital stocks. This improves business performance and delivers customer priorities of: Clean, safe and reliable supply of drinking water Reliable wastewater service Resilience Protecting the environment. The UST schemes primarily reduced pesticide risks in drinking water resources, while also improving water quality and quantity of flow and flood risk. The 2020 UST report records the progress accomplished between 2015-2020 as part of SWW's sixth Asset Management Plan (AMP6), while also providing a foundation for goals set for AMP7 (2020-2025).
Business Plan 2020-2025	Water	The Business Plan aims to empower customers to influence the future direction of the business, building the plan around the two key priorities identified by customers, i.e. a resilient and reliable service, and a fair and affordable bill. The Plan also outlines SWW's Board pledges to 2025, which includes the following goals: To deliver efficiency, keeping bills as low as possible and address water poverty To provide outstanding customer service To deliver environmental leadership To empower customers by giving them more opportunities to be involved in the business and offering them more tangible financial stake To support the regional economy and communities.

Policy, Plan or Programme	Topic	Key Summary
		The SWW 2020-25 Business Plan Commitments also include the company's WINEP requirements.
Asset Management Policy (2020)	Water	The Asset Management Policy defines SWW's key principles and requirements that would be applied to manage its assets, ensuring that the process contributes towards the continuous improvement of water and wastewater services to provide a high-quality service to its customers. In the statement, SWW seeks to ensure that all legislative and regulatory requirements are complied with; that it delivers value for money for customers and stakeholders; and that it delivers against its committed outcomes and board pledges, including the clean and safe supply of drinking water, reliable wastewater services, etc.
Pollution Incident Reduction Plan (2020)	Water	As part of SWW's 2020-2025 Business Plan, the company has set targets for reducing pollution incidents and collated actions to reduce these incidents within this document, and described the benefits these actions will bring. SWW has set a long-term vision to 2050 to be the industry leader in minimising Category 3 pollutions and to eliminate harmful (Category 1 and 2) pollutions.
Environment Plan to 2050 (2019)	Cross-cutting	SWW published this plan in line with Defra's 25-Year Environment Plan, incorporating an ambitious programme to reduce leakage and improve water efficiency to reduce stress on the environment. The plan also includes catchment management for over 80% of the catchments within which SWW operates, stretching targets for zero serious pollution events, protecting bathing and shellfish waters, and the delivery of Drainage and Wastewater Management plans. The overall outcome of the plan is that water abstraction will be reduced by nearly 5% by 2025 and there will be improved water quality and security though the region.

C. Baseline Information

C.1 Biodiversity, Flora and Fauna

C.1.1 The SWW region contains numerous Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR). The number and type of ecological sites across the region is presented in Table C.2: Ecological sites in the SWW region and shown in **Figure D1** in **Appendix D**.

Table C.2: Ecological sites in the SWW region

Designated Site	Total Number
SAC	41
SPA	11
Ramsar	6
SSSI	279
NNR	17
LNR	63

C.1.16 The SWW region is rich in species and habitat diversity, however, in line with the rest of the UK, nature in this region is in decline. Priority species that can be found within the SWW region include otters, dormice, cirl bunting, and several species in decline including the high brown and marsh fritillary, water vole and kittiwake. A range of issues that threaten the habitats within the SWW region and lead to species decline include climate change, poor or inappropriate land management, invasive species and diseases and continued habitat loss and fragmentation from land use change and built development[67].

C.1.17 The Environment Act 2021 introduces a new statutory requirement to produce locally-led Nature Recovery Strategies every five years, with an aim to create a Nature Recovery Network (NRN) of 500,000 ha of additional habitat in England. Within the SWW region, Cornwall Council has been assigned as one of five pilots to test the preparation of a Local Nature Recovery Strategy[68], which would help determine areas with the greatest potential for nature to recover.

C.1.18 Under the Natural Environment and Rural Communities (NERC) Act 2006, SWW has a duty to have regard to the conservation of biodiversity in exercising its function. The duties relate to habitats and species of principal importance, some which may be designed Local Wildlife Sites (LWS) / CWS.

C.1.19 Priority habitats make up 18% of the SWW region equating to a total of 206,581 ha[69]. Deciduous woodland accounts for the highest percentage of priority habitat in the region. The split of the priority habitat by type across the region is shown in Table C.3: Priority habitats in the SWW region.

[67] Overall trends in biodiversity are obtained from the State of Nature or Natural Environment reports where available for the counties that lie within the SWW region.

[68] Cornwall Council (2021) *Cornwall Nature Recovery Strategy* (Pilot Draft v1.5): A Statement of Biodiversity Priorities.

[69] Natural England (2020) *Priority Habitat Inventory*. Available at: https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england

Table C.3: Priority habitats in the SWW region

Priority Habitat Type	Hectares (ha)	Percentage (%)
Blanket bog	16,791	1.479
Calaminarian grassland	94	0.008
Coastal and floodplain grazing marsh	9,945	0.876
Coastal saltmarsh	673	0.059
Coastal sand dunes	2320	0.204
Coastal vegetated shingle	36	0.003
Deciduous woodland	78,334	6.898
Fragmented heath	1,401	0.123
Good quality semi-improved grassland	5,427	0.478
Grass moorland	14,760	1.300
Lowland calcareous grassland	842	0.074
Lowland dry acid grassland	2,168	0.191
Lowland fens	1,980	0.174
Lowland heathland	22,237	1.958
Lowland meadows	1,138	0.1
Maritime cliff and slope	6,571	0.579
Mudflats	1,537	0.135
No main habitat but additional habitats present	13,466	1.186
Purple moor grass and rush pastures	5,071	0.447
Reedbeds	169	0.015

Priority Habitat Type	Hectares (ha)	Percentage (%)
Saline lagoons	73	0.006
Traditional orchard	1,605	0.141
Upland calcareous grassland	3	0.0003
Upland flushes, fens and swamps	984	0.087
Upland hay meadow	30	0.003
Upland heathland	18,926	1.667

C.1.101 CWS are a non-statutory biodiversity designation. They are selected based upon their nature conservation value, considering distinctive, important or threatened species and habitats. Many CWS include priority habitats, which are considered of conservation significance either locally or nationally. CWS aim to link and buffer other important conservation areas, such as SSSIs. Within the county of Cornwall, there are 498 CWS[70], totalling an area of 33,000 hectares. There are also 2,200 CWS within the county of Devon[71].

C.1.102 There are 48 Marine Conservation Zones (MCZs) associated with the SWW area, including 12 offshore MCZs off the coasts of Cornwall and Devon and 10 MCZs along the shores of the Isles of Scilly[72]. The waters in the South West host a rich mix of marine habitats like kelp beds and seagrass, hosting diverse species from large migratory fish to jellyfish, basking sharks, and large mammals such as seals and dolphins. The coastal habitats around the South West, particularly around Cornwall[73] and Devon[74], are threatened by overfishing, damaging fishing practices, climate change and pollution. The SWW region also includes Shellfish Waters Protected Areas, which are areas designated to protect the growth and production of shellfish. The key concern for these areas is the protection of water quality through the reduction of pollution in order to produce high quality shellfish. Within the SWW region, there are approximately 27 sites of shellfish waters, totalling an area of 877ha.

C.1.103 The South West contributes the second largest output of the UK industry total in fishing and aquaculture (10%), following Scotland (61%)[75].The region has the three most significant fishing ports in England located in Newlyn, Plymouth and Brixham, which form a third of all landings into England[76]. In January 2022, these three ports combined accounted for 47% of England's

[70] Cornwall Wildlife Trust (2022) *County Wildlife Sites.* Available at: https://www.cornwallwildlifetrust.org.uk/what-we-do/our-conservation-work/on-land/county-wildlife-sites

[71] Devon Biodiversity Record Centre (2019) *County Wildlife Sites.* Available at: https://www.dbrc.org.uk/information/sites-and-habitats/

[72] JNCC (2020) *Marine Protected Area Mapper.* Available at: https://jncc.gov.uk/our-work/marine-protected-area-mapper/

[73] Cornwall Wildlife Trust (2020) *State of Nature: Cornwall 2020*. Available at: https://www.cornwallwildlifetrust.org.uk/what-we-do/about-us/state-nature-cornwall-2020-report

[74] Devon Local Nature Partnership (2018) *State of Environment Report*. Available at: https://www.devonlnp.org.uk/devons-environment/state-of-environment-report/

[75] House of Commons (2021) *UK fisheries statistics.* Available at: https://researchbriefings.files.parliament.uk/documents/SN02788/SN02788.pdf

[76] Marine Management Organisation (2019) *UK Sea Fisheries Statistics 2019*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920679/UK_Sea_Fisheries_Statistics_2019_-_access_checked-002.pdf

total catch value from sea fisheries and 46% of live weight of landings[77], with contributions from each port seen in Table C.4: Landings into English ports in the SWW region by all vessels (Live weight (tonnes) and Values (£000's)). In Brixham, nearly half of the catch from sea fisheries is shellfish, whilst pelagic catches dominate in Plymouth and demersal catches dominate in Newlyn.

C.1.104 Note that Table C.4: Landings into English ports in the SWW region by all vessels (Live weight (tonnes) and Values (£000's)) considers sea fisheries only and does not consider inshore, shellfish nor recreational fishing. Numbers of sea anglers in England were reportedly largest in the South West from a study undertaken in 2020[78], marking the region's significance for recreational sea fishing. South West Lakes Trust manages coarse and trout fishing activities under South West Lakes Fishing and works alongside SWW to manage the South West's reservoirs and lakes. There are 14 established lakes in the South West with over 275 acres of water for recreational coarse fisheries[79], and 11 sites of still water fisheries to accommodate trout anglers with sites varying from around 50 to 900 acres[80]. The South West region of England also has a vast network of Atlantic salmon rivers with 22 salmon rivers, eight of which are designated as SACs[81].

Table C.4: Landings into English ports in the SWW region by all vessels (Live weight (tonnes) and Values (£000's))

Port	Value (£'000s)	Live weight of landings (t)
England total	16,257	7,638
Brixham	3,214	988
Newlyn	3,773	2,309
Plymouth	673	181

Source: MMO (2022) Monthly Sea Fisheries Statistics January 2022

C.2 Water

C.2.1 According to the Environment Agency's Final Classification for water stressed areas[82], Bournemouth and the Isles of Scilly are two areas within SWW's coverage that are classed as seriously water stressed. The regions of Devon and Cornwall are determined to be not seriously water stressed; however, these regions still experience pressure on water resources. The anticipated growth in population and the economy alongside the projected changes in climate

[77] Marine Management Organisation (2022) *Monthly Sea Fisheries Statistics January 2022*. Available at: https://www.gov.uk/government/statistics/monthly-sea-fisheries-statistics-january-2022

[78] Hyder, K. et al. (2020) *Participation, catches and economic impact of sea anglers resident in the UK in 2016 & 2017.* Cefas, Lowestoft UK.

[79] South West Lakes Trust (n.d.) *Coarse Fishing*. Available at: https://www.swlakestrust.org.uk/coarse-fishing

[80] South West Lakes Trust (n.d.) *Trout Fishing*. Available at: https://www.swlakestrust.org.uk/trout-fishing

[81] Cefas, Environment Agency, and Natural Resources Wales (2021). Salmon Stocks and Fisheries in England and Wales in 2020. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019223/SalmonReport-2020-summary.pdf

[82] Environment Agency (2021) *Water Stressed Areas – Final Classification.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998237/Water_stressed_areas__final_classification_2021.odt

will continue to place additional stress on water availability within the SWW regions, highlighting the importance of managing water resources.

C.2.2 The main rivers in the SWW region are shown in **Figure D2** in **Appendix D**. There are two river basin districts (RBD) within the SWW region: South West and South East. The South West RBD covers an area of over 21,000km^2 and includes nine management catchments, encompassing many interconnected rivers, lakes, groundwater and coastal waters[83]. The South East RBD covers over 10,200km^2 and includes nine management catchments with rivers and lakes, groundwater, chalk streams of the Test and Itchen catchments, and estuarine and coastal waters[84].

C.2.3 The number of water bodies in the SWW region within the South East and South West RBDs is presented in Table C.5: Number of water bodies in the SWW region.

Table C.5: Number of water bodies in the SWW region

Water body categories	South West RBD	South East RBD	Total
Rivers	388	18	406
Lake	45	2	47
Coastal	18	2	20
Transitional	19	3	22
Groundwater	31	5	36
Canal	3	0	3
Surface water transfer	3	0	3
Total	**507**	**30**	**537**

C.2.40 The WFD indicator of the health of the water environment is whether a water body is at good status or potential. This is an assessment of a range of quality elements relating to the biology and chemical quality of surface waters and quantitative and chemical quality of groundwater. To achieve good ecological status or potential, good chemical status or good groundwater status every single element assessed must be at good status or better. If one element is marginally below its threshold for good status, then the whole water body's status is classed as less than good.

C.2.41 Another aspect to consider when assessing the status of the water body is its hydrology. The hydromorphological supporting element under WFD, including the flow (i.e. hydrological) regime, is also assessed as a contributing element to supporting the ecology of that catchment. The flow of a river is a key determinant of riverine habitat conditions, and the natural flow regime can be used as a reference point to evaluate the hydrological and ecological effects arising from

[83] Defra and Environment Agency (2016*) Part 1: South West River Basin District – River Basin Management Plan*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718339/South_West_RBD_Part_1_river_basin_management_plan.pdf

[84] Ibid.

them. Hence, flow targets have been defined on UK rivers to control the adverse effects of flow modifications on riverine habitats arising from human activities[85]. It is important to note that different flow targets are set depending on the sensitivity and designations of the water environment, e.g. a SSSI would use different flow targets than those identified as Heavily Modified Water Bodies.

C.2.42 Groundwater is crucial in supplying drinking water as well as supporting ecosystems such as Groundwater Dependent Terrestrial Ecosystems (GWDTE), which are wetlands that depend on the flows or chemistries of groundwater. Groundwater can be over-exploited due to the expansion in public water supply and historic industrialisation. Abstraction pressures can negatively affect groundwater bodies, for example, by inducing saline intrusions from deep groundwater or from the sea, consequently leading to the movement of poorer quality groundwater. The groundwater quantitative status in the SWW region is largely of good status, with a minor area of poor status in Devon[86]. Groundwater levels often vary throughout the year, with peaks in spring following recharge through the winter, and often decline through the summer and early autumn[87].

C.2.43 Table C.6: WFD Ecological and chemical 2019 classification for surface water bodies in the SWW region and Table C.7: WFD quantitative and chemical 2019 classification for groundwater water bodies in the SWW region summarise the current status of surface and groundwater water bodies in the SWW region within the South West and South East RBDs. It is noted that the River Basin Management Plans (RBMPs) for these RBDs also provide the current status and objectives of the entire river catchments within their respective regions – however, the tables below reflect the WFD status specifically for areas within those regions that intersect with areas that SWW operate in.

Table C.6: WFD Ecological and chemical 2019 classification for surface water bodies in the SWW region

River basin district	Ecological status or potential					Chemical Status	
	Bad	Poor	Moderate	Good	High	Fail	Good
South West RBD	3	66	285	122	0	476	0
South East RBD	0	1	17	7	0	25	0

[85] Natural England (2011). *An evidence base for setting flow targets to protect river habitat*. [Online]. Available at: http://publications.naturalengland.org.uk/publication/9025

[86] Environment Agency (2019). *2021 River Basin Management Plan: Water levels and flows challenge*. [Online]. Available at: https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/water-levels-and-flow-challenge-rbmp-2021-1.pdf

[87] UK Centre for Ecology & Hydrology (2022). Hydrological Summary for the United Kingdom – May 2022.

Table C.7: WFD quantitative and chemical 2019 classification for groundwater water bodies in the SWW region

River basin district	Quantitative status		Chemical status	
	Poor	Good	Poor	Good
South West RBD	2	29	23	8
South East RBD	0	5	1	4

C.2.87 The RBMPs for the South West and South East RBDs highlight significant management issues which prevent the sustainable management of water within the entirety of each river basin, as presented in Table C.8: Water management issues. For the South West RBD, pollution from rural areas affect the highest proportions of waterbodies, followed by pollution from wastewater and physical modifications. For the South East RBD, physical modifications and pollution from wastewater affect the highest proportions of water bodies, followed by pollution from rural areas.

Table C.8: Water management issues

Water Management Issue	Percentage of water bodies affected	
	South West RBD	South East RBD
Physical modifications	22%	43%
Pollution from wastewater	33%	40%
Pollution from towns, cities and transport	4%	9%
Changes to the natural flow and level of water	3%	7%
Negative effects of invasive non-native species	1%	2%
Pollution from rural areas	44%	30%
Pollution from abandoned mines	5%	-

C.2.113 Risks to groundwater and surface water quality are typically brought about by polluting activities, for example the flooding of abandoned mines or the build-up of nitrates from fertilisers in rural areas. Changes in rainfall patterns and population growth can increase the pressure on public sewer networks, resulting in more leakages from sewage networks and negatively affecting the quality of both groundwater and bathing waters. Physical modifications to water bodies would

affect natural flow levels, cause excess sediments to build up as a result of lower flows and result in the loss of habitats or functionality for recreational purposes, significantly affecting surface water quality. Changes in rainfall patterns, demand and consumption from agriculture and public supply can also reduce the dilution ability in waterbodies and exacerbate water quality issues. In both the South West and South East river basins, agriculture, rural land management and the water industry are sectors that significantly contribute to water management issues.

C.2.114 SWW operates over 640 sewage treatment works and maintains 15,570km of public sewers, processing a daily average of 585 megalitres of sewage. Around 21% of the yearly average of 8500 blockages in these sewers are caused by the flushing of inappropriate materials such as baby wipes, hygiene wipes, and sanitary products[88].

C.2.115 It is worth noting that there are Drinking Water Protected Areas within the WFD (DrWPA), which determines where raw water needs to be protected to ensure it is not polluted so as not to need additional purification treatment prior to entering the public water supply for drinking. Raw water sources that are 'at risk' of deterioration are identified, and actions within these zones are planned to address pollution and avoid extra treatment of raw water.

C.2.116 There are 169 bathing water sites in the SWW area, including the sites along Bournemouth[89]. 81% of these sites have been classified as Excellent in the 2021 data; 17% have been classified as Good and only 2% have been classified as sufficient, while one site (Watcombe) has been closed due to coastal erosion. As described above pollution from wastewater poses a significant risk to bathing water quality.

C.2.117 Flood risk across the SWW region is diverse and can occur from a wide range of sources including rivers and the sea, groundwater, reservoirs and surface water. Notable areas for flood risk from rivers, sea and surface water include areas around the Rivers Exe and Axe, and in Bournemouth around the River Avon area[90]. Climate change, as covered in **Section 5.3**, is projected to result in more extreme weather events which, alongside projected increases in sea level, is likely to have an effect on the future flood risk of the region. This is especially pertinent to the SWW region as the South West RBD contains 105 of England's Rapid Response Catchments for flood flows[91], showing the region's vulnerability to high flows. Surface water flood risk and peak flows are likely to increase due to climate change leading to higher extreme rainfall intensities, along with population increase and expansion of hardstanding areas (e.g. towns). The draft second cycle of the South West Flood Risk Management Plan[91] identified Exeter and Plymouth as two nationally significant flood risk areas.

C.3 Soils

C.3.1 The South West of England has been quarried for slate, granite and limestone, and the extractive industry has worked on sands and gravels and produced large quantities of china clay (kaolin). Cornwall and Dartmoor have had historical significance in metalliferous mining activities, and from prehistoric times up to the twentieth century they have been important sources of tin, copper and arsenic. Mineral resources today are currently being actively extracted from the South West region, including key resources such as aggregates, building

[88] South West Water (n.d.) *Advice and services – Your Wastewater*. Available at: https://www.southwestwater.co.uk/advice-and-services/your-wastewater/

[89] Defra and Environment Agency (2021) *Bathing waters data*. Available at: https://environment.data.gov.uk/bwq/profiles/data.html?bw=ukk4305-25400,ukk4301-21700&appointedSewerageUndertaker=South%20West%20Water%20Limited

[90] Environment Agency (2019) *Check your long-term flood risk*. Available at: https://check-long-term-flood-risk.service.gov.uk/map

[91] Environment Agency (2021). *The South West River Basin District Draft Flood Risk Management Plan 2021 to 2027 (Draft)*. Available at: https://consult.environment-agency.gov.uk/fcrm/draft-second-cycle-flood-risk-management-plans/supporting_documents/South_West_FRMP_20212027%201WM.pdf

stone, metals, and china clay. Counties within the SWW region have mineral plans and allocations that help safeguard their mineral resources.

C.3.2 However, the prolific history of mineral extraction as mentioned above has led to legacy water quality issues as a result of these industrial activities. The rocks do not contain sufficient water in most of the region to act as a source for drinking water, although some areas can be abstracted for small domestic supplies.[92]

C.3.3 The bedrock geology in the South West can be broadly split into two types: sedimentary bedrock and basement rocks. The sedimentary bedrock can be found in the east of the region and was formed from around 25 to 300 million years ago. This bedrock consists of a number of groups including the Chalk Group in the Cretaceous sedimentary rocks, Jurassic sedimentary rocks, and Permo-Triassic sedimentary rocks including the Mercia Mudstone Group. These groups were deposited in shallow seas, deserts and river systems when Britain was located closer to the equator. The basement rocks were deposited mainly in deep to shallow seas from 315 to 410 million years ago and have been metamorphosed. These range from Early Carboniferous to Early Palaozoic rocks, with some sandstones, conglomerates and mudstones in the Devonian rocks, and igneous intrusions.

C.3.4 Recent surface deposits are rare within the region, and often comprise sands and gravels developed along the larger river systems. Blankets of peat that reach a few metres thick can be found in the wetter, higher parts of the region where drainage is poor. SWW are engaged in ongoing planning and delivery of augmentation schemes downstream of reservoir assets in conjunction with the Environment Agency and local delivery partners such as Westcountry Rivers Trust to improve geomorphological and ecological quality.

C.3.5 The South West has significant areas of peatland in the moors of Bodmin, Dartmoor and Exmoor. As seen in Table C.3: Priority habitats in the SWW region, blanket bogs constitute approximately 1.5% of SWW's priority habitats with a total of 16,791 ha. 45% of SWW's daily water supply originates from rain on Dartmoor's uplands where notable peat bogs are present[93]. These peat bogs help prevent flooding along with storing and releasing clean water into rivers and reservoirs. However, extensive damage due to human activity (e.g. drainage, cutting and erosion) results in detrimental effects on the quality and distribution of moorland ecology. SWW is currently leading peatland recovery projects within the South West through the South West Peatland Partnership, aiming to restore more than 1,600 ha of peatland[94].

C.3.6 Parts of the SWW area are within the South East region of England. The younger sedimentary bedrock geology is composed of hard rocks which were deposited as layers of sediments in shallow seas, deserts and rivers from a few hundred to tens of millions of years ago. These sedimentary rocks include the Solent Group as part of the Palaeogene sediments that dominate the Bournemouth area, the Chalk Group (Late Cretaceous), Portland Group (Jurassic sedimentary rocks), and the Mercia Mudstone Group (Permo-Triassic sedimentary rocks). The Chalk is a major aquifer in the area and is a significant source for drinking water. Older sedimentary and basement rocks originate from the Palaeozoic to the Precambrian eras.

C.3.7 The Dorset and East Devon Coast (also known as the 'Jurassic Coast') UNESCO World Heritage Sites is located within the SWW region, which has been designated for having outstanding universal value and of global importance by UNESCO. The Jurassic Coast comprises of comprises of eight sections along 155km of largely undeveloped coastline, and

[92] British Geological Survey (2020) *Regional geological summaries – South-west England*. Available at: https://www.bgs.ac.uk/download/regional-geological-summaries-south-west-england/

[93] Dartmoor National Park Authority (2017*) The South West Peatland Project*. Available at: https://www.dartmoor.gov.uk/wildlife-and-heritage/our-conservation-work/the-south-west-peatland-project

[94] Defra (n.d.) *South West Peatland Partnership*. Available at: https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/file_attach/South%20West%20Peatland%20Partnership.pdf

has been inscribed for its geology, geomorphology and fossil interest, with notable contribution to earth science investigations for over 300 years.[95]

C.3.8 The English Riviera UNESCO Global Geopark is situated in South Devon, and covers the entire area of Torbay. This is an area of international geological significance, due to its 350-400 million year old Marine Devonian limestones of great historical importance.[96]

C.3.9 The SWW region has a strong agricultural presence particularly in the South West. Agricultural land is classified on a scale of 1 to 5 where 1 is the highest quality and 5 is the lowest. The agricultural land classification of the SWW region is predominately of Grade 3 and Grade 4, each measuring 573,902 ha and 271,566 ha in the SWW region respectively, with pockets of urban and non-agricultural land as shown in **Figure D2** in **Appendix D**. There are some areas of Grade 1, particularly within East Devon on the outskirts of Exeter. There is prevalent Grade 5 presence in the upland moors, particularly Dartmoor and Bodmin Moor in Devon and Cornwall respectively, and in the eastern part of the Bournemouth area.

C.3.10 The Northern part of the SWW area is dominated by two main soil types – freely draining, slightly acidic loamy soils; and slowly permeable, seasonally wet acidic loamy and clayey soils.[97] The freely draining, acidic loamy soils are of a low fertility, made up of mainly arable and grassland landcover, with deciduous woodlands and areas of bracken and gorse habitats. Loamy and clayey soils are also of a low fertility, covered by seasonally wet pastures and woodlands. The drainage here is impeded, with potential for fairly wet ground conditions in winter. The South-western edge of the SWW area is mainly made up of freely draining acidic loamy soils over rock. Habitats within this area consist of steep upland pastures, dry heath and moor, bracken gorse and oak woodlands. The Southern edge of the SWW area is made up of a mixture of freely draining acidic loamy soils and freely draining acidic loamy soils over rock. Further east in the area, there are multiple areas of loamy and clayey soils with impeded drainage, covering a range of pasture and woodland type habitat. Finally, in the central part of the area, there are areas of acid loamy upland soils with a wet peaty surface, and also areas of blanket bog peat soils. Both of these areas are of very low fertility, with surface wetness across the area, and made up of grass and heather moor habitats, with flush and bog communities in the wetter parts. There are various other soil designations across the SWW area, however the majority of the area is dominated by the designations mentioned.

C.3.11 Currently, there are 94 authorised landfill sites and 1,040 historic landfill sites across the SWW region.

C.4 Air

C.4.1 Air quality in the SWW region is varied and there are certain areas with higher concentrations of air pollutants, likely to be associated with transport or business activities. Air Quality Management Areas (AQMAs) are declared where the national air quality objectives are not being met[98].

C.4.2 There are nine local authorities within the SWW region that contain at least one AQMA and are predominately designated for Nitrogen dioxide (NO_2), with one AQMA (Crediton AQMA) designated for both NO_2 and Particulate Matter (PM_{10}). In total there are 27 AQMAs designated within the SWW region as shown in **Figure D3** in **Appendix D**.

[95] UNESCO (2022) *Dorset and East Devon Coast*. Available at: https://whc.unesco.org/en/list/1029

[96] UNESCO (2021) *English Riviera UNESCO Global Geopark*. Available at: https://en.unesco.org/global-geoparks/english-riviera

[97] Cranfield Soil and Agrifood Institute (n.d.) *Soilscapes.* Available at: http://www.landis.org.uk/soilscapes/index.cfm

[98] Defra (n.d.) *List of Local Authorities with AQMAs*. Available at: https://uk-air.defra.gov.uk/aqma/list

C.5 Climatic Factors

C.5.1 Current observations indicate that UK temperatures are continuing to rise. The year 2020 was the third warmest year on record for the UK, with the annual mean temperature around 0.5-1.0°C above average across most of the UK[99]. In the summer, the UK saw its third hottest day on record in July with a temperature of 37.8°C and a more sustained heat wave across the South of England in August, with temperatures reaching 34°C on six consecutive days. The year 2020 was the fifth warmest winter for the UK in the series from 1884. Annual precipitation has increased across the UK in the last few decades with 2020 seeing 116% of the 1981-2010 average and was the wettest year since 2000. Winter in 2020 was the fifth wettest in a series from 1863 and precipitation was 144% of the 1981-2010 long-term average, while summer saw a rainfall total of 135% of the 1981-2010 average.

C.5.2 The Met Office UK Climate Projections (UKCP) were updated for the first time since 2009 in December 2018 (UKCP18)[100]. The UKCP18 are largely the same as the previous projections where all areas of the UK are projected to be warmer, particularly during summer months. Rainfall is projected to vary seasonally and at a regional scale, however the UK is projected to have wetter winters and drier summers. The projected changes in temperature and precipitation for the South West of England by the 2050s (2040-2069), under the RCP8.5 (high emissions scenario) are detailed in Table C.9: Future climate projects by the 2050s under the RCP8.5 scenario. The 1981-2010 baseline period and the central estimate, representing 'as likely as not' probability of change (50th percentile), was used for the following projections.

Table C.9: Future climate projects by the 2050s under the RCP8.5 scenario

Climatic Factor	Climate Projections
Temperature	Annual mean temperatures are projected to increase by 1.8°C. Summer temperatures are projected to see the largest increase by 2.4°C and winter temperatures by 1.6°C. Mean maximum summer temperatures are projected to increase by 2.8°C.
Precipitation	Annual mean precipitation is projected to decrease by 0.06%. Seasonal variability is projected with a 25.1% decrease in precipitation during summer months and an increase of 11.6% during winter months.

Source: Met Office UKCP18 using the central probability estimate for a RCP8.5 scenario

C.5.3 Based on the local authorities which fall within the SWW region[101], the total (CO_2) emissions for 2019 across all sectors is estimated at 19,551 kilotonnes ($ktCO_2$) (not including land use, land-use change, and forestry (LULUCF))[102]. The transport sector contributed the highest proportion of emissions to the total in 2019 at 42% followed by the domestic and industrial sectors at 29% and 17% respectively. The LULUCF sector is estimated to be responsible for the removal of 879 $ktCO_2$, equating to a 4% reduction in the total CO_2 emissions.

C.5.4 There is a declining trend in the total CO_2 emissions based on the local authorities within the SWW region within the last decade. In 2009, these local authorities emitted a total of 26,814 $ktCO_2$ across all sectors excluding LULUCF, marking a 27% reduction in $ktCO_2$ from the 2009 figures in 2019. However, transport emissions remain at a similar level to 2009 emissions, with 8182 $ktCO_2$ released in 2019 and 8189 $ktCO_2$ in 2009.

[99] RMetS (2021) *State of the UK Climate 2020*. Available at: https://rmets.onlinelibrary.wiley.com/doi/epdf/10.1002/joc.7285

[100] Met Office (2018) *UK Climate Projections (UKCP)*. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

[101] CO_2 emissions data covers the entirety of each local authority; however, it is acknowledged that not all of the relevant local authorities are located entirely within the SWW region boundary. Therefore, at this stage of the SEA process the $ktCO_2$ values indicated in the baseline are to be taken as an approximation.

[102] BEIS (2021) *UK Local Authority Carbon Dioxide Emissions National Statistics: 2005 to 2019*. Available at: https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019

C.5.5 Additionally, water companies in the UK have set a sector-wide aim of delivering a net zero water supply to the public by 2030. At present, the sector's primary sources of operational greenhouse gas emissions are CO_2 from grid electricity, methane (CH_4) and nitrous oxides (N_2O) emissions from wastewater and sludge treatment processes, with the Total Grid emissions (i.e. from the operation of water and wastewater treatments) of greenhouse gases totalling 1.96 $MtCO_2e$ in the period of 2018-2019[103]. SWW has a goal to achieve net zero carbon by 2030 for its operational emissions, and by 2045 for all other carbon emissions.

C.6 Population and Human Health

C.6.1 According to 2011 census data, approximately 3.1 million people in Devon and Cornwall and parts of Somerset and Dorset live within the SWW region. Of that figure, approximately 2.1 million people had their water supplied by SWW in 2017/18[104]. It is projected that by 2044/2045 this population supplied by SWW is forecast to increase to 2.4 million.

C.6.2 Using data derived from NOMIS and the Office of National Statistics, West outlines the population of the South West aged between 16 – 64 and the level of employment. However, it is important to recognise that data provided by NOMIS includes records outside of the SWW catchment and therefore this is used for indicative purposes only.

Table C.10: Population age and economic activity in the South West

	South West (population)	South West (%)	UK (population)	UK (%)
Population aged 16 – 64 (2020)				
All	3,394,600	60	41,845,000	62.4
Males	1,692,100	60.8	20,896,600	63
Females	1,702,500	59.2	20,948,500	61.7
Economic Activity – all people (seasonally adjusted Oct 2021 – Dec 2021)				
Economically Active	2,855,000	81.2	33,860,000	78.8
In Employment	2,773,000	78.8	32,485,000	75.5
Unemployed	82,000	2.9	1,374,000	4.1
Economically Inactive	625,000	18.8	8,764,000	21.2

C.6.3 Based on the information provided above in **Table C.10**: Population age and economic activity in the South West, the South West region of England has a lower percentage of males and females aged 16 – 64 compared to the wider UK. Additionally, the number of economically active people in the South West is higher than across the UK with more people also currently employed. There are 2.2 million households in the South West region of England, of which 1.5 million are owned outright or with a mortgage, and the remaining households are either rented privately or socially.[105]

C.6.4 The Covid-19 pandemic in 2020 had a large effect on population and human health across the UK. Population continued to increase, however this was at the slowest rate since 2001 – largely due the effects of the Covid-19 pandemic. Across the SWW region, population growth was

[103] Water UK (2020) *Net Zero 2030 Routemap*. Available at: https://www.water.org.uk/routemap2030/wp-content/uploads/2020/11/Water-UK-Net-Zero-2030-Routemap.pdf

[104] South West Water and Bournemouth Water (2019). *Final Water Resources Management Plan*. Available at: https://www.southwestwater.co.uk/siteassets/document-repository/environment/sww-bw-wrmp19---finalplan_aug2019.pdf

[105] Office for National Statistics (2011) *Nomis – Official Labour Market Statistics Household Tenure*. Available at: https://www.nomisweb.co.uk/census/2011/KS402EW/view/2013265929?cols=measures

similar to that of the rest of the UK, at between a 0.3%-1.2% increase.[106] The pandemic also had an effect on home working, with 45.1% of people in the South West region moving towards home working, however, data from the Office for National Statistics[107] showed that the South West was a region where respondents were least likely to cite the pandemic as the main reason for homeworking.

C.6.5 SWW offer support to customers who have a low income, are temporarily unemployed or are undergoing an emergency to pay their bills. The WaterCare tariff helps people on a low income and use more water than the average household by capping yearly bills. The WaterCare tariff supports people on a very low income by offering a percentage off of standard meter charges, from 15% up to 85% depending on individual circumstances.

C.6.6 Life expectancy for both men and women in the South West (which includes the SWW catchment) is higher than in England as a whole. The average life expectancy projections (2018 – 2020) for residents in the region is approximately 80.3 years for males (increased from 80.2 years in 2015-2017) and 84.1 years for females (increased from 83.7 in 2015 – 2017)[108].

C.6.7 Using data obtained from the office of national statistics[109], **Table C.11**: Life expectancy and disability-free life expectancy in the South West highlights the disability-free life expectancy (DFLE), life expectancy (LE), expected years with a disability, proportion of life with and without a disability for males and females at birth from 2012 to 2014 in the South West. Based on this data, people in the South West region have a higher DFLE than the England average and have fewer expected years with a disability.

Table C.11: Life expectancy and disability-free life expectancy in the South West

Area	LE (years)	DFLE (years)	Expected years with a disability
Males			
South West	80.2	65	15.2
England	79.5	63.3	16.3
Females			
South West	83.9	64.7	19.6
England	83.2	63.2	20

C.6.8 The IMD (2019) for the Lower Super Output Areas (LSOAs) within the region[110] are ranked from 1 to 10, with 1 being the most deprived and 10 being the least, as shown in **Figure C.1**: Distribution of the Index of Multiple Deprivation below. Around 49% of the LSOAs in the region

[106] Office for National Statistics. *Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2020*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2020

[107] Office for National Statistics. *Coronavirus and homeworking in the UK: April 2020.* Available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/coronavirusandhomeworkingintheuk/april2020

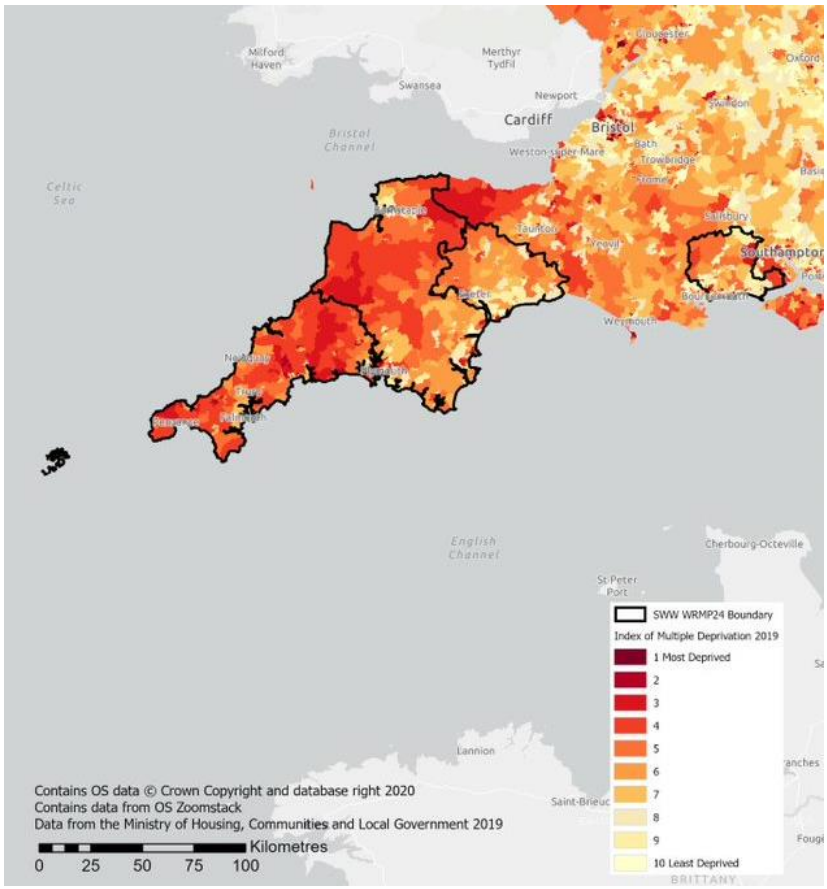
[108] Office for National Statistics (2021) *Life Expectancy for Local Areas of the UK*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/lifeexpectancyforlocalareasoftheuk/between2001to2003and2018to2020

[109] Office for National Statistics (2016) *Disability-Free Life Expectancy (DFLE) and Life Expectancy (LE) at birth by Region, England*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/datasets/disabilityfreelifeexpectancydfleandlifeexpectancyleatbirthbyregionengland

[110] At this stage, IMD data covers the entirety of each local authority; however, it is acknowledged that not all of the relevant local authorities are located entirely within the South West Water region boundary. Therefore, at this stage of the SEA process the percentages indicated are to be taken as an approximation.

have an IMD ranking of 8 or over (i.e. least deprived), 40% have a ranking between 4 and 7 and the remaining 11% are 3 or below (i.e. most deprived)[111].

Figure C.1: Distribution of the Index of Multiple Deprivation



Source: The English Indices of Deprivation 2019 (DCLG, September 2019)

C.6.9 Tourism in the South West has increased during the last decade; in 2012 there were 2.05 million visits by international visitors to the region and in 2019 there were 2.6 million visits[112]. Using 2019 data, the winter and autumn months accounted for approximately 900,000 visits, and the spring and summer months experienced 1.6 million visits. Domestic tourism is similar, with 18.9 million overnight trips to the South West in 2019[113], more than any other region in England. It is expected that the influx of tourists during the summer months are drawn to the coastal areas and amenities of Devon and Cornwall, as well as the lakes and reservoirs owned by SWW and managed by South West Lakes Trust (SWLT), which offer watersports, recreational activities and support wildlife. These include reservoirs such as Roadford, Wimbleball, Tottiford, Longham, Siblyback, and Upper Tamar Lake.

C.6.10 The coastal environment and water quality is also important for surfing and watersports. North Devon has been designated as a 'World Surfing Reserve' by the Save The Waves Coalition, which reflects the quality of its beaches and surf; the local ecosystems and natural beauty of the

[111] Ministry of Housing, Communities & Local Government (2019). *English Indices of Deprivation 2019*. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

[112] Visit Britain (n.d.) *Inbound Nation, Region and County Data*. Available at: https://www.visitbritain.org/nation-region-county-data

[113] Visit Britain (2019) *Great British Tourist Report*. Available at: https://www.visitbritain.org/sites/default/files/vb-corporate/gb_tourist_annual_report_2019_final.pdf

surroundings; and the site's importance to the wider community. Water pollution/sewage and coastal development are noted as potential concerns for coastal watersports in the area.[114]

C.7 Historic Environment

C.7.1 Heritage assets can be classified as 'designated' or 'non-designated' assets. As defined by the NPPF, designated heritage assets include world heritage sites, scheduled monuments, listed buildings, registered parks and gardens, registered battlefields and conservation areas which are designated under the relevant legislation. Non-designated heritage assets are buildings, monuments, sites, places, areas or landscapes identified as having a degree of heritage significance meriting consideration during the planning process but which do not meet the criteria for designated heritage assets. The significance of these heritage assets may be affected by their setting, which is defined in the NPPF as "the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve."[115] Elements of the setting may contribute to the significance of a heritage asset in a positive, negative, or neutral manner, or affect the ability to appreciate that significance.

C.7.2 The SWW region is abundant in heritage assets. The total number of each of the designated assets within the SWW region is presented in **Table C.12**: Historic environment assets in the SWW region.

Table C.12: Historic environment assets in the SWW region

Asset	Description	Number		Date of Historic England dataset used
Listed Buildings	The statutory responsibility for listed buildings control lies with the individual Local Authorities. The Department for Digital, Culture, Media and Sport is responsible for compiling the statutory list of buildings of special architectural or historic interest and each building or structure of interest is classified under one of three Grades; I, II* and II depending on their significance (Grade I assessed as highest significance).	Grade I	887	27 June 2022
		Grade II*	2,333	
		Grade II	39,154	
Registered Parks and Gardens	Historic England maintains a register of historic parks and gardens of special interest in England, these parks and gardens are as equally important as buildings and settlements and form part of an area's cultural heritage. However, unlike listed buildings and conservation areas, historical parks and gardens are not afforded legal protection within the UK. The registration of these historic parks and gardens is a 'material consideration' in the planning process, meaning that planning authorities must	Grade I	12	4 January 2022
		Grade II*	43	
		Grade II	79	

[114] Save The Waves Coalition (2022) *North Devon: United* Kingdom. Available at: https://www.savethewaves.org/North-devon

[115] Ministry of Housing, Communities and Local Government (2021). NPPF – Annex 2: Glossary.

Asset	Description	Number	Date of Historic England dataset used
	consider the effect of any proposed development on the landscapes' special character.		
Scheduled Monuments	Scheduled Monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979. The monuments are scheduled and recorded through Historic England, based on national importance and covering a diverse range of archaeological sites. Scheduled monuments are often in a ruinous or semi-ruinous condition or take on the form of earthworks. More complete structures of national significance are usually protected as listed buildings.	4,682	27 June 2022
Registered Battlefields	Historic England holds a Register of Historic Battlefields. Its purpose is to offer battlefields protection through the planning system, and to promote a better understanding of their significance and public enjoyment.	5	20 August 2021
UNESCO World Heritage Site	The United Nations Educational, Scientific and Cultural Organisation (UNESCO) protect and preserve cultural and/or natural sites considered to be of outstanding universal value. Outstanding universal value is considered to transcend national boundaries and to be of importance for future generations.	2	20 August 2021

C.7.3 The locations of Scheduled Monuments, World Heritage Sites, Registered Parks, Gardens and Battlefields are shown on **Figure D4** in **Appendix D**.

C.7.4 It is likely that most of the Local Authorities in the SWW region will have designated conservation areas to preserve special areas of historical and architectural importance, and hold a Historic Environment Record (HER) which is a database of archaeological sites, listed buildings and other historic buildings, and finds of historic objects. There are hundreds of entries on the HERs from churches and houses to roman coin finds and medieval finds. There is also potential for unidentified heritage assets and archaeological remains to be present within the region.

C.7.5 Non-designated heritage assets are usually catalogued in a variety of sources, with local lists as a key information source. Other potential information sources for identifying non-designated heritage assets include (but are not limited to) areas of archaeological potential which may be found in local plans, conservation area character appraisals, and neighbourhood plans. There are instances where non-designated heritage assets of archaeological interest may be of demonstrable equivalence in significance to scheduled monuments – for example, there are

organic and palaeoenvironmental remains of potential national significance in wetland areas and mires in the moors of Bodmin, Dartmoor and Exmoor[116]. In such cases, the NPPF requires these to be treated as designated heritage assets.

C.7.6 There are water-dependent heritage assets and water sensitive historic environments within the SWW region that are sensitive to changes in water levels and water quality. Water meadows, for example, were areas of grassland irrigated near a river or stream to produce hay crops and rich pasture. These water meadows consisted of engineered channels which allowed a thin sheet of water to flow steadily across the meadows for set periods of time throughout the seasons. Water meadows were used from at least the medieval period and continued to be used in some areas of England until the 18th century. These can be seen in areas of Devon, Dorset and Somerset, and became a particular feature of areas of South-west England such as Exmoor by the early 17th century[117]. Wetland and waterlogged archaeology, such as those that could be found in the expanses of peatland in the South-west, rely on water-saturated ground to deprive the matrix of oxygen and promote excellent preservation of remains[118]. These archaeological remains can therefore be sensitive to changes in water levels and water quality.

C.7.7 Heritage at risk assets are identified as being threatened by issues often related to environmental or human impacts. These assets can consist of buildings, structures, earthworks and buried remains. **Table C.13**: Heritage at risk within SWW catchment highlights the heritage assets at risk in each county within the SWW catchment.

Table C.13: Heritage at risk within SWW catchment

County	No. Heritage at Risk Assets
Cornwall	249
Devon	385
Dorset	43
Hampshire	8
Isles of Scilly	32
Somerset	0
Wiltshire	1

C.7.8 **Figure C.2**: Heritage at risk locations illustrates the location of heritage at risk within the SWW catchment. A large number of these are clustered in rural areas such as Dartmoor National Park and Bodmin Moor. Coastal heritage assets are also under threat from factors such as climate change and coastal erosion. Three of English Heritage's most at-risk coastal castles are located in the SWW supply area (Tintagel Castle, Cornwall; Bayard's Cove Fort, Devon; Garrison Walls, Isles of Scilly), which are identified as being at particularly high risk from flooding and erosion.[119]

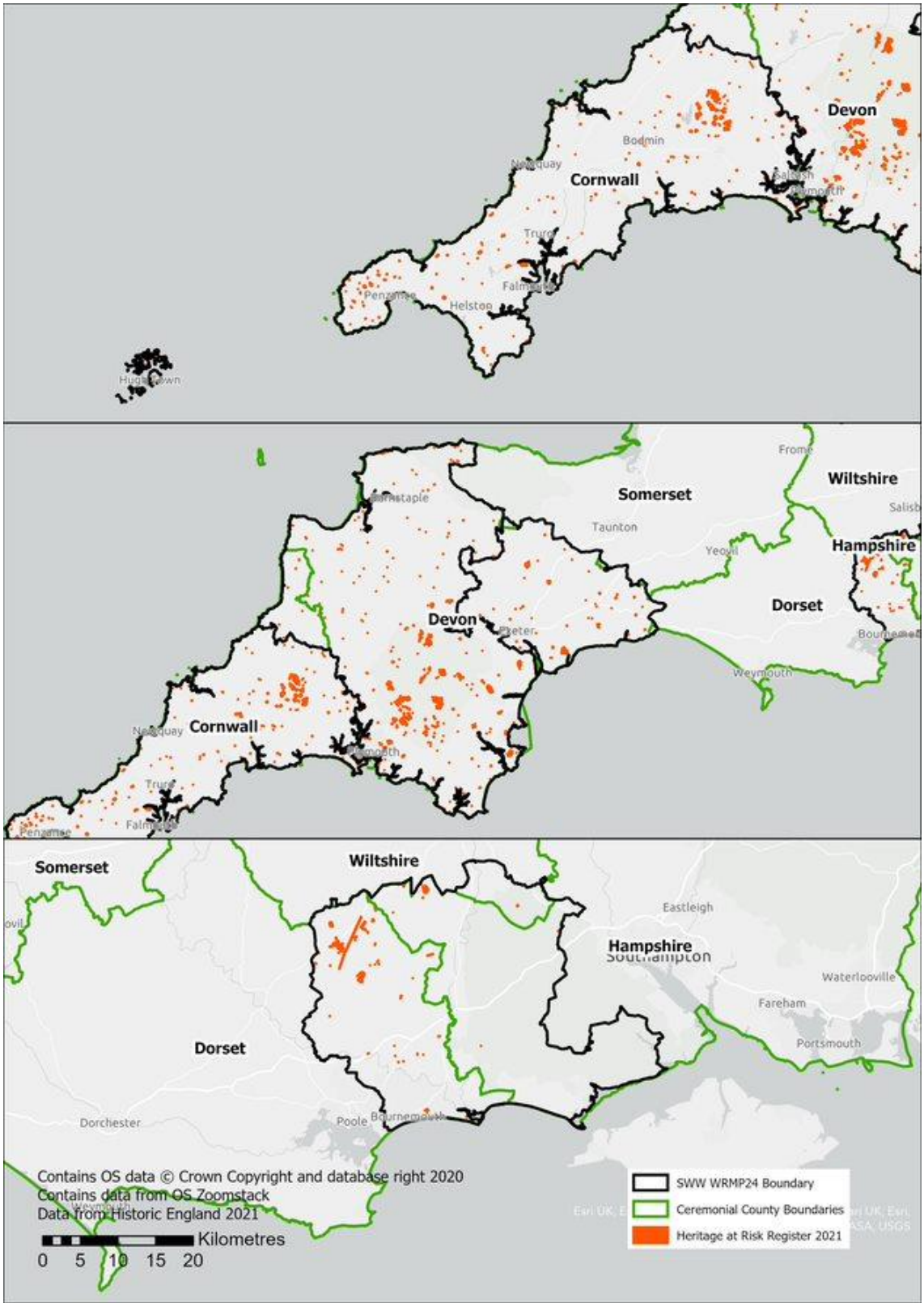
[116] Historic England (2020). *Peatlands and the Historic Environment: An Introduction to their Cultural and Heritage Value*. Available at: https://historicengland.org.uk/images-books/publications/peatlands-and-historic-environment/heag300a-v1-1-peatlands/

[117] Historic England (2018). *Water Meadows: Introductions to Heritage Assets. Historic England, Swindon*. Available at: https://historicengland.org.uk/images-books/publications/iha-water-meadows/heag237-water-meadows/

[118] Historic England (2012). *Strategy for Water and Wetland Heritage.* Available at: https://historicengland.org.uk/content/docs/research/strategy-water-wetland-heritage-pdf/

[119] English Heritage (2022). *Coastal Heritage at Risk.* Available at: https://www.english-heritage.org.uk/about-us/search-news/pr-coastal-appeal-2022/

Figure C.2: Heritage at risk locations



Source: Historic England

C.8 Landscape

C.8.1 The landscape across the SWW region has a diverse and unique character and is known for its open and tranquil nature. Consisting of a mosaic of uninterrupted views, scattered settlements and mixed agriculture, the relatively isolated landscape offers a rich habitat for both flora and fauna with complex geology with a strong contrast of landforms including granite hills, steep chalk ridges, plateaus and a rugged coastline with sandy beaches and coves out into the Atlantic Ocean. There are no known Green Belts situated within the SWW region.

C.8.2 Natural England has divided England into 159 National Character Areas (NCAs), which are defined by their broad-scale landscape character and a unique combination of aspects such as landscape, biodiversity, geodiversity and economic activity[120]. There are 18 NCAs within the SWW region, detailed in **Table C.14**: NCAs in the SWW region.

Table C.14: NCAs in the SWW region

NCA	Description
158 – Isles of Scilly (NE507)	Comprises of over 200 granite islands scattered over 200 km2 within the Atlantic Ocean, situated 45km off the South-west of England. The majority of islands are low outcrops of granite with maritime heathland and grassland.
156 – West Penwith (NE371)	A sparsely populated peninsula, of high cliffs and rocky moorland. The NCA is surrounded on three sides by the Atlantic Ocean and is separated from the mainland (Cornwall) by a low-lying isthmus.
157 – Lizard (NE434)	Forms the Southern-most point of mainland Britain consisting of gently undulating exposed heathland plateau cur by narrow river valleys. The coastline is defined as geologically complex and rugged with long uninterrupted views over the plateau out to sea.
155 – Carnmenellis (NE528)	Consists predominantly of agricultural landscape, with rolling hills divided by regular fields bound by hedges.
152 – Cornish Killas (NE547)	Forms the main body of Cornish landmass situated around the granite outcrops. The Northern section consists of an open character with long views across Cornwall and out to sea whilst the Southern section has a gently rolling scenery with sheltered coves, headlands and estuaries and rocky coastline.
154 – Hensbarrow (NE486)	The NCA has an open and wild landscape with granite hills which are home to the old china clay industry. The landscape consists of biodiverse heath and willow carr, and an idyllic pattern of fields bounded by Cornish hedges and woodlands.
153 – Bodmin Moor (NE415)	Described as a remote, stark, open upland moorland, fringed with deciduous damp wooded valleys and dispersed farmsteads linking larger areas of common land on the higher granite strewn moors.
151 – South Devon (NE338)	The majority of the NCA consists of mixed farming with fields bonded by hedge banks. The landscape is predominantly a plateau, dissected by steep valleys and rivers.
150 – Dartmoor (NE519)	Granite unites characterises the upland moorland with distinctive tors creating key landscape features, overlaid with thick deposits of peat surrounded by heathland and grass moorland. The NCA is home to isolated farms, scattered villages, semi natural broadleaved and coniferous plantations and fast flowing rivers.
149 – The Culm (NE389)	Comprises of a remote and sparse landscape with rolling ridges and plateaux extending. The NCA consists of cliffs and sandy beaches to west outlooking the Atlantic Ocean and open, treeless ridges separated by small valleys.
148 – Devon Redlands (NE425)	Has a strong a unified character with underlying red sandstone with farms and villages scattered throughout . The landscape consists of gently rolling hills, network of hedgerows with flat bottomed and open valleys creating extensive flood plains.

[120] Natural England (2014) *NCAs*. Available at: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making

NCA	Description
147 – Blackdowns (NE566)	Consists of long, dark ridges creating prominent backdrops with far reaching views, deep valleys and dynamic cliffs. The NCA has flat plateaux with large regular fields, lowland heath and scrub. Additionally, there are areas of semi-natural woodland along the steep valley tops.
145 – Exmoor (NE342)	Predominantly a landscape of upland plateaux of Devonian sandstones and slates extending to the Bristol Channel in the North. The Exmoor NCA contains sparse settlements.
146 – Vale of Taunton and Quantock Fringes (NE550)	The Southern section of the NCA is situated within the study area and consists of the Blackdown Hills AONB and is characterised with steep, moorland with open character of clay, contrast with areas of lush pastoral character.
136 – South Purbeck (NE370)	A highly diverse landscape consisting of steep chalk ridges, undulating vales and coastal slopes with seaward dipping limestone plateau and gently rolling chalk.
135 – Dorset Heaths (NE506)	Consists of settlements, within an area of historically dominated by extensive blocks of heathland separated by river valleys and two natural harbours.
131 – New Forest (NE477)	Situated predominantly within the New Forest National Park, the NCA includes an area of urbanised 'waterside' and port related industry. The landscape consists of a plateau reaching 80 – 100 m above sea level with Paleogenic deposits overlain by Quaternary gravels in river terraces.
134 – Dorset Downs and Cranborne Chase (NE494)	A rural and agricultural NCA characterised by large, open fields of pasture and arable land separated by blocks of woodland draped over undulating chalk topography.

C.8.3 Areas of Outstanding Natural Beauty (AONB), are areas recognised for their nationally important landscape protected for their natural beauty by the Countryside and Rights of Way Act 2000 (CROW Act).[121] There are 34 AONBs situated within the UK with ten AONBs located within the SWW region which are detailed in **Table C.15**: AONB in the SWW region and shown in **Figure D5** in **Appendix D**.

Table C.15: AONB in the SWW region

AONB	Description
Blackdown Hills	Blackdown Hills AONB situated in East Devon is recognised for its tranquil and relatively isolated landscape. Situated on the border of Devon and Somerset spanning less than 15 miles in each direction, the Blackdown Hills AONB offers a diverse and unique habitat consisting of steep ridges, high plateaux, river valleys and springs as well as being home to small farms and villages.
Cornwall	Cornwall AONB is made up of 12 separate geological areas, covering approximately one-third of Cornwall approximately 958 sq.km. The Cornwall AONB landscape captures rugged uplands, tranquil estuaries and is home to many other designated sites including World Heritage Sites, Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI), as well as a rich historic heritage including Scheduled Ancient Monuments and ancient Cornish Hedges.
Cranborne Chase & West Wiltshire Downs	Cranborne Chase & West Wiltshire Downs AONB is located predominantly within the South-West region of the UK with a small section situated within the South-East region (Hampshire). The South of the AONB consists diverse countryside ranging from rich, rolling chalk grassland, ancient woodland, chalk escarpments, downland hillsides and rural villages additionally there is an extensive river network with over 220 miles of chalk rivers situated within the Nadder, Wyle and Chalke Valleys. The AONB is also recognised as a Category V Protected Landscape by the Union for the Conservation of Nature (IUCN)

[121] GOV.UK (2018) *Areas of Outstanding Natural Beauty (AONB): Designations and Management.* Available at: https://www.gov.uk/guidance/areas-of-outstanding-natural-beauty-aonbs-designation-and-management

AONB	Description
Dorset	Dorset AONB, known as the Jurassic Coast, is England's only natural World Heritage site stretching 95 miles from Orcombe Point near Exmouth to Old Harry Rocks near Swanage. The Dorset AONB complex geology gives rise to chalk downland, limestone country, greensand ridges and clay vales and beaches providing a strong contrast of landforms in some areas with a gentler transition of character in others enabling the AONB to retain a sense of tranquillity and remoteness.
East Devon	East Devon AONB covers 268 sq.km. including the Heritage Coast and part of the Jurassic Coast. The East Devon AONB offers a unique landscape, full of diverse and rich wildlife which has been shaped by centuries of farming and is characterised by intimate wooded combes, vast areas of heathland, fertile river valleys, undulating hills and cliffs.
North Devon	North Devon AONB landscape ranges from Northam Burrows, the lowest point on dry land to Pebble Ridge reaching 269 m at Berry Down. The North Devon AONB situated along the heritage coast remains heavily undeveloped with sandy beaches, dunes, agriculture and sheltered woodland combes.
North Wessex Downs	North Wessex Downs AONB is known of its remote, diverse and ancient landscape although being almost entirely formed from chalk . The AONB consists of ancient woodland, open downland, chalk streams and grassland. The AONB also consists of large scale open arable farmland and remote villages throughout.
Isles of Scilly	Isles of Scilly AONB covers the whole of the Island and is the UKs smallest AONB. However, possess a diverse landscape consisting of rugged granite cliffs and headlands, sandy bays and coves, saline lagoons and lowland heath, pastures as well as small scattered rural settlements and harbours. The AONB have nationally important habitats such as maritime heathland and grassland, small pockets of woodland, arable fields, hedges and stone walls. Moreover, the island is home to species international importance including Grey Seals and breeding bird colonies.
South Devon	South Devon AONB captures the rugged coastline stretching from Torbay to the outskirts of Plymouth. The AONB consists of pastoral landscape of flowering hedgerows and ancient sunken lanes, carved into by the richly wooded valleys of the Avon and Dart. Encompassing the South Hams Peninsula which is known for its traditional mixed farming country and rural economy, whilst providing a haven of wildlife (birds), reed beds and freshwater lakes. The National Trust has acquired a large portion of the AONB, specifically the cliff top areas whilst the western end lies the Plymouth Sound and Estuaries which are a proposed Special Area of Conservation (SAC).
Tamar Valley	Tamar Valley AONB is a rare valley and water landscape situated along the Devon and Cornwall border. The landscape of the Tamar Valley AONB is defined and shaped by the rivers Tamar, Tavy and Lynher and surrounding historic human development such as mining and market gardening, promoting an area of unspoilt drowned estuary, steep gorges and wooded valleys with a unique wildlife with ancient woodlands and wetlands creating a remote and distinctive landscape.

C.8.4 National Parks offer world-class landscapes that have been designated for the natural beauty, wildlife and cultural heritage. There are 15 National Parks across the UK with each one being designated as a protected landscape.[122] There are three national parks within the SWW region which are detailed in **Table C.16**: National Parks in the SWW region and shown in **Figure D5** in **Appendix D**.

Table C.16: National Parks in the SWW region

National Park	Description
Dartmoor National Park	Dartmoor National Park is known for its wild, open moorlands and deep river valleys rich with wildlife and history. Situated in Southern Devon the National Park covers 954 km^2 and consists of moorland granite uplands, dating from the Carboniferous Period.

[122] National Parks UK (n.d.) *British National Parks*. Available at: https://www.nationalparks.uk/

National Park	Description
Exmoor National Park	Exmoor National Park is an area of hilly open moorland providing a sense of remoteness and tranquillity with coastal views, deep wooded valleys, high sea cliffs and streams.
New Forest National Park	New Forest National Park host a vast array of different landscapes included a steep wooded ridge to the North, a central plateau of sands, gravels and clays that slope gently to an open coastline of the Solent to the South. The National Park consists of areas of semi-natural habitat and pastoral farming with ancient woodland, stream valleys, heathland and grass lawns.

C.8.5 Heritage Coasts are established to conserve stretches of undeveloped coastline across England and are defined via agreement between the relevant maritime and local authorities as well as Natural England. There are 32 heritage coasts identified within the UK of which 18 are located within the SWW region[123].

C.8.6 The SWW region includes the Cornwall and West Devon Mining Landscape Cultural Site 'Cornish Mining' UNESCO World Heritage Site. This is a site of global importance which has been designated for cultural landscape value, which helped shape the landscape and played an important role in developing today's society.[124]

C.8.7 In many cases, there are strong inter-relationships between landscape and the historic environment as exemplified in **Section C.8.6**. Landscapes can provide important settings for some heritage assets, for example, by providing scenic visual backdrops to assets such as listed buildings and scheduled monuments. Some heritage assets are also entire landscapes on their own, such as the Cornwall and West Devon Mining Landscape World Heritage Site and the Dorset and East Devon Jurassic Coast World Heritage Site, and will need to be considered as both heritage and landscape assets. The historic environment is also managed at landscape-scale through the characterisation of historic landscapes, townscapes and seascapes, and these are often inter-related with conservation areas.

C.8.8 There are seven Biosphere Reserves located within the UK which have been designated by UNESCO to manage ecosystems which promote conservation of biodiversity and sustainable ecological use.[125] The North Devon Biosphere is located within the SWW Region and is designated through the "Man and the Biosphere" programme and covers much of North Devon.[126]

C.8.9 The SWW region is situated within areas of high tranquillity, with large expanses of land defined as 'undisturbed areas'. There are few large areas of urban development and major infrastructure, and these are typically situated along the South coast of England including the cities of Plymouth and Exeter and Bournemouth town. Tranquillity has been defined and outlined within The Campaign for Rural England (CPRE) tranquillity map.[127] The map highlights areas that have been recognised for their tranquillity, a natural resource that is identified as an essential quality of the countryside.

C.9 Material Assets

C.9.1 The SWW region has a vast reaching transport network, connecting people, places and services both within the region and beyond to support the regional and national economy.

[123] Natural England (2022). Heritage Coasts (England) – Natural England Open Data Publication. Available at: https://naturalengland-defra.opendata.arcgis.com/datasets/d9557885721d483dac138bdd0ab08c3e_0/explore?location=51.110587%2C-5.546402%2C8.55

[124] Cornish Mining World Heritage (n.d.) *Cornish Mining World Heritage*. Available at: https://www.cornishmining.org.uk/about

[125] UNESCO (n.d.) *Biosphere Reserves*. Available at: https://en.unesco.org/biosphere

[126] Devon County Council (n.d.) *National and UNESCO Designations.* Available at: https://www.devon.gov.uk/environment/landscape/national-and-unesco-designations

[127] CPRE (2015). *Give Peace a Chance*. Available at: https://www.cpre.org.uk/resources/give-peace-a-chance/

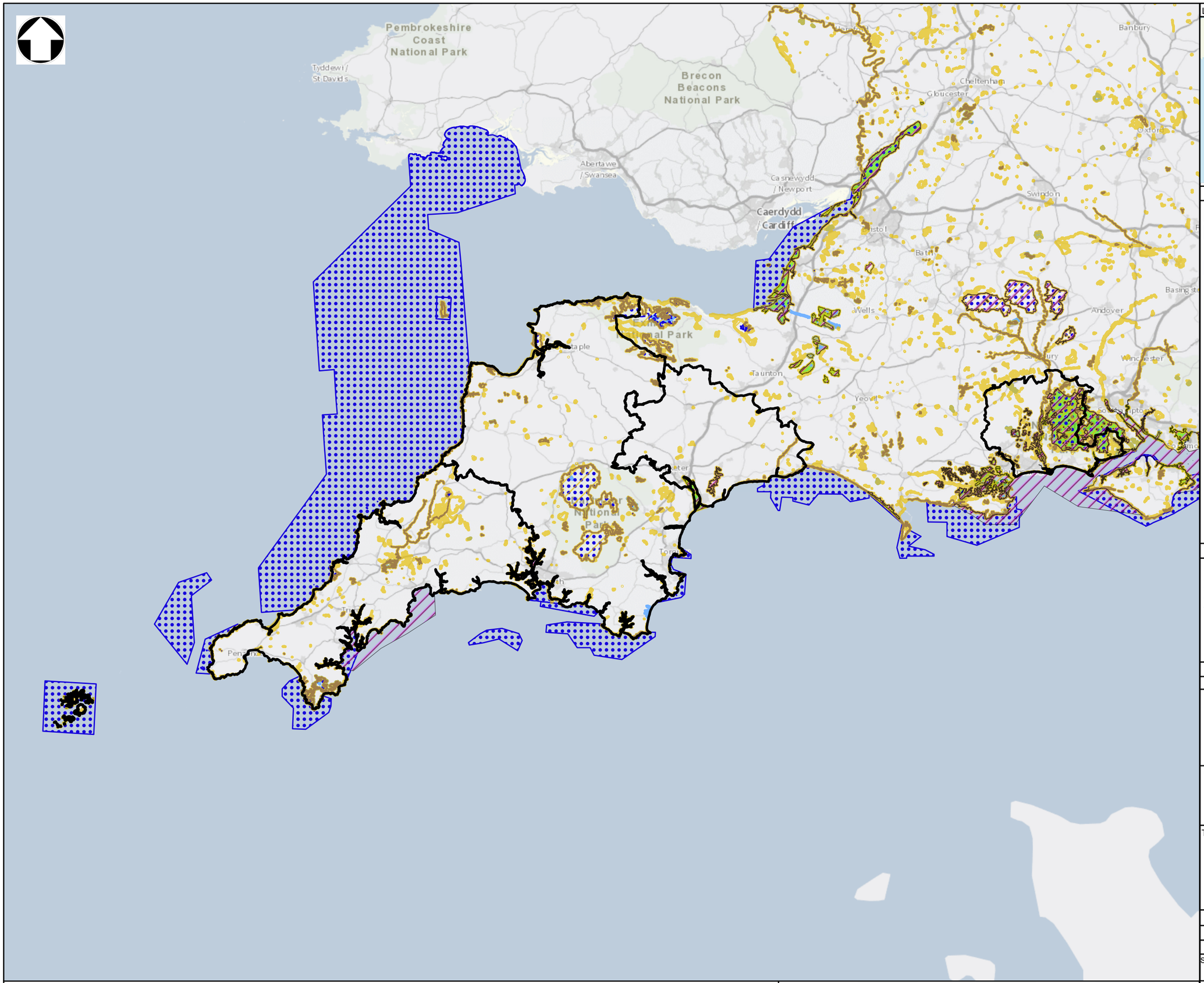
Plymouth port supports extensive defence related maritime activity as well as commercial activities. In 2009, nearly 60,000 vessel movements were recorded within the port limits, of which 75% were defence related[128]. Road transport routes are limited within the SWW region, with the M5 Motorway connecting Northern regions to Exeter, where A-roads such as the A38 lead to Plymouth and the A30 to Cornwall. Areas in the Dorset region of the SWW catchment utilise A-roads to connect to towns in Hampshire and Wiltshire, with the M3 Motorway leading from Southampton to London. There are rail links connecting rural areas in Cornwall to Plymouth and Exeter, where rail travel can then be taken to Bristol and London.

C.9.2 In 2019/2020, the total amount of local authority managed waste in England was 25.6 million tonnes, of which the South West region of England managed 2.6 million tonnes[129]. Due to the Covid-19 pandemic beginning in 2020, the baseline for managed waste in each authority has changed to reflect various government guidance and legislation changes, which included the restriction of movement within the country and more people working from home. Recycling and composting was the most common waste disposal method in the South West region, accounting for 49% of local authority managed waste. Incineration was the second most common waste disposal method, resulting in 34% of managed local authority waste.

[128] Plymouth City Council (2010) *Port of Plymouth Evidence Base Study.* Available at: https://www.plymouth.gov.uk/sites/default/files/PortOfPlymouthStudy.pdf

[129] DEFRA (2021) *Statistics on waste managed by local authorities in England in 2019/20.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/966114/Statistics_on_waste_managed_by_local_authorities_in_England_in_2019v3_accessible.pdf

D. Baseline Maps



Location Map

Key to Symbols

- SWW WRMP24* boundary
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- National Nature Reserves (NNR)
- Ramsar

*Water Resources Management Plan 2024

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Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02/02/23	JF	For information	KM	MR

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Title

SWW WRMP24
Environmental Constraints - Figure D1
International and Nationally Designated Wildlife Sites

Designed	K Mason	KM	Eng. Check	K Mason	KM
Drawn	J Faber	JF	Coordination	A Nadhira	AN
GIS Check	M Law	ML	Approved	M Reid	MR

Scale at A3	Status	Rev	Security
1:1,200,000	INF	P1	STD

Drawing Number 107117-MMD-XX-00-GIS-Y-0001

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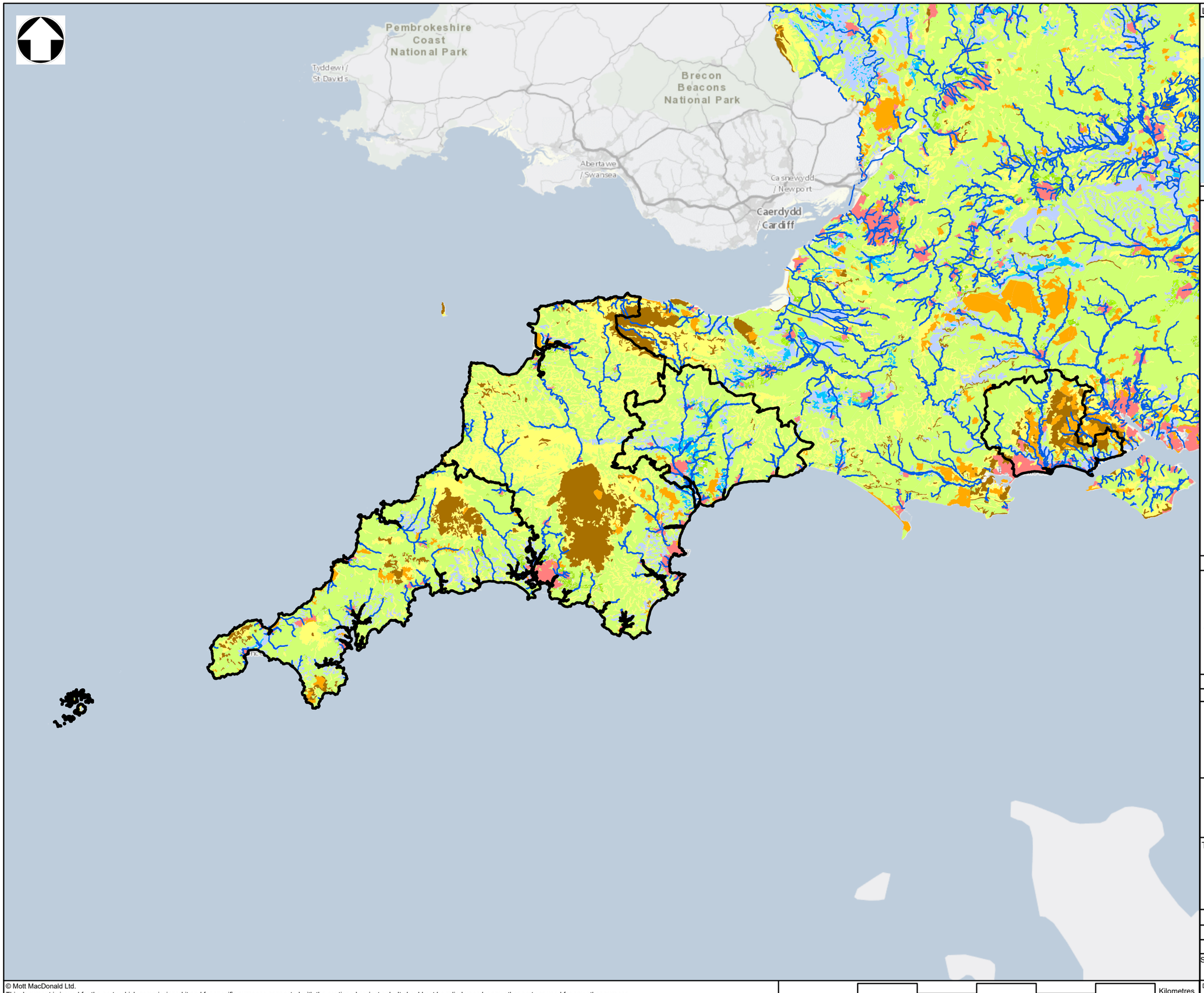

Location Map

Key to Symbols

- SWW WRMP24* boundary
- Main rivers

Provisional Agricultural Land Classification (ALC)

- Grade 1
- Grade 2
- Grade 3
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Non Agricultural
- Urban

*Water Resources Management Plan 2024

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Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02/02/23	JF	For information	KM	MR

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Title

SWW WRMP24
Environmental Constraints - Figure D2
Main Rivers and Agricultural Classification

Designed	K Mason	KM	Eng. Check	K Mason	KM
Drawn	J Faber	JF	Coordination	A Nadhira	AN
GIS Check	M Law	ML	Approved	M Reid	MR

Scale at A3	Status	Rev	Security
1:1,200,000	INF	P1	STD

Drawing Number
107117-MMD-XX-00-GIS-Y-0002

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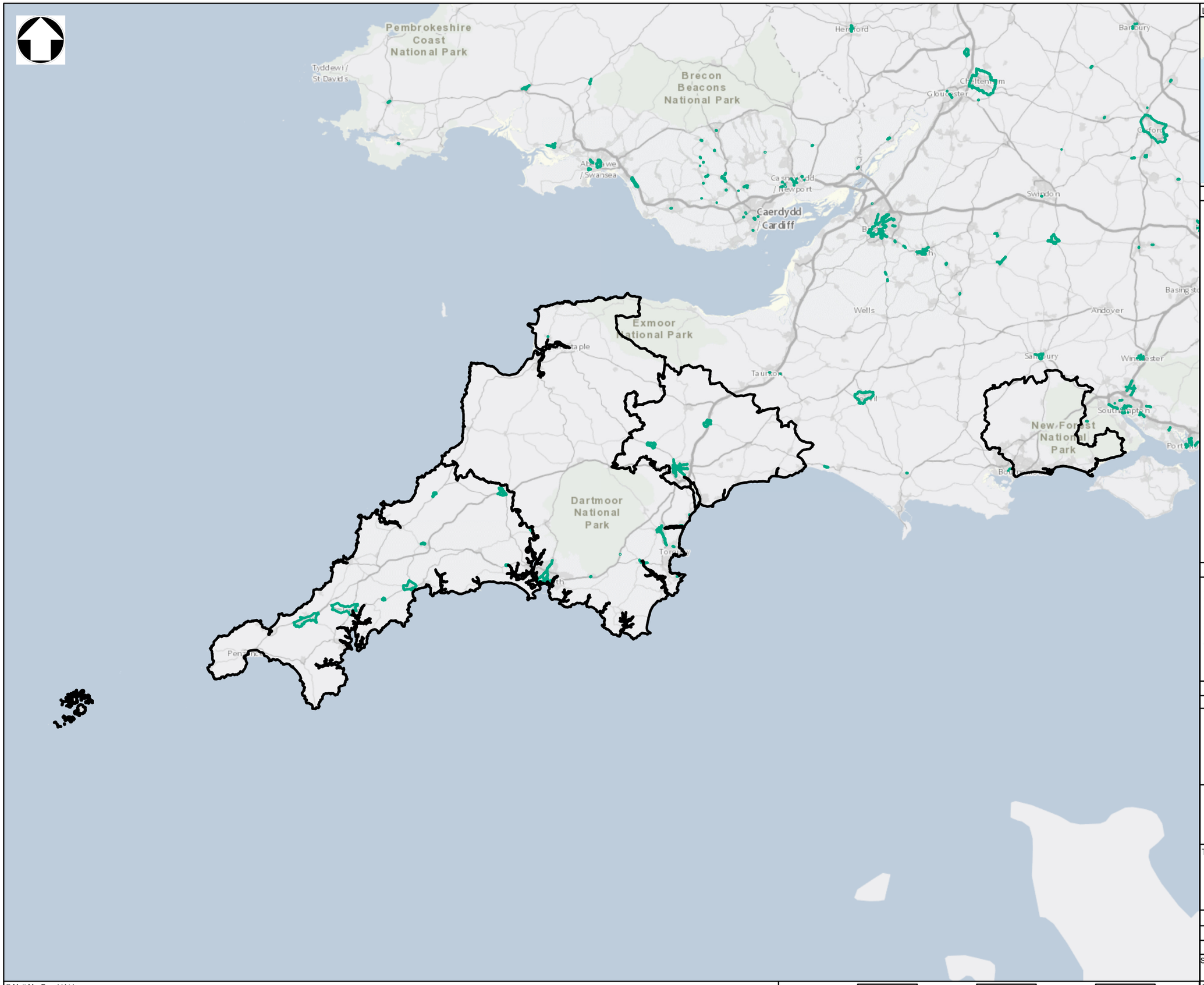

Location Map

Key to Symbols

- SWW WRMP24* boundary
- Air Quality Management Area

*Water Resources Management Plan 2024

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Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02/02/23	JF	For information	KM	MR

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SWW WRMP24
Environmental Constraints - Figure D3
Air Quality Management Areas

Designed	K Mason	KM	Eng. Check	K Mason	KM
Drawn	J Faber	JF	Coordination	A Nadhira	AN
GIS Check	M Law	ML	Approved	M Reid	MR

Scale at A3	Status	Rev	Security
1:1,200,000	INF	P1	STD

Drawing Number
107117-MMD-XX-00-GIS-Y-0003

0 20 40 60 80 100 Kilometres

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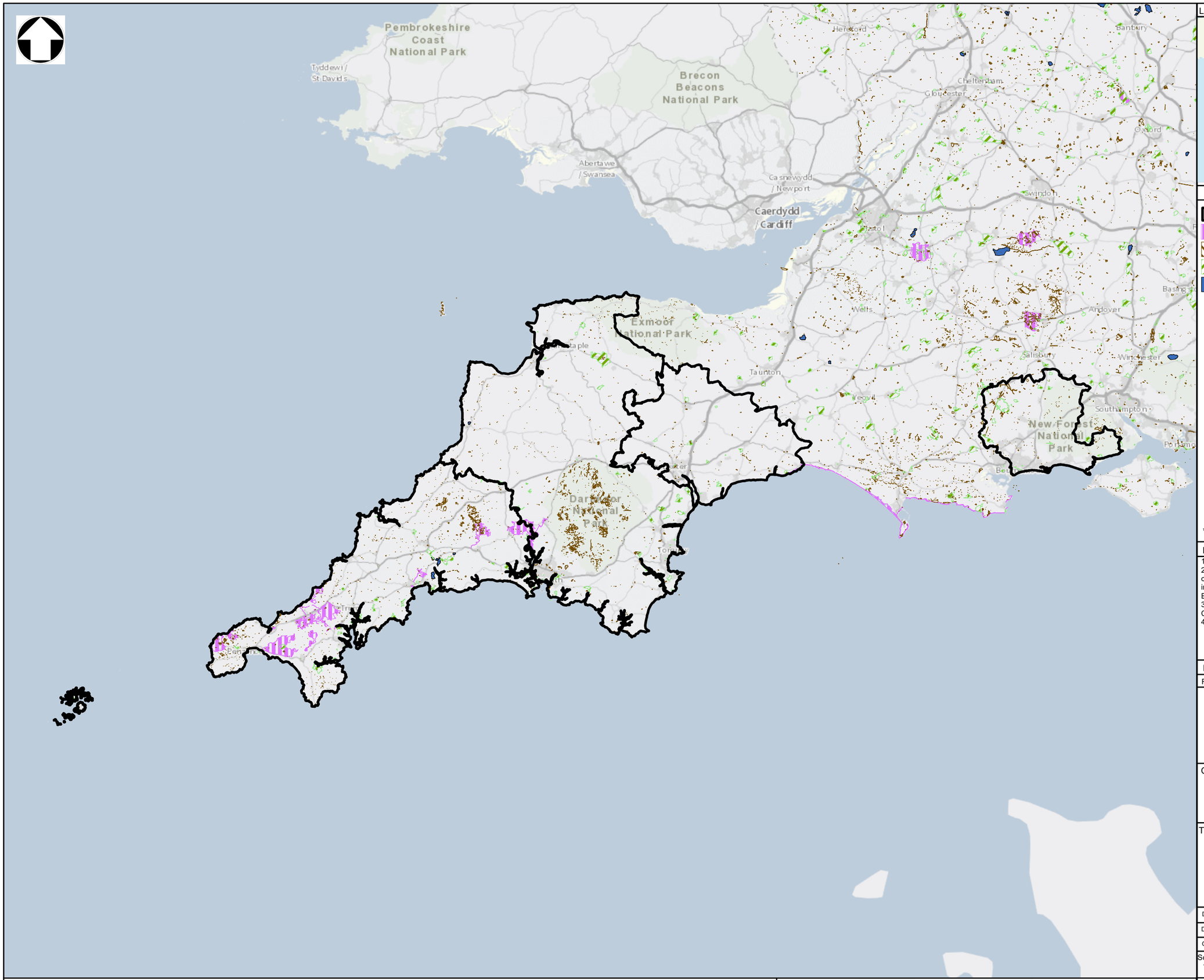

Location Map

Key to Symbols

- SWW WRMP24* boundary
- World Heritage Site
- Scheduled Monument
- Registered Parks and Gardens
- Battlefields

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SWW WRMP24
Environmental Constraints - Figure D4
World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens and Battlefields

Designed	K Mason	KM	Eng. Check	K Mason	KM
Drawn	J Faber	JF	Coordination	A Nadhira	AN
GIS Check	M Law	ML	Approved	M Reid	MR

Scale at A3	Status	Rev	Security
1:1,200,000	INF	P1	STD

Drawing Number
107117-MMD-XX-00-GIS-Y-0004

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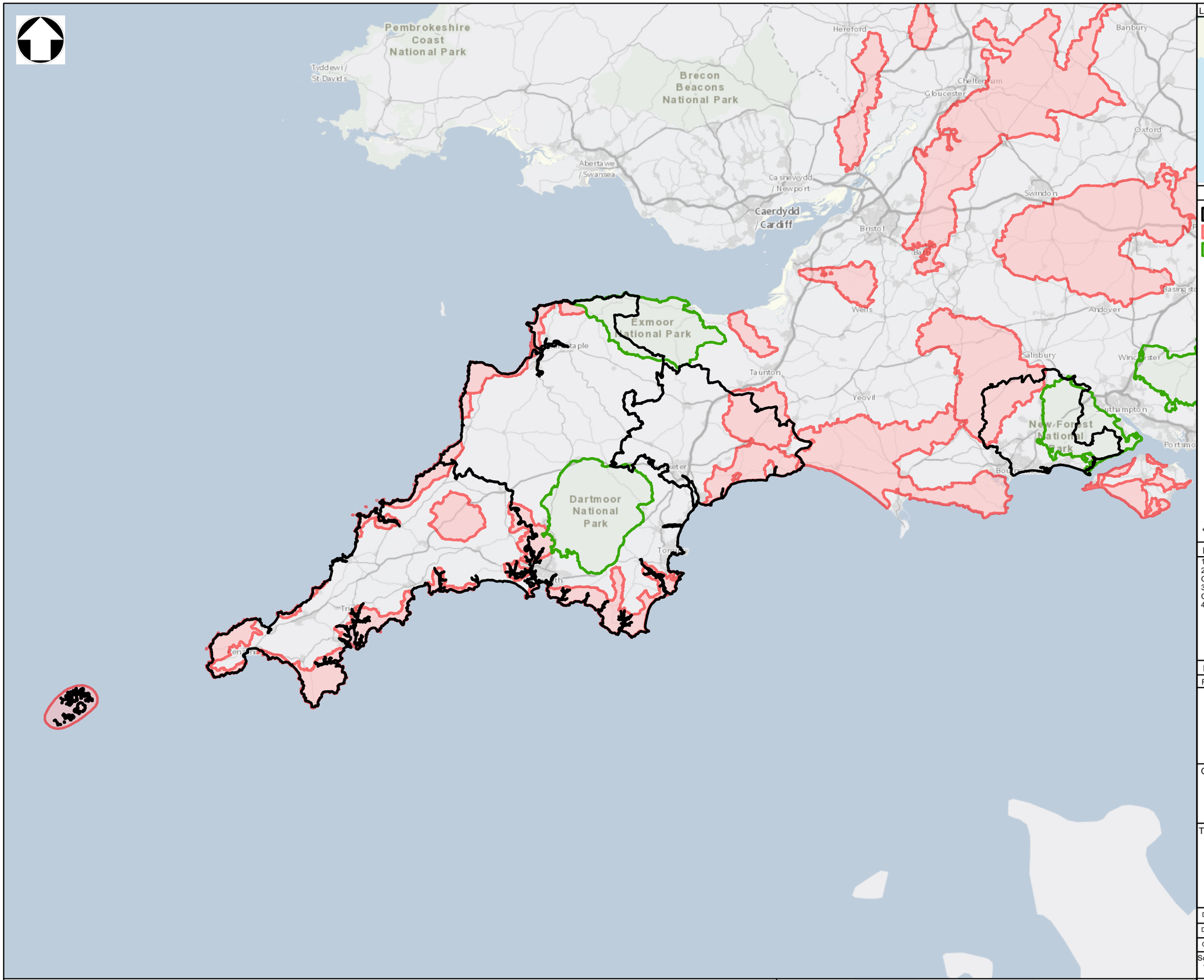

Location Map

Key to Symbols

- SWW WRMP24* boundary
- Areas of Outstanding Natural Beauty (AONB)
- National Parks England

*Water Resources Management Plan 2024

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SWW WRMP24
Environmental Constraints - Figure D5
Areas of Outstanding Natural Beauty and National Parks

Designed	K Mason	KM	Eng. Check	K Mason	KM
Drawn	J Faber	JF	Coordination	A Nadhira	AN
GIS Check	M Law	ML	Approved	M Reid	MR

Scale at A3	Status	Rev	Security
1:1,200,000	INF	P1	STD

Drawing Number
107117-MMD-XX-00-GIS-Y-0005

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E. Assessment Scoring Criteria

Table E.17: Assessment Scoring Criteria

SEA Objective	Datasets/Key Themes	Effect	Description	
Biodiversity, Flora, Fauna: • Protect and enhance designated and non-designated ecological sites • Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity • Reduce the spread or presence of INNS	• SPA • SAC • Ramsar site • SSSIs • MPA • MCZ • NNR • LNR • Priority habitats and species • Non-designated sites • Terrestrial, aquatic and marine habitats, species and protected sites • Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales), Nature Recovery Networks • LWS (where available)	+++	Major Positive	The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.
		-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity. The option would result in a minor increase or spread of INNS.
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity.

SEA Objective	Datasets/Key Themes	Effect	Description	
				The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Water: • Protect and enhance the quality of the water environment and water resources • Increase resilience and reduce flood risk • Deliver reliable and resilient water supplies	• Environment Agency Flood Defences • Environment Agency Main Rivers • Flood Zones 2 and 3 • Surface Water Features • WFD River Waterbody Catchments • WFD River Waterbodies Cycle 2 • Bathing Waters • Shellfish Waters • Source Protection Zones • WFD Groundwater bodies	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvements in water efficiency, reduces demand and improves resilience.
		++	Moderate Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience.
		+	Minor Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvements in water efficiency, reduces demand and improves resilience.
		0	Neutral	The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk, sea level rise and managed coastal realignment.
		-	Minor Negative	The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. The option would result in minor decreases in groundwater quality or levels. The option is located in Flood Zone 2. The option would result in minor decreases in water efficiency, increases demand and reduces resilience. The option is in a location at minor risk of sea level rise and managed coastline realignment.

SEA Objective	Datasets/Key Themes	Effect	Description	
		--	Moderate Negative	The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality or levels. The option is located in Flood Zone 3. The option would result in moderate decreases in water efficiency, increases demand and reduces resilience. The option is in a location at moderate risk of sea level rise and managed coastline realignment.
		---	Major Negative	The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the deterioration of WFD classification. The option would result in major decreases in groundwater quality or levels. The option is located in Flood Zone 2 or 3 and further contributes to flood risk. The option would result in major decreases in water efficiency, increases demand and reduces resilience. The option is in a location at major risk of sea level rise and managed coastline realignment.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Soil: • Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	• Agricultural Land Classification • Landfill sites – authorised and historic • Mineral & Waste allocations (where available)	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures. The option would result in a major enhancement on the quality of designated sites of geological importance.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures. The option would result in a moderate enhancement on the quality of designated sites of geological importance.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land. The option would result in a minor enhancement on the quality of designated sites of geological importance.
		0	Neutral	The option would not result in any effects on soils, sediments, land use or sites of geological importance.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination. The option would result in a minor negative effect on the quality of designated sites of geological importance.

SEA Objective	Datasets/Key Themes	Effect	Description	
		--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation. The option would result in a moderate negative effect on the quality of designated sites of geological importance.
		---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation. The option would result in a major negative effect on the quality of designated sites of geological importance.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Air: • Reduce and minimise air emissions	• Air Quality Management Zones • Air quality monitoring sites	+++	Major Positive	The option would result in a major enhancement of the air quality within one or more AQMAs.
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAs.
		+	Minor Positive	The option would result in an enhancement of the air quality.
		0	Neutral	The option would not result in any effects on Air Quality and AQMAs.
		-	Minor Negative	The option would result in a decrease of the air quality.
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAs.
		---	Major Negative	The option would result in a major decrease in the air quality within one or more AQMAs.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Climatic Factors: • Reduce embodied and operational carbon emissions • Reduce vulnerability to climate change risks and hazards	• Option Carbon data • UKCP18 climate data • Sea level rise projections	+++	Major Positive	The option will generate additional zero carbon energy that can be fed back into the grid. The option will result in a major increase in carbon sequestration.
		++	Moderate Positive	The option will be carbon neutral. The option will increase resilience/decrease vulnerability to climate change effects. The option will reduce operational carbon emissions by between 100 and 1,000 tonnes CO_2e/year. The option will result in a moderate increase in carbon sequestration.
		+	Minor Positive	The option includes renewable energy sources that bring operational carbon to under 100 tonnes CO_2e/year The option will increase resilience/decrease vulnerability to climate change effects.

SEA Objective	Datasets/Key Themes	Effect	Description	
				The option will reduce operational carbon emissions by up to 100 CO_2e/year.
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
		-	Minor Negative	The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate operational carbon emissions of between 100 and 1,000 tonnes CO_2e/year.
		--	Moderate Negative	The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate operational carbon emissions of between 1,000 and 10,000 CO_2e/year. The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative	The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate operational carbon emissions of more than 10,000 tonnes CO_2e/year. The option will result in a major release of previously sequestered carbon.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Historic Environment: • Conserve, protect and enhance the historic environment, including archaeology	• Scheduled Monuments • World Heritage Sites • Listed buildings: • Grade I listed structures • Grade II* listed structures • Grade II listed structures • Registered Parks and Gardens: • Grade I Registered Parks and Gardens	+++	Major Positive	The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as: • Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register; • Improving interpretation and public access to important heritage assets.
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	The option will result in the loss of significance of non-designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. There will be limited damage to known, non-designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		--	Moderate Negative	The option will result in the loss of significance of non-designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.

SEA Objective	Datasets/Key Themes	Effect	Description	
	• Grade II* Registered Parks and Gardens • Grade II Registered Parks and Gardens • Protected Wrecks • Registered Battlefields • Conservation Areas	---	Major Negative	The option will diminish the significance of designated heritage assets and/or their setting such as: • Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register. • Loss of public access to important heritage assets and lack of appropriate interpretation. • There will be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Landscape: • Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• Areas of Outstanding Natural Beauty • National Character Areas • Green Belt land • National Parks • Townscapes, seascapes and historic landscapes	+++	Major Positive	The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives. The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option would have a moderate positive contribution to designated landscape management plan objectives The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative	The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative	The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Population, Human Health: • Maintain and enhance the health and	• Noise action important area • Indices of Multiple Deprivation 2015	+++	Major Positive	The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.

SEA Objective	Datasets/Key Themes	Effect	Description	
wellbeing of the local community, including economic and social wellbeing • Maintain and enhance tourism and recreation	• Functional site: Schools Medical facilities • OS Greenspace dataset: Allotments Bowling green Cemetery Golf course Sports facility Play space Playing field Public park or garden Religious grounds Tennis courts • Natural England - Country Parks • National Parks • Section 15 open access areas • CRoW S4 Conclusive Registered Common Land	++	Moderate Positive	The option leads to positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area
		+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits
		0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	The option has a temporary effect on human health (e.g. noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area
		---	Major Negative	The option has a significant long-term effect on human health (e.g. noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.
Material Assets: • Minimise resource use and waste production • Avoid negative effects on built assets and infrastructure	• Housing allocations (where available) • Transport: • Major roads – A roads • Major roads motorway	+++	Major Positive	The option will re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 100% renewable sources. The option improves national cycle routes or national trails.
		++	Moderate Positive	The option will re-use or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from predominantly renewable sources. The option improves national cycle routes or national trails.
		+	Minor Positive	The option will re-use or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will include a minor contribution from renewable sources.

SEA Objective Datasets/Key Themes	Effect Description			
	• Railway line • National cycle route • National trails			The option improves national cycle routes or national trails.
		0	Neutral	The option would not result in any effects on material assets.
		-	Minor Negative	The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials. The option results in a minor increase in energy consumption with no renewable energy options. The option results in a minor disruption on built assets and infrastructure, including transport.
		--	Moderate Negative	The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. The option results in a moderate increase in energy consumption with no renewable energy options. The option results in a moderate disruption on built assets and infrastructure, including transport links.
		---	Major Negative	The option will require significant new infrastructure that cannot be provided through the re-use or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials. The option results in a major increase in energy consumption with no renewable energy options. The option results in a major distribution on built assets and infrastructure, including transport links.
		?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

F. SEA Scoping Report Consultation Log

MOTT MACDONALD

SWW WRMP24 SEA Scoping Report - Consultation Responses

Project:	South West Water (SWW) Water Resources Management Plan 2024 (WRMP24) Environmental Assessments		
Our reference:	100107117-MMD-TN-SEA-011-B		
Prepared by:	Ardianty Nadhira	**Date:**	08/09/22
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	WRMP24 SEA Scoping Report – Consultation Responses		

1 Consultation Responses

Water companies such as South West Water (SWW) have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. WRMPs should ensure a secure and sustainable supply of water, and focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

The SWW supply area covers Devon, Cornwall, the Isles of Scilly and parts of Dorset, Somerset, Wiltshire and Hampshire, and provides drinking water to a population of 1.7 million. The SWW supply area is split into five Water Resource Zones (WRZs) in total. Three WRZs are operated in conjunction with one another to maximise water availability; these are Colliford, Roadford, and Wimbleball WRZs. Bournemouth WRZ and Isles of Scilly WRZ operate independently.

A Strategic Environmental Assessment (SEA) is required for the SWW WRMP 2024 (WRMP24) under the *Environmental Assessment of Plans and Programmes Regulations 2004* ('SEA Regulations')[1], which require an assessment of the effects of certain plans and programmes on the environment. The SEA also works to inform the decision-making process through the identification and assessment of significant and cumulative effects that a plan or programme may have on the environment. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders.

The SEA Scoping Report marked the first stage of the SEA process for the draft WRMP24. The Scoping Report was submitted for consultation in May 2022 and consultation responses were received in June 2022 from the following bodies:

- Environment Agency (EA): E-mail correspondence dated 16 June 2022 followed by a second round of e-mail correspondence dated 27 June 2022.
- Historic England (HE): E-mail correspondence dated 9 June 2022 (Ref. PL00774643).

[1] *The SEA Regulations were transposed into United Kingdom (UK) law from the European Union Directive 2001/42/EC, more commonly known as the SEA Directive. The SEA Regulations remain UK law following the UK's exit from the EU.*

Table F.1 below summarises the consultation responses received from the EA while **Table F.2** summarises the responses received from HE. Actions taken to respond to the comments have been summarised in these tables and have been applied within the SEA and incorporated in the Environmental Report. This consultation log forms Appendix F of the Environmental Report.

Table F.1: Environment Agency SEA Scoping Report Consultation Response

Section	Consultee Response	SWW Action
Water baseline	The baseline evidence presented for Water (4.2.10) makes no reference to the hydrology supporting element under WFD and the current status and objectives set in the WFD River Basin Management Plan. This is required to cross-reference against the intention in Table 6.2 to assess options against flow targets. If a waterbody is already failing WFD flow targets, we are unable to licence additional water.	Reference to the hydromorphological supporting element under WFD, including the hydrological regime and flow targets, has been added in the baseline environmental review section of the Environmental Report (Appendix C.2.41) to ensure flow targets have been addressed in the SEA.
	Whilst the SEA is low flow focussed, SWW's area covers roughly 20% of England's Rapid Response Catchments for flood flows. The company could consider covering both extremities in its SEA, by at least commenting on high flows.	A comment on this has been added in the baseline section in the Environmental Report (Appendix C.2.117), referring to England's Rapid Response Catchments in the South West, and consideration to high flows and their consequences (e.g. flooding) has been made.
Flow targets	The scoping document would benefit from further information about 'flow targets'. There are different flow targets depending on the sensitivity of the water environment and designations and the assessment of the options presented in WRMP24 needs to consider this. This information could be explained in the baseline section on water. For example, there are different flow targets for the SAC rivers and those which are identified as HMWB under WFD. We would expect the SEA for options to use the appropriate flow targets.	Information on flow targets has now been incorporated in the baseline environmental review section of the Environmental Report (Appendix C.2.41). Flow targets have been considered within the WFD assessments that support the SEA.
	As above, SWW could consider commenting on the catchments where high flow are increasing.	Comment on increase in peak flows, e.g. due to climate change, has been included in the baseline (Appendix C.2.117) and future baseline (Section 5.3) sections of the Environmental Report.
Groundwater	The SEA makes minimal reference to groundwater and the interaction between groundwater and surface waters and groundwater dependent terrestrial ecosystems. This needs to be part of the SEA for the relevant options (as included in Table 6.2) but the scoping document would benefit from additional information about the current baseline for groundwater levels and quality and the future baseline scenario.	Effects to groundwater and groundwater dependent terrestrial ecosystems have been considered in the SEA for the relevant options. Additional information on groundwater quality has been added in the baseline environmental review section of the Environmental Report (Appendix C.2.42) as well as within the future baseline scenario section (Section 5.3).
	Section 4.2.15 does not include the impact of groundwater abstraction on the groundwater system. The company should ensure this is included within its report.	Reference to this has been added in the baseline environmental review section of the Environmental Report (Appendix C.2.42), with potential impacts such as saline intrusions and the mobilisation of poorer quality groundwater included.
	The company has not included groundwater within Table 5.1. It would be beneficial for the company to provide further information why this was not included or update the table to include groundwater.	Issues to groundwater have now been included in the Key Issues and Opportunities section (Chapter 6, Table 6.1) of the Environmental Report.
	Table D3 and D5 do not appear to include the same information as tables D1 and D2 etc. The other tables appear to appear to promote the subject as a possible way of increasing water supply. It would be beneficial for the company to provide further information on why groundwater sources and aquifer recharge are not included as a possible way of increasing water supply.	The full list of options is detailed in the Environmental Report (Chapter 9). This includes groundwater sources and aquifer recharge options.

Section	Consultee Response	SWW Action
		The tables in Appendix D of the Scoping Report included illustrative examples of the types of issues and impacts, prior to completion of the detailed SEA options assessment matrices. The detailed SEA assessments include full detail on benefits of increased water supply.
Future water baseline	Section 4.3.1 regarding the future baseline for water is very generic. SWW have information from the Environmental Destination modelling produced for the regional plan which should be referenced in this section. Climate change predictions for summer flows as presented in the WR regional plan consultation would be useful to include here. Overall, the text is generic and could apply anywhere, it is not specific to the SWW area. In particular, the IoS [Isles of Scilly] have been identified as being at high risk from climate change from sea level rise, which has the potential to impact the boreholes used for public water supply but this is not mentioned.	These future modelling scenarios have now been incorporated in the future baseline section of the Environmental Report (Section 5.3) in the Water future baseline, along with reference to the risk of sea levels rising from climate change.
	As above, it would be beneficial for peak flows to be part of the context.	This has been referred to in the future baseline section (Section 5.3) of the Environmental Report.
WFD prevent deterioration	Table 6.1 regarding the opportunities for water has the following statement. Options which reduce pressures on the water environment should be explored. WFD will be considered during the optioneering process to contribute to the selection of options which could lead to WFD improvements or avoid WFD deterioration. Actions to avoid deterioration are considered statutory (as set out in the PR24 WINEP guidance documentation) and we would not support any actions in WRMP24 which pose a deterioration risk to WFD status. This sentence in the table needs rewording to recognise this.	This has been amended in the Key Issues and Opportunities section (Chapter 6, Table 6.1) to recognise the statutory requirement as set out in the PR24 WINEP guidance documentation and to clarify EA's stance on the matter.
Sea level rise	Table 6.1 regarding the opportunities for climatic factors includes the following statement pasted below. The WRMP24 should: • Increase resilience to climate change, including the resilience of resources, infrastructure and the environment We would expect the SEA to consider the risks to potential new assets from sea level rise and managed realignment along the coast. Appendix E for the Water scoring criteria would benefit from including this in the determination of whether an option is positive or negative. It's not clear from the datasets listed whether this is proposed. Similarly, risks to boreholes near the coast from rising salinity levels needs to be considered.	This has been assessed as part of the SEA. The risks from sea level rise and managed realignment along the coast have been added as items in the Water scoring criteria in Appendix E.
	This section should be updated to include coastal erosion as well as Sea Level Rise. The report could link to the South West Coast Group/ Shoreline Management Plans.	These issues have been included in the Key Issues and Opportunities table in the Environmental Report (Chapter 6, Table 6.1) under the theme of Climatic Factors. The relevant Shoreline Management Plans for the SWW region have been referenced to in the Policy, Plans and Programmes review in the Environmental Report as well as in Appendix B.
	There are many SWW sites that would be affected by sea level rise/coastal erosion. This would impact its network. It would be beneficial for the company to cross-reference this section with the DWMP. Specifically, how it will mitigate the impacts of sea level rise/coastal erosion and how it will	This has been incorporated in the Key Issues and Opportunities section of the Environmental Report (Chapter 6, Table 6.1),

Section	Consultee Response	SWW Action
	adapt to it where policy in the Shoreline Management Plan promotes No Active Intervention or Managed Realignment, where erosion rates will see their assets impacted in the future.	including cross-referencing the DWMP in the section as well as in the Plans, Policies and Programmes review.
DrWPA	The company has not mentioned WFD Drinking Water Protected Areas and those identified as being at risk (and so the focus of SWW-funded catchment management to improve raw water quality). We would expect the SEA to consider if the proposals in WRMP24 had the potential to impact on DrWPA, in particular those already at risk. This needs to be added as a dataset to Appendix E.	DrWPA has been considered in the SEA detailed option assessments and added as a dataset in Appendix E.
Salmon rivers	The data sources used in Appendix E needs to include this. It is not clear if this is part of the 'priority habitats and species' dataset. Any proposals would need to consider impact on passage upstream and downstream plus if any options, which include provision of new barriers to facilitate abstraction, would need to be considered in terms of passability for migratory species under current flows and future flows. This would include the need for unhindered migration of salmon for the Dartmoor SAC.	Reference to salmon rivers has been made in the baseline section of the Environmental Report (Appendix C.1.104) and considered in the SEA detailed option assessments.
Approach to the SEA	Section 7.4 outlines how effects outside the SWW boundary will be managed. It would be useful to have the study area clearly defined upfront in the report, with information about cross boundary effects as well.	Clarification on the study area has been added in the Environmental Report within the Description and Context of the WRMP24 (Section 2.1), noting effects may extend outside the SWW region.
	Chapter 7 of the report outlines a staged approach to the assessment. Section 7.5 outlines how the SEA will influence the SWW WRMP, and sets out key decision points for influence. However, it would be good to understand how the SEA will influence upfront in the development of the options. The SEA influence currently feels a bit back ended which will limit the level of influence possible. The company should ensure that the decision making rationale is clearly outlined in the Environmental Report. The company should also ensure this report explains the difference in environmental effects between the adaptive programmes clearly, as well as why they were discounted.	This additional detail on how the SEA informs the design options is included in the Environmental Report (Section 8.7.1). The assessment criteria also inform designs as they are being developed, ensuring the rationale used for the SEA are considered upfront in the design of the options to maximise environmental benefits and minimise adverse environmental impacts. This provides opportunity for the SEA process to influence the design of the options at their early stages. Three programmes have been assessed in the Environmental Report. Sections 10.1 – 10.4 detail the programme assessments, and Section 10.6 describes the reasons for selecting the preferred plan.
Historic environment baseline	In the report, historic environment is focused predominantly on designated sites and assets. It would be beneficial for the report to include further information on how historic landscape character will be considered.	Historic landscapes have now been included in the landscape baseline section (Appendix C.8.7) as an item to be considered in the SEA detailed option assessments.
Key issues and opportunities	Appendix D in the report presents key issues and opportunities related to water resource supply option types. It would be beneficial to explain more about Appendix D in the text, and how this fits with the SEA framework and those issues/opportunities identified in Table 5.1.	The tables in Appendix D of the Scoping Report included illustrative examples of the types of issues and impacts for different supply option types, these were not a comprehensive assessment of options. These tables are not included in the Environmental Report, as the detailed SEA assessments of the options have now taken place and are available to the regulators.
Plans, policies, and programmes	The report should be updated to include additional PPs: ● Draft cycle 3 River Basin Management Plans ● Cycle 2 Flood Risk Management Plans ● Draft cycle 3 Flood Risk Management Plans. ● Another useful addition to consider is The Clean Growth Strategy (BEIS, 2017)	These additional PPs have been added in the plans, policies and programmes (Table 4.1). It is noted that the first cycle of Flood Risk Management Plans is for the period 2015-2021 and the current draft Cycle 2 of the Flood Risk Management Plans is for the period 2021-2027. No documentation of Draft Cycle 3 of the

Section	Consultee Response	SWW Action
		Flood Risk Management Plans have been published yet (at the time of writing).
SEA Framework	Appropriate SEA assessment objectives and prompt questions are outlined in Chapter 6. Note that in Table 6.2. one of the prompt questions is in relation to minerals sterilisation, however, mineral allocations (active and future) aren't specifically covered in the baseline. The company should ensure there is join up between the SEA prompt questions and baseline. In addition, under soil, with regard to agriculture, the focus is on high grade agricultural land. This could be extended to think about the impact on food production (using the natural capital assessment to help inform).	Mineral allocations have now been referred to in the baseline section for soils (Appendix C.3.1). The question of ALC has been extended to consider the impact on food production in the Key Issues and Opportunities section (Section 6.1).

Table F.2: Historic England SEA Scoping Report Consultation Response

Section	Consultee Response	SWW Action
Chapter 3: Review of Policy, Plans and Programmes – National	We have the following suggestions for updates and additional items that could usefully be mentioned: • National Planning Policy Framework 2021 (instead of 2019); • HEAN 12: Statements of Heritage Significance (2019); • Historic England's website has a new climate change landing page to enable easy access to our ever expanding information and advice about how the historic environment can positively contribute to overall global sustainability as well as the latest research on the impacts of climate change on the historic environment. This could replace the 2008 English Heritage reference. • Historic England's website has useful information and advice on infrastructure and the water environment that may also be relevant, including Heritage The Foundation for Success – Modern Infrastructure and the Historic Environment (2018); Water and Wetland Heritage Strategy (2012); water environment; peatlands; Heritage and the Environment (2020); and Preserving Archaeological Remains (2016), which focusses on waterlogged archaeological sites. The pilot projects for a new management tool for historic watercourses may also be worth a mention, given the pilot project locations. • Historic England's Heritage at Risk programme; and • The Historic Environment Forum and the Strategic Framework for Collaborative Action 2020-2025 as well as the work of the Sustainability and Climate Change Task Group.	The suggested updates and additional items have been incorporated in the Environmental Report as far as possible. The suggested plans and programmes have been added into the Policies, Plans and Programmes Review table in the Environmental Report (Table 4.1) and in Appendix B of the Report as items to consider in the SEA. Other documents have been noted as useful guidance.
Chapter 3: Review of Policy, Plans and Programmes – Regional and Local	We note that the WRMP covers a large area and that the options in the DWMP are still under development. Given this, we would welcome the assurance that relevant plans, policies and programmes at sub-regional/local level will be kept under review (as part of updating baseline conditions) during subsequent SEA stages as the location of options become known. Examples will include: • development plans (e.g. local plans and neighbourhood plans) as well as to relevant supplementary planning documents; • conservation area appraisals/management plans; • heritage strategies; • landscape/seascape/urban characterisation work; • World Heritage Site, National Park and AONB Management Plans; • relevant Historic Environment Records (HERs); and • areas of archaeological potential, local lists and local risk registers.	We have included this assurance in the Environmental Report (Table 4.1) and continued to review the relevant plans, policies and programmes during the SEA process.

Section	Consultee Response	SWW Action
	We welcome the inclusion of protecting landscape character and quality, and cultural heritage assets including archaeology and built heritage, as main themes for the SEA process.	Noted. These themes have been continuously considered within the SEA process for each option.
Chapter 4: Environmental Baseline - Historic Environment	Historic England has considered the baseline information for the historic environment at 4.2.46-50, which generally appears to be comprehensive and up-to-date (although there is no date given for the data presented in Tables 4.11 and 4.12). Listing data can be downloaded from here.	The data is periodically updated on the GIS database to ensure the latest data is used in the assessments. Dates of the latest datasets used in the assessments have now been added in the tables for historic environment baseline (Appendix C.7.2).
	We recommend introducing the concepts of designated and non-designated heritage assets into paragraph 4.2.46, given this is the terminology used in national planning policy for the conservation and enhancement of the historic environment. A brief explanation of settings and how they can contribute to the significance of heritage assets would also be helpful to include.	The descriptions for designated and non-designated heritage assets have been added to the baseline environmental review section of the Environmental Report along with an explanation of the settings and how they can contribute to the significance of the heritage assets (Appendix C.7.1).
	In respect of designated heritage assets, the number and distribution of protected wrecks and conservation areas are not covered but should be borne in mind in later stages of the SEA process when the locations of options in the WRMP are known.	Noted. These items have been considered in the SEA process when assessing the options.
	The same is the case for non-designated heritage assets. While we appreciate mention of the Historic Environment Records, local lists are a key information source. Other potential information sources for identifying non-designated heritage assets include areas of archaeological potential (sometimes found in local plans), conservation area character appraisals, neighbourhood plans, and Intertidal and Coastal Peat Database, for example.	This information has been acknowledged and added in the baseline environmental review section of the Environmental Report (Appendix C.7.5). It should be noted that information on 'local list areas' for non-designated heritage assets for Devon has been included in the SEA, however specific locations for non-designated assets for the remainder of the SWW area were not available at the time of completing the SEA assessments.
	We also suggest including reference to non-designated heritage assets of archaeological interest that are of demonstrable equivalence in significance to scheduled monuments and how the National Planning Policy Framework (NPPF) requires these to be treated as designated heritage assets. For example, there are organic and palaeoenvironmental remains of potential national significance in wetland areas and mires in the moors of Bodmin, Dartmoor and Exmoor.	Reference to non-designated heritage assets of archaeological interest that are of demonstrable equivalence in significance to scheduled monuments and how these will need to be treated as designated heritage assets has been added to the baseline section of the Environmental Report (Appendix C.7.5).
	Given the nature of the WRMP, you might also like to consider including a brief section on water-dependent heritage assets and water sensitive historic environments within the South West Water area with consideration of how some heritage assets, including historic water meadows and archaeological sites and remains, can be particularly sensitive to changes in water levels and water quality. You may also wish to contact the Historic England Science Advisor for the South West, who would be able to discuss some of these issues with you in more detail.	A paragraph on water-dependent heritage assets and water sensitive historic environments has been added to the baseline section of the Environmental Report, with a brief explanation on how these heritage assets can be sensitive to changes in water levels and water quality (Appendix C.7.6).
	We welcome inclusion of Heritage at Risk. You might like to consider if any of these assets are at risk owing to water supply or demand related activities. Local planning authorities in the South West Water area may also have their own risk registers or	Noted. Heritage data of each local planning authority has been considered where available at this stage. Consideration as to whether heritage assets are at risk owing to water supply or

Section	Consultee Response	SWW Action
	know of sites or locations that are sensitive in relation to water issues. The local authority conservation and archaeology advisers would be well placed to comment on this.	demand related activities has been given in conjunction with water-dependent assets where identified in the SEA.
Chapter 4: Environmental Baseline - Landscape	Historic England has considered the landscape baseline information at 4.2.51-4.2.58, bearing in mind the strong inter-relationships between landscape and the historic environment. For example, some heritage assets are landscapes, notably the Cornwall and West Devon Mining Landscape World Heritage Site as well as registered and historic parks and gardens. The Dorset and East Devon 'Jurassic' Coast World Heritage Site is also an unusual example of an extensive designated heritage asset that is of outstanding universal value as a natural site. Landscape can also provide important settings for some heritage assets, e.g. listed buildings and scheduled monuments. In our view, these matters could usefully be mentioned.	The relationship between landscape and heritage has now been described in the baseline section of the Environmental Report (Appendix C.8.7).
	The concepts of historic townscapes, landscapes and seascapes could also be usefully touched upon. Historic townscapes and conservation areas are often inter-related. Historic landscape characterisation information will be available for the South West Water area, as will seascape character assessment work related to the Marine Plans.	The concept of historic townscapes, landscapes and seascapes has now been mentioned in the baseline section of the Environmental Report (Appendix C.8.7).
	This information should be borne in mind in later stages of the SEA process when the locations of options in the WRMP are known.	Noted. The information has been considered in the SEA process where available. This includes information of historic townscapes, landscapes and seascapes available within the Colliford, Roadford and Wimbleball Water Resource WRZs. However, it has not been possible at this stage to include information on Bournemouth and Isles of Scilly WRZs aside from historic landscape character due to data availability.
Chapter 4: Environmental Baseline - Future Baseline	Historic England has considered the likely evolution sub-section for the historic environment and landscape. We generally agree with the overview presented. However, the Heritage at Risk information should be amended. The 2021 Heritage at Risk findings make clear that in 2020 and 2021, we were unable to report on trends owing to issues with data collection.	This has now been amended in the future baseline section (Section 5.3) to acknowledge the limitation with data collection in 2021.
	Given the nature of the WRMP, however, we suggest it would be more useful to consider how water supply and demand activities may affect the historic environment and landscape. We also consider that the impacts and effects of climate change and responses to climate change on the historic environment and landscape should be briefly covered.	This has been added in the future baseline section for historic environment (Section 5.3).
Chapter 5: Key Environmental Issues and Opportunities	Historic England welcomes that the historic environment and landscape have been scoped into the SEA.	Noted.
	We have considered the key environmental issues and opportunities for these SEA Topics in Table 5.1.	These inputs have been incorporated in the Key Issues and Opportunities section (Chapter 6, Table 6.1) of the Environmental Report.

Section	Consultee Response	SWW Action
	We generally agree with the implications for the historic environment, although this could perhaps be slightly expanded to recognise that both the construction of water infrastructure and water resources management can affect heritage assets, especially those that are water dependent or water sensitive. While we also largely agree with the opportunities set out, the WRMP options should seek to first avoid any adverse effects wherever possible before going to minimise and then mitigate them. Opportunities for enhancing the significance of heritage assets should also be included as has been for landscape. Some habitat creation, for example, may also offer opportunities to improve the setting of heritage assets. We welcome mention of encouraging public awareness of heritage assets and this could be broadened to include access and enjoyment	
	For landscape, we broadly agree with the implications and opportunities set out. The opportunities section could also mention minimising and mitigating adverse effects. It would be helpful if townscape and seascape character could also be included.	This has been incorporated in the Key Issues and Opportunities section of the Environmental Report (Chapter 6, Table 6.1).
	We have also briefly considered the key issues and opportunities for the water resource supply options in Table D.1 Appendix D. We do not wish to comment in detail except to highlight that: • the South West Water area contains some heritage assets are water dependent heritage assets and water sensitive historic environments, e.g. water meadows, wetland areas and mires. These can be of archaeological potential and contain unrecorded but important organic and palaeoenvironmental remains, which may be affected by changes to water levels and water quality. These types of effects do not seem to have been considered. • the construction of new water infrastructure, e.g. reservoirs, can offer opportunities for improved public access, understanding and enjoyment of the historic environment, which again do not seem to have been recognised.	The tables in Appendix D of the Scoping Report included illustrative examples of the types of issues and impacts for different supply option types, and are not included in the Environmental Report. The points raised in the consultee response have instead been considered in the detailed SEA assessment of the options.
Chapter 6: SEA Framework	Historic England has considered the SEA Framework. We support the proposed SEA objectives for the historic environment and landscape in Table 6.1.	Noted.
	We are broadly satisfied with the SEA assessment criteria in Table 6.2. However, we have a number of suggested improvements to the historic environment assessment questions/sub-themes: • All bullet points - replace ‘historic assets’ with ‘heritage assets’ given NPPF terminology; • Second bullet point – ‘significance’ should come before ‘setting‘; • Third bullet point – replace ‘unknown archaeology’ with ‘areas of archaeological potential and unrecorded archaeology’; • Add a bullet point asking if the option will avoid, minimise and mitigate	These have been amended in the SEA Framework chapter of the Environmental Report (Table 7.2) and considered in the SEA.

Section	Consultee Response	SWW Action
	adverse effects on the historic environment; • Add a bullet point asking if the option will enhance the significance of heritage assets including their settings; and • Add a bullet point asking if the option will improve public access to, and understanding and enjoyment of the historic environment.	
	The landscape assessment questions/sub-themes may also need similar changes so that options seek to avoid, minimise and mitigate adverse effects on landscape, townscape and seascape character; and offer opportunities for enhancement and improved public access and enjoyment.	These have been amended in the SEA Framework chapter of the Environmental Report (Table 7.2) and considered in the SEA.
	We have considered the Assessment Scoring Criteria in Appendix E and have the following comments for the historic environment: • Datasets will need to include Historic England's Heritage at Risk Register as well as any local risk registers; • datasets should include non-designated heritage assets, e.g. HERs, local lists, conservation area appraisals, neighbourhood plans, areas of archaeological potential, etc.; • all references to 'undesignated heritage assets' should be replaced with 'non-designated'; • there may be a need for further guidance in the descriptions for the Jurassic Coast World Heritage Site, bearing in mind it is unusual being both a designated heritage asset but a natural World Heritage Site; and • further guidance will be needed for non-designated heritage assets of archaeological interest that are of demonstrable equivalence in significance to scheduled monuments given that the National Planning Policy Framework (NPPF) requires these to be treated as designated heritage assets.	Historic England's Heritage at Risk register has been included in the SEA assessment. Where possible, data on non-designated heritage assets such as local lists and plans have been considered in the assessment. Any items to consider that have not yet been addressed in the SEA shall be followed up on after the consultation for the Environmental Report. Non-designated heritage assets of archaeological interest and are of demonstrable equivalence in significance to Scheduled Monuments have been included for Devon as data was available. However, it was not possible at this stage to incorporate non-designated heritage assets in the SEA report for the remainder of the SWW area, although it is acknowledged that non-designated heritage assets may be present in the study area. Regarding further guidance on the Jurassic Coast World Heritage Site and for non-designated assets, recognition of their unique considerations have been included in the baseline section of the Environmental Report within the landscape and heritage sections respectively.
	For landscape, you will need to add datasets for townscape, seascape and historic landscape.	These have been added as items in the datasets/key themes and considered in the SEA where this information is available.
Chapter 7: Proposed Approach to the SEA	Historic England has considered the proposed approach to the SEA evaluation. We have commented on Appendix E above with regards to datasets for heritage at risk, non-designated heritage assets, and townscape, seascape and historic landscape. However, not all information sources will be available for GIS use, so it is not appropriate for this be relied on alone (see 7.2.2-4).	Other datasets have been considered for the assessment. The Environmental Assessment Methodology section in the Environmental Report has been amended to note that some information may not be as readily available as the GIS datasets, and other sources of information have been used where appropriate.
	We note and welcome the intention to reflect both positive and negative effects at 7.2.4 in assessing the options. For such cases, further guidance on how to assign the overall scale of effect would be useful to ensure consistency in the methodology.	Noted. The use of the guide questions in the assessment criteria for each SEA objective and the scoring definitions in Appendix E of the Environmental Report assist in determining the nature and scale of effects. The Environmental Assessment Methodology chapter in the Environmental Report explains how the scoring

Section	Consultee Response	SWW Action
		key is used throughout the options assessment to ensure consistency in assessing effects.
	We welcome assurances that mitigation and enhancement measures will be considered for each option, especially for those with major or moderative negative effects.	Noted.
	Likewise, we are pleased to see that cumulative, in-combination and cross-boundary effects are to be taken into account with additional mitigation measures or alternative options to be considered for significant negative effects. We also appreciate that efforts will be made to maximise benefits for each option and for the WRMP as a whole, which we hope will include the historic environment.	Noted.

G. SEA QA Checklist

Checklist item	Comments
Objectives and context	
The plan's or programme's purpose and objectives are made clear.	The purpose of the WRMP24 is set out in Section 2.1 of this Environmental Report (ER).
Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets.	Objectives of other relevant plans and programmes are set out in Section 4.4 and Annex 1: Appendix B of this ER. The key themes from other plans/programmes are detailed in Section 4.5, which were used for developing the SWW WRMP24 SEA objectives.
SEA objectives, where used, are clearly set out and linked to indicators and targets where appropriate.	SEA objectives are set out in Section 7.1 of this ER.
Links with other related plans, programmes and policies are identified and explained.	Links are identified in Section 4 and Annex 1: Appendix B of this ER.
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the ER.	The SEA Scoping Report was consulted upon as part of the consultation process required to meet the requirements of the SEA Directive. The Scoping consultation process is described in Section 3.2 of this ER.
The assessment focuses on significant issues.	The proposed scope of the assessment reflects the geographic extent of the potential options under consideration and provides a comprehensive approach to assessment of potentially significant effects.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	Difficulties and assumptions are set out in Section 8.8 of this ER. Limitations of the reporting including data limitation are included in Section 1.4.
Reasons are given for eliminating issues from further consideration.	The proposed objectives provide a comprehensive basis for assessment and at this stage, no issues have been eliminated.
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	Three potential programmes were assessed as part of this SEA (Best Value Plan, Least Cost Plan and Worst Case Plan). This included the preferred plan and two alternatives. Detail is set out in Sections 10.1 – 10.4 of this ER.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	Assessment of alternatives has been considered in Sections 10.3 and 10.4 of this ER.

Checklist item	Comments
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	Assessment of alternatives are presented in Sections 10.3 and 10.4 of this ER.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	Assessment of alternatives has been considered in Sections 10.3 and 10.4 of this ER.
Reasons are given for selection or elimination of alternatives.	Reasons for selecting the preferred plan are included in Section 10.6 of this ER. Reasons for removed options are outlined in Section 10.6.7.
Baseline information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described.	The current state of the environment and likely future baseline is set out in Chapter 5 and Annex 1: Appendix C of this ER for each SEA topic.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan.	The environmental characteristics of the area under consideration for the SEA are described in Section 5.2 of this ER.
Difficulties such as deficiencies in information or methods are explained.	Difficulties and limitations are set out in Sections 1.4 and 8.8.
Prediction and evaluation of LSEs	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural, heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate.	Potential effects for each of the topics have been considered within the SEA assessment in the ER within Chapters 9 and 10.
Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) is addressed.	The nature and duration of potential effects has been set out in the ER, using an appraisal framework described in Section 7.2. Scoring criteria is presented in Annex 1: Appendix E.
Likely secondary, cumulative and synergistic effects are identified where practicable.	These effects have been identified and described in the ER in Section 10.5.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations, and thresholds.	Relevant standards have been used where appropriate in undertaking the assessment in the ER.
Methods used to evaluate the effects are described.	Information on the methods used for evaluation of potential effects are described in Section 8.2 and Annex 1: Appendix E.

Checklist item	Comments
Mitigation measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	Mitigation measures for potential negative effects have been incorporated into the SEA assessments undertaken in preparing the ER.
Issues to be taken into account in project delivery.	Mitigation measures are discussed in Chapter 11 of this ER.
The Environmental Report	
Is clear and concise in its layout and presentation.	The ER is clear and concise.
Uses simple, clear language and avoids or explains technical terms.	The ER uses simple, clear language, and explains technical terms, as appropriate.
Uses maps and other illustrations where appropriate.	The ER uses maps and illustrations where appropriate.
Explains the methodology used.	The SEA methodology has been described in the ER (see Section 8 and Annex 1: Appendix E).
Explains who was consulted and what methods of consultation were used.	The consultation approach, including organisations and dates of consultation, is included in the ER – see Section 12.1.
Identifies sources of information, including expert judgement and matters of opinion.	Sources of information are detailed in the ER.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	The ER includes a Non-Technical Summary.
Consultation	
The SEA is consulted on as an integral part of the plan-making process.	This ER outlines the findings of the SEA. It forms part of the consultation process of the draft WRMP24, and invites consultees to comment. The consultation process is described in Section 12.1.
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and ER.	This ER is a part of the consultation process which is needed to meet the requirements of the SEA Directive. It has been circulated to consultees (alongside the draft plan), with appropriate consultation methods and length. The consultation process is described in Section 12.1.

Checklist item	Comments
Decision-making and information on the decision	
The ER and the opinions of those consulted are taken into account in finalising and adopting the plan or programme.	Responses from consultation on the draft ER (this document) will be incorporated into the final revised ER. After finalisation of the WRMP24, a statement will be published describing how the SEA and the responses to consultation have been considered during the preparation of the plan (see Section 12 of this ER).
An explanation is given of how they have been taken into account.	Responses from consultation on the draft ER will be incorporated into the final ER. After finalisation of the WRMP24, a statement will be published describing how the SEA and the responses to consultation have been taken into account during the preparation of the plan. This will be published as a SEA Post-Adoption Statement.
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	Details on the assessment of the alternative programmes and the role of SEA in developing the preferred programme is set out in Chapter 10 of this ER. Reasons for selecting the preferred plan are included in Section 10.6.
Monitoring Measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	Monitoring proposals are presenting in Section 11.2 of this ER.
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	The suggestions for monitoring have been made in this ER, with monitoring taking place following implementation of the plan, further to consultation with regulatory authorities.
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include predictions which prove to be incorrect.)	Suggestions for monitoring have been made in the ER, with monitoring taking place following implementation of the plan, further to consultation with regulatory authorities.
Proposals are made for action in response to significant adverse effects.	Mitigation measures for adverse effects are discussed in Section 11.1 of this ER.

MOTT MACDONALD

SEA Environmental Report ANNEX 2: APPENDIX H

Informal Habitats Regulations Assessment (HRA)

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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SEA Environmental Report ANNEX 2: APPENDIX H

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Revision	Date	Originator	Checker	Approver	Description
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Contents

Tables

Executive summary

This report presents the results of the informal Habitats Regulations Assessment (HRA) undertaken for 45 strategic improvements selected by South West Water (SWW) for the Water Resource Management Plan 2024 (WRMP24). As of January 2023, one of these options is new and has not yet been assessed. Eleven of the options are part of the preferred (best value) plan, as of December 2022, and a further 28 options are part of alternative plans. Additionally, two of the options within the WRMP are Strategic Resource Options (SRO) and have been assessed separately. Assessments for 42 options are presented within this report.

This report includes both HRA Stage 1 Screenings and Stage 2 Appropriate Assessments (AA), where applicable, assessing potential effects of each of the options on Habitats Sites. Habitats Sites are the collective term used within this report for designated sites which form a network that across Europe is known as Natura 2000, and domestically now known as the National Site Network (NSN). Within the UK, this network consists of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), proposed and candidate SPAs and SACs (pSPAs and cSACs). This document is indicative of potential effects and does not constitute a formal HRA.

This report supports the Strategic Environmental Assessment (SEA), which is to inform the decision-making process for the SWW management plan. Mott MacDonald undertook the assessments within this informal HRA and AA between August and September 2022, following the methodology in the *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15)*.

In addition to best practice measures for construction, the mitigation measures proposed to avoid adverse impacts during the construction phase include sensitive timings of works to avoid key periods for qualifying features, habitat retention and replacement resting sites for otter *Lutra lutra*.

An indicative in-combination assessment was undertaken for the 11 options identified within the preferred (best value) plan, with information correct as of December 2022. It was concluded that there will be no in-combination effects on Habitats Sites from the preferred (best value) plan. Many of the options are geographically isolated from one another and anticipated delivery dates are separate for most.

Following this AA and provided that all mitigation measures are taken forward and no changes are made to the options, no further assessment is required for 23 of the options in the preferred (best value) plan, alternatives and/or other options.

Uncertainty over residual impacts during operation of three preferred/alternative plan options remains. This, however, does not mean that progression to HRA Stage 3 (Assessment of Alternative Solutions) is required at present. Instead, it is recommended that further assessment and targeted ecological survey data is obtained to accurately determine potential adverse impacts. Upon receipt of the necessary information, a revised HRA Stage 1 Screening is required, with progression to subsequent stages if necessary.

1 Introduction

1.1 Overview

This Habitat Regulations Assessment has been undertaken at a strategic level, informally, in order to provide an indication of potential effects on relevant designated sites to identify significant constraints and assist with the option shortlisting process. By identifying potential risks at this early stage, SWW can reduce the risk of non-compliance at a later stage.

This assessment supports the Strategic Environmental Assessment (SEA) for the South West Water (SWW) Water Resources Management Plan 2024 (WRMP24). This will inform any likely impediments to the practicality or deliverability of WRMP24. The SEA works to inform the decision-making process through the identification and assessment of significant and cumulative effects that a plan or programme may have on the environment. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders.

A formal HRA will be undertaken for any of the individual options contained within this plan if they are taken forward to delivery.

This HRA presents the findings of Stage 1 screening of 42 options, with Stage 2 assessments included where applicable. Details of the HRA process are included within Section 3. One new option (BNW17) and two SRO options (BNW7 and BNW8) are referenced but not assessed herein.

There has been no fine option screening, so options being progressed to subsequent stages remain unknown.

At later stages of development of WRMP24, further consultation between SWW and Statutory Nature Conservation Body (SNCB), Natural England, will be required and this report will form the basis of future iterations of the assessment, which will be updated when changes are made at later stages.

1.2 Assumptions and limitations

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and the undertaking of the proposed works.

Any uncertainties surrounding, and limitations of, the assessment process are acknowledged and highlighted. Recommendations for avoidance and mitigation measures to address the potential adverse effects on the integrity of the Habitats Sites identified by this report are also based on the information available at the time of the assessment. It is acknowledged that the requirement for mitigation may change as the design of the options progresses. This is expected to be through increasing the level of detail available during later stages of option development for subsequent stages if the relevant options are progressed.

2 Summary scheme description

2.1 Background

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. In the development of a WRMP, companies must follow the Water Resource Planning Guidelines[1] ('Guidelines'). WRMPs should ensure a secure and sustainable supply of water and focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

The SWW supply area covers Devon, Cornwall, the Isles of Scilly and parts of Dorset, Somerset, Wiltshire and Hampshire, and provides drinking water to a population of 1.7 million. Water resources in the SWW supply area consist of three large reservoirs, a number of smaller reservoirs, river intakes, and some groundwater sources which are predominantly in East Devon.

The SWW supply area is split into five Water Resource Zones (WRZs) in total. Three WRZs are operated in conjunction with one another to maximise water availability, these are Colliford, Roadford, and Wimbleball WRZs. Bournemouth WRZ and Isles of Scilly WRZ operate independently.

The summary of options included within preferred (best value) and/or alternatives plans is summarised within Table 2-1 below. Individual options are not exclusive to one scenario and may find themselves as part of the preferred (best value) and alternative plans.

Information for options included within alternative plans (least cost and worst case) is correct as of September 2022. Information on the preferred plan (best value) options is correct as of December 2022.

Table 2-1: WRMP24 options

WRZ	Option ID	Preferred plan (Best value)	Alternative plan (Least cost)	Alternative plan (Worst case)
Bournemouth	BNW1	Yes	Yes	Yes
	BNW3	Yes		Yes
	BNW6	Yes	Yes	Yes
	BNW7			
	BNW8			Yes
	BNW11	Yes	Yes	Yes
	BNW17			
Colliford	COL2			Yes
	COL3		Yes	Yes
	COL4		Yes	Yes
	COL5		Yes	Yes
	COL6			
	COL9			Yes

[1] EA, NRW, Defra and Ofwat (2021) *Water Resources Planning Guideline*. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

WRZ	Option ID	Preferred plan (Best value)	Alternative plan (Least cost)	Alternative plan (Worst case)
	COL11			
	COL12			Yes
	COL15	Yes		Yes
	COL18			
	COL19			
	COL20			
Isles of Scilly	ISMY1			
	ISMY2			
	ISMY4			
	ISB4			
	IST1			
Roadford	ROA2			Yes
	ROA3			Yes
	ROA4		Yes	Yes
	ROA6		Yes	Yes
	ROA7	Yes		Yes
	ROA8			Yes
	ROA10	Yes	Yes	Yes
	ROA11			
	ROA12			
	ROA13			
	ROA14			
	ROA15			Yes
	ROA16	Yes		Yes
Wimbleball	WIM1		Yes	Yes
	WIM2			
	WIM4		Yes	Yes
	WIM5	Yes		Yes
	WIM6			Yes
	WIM7			
	WIM8	Yes	Yes	Yes
	WIM9	Yes	Yes	Yes

Source: Mott MacDonald, 2022

2.2 WRMP24 options

The following options have been identified by SWW as part of their preferred (best value) plan options package and/or two alternatives for provision in the final WRMP. The preferred plan represents the best value implications which have been applied to SWW's model output, including 11 options as of December 2022.

The alternative plans include a least-cost model scenario, including 13 options, and a worst-case model scenario, including 27 options. The worst-case scenario assumes high climate change impacts affected supply and demand of water resources. Three of the options included within the worst-case scenario have not been included within this report; these are brand new and have not received assessment at the time of writing. Descriptions of each option and their locations are provided below.

Options are not exclusive to any of the plan scenarios and may find themselves included within multiple plans.

Some options have not been identified as part of any of the aforementioned plans but are still included within the WRMP24 package and have been assessed accordingly.

2.2.1 BNW1

This option involves the development of a new abstraction borehole location, in addition to remedial works on an existing borehole near Lymington, Dorset; increased yields and changes to system operations will result in more regular use. The new borehole will increase the overall abstraction licence by 1 Megalitre per day (Ml/d). All boreholes are within the existing SWW site footprint.

The main chalk aquifer which is exploited in the Bournemouth Water (BW) supply area is considered to be under environmental stress due to the level of groundwater abstraction. Additional abstractions will not be licensable and there is potential for licence reductions going forward. This option represents an opportunity to maximise the potential of this under-used non-chalk source at the new abstraction borehole location in the north of Lymington. The confined nature of the aquifer and isolation from the surface water system provides good environmental, as well as water quality, security. Treatment facilities already exist to accommodate additional abstraction.

The exact location of the borehole is unknown, although a buffer of approximately 30 metres (m) has been provided around the indicative location for the assessment.

2.2.2 BNW3

This option involves the transfer of the groundwater abstraction licence from Wimborne to Longham on the River Stour. This is a total of 4 Ml/d, which is not expected to occur until 2027 when the current Longham licence is due to be reduced. There are not expected to be significant infrastructure changes at Wimborne, although this cannot be confirmed at this stage.

2.2.3 BNW6

This option is an aquifer recharge (AR) scheme type which involves the construction of new aquifer storage and recovery boreholes on the existing SWW site at Longham Lakes, Dorset. Water will be pumped from the Matchams intake on the River Stour into the storage boreholes in the winter, with subsequent abstraction from these locations in the summer.

The current estimate of 10 Ml/d gain in supply would represent a significant and valuable resource. Although relatively expensive and speculative, this option could prove to be a very cost effective and environmentally sustainable option that might be available prior to highly expensive out of area transfers which are the only other realistic options for large-scale resource development. The capture of "spare" winter water underground for use in peak periods has key advantages in terms of limited land use and making smarter use of water when the environment is less stressed.

2.2.4 BNW7

This is an SRO option and has been assessed separately. Details are not provided within this report.

2.2.5 BNW8

This is an SRO option and has been assessed separately. Details are not provided within this report.

2.2.6 BNW11

This option involves the treatment of water, specifically nutrient removal, at Christchurch WWTW, before being pumped through 29km of new rising mains pipeline north-west to Longham Lakes. The current STW discharges into the Clockhouse Stream, and subsequently into the River Avon in the transitional water body.

The option is predicted to result in an increase of 14Ml/d within Longham Lakes.

2.2.7 BNW17

This is a new option and has not yet been assessed.

2.2.8 COL2

The option involves a new abstraction licence as well as a new intake on the River Camel near Nanstallon, Cornwall. A new pumping station will be constructed at Nanstallon. Approximately 14km of 900mm diameter pipeline will transfer 90 Ml/d from the intake to the Restormel WTW. There will be upgrades to the existing Restormel WTW intake to pump 110 Ml/d (an increase of 15 Ml/d), where raw water is then pumped to Colliford Reservoir via the existing pipe infrastructure.

The River Camel will have a reduced flow downstream of the new abstraction (downstream is to the north, the river discharges to the sea at Padstow). Colliford Reservoir (east of the option) will have an increased water level as the abstracted water is being transferred there via the existing pipe network. Ongoing increase in energy for additional pumping and water treatment.

2.2.9 COL3

The option includes the abstraction of Colliford compensation flow when making supply releases. There are currently no planned infrastructure changes required as part of this option.

The water which has come from Colliford Reservoir, near Bodmin, Cornwall, be unchanged between Colliford and Restormel, near Lostwithiel, Cornwall. There will be an increase in abstraction at Restormel WTW and therefore a reduction in flow downstream of this location, on the River Fowey.

2.2.10 COL4

The option involves the abstraction of Siblyback compensation flow when making supply releases. As part of this option there are no infrastructure changes anticipated.

The water which has come from Siblyback Reservoir, near Bodmin, will be unchanged between Siblyback and Restormel. There will be an increase in abstraction at Restormel WTW and therefore a reduction in flow downstream of this location, on the River Fowey.

2.2.11 COL5

This option involves an increase to the annual abstraction licence at Wendron WTW, near Helston, Cornwall. This results in a reduced flow downstream of the abstraction point on the River Cober. No infrastructure changes are anticipated as a result of this option.

2.2.12 COL6

This option involves direct abstraction of approximately 2 Ml/d from the River Hayle near St Erth, Cornwall. The abstraction will utilise an existing, but disused, intake, and treat water at a new treatment works. The location of the new treatment works is currently unknown but could be up to 10km downstream of the intake point.

2.2.13 COL9

This option proposes to transfer raw water from the Balleswidden Pool for eventual use at Drift WTW via Sancreed Brook. The raw water transfer will augment the raw water supply from Colliford Reservoir during drought conditions. A previous raw water transfer scheme was successfully used under a temporary Drought Order for six months between 1995 and 1996, pumping 5.46 Ml/d of water from Leswidden Pool to the Sancreed Brook, which subsequently flows into Drift Reservoir. Drift WTW lies at the base of the Drift Dam and is fed by gravity from the reservoir.

Drift WTW has a maximum output of 12.3 Ml/d and is the normal dedicated source of water supply for the Land's End peninsula.

Assumed small increase in energy due to increased water treatment and pumping.

2.2.14 COL11

This option involves the construction of a new pipeline between Hawk's Tor Pit (an old quarry) and the Colliford Reservoir, near Bodmin, Cornwall. New intake and discharge points will be required, with the pipeline under the A30 to avoid any disturbance to the road infrastructure. The new pipeline will transfer approximately 3 Ml/d to the Colliford Reservoir.

2.2.15 COL12

This option involves a daily abstraction increase from the Stannon Reservoir south west of Camelford, Cornwall. The licence will be increased from 4 Ml/d to 8 Ml/d for up to three months of the year. Pumps and associated power will be upgraded. A 0.2 Ml/d stream support stream facility will also be constructed on the north-eastern corner of the reservoir.

This scheme is highly cost effective with strong environmental safeguards. It could be implemented rapidly. Recent modelling has identified that increasing the peak abstraction but retaining the existing annual limit does not pose any risk of deterioration implications.

2.2.16 COL15

This option would take Restormel WTW up to its maximum licensed abstraction and enable more effective use to be made of the Colliford and River Fowey resources system.

Final requirements are not currently confirmed, however, it is anticipated that new buildings to house additional treatment equipment and new pumps may be required. This would all be within the footprint of the existing Restormel WTW. An increase in abstraction at the Restormel WTW from the River Fowey has the potential to result in a reduction in flow downstream of the WTW in the River Fowey.

2.2.17 COL18

This option involves a new intake structure at the existing Rialton site near Porth, Cornwall. A new water treatment works (WTW) will be built with the existing Coswarth site boundary near Quintrell Downs, Cornwall and a new pipeline to connect the sites. Abstraction from the river at Rialton (6 Ml/d) will be transferred to Coswarth to be treated and distributed to the existing system.

This is an existing reservoir/intake and abstraction licence close to a major demand centre (Newquay). Following investigation, some changes to the abstraction will be needed but the source will still represent a key resource opportunity. Its reintroduction would be an appropriate counter to offset the proposed licence reduction at Delank, a tributary of the River Camel.

2.2.18 COL19

The option involves the re-introduction of abstraction points at Boswyn Stream, Cargenwen Reservoir and Carwynnen Stream, all in Cornwall.

The three previously existing abstraction points are to be brought back into use, via minor recommissioning works. Exact abstraction points cannot be disclosed, but they all exist between Trevoole and Cargenwyn on the respective streams mentioned. There is also the potential for a new WTW to be built at Cargenwen Reservoir.

This option has the potential to result in reduced water flows downstream of the abstraction points at Boswyn Stream and Carwynnen Stream and a reduction in water at Cargenwen Reservoir.

2.2.19 COL20

This option involves a new abstraction point on the River Fal near Ruan Lanihorne and a new WTW, with connection to the existing distribution system. The exact location of the new infrastructure is not known.

Colliford WRZ is facing a number of supply challenges at present and going forwards due to a combination of very high demands relative to forecast and pressures on existing abstraction licences from environmental targets. A major scheme is required to mitigate the risk to supply and allow a pro-active approach. A new abstraction on the Fal with new treatment capacity would provide a substantial increase in WRZ deployable output which is currently constrained by Colliford storage and Restormel WTW capacity. This represents the best option for strategic resource development based on the current understanding of water availability in the Fal catchment.

2.2.20 ROA2

This option involves the relocation of the River Erme surface water abstraction point near Ivybridge, Devon. The option will involve the construction of a new intake point along the River Erme. This may require a new pipeline between the new intake point and existing pipe network, plus the construction of a new pumping station. Increased abstraction at new intake has the potential to result in reduced flow downstream of this point.

2.2.21 ROA3

This option involves the relocation of the existing River Yealm Intake near the A38 west of Ivybridge, Devon, and the construction of a new pumping station. It is anticipated that the water destination will be Littlehempston WTW, near Totnes, via South Devon Spine Main (existing pipeline). However, there is also the potential for an additional pipeline to be required, required to connect the new intake point with the existing South Devon Spine Main pipe network.

Increased abstraction at new intake has the potential to result in reduced flow downstream of this point.

2.2.22 ROA4

This option involves the abstraction of the Roadford compensation flow at Gunnislake, Cornwall, at the existing connection to the River Tamer when making supply releases. There are no infrastructure changes required. Water will be abstracted at the Gunnislake intake, resulting in reduction in water flow downstream of the abstraction point.

2.2.23 ROA6

This option involves an increase in the daily abstraction limit and annual licensed volume at Upper Tamar Lake, near Alfardisworthy on the Devon-Cornwall border. There is potential for some infrastructure works/upgrades at the existing WTW at southern edge of Upper Tamar Lake. However, this is not anticipated to result in any land changes. There will be some distribution network (pipeline) upgrades, but the location of these are not yet known.

2.2.24 ROA7

This option involves the expansion of Northcombe WTW near Patchacott, Devon, to its licence maximum of 60 Ml/d; an additional 10 Ml/d pumping capacity from Roadford Reservoir achieves this. It is assumed that some adjacent land will be required around the existing SWW site to facilitate the required infrastructure upgrades. Any pump upgrades will be within the existing WTW.

The WRZ is constrained by works treatment capacity and in order to make greater use of any additional water in Roadford, additional treatment capacity is required. The uprating of Northcombe WTW represents the most effective and efficient way of developing this capacity. It would provide treated water for North Devon which would allow a reduction in support from the neighbouring Wimbleball WRZ. Additionally, it would provide much needed resilience against water quality issues which can affect North Devon reservoir sources.

2.2.25 ROA8

This option is the reduction in the Tottiford WTW minimum capacity, through process control changes to allow minimum flow rates to be treated. This will enable the WTW, near Bovey Tracey, Devon, to reduce flow during periods of low demand, reserving water resources for use at time of increased demand. The source optimisation will improve control systems, principally chemical dosing, with some allowance for flow controls, isolation and ICA/SCADA improvements. Changes will occur within the existing WTW site footprint, through reducing the minimum output allows the WTW to run at a lower output over a longer period of time.

2.2.26 ROA10

This option is the reduction in the Avon WTW minimum capacity, through process control changes to allow minimum flowrates to be treated. Enabling the WTW, near South Brent, Devon, to reduce flow during periods of low demand, reserving water resources for use at time of increased demand. The source optimisation will improve control systems, principally chemical dosing, with some allowance for flow controls, isolation and ICA/SCADA improvements. Changes will occur within the existing WTW site footprint, through reducing the minimum output allows the WTW to run at a lower output over a longer period of time.

2.2.27 ROA11

This option involves reducing the minimum capacity of the Meldon water treatment works (WTW) near Okehampton, Devon. Optimisation within the existing site footprint will reduce the yield from 12 Ml/d to 10 Ml/d.

2.2.28 ROA12

This option involves the construction of a new pumping station at Slade Reservoir and construction of a new granular activated carbon (GAC) within the existing Horedown WTW, both near Ilfracombe, Devon. Slade reservoir will be reintroduced as a water source and the new GAC plant will provide a yield of 4 Ml/d.

2.2.29 ROA13

This option involves the construction of a 4 Ml/d nitrate removal plant at the existing Duckaller pumping station near Dawlish, Devon. A new raw water pipeline may be required from the Vennbridge borehole to the new pumping station. Changes in abstraction licences are also cited as part of this option.

2.2.30 ROA14

This option involves works to the Avon dam, near Buckfastleigh in Dartmoor, Devon. The dam will be raised by 2m to increase overall capacity, although the additional storage has not been quantified at this stage.

2.2.31 ROA15

This option involves the upgrade of existing pipelines between the abstraction point on the River Lyd near Lifton, and the west side of the Roadford Reservoir, near Broadwoodwidger, Devon. Dualling of existing pipelines between the abstraction point and the River Thrushel intake near Portgate, and between the River Thrushell intake and Roadford Reservoir, would allow 125 Ml/d to be transferred to the reservoir. This is the preferred route for the pipeline, and the other route option has not been included within this report.

Roadford Reservoir is currently vulnerable to a multi-season drought due its limited catchment; limited supply capacity means the reservoir could still be significantly below full capacity following a dry winter. This option will provide enough further capacity to ensure the reservoir can be filled, irrespective of the level of winter rainfall, to be operated as a single season reservoir. It represents a key strategy supply option for the whole Roadford WRZ. A number of sustainability reductions are likely to be required in future years which, if implemented, would put the WRZ into supply-demand deficit. This is the logical option to address and offset loss of resource from existing sources which could be subjected to licence reductions.

2.2.32 ROA16

This option involves the upgrade of the Littlehempston WTW near Totnes, Devon. The current WTW extracts untreated water from the River Hems and treats 78 Ml/d. Upgrades will allow for treatment at maximum capacity of 84 Ml/d. The upgrades will not require any additional land take and are all confined within the existing WTW site footprint.

2.2.33 WIM1

This option involves the abstraction of Wimbleball Reservoir compensation flow when making supply releases. The abstracted water is to come from Wimbleball Reservoir, near Dulverton, Somerset. Downstream of the abstraction point, the River Erme will have a reduced flow. There is no infrastructure change anticipated as part of this option and it is assumed that the abstraction point is where an existing SWW pipeline goes to the River Exe.

It is assumed that the water will come from Wimbleball Reservoir, and the infrastructure and operation will be unchanged between Wimbleball and the abstraction point. Downstream of the abstraction point, the River Exe will have a reduction in flow.

2.2.34 WIM2

This option involves the recommissioning of an existing borehole near Sidford, Devon. The borehole will be equipped and made operational; provision of pumps and connecting pipework will be constructed. There will also be a new groundwater source treatment system including chlorination and iron and manganese removal plant. The new plant is within the existing site footprint at the borehole location. This borehole will have a yield of 1.5 Ml/d.

2.2.35 WIM4

This option is an increase in the Wilmington springs annual abstraction from Umborne Brook groundwater source from the existing abstraction point, resulting in a potential reduction in flow downstream in the Umborne Brook, between Axminster, Somerset and Honiton, Devon. The current intake is restricted by the current licence. As part of the option the licence will be varied to allow a greater volume of water to be taken over the year.

2.2.36 WIM5

This option involves the pumping of treated effluent from Sidmouth WWTW, near Sidford, Devon, directly to the River Otter using a new 3km pipeline. A new outfall will augment the river during periods of low flow. This will act as stream support for Dotton WTW. Treated water from the Sidmouth WWTW will be piped to the River Otter, near Bridge End, Devon, therefore increasing flow in River Otter downstream of the outfall point and ensuring the river has enough water.

2.2.37 WIM6

This option involves increasing the Allers WTW near Tiverton, Devon, to its maximum licence capacity from 32 Ml/d to 36 Ml/d. This is achieved by upgrading the Bolham abstraction point on the River Exe to pump an additional 4 Ml/d; upgrades to the WTW will allow treatment of this additional capacity. Improvements to the distribution network are also anticipated, but details and locations are currently unknown and are not considered for this assessment.

In order to accommodate a licence reduction of the Otter Valley groundwater sources, additional resource and treatment capacity would be required during the winter months. This cannot be provided by any increase in Pynes WTW, near Exeter, capacity due to an existing limitation in the network at Whitecross. The increase in Allers abstraction would make use of high winter flows and the existing network linking the Allers supply area with the Dotton supply area. An increase in treatment capacity at Allers would be a requirement of this option given the existing capacity of only 32 Ml/d is already assumed to be required.

2.2.38 WIM7

This option involves increasing the Pynes WTW to its maximum licence capacity; an additional 6.5 Ml/d will take the total to 66.46 Ml/d. Infrastructure upgrades will remain within the footprint of the existing WTW site. Final works are not confirmed, and could include further construction of new river intakes, pipeline replacements and installation of additional water treatment equipment. However, with no details available, only the Pynes WTW licence increase is assessed at current.

Wimbleball WRZ has limited options for major supply option development. Treated water capacity is a constraint on WRZ deployable output, whist the Pynes abstraction licence is effectively under-used. The Pynes WTW works capacity increase represents a practical and cost-effective option to increase treated water availability where it can best be utilised.

2.2.39 WIM8

This option is the re-introduction of North Exeter groundwater source west of the Exe. Involving an existing borehole site located near Brampford Speke, Devon, as part of the option water will be discharged from the borehole into the River Exe. This option will also involve the agreed licence changes with EA and any required site commissioning.

Increased abstraction from borehole could result in reduced groundwater levels and increased flow in the River Exe downstream from this point, as the water is discharged into the River -

presumably for abstraction further downstream, not known where but likely to be Pynes WTW just north of Exeter.

2.2.40 WIM9

This option involves the re-introduction of a North Exeter groundwater source east of the Exe. This option will also involve the agreed licence changes with EA, installation of a new power supply and any required site commissioning.

As part of the option the existing borehole site, near Stoke Canon, Devon, may require some minor commissioning works, within the existing site. The river washout is located south-west of the borehole on the River Exe, i.e. at the other end of the existing mains pipeline. It is assumed washout will be within the existing infrastructure and as such no new pipeline is needed.

Increased abstraction from the borehole could result in reduced groundwater levels and increased flow in the River Exe downstream from this point, as the water is discharged into the river - presumably for abstraction further downstream, not known where but likely to be Pynes WTW, just north of Exeter.

3 Habitats Regulations Assessment process

3.1 Habitats Regulations Assessment process

There is a requirement under the Conservation of Habitats and Species Regulations 2017 (as amended) ("the 2017 Regulations") to determine if a plan or project may have an adverse impact on a site designated under the same (or preceding Regulations) prior to any consent or permission being determined. The process of undertaking this assessment is known as an HRA.

The 2017 Regulations include measures to establish and maintain a network of sites protecting habitats which in themselves are valuable as well as for the species they support. These sites form a network that across Europe is known as Natura 2000, and domestically now known as the National Site Network (NSN). Within the UK, this network consists of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), proposed and candidate SPAs and SACs (pSPAs and cSACs). This network also extends to marine environments, with wetland sites of international importance (Ramsar sites) also treated equally within this assessment framework. These sites are collectively referred to in this document as 'Habitats Sites'.

The 2017 Regulations are set out in Parts which implement the requirements of the Directives, with Part 6 providing provisions to ensure that assessment of plans and projects are fully considered before being granted consent or permission. They also define the nature of and roles of statutory bodies, competent authorities and the appropriate nature conservation body and the requirements for information to be submitted to these bodies to enable them to undertake the required assessments.

Although the 2017 Regulations have been amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, due to the UK's exit from the EU, the effect of these amendments is largely related to wording and requirements and processes remain the same, as protection levels remain unchanged. As such existing EU guidance[2] and preceding case law from the European Court of Justice (ECJ)[3] [4] [5] remains valid as a source of direction and interpretation of the requirements of the legislation, although it should be noted that much case law has now been incorporated into guidance and/or best practice.

The HRA process consists of four stages, each stage being informed by the one preceding, to ensure an iterative and objective assessment. If the conclusion of Stage 1 Screening is that there will be no Likely Significant Effects (LSE) on any features of a Habitats Site, there is no requirement to undertake further stages. Similarly, if the Stage 2 AA concludes there will be no adverse effect on integrity of the Habitats Site, then the assessment is concluded. The HRA stages are summarised within Table 3-1.

[2] European Commission (2018). Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE [online] available at: EN_art_6_guide_jun_2019.pdf (europa.eu) (last accessed April 2022).

[3] Landelijke Vereniging tot Behoud van de Waddenzeecase/ Nederlandse Vereniging tot Bescherming van Vogels, European Court of Justice, Case C-127/02 'Waddenzee 2002'

[4] Sweetman et al v An Bord Pleanala, European Court of Justice, Case C-258/11 'Sweetman 2011'

[5] People over Wind/Sweetman v Coiltte Teorante, European Court of Justice Case C-323/17 'People over Wind 2017'

Table 3-1: HRA Stages

Stage	Description
Screening (Stage One)	This is the process which identifies the potential effects upon the Habitats Sites and considers if these are likely to be significant (see definitions below). Screening is an iterative process and before moving to Stage Two it can be repeated if required. Proposals to mitigate any likely significant effects cannot be considered at the screening stage. If the Screening (Stage 1) identifies that the project or plan, alone or in combination, may have likely significant effects on a Habitats Site and/or its features of interest, or if there is uncertainty, the competent authority must undertake an Appropriate Assessment (Stage 2) of the implications for that Site in view of that Site's conservation objectives.
Appropriate Assessment (Stage Two)	This stage involves the consideration of the predicted adverse effects of the project or plan either alone, or in combination with other projects or plans, on the integrity of the Habitats Site with respect to the Site's structure, function and conservation objectives. Additionally, where mitigation has been proposed to avoid or minimise likely significant effects, this stage includes assessment of the likely effectiveness of any mitigation applied. A key outcome of the Appropriate Assessment is to identify whether the integrity of the Habitats Site(s) is likely to be adversely affected by the plan/project.
Assessment of Alternative Solutions (Stage Three)	If the mitigation measures applied and assessed during Appropriate Assessment cannot avoid adverse effects on the integrity of a Habitats Site, this stage examines alternative ways of achieving the objectives of the project or plan that avoid adverse effects on the integrity of the Habitats Site.
Assessment where no alternative solutions exist and where adverse effects remain (Stage Four)	If no suitable alternative solutions are available, Stage Four requires an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest ("IROPI"), it is considered that the project or plan should proceed. In making this assessment, it is important to recognise that it will be appropriate to the likely scale, importance and impact of the proposed project. If it is impossible to avoid or mitigate the adverse impact, it must be demonstrated that there is IROPI.

Source: Mott MacDonald, 2022

This assessment has been undertaken in an iterative and objective manner following the above stages, with reference to best practice guidance and relevant case law, notably that provided by the Waddenzee case (ECJ 2002) and Sweetman (ECJ 2011) to inform the interpretation and therefore correct application of the terms 'likelihood, 'significance' and 'in combination'.

Mott MacDonald undertook this HRA and AA at the strategic stage in August 2022, following the methodology in the *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15)*[6].

3.2 Screening assessment methodology

The initial list of sites for the HRA screening was derived by adopting a distance-based threshold of 10km, whilst including more distant sites subject to longer pathways; this included those sites which were hydrologically connected via surface watercourses. This is based on the premise that most significant effects on qualifying features of Habitats Sites will occur within a maximum of a 10km radius. This distance of 10km is defined as the Zone of Influence (ZoI) for the WRMP options, which has been extended where appropriate to capture all potential significant effects on Habitats Sites.

In undertaking this HRA, a number of steps were undertaken to identify the relevant information to inform the assessment. Information gathered to inform the screening included the identification of:

- Any SPA/SAC/pSPA/cSAC/Ramsar sites, including any marine or marine elements of these sites within the potential ZoI, and any known areas of land outside the site boundary itself, which plays an important role in supporting the site and its features of interest (functionally linked land)
- Potential effects resulting from the option
- The ZoI of these effects, noting this may extend some distance from the site and are not confined to activities on or adjacent to the site
- Any viable pathways from the option to the receptor (Habitats Sites themselves or functionally linked land)
- The features of interest of the Habitats Site(s) in question
- The conservation objectives of the Habitats Site, including any site sensitivities given within any supplementary advice, site improvement plan, or equivalent document published by the relevant SNCB

The above information was reviewed in respect of each feature of interest and potential development effect / impact pathway to inform an assessment of any LSE or adverse effects on integrity. Key aspects and terms used in this assessment are defined below:

- **Likelihood:** Where an effect was considered to be potentially significant, then the assessment of its occurrence was based on the likelihood of it occurring and not certainty that it would occur. Potential effects are scoped in unless there was evidence to the contrary demonstrating that they would not occur e.g. there being no valid pathway, or the absence of the species in that area, at that time.
- **Significance:** The significance of any effect is considered objectively, against the scale and nature of the impact in relation to those of that particular feature or condition and in relation to the extent of that feature or condition over the entire Habitats Site. A significant effect within this assessment is one which, if it occurred, would lead to a decline in the quality or status of the habitats or distribution, abundance, etc. of feature(s) of interest.
- **In-combination**: The assessment of in-combination effects considers those projects or plans which:
  - are currently in operation

[6] UKWIR (2021). Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15), 287p.

– are actually proposed - defined by being a valid live planning application, or any referenced with a local plan where there is potential for them being undertaken within a reasonable time period, specified within that plan.

In line with relevant case law, this assessment is undertaken in the absence of mitigation (including 'best practice' measures embedded into the option where these are intended for the avoidance of effects).

Where potential significant effects were identified the assessment has taken these effects through to Stage 2 AA.

3.3 Appropriate Assessment approach and methodology

3.3.1 Approach

Where a plan or project is likely to, or has the potential to, give rise to LSE upon a Habitats Site, an assessment must be made of the implications on the integrity of that site in view of that site's structure, function and conservation objectives and taking into account any site-specific supplementary advice or site improvement plan.

At this stage, where this document represents an informal HRA process, a worst-case scenario is assumed regarding significant effects on Habitats Sites and adverse effects on their integrity. In the absence of detailed information surrounding the options' designs, and a lack of targeted ecological survey data, conclusions made within this document have the potential to change with the provision of further information. As such, options which have been included within the AA here, could be scoped out at the screening stage of the project HRA, provided there is sufficient justification to do so. At present, options are taken to the Stage 2 AA where findings of no LSE cannot be concluded.

Where mitigation measures are to be applied to eliminate or reduce any effects identified in screening, these may be considered within the AA. This includes the implementation of widely used best practice measures, which have not been considered during the Stage 1 screenings.

Potential effects may be direct or indirect and are dependent on the relationship between the source (proposed options' actions) and the receptor (the qualifying features of the Habitats Site(s)). The significance of an impact is relative to the sensitivity, existing condition and conservation status of the qualifying features of the site and the scale of the impact in space and time.

Potential effects on the qualifying features of the Habitats Site(s) are evaluated with respect to the scale, extent and nature of the impact, for example the area of habitat affected, changes in hydrodynamics, potential changes in species distribution, and the duration of the impact. Given the high-level nature of the assessment at this plan stage it is not always possible to determine the exact scale and extent of the impact, when this is the case, a precautionary approach is taken when evaluating the significance of the impact.

This HRA Stage 2 AA has been formulated using the following approach:

- Review the sites identified at Stage 1 and confirm any additions or exclusions
- Assessment of the construction and operation effects of the option
- Assessment of the Habitats Sites' characteristics and identification of their conservation objectives[7]

[7] Habitats Sites descriptions, qualifying features and conservation objectives are given in Appendix A.

- Identification of the aspects of the proposed options that may significantly impact the conservation objectives of the Habitats Site(s)[8]

This assessment has been undertaken in accordance with the following guidance:

- GOV.UK (2019) *Appropriate Assessment - Guidance on the use of Habitats Regulations Assessment*. Published 22 July 2019[9]
- UK Water Industry Research (UKWIR, 2021)[10]
- European Commission (EU, 2018) *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*[11]

3.3.2 Consultation

It is a statutory requirement of the HRA process that Natural England be consulted at the AA stage. As this HRA is not a formal document, and none of the options currently have enough associated information to conduct an appropriate Stage 1 screening, it is not deemed necessary to engage with Natural England until it is clear that any options definitely require progressing to Stage 2 AA.

3.3.3 Potential effects considered as part of the HRA

Following UKWIR (2021) guidance and the available information of the options, the potential effects considered in this assessment are summarised in Table 3-2. Proposed distances are also provided following the same guidance to ascertain if, where a pathway has been identified, the impact is likely to affect the habitats or species for which the Habitats Site(s) are designated.

Table 3-2: Potential effects and proposed Zone of Influence

Broad categories of potential effects on Habitats Sites (with examples)	Examples of operations resulting in effects and proposed ZoI
Physical loss Destruction (including offsite effects) e.g. foraging habitat, smothering	Development of built infrastructure associated with the schemes, e.g. reservoir embankments and access routes[12]. Physical loss is only likely to be significant where the boundary of the option extends within the boundary of the Habitats Site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a Habitats Site is designated or where natural processes link the option to the site, such as through hydrological connectivity downstream, or the scheme effects the linking habitat).

[8] This is the Appropriate Assessment given and tabulated in Sections 4, 5 and 7.

[9] UK Government (2019). Guidance on the use of Habitats Regulations Assessment [online] available at: Appropriate assessment - GOV.UK (www.gov.uk) (last accessed April 2022).

[10] UKWIR (2021). Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15), 287p

[11] European Commission (2018). Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE [online] available at: EN_art_6_guide_jun_2019.pdf (europa.eu) (last accessed April 2022).

[12] It is acknowledged that infrastructure associated with the construction of the reservoirs may have an impact on Habitats Sites. However, for the purposes of this informal HRA, only the construction footprint of the reservoir itself has been used to determine the potential for significant effects.

Broad categories of potential effects on Habitats Sites (with examples)	Examples of operations resulting in effects and proposed ZoI
Physical damage Habitat degradation Erosion Trampling Fragmentation Severance/barrier effects Edge effects	Development of built infrastructure associated with the schemes, e.g. reservoir embankments and access routes. Physical loss is only likely to be significant where the boundary of the option extends within the boundary of the Habitats Site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a Habitats Site is designated or where natural processes link the option to the site, such as through hydrological connectivity downstream, or the scheme effects the linking habitat).
Non-physical disturbance Noise Visual presence Light pollution	**Noise from construction activities.** Taking into consideration the noise level generated from general building activity (c. 122dB(A)) and considering the lowest noise level identified in guidance as likely to cause disturbance to waterbird species (although this guidance is designed primarily for estuarine birds it was considered appropriate to use for this plan), it is concluded that noise effects could be significant up to **1km** from the boundary of the Habitats Site. **Noise from vehicular traffic during construction of the scheme** Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within **500m** of the boundary of the Habitats Site(s). **Plant and personnel involved in operation of the option** These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is adjacent to an offsite area of known foraging, roosting, breeding habitat that support species for which a Habitats Site is designated. **Options that might include artificial lighting,** e.g. for security around a temporary pumping station. Effects from light pollution are more likely to be significant where the boundary of the scheme is within **500m** of the boundary of the Habitats Site
Water table/ availability Drying Flooding/storm water Changes to surface water levels and flows Changes to groundwater level and flows	Change to water levels and flows due to water abstraction, storage and drainage interception associated with inland options. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the Habitats Site. However, these effects are dependent on hydrological continuity between the scheme and the Habitats Site and whether the scheme is up or downstream from the Habitats Site.
Toxic contamination Water pollution Soil contamination Air pollution	**Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems.** These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the Habitats Site. However, these effects are dependent on hydrological continuity between the scheme and the Habitats Site, and sometimes whether the scheme is up or downstream from that site. Air emissions associated with plant and vehicular traffic during construction and operation of the scheme. The effect of dust is only likely to be significant where site is within or in close proximity to the boundary of a Habitats Site. Without mitigation, dust can be deposited onto the public road network and then spread by vehicles on roads up to 500m from large sites, 200m from medium sites, and 50m from small sites as measured from the site exit. Effects of road traffic emissions from the transport route to be taken by the scheme traffic are only likely to be significant where the Habitats Site falls within 200 metres of the edge of a road affected.
Non-toxic contamination Nutrient enrichment (e.g. of soils and water) Algal blooms Changes in turbidity	**Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, discharges, storage, or reduced compensation flow releases to river systems.** These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the

Broad categories of potential effects on Habitats Sites (with examples)	Examples of operations resulting in effects and proposed ZoI
Changes in sedimentation/silting Air pollution (dust)	Habitats Site. However, these effects are dependent on hydrological continuity between the scheme and the Habitats Site, and sometimes whether the scheme is up or downstream from that site. Emissions of dust during the earthworks, construction of plant and tunnel/pipeline construction associated with options.
Biological Disturbances Direct mortality Changes to habitat availability Changes in species abundance or distribution Out-competition by non-native species Introduction of disease Introduction of invasive species	**Killing or injury due to construction activity.** Likely to be a risk where the boundary of the scheme extends within or is directly adjacent to the boundary of the Habitats Site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a Habitats Site is designated). **Changes in habitat availability, such as reductions in wetted width of rivers from abstraction or reduced compensation flow.** These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the Habitats Site. However, these effects are dependent on hydrological continuity between the scheme and the Habitats Site, and sometimes whether the scheme is up or downstream from that site. **Creation of new pathway for spread of non-native invasive species.** This effect is only likely to be significant where the scheme is situated within the Habitats Site or an upstream tributary of the Habitats Site, but also for inter-catchment water transfers.

Source: Adapted from: UK Water Industry Research (2021)[13].

3.3.4 Assumptions and standard best-practice mitigation measures

3.3.4.1 Assumptions

The high-level nature of this assessment undertaken at the options stage means that there is a lack of detailed design. By law, any scheme being taken forward to be implemented will be subject to an Appropriate Assessment at the project stage, when, in the light of more information relating to the construction and design of the scheme, a more refined HRA assessment can be undertaken.

Where exact locations for options are not known, the closest potential location to a Habitats Site is assumed, taking a worst-case scenario approach to assess for potential significant effects.

Thresholds for potential significant effects from hydrological connection pathways have been drawn at 10km for surface water connections and 5km for groundwater-only connections. Where a barrier to groundwater connectivity is present, such as a watercourse, no groundwater connectivity is assumed. It is assumed that there is no connectivity across and between groundwater catchments for the purpose of these assessments.

An in-combination assessment has not been included for those options which are part of alternative (least cost and worst case) plans at Stage 1 nor Stage 2 of the assessment, as relevant information was not available. Very few of these options have an indicative construction start date or duration, nor details for associated civil works, such as haul roads or diversion routes. Without this information, it is not possible to determine any interactions with other plans or projects which are operational or proposed. At this stage, these options are assessed without in-combination effects and details of other projects are not included.

However, indicative construction dates for the preferred plan (best value) options were provided in December 2022, allowing an indicative in-combination assessment to be undertaken.

[13] UK Water Industry Research (UKWIR, 2021). *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15).*

Although finer details are not available at this stage, there was at least an indication of temporal overlap between options, allowing for a limited assessment. This in-combination assessment only considers possible interactions between preferred plan options and does not account for other operational schemes or submitted planning applications within the respective WRZs.

Where the Stage 2 AA at this stage concludes that there may be residual adverse effects on the integrity of a Habitats Site, further data and/or consultation is required. This AA should be revised when additional information is known. At this stage, residual adverse effects does not mean that any HRA needs to be progressed to Stage 3, given the considerable unknowns and assumptions.

It is recommended that SWW works closely with Natural England and the Habitats Sites' owners/managers to agree the specific mitigation measures to be included at the project stage HRA. The agreed mitigation measures will be expected to form part of planning conditions and/or conditions of relevant environmental permits, and their implementation managed through contractual obligations.

3.3.4.2 Best practice measures during construction

The following measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the potentially significant effects on Habitats Sites as much as is reasonably possible. Whilst these measures will be integrated into construction of the final option, they have not been included within the Stage 1 screening of the options to alleviate adverse environmental effects. Instead, they will be applied during the Stage 2 AA and treated as targeted mitigation.

Best practice for the design, pollution control, biosecurity, disturbance, and the Construction and Environmental Management Plan (CEMP) includes:

Option design

- Should design be altered, every opportunity for avoiding potential effects on Habitats Sites (e.g. through alternative pipeline routes, micro-siting, etc.) should be taken.

Pollution control

- Indirect construction-related pollution is identified as one key pathway through which Habitats Sites may be affected. There is numerous guidance on environmental good practice measures during construction which can be relied on (at this level) to prevent significant adverse effects on a designated site occurring. The best-practice procedures detailed in the following documents should be followed for all construction works derived from this option, as a minimum standard:
  - CIRIA C741 *Environmental good practice on site guide* (Charles and Edwards, 2015)[14]
  - CIRIA C532 *Control of water pollution from construction sites* (Masters-Williams *et al.* 2001)[15]
  - Environment Agency's Pollution Prevention Guidance Notes[16] including PPG1: *General Guide to Prevention of Pollution* (July 2013); PPG5: *Works and maintenance in or near*

[14] Charles P. and Edwards P (2015) *Environmental good practice on site guide.* CIRIA C741, 260p.

[15] Masters-Williams H., Heap A., Kitts H. *et al.* (2001) *Control of water pollution from construction sites*. CIRIA C532, 27p.

[16] Note, the Environment Agency Pollution Prevention Guidance Notes have been withdrawn by the Government, although the principles within them are robust and still form a reasonable basis for pollution prevention measures. Documents are still available online at: [ARCHIVED CONTENT] Environment Agency - Pollution prevention advice and guidance (PPG) (nationalarchives.gov.uk) (last accessed April 2022).

water (October 2007), PPG6: *Pollution prevention guidance for working at construction and demolition sites* (April 2010); PPG21: *Pollution incident response planning* (March 2009); PPG22: *Dealing with spills* (April 2011).

- The installation of sediment traps near or in watercourses or the use of cofferdams should be specified at the project stage.

Biosecurity

- Biosecurity measures will be in place to ensure the management of invasive non-native species on construction sites and during controlled activities. The following considerations will be given pre-construction:
  - Invasive non-native species (INNS) risk assessment to be undertaken at site feasibility stage.
  - Where INNS are identified, legal requirements and mitigation plan developed at early planning stage.
  - INNS to be included on all site method statements including CEMP and any Ecological Protection Plans. INNS risk to be managed by Clerk of Works and INNS brief given to all site contractors.
  - Where a species requires long-term management (such as Japanese knotweed *Fallopia japonica*), a specific INNS management plan will be developed.
- The best-practice procedures detailed in the following documents should be followed to reduce the spread of INNS for all construction works derived from these options, as a minimum standard:
  - CIRIA Manual C679 'Invasive species management for infrastructure managers and the construction industry'; The Knotweed Code of Practice – managing Japanese Knotweed on development sites'.

Disturbance - noise

- Construction activities will be conducted in accordance with noise limits to avoid disturbance.
- Construction related noise disturbance will be minimised by implementing best practice such as BS 5228-1:2009+A1:2014 (The British Standards Institute, 2008)[17].

Disturbance - light

- Lighting will be kept to a minimum to reduce disturbance. Should the works be undertaken at night and flood lighting required, lighting should be kept to a minimum, and hooded spotlights directed away from potentially suitable habitat for qualifying species of Habitats Sites, to reduce disturbance while ensuring standards for health and safety.
- The potential impact of artificial light may be minimised through the implementation of best practice such as '*Guidance Notes for the Reduction of Obtrusive Light*' (Institute of Lighting Professionals, 2011)[18].

Construction Environmental Management Plan

[17] The British Standards Institute, 2008. BS 5228-1:2009+A1:2014. *Code of practice for noise and vibration control on construction and open sites. Noise*. BSI Standards Limited, London.

[18] Institution of Lighting Professionals (2020) Guidance note for the reduction of obtrusive light. Guidance Note1/20.

A CEMP must be developed prior to construction, including measures to ensure that the risk of uncontrolled discharges from construction is reduced (including sediment management) and detailing an Emergency Response Plan in the event of a pollution incident. This plan must be prepared for all works and include the industry best practice measures listed above and any targeted mitigation measures identified during the formal HRA.

3.3.4.3 Best practice measures during operation

There are no assumptions relating to best practice or otherwise during the operation of the final option. No best practice measures are recommended in this document to reduce significant effects or adverse effects on Habitats Sites during operation.

4 Coarse Option Screening

A summary of the coarse screening for WRMP24 options is provided within Table 4-1 below. All options identified as being within the WRMP24 are detailed in Sections 5 to 45 hereafter. Details of the Habitats Sites are provided for all options within the appendices.

Table 4-1: Coarse Option Screening Summary

WRZ	Option ID	Option title	Screening conclusion
Bournemouth	BNW1	Borehole development, existing borehole remedial works	Potential for significant effects – Stage 2 required
	BNW3	Wimborne transfer to Longham - licence change	No Likely Significant Effects
	BNW6	Longham aquifer recharge	Potential for significant effects – Stage 2 required
	BNW7	Mendips quarry – 30Ml/d scheme option – raw water transfer and augmentation of the River Stour	SRO option, assessed separately
	BNW8	Pole Harbour FE-reuse	SRO option, assessed separately
	BNW11	Christchurch WWTW IPR 2 transfer to Longham Lakes	Potential for significant effects – Stage 2 required
	BNW17	Cheddar 2 new strategic regional reservoir and transfer	Not yet assessed
Colliford	COL2	Colliford PS Stage 2 - River Camel abstraction.	Potential for significant effects – Stage 2 required
	COL3	Abstraction of Colliford compensation flow when making supply releases	No Likely Significant Effects
	COL4	Abstraction of Siblyback compensation flow when making supply releases	No Likely Significant Effects
	COL5	Increase Wendron annual licence and de-couple from Stithians	No Likely Significant Effects
	COL6	River Hayle abstraction	No Likely Significant Effects
	COL9	Leswidden Pool	Potential for significant effects – Stage 2 required
	COL11	Hawk's Tor Pit	No Likely Significant Effects
	COL12	Stannon daily abstraction increase	Potential for significant effects – Stage 2 required
	COL15	Restormel WTW	No Likely Significant Effects
	COL18	Porth/Rialton	Potential for significant effects – Stage 2 required

	COL19	Boswyn stream/ Cargenwen Reservoir/Carwynnen stream	No Likely Significant Effects
	COL20	River Fal new abstraction	Potential for significant effects – Stage 2 required
Isles of Scilly	ISMY1	St Mary's - St. Mary's new borehole (location 1)	Potential for significant effects – Stage 2 required
	ISMY2	St Mary's - St. Mary's new borehole (location 2)	Potential for significant effects – Stage 2 required
	ISMY4	St. Mary's - increase existing desalination plant capacity	Potential for significant effects – Stage 2 required
	ISB4	Bryher - increase existing desalination plant capacity	Potential for significant effects – Stage 2 required
	IST1	Tresco new borehole	Potential for significant effects – Stage 2 required
Roadford	ROA2	River Erme	No Likely Significant Effects
	ROA3	River Yealm	No Likely Significant Effects
	ROA4	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases	Potential for significant effects – Stage 2 required
	ROA6	Upper Tamar Lake increasing annual licence	Potential for significant effects – Stage 2 required
	ROA7	Expansion of Northcombe WTW to 60 Ml/d	Potential for significant effects – Stage 2 required
	ROA8	Tottiford WTW - reduce WTW minimum capacity	Potential for significant effects – Stage 2 required
	ROA10	Avon WTW - reduce WTW minimum capacity	Potential for significant effects – Stage 2 required
	ROA11	Meldon WTW - reduce WTW minimum capacity	Potential for significant effects – Stage 2 required
	ROA12	Slade and Horedown WTW (GAC)	No Likely Significant Effects
	ROA13	Duckaller and Vennbridge	Potential for significant effects – Stage 2 required
	ROA14	Raise Avon Dam	Potential for significant effects – Stage 2 required
	ROA15	Gatherley Phase 2	No Likely Significant Effects
	ROA16	Littlehempston WTW	Potential for significant effects – Stage 2 required
Wimbleball	WIM1	Abstraction of Wimbleball compensation flow at Northbridge when making supply releases	No Likely Significant Effects
	WIM2	Sidford borehole commissioning	No Likely Significant Effects
	WIM4	Wilmington springs annual abstraction increase	No Likely Significant Effects

	WIM5	Indirect potable reuse - stream support for Dotton WTW	Potential for significant effects – Stage 2 required
	WIM6	Increase Allers WTW capacity	No Likely Significant Effects
	WIM7	Increase Pynes to licence limit 66.46 Ml/d	Potential for significant effects – Stage 2 required
	WIM8	Bramford Speke borehole	No Likely Significant Effects
	WIM9	**Stoke Canon borehole**	**No Likely Significant Effects**

Source: Mott MacDonald, 2022

5 Option BNW1 Habitats Regulations Assessment

5.1 Screening

The Stage 1 Screening identified eight Habitats Sites within the ZoI of BNW1 (Table 5-1). LSE could not be ruled out for seven of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 5-1: BNW1 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
The New Forest SAC (approximately 1.5km north-east)	
New Forest SPA (approximately 1.5km north-east)	
New Forest Ramsar (approximately 1.5km north-east)	
Solent Maritime SAC (approximately 2.3km downstream)	
Solent and Isle of Wight Lagoons SAC (approximately 3.5km downstream	
Solent & Southampton Water SPA (within option)	
Solent & Southampton Water Ramsar (within option)	
Solent and Dorset Coast SPA (approximately 4.3km downstream)	

Source: Mott MacDonald, 2022

5.1.1 The New Forest SAC

There is a hydrological connection between the site and the option via the Water Framework Directive (WFD) groundwater waterbody GB40702G503500 (SW Hants Barton Group). Any pollution events may be transferred via the groundwater catchment to the site and affect qualifying features. Annex I habitats may be damaged through pollution, as well as other suitable habitat and foraging areas for qualifying species. There are no other impact pathways during construction due to the distance of the site from the option.

There is also the potential for significant effects during operation. With increased abstraction from the new borehole, groundwater levels may be reduced. Significant effects on qualifying features which are dependent on groundwater levels cannot be ruled out at this stage. Additionally, it is unknown where water will be discharged to, and this may affect the site elsewhere. It is currently not possible to rule out significant effects.

5.1.2 New Forest SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group). Any pollution events may be transferred to the site and impact qualifying features. Suitable habitat and foraging areas for qualifying species may be damaged and/or degraded through pollution. There are no other impact pathways during construction due to the distance of the site from the option.

There is also the potential for significant effects during operation. With increased abstraction from the new borehole, groundwater levels may be reduced. Significant effects on qualifying features as a result of habitat degradation from changes to groundwater levels cannot be ruled

out at this stage. Additionally, it is unknown where water will be discharged to, and this may affect the site elsewhere. It is currently not possible to rule out significant effects.

5.1.3 New Forest Ramsar

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged through pollution, as well as other suitable habitat and foraging areas for qualifying species. There are no other impact pathways during construction due to the distance of the site from the option.

There is, however, the potential for significant effects during operation. Increased abstraction from the new borehole will result in a reduction in groundwater, for which qualifying features of these Habitats Sites are dependent. Some of the Annex I habitats which are qualifying features of The New Forest SAC, such as bog woodland and Northern Atlantic wet heaths, are sensitive to groundwater level changes. Wetland plants and invertebrates, qualifying features of the Ramsar, under Criterion 2, are also sensitive to groundwater changes. With abstraction reducing groundwater levels in the catchment, there may be adverse impacts on these qualifying features, to a degree where they are damaged and/or outcompeted by other species and habitat types under new conditions. These effects pose a risk to the integrity of the Habitats Sites.

5.1.4 Solent Maritime SAC

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group) and the Lymington River. Any pollution events may be transferred to the site and impact qualifying features. Annex I habitats may be damaged through pollution, as well as other suitable habitat and foraging areas for qualifying species. There are no other impact pathways during construction due to the distance of the site from the option.

The abstraction during operation is only anticipated to affect groundwater levels. Some of the qualifying features are dependent on groundwater, although the option and the site exist in separate groundwater catchments. Due to this, and the distance between the option and the site, there are not anticipated to be any significant effects during operation.

5.1.5 Solent and Isle of Wight Lagoons SAC

There may an indirect hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group) and the Lymington River out into the Solent. Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. There are no other impact pathways during construction due to the distance of the site from the option.

The abstraction during operation is only anticipated to affect groundwater levels. The qualifying feature (coastal lagoons) is dependent on groundwater, although the option and the site exist in separate groundwater catchments. Due to this, and the distance between the option and the site, there are not anticipated to be any significant effects during operation.

5.1.6 Solent & Southampton Water SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Habitats

may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Because the option is within the Solent & Southampton Water SPA, there is also the potential for reductions in air quality from atmospheric pollution. Construction activities and plant can increase dust, CO_2 and NO_x emissions, which can damage sensitive habitats, which support the qualifying features.

Due to the proximity of option BNW1 to the SPA, it is possible that there may be indirect effects to the sites' integrities through disturbance; noise, visual disturbance and artificial light may all adversely impact qualifying bird species. These are all sources of disturbance which could affect the integrity via changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

At this stage, significant effects on the site are anticipated during operation. The Lymington River Reedbeds SSSI component of the site is adjacent to the option and is designated for habitats which are dependent on groundwater. Abstraction may affect groundwater levels and quality, subsequently degrading habitats which are used by qualifying features of the site. Effects on groundwater are not anticipated to be significant on the components of the site within the estuary and coastal areas, as habitats at these locations are within different groundwater catchments.

There may also be significant effects during operation if the abstracted water is discharged into the Lymington River (within the SPA boundary). Qualifying features are dependent on the surface water quality and quantity, and additional discharge may affect prey availability and/or water quality of the site. Without knowing the discharge point during operation, it is not possible to rule out significant effects.

5.1.7 Solent and Southampton Water Ramsar

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Due to the proximity of option BNW1 to the Ramsar, it is possible that there may be indirect effects to the sites' integrities through disturbance; noise, visual disturbance and artificial light may all adversely impact qualifying bird species. These are all sources of disturbance which could affect the integrity via changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

Because the option is within the Solent & Southampton Water Ramsar, there is also the potential for reductions in air quality from atmospheric pollution. Construction activities and plant can increase dust, CO_2 and NO_x emissions, which can damage sensitive habitats, rare plants, and habitats which support other qualifying features.

At this stage, significant effects on the site are anticipated during operation. The Lymington River Reedbeds SSSI component of the site is adjacent to the option and is designated for habitats which are dependent on groundwater. Abstraction may affect groundwater levels and quality, subsequently degrading qualifying habitats and habitats which support qualifying features of the site. Effects on groundwater are not anticipated to be significant on the components of the site within the estuary and coastal areas, as habitats at these locations are within different groundwater catchments.

There may also be significant effects during operation if the abstracted water is discharged into the Lymington River (within the Ramsar boundary). Wetland plants and invertebrates, qualifying features of the Ramsar, under Criterion 2, are also sensitive to groundwater changes. With abstraction reducing groundwater levels in the catchment, there may be adverse impacts on these qualifying features, to a degree where they are damaged and/or outcompeted by other species and habitat types under new conditions. These effects pose a risk to the integrity of the Habitats Sites.

5.1.8 Solent and Dorset Coast SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group) and the Lymington River. Any pollution events may be transferred via the groundwater catchment to the site and indirectly impact qualifying features. Habitats within the site may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

The abstraction during operation is only anticipated to affect groundwater levels. There is no direct groundwater connection between the site and the option, and the qualifying features are not dependent on groundwater-dependent habitats.

5.2 Appropriate Assessment

5.2.1 Scope

The following eight sites were assessed at Stage 2 AA:

- The New Forest SAC (approximately 1.5km north-east)
- New Forest SPA (approximately 1.5km north-east)
- New Forest Ramsar (approximately 1.5km north-east)
- Solent Maritime SAC (approximately 2.3km downstream)
- Solent and Isle of Wight Lagoons SAC (approximately 3.5km downstream)
- Solent & Southampton Water SPA (within option)
- Solent & Southampton Water Ramsar (within option)
- Solent and Dorset Coast (approximately 4.3km downstream)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 5-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option BNW1 cannot necessarily be confirmed, and further information may be required.

5.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate adverse effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of BNW1, and the immediate surrounds, is regularly used by significant numbers of qualifying species of all Habitats Sites assessed in this Appropriate Assessment. This includes wetland invertebrates and overwintering bird species associated with the Solent & Southampton Water SPA and Ramsar. There is also an assumption that changes in groundwater levels from abstraction are as far-reaching as 5km. The discharge point of abstracted water during operation is assumed to be the Lymington River.

With the provision of additional information at subsequent project stages, this AA and recommended mitigation measures may need amending.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 5-2: Potential adverse impacts on integrity of Habitats Sites from option BNW1

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
The New Forest SAC (approximately 1.5km north-east)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary ● Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. Option BNW1 may have the following permanent impacts on the Habitats Site during the operational phase: ● Water table availability – abstraction from the new borehole will reduce groundwater levels ● Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features, as a result of changes to groundwater levels.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction. However, there is currently not enough information available to propose mitigation for the potential operational impacts of this option on the Habitats Site. As a result, there is still the potential for residual adverse impacts.	Potential adverse impacts
New Forest SPA (approximately 1.5km north-east)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary ● Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction. However, there is currently not enough information available to propose mitigation for the potential operational impacts of this option on the Habitats	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		localised due to the distance of the option from the Habitats Site. Option BNW1 may have the following permanent impacts on the Habitats Site during the operational phase: ● Water table availability – abstraction from the new borehole will reduce groundwater levels Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features, as a result of changes to groundwater levels.	Site. As a result, there is still the potential for residual adverse impacts.	
New Forest Ramsar (approximately 1.5km north-east)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction and operation phases: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary ● Physical loss/damage ‑ significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. Option BNW1 may have the following permanent impacts on the Habitats Site during the operational phase: ● Water table availability – abstraction from the new borehole will reduce groundwater levels ● Physical loss/damage ‑ significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features, as a result of changes to groundwater levels.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction. However, there is currently not enough information available to propose mitigation for the potential operational impacts of this option on the Habitats Site. As a result, there is still the potential for residual adverse impacts.	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Solent Maritime SAC (approximately 2.3km downstream)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary ● Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Solent and Isle of Wight Lagoons SAC (approximately 3.5km downstream)	● Coastal lagoons (priority feature)	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the surface water and groundwater catchment which could be transferred to within the Habitats Site boundary ● Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Solent & Southampton Water SPA (within option)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary. Air pollution from construction activities within the Site boundary	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 ● Sensitive timing of construction works to avoid the passage and overwintering period for birds	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		● Non-toxic contamination – reduced air quality from dust, associated with construction activities and plant ● Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. The effects of non-toxic contamination are unlikely to be significant given the scale of the works required for this option. Option BNW1 may have the following permanent impacts on the Habitats Site during the operational phase: ● Water table availability – abstraction from the new borehole will reduce groundwater levels and discharge may change surface water processes. ● Biological disturbance - changes in habitat availability and potential for SPA populations to be displaced from current foraging areas.	detailed in the Solent & Southampton Water SPA citation[19] during October to March inclusive ● Any works which are undertaken between October and March which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited SPA population in the citation. With this in place, adverse impacts on the Habitats Site will be alleviated during construction. However, there is currently not enough information available to propose mitigation for the potential operational impacts of this option on the Habitats Site. As a result, there is still the potential for residual adverse impacts.	
Solent & Southampton Water Ramsar (within option)	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary. Air pollution from construction activities within the Site boundary ● Non-toxic contamination – reduced air quality from dust, associated with construction activities and plant	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 ● Sensitive timing of construction works to avoid the passage and overwintering period for birds detailed in the Solent & Southampton Water	Potential adverse impacts

[19] JNCC (2015). Solent & Southampton Water SPA Standard Data Form (UK9011061) [online] available at: UK9011061.pdf (jncc.gov.uk)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		● Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. The effects of non-toxic contamination are unlikely to be significant given the scale of the works required for this option. Option BNW1 may have the following permanent impacts on the Habitats Site during the operational phase: ● Water table availability – abstraction from the new borehole will reduce groundwater levels and discharge may change surface water processes. ● Biological disturbance – changes in habitat availability and potential for populations to be displaced from current foraging areas. ● Physical damage/loss – changes in the hydrological regime as a result of abstraction and discharge may permanently damage rare plants and/or invertebrates which are qualifying features under Criterion 2.	Ramsar Information Sheet (RIS)[20] between October to March inclusive ● Any works which are undertaken between October and March which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited population in the RIS. With this in place, adverse impacts on the Habitats Site will be alleviated during construction. However, there is currently not enough information available to propose mitigation for the potential operational impacts of this option on the Habitats Site. As a result, there is still the potential for residual adverse impacts.	
Solent and Dorset Coast SPA	● All	Option BNW1 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the surface water and groundwater catchment which could be transferred to within the Habitats Site boundary	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2	No adverse impacts

[20] JNCC (2005). Ramsar Information Sheet UK11063 [online] available at: untitled (jncc.gov.uk)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		• Physical loss/damage – significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	

Source: Mott MacDonald, 2022

5.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2025 and 2026, meaning there is temporal overlap with indicative delivery dates for COL15, ROA7, WIM8 and WIM9. However, there is no geographical overlap with these options; the study areas of these other options do not overlap with BNW1 and therefore the sites identified in this section will not be affected by the other best value options.

Other preferred (best value) plan options exist within the WRZ. Options BNW3, BNW6 and BNW11 are not anticipated to have significant effects on the integrity of the Solent and Dorset Coast SPA, as shown in sections 6, 7 and 8 of this report. This is the only Habitats Site within the overlapping study area. Furthermore, there is no temporal overlap between any of these options and option BNW1, with their deliveries expected to be from 2030 onwards.

Information was not obtained on other projects and plans in the area, but will be included within an in-combination assessment at the project stage.

5.2.4 Appropriate Assessment outcomes for option BNW1

There will be no adverse effects resulting from the implementation of option BNW1 on the integrity of the following Habitats Sites, if the suggested mitigation and best practice measures are implemented:

- Solent Maritime SAC
- Solent and Isle of Wight Lagoons SAC
- Solent and Dorset Coast SPA

There are potential residual adverse impacts on the integrity of the following Habitats Sites, in the absence of detailed option information and ecological data:

- The New Forest SAC
- New Forest SPA
- New Forest Ramsar
- Solent & Southampton Water SPA
- Solent & Southampton Water Ramsar

In conclusion, further information is required to complete a Stage 2 assessment and determine the potential impacts of option BNW1 on the above Habitats Sites during operation. The inability to rule out residual impacts, even after implementation of mitigation, does not necessarily mean that the HRA needs progressing to Stage 3. When additional information is available, this document, including the Stage 1 screening, should be updated.

6 Option BNW3 Habitats Regulations Assessment

6.1 Screening

The Stage 1 Screening identified six Habitats Sites within the ZoI of BNW3 (Table 6-1). LSE were ruled out for all of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 6-1: BNW3 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Dorset Heaths SAC (approximately 3.2km south)
	Dorset Heathlands SPA (approximately 3.2km south)
	Dorset Heathlands Ramsar (approximately 3.5km south)
	Poole Harbour SPA (approximately 8km south)
	Poole Harbour Ramsar (approximately 8km south)
	Solent and Dorset Coast SPA (approximately 24km downstream)

Source: Mott MacDonald, 2022

6.1.1 Dorset Heaths SAC

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

6.1.2 Dorset Heathlands SPA

This site is not hydrologically connected to the option, through surface water or the groundwater catchment. Therefore, there will be no significant effects from pollution through the water environment during construction.

The option is within the distance at which nightjar *Caprimulgus europaeus* are known to commute when foraging (~7km). Although a large number of the nightjar territories occur outside the SPA boundary, the habitats surrounding the option are not considered to be optimal habitats for this species. As such, no significant disturbance effects are anticipated during construction.

The habitats surrounding the indicative construction area are not considered to be suitable as supporting functional habitats for any of the qualifying features outside of the SPA boundary. As such, no significant disturbance effects are anticipated.

No other effect pathways are present, due to the distance between the option and the site.

No effect pathways are present during operation.

6.1.3 Dorset Heathlands Ramsar

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

6.1.4 Poole Harbour SPA

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

6.1.5 Poole Harbour Ramsar

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

6.1.6 Solent and Dorset Coast SPA

Although the site is hydrologically connected downstream from the option, the distance (24km) is sufficient that there are unlikely to be significant effects on the site or its qualifying features during construction or operation. Any pollution events during construction would have to travel through the WFD groundwater waterbody ID GB40802G805900 (Reading Beds) into the River Allen, which then joins the River Stour approximately 2km downstream. The site is then a further 22km downstream. If a pollution event did occur, it is unlikely that significant effects on the qualifying features of the site would occur.

6.1.7 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. There is significant geographical overlap with options BNW6 and BNW11, considering the proximity of both options. However, as no LSE were concluded within this section, and sections 7 and 8 following mitigation, there are no in-combination effects. Furthermore, delivery of this option, if progressed, is anticipated between 2044 and 2045, meaning there is no temporal overlap with any other preferred plan (best value) options' indicative delivery dates.

Option BNW1 is within the same WRZ; only the Solent and Dorset Coast SPA exists within the overlapping study area and findings of no LSE have been concluded for both options. There is no temporal overlap between these options.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

It is considered that there are no effect pathways between all Habitats Sites and option BNW3. Consequently, no LSE can be concluded, either alone or in-combination with other preferred (best value) plan options. As such, this option does not require a Stage 2 AA and is not considered further.

7 Option BNW6 Habitats Regulations Assessment

7.1 Screening

The Stage 1 Screening identified nine Habitats Sites within the ZoI of BNW6 (Table 7-1). LSE could not be ruled out for three of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 7-1: BNW6 Stage 1 screening results

Potential for significant effects	No likely significant effects
Dorset Heaths SAC (approximately 1.2km north)	Dorset Heathlands Ramsar (approximately 1.4km south-east)
Dorset Heathlands SPA (approximately 1.2km north)	Solent and Dorset Coast SPA (approximately 14km downstream)
Avon Valley SPA (approximately 18km downstream)	River Avon SAC (approximately 17.5km downstream)
	Avon Valley Ramsar (approximately 18km downstream)
	Poole Harbour SPA (approximately 7.2km south-west)
	Poole Harbour Ramsar (approximately 7.2km south-west)

Source: Mott MacDonald, 2022

7.1.1 Dorset Heaths SAC

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged through pollution, as well as other suitable habitat and foraging areas for qualifying species. There are no other impact pathways due to the distance between the site (1.2km) and the option during the construction (drilling) of additional boreholes.

Water is to be discharged into new boreholes during the winter, for subsequent abstraction in the summer. The source of the storage water is the Matchams Intake on the River Stour. There will be no changes in groundwater levels, for which some qualifying features are dependent, and therefore no significant effects are anticipated during operation.

7.1.2 Dorset Heathlands SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species. There are no other impact pathways due to the distance between the site (1.2km) and the option during the construction (drilling) of additional boreholes.

The construction is within an existing SWW site, over 1km from the site and outside of suitable functional habitat. Therefore, it is not anticipated that there will be significant construction disturbance or physical damage to any of the qualifying features or their functional habitats.

There are no anticipated effects during operation, as none of the qualifying features of the site are dependent on surface water levels, which may be affected during operation as a result of increased abstraction.

7.1.3 Dorset Heathlands Ramsar

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). However, as the River Stour and other connecting surface watercourses exist between the site and this option, it is not anticipated that any pollution events will be transferred through the groundwater connection. There are no other impact pathways due to the distance between the site (1.4km) and the option during the construction (drilling) of additional boreholes.

Water is to be discharged into new boreholes during the winter, for subsequent abstraction in the summer. The source of the storage water is the Matchams Intake on the River Stour. There will be no changes in groundwater levels, for which some qualifying features are dependent, and therefore no significant effects are anticipated during operation.

7.1.4 Solent and Dorset Coast SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group) and the Lymington River. Any pollution events during construction are not considered to result in significant effects at this distance downstream. There are no other impact pathways during construction due to the distance of the site (14km downstream) from the option.

No significant effects are anticipated during operation, as none of the qualifying features of the site are dependent on surface water changes from the increased abstraction. Effects from lower flows downstream of the intake location are unlikely to be significant on qualifying features given the small proportion of the site within the River Stour and other water sources into the estuary (the River Avon). Furthermore, the qualifying features predominantly forage within marine and coastal areas, so the reduction in flow is not anticipated to significantly affect their foraging areas and subsequent breeding and survival rates.

7.1.5 River Avon SAC

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon) and the River Stour. Any pollution events during construction are not considered to result in significant effects at this distance downstream. There are no other impact pathways due to the distance between the site (17.5km downstream) and the option during the construction (drilling) of additional boreholes.

No significant effects are anticipated during operation. The source of the water for discharge into the boreholes is the intake on the River Stour, and due to the distance upstream of the site, any changes in flow are unlikely to result in effects on the River Avon.

7.1.6 Avon Valley SPA

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon) and the River Stour. Any pollution events during construction are not considered to result in significant effects at this distance downstream (18km).

Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the Avon Valley SPA. Although the indicative construction area for option BNW6 is approximately 7.5km from the Habitats Sites (and 18km upstream), it is within Natural England's *Goose and Swan Functional Land IRZ*, which has identified suitable habitat outside of the sites' boundaries which can support qualifying species. At this distance from the Avon Valley, it is likely that the only qualifying species present will be Bewick's swan *Cygnus columbianus bewickii*. Swans will typically forage in agricultural land during the day and return to roosting sites within the Avon Valley SPA at night. Permanent or temporary loss of this habitat could impact the ability of the surrounding functional land to support the Habitats Site's populations. The ability of these qualifying species to safely and successfully move to and from nesting, feeding and roosting areas is critical to adult fitness and survival, and future breeding success.

During construction there may also be indirect effects to the integrity of the Avon Valley SPA through disturbance; noise, visual disturbance and artificial light are all sources of disturbance which could impact upon qualifying features. Disturbance can result in changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

Since this IRZ area is considered to be potentially functionally connected to the Habitats Sites, the construction of option BNW6 may have a significant effect on the qualifying species of Avon Valley SPA. Without up-to-date species records or survey data, it is not possible to rule out significant effects on these Habitats Sites during the screening stage.

There are no other impact pathways due to the distance between the site and the option (18km downstream) during the construction (drilling) of additional boreholes.

No significant effects are anticipated during operation. The source of the water for discharge into the boreholes is the intake on the River Stour, and due to the distance upstream of the site, any changes in flow are unlikely to result in effects on the River Avon.

7.1.7 Avon Valley Ramsar

There is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon) and the River Stour. Any pollution events during construction are not considered to result in significant effects at this distance downstream. There are no other impact pathways due to the distance between the site and the option (18km downstream) during the construction (drilling) of additional boreholes.

No significant effects are anticipated during operation. The source of the water for discharge into the boreholes is the intake on the River Stour, and due to the distance upstream of the site, any changes in flow are unlikely to result in effects on the River Avon.

7.1.8 Poole Harbour SPA

This site is sufficiently distant from the option (over 7km) and not hydrologically connected to the works footprint. As such, there are unlikely to be any effects during construction or operation of the option.

7.1.9 Poole Harbour Ramsar

This site is sufficiently distant from the option (over 7km) and not hydrologically connected to the works footprint. As such, there are unlikely to be any effects during construction or operation of the option.

It is considered that there are no effect pathways between the following sites and option BNW6: Dorset Heathlands Ramsar, Solent and Dorset Coast SPA, River Avon SAC, Avon Valley Ramsar, Poole Harbour SPA and Poole Harbour Ramsar. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required and these sites are not considered further.

7.2 Appropriate Assessment

7.2.1 Scope

The following three sites were assessed at Stage 2 Appropriate Assessment:

- Dorset Heaths SAC (approximately 1.2km north)
- Dorset Heathlands SPA (approximately 1.2km north)
- Avon Valley SPA (approximately 18km downstream)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 7-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option BNW6 cannot necessarily be confirmed, and further information may be required.

7.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of BNW6 is regularly used by significant numbers of overwintering Bewick's swan, associated with the Avon Valley SPA. With the provision of additional information, it is possible that the mitigation provided within this document will need amending.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 7-2: Potential adverse impacts on integrity of Habitats Sites from option BNW6

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Dorset Heaths SAC (approximately 1.2km north)	● All	Option BNW6 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Dorset Heathlands SPA (approximately 1.2km north)	● All	Option BNW6 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Avon Valley SPA (approximately 7.5km east)	● Overwintering populations of Bewick's swan *Cygnus*	Option BNW6 lies within the Avon Valley *Goose and Swan Functional Land IRZ*, with the following temporary impacts possible during the construction phase:	The following measures will be implemented to avoid or reduce adverse impacts during construction: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2;	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
	columbianus bewickii	● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Functional Land IRZ; ● Physical loss/damage ‑ small, localised habitat loss and/or habitat degradation leading to a slight reduction of functional land; ● Non-toxic contamination ‑ reduction in air quality due to construction activities likely to result in degradation of surrounding functional land and reductions in foraging areas; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and ● Biological disturbance ‑ changes in habitat availability and potential for SPA populations to be displaced from current foraging areas. The impacts of non-toxic contamination and non-physical disturbance are considered to be temporary and localised. Physical loss of habitat is a permanent impact but localised to the option footprint. The identified impacts have the potential to reduce the extent and distribution of functional habitat which supports the qualifying species' populations. Disturbance to qualifying species may impact upon adult survival. No adverse impacts are identified during operation.	● Sensitive timing of construction works to avoid the passage and overwintering period for birds detailed in the Avon Valley SPA supplementary advice note[21] during November to March inclusive; and ● Any works which are undertaken between November and March which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited SPA population in the advice note (156 individuals, therefore 2 birds is the threshold). This approach is considered to be conservative in the absence of recent survey data. Habitat loss and non-physical disturbance caused by construction are not anticipated to result in adverse effects on the integrity of the SPA from reductions in habitat availability and/or displacement effects. However, this cannot be confirmed until records or survey data is obtained. Therefore, these mitigation measures are proposed to remove the potential adverse effects. Overwintering populations of Bewick's swan roost within the Habitats Sites' boundary itself and only use surrounding agricultural land for foraging. Therefore, specific mitigation measures for temporary artificial lighting during night works are not required. Assuming all proposed mitigation, and best practice measures, is implemented it is considered there will not be any adverse effects on the integrity of the SPA.	

Source: Mott MacDonald, 2022

[21] Natural England (2019). Avon Valley SPA (UK90111091) Conservation Objectives Supplementary Advice [online] available at: European Site Conservation Objectives for Avon Valley SPA - UK9011091 (naturalengland.org.uk)

7.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2030 and 2031, meaning there is possible temporal overlap with indicative delivery dates for BNW11 and WIM5. However, there is no geographical overlap with WIM5; the study area of WIM5 does not overlap with BNW6 and therefore the sites identified in this section will not be affected by option WIM5.

Other preferred (best value) plan options exist within the WRZ. Options BNW1, BNW3 and BNW11 are not anticipated to have significant effects on the integrity of the Solent and Dorset Coast SPA, as shown in sections 5, 6 and 8 of this report. This is the only Habitats Site within the overlapping study area.

There is significant temporal and geographical overlap between options BNW6 and BNW11. However, following conclusions that there will be no adverse effects on any Habitat Sites' integrities from either option, as shown in this section and section 8, in-combination effects on Habitats Sites within the study area can be ruled out. There is significant geographical overlap between this option and option BNW3, although the indicative delivery date for BNW3 is between 2044 and 2045 and therefore there would be no temporal overlap.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

7.2.4 Appropriate Assessment outcomes for option BNW6

There will be no adverse impacts resulting from the implementation of option BNW6 on the integrity of the following Habitats Sites, if the suggested mitigation and best practice measures are implemented:

- Dorset Heaths SAC
- Dorset Heathlands SPA
- Avon Valley SPA

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, alone or in-combination with other options, and therefore no further stages in the HRA process are necessary for option BNW6.

8 Option BNW11 Habitats Regulations Assessment

8.1 Screening

The Stage 1 Screening identified 12 Habitats Sites within the ZoI of BNW11 (Table 8-1). LSE could not be ruled out for seven of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 8-1: BNW11 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
River Avon SAC (within option)	The New Forest SAC (approximately 8km east
Avon Valley SPA (within option)	New Forest SPA (approximately 7.5km north-east)
Avon Valley Ramsar (within option)	New Forest Ramsar (approximately 7.5km north-east)
Solent and Dorset Coast SPA (approximately 200m south)	Poole Harbour SPA (approximately 7km south-west)
Dorset Heaths SAC (approximately 200m south)	Poole Harbour Ramsar (approximately 7km south-west)
Dorset Heathlands SPA (approximately 1.5km south)	
Dorset Heathlands Ramsar (approximately 200m south)	

Source: Mott MacDonald, 2022

8.1.1 River Avon SAC

The site is within the construction boundary of the option, and water may be discharged directly into the site during operation. Any pollution events may be transferred through the site and impact qualifying features. Annex I habitats may be damaged through pollution of the water environment, and degradation of suitable habitat and foraging areas for qualifying species may have a significant effect.

The construction of the new pipeline also has the potential to result in habitat loss, with possible significant effects to qualifying species within the SAC boundary.

It is also possible that reduced air quality and increased nitrogen deposition has a significant effect on qualifying habitats of the SAC. The conservation objectives state that this feature is sensitive to air pollution. The Air Pollution Information System (APIS) states sensitivities of priority habitats within the site to NOx, ammonia and sulphur dioxide, although there are no comparable habitats with an established critical load estimate available. As such, further assessment is required.

There are no anticipated effects on the site during operation, with the pipeline passing through the site to a separate discharge location.

8.1.2 Avon Valley SPA

The site is within the construction boundary of the option, and water may be discharged directly into the site during operation. Any pollution events may be transferred through site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Construction of the new pipeline has the potential to result in the loss of habitat used by the qualifying features, both within and outside of the SPA boundary. Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the Avon Valley SPA.

The construction area at the north end of the pipeline is approximately 10km from the SPA boundary, but lies within Natural England's *Goose and Swan Functional Land IRZ*, which has identified suitable habitat outside of the sites' boundaries which can support qualifying species. At this distance, it is likely that the only qualifying species present will be Bewick's swan. Swans will typically forage in agricultural land during the day and return to roosting sites within the Avon Valley SPA at night. Permanent or temporary loss of this habitat could impact the ability of the surrounding functional land to support the Habitats Site's populations. The ability of these qualifying species to safely and successfully move to and from nesting, feeding and roosting areas is critical to adult fitness and survival, and future breeding success.

During construction there may also be indirect effects to the integrity of site, through disturbance; noise, visual disturbance and artificial light are all sources of disturbance which could impact upon qualifying features. Disturbing effects can result in changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

It is possible that reduced air quality and increased nitrogen deposition during construction has a significant effect on habitats which support qualifying species. An increase in construction dust and sedimentation may degrade supporting roosting and foraging habitats. As such, further assessment is required.

There are no anticipated effects on the site during operation, with the pipeline passing through the site to a separate discharge location.

8.1.3 Avon Valley Ramsar

The site is within the construction boundary of the option, and water may be discharged directly into the site during operation. Any pollution events may be transferred through the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Construction of the new pipeline has the potential to result in the loss of habitat used by the qualifying bird species, both within and outside of the Ramsar boundary. During construction there may also be indirect effects to the integrity of site, through disturbance; noise, visual disturbance and artificial light are all sources of disturbance which could impact upon qualifying features. Disturbing effects can result in changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

Construction of the new pipeline has the potential to result in habitat loss, with possible significant effects to qualifying species within the Ramsar boundary.

It is possible that reduced air quality and increased nitrogen deposition during construction has a significant effect on qualifying habitats of the Ramsar, and those habitats which support qualifying features. APIS states sensitivities of priority habitats within the site to NOx, Ammonia

and Sulphur Dioxide. An increase in construction dust and sedimentation may degrade supporting roosting and foraging habitats. As such, further assessment is required.

There are no anticipated effects on the site during operation, with the pipeline passing through the site to a separate discharge location.

8.1.4 Solent and Dorset Coast SPA

This site is hydrologically connected downstream of the option via the River Avon and WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Despite the proximity, the qualifying features are unlikely to be significantly disturbed by any construction-related activities. The proportion of the site which is likely to be affected during construction (1%) represents a very small area of its total size. The qualifying features are predominantly marine species, although common tern will sometimes forage within inland waterways. As such, there are unlikely to be significant effects on the breeding success and/or adult survival and fitness of all tern species.

However, there is still potential for a reduction in air quality to impact upon breeding sites, due to the proximity of the option to the site in the lower Stour. It is unknown how qualifying features are using these areas and whether or not they may be displaced from breeding or foraging areas as a result of habitat degradation. As such, further assessment is required.

The qualifying features will not be affected during operation, as they are not dependent on the water quality/quantity of the River Avon.

8.1.5 Dorset Heaths SAC

This site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). The River Avon and Christchurch Bay provide barriers between the downstream components of the site (approximately 3km), meaning that there is no direct transfer through groundwater in this direction.

It is possible that reduced air quality and increased nitrogen deposition during construction have a significant effect on qualifying habitats of the SAC. APIS states sensitivities of priority habitats within the site to NOx, ammonia and sulphur dioxide. As such, further assessment is required. This impact pathway is only applicable to the Turbary and Kinson Commons SSSI component of the SAC.

8.1.6 Dorset Heathlands SPA

This site is hydrologically connected downstream of the option via the River Avon and WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). Any pollution events may be transferred through the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Due to the distance of the site from the option, there are no other impact pathways and no significant effects anticipated during construction or operation. The proposed pipeline location follows existing road infrastructure and urbanised areas, thus there will be no loss or degradation of suitable functional habitat for all qualifying features.

8.1.7 Dorset Heathlands Ramsar

This site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). Any pollution events may

be transferred through the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

It is possible that reduced air quality and increased nitrogen deposition during construction have a significant effect on qualifying habitats of the Ramsar. APIS states sensitivities of priority habitats within the site to NOx, ammonia and sulphur dioxide. As such, further assessment is required. This impact pathway is only applicable to the Turbary and Kinson Commons SSSI component of the Ramsar.

8.1.8 The New Forest SAC

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

8.1.9 New Forest SPA

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation.

8.1.10 New Forest Ramsar

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of this option.

8.1.11 Poole Harbour SPA

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of this option.

8.1.12 Poole Harbour Ramsar

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of this option.

8.2 Stage 2 Appropriate Assessment

8.2.1 Scope

The following seven sites were assessed at Stage 2 AA:

- River Avon SAC (within option)
- Avon Valley SPA (within option)
- Avon Valley Ramsar (within option)
- Solent and Dorset Coast SPA (approximately 200m south)
- Dorset Heathlands SAC (approximately 200m south)
- Dorset Heathlands SPA (approximately 1.5km south)
- Dorset Heathlands Ramsar (approximately 200m south)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 8-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not

necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option BNW11 cannot necessarily be confirmed, and further information may be required.

8.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of BNW11 is regularly used by significant numbers of qualifying bird species, associated with the Avon Valley SPA and Ramsar. With the provision of additional information, it is possible that the mitigation provided within this document will need amending.

It is assumed that significant populations of the qualifying features of the Solent and Dorset Coast SPA are not using the habitats within or immediately adjacent to the proposed construction area. As these features are predominantly marine species, they are not considered to be significantly disturbed by construction activities. They are, however, still vulnerable to degradation of suitable habitat as a result of air quality reductions.

Only the closest area of the Dorset Heaths SAC and Dorset Heathlands Ramsar is at risk of degradation from reduced air quality; the Turbary and Kinson Commons SSSI component of the Habitats Site is within 200m, although all other components are further from the proposed option, where this impact pathway is not considered to result in adverse impacts.

The proposed mitigation measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 8-2: Potential adverse impacts on integrity of Habitats Sites from option BNW11

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
River Avon SAC (within option)	• All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: • Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site. Air pollution from construction activities within 200m of the site boundary; • Physical loss/damage - small, localised habitat loss and/or habitat degradation leading to a slight reduction of functional land; • Non-toxic contamination - reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in foraging areas; • Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and • Biological disturbance - changes in habitat availability and potential for SPA populations to be displaced from current foraging areas. The impacts of non-toxic contamination and non-physical disturbance are considered to be temporary and localised. Physical loss of habitat is a permanent impact but localised to the option footprint. The identified impacts have the potential to reduce the extent and distribution of functional habitat which supports the qualifying species' populations. Disturbance to qualifying species may impact upon adult survival.	The following measures will be implemented to avoid or reduce adverse impacts during construction: • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2; • Maintain upstream and downstream passage for all fish during construction, with no physical barriers; • Sensitive timing of construction works to avoid the key spawning and upstream migration season of Atlantic salmon, November to February inclusive; • Sensitive timing of construction works to avoid the key spawning season of the brook lamprey *Lampetra planeri*, April to June inclusive; • Sensitive timing of construction works to avoid the key spawning and upstream migration season of sea lamprey *Petromyzon marinus*, May to July inclusive; • Retain bankside habitat cover and other suitable adjacent habitats where possible; and, • Avoid working within the watercourse itself and limiting the length of the bankside working area. With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	No adverse impacts
Avon Valley SPA (within option)	• All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: • Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site.	The following measures will be implemented to avoid or reduce adverse impacts during construction: • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2;	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		Air pollution from construction activities within 200m of the site boundary; ● Physical loss/damage – small, localised habitat loss and/or habitat degradation leading to a slight reduction of functional land; ● Non-toxic contamination – reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in foraging areas; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and ● Biological disturbance – changes in habitat availability and potential for SPA populations to be displaced from current foraging areas. The impacts of non-toxic contamination and non-physical disturbance are considered to be temporary and localised. Physical loss of habitat is a permanent impact but localised to the option footprint. The identified impacts have the potential to reduce the extent and distribution of functional habitat which supports the qualifying species' populations. Disturbance to qualifying species may impact upon adult survival. No adverse impacts are identified during operation.	● Sensitive timing of construction works to avoid the passage and overwintering period for birds detailed in the Avon Valley SPA supplementary advice note[22] during November to March inclusive; and ● Any works which are undertaken between November and March which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited SPA populations in the advice note. This approach is considered to be conservative in the absence of recent survey data. Habitat loss and non-physical disturbance caused by construction are not anticipated to result in adverse effects on the integrity of the SPA from reductions in habitat availability and/or displacement effects. However, this cannot be confirmed until records or survey data is obtained. Therefore, these mitigation measures are proposed to remove the potential adverse effects. Assuming all proposed mitigation, and best practice measures, is implemented it is considered there will not be any adverse effects on the integrity of the SPA.	
	● Overwintering populations of Bewick's swan	Option BNW11 lies within the Avon Valley *Goose and Swan Functional Land IRZ*, with the following temporary impacts possible during the construction phase outside of the site's boundary. The same potential impacts as above apply but are only applicable to populations of Bewick's swan within the IRZ.	The same mitigation measures apply as above.	No adverse impacts

[22] Natural England (2019). Avon Valley SPA (UK90111091) Conservation Objectives Supplementary Advice [online] available at: European Site Conservation Objectives for Avon Valley SPA - UK9011091 (naturalengland.org.uk)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Avon Valley Ramsar (within option)	● All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site. Air pollution from construction activities within 200m of the site boundary; ● Physical loss/damage ‑ small, localised habitat loss and/or habitat degradation leading to a slight reduction of functional land; ● Non-toxic contamination ‑ reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in foraging areas; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and ● Biological disturbance ‑ changes in habitat availability and potential for SPA populations to be displaced from current foraging areas. The impacts of non-toxic contamination and non-physical disturbance are considered to be temporary and localised. Physical loss of habitat is a permanent impact but localised to the option footprint. The identified impacts have the potential to reduce the extent and distribution of functional habitat which supports the qualifying species' populations. Disturbance to qualifying species may impact upon adult survival. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts during construction: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2; ● Sensitive timing of construction works to avoid the passage and overwintering period for birds detailed in the Avon Valley RIS supplementary advice note[23] during November to March inclusive; and ● Any works which are undertaken between November and March which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited Ramsar populations in the information sheet. This approach is considered to be conservative in the absence of recent survey data. Habitat loss and non-physical disturbance caused by construction are not anticipated to result in adverse effects on the integrity of the Ramsar from reductions in habitat availability and/or displacement effects. However, this cannot be confirmed until records or survey data is obtained. Therefore, these mitigation measures are proposed to remove the potential adverse effects. Assuming all proposed mitigation and best practice measures are implemented it is considered there will not be any adverse effects on the integrity of the Ramsar.	No adverse impacts
Solent and Dorset Coast	●	Option BNW11 has the potential to have the following temporary impact during the construction phase at this location:	The following measures will be implemented to avoid or reduce adverse impacts:	No adverse impacts

[23] JNCC (1998). UK11005 Avon Valley Ramsar Information Sheet [online] available at: untitled (jncc.gov.uk)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
SPA (within option)		● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site. Air pollution from construction activities within 200m of the site boundary; ● Physical loss/damage – small, localised habitat loss and/or habitat degradation leading to a slight reduction of functional land; ● Non-toxic contamination – reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in nesting area. No adverse impacts are anticipated during operation.	● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	
Dorset Heaths SAC (approximately 200m south)	● All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site. Air pollution from construction activities within 200m of the site boundary; ● Physical loss/damage – small, localised habitat loss and/or habitat degradation leading to a slight reduction of supporting habitat; ● Non-toxic contamination – reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in foraging areas; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Dorset Heathlands SPA (approximately 1.5km south)	● All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		Air pollution from construction activities within 200m of the site boundary; ● Physical loss/damage – small, localised habitat loss and/or habitat degradation leading to a slight reduction of supporting habitat; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	
Dorset Heathlands Ramsar (approximately 200m south)	● All	Option BNW11 has the potential to have the following temporary or permanent impacts during the construction phase at this location: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the site; ● Physical loss/damage – small, localised habitat loss and/or habitat degradation leading to a slight reduction of supporting habitat; ● Non-toxic contamination – reduction in air quality due to construction activities likely to result in degradation of surrounding habitat and reductions in foraging areas; The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

8.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2031 and 2032, meaning there is possible temporal overlap with indicative delivery dates for BNW6 and WIM5. However, there is no geographical overlap with WIM5; the study area of WIM5 does not overlap with BNW11 and therefore the sites identified in this section will not be affected by option WIM5.

Other preferred (best value) plan options exist within the WRZ. Options BNW1, BNW3 and BNW6 are not anticipated to have significant effects on the integrity of the Solent and Dorset Coast SPA, as shown in sections 5, 6 and 7 of this report.

There is significant temporal and geographical overlap between options BNW6 and BNW11. However, following conclusions that there will be no adverse effects on any Habitat Sites' integrities, from either option, as shown in this section and section 6, in-combination effects on Habitats Sites within the study area can be ruled out. There is significant geographical overlap between this option and option BNW3, although the indicative delivery date for BNW3 is between 2044 and 2045 and therefore there would be no temporal overlap.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

8.2.4 Stage 2 outcomes for option BNW11

There will be no adverse impacts resulting from the implementation of option BNW11 on the integrity of all Habitats Sites, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, alone or in-combination with other options, and therefore no further stages in the HRA process are necessary for option BNW11.

9 Option COL2 Habitats Regulations Assessment

9.1 Screening

The Stage 1 Screening identified six Habitats Sites within the ZoI of COL2 (Table 9-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 9-1: COL2 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
River Camel SAC (within option)	Breney Common and Goss & Tregoss Moors SAC (approximately 2.2km south-west)
	St Austell Clay Pits SAC (approximately 9.5km south-west)
	Polruan to Polperro SAC (approximately 11.5km downstream)
	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately16km downstream)
	Falmouth Bay to St Austell Bay SPA (approximately 12km downstream)

Source: Mott MacDonald, 2022

9.1.1 River Camel SAC

The site is adjacent to the option and hydrologically connected throughout the River Camel and the WFD groundwater waterbody GB40802G800300 (North Cornwall). Any pollution events may be transferred to the site and impact qualifying features. Annex I habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species. There may be significant effects on qualifying features from the following impact pathways during construction of the new intake: habitat loss/fragmentation, air pollution, visual and aural disturbance.

There is potential for significant effects on aquatic and semi-aquatic qualifying features. Otter *Lutra lutra* may be disturbed during construction as a result of habitat loss and/or construction-related noise but this is unlikely to be significantly affected during operation.

Atlantic salmon *Salmo salar* and bullhead *Cottus gobio* may be significantly affected during both construction and operation. Construction disturbance and habitat loss within the river channel and bankside may displace these species temporarily. During operation, the reduction in flow within the river may affect habitat suitability of these sensitive species and displace them to other areas within the site boundary or elsewhere. These effects may be felt downstream within the SAC.

Upgrade works to the Restormel pipeline at the southern end of the option are not anticipated to have a significant effect on this site. This end of the option is not hydrologically connected to the site. Due to the distance from the site, no other impact pathways are anticipated from the Upgrades to Restormel WTW.

Abstraction directly from the River Camel will result in a reduced flow downstream of this location, possibly resulting in changes to hydrology downstream of the intake and impacting

suitable habitat and conditions for qualifying features. It is unknown how this may impact upon qualifying features of the site, particularly in-channel habitats for migrating Atlantic salmon and bullhead within the SAC boundary. The reduced flow is unlikely to result in significant impacts to Annex I habitats but may affect prey availability and in-channel suitability for otters.

9.1.2 Breney Common and Goss & Tregoss Moors SAC

This site may be hydrologically connected to the option and the River Fowey, via smaller upstream watercourses, although there is no groundwater connectivity. The location upstream will preclude significant effects from pollution events to the water environment.

There are no other impact pathways during construction or operation, and as such, no significant effects are anticipated.

9.1.3 St Austell Clay Pits SAC

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

9.1.4 Polruan to Polperro SAC

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Due to the distance downstream, no significant effects are anticipated during construction. There are no additional impact pathways during construction.

Water discharged into the River Fowey from the Restormel WTW is not anticipated to have any significant effects on the site during operation. Whilst there is a hydrological connection, there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces.

9.1.5 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is hydrologically connected to the option via the River Camel. Due to the distance downstream, no significant effects are anticipated. There are no additional impact pathways during construction.

The qualifying feature of this site is a marine component and not dependent on the surface water from the River Camel. Consequently, any effects on hydrology as a result of the new intake will not affect this site.

9.1.6 Falmouth Bay to St Austell Bay SPA

This site is hydrologically connected to the southern end of the option via the Rver Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Due to the distance downstream, no significant effects are anticipated during construction. There are no additional impact pathways during construction.

The qualifying features of the site are marine specialists and will not be affected by any additional water discharge from the Restormel WTW upstream, through prey availability or water quality/quantity. As a result, they are no anticipated effects during operation.

It is considered that there are no effect pathways between the following sites and option BNW6: Breney Common and Goss & Tregoss Moors SAC, St Austell Clay Pits SAC, Polruan to Polperro SAC, Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC and Falmouth Bay to St Austell Bay SPA. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required and these sites are not considered further.

9.2 Appropriate Assessment

9.2.1 Scope

The following site were assessed at Stage 2 AA:

- River Camel SAC (within option)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 9-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option COL2 cannot necessarily be confirmed, and further information may be required.

9.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of COL2 is regularly used by significant numbers of otter, bullhead and Atlantic salmon, all associated with the River Camel SAC. It is also assumed that changes in flow within the river immediately downstream of the construction area will result in significant changes to the flow within River Camel SAC. With the provision of additional information, it is possible that the mitigation provided within this document will need amending.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible. There are no known mitigation measures to address the issue of water abstraction from the SAC.

Table 9-2: Potential adverse impacts on integrity of Habitats Sites from option COL2

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
River Camel SAC (adjacent)	● Annex I habitats	Option COL2 may have the following permanent impacts on the qualifying Annex I habitats during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; and ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Atlantic salmon and bullhead	Option COL2 may have the following permanent impacts on these Annex II species during the construction and operation phases: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting	The following measures will be implemented to avoid or reduce adverse impacts: ● Maintain upstream and downstream passage for all fish during construction, with no physical barriers; ● Sensitive timing of construction works to avoid the key spawning and upstream migration season, November to February inclusive; ● Retain bankside habitat cover and other suitable adjacent habitats where possible; ● Avoid working within the watercourse itself and limiting the length of the bankside working area; and,	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and ● Biological disturbance – changes in habitat availability and potential for SAC populations to be displaced from currently used areas.	● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction. However, there is not enough information available to provide mitigation to alleviate the potential impacts during operation.	
	● Otter	Option COL2 may have the following permanent impacts on the otter during the construction and operation phases: ● Toxic contamination – pollution of the marine environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and ● Biological disturbance – changes in habitat availability and potential for SAC populations to be displaced from current spawning areas.	The following measures will be implemented to avoid or reduce adverse impacts: ● Maintain commuting routes during construction, with no physical barriers to movement within the watercourse and adjacent suitable habitat; ● Sensitive timing of construction works to avoid the periods of greatest otter activity, i.e. no night-time working; ● Retain bankside habitat cover and other suitable adjacent habitats where possible; ● Avoid disturbance to confirmed holts until no longer in use. This can be informed from monitoring using cameras (requires Natural England licence); ● If holts require closure and destruction to facilitate construction, artificial replacements will be required on the same watercourse away from the works area. These must be in-situ before construction starts. This work will require a Natural England licence; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction. However, there is not enough	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
			information available to provide mitigation to alleviate the potential impacts during operation.	

Source: Mott MacDonald, 2022

9.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

9.2.4 Appropriate Assessment outcomes for option COL2

There will be no adverse impacts during construction of option COL2 on the integrity of the River Camel SAC, if the suggested mitigation and best practice measures are implemented.

There are potential residual adverse impacts on the integrity of the Habitats Site during operation, in the absence of detailed option information and ecological data. In conclusion, further information is required to complete a revised AA and determine the potential impacts of option COL2 on the River Camel SAC during operation. The inability to rule out residual impacts, even after implementation of mitigation, does not mean that the HRA needs progressing to Stage 3. When additional information is available, this document, including the Stage 1 screening, should be updated.

10 Option COL3 Habitats Regulations Assessment

10.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL3 (Table 10-1). LSE were ruled out for all four of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 10-1: COL3 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Breney Common and Goss & Tregoss Moors SAC (approximately3.5km west)
	River Camel SAC (approximately 7.5km north)
	Polruan to Polperro SAC (approximately 12km downstream)
	Falmouth Bay to St. Austell Bay SPA (approximately 15km downstream)

Source: Mott MacDonald, 2022

10.1.1 Breney Common and Goss & Tregoss Moors SAC

There are no infrastructure changes for this option and therefore there are no likely significant effects during a construction phase.

This site may be hydrologically connected to the option and the River Fowey, via smaller upstream watercourses. However, there is no groundwater connectivity and there are unlikely to be any effects during operation as the effects of abstraction will only be applicable downstream.

10.1.2 River Camel SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

10.1.3 Polruan to Polperro SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Increased abstraction from the River Fowey is not anticipated to have any significant effects on the site during operation. Whilst there is a hydrological connection, there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces.

10.1.4 Falmouth Bay to St. Austell Bay SPA

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). The qualifying features of the site are marine specialists and will not be affected by a reduction in flow into the bay, through prey availability or water quality/quantity. As a result, they are no anticipated effects during operation.

It is considered that there are no effect pathways between all Habitats Sites and option COL3. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

11 Option COL4 Habitats Regulations Assessment

11.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL4 (Table 11-1). LSE were ruled out for all four of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 11-1: COL4 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Breney Common and Goss & Tregoss Moors SAC (approximately 3.5km west)
	River Camel SAC (approximately 7.5km north)
	Polruan to Polperro SAC (approximately 12km downstream)
	Falmouth Bay to St. Austell Bay SPA (approximately 15km downstream)

Source: Mott MacDonald, 2022

11.1.1 Breney Common and Goss & Tregoss Moors SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site may be hydrologically connected to the option and the River Fowey, via smaller upstream watercourses. However, there is no groundwater connectivity, and there are unlikely to be any effects during operation as the effects of abstraction will only be applicable downstream.

11.1.2 River Camel SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

11.1.3 Polruan to Polperro SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Increased abstraction from the River Fowey is not anticipated to have any significant effects on the site during operation. Whilst there is a hydrological connection, there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces.

11.1.4 Falmouth Bay to St. Austell Bay SPA

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). The qualifying features of the site are marine specialists and will not be affected by a reduction in flow into the bay, through prey availability or water quality/quantity. As a result, they are no anticipated effects during operation.

It is considered that there are no effect pathways between all Habitats Sites and option COL4. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

12 Option COL5 Habitats Regulations Assessment

12.1 Screening

The Stage 1 Screening identified five Habitats Sites within the ZoI of COL5 (Table 12-1). LSE were ruled out for all five of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 12-1: COL5 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Fal and Helford SAC (approximately 5.2km south-east)
	Tregonning Hill SAC (approximately 7.5km west)
	The Lizard SAC (approximately 8km south)
	Lizard Point SAC (Approximately 8.5km south)
	Falmouth Bay to St Austell Bay SPA (approximately 8km south-east)

Source: Mott MacDonald, 2022

12.1.1 Fal and Helford SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

12.1.2 Tregonning Hill SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

12.1.3 The Lizard SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and only hydrologically connected to the option footprint via the marine environment. As such, there are unlikely to be any effects during operation of the option.

12.1.4 Lizard Point SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and only hydrologically connected to the option footprint via the marine environment. As such, there are unlikely to be any effects during operation of the option.

12.1.5 Falmouth Bay to St Austell Bay SPA

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

It is considered that there are no effect pathways between all Habitats Sites and option COL5. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

13 Option COL6 Habitats Regulations Assessment

13.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of option COL6 (Table 13-1). LSE were ruled out for all of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 13-1: COL6 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 9.5km downstream)
	Tregonning Hill SAC (approximately 7km south-east)
	Marazion Marsh SPA (approximately 3.5km south-west)

Source: Mott MacDonald, 2022

13.1.1 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is sufficiently distant from the proposed works and only hydrologically connected indirectly, through the marine environment approximately 5km from the mouth of the River Hayle. Due to this distance, any pollution of the water environment during construction is unlikely to have a significant effect of Harbour Porpoise *Phocoena phocoena*, the qualifying feature of this site. There are no other impact pathways during construction due to this distance.

Harbour porpoise is not dependent on the surface water from the River Hayle, and as such, no significant effects are anticipated as a result of abstraction during operation.

13.1.2 Tregonning Hill SAC

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of this option.

13.1.3 Marazion Marsh SPA

This site is sufficiently distant from the proposed works (over 3.5km) and not hydrologically connected to the option footprint. Additionally, there is no suitable supporting habitat for the qualifying features – Bittern *Botaurus stellaris* and Aquatic warbler *Acrocephalus paludicola* – between the site and option COL6 which are at risk of disturbance during construction. There are no other impact pathways during construction or operation due to the distance between the site and this option.

It is considered that there are no impact pathways between option COL6 and all identified Habitats Sites. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required and these sites are not considered further.

14 Option COL9 Habitats Regulations Assessment

14.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of COL9 (Table 14-1). LSE could not be ruled out for either of these two of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 14-1: COL9 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Lower Bostraze & Leswidden SAC (approximately 40m west)	
Lands End and Cape Bank SAC (approximately 3.5km west)	

Source: Mott MacDonald, 2022

14.1.1 Lower Bostraze & Leswidden SAC

The site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G800100 (West Cornwall). Any pollution events may be transferred to the site and impact qualifying features. Consequently, damage and destruction of qualifying species (Western rustwort *Marsupella profunda*) is possible as a result of water pollution.

Due to the proximity of the site to the option (40m), there is potential for significant effects on the qualifying features as a result of air pollution associated with construction activities. The conservation objectives state that Western rustwort is sensitive to air pollution. APIS states sensitivities of priority habitats to NOx, Ammonia and Sulphur Dioxide, although there is no comparable habitats with an established critical load estimate available. As such, further assessment is required. Non-toxic air pollution, such as dust and sedimentation during construction activities, may also affect Western rustwort.

During operation, the reduction in water from Leswidden Pool is not anticipated to affect the qualifying feature of the site. There are no other impact pathways during operation and so no likely significant effects are anticipated.

14.1.2 Lands End and Cape Bank SAC

The site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G800100 (West Cornwall). Any pollution events may be transferred to the site and impact qualifying Annex I habitats through damage and/or degradation, which may be temporary or permanent. There are no other impact pathways during construction due to the distance of the site from the option.

No significant effects are anticipated during operation due to the distance of the site from the option as there are no impact pathways during water transfer.

14.2 Appropriate Assessment

14.2.1 Scope

The following two sites were assessed at Stage 2 AA:

- Lower Bostraze & Leswidden SAC (approximately 40m west)
- Lands End and Cape Bank SAC (approximately 3.5km west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 14-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option COL9 cannot necessarily be confirmed, and further information may be required.

14.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 14-2: Potential adverse impacts on integrity of Habitats Sites from option COL9

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Lower Bostraze & Leswidden SAC (approximately 40m west)	● All	Option COL9 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; Air pollution from construction activities within 200m of the Site boundary; ● Non-toxic contamination – reduced air quality from dust, associated with construction activities and plant; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Lands End and Cape Bank SAC (approximately 3.5km west)	● All	Option COL9 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

14.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

14.2.4 Appropriate Assessment outcomes for option COL9

There will be no adverse impacts resulting from the implementation of option COL9 on the integrity of the following Habitats Sites, if the suggested mitigation and best practice measure are implemented:

- Lower Bostraze & Leswidden SAC
- Lands End and Cape Bank SAC

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, and therefore no further stages in the HRA process are necessary for option COL9.

15 Option COL11 Habitats Regulations Assessment

15.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of COL11 (Table 15-1). LSE were ruled out for all of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 15-1: COL11 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	River Camel SAC (approximately 2.5km north)
	Crowdy Marsh SAC (approximately 8km north)
	Polruan to Polperro SAC (approximately 30km downstream)

Source: Mott MacDonald, 2022

15.1.1 River Camel SAC

This site is not hydrologically connected to the option and is sufficiently distant (>2km) that there will be no significant effects on qualifying features. There is no functionally connected habitat outside of the SAC boundary to support otters which is likely to be affected during construction.

The transfer of water between the reservoirs will have no significant effects on the site during operation.

15.1.2 Crowdy Marsh SAC

This site is sufficiently distant from the proposed works (over 8km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of this option.

15.1.3 Polruan to Polperro SAC

This site is hydrologically connected to the southern end of the option via the St. Neot River and River Fowey downstream of the option, as well as through the WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Due to the distance downstream (30km), no significant effects from water pollution are anticipated during construction, particularly as there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces.

There are no other impact pathways during construction or operation due to this distance.

It is considered that there are no impact pathways between option COL11 and all identified Habitats Sites. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required, and these sites are not considered further.

16 Option COL12 Habitats Regulations Assessment

16.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL12 (Table 16-1). LSE could not be ruled out for two of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 16-1: COL12 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
River Camel SAC (approximately 3.8km downstream)	Tintagel-Marsland-Clovelly Coast SAC (approximately 9km north-west)
Crowdy Marsh SAC (approximately 2.1km north-east)	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 34km downstream)

Source: Mott MacDonald, 2022

16.1.1 River Camel SAC

This site is hydrologically connected downstream of the option and via the WFD groundwater waterbody GB40802G800300 (North Cornwall). Any pollution events may be transferred to the site and impact qualifying features. Annex I habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species. Due to the distance (3.8km downstream), there are unlikely to be significant effects from other impact pathways on qualifying habitats of the site during construction or operation.

Construction within the riparian corridor has the potential to impact aquatic and semi-aquatic species through permanent and temporary habitat loss of functional land used by qualifying species of the River Camel SAC. Although the indicative construction area is over 3km upstream of the Habitats Site, there is direct connectivity through surface watercourses which are considered to be functionally connected; both otter and Atlantic salmon can easily travel this distance upstream. Permanent or temporary loss of this habitat could impact the ability of the surrounding functional land to support the Habitats site's populations. The ability of these qualifying species to safely and successfully move to and from resting, breeding and feeding areas is critical to adult fitness and survival, and future breeding success.

During construction there may also be indirect effects to the sites' integrities through disturbance; noise, visual and artificial light are all sources of disturbance which could impact the integrity of the River Camel SAC. Disturbing effects can result in changes to behaviours, increased energy expenditure due to fleeing, abandonment of young (otter only), and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site. Otter may be disturbed during construction but is unlikely to be significantly affected during operation.

Atlantic salmon and bullhead may be significantly affected during operation. The reduction in flow within the stream from abstraction may affect habitat suitability of these sensitive species and displace them to other areas within the site boundary or elsewhere, reducing availability of functionally connected habitat. These effects may be felt downstream within the SAC.

16.1.2 Crowdy Marsh SAC

This site is hydrologically connected via the WFD groundwater waterbody GB40802G800300 (North Cornwall) and through surface watercourses upstream of the option. Any pollution events may be transferred to the site and impact qualifying features. No other impact pathways are present during construction due to the distance of the site from the option (2.1km).

As the site is upstream of the option, changes in flow will not have any impact on the site. There are no other impact pathways during operation.

16.1.3 Tintagel-Marsland-Clovelly Coast SAC

This site is hydrologically connected via the WFD groundwater waterbody GB40802G800300 (North Cornwall). At this distance (9km) it is unlikely that there will be significant effects of water pollution during construction. The River Camel exists between the site and the option, meaning any groundwater will not be directly connected.

Once operational, there are no impact pathways between the site and the option, therefore no significant effects are anticipated.

16.1.4 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is sufficiently distant from the proposed works but hydrologically connected via the River Camel. At this distance downstream (34km), any pollution events during construction are unlikely to have a significant effect. There are no other impact pathways during construction.

The qualifying feature of this site is a marine component and not dependent on the surface water from the River Camel. As a result, any effects on hydrology as a result of the new intake will not have a significant effect during operation, particularly at this distance.

As no LSE are concluded for Tintagel-Marsland-Clovelly Coast SAC and Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC, it is considered that there are no effect pathways between these sites and option COL12. Consequently, these sites do not require a Stage 2 AA and are not considered further.

16.2 Appropriate Assessment

16.2.1 Scope

The following two sites were assessed at Stage 2 Appropriate Assessment:

- River Camel SAC (approximately 3.8km downstream)
- Crowdy Marsh SAC (approximately 2.1km north-east)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 16-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option COL12 cannot necessarily be confirmed, and further information may be required.

16.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of COL12 is regularly used by significant numbers of otter and Atlantic salmon, associated with the River Camel SAC. It is also assumed that changes in flow within the stream immediately downstream of the construction area will result in significant changes to the flow within River Camel SAC. With the provision of additional information, this AA should be revised, which may result in changes to the recommended mitigation.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 16-2 Potential adverse impacts on integrity of Habitats Sites from option COL12

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
River Camel SAC (3.8km downstream)	● Annex I habitats	Option COL12 may have the following permanent impacts on the qualifying Annex I habitats during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Atlantic salmon	Option COL12 may have the following permanent impacts on Atlantic salmon during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and	The following measures will be implemented to avoid or reduce adverse impacts: ● Maintain upstream and downstream passage for all fish during construction, with no physical barriers; ● Sensitive timing of construction works to avoid the key spawning and upstream migration season, November to February inclusive; ● Avoid working within the watercourse itself and limiting the length of the bankside working area; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction. However, there is not enough	Potential adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		● Biological disturbance – changes in habitat availability and potential for SAC populations to be displaced from currently used areas.	information available to provide mitigation to alleviate the potential impacts during operation.	
	● Bullhead	Option COL12 may have the following permanent impacts on bullhead during the construction phase: ● Toxic contamination – pollution of the marine environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; and ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on this qualifying feature will be alleviated during construction. However, there is not enough information available to provide mitigation to alleviate the potential impacts during operation.	Potential adverse impacts
	● Otter	Option COL12 may have the following permanent impacts on otter during the construction phase: ● Toxic contamination – pollution of the marine environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and ● Biological disturbance – changes in habitat availability and potential for SAC populations to be displaced from current spawning areas.	The following measures will be implemented to avoid or reduce adverse impacts: ● Maintain commuting routes during construction, with no physical barriers to movement within the watercourse and adjacent suitable habitat; ● Sensitive timing of construction works to avoid the periods of greatest otter activity, i.e. no night-time working; ● Retain bankside habitat cover and other suitable adjacent habitats where possible; ● Avoid disturbance to confirmed holts until no longer in use. This can be informed from monitoring using cameras (requires Natural England licence); ● If holts require closure and destruction to facilitate construction, artificial replacements will be required on the same watercourse away from the works area. These must be in-	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		No adverse impacts are identified during operation.	situ before construction starts. This work will require a Natural England licence; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	
Crowdy Marsh SAC (approximately 2.1km north-east)	● All	Option COL12 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

16.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

16.2.4 Appropriate Assessment outcomes for option COL12

There will be no adverse impacts resulting from the implementation of option COL12 on the integrity of the following Habitats Sites, if the suggested mitigation and best practice measures are implemented:

- Crowdy Marsh SAC

There are potential residual adverse impacts on the integrity of the following Habitats Sites during operation, in the absence of detailed option information and ecological data:

- River Camel SAC

In conclusion, further information is required to complete a Stage 2 assessment and determine the potential impacts of option COL12 on the River Camel SAC during operation. The inability to rule out residual impacts, even after implementation of mitigation, does not mean that the HRA needs progressing to Stage 3. When additional information is available, this document, including the Stage 1 screening, should be updated.

17 Option COL15 Habitats Regulations Assessment

17.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL15 (Table 17-1). LSE ruled out all four of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 17-1: COL15 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Breney Common and Goss & Tregoss Moors SAC (approximately 3.5km west)
	River Camel SAC (approximately 7km north)
	Polruan to Polperro SAC (approximately 12km downstream)
	Falmouth Bay to St. Austell Bay SPA (approximately 9.5km south and 13km downstream)

Source: Mott MacDonald, 2022

17.1.1 Breney Common and Goss & Tregoss Moors SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site may be hydrologically connected to the option and the River Fowey, via smaller upstream watercourses. However, there is no groundwater connectivity, and there are unlikely to be any effects during operation as the effects of abstraction will only be applicable downstream.

17.1.2 River Camel SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is sufficiently distant from the proposed works (at least 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during operation of the option.

17.1.3 Polruan to Polperro SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). Increased abstraction from the River Fowey is not anticipated to have any significant effects on the site during operation. Whilst there is a hydrological connection, there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces.

17.1.4 Falmouth Bay to St. Austell Bay SPA

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

This site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody GB40802G806600 (Looe and Fowey). The qualifying features of the site are marine specialist and will not be affected by a reduction in flow into the bay, through prey availability or water quality/quantity. As a result, they are no anticipated effects during operation.

17.1.5 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2025 and 2026, meaning there is temporal overlap with indicative delivery dates for BNW1, ROA7, WIM8 and WIM9. However, there is no geographical overlap with these options; the study areas of these other options do not overlap with COL15 and therefore the sites identified in this section will not be affected by the other best value options.

No other preferred (best value) plan options exist within the WRZ.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

It is considered that there are no effect pathways between all Habitats Sites and option COL15. Consequently, no LSE can be concluded, either alone or in-combination with other preferred (best value) plan options. As such, this option does not require a Stage 2 AA and is not considered further.

18 Option COL18 Habitats Regulations Assessment

18.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL18 (Table 18-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 18-1: COL18 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 4.5km north-west)	Newlyn Downs SAC; approximately 5.5km south-west
	Breney Common and Goss & Tregoss Moors SAC; approximately 7km east
	Penhale Dunes SAC; approximately 8km west

Source: Mott MacDonald, 2022

18.1.1 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is hydrologically connected to the option via WFD groundwater waterbody GB40802G800300 (North Cornwall) and potentially the River Gannell. Any pollution events may be transferred to the site and impact qualifying features through degradation of foraging habitat and direct damage to harbour porpoise *Phocoena phocoena*. No other impact pathways are present during construction due to the distance of the site from the option (4.5km).

The qualifying feature of this site is a marine component and not dependent on surface water. As a result, any effects on hydrology as a result of the new intake will not have a significant effect during operation, particularly at this distance.

18.1.2 Newlyn Downs SAC

This site is hydrologically connected to the option via WFD groundwater waterbody GB40802G800300 (North Cornwall). At this distance downstream it is unlikely that there will be significant effects from any water pollution events during construction. No other impact pathways are present during construction due to the distance of the site from the option (5.5km).

Due to the distance of the site, there will be no significant effects during operation.

18.1.3 Breney Common and Goss & Tregoss Moors SAC

This site is sufficiently distant from the proposed works (7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any significant effects from disturbance during construction or operation of the option.

18.1.4 Penhale Dunes SAC

This site is sufficiently distant from the proposed works (8km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any significant effects from disturbance during construction or operation of the option.

As no LSE are concluded for Newlyn Downs SAC, Breney Common and Goss & Tregoss Moors SAC and Penhale Dunes SAC, it is considered that there are no effect pathways between these sites and option COL18. Consequently, these sites do not require a Stage 2 AA and are not considered further.

18.2 Appropriate Assessment

18.2.1 Scope

The following site was assessed at Stage 2 AA:

- Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 4.5km north-west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 18-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option COL18 cannot necessarily be confirmed, and further information may be required.

18.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 18-2 Potential adverse impacts on integrity of Habitats Sites from option COL18

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 4.5km north-west)	● Harbour porpoise	Option COL18 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

18.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

18.2.4 Appropriate Assessment outcomes for COL18

There will be no adverse impacts resulting from the implementation of option COL18 on the integrity of the Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option COL18.

19 Option COL19 Habitats Regulations Assessment

19.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of COL19 (Table 19-1). LSE were ruled out for both of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 19-1: COL19 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 7km north)
	Tregonning Hill SAC (approximately 6.5km south-west)

Source: Mott MacDonald, 2022

19.1.1 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is sufficiently distant from the proposed works and only hydrologically connected indirectly, through the marine environment approximately 2km from the mouth of the Red River, which itself is 8km downstream of the nearest component of the option (the Carwynnen Stream). Due to this distance, and the small nature of the watercourse immediately downstream of the option, any pollution of the water environment during construction is unlikely to have a significant effect on harbour porpoise, the qualifying feature of this site. There are no other impact pathways during construction due to this distance.

Harbour porpoise is not dependent on the surface water from the Red River, and as such, no significant effects are anticipated as a result of abstraction during operation.

19.1.2 Tregonning Hill SAC

Although the site is hydrologically connected to the option via WFD groundwater waterbody GB40802G800100 (West Cornwall), it is sufficiently distant from the proposed works that there are unlikely to be any effects during construction of the option.

The abstraction during operation will be taken from surface water, and will therefore not affect the site, which is connected through the groundwater only.

It is considered that there are no impact pathways between option COL19 and both identified Habitats Sites. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required, and these sites are not considered further.

20 Option COL20 Habitats Regulations Assessment

20.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of COL20 (Table 20-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 20-1: COL18 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Fal & Helford SAC (approximately 4.5km downstream)	Falmouth Bay to St. Austell Bay SPA (approximately 12.8km downstream)

Source: Mott MacDonald, 2022

20.1.1 Fal & Helford SAC

This site is hydrologically connected to the option via the River Fal and WFD groundwater waterbody GB40802G800200 (South Cornwall). Any pollution events may be transferred to the site and impact qualifying features; damage or degradation to Annex I habitats or shore dock *Rumex rupestris* may be significant. No other impact pathways are present during construction due to the distance of the site from the option (4.5km downstream).

During operation, the reduced flow into the site from the River Fal is not anticipated to have a significant effect on the qualifying features of the site; many of these are associated with the tidal regime and the water from the Fal represents a small proportion of the overall provision to the estuary.

20.1.2 Falmouth Bay to St. Austell Bay SPA

This site is hydrologically connected to the option via the River Fal and WFD groundwater waterbody GB40802G800200 (South Cornwall). Any pollution events may be transferred to the site and impact qualifying features' foraging areas. However, considering the distance of the site from the option, and the overall proportion which may be affected through this pathway, any adverse effects are not considered to be significant. No other impact pathways are present during construction due to the distance of the site from the option (12.8km downstream).

The qualifying features of the site are marine specialists and will not be affected by a reduction in flow into the bay, through prey availability or water quality/quantity. As a result, there are no anticipated effects during operation.

As no LSE are concluded for Falmouth Bay to St. Austell Bay SPA, it is considered that there are no effect pathways between these sites and option COL20. Consequently, these sites do not require a Stage 2 AA and are not considered further.

20.2 Appropriate Assessment

20.2.1 Scope

The following site was assessed at Stage 2 AA:

- Fal & Helford SAC (approximately 4.5km downstream)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 20-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option COL20 cannot necessarily be confirmed, and further information may be required.

20.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 20-2 Potential adverse impacts on integrity of Habitats Sites from option COL20

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Fal & Helford SAC (approximately 4.5km downstream)	● All	Option COL20 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

20.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

20.2.4 Appropriate Assessment outcomes for option COL20

There will be no adverse impacts resulting from the implementation of option COL20 on the integrity of the Fal & Helford SAC, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option COL20.

21 Options ISMY1 and ISMY2 Habitats Regulations Assessment

21.1 Screening

Based on current knowledge of the borehole locations, options ISMY1 and ISMY2 are assumed to be within the same area. As such, these options are assessed together. Once additional information for these options is known, they should be separated, if appropriate.

The Stage 1 Screening identified three Habitats Sites within the ZoI of ISMY1 and ISMY2 (Table 21-1). LSE were ruled out for two of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 21-1: ISMY1 and ISMY2 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Isles of Scilly Complex SAC (approximately 120m east)	Isles of Scilly SPA (approximately 1.8km north-east)
	Isles of Scilly Ramsar (approximately 1.8km north-east)

Source: Mott MacDonald, 2022

21.1.1 Isles of Scilly Complex SAC

The site is connected to the options through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly) and the marine environment at Watermill Cove; the site boundary is approximately 100m off the coast. Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species may also occur, including foraging areas for grey seal *Halichoerus grypus*.

Despite the proximity of these options to the site, it is not anticipated that there will be any significant effects through other impact pathways. The type of construction associated with these options is unlikely to result in disturbance to grey seal as it is not on the coast. Additionally, increases in air pollution as a result of construction activities are likely to be negligible for these options, given the scale and duration of the construction period. Furthermore, air pollution is not listed as a threat to any of the qualifying features within the published site improvement plan[24].

No impact pathways are present during the operation of these options.

21.1.2 Isles of Scilly SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

This site is sufficiently distant from the proposed works (1.8km) and not hydrologically connected to the options' footprints. No part of the sites is present on St. Mary's, with the nearest point being on smaller islands to the north-east.

[24] Natural England (2014). Site Improvement Plan: Isles of Scilly Complex (SIP211) [online] available at: Site Improvement Plan: Isles of Scilly Complex - SIP211 (naturalengland.org.uk)

It is possible that qualifying features of the sites use the coastal waters of St. Mary's for foraging during the breeding season. Even in a worst-case scenario, these options are a sufficient distance from the coast that there will not be any significant disturbance effects on qualifying features during construction.

No impact pathways are present during the operation of these options.

It is considered that there are no impact pathways between options ISMY1 and ISMY2 and the Isles of Scilly SPA and Ramsar. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required, and these sites are not considered further.

21.2 Appropriate Assessment

21.2.1 Scope

The following site was assessed at Stage 2 AA:

- Isles of Scilly Complex SAC (approximately 120m east)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 21-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from options ISMY1 and ISMY2 cannot necessarily be confirmed, and further information may be required.

21.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 21-2: Potential adverse impacts on integrity of Habitats Sites from options ISMY1 and ISMY2

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Isles of Scilly Complex SAC (approximately 120m east)	● All	Options ISMY1 and ISMY2 may have the following temporary or permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

21.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

21.2.4 Appropriate Assessment outcomes for options ISMY1 and ISMY2

There will be no adverse impacts on the Isles of Scilly Complex SAC resulting from the implementation of options ISMY1 and ISMY2, if the suggested best practice measures are implemented.

Provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, and therefore no further stages in the HRA process are necessary for options ISMY1 and ISMY2.

22 Option ISMY4 Habitats Regulations Assessment

22.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ISMY4 (Table 22-1). LSE could be ruled out for two of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 22-1: ISMY4 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Isles of Scilly Complex SAC (approximately 130m east)	Isles of Scilly SPA (approximately 2.2km north)
	Isles of Scilly Ramsar (approximately 2.2km north)

Source: Mott MacDonald, 2022

22.1.1 Isles of Scilly Complex SAC

The site is connected to the option through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly) and the marine environment; the site boundary is approximately 100m off the coast. Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species may also occur, including foraging areas for grey seal.

Despite the proximity of this option to the site, it is not anticipated that there will be any significant effects through other impact pathways. The type of construction associated with this option is unlikely to result in disturbance to grey seal as it is not on the coast. Additionally, increases in air pollution as a result of construction activities are likely to be negligible for this option, given the scale and duration of the construction period. Furthermore, air pollution is not listed as a threat to any of the qualifying features within the published site improvement plan[25].

No impact pathways are present during the operation of this option.

22.1.2 Isles of Scilly SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

These sites are sufficiently distant from the proposed works (2.2km) and not hydrologically connected to the option footprint. No part of the sites is present on St. Mary's, with the nearest point being on smaller islands to the north-east.

It is possible that qualifying features of the sites use the coastal waters of St. Mary's for foraging during the breeding season. Even in a worst-case scenario, this option is a sufficient distance from the coast that there will not be any significant disturbance effects on qualifying features during construction.

No impact pathways are present during the operation of this option.

[25] Natural England (2014). Site Improvement Plan: Isles of Scilly Complex (SIP211) [online] available at: Site Improvement Plan: Isles of Scilly Complex - SIP211 (naturalengland.org.uk)

It is considered that there are no impact pathways between option ISMY4 and the Isles of Scilly SPA and Ramsar. Consequently, no LSE are concluded for these sites; Stage 2 AA is not required, and these sites are not considered further.

22.2 Appropriate Assessment

22.2.1 Scope

The following site was assessed at Stage 2 AA:

- Isles of Scilly Complex SAC (approximately 130m east)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 22-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ISMY4 cannot necessarily be confirmed, and further information may be required.

22.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 22-2: Potential adverse impacts on integrity of Habitats Sites from option ISMY4

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Isles of Scilly Complex SAC (approximately 130m east)	● All	Option ISMY4 may have the following temporary or permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

22.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

22.2.4 Appropriate Assessment outcomes for options ISMY3 and ISMY4

There will be no adverse impacts on the Isles of Scilly Complex SAC resulting from the implementation of option ISMY4, if the suggested best practice measures are implemented.

Provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, and therefore no further stages in the HRA process are necessary for option ISMY4.

23 Option ISB4 Habitats Regulations Assessment

23.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ISB4 (Table 23-1). LSE could not be ruled out for any of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 23-1: ISB4 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Isles of Scilly Complex SAC (approximately 190m west)	
Isles of Scilly SPA (approximately 120m north)	
Isles of Scilly Ramsar (approximately 120m north)	

Source: Mott MacDonald, 2022

23.1.1 Isles of Scilly Complex SAC

The site is connected to the option through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species may also occur, including foraging areas for grey seal.

Despite the proximity of this option to the site, it is not anticipated that there will be any significant effects through other impact pathways. The type of construction associated with this option is unlikely to result in disturbance to grey seal as it is not on the coast. Additionally, increases in air pollution as a result of construction activities are likely to be negligible for this option, given the scale and duration of the construction period. Furthermore, air pollution is not listed as a threat to any of the qualifying features within the published site improvement plan[26].

No impact pathways are present during the operation of this option.

23.1.2 Isles of Scilly SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

These sites are connected to the option through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Breeding habitats may be damaged through pollution on the island, and coastal foraging areas may be degraded through pollution.

Due to the proximity of option ISB3 to the SPA/Ramsar, it is possible that there may be indirect effects to the sites' integrities through disturbance; noise, visual disturbance and artificial light may all adversely impact qualifying bird species. These are all sources of disturbance which could affect the integrity via changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs

[26] Natural England (2014). Site Improvement Plan: Isles of Scilly Complex (SIP211) [online] available at: Site Improvement Plan: Isles of Scilly Complex - SIP211 (naturalengland.org.uk)

and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

Despite the proximity of potential foraging areas to this option, it is not anticipated that there will be any significant effects through other impact pathways. Increases in air pollution as a result of construction activities are likely to be negligible for these options, given the scale and duration of the construction period.

No impact pathways are present during the operation of the option.

23.2 Appropriate Assessment

23.2.1 Scope

The following sites were assessed at Stage 2 AA:

- Isles of Scilly Complex SAC (approximately 190m west)
- Isles of Scilly SPA (approximately 120m north)
- Isles of Scilly Ramsar (approximately 120m north)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 23-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ISB4 cannot necessarily be confirmed, and further information may be required.

23.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 23-2 Potential adverse impacts on integrity of Habitats Sites from option ISB4

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Isles of Scilly Complex SAC (approximately 80m west)	• All	Option ISB4 may have the following temporary or permanent impacts on the Habitats Site during the construction phase: • Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and • Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Isles of Scilly SPA/Ramsar (approximately 120m north)	• All	Option ISB4 may have the following permanent impacts on the Habitats Site during the construction phase: • Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; • Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; • Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be	The following measures will be implemented to avoid or reduce adverse impacts: • Sensitive timing of construction works to avoid the breeding periods for birds detailed in the Isles of Scilly SPA Standard Data Form (SDF)[27] and Ramsar Information Sheet (RIS)[28], April to September inclusive; • Any works which are undertaken between April and September which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited SPA population in the SDF and RIS; and • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2.	No adverse impacts

[27] JNCC (2020). Isles of Scilly SPA (UK9020288) Standard Data Form [online] available at: UK9020288.pdf (jncc.gov.uk)

[28] JNCC (2001). Ramsar Information Sheet UK11033 Isles of Scilly [online] available at: GB1095RIS.pdf (ramsar.org)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	This approach is considered to be conservative in the absence of recent survey data. Non-physical disturbance caused by construction is not anticipated to result in adverse effects on the integrity of the SPA/Ramsar from reductions in habitat availability and/or displacement effects. This is due to the small proportion of the functional land surrounding the Site within the construction area; even if birds are displaced from this area, there is sufficient foraging habitat elsewhere. However, this cannot be confirmed until records or survey data is obtained. Therefore, these mitigation measures are proposed to remove the potential adverse effects. Breeding seabirds roost within the Habitats Sites' boundary itself and only use surrounding marine areas for foraging. Therefore, specific mitigation measures for temporary artificial lighting during night works are not required. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	

Source: Mott MacDonald, 2022

23.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

23.2.4 Appropriate Assessment outcomes for option ISB4

There will be no adverse impacts resulting from the implementation of option ISB4 on the integrity of the Isles of Scilly Complex SAC and the Isles of Scilly SPA and Ramsar, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ISB4.

24 Option IST1 Habitats Regulations Assessment

24.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of IST1 (Table 24-1). LSE could not be ruled out for any of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 24-1: IST1 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Isles of Scilly Complex SAC (approximately 40m north-east)	
Isles of Scilly SPA (approximately 40m north-east)	
Isles of Scilly Ramsar (approximately 40m north-east)	

Source: Mott MacDonald, 2022

24.1.1 Isles of Scilly Complex SAC

The site is connected to the option through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species may also occur, including foraging areas for grey seal.

During construction there may also be indirect impacts on the SAC's integrity through disturbance; noise, visual and artificial light are all sources of disturbance which could impact grey seal. Disturbance can result in changes to behaviours, increased energy expenditure due to more frequent movements, abandonment of young, and desertion of supporting habitat. Disturbance to qualifying species may jeopardise adult fitness, survival and breeding success by displacing individuals from preferred feeding and breeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site. These impacts will be most severe if they occur during the breeding period, typically August to December inclusive.

Despite the proximity of this option to the site, it is not anticipated that there will be any significant effects through other impact pathways. Increases in air pollution as a result of construction activities are likely to be negligible for this option, given the scale and duration of the construction period. Furthermore, air pollution is not listed as a threat to any of the qualifying features within the published site improvement plan[29].

No impact pathways are present during operation.

24.1.2 Isles of Scilly SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

[29] Natural England (2014). Site Improvement Plan: Isles of Scilly Complex (SIP211) [online] available at: Site Improvement Plan: Isles of Scilly Complex - SIP211 (naturalengland.org.uk)

These sites are connected to the option through the WFD groundwater waterbody GB40802G081200 (Isles of Scilly). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Breeding habitats may be damaged through pollution on the island, and coastal foraging areas may be damaged or degraded through pollution, reducing prey availability which could affect breeding success and adult survival.

Due to the proximity of option ISB3 to the SPA/Ramsar, it is possible that there may be indirect effects to the sites' integrities through disturbance; noise, visual disturbance and artificial light may all adversely impact qualifying bird species. These are all sources of disturbance which could affect the integrity via changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

Despite the proximity of potential foraging areas to this option, it is not anticipated that there will be any significant effects through other impact pathways. Increases in air pollution as a result of construction activities are likely to be negligible for these options, given the scale and duration of the construction period.

No impact pathways are present during the operation of the option.

24.2 Appropriate Assessment

24.2.1 Scope

The following site was assessed at Stage 2 AA:

- Isles of Scilly Complex SAC (approximately 40m north-east)
- Isles of Scilly SPA (approximately 40m north-east)
- Isles of Scilly Ramsar (approximately 40m north-east)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 24-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option IST1 cannot necessarily be confirmed, and further information may be required.

24.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 24-2 Potential adverse impacts on integrity of Habitats Sites from option IST1

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Isles of Scilly Complex SAC (approximately 40m north-east)	● Annex I habitats and shore dock *Rumex rupestris*	Option IST1 may have the following temporary and permanent impacts on the qualifying Annex I habitats and Annex II species during the construction phase: ● Toxic contamination – pollution of the marine environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; and The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Grey seal	Option IST1 may have the following temporary and permanent impacts on the qualifying Annex II species during the construction phase: ● Toxic contamination – pollution of the marine environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; and ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site.	The following measures will be implemented to avoid or reduce adverse impacts: ● Sensitive timing of construction works to avoid the breeding period for grey seal during August to December inclusive; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
		No adverse impacts are identified during operation.		
Isles of Scilly SPA/Ramsar (approximately 40m north-west)	• All	Option IST1 may have the following permanent impacts on the Habitats Site during the construction phase: • Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; • Physical loss/damage – significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; • Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species; and. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: • Sensitive timing of construction works to avoid the breeding periods for birds detailed in the Isles of Scilly SPA Standard Data Form (SDF)[30] and Ramsar Information Sheet (RIS)[31], April to September inclusive; • Any works which are undertaken between April and September which may disturb or displace this species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited SPA population in the SDF and RIS; and • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. This approach is considered to be conservative in the absence of recent survey data. Non-physical disturbance caused by construction is not anticipated to result in adverse effects on the integrity of the SPA/Ramsar from reductions in habitat availability and/or displacement effects. This is due to the small proportion of the functional land surrounding the Site within the construction area; even if birds are displaced from this area, there is sufficient foraging habitat elsewhere. However, this cannot be confirmed until records or survey data is obtained. Therefore, these mitigation measures are proposed to remove the potential adverse effects. Breeding seabirds roost within the Habitats Sites' boundary itself and only use surrounding marine	No adverse impacts

[30] JNCC (2020). Isles of Scilly SPA (UK9020288) Standard Data Form [online] available at: UK9020288.pdf (jncc.gov.uk)

[31] JNCC (2001). Ramsar Information Sheet UK11033 Isles of Scilly [online] available at: GB1095RIS.pdf (ramsar.org)

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
			areas for foraging. Therefore, specific mitigation measures for temporary artificial lighting during night works are not required. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	

Source: Mott MacDonald, 2022

24.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

24.2.4 Appropriate Assessment outcomes for option IST1

There will be no adverse impacts resulting from the implementation of option IST1 on the integrity of the Isles of Scilly Complex SAC and the Isles of Scilly Spa and Ramsar, if the suggested mitigation and best practice measure are implemented:

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option IST1.

25 Option ROA2 Habitats Regulations Assessment

25.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA2 (Table 25-1). LSE are ruled out at all three of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 25-1: ROA2 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Start Point to Plymouth Sound & Eddystone SAC (approximately 7.5km downstream)
	Dartmoor SAC (approximately 6km north)
	Plymouth Sound &Estuaries SAC (approximately 8km south-west)

Source: Mott MacDonald, 2022

25.1.1 Start Point to Plymouth Sound & Eddystone SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works (over 7km) so that no likely significant effects are anticipated during construction.

Owing to this distance, no effects are anticipated during operation. The qualifying feature of the site is a marine component and not dependent on freshwater provision.

25.1.2 Dartmoor SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works (over 7km) that no likely significant effects are anticipated during construction.

Due to this distance, no effects are anticipated during operation either.

25.1.3 Plymouth Sound &Estuaries SAC

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

It is considered that there are no effect pathways between all Habitats Sites and option ROA2. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

26 Option ROA3 Habitats Regulations Assessment

26.1 Screening

The Stage 1 Screening identified five Habitats Sites within the ZoI of ROA3 (Table 26-1). LSE ruled out all five of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 26-1: ROA3 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Plymouth Sound & Estuaries SAC (approximately 6.8km downstream)
	Dartmoor SAC (approximately 5.5km north)
	South Dartmoor Woods SAC (approximately 9.5km north-west)
	Blackstone Point SAC (approximately 9.7km south-west)
	Start Point to Plymouth Sound & Eddystone SAC (approximately 7.5km south)

Source: Mott MacDonald, 2022

26.1.1 Plymouth Sound & Estuaries SAC

The site is hydrologically connected downstream of the option and via the WFD groundwater waterbody GB40802G806700 (Tamar). However, it is sufficiently distant from the proposed works (approximately 7km) so that no likely significant effects are anticipated during construction.

The reduced flow and increase in energy downstream of the option is unlikely to result in significant effects on the site due to its distance. Other surface water feeds into the site and the yield of 3 Ml/d is unlikely to have a significant effect over 6.8km.

26.1.2 Dartmoor SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar), it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction.

Due to this distance, no effects are anticipated during operation either.

26.1.3 South Dartmoor Woods SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar), it is sufficiently distant from the proposed works (over 7km) so that no likely significant effects are anticipated during construction.

Due to this distance, no effects are anticipated during operation either.

26.1.4 Blackstone Point SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar), it is sufficiently distant from the proposed works (over 7km) so that no likely significant effects are anticipated during construction.

Due to this distance, no effects are anticipated during operation either.

26.1.5 Start Point to Plymouth Sound & Eddystone SAC

Although the site is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar), it is sufficiently distant from the proposed works (over 7km) so that no likely significant effects are anticipated during construction.

Due to this distance, no effects are anticipated during operation either. Moreover, the qualifying feature of the site is a marine component and not dependent on freshwater provision.

It is considered that there are no effect pathways between all Habitats Sites and option ROA3. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

27 Option ROA4 Habitats Regulations Assessment

27.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA4 (Table 27-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 27-1: ROA4 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Plymouth Sound & Estuaries SAC (within option)	Tamar Estuaries Complex SPA (approximately 10.8km downstream)
	South Dartmoor Woods SAC (approximately 10km east)

Source: Mott MacDonald, 2022

27.1.1 Plymouth Sound & Estuaries SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

There are potential adverse impacts on the Plymouth South & Estuaries SAC during operation of the proposed option. Water will be abstracted from the River Tamar, resulting in a reduction of flow downstream of this point. It is currently unknown what impact this may have on qualifying Annex I habitats, shore dock *Rumex rupestris* and particularly allis shad *Alosa alosa*, which migrate into the freshwaters of the River Tamar to spawn in April and May. This is the only confirmed spawning site for this species in England, and possibly the UK.

27.1.2 Tamar Estuaries Complex SPA

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

The abstraction during operation is not anticipated to result in likely significant effects on the downstream site, due to its distance from the option (over 7km). Furthermore, the Tamar Estuary is not a groundwater dependent ecosystem, as the habitats which support the qualifying features are intertidal.

27.1.3 South Dartmoor Woods SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

Although there is hydrological connectivity via the WFD groundwater waterbody GB40802G806700 (Tamar), the change in flow during operation will have no effect on the site. As such, there are no anticipated effects during operation.

It is considered that there are no impact pathways between the Tamar Estuaries Complex SPA and South Dartmoor Woods SAC, and option ROA48. Consequently, no LSE can be concluded; these sites do not require a Stage 2 AA and are not considered further.

27.2 Appropriate Assessment

27.2.1 Scope

The following site was assessed at Stage 2 AA:

- Plymouth Sound & Estuaries SAC (within option)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives.

At this stage, conclusions on adverse impacts arising from option ROA4 cannot necessarily be confirmed, and further information may be required.

27.2.2 Potential effects on Habitats Sites

The potential effects of the construction and operational phases for option ROA4 are described below, taking into account the type, size and scale of the option.

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Where adverse effects are deemed significant, mitigation measures are also proposed in the following section. At this stage, conclusions on adverse impacts arising from option ROA4 cannot necessarily be confirmed, and further information may be required.

27.2.3 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

It is assumed, in the absence of detailed site habitat mapping and ecological distribution information, that Annex II qualifying species are present in all habitats throughout the site extent. As a result, shore dock and allis shad are regularly found adjacent to the abstraction point.

There are no known widely-used mitigation measures to implement during operation to alleviate the potential adverse impacts on the Plymouth Sound & Estuaries SAC; this issue requires further assessment.

27.2.4 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

27.2.5 Appropriate Assessment outcomes for option ROA4

There are potential residual adverse impacts on the integrity of the Plymouth Sound & Estuaries SAC during operation, in the absence of detailed option information and ecological data.

In conclusion, further information is required to complete a Stage 2 assessment and determine the potential impacts of option ROA4 on the Plymouth Sound & Estuaries SAC during operation. Upon receipt of additional information this AA should be revised, which may change the recommended mitigation. At this stage, this does not mean that the HRA needs progressing to Stage 3.

28 Option ROA6 Habitats Regulations Assessment

28.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA6 (Table 28-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 28-1: ROA6 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Culm Grasslands SAC (approximately 3.5km south)	Tintagel-Marsland-Clovelly Coast SAC (approximately 5km north-west)
	Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (approximately 8.5km)

Source: Mott MacDonald, 2022

28.1.1 Culm Grasslands SAC

This site may be hydrologically connected through small watercourses upstream of the River Tamar, and it is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar). Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the Habitats Site. It is possible that any pollution events during construction may be transferred through the groundwater catchment to the Habitats Site and impact qualifying features. Annex I habitats as standalone qualifying features, as well as supporting other qualifying species (Marsh fritillary butterfly *Euphydryas aurinia*), may be temporarily or irreversibly damaged as a result. No other impact pathways are present during construction due to the distance of the site from the option (3.5km).

As the site's hydrology is not dependent on the Tamar, downstream of the option, significant effects are not anticipated during operation.

28.1.2 Tintagel-Marsland-Clovelly Coast SAC

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

28.1.3 Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC

This site is sufficiently distant from the proposed works and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

It is considered that there are no effect pathways between Tintagel-Marsland-Clovelly Coast SAC and Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC and option ROA6. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

28.2 Appropriate Assessment

28.2.1 Scope

The following site was assessed at Stage 2 AA:

- Culm Grasslands SAC (approximately 3.5km south)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 28-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA6 cannot necessarily be confirmed, and further information may be required.

28.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 28-2 Potential adverse impacts on integrity of Habitats Sites from option ROA6

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Culm Grasslands SAC (approximately 3.5km south)	● All	Option ROA6 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

28.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

28.2.4 Appropriate Assessment outcomes for option ROA6

There will be no adverse impacts resulting from the implementation of option ROA6 on the integrity of the Culm Grasslands SAC, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA6.

29 Option ROA7 Habitats Regulations Assessment

29.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of ROA7 (Table 29-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 29-1: ROA7 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Culm Grasslands SAC (approximately 4.5km north)	Dartmoor SAC (approximately 9km south-east)

Source: Mott MacDonald, 2022

29.1.1 Culm Grasslands SAC

This site may be hydrologically connected upstream of the option but is also connected via the WFD groundwater waterbody GB40802G800600 (Torridge and Hartland Streams). Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the Habitats Site. It is possible that any pollution events during construction may be transferred through the groundwater catchment to the Habitats Site and impact qualifying features. Annex I habitats as standalone qualifying features, as well as supporting other qualifying species (Marsh fritillary butterfly), may be temporarily or irreversibly damaged as a result. No other impact pathways are present during construction due to the distance of the site from the option (4.5km).

No impact pathways are present during operation.

29.1.2 Dartmoor SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800600 (Torridge and Hartland Streams), it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction. No other impact pathways are present during construction due to the distance of the site from the option (9km).

Due to this distance, no effects are anticipated during operation.

It is considered that there are no effect pathways between the Dartmoor SAC and option ROA7. Consequently, no LSE are concluded; this site does not require a Stage 2 AA and is not considered further.

29.2 Appropriate Assessment

29.2.1 Scope

The following site was assessed at Stage 2 AA:

- Culm Grasslands SAC (approximately 4.5km north)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 29-2 below, and mitigation measures are

proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA7 cannot necessarily be confirmed, and further information may be required.

29.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 29-2 Potential adverse impacts on integrity of Habitats Sites from option ROA7

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Culm Grasslands SAC (approximately 4.5km north)	● All	Option ROA7 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

29.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2025 and 2026, meaning there is temporal overlap with indicative delivery dates for BNW1, COL15, WIM8 and WIM9. However, there is no geographical overlap with these options; the study areas of these other options do not overlap with ROA7 and therefore the sites identified in this section will not be affected by the other best value options.

There are other preferred (best value) plan options which exist within the WRZ. Options ROA10 and ROA16 are both anticipated for delivery between 2046 and 2047, and therefore there will be no temporal overlap with ROA7. ROA16 is a new option and has not been assessed at this stage. As such, the potential for in-combination effects with this option is unknown. Both options ROA7 and ROA10 identify the Dartmoor SAC within their study areas, although no adverse effects are concluded in this section and section 27 respectively.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

29.2.4 Appropriate Assessment outcomes for option ROA7

There will be no likely adverse impacts resulting from the implementation of option ROA7 on the integrity of the Culm Grasslands SAC, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects, alone or in-combination with other options, on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA7.

30 Option ROA8 Habitats Regulations Assessment

30.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA8 (Table 30-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 30-1: ROA8 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
South Dartmoor Woods SAC (approximately 3km south-west)	South Hams SAC (approximately 6.5km south-west)
	Dartmoor SAC (approximately 9km west)

Source: Mott MacDonald, 2022

30.1.1 South Dartmoor Woods SAC

This site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme). It is possible that any pollution events during construction may be transferred through the groundwater catchment to the Habitats Site and impact qualifying features. Annex I habitats may be temporarily or irreversibly damaged as a result.

The WTW infrastructure already exists, and it is not anticipated that there will be any other impact pathways during construction. Reduction of the WTW capacity will have no operational effects on the site.

30.1.2 South Hams SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works so that no likely significant effects on designated habitats are anticipated during construction.

The option is outside of the 4km Sustenance Zone for the greater horseshoe bat *Rhinolophus ferrumequinum* but sits within the wider Landscape Connectivity Zone. However, as any construction of the option would not result in any loss, disturbance or damage to potential commuting routes, 'Pinch Points', or 'Existing Mitigation Features' for the site's greater horseshoe population, and there are not anticipated to be any significant effects during this phase. Details of functional habitat, commuting routes, Pinch Points and mitigation areas for the SAC's population are detailed within the Dartmoor Local Plan HRA[32] and Devon County Council environment viewer[33].

[32] Dartmoor National Park (2019). Dartmoor National Park Authority Local Plan Review 2020-2036: Habitats Regulations Assessment (HRA) Screening & Appropriate Assessment Report [online] available at: 190802_DNPLP-Reg-19_HRA-Report_Final.pdf (dartmoor.gov.uk)

[33] Devon County Council (2022). Devon County Council Environment Viewer [online] available at: Devon County Council Environment Viewer

The WTW infrastructure already exists, and it is not anticipated that there will be any other impact pathways during construction. Reduction of the WTW capacity will have no operational effects on the site.

30.1.3 Dartmoor SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works (over 7km) so that no likely significant effects are anticipated during construction.

The WTW infrastructure already exists, and it is not anticipated that there will be any other impact pathways during construction. Reduction of the WTW capacity will have no operational effects on the site.

30.2 Appropriate Assessment

30.2.1 Scope

The following site was assessed at Stage 2 AA:

- South Dartmoor Woods SAC (approximately 3km south-west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 30-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA8 cannot necessarily be confirmed, and further information may be required.

30.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 30-2 Potential adverse impacts on integrity of Habitats Sites from option ROA8

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
South Dartmoor Woods SAC (approximately 3km south-west)	● All	Option ROA8 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

30.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

30.2.4 Appropriate Assessment outcomes for option ROA8

There will be no adverse impacts resulting from the implementation of option ROA8 on the integrity of the South Dartmoor Woods SAC, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA8.

31 Option ROA10 Habitats Regulations Assessment

31.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA10 (Table 31-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 31-1: ROA10 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Dartmoor SAC (approximately 1.7km north-west)	South Hams SAC (approximately 7km east)
	South Dartmoor Woods SAC (approximately 7km north-east)

Source: Mott MacDonald, 2022

31.1.1 Dartmoor SAC

This site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme). Any pollution events may be transferred to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the Habitats Sites. It is possible that any pollution events during construction may be transferred through the groundwater catchment to the Habitats Site and impact qualifying features. Annex I habitats as standalone qualifying features, as well as supporting other qualifying species, may be temporarily or irreversibly damaged as a result. There is groundwater connectivity from the option to the Habitats Sites screened in for Stage 2 AA and this represents an impact pathway which could adversely affect the integrity of all of them.

During construction there may also be indirect effects to the sites' integrities through disturbance; noise, visual and artificial light are all sources of disturbance which could impact the integrity of the Dartmoor SAC. The Bala Brook is hydrologically connected to the site and may be a watercourse regularly used by otter, a qualifying feature. Disturbing effects can result in changes to behaviours, increased energy expenditure due to fleeing, abandonment of young, and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

The Bala Brook may support Atlantic salmon. However, as this watercourse and its headwaters are outside of the SAC boundary, it is unlikely that populations of Atlantic salmon here, if present, are those associated with the SAC.

There is potential for significant effects on the otter population associated with the SAC. Although the option is outside of the site boundary, it is possible that otters use the Bala Brook and River Avon upstream of the option for foraging and commuting, and disturbance associated with construction activities may impact this species at resting sites. Increases in noise, vibration,

airborne pollutants and artificial lighting associated with construction may all have significant effects on this species if present nearby.

There are no impact pathways between the option and any of the qualifying features during operation.

31.1.2 South Hams SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works so that no likely significant effects are anticipated during construction.

There are no impact pathways between the option and the site during operation.

31.1.3 South Dartmoor Woods SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant from the proposed works so that no likely significant effects on designated habitats are anticipated during construction.

The option is outside of the 4km Sustenance Zone for the greater horseshoe bat but is within the wider Landscape Connectivity Zone. However, as construction of the option would not result in any loss, disturbance or damage to potential commuting routes, 'Pinch Points', or 'Existing Mitigation Features' for the site's greater horseshoe population, there are not anticipated to be any significant effects during construction. Details of functional habitat, commuting routes, Pinch Points and mitigation areas for the SAC's population are detailed within the Dartmoor Local Plan HRA and Devon County Council portal.

There are no impact pathways between the option and any of the qualifying features during operation.

31.2 Appropriate Assessment

31.2.1 Scope

The following site was assessed at Stage 2 AA:

- Dartmoor SAC (approximately 1.7km north-west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 31-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA10 cannot necessarily be confirmed, and further information may be required.

31.2.2 Assumptions and mitigation measures

Based on the current level of information a number of assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of ROA10 is regularly used by significant numbers of otter and associated with the Dartmoor SAC.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 31-2 Potential adverse impacts on integrity of Habitats Sites from option ROA10

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Dartmoor SAC (approximately 1.7km north-west)	● Annex I habitats, southern damselfly *Coenagrion mercuriale* and Atlantic salmon	Option ROA10 may have the following permanent impacts on the qualifying Annex I habitats and Annex II species during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Otter	Option ROA10 may have the following permanent impacts on otter during the construction phase: ● Toxic contamination – pollution of the water environment (Bala Brook) and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Non-toxic contamination - reduced air quality from dust, associated with construction activities and plant, damaging habitats; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Maintain commuting routes during construction, with no physical barriers to movement within the watercourse and adjacent suitable habitat; ● Sensitive timing of construction works to avoid the periods of greatest otter activity, i.e. no night-time working; ● Avoid disturbance to confirmed holts until no longer in use. This can be informed from monitoring using cameras (requires Natural England licence); ● If holts require closure and destruction to facilitate construction, artificial replacements will be required on the same watercourse away from the works area. These must be in-situ before construction starts. This work will require a Natural England licence; and	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
			• Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	

Source: Mott MacDonald, 2022

31.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. There is a geographical overlap with options ROA7 and ROA16. Options ROA7, ROA10 and ROA16 all identify the Dartmoor SAC within their study areas, although no adverse effects are concluded in this section, or sections 27 and 30, respectively. Furthermore, the delivery of option ROA7 is anticipated between 2025 and 2026, so there is no temporal overlap to exacerbate any residual adverse effects on the site.

Delivery of this option, if progressed, is anticipated between 2046 and 2047, meaning there is temporal overlap with indicative delivery dates for ROA16. However, neither option ROA10 nor ROA16 are anticipated to have adverse effects on the integrity of the Dartmoor SAC, and so there will be no in-combination effects.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

31.2.4 Appropriate Assessment outcomes for option ROA10

There will be no adverse impacts resulting from the implementation of option ROA10 on the integrity of the Dartmoor SAC, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects, alone or in-combination with other options, on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA10.

32 Option ROA11 Habitats Regulations Assessment

32.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA11 (Table 32-1). LSE could not be ruled out for this site.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 32-1: ROA11 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Dartmoor SAC (approximately 450m south)	

Source: Mott MacDonald, 2022

32.1.1 Dartmoor SAC

Although this site is upstream of the option, it is hydrologically connected via the WFD groundwater waterbody GB40802G806700 (Tamar). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species, such as Southern damselfly *Coenagrion mercuriale*, may also occur.

During construction there may also be indirect effects to the sites' integrities through disturbance; noise, visual and artificial light are all sources of disturbance which could impact the integrity of the Dartmoor SAC. The River Lew is hydrologically connected upstream of the site and may be a watercourse regularly used by otter *Lutra lutra*, a qualifying feature. Disturbing effects can result in changes to behaviours, increased energy expenditure due to fleeing, abandonment of young, and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

The River Lew may support Atlantic salmon *Salmo salar*. However, as this watercourse and its headwaters are outside of the SAC boundary, it is unlikely that populations of Atlantic salmon here, if present, are those associated with the SAC.

There are no impact pathways between the option and any of the qualifying features during operation.

32.2 Appropriate Assessment

32.2.1 Scope

The following site was assessed at Stage 2 AA:

- Dartmoor SAC (approximately 450m south)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 32-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not

necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA11 cannot necessarily be confirmed, and further information may be required.

32.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of ROA11, and the connected watercourse, is regularly used by significant numbers of otter and populations of this feature associated with the Dartmoor SAC.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 32-2 Potential adverse impacts on integrity of Habitats Sites from option ROA11

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Dartmoor SAC (approximately 450m south)	● Annex I habitats, southern damselfly and Atlantic salmon	Option ROA11 may have the following temporary or permanent impacts on the qualifying Annex I habitats and Annex II species during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Otter	Option ROA11 may have the following temporary or permanent impacts on otter during the construction phase: ● Toxic contamination – pollution of the water environment (River Lew) and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Sensitive timing of construction works to avoid the periods of greatest otter activity, i.e. no night-time working; ● Avoid disturbance to confirmed holts until no longer in use. This can be informed from monitoring using cameras (requires Natural England licence); ● If holts require closure and destruction to facilitate construction, artificial replacements will be required on the same watercourse away from the works area. These must be in-situ before construction starts. This work will require a Natural England licence; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2.	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
			With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	

Source: Mott MacDonald, 2022

32.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

32.2.4 Appropriate Assessment outcomes for option ROA11

There will be no adverse impacts resulting from the implementation of option ROA11 on the integrity of the Dartmoor SAC, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA11.

33 Option ROA12 Habitats Regulations Assessment

33.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of ROA12 (Table 33-1). LSE have been ruled out for both these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 33-1: ROA12 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Exmoor Heaths SAC (approximately 7.5km north-east)
	Braunton Burrows SAC (approximately 9.5km south-west)

Source: Mott MacDonald, 2022

33.1.1 Exmoor Heaths SAC

Although this site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G801000 (River Taw and North Devon Streams), it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction. Due to this distance (7.5km), there are no other impact pathways during construction.

There are no impact pathways between the option and any of the qualifying features during operation.

33.1.2 Braunton Burrows SAC

Although this site is hydrologically connected to the option via the WFD groundwater waterbody GB40802G801000 (River Taw and North Devon Streams), it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction. Due to this distance (9.5km), there are no other impact pathways during construction.

There are no impact pathways between the option and any of the qualifying features during operation.

It is considered that there are no effect pathways between both Habitats Sites and option ROA12. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

34 Option ROA13 Habitats Regulations Assessment

34.1 Screening

The Stage 1 Screening identified six Habitats Sites within the ZoI of ROA13 (Table 34-1). LSE have been ruled out for three of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 34-1: ROA13 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Exe Estuary SPA (approximately 2km downstream)	East Devon Pebblebed Heaths SAC (approximately 7.5km north-east)
Exe Estuary Ramsar (approximately 2km downstream)	East Devon Heaths SPA (approximately 7.5km north-east)
Dawlish Warren SAC (approximately 2.3km south-east)	South Hams SAC (approximately 9km west)

Source: Mott MacDonald, 2022

34.1.1 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

The site is hydrologically connected to the option via a surface water drain and the WFD groundwater waterbody GB40801G801700 (Permian Aquifers in Central Devon). Any pollution events may be transferred to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species.

The distance from the site to the option is sufficiently far that there are no other impact pathways during construction.

The Exe Estuary is not a surface water dependent ecosystem, as the habitats which support the qualifying features are intertidal. As such, no significant effects are anticipated during operation.

34.1.2 Dawlish Warren SAC

This site is hydrologically connected via the WFD groundwater waterbody GB40801G801700 (Permian Aquifers in Central Devon). Any pollution events may be transferred to the site and impact qualifying features; Annex I habitats and petalwort *Petalophyllum ralfsii* may be damaged or degraded through pollution.

The distance from the site to the option is sufficiently far that there are no other impact pathways during construction.

There are no impact pathways during operation and therefore no significant effects are anticipated.

34.1.3 East Devon Pebblebed Heaths SAC

This site is sufficiently distant from the proposed works (7.5km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any significant effects during construction or operation.

34.1.4 East Devon Heaths SPA

This site is sufficiently distant from the proposed works (7.5km) and not hydrologically connected to the option footprint. The site and option are separated by the Exe Estuary and not functionally connected through habitats which are suitable for, or within cited foraging range of, the qualifying features of the site[34]. As such, there are unlikely to be any significant effects during construction or operation.

34.1.5 South Hams SAC

This site is sufficiently distant from the proposed works (9km) and not hydrologically connected to the option footprint.

However, as the qualifying features of this site are bats, and highly mobile, additional effects on functionally connected areas needs to be assessed to determine potential effects. The option is outside of the 4km Sustenance Zone for the greater horseshoe bat *Rhinolophus ferrumequinum* but sits within the wider Landscape Connectivity Zone. However, as any construction of the option would be within the existing WTW footprint, disturbance or damage to potential commuting routes, 'Pinch Points', or 'Existing Mitigation Features' for the site's greater horseshoe population is not anticipated. Details of functional habitat, commuting routes, Pinch Points and mitigation areas for the SAC's population are detailed within the Dartmoor Local Plan HRA[35] and Devon County Council environment viewer[36].

There are no impact pathways during operation and therefore no significant effects are anticipated.

34.2 Appropriate Assessment

34.2.1 Scope

The following sites were assessed at Stage 2 AA:

- Exe Estuary SPA (approximately 2km downstream)
- Exe Estuary Ramsar (approximately 2km downstream)
- Dawlish Warren SAC (approximately 2.3km south-east)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 34-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

[34] Natural England (2019). East Devon Heaths SPA Conservation Objective Supplementary Advice [online] available at: European Site Conservation Objectives for East Devon Heaths SPA - UK9010121 (naturalengland.org.uk)

[35] Dartmoor National Park (2019). Dartmoor National Park Authority Local Plan Review 2020-2036: Habitats Regulations Assessment (HRA) Screening & Appropriate Assessment Report [online] available at: 190802_DNPLP-Reg-19_HRA-Report_Final.pdf (dartmoor.gov.uk)

[36] Devon County Council (2022). Devon County Council Environment Viewer [online] available at: Devon County Council Environment Viewer

At this stage, conclusions on adverse impacts arising from option ROA13 cannot necessarily be confirmed, and further information may be required.

34.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

The assumption, in the absence of detailed design or recent survey data, is that the land required for the construction of ROA13, and the connected watercourse, is regularly used by significant numbers of otter and populations of this feature associated with the Dartmoor SAC.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 34-2 Potential adverse impacts on integrity of Habitats Sites from option ROA13

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Exe Estuary SPA/Ramsar (approximately 2km downstream)	● All	Option ROA13 may have the following temporary or permanent impacts on the qualifying features during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
Dawlish Warren SAC (approximately 2.3km south-east)	● All	Option ROA13 may have the following temporary or permanent impacts on the qualifying features during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

34.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

34.2.4 Appropriate Assessment outcomes for option ROA13

There will be no adverse impacts resulting from the implementation of option ROA13 on the integrity of the Exe Estuary SPA and Ramsar, and Dawlish Warren SAC, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA13.

35 Option ROA14 Habitats Regulations Assessment

35.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of ROA14 (Table 35-1). LSE have been ruled out for two of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 35-1: ROA14 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Dartmoor SAC (approximately 500m west)	South Dartmoor Woods SAC (approximately 5km north-east)
	South Hams SAC (approximately 6.5km east)

Source: Mott MacDonald, 2022

35.1.1 Dartmoor SAC

Although this site is upstream of the option, it is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme). Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Annex I habitats may be damaged and/or degraded through pollution. Damage to other habitats which support qualifying species, such as Southern damselfly, may also occur.

During construction there may also be indirect effects to the sites' integrities through disturbance; noise, visual and artificial light are all sources of disturbance which could impact the integrity of the Dartmoor SAC. The River Avon is hydrologically connected to the site upstream of the option and may be regularly used by otter, a qualifying feature. Disturbing effects can result in changes to behaviours, increased energy expenditure due to fleeing, abandonment of young, and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

The increase in reservoir size will require permanent additional land take from an approximate area of 50m around the current footprint. This may result in the loss of terrestrial habitats which are suitable for otter resting places, such as priority grass moorland. This could have a significant effect of the SAC population and supporting habitat outside the site boundary.

With the reservoir and dam already present, it is unlikely that populations of Atlantic salmon associated with the SAC are using the habitats within the option boundary, as there is no passage upstream.

There are no impact pathways between the option and any of the qualifying features during operation.

35.1.2 South Dartmoor Woods SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant (5km) from the proposed works that no likely significant effects are anticipated during construction.

There are no impact pathways between the option and the site during operation.

35.1.3 South Hams SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant (6.5km) from the proposed works that no likely significant effects on designated habitats within the SAC boundary are anticipated during construction.

However, as the qualifying features of this site are bats, and highly mobile, additional effects on functionally connected areas needs to be assessed to determine potential effects. The option is outside of the 4km Sustenance Zone for the greater horseshoe bat but sits within the wider Landscape Connectivity Zone. The additional permanent land take around the current reservoir footprint will not result in any disturbance or damage to potential commuting routes, 'Pinch Points', or 'Existing Mitigation Features' for the site's greater horseshoe population. Habitats which may be lost are sub-optimal for greater horseshoes and therefore any effect will be negligible. Details of functional habitat, commuting routes, Pinch Points and mitigation areas for the SAC's population are detailed within the Dartmoor Local Plan HRA[37] and Devon County Council environment viewer[38].

There are no impact pathways between the option and any of the qualifying features during operation.

35.2 Appropriate Assessment

35.2.1 Scope

The following site was assessed at Stage 2 AA:

- Dartmoor SAC (approximately 500m west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 35-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA14 cannot necessarily be confirmed, and further information may be required.

35.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

[37] Dartmoor National Park (2019). Dartmoor National Park Authority Local Plan Review 2020-2036: Habitats Regulations Assessment (HRA) Screening & Appropriate Assessment Report [online] available at: 190802_DNPLP-Reg-19_HRA-Report_Final.pdf (dartmoor.gov.uk)

[38] Devon County Council (2022). Devon County Council Environment Viewer [online] available at: Devon County Council Environment Viewer

Table 35-2 Potential adverse impacts on integrity of Habitats Sites from option ROA14

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Dartmoor SAC (approximately 500m west)	● Annex I habitats, southern damselfly and Atlantic salmon	Option ROA14 may have the following temporary or permanent impacts on the qualifying Annex I habitats and Annex II species during the construction phase: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts
	● Otter	Option ROA14 may have the following temporary or permanent impacts on otter during the construction phase: ● Toxic contamination – pollution of the water environment (River Lew) and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Physical loss/damage - significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; and ● Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution; and No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Sensitive timing of construction works to avoid the periods of greatest otter activity, i.e. no night-time working; ● Avoid disturbance to confirmed holts until no longer in use. This can be informed from monitoring using cameras (requires Natural England licence); ● If holts require closure and destruction to facilitate construction, artificial replacements will be required on the same watercourse away from the works area. These must be in-situ before construction starts. This work will require a Natural England licence; and ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2.	No adverse impacts

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
			With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	

Source: Mott MacDonald, 2022

35.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

35.2.4 Appropriate Assessment outcomes for option ROA14

There will be no adverse impacts resulting from the implementation of option ROA14 on the integrity of the Dartmoor SAC, if the suggested mitigation and best practice measures are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA14.

36 Option ROA15 Habitats Regulations Assessment

36.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of ROA15 (Table 36-1). LSE has been ruled out for both these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 36-1: ROA15 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Plymouth Sound & Estuaries SAC (approximately 29km downstream)
	Tamar Estuaries Complex SPA (approximately 40km downstream)

Source: Mott MacDonald, 2022

36.1.1 Plymouth Sound & Estuaries SAC

Although this site is hydrologically connected downstream of the option via the River Tamar, it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction. No other impact pathways are present during construction due to the distance of the site from the option (29km downstream).

The abstraction during operation is not anticipated to result in likely significant effects on the downstream site, due to its distance from the option and tidal nature. Additional surface water feeds the site from major rivers downstream of the abstraction point. As such, there are unlikely to be any effects during construction or operation of the option.

36.1.2 Tamar Estuaries Complex SPA

Although this site is hydrologically connected downstream of the option via the River Tamar, it is sufficiently distant from the proposed works that no likely significant effects are anticipated during construction. No other impact pathways are present during construction due to the distance of the site from the option (40km downstream).

The abstraction during operation is not anticipated to result in likely significant effects on the downstream site, due to its distance from the option. Furthermore, the Tamar Estuary is not a groundwater dependent ecosystem, as the habitats which support its qualifying features are intertidal.

It is considered that there are no effect pathways between all Habitats Sites and option ROA15. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

37 Option ROA16 Habitats Regulations Assessment

37.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of ROA16 (Table 37-1). LSE were ruled out for three of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 37-1: ROA16 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Dartmoor SAC (approximately 14km north-west)	South Hams SAC (approximately 5.5km west)
	South Dartmoor Woods SAC (approximately 9.5km north-west)
	Lyme Bay and Torbay SAC (approximately 9.5km east)

Source: Mott MacDonald, 2022

37.1.1 South Hams SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant (5.5km) from the proposed works that no likely significant effects on designated habitats within the SAC boundary are anticipated during construction.

However, as the qualifying features of this site are bats, which are highly mobile, additional effects on functionally connected areas needs to be assessed to determine potential effects. The option is outside of the 4km Sustenance Zone for the greater horseshoe bat but sits within the wider Landscape Connectivity Zone. These areas have been mapped around the SAC and key species' roosts outside of the SAC, to help connect the SAC to other populations for the purpose of maintaining genetic diversity and resilience. This option is outside of the key sustenance zones for all qualifying features and as a result is not anticipated to have any significant effect on the SAC. It is not anticipated that there will be any loss of suitable commuting or foraging habitat, as the option is assumed to be confined to the existing hardstanding of the WTW footprint.

There is a 'Pinch Point' approximately 450m south of the option, on the River Dart in Totnes. A Pinch Point is a known or potential greater horseshoe commuting route which is significantly restricted, for example due to urban encroachment. Further restriction to Pinch Points could significantly impact the movements of greater horseshoes and potentially have a significant effect on the SAC. This option will not result in any impacts on this Pinch Point, or other suitable commuting corridors such as the River Hems. Details of functional habitat, commuting routes, Pinch Points and mitigation areas for the SAC's population are detailed within the Dartmoor

Local Plan HRA[39] and Devon County Council environment viewer[40]. There are no other potential impact pathways during construction, due to the distance between the option and the site.

There are no impact pathways between the option and any of the qualifying features during operation.

37.1.2 South Dartmoor Woods SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant (5km) from the proposed works that no likely significant effects are anticipated during construction.

There are no impact pathways between the option and the site during operation.

37.1.3 Lyme Bay and Torbay SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme) and the River Dart, it is sufficiently distant (>10km downstream) from the proposed works that no likely significant effects are anticipated during construction.

There are no impact pathways between the option and the site during operation. The additional abstraction from the River Hems will not affect the marine environment and this site's Annex I habitats.

37.1.4 Dartmoor SAC

Although this site is hydrologically connected via the WFD groundwater waterbody GB40802G800700 (Teign, Avon, Dart and Erme), it is sufficiently distant (>10km) from the proposed works that no likely significant effects are anticipated during construction. The River Dart lies between the works footprint and the site (approximately 200m west), so any pollution events would be transferred downstream through the surface water, rather than towards the SAC.

The River Dart is connected to the site via the East- and West Dart Rivers, with the option footprint approximately 36km downstream. Otter and Atlantic salmon are qualifying features which may utilise the River Dart. Otter populations associated with the SAC may commute and forage on the river, even at this distance from the site boundary. Any pollution events which affect the river may impact upon prey availability. However, at this distance from the site, only low densities of otter associated with the SAC are likely to be present and therefore any effects from pollution of the water environment are not anticipated to be significant. No other impact pathways on otter are anticipated, due to the distance of the option from the River Dart (200m).

Atlantic salmon are known to migrate into the site through the River Dart. It is possible that any pollution events which affect the river could have a significant effect on salmon, changing water quality downstream of the option. Maintaining good water quality is stated as a target for supporting salmon populations in the conservation objectives supplementary advice for Dartmoor SAC[41]. Although these impacts would be outside the SAC boundary, they could be within supporting habitat and significantly affect salmon which use the River Dart to migrate to

[39] Dartmoor National Park (2019). Dartmoor National Park Authority Local Plan Review 2020-2036: Habitats Regulations Assessment (HRA) Screening & Appropriate Assessment Report [online] available at: 190802_DNPLP-Reg-19_HRA-Report_Final.pdf (dartmoor.gov.uk)

[40] Devon County Council (2022). Devon County Council Environment Viewer [online] available at: Devon County Council Environment Viewer

[41] Natural England (2019). Dartmoor SAC Conservation Objectives Supplementary Advice [online] available at: European Site Conservation Objectives for Dartmoor SAC - UK0012929 (naturalengland.org.uk)

and from spawning grounds within the SAC. This could result in direct mortality to individual fish and displace populations from the SAC if migration routes are degraded. No other impact pathways on Atlantic salmon are anticipated due to the distance of the option from the River Dart (200m).

There are no impact pathways between the option and the site during operation.

37.2 Appropriate Assessment

37.2.1 Scope

The following site was assessed at Stage 2 AA:

- Dartmoor SAC (approximately 14km north-west and 36km upstream)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 37-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option ROA16 cannot necessarily be confirmed, and further information may be required.

37.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 37-2 Potential adverse impacts on integrity of Habitats Sites from option ROA16

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Dartmoor SAC (approximately 14km north-west, 36km upstream)	● Atlantic salmon	Option ROA16 may have the following permanent impacts on these Annex II species during the construction and operation phases: ● Toxic contamination – pollution of the water environment and groundwater catchment - which could be transferred to within the Habitats Site boundary; ● Physical loss/damage – significant localised habitat degradation/loss leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features; and ● Biological disturbance – changes in habitat availability and potential for SAC populations to be displaced from currently used areas. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Sensitive timing of construction works to avoid the key spawning and upstream migration season, November to February inclusive; ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on this qualifying feature will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

37.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. There is a geographical overlap with options ROA7 and ROA10. Options ROA7, ROA10 and ROA16 all identify the Dartmoor SAC within their study areas, although no adverse effects are concluded in this section, or sections 27 and 28, respectively. Furthermore, the delivery of option ROA7 is anticipated between 2025 and 2026, so there is no temporal overlap to exacerbate any residual adverse effects on the site.

Delivery of this option, if progressed, is anticipated between 2046 and 2047, meaning there is temporal overlap with indicative delivery dates for ROA10. However, neither option ROA10 nor ROA16 are anticipated to have adverse effects on the integrity of the Dartmoor SAC, and so there will be no in-combination effects.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

37.2.4 Appropriate Assessment outcomes for option ROA16

There will be no adverse impacts resulting from the implementation of option ROA16 on the Dartmoor SAC, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects, alone or in-combination with other options, on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option ROA16.

38 Option WIM1 Habitats Regulations Assessment

38.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of WIM1 (Table 38-1). LSE has been ruled out for both these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 38-1: WM1 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Exe Estuary SPA (approximately 9.5km downstream)
	Exe Estuary Ramsar (approximately 9.5km downstream)

Source: Mott MacDonald, 2022

38.1.1 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

The site is hydrologically connected to the option via the River Exe. During operation, borehole abstraction of groundwater is not anticipated to have any impact on the site due to the significant distance (over 7km). Furthermore, the Exe Estuary is not a groundwater dependent ecosystem, as the habitats which support its qualifying features are intertidal.

It is considered that there are no effect pathways between all Habitats Sites and option WIM1. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

39 Option WIM2 Habitats Regulations Assessment

39.1 Screening

The Stage 1 Screening identified five Habitats Sites within the ZoI of WIM2 (Table 39-1). LSE have been ruled out for all of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 39-1: WIM2 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Sidmouth to West Bay SAC (approximately 3.3km downstream)
	East Devon Pebblebed Heaths SAC (approximately 7km west)
	East Devon Heaths SPA (approximately 7km west)
	Beer Quarry & Caves SAC (approximately 8km east)
	Lyme Bay and Torbay SAC (approximately 7.5km south-east)

Source: Mott MacDonald, 2022

39.1.1 Sidmouth to West Bay SAC

There is a hydrological connection between the site and the option, via the WFD groundwater body GB40802G802800 (Sidmouth-Honiton, Mercia Mudstone). However, between the site and the option there is no direct connectivity through the groundwater catchment due to the River Sid, which would transfer pollutants downstream. However, the River Sid does not provide a pathway between the site and the option as it is not connected to the vegetated cliffs. Due to the distance (>3km) between the site and this option, no other impact pathways are present during construction or operation. As such, no likely significant effects are anticipated.

39.1.2 East Devon Pebblebed Heaths SAC

This site is sufficiently distant from the proposed works (7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

39.1.3 East Devon Heaths SPA

This site is sufficiently distant from the proposed works (7km) and not hydrologically connected to the option footprint. The works area is small and in existing hardstanding, which means that there will be no loss of functionally linked habitat for qualifying features outside the SPA boundary. As it stands, the habitat surrounding the proposed works area is not suitable for the qualifying species of the site to use for foraging and is outside of the foraging radius cited within the supplementary advice[42]. As such, there are unlikely to be any effects during construction or operation of the option.

[42] Natural England (2019). East Devon Heaths SPA Conservation Objective Supplementary Advice [online] available at: European Site Conservation Objectives for East Devon Heaths SPA - UK9010121 (naturalengland.org.uk)

39.1.4 Beer Quarry & Caves SAC

This site is sufficiently distant from the proposed works (8km) and not hydrologically connected to the option footprint, meaning that there are unlikely to be any significant effects within the SAC boundary during construction or operation.

However, as the qualifying features of this site are bats, and highly mobile, additional effects on functionally connected areas needs to be assessed to determine potential effects. This option lies within the consultation area of this site, as defined in the Beer Quarry & Caves SAC HRA guidance[43]. This option lies within the landscape connectivity zones of all qualifying features; greater horseshoe, lesser horseshoe *Rhinolophus hipposideros* and Bechstein's bat *Myotis bechsteinii*. These areas have been mapped around the SAC and key species' roosts outside of the SAC, to help connect the SAC to other populations for the purpose of maintaining genetic diversity and resilience. However, this option is outside of the key sustenance zones for all qualifying features and as a result is not anticipated to have any significant effect on the SAC. Furthermore, the construction is confined to the existing SWW site; an area of hardstanding will be developed which will not result in the loss or disturbance to any suitable commuting and foraging habitat for qualifying features.

There are no impact pathways during operation and therefore no significant effects are anticipated.

39.1.5 Lyme Bay and Torbay SAC

This site is sufficiently distant from the proposed works (7.5km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

It is considered that there are no effect pathways between all Habitats Sites and option WIM2. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

[43] Devon County Council, East Devon District Council and East Devon AONB (2022). Beer Quarry & Caves SAC Habitats Regulations Assessment Guidance [online] available at: 2a-appendix-1-bat-consultation-zones-sac-guidance.pdf (eastdevon.gov.uk)

40 Option WIM4 Habitats Regulations Assessment

40.1 Screening

The Stage 1 Screening identified four Habitats Sites within the ZoI of WIM4 (Table 40-1). LSE has been ruled out for all four of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 40-1: WIM4 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	River Axe SAC (approximately 3.5km south-east)
	Sidmouth to West Bay SAC (approximately 8.8km downstream)
	Beer Quarry & Caves SAC (approximately 8km south)
	Lynne Bay and Torbay SAC (approximately 8.8km downstream)

Source: Mott MacDonald, 2022

40.1.1 River Axe SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

There is a hydrological connection between the Umborne Brook and River Axe, although this is downstream of the site and therefore not considered to be an effect pathway. Additionally, there is connectivity via the WFD groundwater body GB40802G803000 (River Yarty and Lower Axe - Mercia Mudstone). Due to this distance between the site and the option (~3.5km), likely significant effects from increased abstraction during operation are not anticipated.

40.1.2 Sidmouth to West Bay SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

There is a hydrological connection between the site and the option, via the WFD groundwater body GB40802G803000 (River Yarty and Lower Axe - Mercia Mudstone). However, there is no direct connectivity through this waterbody between the site and the option due to the presence of the River Axe. The River Axe does not provide a pathway between the site and the option is not connected to the vegetated cliffs. As such, no likely significant effects are anticipated during operation.

40.1.3 Beer Quarry & Caves SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

There are no hydrological pathways between the option and the site, thus foraging areas suitable for qualifying features will not be impacted by increased abstraction of groundwater.

40.1.4 Lyme Bay and Torbay SAC

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

There is a hydrological connection between the site and the option via the River Axe. During operation, additional abstraction of groundwater is not anticipated to have any impact on the site due to the significant distance (over 7km). Additional surface water sources also flow into the site via the River Axe.

It is considered that there are no effect pathways between all Habitats Sites and option WIM4. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

41 Option WIM5 Habitats Regulations Assessment

41.1 Screening

The Stage 1 Screening identified five Habitats Sites within the ZoI of WIM5 (Table 41-1). LSE could not be ruled out for one of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 41-1: WIM5 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
East Devon Heaths SPA (approximately 1.8km west)	Sidmouth to West Bay SAC (approximately 3.2km downstream)
	East Devon Pebblebed Heaths SAC (approximately 1.8km west)
	Beer Quarry & Caves SAC (approximately 8km east)
	Lyme Bay and Torbay SAC (approximately 7.5km south-east)

Source: Mott MacDonald, 2022

41.1.1 East Devon Heaths SPA

There is a hydrological connection between the site and the River Otter outfall, via the WFD groundwater body GB40801G801900 (Otter Valley). The site is upstream of the option and therefore not anticipated to result in any significant effects from potential pollution events.

Construction activities have the potential to result in permanent and temporary habitat loss of functional land used by qualifying species of the East Devon Heaths SPA. Both qualifying species; Dartford warbler *Sylvia undata* and European nightjar *Caprimulgus europaeus* will forage outside of the SPA boundary up to several kilometres from territories. It is possible that these species will be utilising habitats within the construction area, if suitable for foraging. Damage may also occur in functionally-linked habitat from reductions in air quality associated with construction activities.

Similarly, it is possible that there may be indirect effects to the sites' integrities through disturbance; noise, visual disturbance and artificial light are all sources of disturbance which could impact the integrity of the Habitats Site. Disturbing effects within or adjacent to functionally-linked land outside the SPA boundary can result in changes to feeding or roosting behaviours, increased energy expenditure due to more frequent flights, abandonment of nests, disrupted incubation of eggs and desertion of supporting habitat. Disturbance to qualifying species when foraging may jeopardise adult fitness, survival and breeding success by displacing birds from preferred feeding grounds. Effects of displacement may be temporary or long-lasting and may result in redistribution within or from a site.

There are no anticipated significant effects during operation. The pipeline will be underground and will not affect suitable nesting habitat or foraging areas for the qualifying features. The qualifying features of the site are not dependent on surface water habitats either.

41.1.2 Sidmouth to West Bay SAC

There is a hydrological connection between the site and the option, via the WFD groundwater body GB40802G802800 (Sidmouth-Honiton, Mercia Mudstone). However, there is no direct connectivity between the site and the option through this waterbody due to the presence River Sid. The River Sid does not provide a pathway between the site and the option as it is not connected to the vegetated cliffs. As such, no likely significant effects are anticipated during construction or operation.

41.1.3 East Devon Pebblebed Heaths SAC

There is a hydrological connection between the site and the River Otter outfall, via the WFD groundwater body GB40801G801900 (Otter Valley). The site is upstream of the option and therefore not anticipated to result in any significant effects from potential pollution events. No other impact pathways are present due to the distance of the site from the option.

No likely significant effects are anticipated during operation. The outfall location of the new pipeline is downstream of the site and with therefore not affect the hydrological regime.

41.1.4 Beer Quarry & Caves SAC

The site is sufficiently distant (8km) from the option to not result in disturbance to foraging areas and core sustenance zones for the qualifying features of the site. The pipeline route largely follows the existing road infrastructure, avoiding severance of suitable commuting routes and foraging habitat.

There are no buildings within the pipeline route, reducing the likelihood or damage or disturbance to horseshoe roosts. Similarly, the route avoids woodland which are preferred by Bechstein's bat *Myotis bechsteinii*. It is unlikely that there will be significant effects on the qualifying features of the site during construction. With the pipeline being underground, there will be no significant effects during operation either.

41.1.5 Lyme Bay and Torbay SAC

This site is sufficiently distant from the proposed works (over 7km) and not hydrologically connected to the option footprint. As such, there are unlikely to be any effects during construction or operation of the option.

It is considered that there are no effect pathways between the following Habitats Sites and option ROA3: Sidmouth to West Bay SAC, East Devon Pebblebed Heaths SAC, Beer Quarry & Caves SAC and Lyme Bay and Torbay SAC. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

41.2 Appropriate Assessment

41.2.1 Scope

The following site was assessed at Stage 2 AA:

- East Devon Heaths SPA (approximately 1.8km west)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 41-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option WIM5 cannot necessarily be confirmed, and further information may be required.

41.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 41-2 Potential adverse impacts on integrity of Habitats Sites from option WIM5

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
East Devon Heaths SPA (approximately 1.8km west)	• All	Option WIM5 may have the following permanent impacts on the Habitats Site during the construction phase: • Non-toxic contamination – reduced air quality from dust, associated with construction activities and plant • Physical loss/damage - significant localised habitat loss and/or habitat degradation leading to a reduction in qualifying features and/or functional land for supporting qualifying features; • Non-physical disturbance – displacement of qualifying species from noise, visual and/or artificial lighting pathways, associated with construction activities, increasing vehicular movement, personnel and lighting can impact survival and distribution of bird species The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. The effects of non-toxic contamination are unlikely to be significant given the scale of the works required for this option. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: • Implementation of widely used best practice measures for pollution control, see section 3.3.4.2 • Sensitive timing of construction works to avoid the passage and overwintering period for birds detailed in the East Devon Heaths supplementary advice[44] between April to August inclusive, and • Any works which are undertaken between April and August inclusive which may disturb or displace qualifying species from suitable functional land will only be permitted if the population present at risk of disturbance is less than 1% of the cited population in the SPA. With this in place, adverse impacts on the Habitats Site will be alleviated during construction. Please note that a large proportion of the breeding Dartford warbler populations is present on the site all year round. However, avoiding the breeding season means that any adverse impacts on functional habitat are unlikely to be significant outside of April to August inclusive.	No adverse impacts

Source: Mott MacDonald, 2022

[44] Natural England (2019). European Site Conservation Objectives for East Devon Heaths SPA (UK9010121) [online] available at: European Site Conservation Objectives for East Devon Heaths SPA - UK9010121 (naturalengland.org.uk)

41.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2030 and 2031, meaning there is temporal overlap with indicative delivery dates for BNW6. However, BNW6 is a new option and has not been assessed at this stage. As such, the potential for in-combination effects with this option is unknown.

There is a geographical overlap with options WIM8 and WIM9, although no Habitats Sites were identified within the overlapping area. Furthermore, the delivery of options WIM8 and WIM9 is anticipated between 2025 and 2026, so there is no temporal overlap.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

41.2.4 Appropriate Assessment outcomes for option WIM5

There will be no adverse impacts resulting from the implementation of option WIM5 on the East Devon Heaths SPA, if the suggested mitigation and best practice measure are implemented.

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects, alone or in-combination with other options, on the integrity of the Habitats Site will occur, and therefore no further stages in the HRA process are necessary for option WIM5.

42 Option WIM6 Habitats Regulations Assessment

42.1 Screening

The Stage 1 Screening identified three Habitats Sites within the ZoI of WIM6 (Table 42-1). LSE has been ruled out for all three of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 42-1: WIM6 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Culm Grasslands SAC (approximately 10km north-west)
	Exe Estuary SPA (approximately 30km downstream)
	Exe Estuary Ramsar (approximately 30km downstream)

Source: Mott MacDonald, 2022

42.1.1 Culm Grasslands SAC

This site is sufficiently distant (10km) from the proposed works and not hydrologically connected to the option footprint. As such, there are no impact pathways during construction or operation of the option.

42.1.2 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

Although these sites are hydrologically connected downstream from the option, the distance is sufficient (30km) that there are unlikely to be significant effects on the sites or their qualifying features during construction or operation.

There is also hydrological connectivity via the WFD groundwater body GB40801G801700 (Permian Aquifers in Central Devon), although at this distance there will not be any effects.

During operation, the increased abstraction from the River Exe (4 ml/day) is not anticipated to have a significant effect on the sites or their qualifying features, due to the distance downstream (30km). Furthermore, the River Exe is not the only watercourse which feeds into the Exe Estuary; the site is not a groundwater dependent ecosystem, as the habitats which support its qualifying features are intertidal.

It is considered that there are no effect pathways between all Habitats Sites and option WIM6. Consequently, no LSE can be concluded, meaning that these sites do not require a Stage 2 AA and are not considered further.

43 Option WIM7 Habitats Regulations Assessment

43.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of WIM7 (Table 43-1). LSE could not be ruled out for either of these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 43-1: WIM7 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
Exe Estuary SPA (approximately 8.3km downstream)	
Exe Estuary Ramsar (approximately 8.3km downstream)	

Source: Mott MacDonald, 2022

43.1.1 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

It is possible that any pollution events during construction may be transferred through the River Exe to the Habitats Sites and impact qualifying features. Habitats which support qualifying species may be temporarily or irreversibly damaged as a result. There is surface water connectivity from the option to the Habitats Sites screened in for Stage 2 AA and this represents an impact pathway which could adversely affect its integrity.

During operation, the increased abstraction from the River Exe (6.5 ml/day) is not anticipated to have a significant effect on the sites or their qualifying features, due to the distance downstream (>8km). Furthermore, the River Exe is not the only watercourse which feeds into the Exe Estuary; the site is not a groundwater dependent ecosystem, as the habitats which support its qualifying features are intertidal.

All Habitats Sites for option WIM7 will be progressed to Stage 2 AA as LSE could not be ruled out during the screening.

43.2 Appropriate Assessment

43.2.1 Scope

The following site was assessed at Stage 2 AA:

- Exe Estuary SPA (approximately 8.3km downstream)
- Exe Estuary Ramsar (approximately 8.3km downstream)

An assessment of each potential impact on the integrity of the designated sites is made, in view of the sites' structure, function and conservation objectives. Potential adverse effects on the integrity of the Habitats Sites are outlined in Table 43-2 below, and mitigation measures are proposed. Standard best practice measures are also included within the table; these are not necessarily integrated into the project and therefore considered to be mitigation within this document.

At this stage, conclusions on adverse impacts arising from option WIM7 cannot necessarily be confirmed, and further information may be required.

43.2.2 Assumptions and mitigation measures

Based on the current level of information, assumed and established mitigation measures are proposed below that will need to be followed at project level to avoid or mitigate effects.

These measures are defined as industry-wide best practice measures to address common risks in the construction and development sectors and thus are proven to reduce the risk of the identified effects in so far as is reasonably possible.

Table 43-2 Potential adverse impacts on integrity of Habitats Sites from option WIM7

Designated sites	Qualifying features	Possible adverse impacts before mitigation	Mitigation measures	Adverse impacts after mitigation
Exe Estuary SPA/Ramsar (approximately 8.3km downstream)	● All	Option WIM7 may have the following permanent impacts on the Habitats Site during the construction phase: ● Toxic contamination – pollution of the groundwater catchment which could be transferred to within the Habitats Site boundary; and ● Physical loss/damage - significant localised habitat degradation leading to a reduction in qualifying habitats and species, and/or functional habitat for supporting qualifying features. The effects of toxic contamination and physical loss/damage of habitat could be permanent impacts but are likely to be localised due to the distance of the option from the Habitats Site. No adverse impacts are identified during operation.	The following measures will be implemented to avoid or reduce adverse impacts: ● Implementation of widely used best practice measures for pollution control, see section 3.3.4.2. With this in place, adverse impacts on the Habitats Site will be alleviated during construction.	No adverse impacts

Source: Mott MacDonald, 2022

43.2.3 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An in-combination assessment was not possible at this stage, with no information on expected construction and operation dates for the option. Furthermore, information was not obtained on other projects and plans in the area. This information will be included within an in-combination assessment at the project stage.

43.2.4 Appropriate Assessment outcomes for option WIM7

There will be no adverse impacts resulting from the implementation of option WIM7 on the integrity of the following Habitats Sites, if the suggested mitigation and best practice measure are implemented:

- Exe Estuary SPA
- Exe Estuary Ramsar

In conclusion, provided that the proposed mitigation measures are taken forward at project level, no residual effects on the integrity of the Habitats Sites will occur, and therefore no further stages in the HRA process are necessary for option WIM7.

44 Option WIM8 Habitats Regulations Assessment

44.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of WIM8 (Table 44-1). LSE has been ruled out for both these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 44-1: WIM8 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Exe Estuary SPA (approximately 9.5km south)
	Exe Estuary Ramsar (approximately 9.5km south)

Source: Mott MacDonald, 2022

44.1.1 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

There are no infrastructure changes for this option and therefore no likely significant effects during a construction phase.

During operation, the increased discharge into the River Exe is not anticipated to have a significant effect on the site or its qualifying features. The increased flow on the River Exe will not impact the site downstream, as the habitats which support its qualifying features are intertidal.

44.1.2 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2025 and 2026, meaning there is temporal overlap with indicative delivery dates for BNW1, ROA7, COL15 and WIM9. However, there is no geographical overlap with BNW1, ROA7 or COL15; the study areas of these other options do not overlap with WIM8 and therefore the sites identified in this section will not be affected by the other best value options.

There is a geographical overlap with option WIM5, although no Habitats Sites were identified within the overlapping area. Furthermore, the delivery of option WIM5 is anticipated between 2030 and 2031, so there is no temporal overlap.

There is significant geographical and temporal overlap with option WIM9 considering the proximity and anticipated delivery of both options. However, as no LSE were concluded within this section and section 35, there are no in-combination effects.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

It is considered that there are no effect pathways between all Habitats Sites and option WIM8. Consequently, no LSE can be concluded, either alone or in-combination with other preferred (best value) plan options. As such, this option does not require a Stage 2 AA and is not considered further.

45 Option WIM9 Habitats Regulations Assessment

45.1 Screening

The Stage 1 Screening identified two Habitats Sites within the ZoI of WIM9 (Table 45-1). LSE has been ruled out for both these sites.

Information on the Habitats Sites is provided in Appendix A**,** including qualifying features, conservation objectives, and threats and pressures to their integrity.

Table 45-1: WIM9 Stage 1 screening results

Potential for Significant Effects	No Likely Significant Effects
	Exe Estuary SPA (approximately 9.5km south)
	Exe Estuary Ramsar (approximately 9.5km south)

Source: Mott MacDonald, 2022

45.1.1 Exe Estuary SPA/Ramsar

Due to the identical extent of these sites and the significant overlap of qualifying features, these sites are considered together.

The site is hydrologically connected to the option via the WFD groundwater body GB40801G801700 (Permian Aquifers in Central Devon), although at this distance (over 9km) there are not anticipated to be any effects during construction.

During operation, borehole abstraction is not anticipated to have any impact on the site due to the significant distance. The increased discharge into the River Exe is not anticipated to have a significant effect on the site or its qualifying features. The increased flow on the River Exe will not impact the site downstream, as the habitats which support its qualifying features are intertidal.

45.1.2 In-combination effects

An in-combination assessment is required when likely significant effects and/or low-level effects that would not result in significant effects alone are identified (UKWIR, 2021).

An indicative in-combination assessment at this stage only considers other options which are included in the preferred (best value) plan. Delivery of this option, if progressed, is anticipated between 2025 and 2026, meaning there is temporal overlap with indicative delivery dates for BNW1, ROA7, COL15 and WIM8. However, there is no geographical overlap with BNW1, ROA7 or COL15; the study areas of these other options do not overlap with WIM9 and therefore the sites identified in this section will not be affected by the other best value options.

There is a geographical overlap with option WIM5, although no Habitats Sites were identified within the overlapping area. Furthermore, the delivery of option WIM5 is anticipated between 2030 and 2031, so there is no temporal overlap.

There is significant geographical and temporal overlap with option WIM8 considering the proximity and anticipated delivery of both options. However, as no LSE were concluded within this section and section 34, there are no in-combination effects.

Information was not obtained on other projects and plans in the area but will be included within an in-combination assessment at the project stage.

It is considered that there are no effect pathways between all Habitats Sites and option WIM8. Consequently, no LSE can be concluded, either alone or in-combination with other preferred (best value) plan options. As such, this option does not require a Stage 2 AA and is not considered further.

46 Conclusions

46.1 Preferred plan

This HRA finds that four options which are identified in the preferred (best value) plan were screened out at Stage 1 of the HRA process due to conclusions of no LSE from both construction and operation phases. The additional seven options could not conclude findings of no LSE and therefore were progressed to Stage 2 AA.

The implementation of widely used best practice construction methods alone was able to alleviate any residual adverse impacts from some of the options, with others requiring specific mitigation measures, including but not limited to: sensitive timings of works to avoid key periods for qualifying features, and habitat retention. It is also recommended that a CEMP be in place that will include the proposed mitigation measures in this AA as well as any other specific measures identified following an HRA undertaken at project level.

The recommended mitigation measures detailed within this document assume a worst-case scenario at this stage, in the absence of detailed survey data or local records. As such, they are appropriate to avoid adverse effects on the Habitats Sites. The receipt of additional data may provide evidence that there will be no adverse effects on Habitats Sites even in the absence of mitigation; in this scenario this document should be revised accordingly.

Whilst the inclusion of specific mitigation measures can alleviate the potential adverse impacts from six of the seven options included within the preferred (best value) plan which required Stage 2 AA, uncertainty over residual impacts during the operation of options BNW1 remains.

An indicative in-combination assessment was undertaken for the 11 options identified within the preferred (best value) plan, with information correct as of December 2022. It was concluded that there will be no in-combination effects on Habitats Sites from the preferred (best value) plan. Many of the options are geographically isolated from one another and anticipated delivery dates are separate for most. This document should be updated following changes to any of the options within this report and/or the addition of new options.

46.2 Alternative plan and other options

A total of 31 assessed options within the WRMP24 are not identified as part of the preferred (best value) plan. Of these options, 14 were screened out at Stage 1 of the HRA process due to conclusions of no LSE from both construction and operation phases. The other 17 options could not conclude findings of no LSE and therefore were progressed to Stage 2 AA.

Whilst the inclusion of widely used best practice methods and other targeted mitigation alleviated the potential for adverse impacts from 28 of these options, uncertainty over residual impacts during the operation of option COL2, COL12 and ROA4 remains.

Where residual impacts remain at this stage, it does not mean that progression to HRA Stage 3 (Assessment of Alternative Solutions) is required. Instead, it is recommended that further assessment and targeted ecological survey data is obtained to accurately conclude potential adverse impacts. Upon receipt of the necessary information, a revised HRA Stage 1 Screening is required, with progression to subsequent stages if necessary.

47 References

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A. Habitats Sites

A.1 Option BNW1

Habitats Sites	Qualifying Features
The New Forest SAC	UK0012557 Annex I habitats (primary reason for site selection): 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-nanojuncetea 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) 7150 Depressions on peat substrates of the Rhynchosporion 9120 Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion 9130 Asperulo-Fagetum beech forests 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains 91D0 Bog woodland *priority feature 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Silicion albae) *priority feature Annex I habitats present as a qualifying feature, but not primary reason for selection: 7140 Transition mires and quaking bogs 7230 Alkaline fens Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* 1083 Stag beetle *Lucanus cervus* Annex II species present as a qualifying feature, but not primary reason for selection: 1166 Great crested newt *Triturus cristatus*
New Forest SPA	UK9011031

Habitats Sites	Qualifying Features
	Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (8.8% of the GB population) Woodlark *Lullula arborea* (29.5% of the GB breeding population) Honey buzzard *Pernis apivorus* (12.5% of the GB breeding population) Dartford warbler *Sylvia undata* (33.6% of the GB breeding population) Over the winter the area regularly supports: Hen harrier *Circus cyaneus* (2% of the GB population) Article 4.2 qualification: During the breeding season the area regularly supports: Hobby *Falco subbuteo* (5% of the GB population) Wood warbler *Phylloscopus sibilatrix* (at least 2% of the GB population)
New Forest Ramsar	UK11047 Ramsar criterion 1: Valley mires and wet heaths are found throughout the site and are of outstanding scientific interest. This is the largest concentration of intact valley mires of their type in Britain. Ramsar criterion 2: The site supports a diverse assemblage of wetland plants and animals including several nationally rare species. Seven species of nationally rare plants are found on site, as are at least 65 British Red Data Book invertebrate species. Ramsar criterion 3: The mire habitats are of high ecological quality and diversity and have undisturbed transitional zones. The invertebrate fauna of the site is important due to the concentration of rare and scarce wetland species. The whole site complex, with its examples of semi-natural habitats is essential to the genetic and ecological diversity of southern England. This site contains a rich invertebrate fauna.
Solent Maritime SAC	UK0030059 Annex I habitats (primary reason for selection): 1130 Estuaries 1320 Spartina swards (Spartinion maritimae)

Habitats Sites	Qualifying Features
	1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1110 Sandbanks which are slightly covered by sea water all the time 1140 Mudflats and sandflats not covered by seawater at low tide 1150 Coastal lagoons *priority feature 1210 Annual vegetation of drift lines 1220 Perennial vegetation of stony banks 1310 Salicornia and other annuals colonising mud and sand 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") Annex II species present as a qualifying feature, but not primary reason for selection: 1016 Desmoulin's whorl snail *Vertigo moulinsiana*
Solent and Isle of Wight Lagoons SAC	UK0017073 Annex I habitats (primary reason for selection): 1150 Coastal lagoons *priority feature
Solent & Southampton Water SPA	UK9011061 Article 4.1 qualification: During the breeding season the area regularly supports: Mediterranean gull *Larus melanocephalus* (15.4% of the GB breeding population) Little tern *Sterna albifrons* (2% of the GB breeding population) Roseate tern *Sterna dougallii* (3.1% of the GB breeding population) Common tern *Sterna hirundo* (2.2% of the GB breeding population) Sandwich tern *Sterna sandvicensis* (1.7% of the GB breeding population) Article 4.2 qualification: Over winter the area regularly supports: Eurasian teal *Anas crecca* (1.1% of the population) Dark bellied brent goose *Branta bernicla bernicla* (2.5% of the population) Common ringed plover *Charadrius hiaticula* (1.2% of the population) Black-tailed godwit *Limosa limosa islandica* (1.7% of the population)

Habitats Sites	Qualifying Features
	Over winter the area regularly supports 51361 waterfowl (5 year peak mean 1992/93-1996/97)
Solent & Southampton Water Ramsar	UK11063 Ramsar criterion 1: The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodlands and rocky boulder reefs. Ramsar criterion 2: This site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. The Mediterranean gull *Larus melanocephalus* is included in CITES Appendix I. Ramsar criterion 5: Assemblages of international importance: Species with peak counts in winter: 51,343 waterfowl (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Qualifying species/populations: Species with peak counts in spring/autumn and winter: Black-tailed godwit *Limosa limosa islandica*; 1,240 individuals, representing an average of 2.6% of the population Dark bellied brent goose *Branta bernicla bernicla*; 6,456 individuals, representing an average of 3.2% of the population Eurasian teal *Anas crecca*; 5,514 individuals, representing an average of 1.1% of the population
Solent and Dorset Coast SPA	UK9020330 Article 1 qualification: During the breeding season the area regularly supports: Sandwich tern *Sterna sandvicensis* (4.01% of the GB breeding population) Common tern *Sterna hirundo* (4.77% of the GB breeding population) Little tern *Sterna albifrons* (3.31% of the GB breeding population)

A.2 Option BNW3

Habitats Sites	Qualifying Features
Dorset Heaths SAC	UK0019857 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7150 Depressions on peat substrates of the Rhynchosporion Annex I habitats present as a qualifying feature, but not primary reason for selection: 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (*Molinion caeruleae*) 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* *priority feature 7230 Alkaline fens 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1166 Great crested newt *Triturus cristatus*
Dorset Heathlands SPA	UK9010101 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (at least 12.8% of the GB breeding population) Woodlark *Lullula arborea* (at least 6.8% of the GB breeding population) Dartford warbler *Sylvia undata* (at least 26.1% of the GB breeding population) Over winter the area regularly supports: Hen harrier *Circus cyaneus* (2.7% of the GB population) Merlin *Falco columbarius* (1.2% of the GB population)
Dorset Heathlands Ramsar	UK11021

Habitats Sites	Qualifying Features
	Ramsar criterion 1: The site contains particularly good examples of northern Atlantic wet heaths with cross-leaved heath and acid mire with Rhynchosporion. The site contains the largest example in Britain of southern Atlantic wet heaths with Dorset heath and cross-leaved heath. Ramsar criterion 2: The site supports 1 nationally rare and 13 nationally scarce wetland plant species, and at least 28 nationally rare wetland invertebrate species. Ramsar criterion 3: The site has a high species richness and high ecological diversity of wetland habitat types and transitions and lies in one of the most biologically rich wetland areas of lowland Britain, being continuous with three other Ramsar sites - Poole Harbour, Avon Valley and The New Forest.
Poole Harbour SPA	UK9010111 Article 4.1 qualification: During the breeding season the area regularly supports: Mediterranean gull *Larus melanocephalus* (10% of the GB breeding population) Common tern *Sterna hirundo* (1.8% of the Gb breeding population) Sandwich tern *Sterna sanvicensis* (1.6% of the GB breeding population) Over winter the area regularly supports: Avocet *Recurvirostra avosetta* (36.1% of the GB population) Little egret *Egretta garzetta* (2.5% of the GB population) Eurasian spoonbill *Platalea leucorodia* (100% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Shelduck *Tadorna tadorna* (1.2% of the biogeographic population - NW Europe) Black-tailed godwit *Limosa limosa islandica* (2.3% of the biogeographic population - NW Europe) In the non-breeding season the area regularly supports 25,176 individuals (4 year peak mean 1993/94 - 1996/97)
Poole Harbour Ramsar	UK11054 Ramsar criterion 1:

Habitats Sites	Qualifying Features
	The site is the best and largest example of a bar-built estuary with lagoonal characteristic (a natural harbour) in Britain. Ramsar criterion 2: The site supports two species of nationally rare plant and one nationally rare alga. There are at least three British Red Data Book invertebrate species. Ramsar criterion 3: The site includes examples of natural habitat types of community interest - Mediterranean and thermo Atlantic halophilous scrubs and calcareous fens. transitions from saltmarsh through to peatland mires are of exceptional conservation importance as few examples remain in Britain. The site supports nationally important populations of breeding waterfowl and a nationally important population of avocet of winter. Ramsar criterion 5: The site supports 24,709 waterfowl over winter (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Shelduck *Tadorna tadorna*; 2,120 individuals representing an average of 2.7% of the GB population Black-tailed godwit *Limosa limosa islandica*; 1,724 individuals representing an average of 4.9% of the population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Species with peak counts in winter: Avocet *Recurvirostra avosetta*; 1,260 individuals representing an average of 1.7% of the population
Solent and Dorset Coast SPA	UK9020330 Article 1 qualification: During the breeding season the area regularly supports: Sandwich tern *Sterna sandvicensis* (4.01% of the GB breeding population) Common tern *Sterna hirundo* (4.77% of the GB breeding population) Little tern *Sterna albifrons* (3.31% of the GB breeding population)

A.3 Option BNW6

Habitats Sites	Qualifying Features
Dorset Heaths SAC	UK0019857 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7150 Depressions on peat substrates of the Rhynchosporion Annex I habitats present as a qualifying feature, but not primary reason for selection: 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (Molinion caeruleae) 7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae *priority feature 7230 Alkaline fens 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1166 Great crested newt *Triturus cristatus*
Dorset Heathlands SPA	UK9010101 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (at least 12.8% of the GB breeding population) Woodlark *Lullula arborea* (at least 6.8% of the GB breeding population) Dartford warbler *Sylvia undata* (at least 26.1% of the GB breeding population) Over winter the area regularly supports: Hen harrier *Circus cyaneus* (2.7% of the GB population) Merlin *Falco columbarius* (1.2% of the GB population)
Dorset Heathlands Ramsar	UK11021

Habitats Sites	Qualifying Features
	Ramsar criterion 1: The site contains particularly good examples of northern Atlantic wet heaths with cross-leaved heath and acid mire with Rhynchosporion. The site contains the largest example in Britain of southern Atlantic wet heaths with Dorset heath and cross-leaved heath. Ramsar criterion 2: The site supports 1 nationally rare and 13 nationally scarce wetland plant species, and at least 28 nationally rare wetland invertebrate species. Ramsar criterion 3: The site has a high species richness and high ecological diversity of wetland habitat types and transitions and lies in one of the most biologically-rich wetland areas of lowland Britain, being continuous with three other Ramsar sites - Poole Harbour, Avon Valley and The New Forest.
Solent and Dorset Coast SPA	UK9020330 Article 1 qualification: During the breeding season the area regularly supports: Sandwich tern *Sterna sandvicensis* (4.01% of the GB breeding population) Common tern *Sterna hirundo* (4.77% of the GB breeding population) Little tern *Sterna albifrons* (3.31% of the GB breeding population)
River Avon SAC	UK0013016 Annex I habitats (primary reason for site selection): 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation Annex II species (primary reason for site selection): 1016 Desmoulin's whorl snail *Vertigo moulinsiana* 1095 Sea lamprey *Petromyzon marinus* 1096 Brook lamprey *Lampetra planeri* 1106 Atlantic salmon *Salmo salar* 1163 Bullhead *Cottus gobio*
Avon Valley SPA	UK9011091 Article 4.1 qualification: Over winter the area regularly supports:

Habitats Sites	Qualifying Features
	Bewick's swan *Cygnus columbianus bewickii* (1.9% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Gadwall *Anas strepera* (2.2% of the population)
Avon Valley Ramsar	UK11005 Ramsar criterion 1: The site shows a greater range of habitats than any other chalk river in Britain, including fen, mire, lowland wet grassland and small areas of woodland. Ramsar criterion 2: The site supports a diverse assemblage of wetland flora and fauna including several nationally rare species. Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Gadwall *Anas strepera;* 537 individuals representing an average of 3.1% of the GB population. Species/populations identified subsequent to designation for possible consideration under criterion 6: Species with peak counts in winter: Northern pintail *Anas acuta*; 715 individuals representing an average of 1.1% of the population Black-tailed godwit *Limosa limosa islandica*; 1,142 individuals representing an average of 3.2% of the population
Poole Harbour SPA	UK9010111 Article 4.1 qualification: During the breeding season the area regularly supports: Mediterranean gull *Larus melanocephalus* (10% of the GB breeding population) Common tern *Sterna hirundo* (1.8% of the Gb breeding population) Sandwich tern *Sterna sanvicensis* (1.6% of the GB breeding population) Over winter the area regularly supports: Avocet *Recurvirostra avosetta* (36.1% of the GB population)

Habitats Sites	Qualifying Features
	Little egret *Egretta garzetta* (2.5% of the GB population) Eurasian spoonbill *Platalea leucorodia* (100% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Shelduck *Tadorna tadorna* (1.2% of the biogeographic population - NW Europe) Black-tailed godwit *Limosa limosa islandica* (2.3% of the biogeographic population - NW Europe) In the non-breeding season the area regularly supports 25,176 individuals (4 year peak mean 1993/94 - 1996/97)
Poole Harbour Ramsar	UK11054 Ramsar criterion 1: The site is the best and largest example of a bar-built estuary with lagoonal characteristic (a natural harbour) in Britain. Ramsar criterion 2: The site supports two species of nationally rare plant and one nationally rare alga. There are at least three British Red Data Book invertebrate species. Ramsar criterion 3: The site includes examples of natural habitat types of community interest - Mediterranean and thermo Atlantic halophilous scrubs and calcareous fens. transitions from saltmarsh through to peatland mires are of exceptional conservation importance as few examples remain in Britain. The site supports nationally important populations of breeding waterfowl and a nationally important population of avocet of winter. Ramsar criterion 5: The site supports 24,709 waterfowl over winter (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Shelduck *Tadorna tadorna*; 2,120 individuals representing an average of 2.7% of the GB population Black-tailed godwit *Limosa limosa islandica*; 1,724 individuals representing an average of 4.9% of the population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Species with peak counts in winter:

Habitats Sites	Qualifying Features
	Avocet *Recurvirostra avosetta*; 1,260 individuals representing an average of 1.7% of the population

A.4 Option BNW11

Habitats Sites	Qualifying Features
River Avon SAC	UK0013016 Annex I habitats (primary reason for site selection): 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation Annex II species (primary reason for site selection): 1016 Desmoulin's whorl snail *Vertigo moulinsiana* 1095 Sea lamprey *Petromyzon marinus* 1096 Brook lamprey *Lampetra planeri* 1106 Atlantic salmon *Salmo salar* 1163 Bullhead *Cottus gobio*
Avon Valley SPA	UK9011091 Article 4.1 qualification: Over winter the area regularly supports: Bewick's swan *Cygnus columbianus bewickii* (1.9% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Gadwall *Anas strepera* (2.2% of the population)
Avon Valley Ramsar	UK11005 Ramsar criterion 1: The site shows a greater range of habitats than any other chalk river in Britain, including fen, mire, lowland wet grassland and small areas of woodland.

Habitats Sites	Qualifying Features
	Ramsar criterion 2: The site supports a diverse assemblage of wetland flora and fauna including several nationally rare species. Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Gadwall *Anas strepera;* 537 individuals representing an average of 3.1% of the GB population. Species/populations identified subsequent to designation for possible consideration under criterion 6: Species with peak counts in winter: Northern pintail *Anas acuta*; 715 individuals representing an average of 1.1% of the population Black-tailed godwit *Limosa limosa islandica*; 1,142 individuals representing an average of 3.2% of the population
Solent and Dorset Coast SPA	UK9020330 Article 1 qualification: During the breeding season the area regularly supports: Sandwich tern *Sterna sandvicensis* (4.01% of the GB breeding population) Common tern *Sterna hirundo* (4.77% of the GB breeding population) Little tern *Sterna albifrons* (3.31% of the GB breeding population)
Dorset Heaths SAC	UK0019857 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7150 Depressions on peat substrates of the Rhynchosporion Annex I habitats present as a qualifying feature, but not primary reason for selection: 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (Molinion caeruleae) 7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae *priority feature 7230 Alkaline fens 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains Annex II species (primary reason for site selection):

Habitats Sites	Qualifying Features
	1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1166 Great crested newt *Triturus cristatus*
Dorset Heathlands SPA	UK9010101 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (at least 12.8% of the GB breeding population) Woodlark *Lullula arborea* (at least 6.8% of the GB breeding population) Dartford warbler *Sylvia undata* (at least 26.1% of the GB breeding population) Over winter the area regularly supports: Hen harrier *Circus cyaneus* (2.7% of the GB population) Merlin *Falco columbarius* (1.2% of the GB population)
Dorset Heathlands Ramsar	UK11021 Ramsar criterion 1: The site contains particularly good examples of northern Atlantic wet heaths with cross-leaved heath and acid mire with Rhynchosporion. The site contains the largest example in Britain of southern Atlantic wet heaths with Dorset heath and cross-leaved heath. Ramsar criterion 2: The site supports 1 nationally rare and 13 nationally scarce wetland plant species, and at least 28 nationally rare wetland invertebrate species. Ramsar criterion 3: The site has a high species richness and high ecological diversity of wetland habitat types and transitions and lies in one of the most biologically-rich wetland areas of lowland Britain, being continuous with three other Ramsar sites - Poole Harbour, Avon Valley and The New Forest.
The New Forest SAC	UK0012557 Annex I habitats (primary reason for site selection): 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the Isoeto-nanojuncetea

Habitats Sites	Qualifying Features
	4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 7150 Depressions on peat substrates of the Rhynchosporion 9120 Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (QUercion robori-petraeae or Ilici-Fagenion 9130 Asperulo-Fagetum beech forests 9190 Old acidophilous oak woods with Quercus robur on sandy plains 91D0 Bog woodland *priority feature 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (ALno-Padion, Alnion incanae, Silicion albae) *priority feature Annex I habitats present as a qualifying feature, but not primary reason for selection: 7140 Transition mires and quaking bogs 7230 Alkaline fens Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* 1083 Stag beetle *Lucanus cervus* Annex II species present as a qualifying feature, but not primary reason for selection: 1166 Great crested newt *Triturus cristatus*
New Forest SPA	UK9011031 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (8.8% of the GB population) Woodlark *Lullula arborea* (29.5% of the GB breeding population) Honey buzzard *Pernis apivorus* (12.5% of the GB breeding population) Dartford warbler *Sylvia undata* (33.6% of the GB breeding population) Over the winter the area regularly supports: Hen harrier *Circus cyaneus* (2% of the GB population)

Habitats Sites	Qualifying Features
	Article 4.2 qualification: During the breeding season the area regularly supports: Hobby *Falco subbuteo* (5% of the GB population) Wood warbler *Phylloscopus sibilatrix* (at least 2% of the GB population)
New Forest Ramsar	UK11047 Ramsar criterion 1: Valley mires and wet heaths are found throughout the site and are of outstanding scientific interest. This is the largest concentration of intact valley mires of their type in Britain. Ramsar crieterion 2: The site supports a diverse assemblage of wetland plants and animals including several nationally rare species. Seven species of nationally rare plants are found on site, as are at least 65 British Red Data Book invertebrate species. Ramsar criterion 3: The mire habitats are of high ecological quality and diversity and have undisturbed transitional zones. The invertebrate fauna of the site is important due to the concentration of rare and scarce wetland species. The whole site complex, with its examples of semi-natural habitats is essential to the genetic and ecological diversity of southern England. This site contains a rich invertebrate fauna.
Poole Harbour SPA	UK9010111 Article 4.1 qualification: During the breeding season the area regularly supports: Mediterranean gull *Larus melanocephalus* (10% of the GB breeding population) Common tern *Sterna hirundo* (1.8% of the Gb breeding population) Sandwich tern *Sterna sanvicensis* (1.6% of the GB breeding population) Over winter the area regularly supports: Avocet *Recurvirostra avosetta* (36.1% of the GB population) Little egret *Egretta garzetta* (2.5% of the GB population) Eurasian spoonbill *Platalea leucorodia* (100% of the GB population) Article 4.2 qualification: Over winter the area regularly supports:

Habitats Sites	Qualifying Features
	Shelduck *Tadorna tadorna* (1.2% of the biogeographic population - NW Europe) Black-tailed godwit *Limosa limosa islandica* (2.3% of the biogeographic population - NW Europe) In the non-breeding season the area regularly supports 25,176 individuals (4 year peak mean 1993/94 - 1996/97)
Poole Harbour Ramsar	UK11054 Ramsar criterion 1: The site is the best and largest example of a bar-built estuary with lagoonal characteristic (a natural harbour) in Britain. Ramsar criterion 2: The site supports two species of nationally rare plant and one nationally rare alga. There are at least three British Red Data Book invertebrate species. Ramsar criterion 3: The site includes examples of natural habitat types of community interest - Mediterranean and thermo Atlantic halophilous scrubs and calcareous fens. transitions from saltmarsh through to peatland mires are of exceptional conservation importance as few examples remain in Britain. The site supports nationally important populations of breeding waterfowl and a nationally important population of avocet of winter. Ramsar criterion 5: The site supports 24,709 waterfowl over winter (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Shelduck *Tadorna tadorna*; 2,120 individuals representing an average of 2.7% of the GB population Black-tailed godwit *Limosa limosa islandica*; 1,724 individuals representing an average of 4.9% of the population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Species with peak counts in winter: Avocet *Recurvirostra avosetta*; 1,260 individuals representing an average of 1.7% of the population

A.5 Option COL2

Habitats Sites	Qualifying Features
River Camel SAC	UK0030056 Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) *priority feature Annex II species (primary reason for site selection): 1163 Bullhead *Cottus gobio* 1355 Otter *Lutra lutra* Annex II species present as qualifying features, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*
Breney Common and Goss & Tregoss Moors SAC	UK0030098 Annex I habitats (primary reason for selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7140 Transition mires and quaking bogs Annex II species (primary reason for selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
St. Austell Clay Pits SAC	UK0030282 Annex II species (primary reason for site selection): 1390 Western rustwort *Marsupella profunda*
Polruan to Polperro SAC	UK0030241 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

Habitats Sites	Qualifying Features
	Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection): 1351 Harbour porpoise *Phocoena phocoena*
Falmouth Bay to St. Austell Bay SPA	UK9020323 Article 4.1 qualification: Over winter the area regularly supports: Black-throated diver *Gavia arctica* (20.5% of the GB population) Great northern diver *Gavia immer* (3% of the GB population) Slavonian grebe *Podiceps auritus* (1.4% of the GB population)

A.6 Option COL3 & COL4

Habitats Sites	Qualifying Features
Breney Common and Goss & Tregoss Moors SAC	UK0030098 Annex I habitats (primary reason for selection): 4010 Northern Atlantic wet heaths with Erica tetralix 4030 European dry heaths 7140 Transition mires and quaking bogs Annex II species (primary reason for selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
River Camel SAC	UK0030056 Annex I habitats present as a qualifying feature, but not primary reason for selection:

Habitats Sites	Qualifying Features
	4030 European dry heaths 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) *priority feature Annex II species (primary reason for site selection): 1163 Bullhead *Cottus gobio* 1355 Otter *Lutra lutra* Annex II species present as qualifying features, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*
Polruan to Polperro SAC	UK0030241 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*
Falmouth Bay to St. Austell Bay SPA	UK9020323 Article 4.1 qualification: Over winter the area regularly supports: Black-throated diver *Gavia arctica* (20.5% of the GB population) Great northern diver *Gavia immer* (3% of the GB population) Slavonian grebe *Podiceps auritus* (1.4% of the GB population)

A.7 Option COL5

Habitats Sites	Qualifying Features
Fal and Helford SAC	UK0013112 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1140 Mudflats and sandflats not covered by seawater at low tide 1160 Large shallow inlets and bays 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1130 Estuaries 1170 Reefs Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*
Tregonning Hill SAC	UK0012604 Annex II species present as a qualifying feature, but not primary reason for selection: 1390 Western rustwort *Marsupella profunda*
The Lizard SAC	UK0012799 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. 3170 Mediterranean temporary ponds *priority feature 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 4040 Dry Atlantic coastal heaths with *Erica vagans* *priority feature
Lizard Point SAC	UK0030374 Annex I habitats (primary reason for site selection): 1170 Reefs

Habitats Sites	Qualifying Features
Falmouth Bay to St. Austell Bay SPA	UK9020323 Article 4.1 qualification: Over winter the area regularly supports: Black-throated diver *Gavia arctica* (20.5% of the GB population) Great northern diver *Gavia immer* (3% of the GB population) Slavonian grebe *Podiceps auritus* (1.4% of the GB population)

A.8 Option COL6

Habitats Sites	Qualifying Features
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection): 1351 Harbour porpoise *Phocoena phocoena*
Tregonning Hill SAC	UK0012604 Annex II species present as a qualifying feature, but not primary reason for selection: 1390 Western rustwort *Marsupella profunda*
Marazion Marsh SPA	UK9020289 Article 4.1 qualification: Over winter the area regularly supports: Bittern *Botaurus stellaris* (2% of the GB population) On passage the area regularly supports: Aquatic warbler *Acrocephalus paludicola* (9% of the GB population)

A.9 Option COL9

Habitats Sites	Qualifying Features
Lower Bostraze & Leswidden SAC	UK0030064 Annex II species (primary reason for site selection): 1390 Western rustwort *Marsupella profunda*
Lands End and Cape Bank SAC	UK0030375 Annex II species (primary reason for site selection): 1170 Reefs

A.10 Option COL11

Habitats Sites	Qualifying Features
River Camel SAC	UK0030056 Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) *priority feature Annex II species (primary reason for site selection): 1163 Bullhead *Cottus gobio* 1355 Otter *Lutra lutra* Annex II species present as qualifying features, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*
Crowdy Marsh SAC	UK0030329 Annex I habitats (primary reason for site selection): 7140 Transition mires and quaking bogs

Habitats Sites	Qualifying Features
Polruan to Polperro SAC	UK0030241 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*

A.11 Option COL12

Habitats Sites	Qualifying Features
River Camel SAC	UK0030056 Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) *priority feature Annex II species (primary reason for site selection): 1163 Bullhead *Cottus gobio* 1355 Otter *Lutra lutra* Annex II species present as qualifying features, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*
Crowdy Marsh SAC	UK0030329 Annex I habitats (primary reason for site selection): 7140 Transition mires and quaking bogs

Habitats Sites	Qualifying Features
Tintagel-Marsland-Clovelly Coast SAC	UK0013047 Annex I habitats (primary reason for site selection): 1230 Vegetated Sea cliffs of the Atlantic and Baltic coasts 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection): 1351 Harbour porpoise *Phocoena phocoena*

A.12 Option COL15

Habitats Sites	Qualifying Features
Breney Common and Goss & Tregoss Moors SAC	UK0030098 Annex I habitats (primary reason for selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7140 Transition mires and quaking bogs Annex II species (primary reason for selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
River Camel SAC	UK0030056 Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) *priority feature

Habitats Sites	Qualifying Features
	Annex II species (primary reason for site selection): 1163 Bullhead *Cottus gobio* 1355 Otter *Lutra lutra* Annex II species present as qualifying features, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*
Polruan to Polperro SAC	UK0030241 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*
Falmouth Bay to St. Austell Bay SPA	UK9020323 Article 4.1 qualification: Over winter the area regularly supports: Black-throated diver *Gavia arctica* (20.5% of the GB population) Great northern diver *Gavia immer* (3% of the GB population) Slavonian grebe *Podiceps auritus* (1.4% of the GB population)

A.13 Option COL18

Habitats Sites	Qualifying Features
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection):

Habitats Sites	Qualifying Features
	1351 Harbour porpoise *Phocoena phocoena*
Newlyn Downs SAC	UK0030065 Annex I habitats (primary reason for site selection): 4020 Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* *priority feature Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
Breney Common and Goss & Tregoss Moors SAC	UK0030098 Annex I habitats (primary reason for selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7140 Transition mires and quaking bogs Annex II species (primary reason for selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
Penhale Dunes SAC	UK0012559 Annex I habitats (primary reason for site selection): 2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes") *priority feature 2190 Humid dune slacks Annex I habitats present as a qualifying feature, but not primary reason for selection: 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") 2170 Dunes with *Salix repens ssp. argentea* (Salicion arenariae) Annex II species (primary reason for site selection): 1395 Petalwort *Petalophyllum ralfsii* 1441 Shore dock *Rumex rupestris* 1654 Early gentian *Gentianella anglica*

A.14 Option COL19

Habitats Sites	Qualifying Features
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection): 1351 Harbour porpoise *Phocoena phocoena*
Tregonning Hill SAC	UK0012604 Annex II species present as a qualifying feature, but not primary reason for selection: 1390 Western rustwort *Marsupella profunda*

A.15 Option COL20

Habitats Sites	Qualifying Features
Fal & Helford SAC	UK0013112 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1140 Mudflats and sandflats not covered by seawater at low tide 1160 Large shallow inlets and bays 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1130 Estuaries 1170 Reefs Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*
Falmouth Bay to St. Austell Bay SPA	UK9020323 Article 4.1 qualification:

Habitats Sites	Qualifying Features
	Over winter the area regularly supports: Black-throated diver *Gavia arctica* (20.5% of the GB population) Great northern diver *Gavia immer* (3% of the GB population) Slavonian grebe *Podiceps auritus* (1.4% of the GB population)

A.16 Options for Isles of Scilly WRZ

Habitats Sites	Qualifying Features
Isles of Scilly Complex SAC	UK0013694 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1140 Mudflats and sandflats not covered by seawater at low tide 1170 Reefs Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris* Annex II species present as a qualifying feature, but not primary reason for selection: 1364 Grey seal *Halichoerus grypus*
Isles of Scilly SPA	UK9020288 Article 4.1 qualification: Regularly used by 1% or more of the GB population during any season: Storm Petrel *Hydrobates pelagicus* (5.1% of the GB population) Article 4.2 qualification: Regularly used by 1% or more of the biogeographical populations of the following migratory species in any season: Lesser black-backed gull *Larus fuscus graelsii* (1.4% of the population) European shag *Phalacrocorax aristotelis* (1.5% of the population) Great black-backed gull *Larus marinus* (Percentage unknown)

Habitats Sites	Qualifying Features
	An internationally important assemblage of seabirds (over 20,000) in any season
Isles of Scilly Ramsar	UK11033 Ramsar criterion 6: Species regularly supported during the breeding season: Storm petrel *Hydrobates pelagicus* (71 occupied sites, representing 0.2% of the GB population) Lesser black-backed gull *Larus fuscus graellsii* (3,603 occupied nests, representing 2.4% of the breeding population Species identified subsequent to designation for possible future consideration under criterion 6: Species regularly supported during the breeding season: European shag *Phalacrocorax aristotelis* (1,091 occupied nests, representing 1.3% of the breeding population).

A.17 Option ROA2

Habitats Sites	Qualifying Features
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature 91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar* 1355 Otter *Lutra lutra*
Plymouth Sound and Estuaries SAC	UK0013111

Habitats Sites	Qualifying Features
	Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1160 Large shallow inlets and bays 1170 Reefs 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1140 Mudflats and sandflats not covered by seawater at low tide Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris* Annex II species present as a qualifying feature, but not primary reason for selection: 1102 Allis shad *Alosa alosa*
Start Point to Plymouth Sound & Eddystone SAC	UK0030373 Annex I habitats (primary reason for site selection): 1170 Reefs

A.18 Option ROA3

Habitats Sites	Qualifying Features
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature 91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles

Habitats Sites	Qualifying Features
	Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar* 1355 Otter *Lutra lutra*
Plymouth Sound and Estuaries SAC	UK0013111 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1160 Large shallow inlets and bays 1170 Reefs 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1140 Mudflats and sandflats not covered by seawater at low tide Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris* Annex II species present as a qualifying feature, but not primary reason for selection: 1102 Allis shad *Alosa alosa*
Start Point to Plymouth Sound & Eddystone SAC	UK0030373 Annex I habitats (primary reason for site selection): 1170 Reefs
South Dartmoor Woods SAC	UK0012749 Annex I habitats (primary reason for site selection): 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

Habitats Sites	Qualifying Features
	Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
Blackstone Point SAC	UK0030091 Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris*

A.19 Option ROA4

Habitats Sites	Qualifying Features
Plymouth Sound and Estuaries SAC	UK0013111 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1160 Large shallow inlets and bays 1170 Reefs 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1140 Mudflats and sandflats not covered by seawater at low tide Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris* Annex II species present as a qualifying feature, but not primary reason for selection: 1102 Allis shad *Alosa alosa*
Tamar Estuaries Complex SPA	UK9010141 Article 4.1 qualification: Over winter the area regularly supports:

Habitats Sites	Qualifying Features
	Avocet *Recurvirostra avosetta* (15.8% of the GB population) On passage the area regularly supports: Little egret *Egretta garzetta* (at least 9.3% of the GB population)
South Dartmoor Woods SAC	UK0012749 Annex I habitats (primary reason for site selection): 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths

A.20 Option ROA6

Habitats Sites	Qualifying Features
Culm Grassland SAC	UK0012679 Annex I habitats (primary reason for site selection): 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (Molinion caeruleae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 4010 Northern Atlantic wet heaths with Erica tetralix Annex II species (primary reason for site selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
Tintagel-Marsland-Clovelly Coast SAC	UK0013047 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

Habitats Sites	Qualifying Features
	Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC	UK0030396 Annex II species (primary reason for site selection): 1351 Harbour porpoise *Phocoena phocoena*

A.21 Option ROA7

Habitats Sites	Qualifying Features
Culm Grasslands SAC	UK0012679 Annex I habitats (primary reason for site selection): 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (Molinion caeruleae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 4010 Northern Atlantic wet heaths with *Erica tetralix* Annex II species (primary reason for site selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature 91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar*

Habitats Sites	Qualifying Features
	1355 Otter *Lutra lutra*

A.22 Options ROA8, ROA10 & ROA14

Habitats Sites	Qualifying Features
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature 91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar* 1355 Otter *Lutra lutra*
South Dartmoor Woods SAC	UK0012749 Annex I habitats (primary reason for site selection): 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
South Hams SAC	UK0012650 Annex I habitats (primary reason for site selection): 4030 European dry heaths 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)

Habitats Sites	Qualifying Features
	Annex I habitats present as a qualifying feature, but not primary reason for selection: 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 8310 Caves not open to the public 9180 Tilio-Acerion forests of slopes, screes and ravines Annex II species (primary reason for site selection): 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*

A.23 Option ROA11

Habitats Sites	Qualifying Features
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature 91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar* 1355 Otter *Lutra lutra*

A.24 Option ROA12

Habitats Sites	Qualifying Features
Exmoor Heaths SAC	UK0030040 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths Annex I habitats present as a qualifying feature, but not primary reason for selection: 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 7130 Blanket bogs (* if active bog) *priority feature 7230 Alkaline fens 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
Braunton Burrows SAC	UK0012570 Annex I habitats (primary reason for site selection): 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") 2130 Fixed coastal dune with herbaceous vegetation ("grey dunes") 2170 Dunes with *Salix repens ssp. argentea* (Salicion arenariae) 2190 Humid dune slacks Annex I habitats present as a qualifying feature, but not primary reason for selection: 1140 Mudflats and sandflats not covered by seawater at low tide Annex II species (primary reason for site selection): 1395 Petalwort *Petalophyllum ralfsii*

A.25 Option ROA13

Habitats Sites	Qualifying Features
Exe Estuary SPA	UK9010081

Habitats Sites	Qualifying Features
	Article 4.1 qualification: Over winter the area regularly supports: Slavonian grebe *Podiceps auritus* (5% of the GB population) Avocet *Recurvirostra avosetta* (28.3% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Dark bellied brent goose *Branta bernicla bernicla* (0.6% of the population) Dunlin *Calidris alpina alpina* (1.1% of the GB population) Oystercatcher *Haematopus ostralegus* (1.2% of the GB population) Black-tailed godwit *Limosa limosa islandica* (7.2% of the GB population) Grey plover *Pluvialis squatarola* (1.1% of the GB population) Over winter the area regularly supports 23,811 waterfowl (5 year peak mean 1991/92 - 1995/96)
Exe Estuary Ramsar	UK11025 Ramsar criterion 5: Species with peak counts in winter: 20,263 waterfowl (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occuring at levels of international importance: Species with peak counts in winter: Dark-bellied brent goose *Branta bernicla bernicla*; 1,509 individuals representing an average of 1.5% of the GB population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Black-tailed godwit *Limosa limosa islandica*: 857 individuals representing an average of 2.4% of the population
Dawlish Warren SAC	UK0030130 Annex I habitats (primary reason for site selection): 2190 Humid dune slacks Annex I habitats present as a qualifying feature, but not primary reason for selection:

Habitats Sites	Qualifying Features
	2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") 2130 Fixed coastal dune with herbaceous vegetation ("grey dunes") *priority feature Annex II species (primary reason for site selection): 1395 Petalwort *Petalophyllum ralfsii*
East Devon Pebblebed Heaths SAC	UK0012602 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale*
East Devon Heaths SPA	UK9010121 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (2.4% of the GB breeding population) Dartford warbler *Sylvia undata* (8% of the GB breeding population)
South Hams SAC	UK0012650 Annex I habitats (primary reason for site selection): 4030 European dry heaths 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 8310 Caves not open to the public 9180 Tilio-Acerion forests of slopes, screes and ravines Annex II species (primary reason for site selection): 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*

A.26 Option ROA15

Habitats Sites	Qualifying Features
Plymouth Sound & Estuaries SAC	UK0013111 Annex I habitats (primary reason for site selection): 1110 Sandbanks which are slightly covered by sea water all the time 1130 Estuaries 1160 Large shallow inlets and bays 1170 Reefs 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1140 Mudflats and sandflats not covered by seawater at low tide Annex II species (primary reason for site selection): 1441 Shore dock *Rumex rupestris* Annex II species present as a qualifying feature, but not primary reason for selection: 1102 Allis shad *Alosa alosa*
Tamar Estuaries Complex SPA	UK9010141 Article 4.1 qualification: Over winter the area regularly supports: Avocet *Recurvirostra avosetta* (15.8% of the GB population) On passage the area regularly supports: Little egret *Egretta garzetta* (at least 9.3% of the GB population

A.27 Option ROA16

Habitats Sites	Qualifying Features
South Hams SAC	UK0012650 Annex I habitats (primary reason for site selection): 4030 European dry heaths 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) Annex I habitats present as a qualifying feature, but not primary reason for selection: 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 8310 Caves not open to the public 9180 Tilio-Acerion forests of slopes, screes and ravines Annex II species (primary reason for site selection): 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*
South Dartmoor Woods SAC	UK0012749 Annex I habitats (primary reason for site selection): 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Annex I habitats present as a qualifying feature, but not primary reason for selection: 4030 European dry heaths
Lyme Bay and Torbay SAC	UK0030372 Annex I habitats (primary reason for site selection): 1170 Reefs 8330 Submerged or partially submerged sea caves
Dartmoor SAC	UK0012929 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 7130 Blanket bogs (* if active bog) *priority feature

Habitats Sites	Qualifying Features
	91A0 Old sessile woods with *Ilex* and *Blechnum* in the British Isles Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale* Annex II species present as a qualifying feature, but not primary reason for selection: 1106 Atlantic salmon *Salmo salar* 1355 Otter *Lutra lutra*

A.28 Option WIM1

Habitats Sites	Qualifying Features
Exe Estuary SPA	UK9010081 Article 4.1 qualification: Over winter the area regularly supports: Slavonian grebe *Podiceps auritus* (5% of the GB population) Avocet *Recurvirostra avosetta* (28.3% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Dark bellied brent goose *Branta bernicla bernicla* (0.6% of the population) Dunlin *Calidris alpina alpina* (1.1% of the GB population) Oystercatcher *Haematopus ostralegus* (1.2% of the GB population) Black-tailed godwit *Limosa limosa islandica* (7.2% of the GB population) Grey plover *Pluvialis squatarola* (1.1% of the GB population) Over winter the area regularly supports 23,811 waterfowl (5 year peak mean 1991/92 - 1995/96)
Exe Estuary Ramsar	UK11025 Ramsar criterion 5:

Habitats Sites	Qualifying Features
	Species with peak counts in winter: 20,263 waterfowl (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occuring at levels of international importance: Species with peak counts in winter: Dark-bellied brent goose *Branta bernicla bernicla*; 1,509 individuals representing an average of 1.5% of the GB population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Black-tailed godwit *Limosa limosa islandica*: 857 individuals representing an average of 2.4% of the population

A.29 Option WIM2

Habitats Sites	Qualifying Features
Sidmouth to West Bay SAC	UK0019864 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 9180 Tilio-Acerion forests of slopes, screes and ravines *priority feature Annex I habitats present as a qualifying feature, but not primary reason for selection: 1210 Annual vegetation of drift lines
East Devon Pebblebed Heaths SAC	UK0012602 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale*
East Devon Heaths SPA	UK9010121

Habitats Sites	Qualifying Features
	Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (2.4% of the GB breeding population) Dartford warbler *Sylvia undata* (8% of the GB breeding population)
Beer Quarry & Caves SAC	UK0012585 Annex II species (primary reason for site selection): 1323 Bechstein's bat *Myotis bechsteinii* Annex II species present as a qualifying feature, but not primary reason for site selection: 1303 Lesser horseshoe bat *Rhinolophus hipposideros* 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*
Lyme Bay and Torbay SAC	UK0030372 Annex I habitats (primary reason for site selection): 1170 Reefs 8330 Submerged or partially submerged sea caves

A.30 Option WIM4

Habitats Sites	Qualifying Features
River Axe SAC	UK0030248 Annex I habitats (primary reason for site selection): 3260 Water course of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation Annex II species present as a qualifying feature, but not primary reason for selection: 1095 Sea lamprey *Petromyzon marinus* 1096 Brook lamprey *Lampetra planeri* 1163 Bullhead *Cottus gobio*

Habitats Sites	Qualifying Features
Sidmouth to West Bay SAC	UK0019864 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 9180 Tilio-Acerion forests of slopes, screes and ravines *priority feature Annex I habitats present as a qualifying feature, but not primary reason for selection: 1210 Annual vegetation of drift lines
Beer Quarry & Caves SAC	UK0012585 Annex II species (primary reason for site selection): 1323 Bechstein's bat *Myotis bechsteinii* Annex II species present as a qualifying feature, but not primary reason for site selection: 1303 Lesser horseshoe bat *Rhinolophus hipposideros* 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*
Lyme Bay and Torbay SAC	UK0030372 Annex I habitats (primary reason for site selection): 1170 Reefs 8330 Submerged or partially submerged sea caves

A.31 Option WIM5

Habitats Sites	Qualifying Features
Sidmouth to West Bay SAC	UK0019864 Annex I habitats (primary reason for site selection): 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts 9180 Tilio-Acerion forests of slopes, screes and ravines *priority feature

Habitats Sites	Qualifying Features
	Annex I habitats present as a qualifying feature, but not primary reason for selection: 1210 Annual vegetation of drift lines
East Devon Pebblebed Heaths SAC	UK0012602 Annex I habitats (primary reason for site selection): 4010 Northern Atlantic wet heaths with Erica tetralix 4030 European dry heaths Annex II species (primary reason for site selection): 1044 Southern damselfly *Coenagrion mercuriale*
East Devon heaths SPA	UK9010121 Article 4.1 qualification: During the breeding season the area regularly supports: Nightjar *Caprimulgus europaeus* (2.4% of the GB breeding population) Dartford warbler *Sylvia undata* (8% of the GB breeding population)
Beer Quarry & Caves SAC	UK0012585 Annex II species (primary reason for site selection): 1323 Bechstein's bat *Myotis bechsteinii* Annex II species present as a qualifying feature, but not primary reason for site selection: 1303 Lesser horseshoe bat *Rhinolophus hipposideros* 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*
Lyme Bay and Torbay SAC	UK0030372 Annex I habitats (primary reason for site selection): 1170 Reefs 8330 Submerged or partially submerged sea caves

A.32 Option WIM6

Habitats Sites	Qualifying Features
Culm Grasslands SAC	UK0012679 Annex I habitats (primary reason for site selection): 6410 Molinia meadows on calcareous, peaty of clayey-silt-laden soils (Molinion caeruleae) Annex I habitats present as a qualifying feature, but not primary reason for selection: 4010 Northern Atlantic wet heaths with *Erica tetralix* Annex II species (primary reason for site selection): 1065 Marsh fritillary butterfly *Euphydryas aurinia*
Exe Estuary SPA	UK9010081 Article 4.1 qualification: Over winter the area regularly supports: Slavonian grebe *Podiceps auritus* (5% of the GB population) Avocet *Recurvirostra avosetta* (28.3% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Dark bellied brent goose *Branta bernicla bernicla* (0.6% of the population) Dunlin *Calidris alpina alpina* (1.1% of the GB population) Oystercatcher *Haematopus ostralegus* (1.2% of the GB population) Black-tailed godwit *Limosa limosa islandica* (7.2% of the GB population) Grey plover *Pluvialis squatarola* (1.1% of the GB population) Over winter the area regularly supports 23,811 waterfowl (5 year peak mean 1991/92 - 1995/96)
Exe Estuary Ramsar	UK11025 Ramsar criterion 5: Species with peak counts in winter: 20,263 waterfowl (5 year peak mean 1998/99 - 2002/03)

Habitats Sites	Qualifying Features
	Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Dark-bellied brent goose *Branta bernicla bernicla*; 1,509 individuals representing an average of 1.5% of the GB population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Black-tailed godwit *Limosa limosa islandica*: 857 individuals representing an average of 2.4% of the population

A.33 Options WIM7, WIM8 & WIM9

Habitats Sites	Qualifying Features
Exe Estuary SPA	UK9010081 Article 4.1 qualification: Over winter the area regularly supports: Slavonian grebe *Podiceps auritus* (5% of the GB population) Avocet *Recurvirostra avosetta* (28.3% of the GB population) Article 4.2 qualification: Over winter the area regularly supports: Dark bellied brent goose *Branta bernicla bernicla* (0.6% of the population) Dunlin *Calidris alpina alpina* (1.1% of the GB population) Oystercatcher *Haematopus ostralegus* (1.2% of the GB population) Black-tailed godwit *Limosa limosa islandica* (7.2% of the GB population) Grey plover *Pluvialis squatarola* (1.1% of the GB population) Over winter the area regularly supports 23,811 waterfowl (5 year peak mean 1991/92 - 1995/96)
Exe Estuary Ramsar	UK11025 Ramsar criterion 5:

Habitats Sites	Qualifying Features
	Species with peak counts in winter: 20,263 waterfowl (5 year peak mean 1998/99 - 2002/03) Ramsar criterion 6: Species/populations occurring at levels of international importance: Species with peak counts in winter: Dark-bellied brent goose *Branta bernicla bernicla*; 1,509 individuals representing an average of 1.5% of the GB population Species/populations identified subsequent to designation for possible future consideration under criterion 6: Black-tailed godwit *Limosa limosa islandica*: 857 individuals representing an average of 2.4% of the population

MOTT MACDONALD

SEA Environmental Report ANNEX 3: APPENDIX I

Water Framework Directive (WFD) Assessment

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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SEA Environmental Report ANNEX 3: APPENDIX I

Water Framework Directive (WFD) Assessment

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	26/07/2022	T Patel	M Durrant	M Reid	First Draft
B	31/08/2022	J Webb	M Durrant	N Spofforth	Inclusion of in combination effects assessment
C	29/09/2022	J Webb	M Durrant	N Spofforth	Inclusion of Level 2 assessments and updates to in-combination effects assessment
D	31/10/2022	M Leeds G Sale	M Durrant	M Reid	Final report for consultation
E	02/02/2023	G Sale	M Durrant	M Reid	Updated BVP, WRMP option list and in-combination effects assessment

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Information class: Standard

Contents

Tables

1 Introduction

1.1 Overview

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. The plans must be prepared every five years and reviewed annually. South West Water's WRMP 2024 (WRMP24) renews the previous WRMP first published in 2019[1]. In the development of a WRMP, water companies must follow the Environment Agency (EA) Water Resources Planning Guideline[2] and consider broader government policy objectives. WRMPs should ensure a secure and sustainable supply of water, focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

As part of the environmental assessment process to support the development of SWWs WRMP24, Water Framework Directive (WFD) Level 1 and Level 2 assessments have been completed. This appendix supports the Environment Report that accompanies the SWW WRMP24 submission to regulators. The appendix presents the findings of Water Framework Directive (WFD) assessments applied to the SWW WRMP options.

The content of this report is draft and relates to material [or data] which is still in the course of completion in travel to the final WRMP24. We continue to develop our thinking and our approach to the issues raised in the document in preparation for the final WRMP24.

1.2 SWW WRMP24 Options

The outputs of the initial options appraisal identified 60 options for additional water supplies in the SWW region. These options are summarised in Table 1.1.

Table 1.1: SWW WRMP24 Options

Option name	Description overview
Bournemouth Water Resource Zone (WRZ)	
BNW1	Borehole development, existing borehole remedial works. Third borehole drilled on existing footprint – increased licence by 1Mld.
BNW3	Wimborne transfer to Longham – Licence change. Conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW6	Longham Aquifer Recharge. Pumping and storage of water into ground during winter months for subsequent abstraction.
BNW7	Mendips Quarry - 30Ml/d scheme option – Raw water transfer and augmentation of the River Stour. This is a Strategic Resource option (SRO) and as such, has been assessed separately. This option is therefore not presented in this report but the findings are included in the in-combination effects assessment
BNW8	Poole Harbour FE reuse is an SRO and, as such, has been assessed separately. This option is therefore not presented in this report but the findings are included in the in-combination effects assessment
BNW11	Christchurch WwTW IPR 2: Transfer to Longham Lakes. Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.

[1] South West Water / Bournemouth Water (2019). Water Resources Management Plan 2019. Available at: Water Resources Management Plan (southwestwater.co.uk)
[2] Environment Agency, Natural Resources Wales, Office for Water Services (2022). Water resources planning guideline. Available at: Water resources planning guideline - GOV.UK (www.gov.uk)

Option name	Description overview
BNW17	Cheddar 2 new strategic regional reservoir and transfer. No information was available for this option at the time of writing and therefore no assessment has been completed at this time.
Colliford WRZ	
COL2	Colliford Reservoir Pumped Storage Stage 2 - River Camel Abstraction. New river intake and pumping station at Nanstallon to Restormel Water Treatment Works (WTW). Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15Ml/d). Raw water then pumped to Colliford Reservoir via existing main.
COL3	Abstraction of Colliford Reservoir compensation flow when making supply releases. Licence change to increase abstraction when water released upstream. No infrastructure changes required.
COL4	Abstraction of Siblyback Reservoir compensation flow when making supply releases. Licence change to increase abstraction when water released upstream. No infrastructure changes required.
COL5	Increase Wendron annual licence and de-couple from Stithians. No infrastructure changes required.
COL6	River Hayle abstraction. Abstraction from River Hayle at existing, disused intake, treat abstracted water at new onsite treatment works.
COL9	Leswidden Pool. Transfer of former quarry water to Drift Reservoir via Sancreed stream
COL11	Hawk's Tor Pit. Development of disused mineral extraction workings at Hawk's Tor Pit. Transfer to Colliford Reservoir.
COL12	Stannon daily abstraction increase. Increase to the daily limit to the abstraction licence of 4Ml/d to 8Ml/d for up to three months in any one year. A stream support facility constructed to discharge from the lake to the adjacent stream.
COL15	Restormel WTW. Increase Restormel WTW up to its maximum licensed capacity and enable more effective use of the Colliford/River Fowey resources system.
COL18	Porth / Rialton New intake structure at Rialton. Raw water pumping station (RWPS) and pipeline to Coswarth service reservoir (SRES) site. Building new WTW at Coswarth SRES site to treat river water. Connection to existing distribution system.
COL19	Boswyn stream / Cargenwen Reservoir / Carwynnen stream. Re-introduce abstractions at Boswyn stream, Cargenwen Reservoir and Carwynnen stream.
COL20	River Fal new abstraction. New abstraction on the River Fal near Ruan Lanihorne. New intake, onsite WTW and connection to distribution system.
Roadford WRZ	
ROA2	River Erme New intake on River Erme, piped to Little Hempston WTW.
ROA3	River Yealm. Re-location of surface water abstraction.
ROA4	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases. Licence change to increase abstraction when water released upstream. No infrastructure changes required.
ROA6	Upper Tamar Lake increasing annual licence. Increase daily abstraction limit, upgrades to WTW and distribution network.
ROA7	Expansion of Northcombe WTW to 60Ml/d. Treatment works expansion to deliver a minimum of 60Ml/d. Additional 10Ml/d pumping capacity at Roadford reservoir.
ROA8	Tottiford WTW - reduce WTW minimum capacity. Process control changes allowing lower minimum flowrate to be treated when there is low demand.
ROA10	Avon WTW - reduce WTW minimum capacity. Process control changes allowing lower minimum flowrate to be treated when there is low demand.
ROA11	Meldon WTW - reduce WTW minimum capacity.

Option name	Description overview
	Process control changes allowing lower minimum flowrate to be treated when there is low demand.
ROA12	Slade and Horedown WTW (GAC) Installation of new pumping station at Slade reservoir and new 4Ml/d treatment at Horedown WTW.
ROA13	Duckaller and Vennbridge. Changes to abstraction licences and 4Ml/d nitrate removal plant installed at Duckaller pumping station to facilitate full use of sources.
ROA14	Raise Avon Dam. Raise dam by 2 m. Subject to structural engineering approval.
ROA15	Gatherley Phase 2. Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125Ml/d to be transferred to Roadford Reservoir.
ROA16	Littlehempston WTW Process upgrades to allow treatment capacity at Littlehempston WTW for full licence for all sources - expected to include additional FBC capacity to replace DAFs.
Wimbleball WRZ	
WIM1	Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases. Increase in abstraction from River Exe. No infrastructure changes required.
WIM2	Sidford borehole commissioning. Equip and make operational existing borehole. New groundwater source treatment system.
WIM4	Wilmington springs annual abstraction increase. Increase in annual licence abstraction from existing Wilmington springs. No infrastructure changes required.
WIM5	Indirect potable reuse - stream support for Dotton WTW. Pump treated effluent from Sidmouth WWTW directly to the River Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods.
WIM6	Increase Allers WTW capacity. To cover East Devon and East coast in the winter, Dotton at a minimum in the winter. Increase in the Bolham licence (winter) and a reduction in the Dotton licence (winter).
WIM7	Increase Pynes to licence limit 66.46Ml/d. Upgrade WTW to treat an additional 6.5Ml/d. with distribution network improvements.
WIM8	Brampford Speke borehole. Increase in existing licence to permit discharge to the River Exe for abstraction further downstream.
WIM9	Stoke Canon borehole. Increase in existing licence to permit discharge to the River Exe for abstraction further downstream.
Isles of Scilly WRZ	
ISB4	Bryher - Increase Existing Desalination Plant Capacity. Increase output of existing RO desalination plant and increase existing borehole yield.
ISMY1	St. Mary's new borehole (location 1). Drill new supply borehole with associated infrastructure piped via raw main to existing WTW.
ISMY2	St. Mary's new borehole (location 2). Drill new supply borehole with associated infrastructure and new WTW, with water piped directly into supply network.
ISMY4	St. Mary's - Increase Existing Desalination Plant Capacity. Increase output of existing RO desalination plant and increase existing borehole yield.
IST1	Tresco new borehole. Drill new supply borehole to south or east of island, with associated infrastructure and on-site treatment.
Demand options	
HH_ E_003	Water labelling - with minimum standards. Standards - Water labelling of relevant products to be legislated as mandatory and managed by government. The scheme operates in association with Building Regulations and minimum standards (i.e. based on changes to The Water Supply (Water Fittings) Regulations 1999). This means that only products performing at a baseline level are allowed on the market and referenced in the Building Regulations. This requires not only the development of the labelling policy but also the development and agreement on the baseline standard and the amendment of the relevant Building Regulations.
HH_E_013	Home efficiency visits (HEV) - Water efficiency audit with free water efficient device installation - metered This option offers non-household (HH) customers within the target sectors an in-person visit, during which, water efficiency devices will be retro-fitted and advice given on water

Option name	Description overview
	efficiency. In addition, simple wastage fixes will take place where feasible (leaky loos, basic leaky tap issues).
HH_A_002	Virtual home efficiency visits (VHEV). Water efficiency audit with free water efficient devices.
HH_A_003	Home efficiency visits (HEVs) - water efficiency audit - local authorities, housing associations, corporate
HH_E_013	School visits water efficiency programme. Working in partnership with schools across the region to promote water efficiency. Tailored for children for the different key stages, providing lesson plans and material to allow teachers to deliver water efficiency lessons. Accompanied by a set number of school visits (targeted to areas of high water use or demography) each year reaching 30 students per visit.
HH_E_017	Water efficiency programmes targeted at specific groups. Focused water efficiency programme at targeted locations across the area including advertising, education and other outreach work, plus the installation of smart metres.
NHH_A_001	Business Efficiency Visits (BEV) - water efficiency audit - in person audit, fix and retrofit, targeted at specific sectors/businesses. Targeting accomodation and health and education. This option offers non-HH customers within the target sectors, an in-person BEV, during which, water efficiency devices will be retro-fitted and advice given on water efficiency. In addition, simple wastage fixes will take place where feasible (leaky loos, basic leaky tap issues).
NHH_A_003	Business Efficiency Visits (BEV) - leakage detection - in person targeted at specific sectors/businesses. Leakage detection in large non-HH users, targeted at specific sectors or large users with high expected leakage. For the purposes of estimating quantifiable savings, customers are targeted in alignment with the option NHH_M_002 (i.e. those that have recently switched to a smart meter, facilitating the identification of leaks.) Broad assumption that large users with large underground customer-side networks have 10% leakage.
NHH_A_004	Business Efficiency Visits (BEV) - process water efficiency audit/leakage detection - in person targeted at agriculture sector. Targeting livestock and dairy. Partnering for delivery with subsidies/funding. Possible intervenetions; meters to monitor waste usage, checking and repairing leaks, olsating and emptying troughs when not in use, adjusting ball valves on troughs to prevent overflow, using smaller troughs that require less water for cleaning, harvesting rainfall from roofs for animal drinking and washing, improved cleaning and washing procedures.
NHH_A_005	Business Efficiency Visit (BEV) - process water efficiency audit/leakage detection. This option provides targeted visits by process engineers to large scale businesses to look at how water use can be reduced on site. The output will be recommendations with indicative cost and efficiencies that could be achieved (solutions could include zero liquid discharge (ZLD), water reuse). This option would also consider any potential for the use of non PWS supplies.
NHH_A_007	Virtual Business Efficiency Visit (VBEV) - water efficiency audit with free water efficient devices. Targeting the retail and food and beverage services sectors. This option is a virtual visit and as such, whilst the customer receives water efficiency advice and is provided with relevant retrofit water efficiency devices, these devices must be self-installed.
NHH_M_009	Switch all existing dumb meters in Non-HH to smart meters across the SWW region.
NHH_N_001	Rainwater harvesting is included in new developments to meet planning conditions - commercial/public sector developments -single or multiple. This option would work with developers to provide rainwater harvesting systems to provide a non-potable supply for use within the new commercial properties. Water is collected from roof runoff and a sustainable drainage system is created. The collected water goes through a basic level of treatment. Rainwater harvesting is included in the development to meet planning conditions.
NHH_N_006	Reuse treated wastewater effluent as an alternative supply. This reclaimed water could be used for industrial/commercial use rather than potable water (drinking water).
NHH-E-001	Sector specific water efficiency advice e.g. partnerships with holiday rental companies Airbnb. The option seeks to increase water efficiency within an element of the tourist sector that remains a component of household demand. The initiative assumes that SWW will work in partnership with Airbnb, or similar accommodation providers to reduce water use amongst their members.

1.3 Methodology

1.3.1 Approach to WFD assessment for WRMP24 Options

The WFD has been transposed into UK law for England and Wales (latest legislation covered in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017)[3]

[3] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. https://www.legislation.gov.uk/uksi/2017/407/contents/made

under which there is the obligation to meet targets for the ecological and chemical status of water bodies.

The WFD's key objectives are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. All objectives are integrated for each river basin, and the last three to specific bodies of water that are designated for drinking water abstraction, those supporting special wetlands, and bathing areas. Ecological protection should apply to all waters.

The environmental objectives of the WFD are the core of this UK legislation providing for long-term sustainable water management on the basis of a high level of protection of the aquatic environment. Within the directive Part 5 Regulation 13 sets out the "environmental objectives" for natural surface and groundwater bodies, artificial water bodies (AWB) and heavily modified water bodies (HMWBs). Natural surface water bodies must, by 2015, adhere to good ecological and chemical status and groundwater bodies to good quantitative and chemical status. AWB and HMWBs must achieve good ecological potential and good chemical status. Regulation 13 also sets out the principal of no deterioration, providing protection from the deterioration of water status/potential. In Regulation 15 the criteria for the designation of AWB or HMWBs are described.

Exemptions are defined within Regulations 16 to 19, outlining the conditions under which the achievement of good status or potential may be phased or not be achieved, or under which deterioration may be allowed. Regulation 16 to 19 describe these distinct conditions. In summary:

- Regulation 16 allows an extension of the time limit so that good status or potential is, under certain conditions, achieved only after 2015;
- Regulation 17 allows the achievement of less stringent objectives under certain conditions;
- Regulation 18 allows the temporary deterioration of status in case of natural causes or "force majeure";
- Regulation 19 allows for deterioration of status or non-achievement of good status or potential under certain distinct conditions.

The All Company Working Group (ACWG) has developed a consistent framework for undertaking WFD assessments to demonstrate that options will not cause deterioration in status of any WFD waterbodies[4]. This assessment considers mitigation that would need to be put in place to protect waterbody status. The assessment also considers WFD future objectives. This framework was developed to ensure consistency in environmental assessment across water companies for SRO development across the UK. To ensure consistent comparison between WRMP options and SRO options, the same framework has been used for the assessment of all WRMP options.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact assessment. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment based for Level 2. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

[4] All Company Working Group, November 2020. Water Framework Directive: Consistent framework for undertaking no deterioration assessments.

1.3.2 Level 1 – basic screening

The first stage of WFD assessment was completed for all options. Level 1 assessment follows these steps:

- Identify affected water bodies crossed or impacted by the option;
- Breakdown option into activities involved in construction, operation and decommissioning phases;
- Assign each water body the activities which occur within them and therefore assign an impact score (based on a predefined list);
- Consider any embedded mitigation measures; and
- Calculate a screening score (using a 6-point scale from -2 to 3) to 'screen out' water bodies and options with no or minor potential impacts from further assessment. If the maximum impact score is greater than 1 (minor localised impact) then the water body will need to be taken forward into level 2 screening.

The scoring system used is set out in Table 1.2 below.

Table 1.2: Impact scoring system used for WFD assessments

Impact	Score	Description
Major beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire water body.
Minor beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body or any quality elements.
Negligible	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Minor localised	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Amber adverse	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
Major adverse	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

Assumed embedded mitigation, such as the use of trenchless river crossings or construction of trenches such that they will not form a preferential pathway for flow of groundwater, are set out in the Level 1 assessment tables (See Appendix A).

The WFD Level 1 screening outcomes for the South West Water WRMP24 options are summarised in Section 2 and Appendix A. Where water bodies and option impacts were 'screened in', they have been taken forward to Level 2 assessment.

1.3.3 Level 2 – detailed impact screening

The second stage of WFD assessment has been completed for options that were screened in at Level 1, following the steps:

- Waterbody scale detailed assessment of impacts to each WFD quality element for each activity proposed as part of an option;
- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on the quality and availability of both physical data and design information about the option at the time of assessment *(note, confidence/certainty expected*

to be low during this initial WRMP assessment and increase over time). Where the confidence levels are medium or low, the requirements for further data or design information in order to raise this confidence level for future gates will be listed*;*

- Identification of further mitigation needs;
- Assessment of impacts after mitigation (scoring on a 6-point scale); and
- Identification of activities to improve certainty of assessment outcomes.

The outcomes of the Level 2 assessments are summarised in Section 3 and Appendix B (further assessment Level 2 output tables).

Where waterbodies and option impacts have been identified, recommendations have been made for increasing the confidence in the assessment. This is expected to be through increasing the level of detail available during later stages of option development if the relevant options are progressed. Recommendations are included in the Level 2 summary tables (Section 3.6) and under next steps (Section 5.5).

1.3.4 In combination effects

For the assessment of WFD, in combination effects considers the additional impact on a waterbody caused by multiple options being constructed or operated within it. For the three SWW plans (Best Value Plan, Least Cost Plan and Worst Case Plan), all of the waterbodies impacted by more than 1 option have been compiled.

This in combination assessment, then, identifies which options impact the same waterbody and whether an increase in impact on that waterbody is likely. This assessment will show whether changes to overall impact scoring should be made in order to fully incapsulate the impact of the SWW plans on the water environment. The findings are detailed in Section 4.

1.3.5 Limitations and assumptions

As the options set out in the WRMP are still in the early stages of design development a precautionary approach has been exercised because of residual uncertainty. The WFD assessment has the following limitations and assumptions:

- The ACWG approach now uses WFD 2019 data, as it is the current officially reported baseline in the Cycle 3 RBMP. The 2019 WFD baseline data was released in late 2020 and forms the legal baseline since the release of the RBMPs in December 2022.
- Assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any larger watercourses, roads or railways) and therefore will not cross watercourses above ground. Smaller watercourses and roads are assumed to be crossed using bypass and trenching. It is assumed that appropriate mitigation will be in place and therefore there will be no direct impacts on any watercourses.
- This assessment has only considered the impacts associated directly with the options at this stage and does not include the impacts of other water company WRMP options.
- The geographical extent of the WFD assessment is generally limited to the water bodies where abstractions or discharges take place. There is potential for some effects continuing downstream of the abstraction point, although it is assumed these would become increasingly limited to ‘negligible’ with distance. This assumption will need to be reviewed as additional hydrological studies are undertaken.

Option specific assumptions are set out in the Level 2 assessment summary tables (see Section 3.6).

2 Water Framework Directive findings (Level 1 WFD)

This section presents the summary of the results of the WFD Level 1 assessments. The full assessments can be found in Appendix A. Where these assessments highlight the requirement for further investigation for some waterbodies, Level 2 assessments will be required. Further information on WFD classification and the approach adopted can be found in ACWG, WFD framework.

2.1 Bournemouth WRZ

2.1.1 BNW1: Borehole development, existing borehole remedial works

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one groundwater body: GB40702G503500 SW Hants Barton Group.

Table 2.1: WFD Level 1 assessment outcomes for Borehole development, existing borehole remedial works

Borehole development, existing borehole remedial works	
Option ID	BNW1
Option description	Borehole development, existing borehole remedial works. Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole development, existing borehole works. Third borehole to be drilled at site with a new licence of 1Ml/d
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB107042011220: Lymington River
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40702G503500: SW Hants Barton Group (GW)

2.1.2 BNW3: Wimborne transfer to Longham – licence change

The Level 1 WFD assessment covered three waterbodies of the option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.2: WFD Level 1 assessment outcomes for Wimborne transfer to Longham – licence change

Wimborne transfer to Longham – licence change	
Option ID	BNW3

Wimborne transfer to Longham – licence change	
Option description	Conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour. This is expected to occur in 2027 when the Longham licence is due to be cut. This would mean that no additional changes would be required on site at Longham.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB108043011090: Allen (Lower); GB108043011040: Stour (Lower) and GB40802G805900: Reading beds GW
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.1.3 BNW6: Longham Aquifer Recharge

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one river water body: GB107042011300 Avon Water.

Table 2.3: WFD Level 1 assessment outcomes for Longham Aquifer Recharge

Longham Aquifer Recharge	
Option ID	BNW6
Option description	Aquifer storage and recovery (ASR) at Longham. Pumping and storage of water in winter months for subsequent abstraction. 10Ml/d abstraction in summer, recharge in winter. Option will compromise several existing ASR boreholes at the Longham site.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB40802G805800: Lower Dorset Stour and Lower Hampshire Avon (GW); GB108043011040: Stour (Lower)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB107042011300: Avon Water

2.1.4 BNW11: Christchurch WwTW IPR 2. Transfer to Longham Lakes

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for two water bodies: GB40802G805800: Lower Dorset Stour and Lower Hampshire Avon groundwater body and the GB520804315900: Christchurch Harbour coastal water body.

Table 2.4: WFD Level 1 assessment outcomes for Christchurch WwTW IPR 2. Transfer to Longham Lakes

Christchurch WwTW IPR 2. Transfer to Longham Lakes	
Option ID	BNW11
Option description	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB108043011040: Stour (Lower)
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB40802G805800: Lower Dorset Stour and Lower Hampshire Avon (GW); GB520804315900: Christchurch Harbour

2.2 Colliford WRZ

2.2.1 COL2: Colliford Reservoir pumped storage Stage 2 - Lower River Camel abstraction

The Level 1 WFD assessment covered six waterbodies for this option. The outcomes indicated further assessment would be necessary for two water bodies: GB108049000190: Lower River Camel river water body and the GB40802G800300: North Cornwall groundwater body.

Table 2.5: WFD Level 1 assessment outcomes for Colliford Reservoir pumped storage Stage 2 - Lower River Camel abstraction

Colliford Reservoir pumped storage Stage 2 - Lower River Camel abstraction	
Option ID	COL2
Option description	New river intake and pumping station at Nanstallon, for 90Ml/d, will require a new abstraction licence. New pipeline from intake to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15Ml/d) Raw water is then pumped to Colliford Reservoir via existing main.
Number of waterbodies passing WFD assessment	4
Waterbodies passing WFD assessment	GB108049000030: Lanivet Stream; GB108049000040: St Lawrence Stream; GB108048001420: Lower River Fowey; GB40802G806600: Looe and Fowey (GW)
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB108049000190: Lower River Camel; GB40802G800300: North Cornwall (GW).

2.2.2 COL3: Abstraction of Colliford Reservoir compensation flow when making supply releases

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048001420: Lower River Fowey river waterbody.

Table 2.6: WFD Level 1 assessment outcomes for Abstraction of Colliford Reservoir compensation flow when making supply releases

Abstraction of Colliford Reservoir compensation flow when making supply releases	
Option ID	COL3
Option description	Abstraction of Colliford compensation flow at Restormel WTW when making supply releases. No infrastructure changes required.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G806600: Looe and Fowey (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048001420: Lower River Fowey

2.2.3 COL4: Abstraction of Siblyback Reservoir compensation flow when making supply releases

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048001420: Lower River Fowey river water body.

Table 2.7: WFD Level 1 assessment outcomes for abstraction of Siblyback Reservoir compensation flow when making supply releases

Abstraction of Siblyback Reservoir compensation flow when making supply releases	
Option ID	COL4
Option description	New abstraction of Silbyback Reservoir compensation flow. No infrastructure/construction works. Increase in abstraction at Restormel WTW. The water has come from Siblyback Reservoir, this will be unchanged between Siblyback and Restormel.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G806600: Looe and Fowey (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048001420: Lower River Fowey

2.2.4 COL5: Increase Wendron annual licence and de-couple from Stithians

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048001171: Upper River Cober river water body.

Table 2.8: WFD Level 1 assessment outcomes for Increase Wendron annual licence and de-couple from Stithians

Increase Wendron annual licence and de-couple from Stithians	
Option ID	COL5
Option description	Increase Wendron annual licence and de-couple from Stithians. No infrastructure/construction works. Increase in abstraction at Wendron WTW. The River Cober will therefore have a reduced flow downstream of Wendron WTW (to SW of WTW).
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB108048001820: Helford River; GB40802G800100: West Cornwall (GW); GB40802G800200: South Cornwall (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048001171: Upper River Cober

2.2.5 COL 6: River Hayle abstraction

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body:GB108049000380: Hayle river water body.

Table 2.9: WFD Level 1 assessment outcomes for River Hayle abstraction

River Hayle abstraction	
Option ID	COL6
Option description	Abstraction from River Hayle at existing, disused intake, treat abstracted water at new onsite treatment works.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB40802G800100: West Cornwall (GW); GB610807680001: Lands End to Trevose Head
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108049000380: Hayle

2.2.6 COL 9: Leswidden Pool

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for three water bodies: GB610807680001: Lands End to Trevose Head coastal water body; GB108048002090: Newlyn River water body and GB30846547: Drift Reservoir lake water body.

Table 2.10: WFD Level 1 assessment outcomes for Leswidden Pool

Leswidden Pool	
Option ID	COL 9
Option description	New pipeline from Leswidden Pool (former quarry, now small reservoir) to Sancreed Stream (to SE of Leswidden Pool). New discharge point to Sancreed Stream required. Water is transferred from Leswidden Pool via new pipeline to Sancreed Stream. Then flows downstream to Drift Reservoir. i.e. reduction in water at Leswidden Pool.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G800100: West Cornwall (GW)
Number of waterbodies requiring further WFD assessment	3
Waterbodies failing WFD assessment	GB610807680001: Lands End to Trevose Head (coastal); GB108048002090: Newlyn River; GB30846547: Drift Reservoir

2.2.7 COL11: Hawk's Tor Pit

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048007630: Warleggan River water body.

Table 2.11: WFD Level 1 assessment outcomes for Hawk's Tor Pit

Hawk's Tor Pit	
Option ID	COL11
Option description	New pipeline required to connect Hawk's Tor Pit (an old quarry, now a small reservoir) to Colliford Reservoir. Assume new intake and discharge points also needed. New pipeline will be drilled underneath the A30 so construct would not affect traffic.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB108048007640: St Neot River; GB30846225: Colliford Lake; GB40802G806600: Looe and Fowey (GW)

Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048007630: Warleggan River

2.2.8 COL12: Stannon daily abstraction increase

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for both of these water bodies: GB108049007040: Stannon Stream river water body and GB40802G800300: North Cornwall groundwater body.

Table 2.12: WFD Level 1 assessment outcomes for Stannon daily abstraction increase

Stannon daily abstraction increase	
Option ID	COL12
Option description	Increase the daily limit to the abstraction licence of 4Ml/d to 8Ml/d for up to three months in any one year. Pumps to be uprated and possible power upgrade. A 0.2Ml/d stream support facility will be constructed discharging from the lake to the adjacent stream.
Number of waterbodies passing WFD assessment	0
Waterbodies passing WFD assessment	0
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB108049007040: Stannon Stream; GB40802G800300: North Cornwall (GW).

2.2.9 COL15: Restormel WTW

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048001420: Lower River Fowey water body.

Table 2.13: WFD Level 1 assessment outcomes for Restormel WTW

Restormel WTW	
Option ID	COL15
Option description	This option would take Restormel WTW up to its maximum licensed abstraction and enable more effective use to be made of the Colliford/River Fowey resources system. Works required include increased pumping facilities from the river to the WTW, increased water treatment capability and increased capacity of the waste water and sludge system.
Number of waterbodies passing WFD assessment	1

Restormel WTW	
Waterbodies passing WFD assessment	GB40802G806600: Looe and Fowey (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048001420: Lower River Fowey

2.2.10 COL18: Porth / Rialton

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108049000000: Porth Stream river water body.

Table 2.14: WFD Level 1 assessment outcomes for Porth / Rialton

Porth / Rialton	
Option ID	COL18
Option description	New intake structure required at Rialton. RWPS and pipeline to Coswarth SRES site. Building new WTW at Coswarth SRES site to treat river water. To treat 6Ml/d. Connection to existing distribution system.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G800300: North Cornwall (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108049000000: Porth Stream

2.2.11 COL19: Boswyn stream / Cargenwen Reservoir / Carwynnen stream

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for two of these water bodies: GB108049000560: Roseworthy Stream river water body and GB30846509: Cargenwyn Reservoir lake water body.

Table 2.15: WFD Level 1 assessment outcomes for Boswyn stream / Cargenwen Reservoir / Carwynnen stream

Boswyn stream / Cargenwen Reservoir / Carwynnen stream	
Option ID	COL19
Option description	Re-introduce abstractions at Boswyn Stream / Cargenwen Reservoir / Carwynnen Stream.
Number of waterbodies passing WFD assessment	1

Boswyn stream / Cargenwen Reservoir / Carwynnen stream	
Waterbodies passing WFD assessment	GB40802G800100: West Cornwall (GW)
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB108049000560: Roseworthy Stream; GB30846509: Cargenwyn Reservoir

2.2.12 COL20: River Fal new abstraction

The Level 1 WFD assessment covered five waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108048001270: Lower River Fal water body.

Table 2.16: WFD Level 1 assessment outcomes for River Fal new abstraction

River Fal new abstraction	
Option ID	COL20
Option description	New abstraction on the River Fal near Ruan Lanihorne. New intake, onsite WTW and connection to distribution system. Includes connection to regional trunk main.
Number of waterbodies passing WFD assessment	4
Waterbodies passing WFD assessment	GB40802G800200: South Cornwall (GW); GB108048002350: Tresillian River (Lower); GB108048002400: Brighton Stream; GB108048002390: Tresillian River (Upper)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108048001270: Lower River Fal

2.3 Roadford WRZ

2.3.1 ROA2: River Erme

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108046005200: Erme river water body.

Table 2.17: WFD Level 1 assessment outcomes for River Erme

River Erme	
Option ID	ROA2
Option description	New intake point to be constructed on River Erme. Possibly may also require new pipeline between new intake point and existing pipe network. Plus new pumping station.

River Erme	
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G800700: Teign, Avon, Dart and Erme (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108046005200: Erme

2.3.2 ROA3: River Yealm

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108047004010: Lower River Yealm water body.

Table 2.18: WFD Level 1 assessment outcomes for River Yealm

River Yealm	
Option ID	ROA3
Option description	Intake relocation. New intake point to be constructed on River Yealm. May also require new pipeline between new intake point and existing pipe network. Increased abstraction at new intake.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40802G806700: Tamar (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108047004010: Lower River Yealm

2.3.3 ROA4: Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108047007860: Lower River Tamar river water body.

Table 2.19: WFD Level 1 assessment outcomes for abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases

Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases	
Option ID	ROA4
Option description	9Ml/d abstraction of Roadford compensation flow at Gunnislake when making supply releases.

Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB520804714300: PLYMOUTH TAMAR; GB40802G806700: Tamar (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108047007860: Lower River Tamar

2.3.4 RAO6: Upper Tamar Lake increasing annual licence

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB30845277: Upper Tamar Lake water body.

Table 2.20: WFD Level 1 assessment outcomes for Upper Tamar Lake increasing annual licence

Upper Tamar Lake increasing annual licence	
Option ID	ROA6
Option description	Increase daily abstraction limit, upgrades to WTW and distribution network.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108047013920: Upper River Tamar; GB40802G806700: Tamar (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB30845277: Upper Tamar Lake

2.3.5 ROA7: Expansion of Northcombe WTW to 60Ml/d

The Level 1 WFD assessment covered five waterbodies for this option. The outcomes indicated further assessment would be necessary for two of these water bodies: GB30847000: Roadford Lake water body and GB108047008020: Wolf river water body.

Table 2.21: WFD Level 1 assessment outcomes for Expansion of Northcombe WTW to 60Ml/d

Expansion of Northcombe WTW to 60Ml/d	
Option ID	ROA7
Option description	Treatment works to be able to deliver a minimum of 60Ml/d. Additional 10Ml/d pumping capacity at Roadford reservoir.
Number of waterbodies passing WFD assessment	3

Waterbodies passing WFD assessment	GB108050008160: Upper River Lew (Torridge); GB40802G806700: Tamar (GW); GB40802G800600: Torridge and Hartland Streams (GW)
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB30847000: Roadford Lake; GB108047008020: Wolf

2.3.6 ROA8: Tottiford WTW - reduce WTW minimum capacity

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.22: WFD Level 1 assessment outcomes for Tottiford WTW - reduce WTW minimum capacity

Tottiford WTW - reduce WTW minimum capacity	
Option ID	ROA8
Option description	Reduce WTW minimum capacity (12-10Ml/d) Assuming that by reducing the minimum capacity for operation, the WTW can operate more frequently, allowing an overall increase in water treatment.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108046008500: Beadon Brook; GB40802G800700: Teign, Avon, Dart and Erme (GW)
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.3.7 ROA10: Avon WTW - reduce WTW minimum capacity

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.23: WFD Level 1 assessment outcomes for Avon WTW - reduce WTW minimum capacity

Avon WTW - reduce WTW minimum capacity	
Option ID	ROA10
Option description	Reduce WTW minimum capacity (7-5Ml/d).
Number of waterbodies passing WFD assessment	3

Waterbodies passing WFD assessment	GB108046004940: Avon - Upper; GB108046004941: Upper Avon; GB40802G800700 :Teign, Avon, Dart and Erme (GW)
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.3.8 ROA11: Meldon WTW - reduce WTW minimum capacity

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.24: WFD Level 1 assessment outcomes for Meldon WTW - reduce WTW minimum capacity

Meldon WTW - reduce WTW minimum capacity	
Option ID	ROA11
Option description	Reduce WTW minimum capacity (12-10Mld).
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108047007770: Lew (Tamar); GB40802G806700: Tamar (GW)
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.3.9 ROA12: Slade and Horedown WTW (GAC)

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB30843764: Slade Lower Reservoir lake water body.

Table 2.25: WFD Level 1 assessment outcomes for Slade and Horedown WTW (GAC)

Slade and Horedown WTW (GAC)	
Option ID	ROA12
Option description	Installation of new pumping station at Slade reservoir (ROA12a) and new 4Ml/d GAC plant at Horedown WTW (ROA12b).
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB610807680004: Bristol Channel Outer South; GB40802G801000: River Taw and North Devon Streams (GW)

Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB30843764: Slade Lower Reservoir

2.3.10 ROA13: Duckaller and Vennbridge

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.26: WFD Level 1 assessment outcomes for Duckaller and Vennbridge

Duckaller and Vennbridge	
Option ID	ROA13
Option description	4Ml/d nitrate removal plant installation at Duckaller pumping station. Changes to abstraction licences to facilitate full use of sources.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB510804505600: EXE (estuary); GB40801G801700: Permian Aquifers in Central Devon (GW)
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.3.11 ROA14: Raise Avon Dam

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB30846291: Avon Dam Reservoir lake water body.

Table 2.27: WFD Level 1 assessment outcomes for Raise Avon Dam

Raise Avon Dam	
Option ID	ROA14
Option description	Raise Avon dam Raise dam by 2 m. Subject to structural engineering approval.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108046004941: Upper Avon; GB40802G800700: Teign, Avon, Dart and Erme (GW)
Number of waterbodies requiring further WFD assessment	1

Waterbodies failing WFD assessment	GB30846291: Avon Dam Reservoir

2.3.12 ROA15: Gatherley Phase 2

The Level 1 WFD assessment covered six waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108047007731: Lower River Lyd river water body.

Table 2.28: WFD Level 1 assessment outcomes Gatherley Phase 2

Gatherley Phase 2	
Option ID	ROA15
Option description	Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125Ml/d to be transferred to Roadford Reservoir. Dual main required between River Lyd and Roadford Reservoir. New scheme which is part of the Green Recovery Programme. Phase 2 – is dualing the main between the River Lyd intake and Roadford Reservoir.
Number of waterbodies passing WFD assessment	5
Waterbodies passing WFD assessment	GB108047008010: Thrushel; GB108047008020: Wolf; GB30847000: Roadford Lake; GB40802G806700: Tamar (GW); GB108047007990: Broadwood Brook
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108047007731: Lower River Lyd

2.3.13 ROA16: Littlehempston WTW

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB510804605900: Dart transitional water body.

Table 2.29: WFD Level 1 assessment outcomes for Littlehempston WTW

Littlehempston WTW	
Option ID	ROA16
Option description	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB510804605900: Dart GB40802G800700 Teign, Avon, Dart and Erme

Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB510804605900: DART

2.4 Wimbleball WRZ

2.4.1 WIM1: Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases

The Level 1 WFD assessment covered three waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108045009060: Exe (Culm to Creedy) river water body.

Table 2.30: WFD Level 1 assessment outcomes for abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases

Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases	
Option ID	WIM1
Option description	Abstraction of Wimbleball compensation flow at Northbridge when making supply releases (9Mld would have been left in river but will now be abstracted).
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108045015050: Exe (Barle to Culm); GB40802G800900: Exeter-Whiddon Down Culm (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108045009060: Exe (Culm to Creedy)

2.4.2 WIM2: Sidford borehole commissioning

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40802G802800: Sidmouth-Honiton, Mercia Mudstone groundwater body.

Table 2.31: WFD Level 1 assessment outcomes for Sidford borehole commissioning

Sidford borehole commissioning	
Option ID	WIM2
Option description	Abstraction of Wimbleball compensation flow at Northbridge when making supply releases (9Mld would have been left in river, but will now be abstracted).
Number of waterbodies passing WFD assessment	1

Sidford borehole commissioning	
Waterbodies passing WFD assessment	GB108045009160: Sid
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40802G802800: Sidmouth-Honiton, Mercia Mudstone (GW)

2.4.3 WIM4: Wilmington springs annual abstraction increase

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108045008880: Umborne Brook.

Table 2.32: WFD Level 1 assessment outcomes for Wilmington springs annual abstraction increase

Wilmington springs annual abstraction increase	
Option ID	WIM4
Option description	Increase in abstraction so annual volume equals that of the daily limit (1.7-2.1Ml/d).
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB40801G802400: East Devon - Greensand (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108045008880: Umborne Brook

2.4.4 WIM5: Indirect potable reuse - stream support for Dotton WTW

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108045009160 Sid river water body.

Table 2.33: WFD Level 1 assessment outcomes for Indirect potable reuse - stream support for Dotton WTW.

Indirect potable reuse - stream support for Dotton WTW.	
Option ID	WIM5
Option description	Pump treated effluent from Sidmouth WWTW directly to the River Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods. 3Ml/d discharge volume.
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB108045009170: Lower River Otter;

Indirect potable reuse - stream support for Dotton WTW.	
	GB40802G802800: Sidmouth-Honiton, Mercia Mudstone (GW); GB40801G801900: Otter Valley (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108045009160: Sid

2.4.5 WIM6: Increase Allers WTW capacity

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option, because the types of activities do not present a risk to WFD status or objectives for any water bodies.

Table 2.34: WRSE WFD Level 1 assessment outcomes for Increase Allers WTW capacity

Increase Allers WTW capacity	
Option ID	WIM6
Option description	Increase daily abstraction Licence 36Ml/d. Upgrade Bolham abstraction to pump an additional 4Ml/d. Upgrade WTW to treat an additional 4Ml/d. with distribution network improvements.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB108045015050: Exe (Barle to Culm); GB40801G801700: Permian Aquifers in Central Devon (GW)
Number of waterbodies requiring further WFD assessment	0
Waterbodies failing WFD assessment	N/A

2.4.6 WIM7: Increase Pynes to licence limit 66.46Ml/d

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB108045009070: Lower Creedy river water body.

Table 2.35: WRSE WFD Level 1 assessment outcomes for Increase Pynes to licence limit 66.46Ml/d

Increase Pynes to licence limit 66.46Ml/d	
Option ID	WIM7
Option description	Increase WTW to licence maximum, Upgrade WTW to treat an additional 6.5Ml/d No distribution network changes as per SWW response.
Number of waterbodies passing WFD assessment	1

Increase Pynes to licence limit 66.46Ml/d	
Waterbodies passing WFD assessment	GB40802G800900: Exeter-Whiddon Down Culm (GW)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB108045009070: Lower Creedy

2.4.7 WIM8: Brampford Speke borehole

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40801G801700: Permian Aquifers in Central Devon.

Table 2.36: WFD Level 1 assessment outcomes for Brampford Speke borehole

Brampford Speke borehole	
Option ID	WIM8
Option description	Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole yield 3.5Mld existing licence change to permit discharge to the river, infrastructure already exists to do this.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB108045015050: Exe (Barle to Culm)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40801G801700: Permian Aquifers in Central Devon (GW)

2.4.8 WIM9: Stoke Canon borehole

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40801G801700: Permian Aquifers in Central Devon groundwater body.

Table 2.37: WFD Level 1 assessment outcomes for Stoke Canon borehole

Stoke Canon borehole	
Option ID	WIM9
Option description	Agree licence changes with EA. Install new power supply. Site Commissioning. Borehole yield 4.5Mld existing licence change to permit discharge to the river infra already exists to do this. Existing site footprint plus a line between borehole and river where washout is located.
Number of waterbodies passing WFD assessment	1

Stoke Canon borehole	
Waterbodies passing WFD assessment	GB108045015050: Exe (Barle to Culm)
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40801G801700: Permian Aquifers in Central Devon

2.5 Isles of Scilly WRZ

2.5.1 ISB4: Bryher - Increase Existing Desalination Plant Capacity

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for both water bodies: GB620807080000: Scilly Isles coastal water body and GB40802G081200: Isles of Scilly groundwater body.

Table 2.38: WRSE WFD Level 1 assessment outcomes for Bryher - Increase Existing Desalination Plant Capacity

Bryher - Increase Existing Desalination Plant Capacity	
WRSE Option ID	ISB4
Option description	Additional process stream at existing RO plant plus increased borehole yield &/or new borehole source.
Number of waterbodies passing WFD assessment	0
Waterbodies passing WFD assessment	N/A
Number of waterbodies requiring further WFD assessment	2
Waterbodies failing WFD assessment	GB620807080000: Scilly Isles; GB40802G081200: Isles of Scilly (GW)

2.5.2 ISMY1: St. Mary's new borehole (location 1)

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40802G081200: Isles of Scilly groundwater body.

Table 2.39: WFD Level 1 assessment outcomes for St. Mary's new borehole (location 1)

St. Mary's new borehole (location 1)	
Option ID	ISMY1
Option description	Construct new borehole and associated infrastructure and transfer raw water from borehole to existing WTW using a new pipeline.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB620807080000: Scilly Isles

St. Mary's new borehole (location 1)	
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40802G081200: Isles of Scilly (GW)

2.5.3 ISMY2: St. Mary's new borehole (location 2)

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40802G081200: Isles of Scilly groundwater body.

Table 2.40: WFD Level 1 assessment outcomes for St. Mary's new borehole (location 2)

St. Mary's new borehole (location 2)	
Option ID	ISMY2
Option description	new borehole, associated infrastructure, plus new standalone treatment plant at new borehole location. Plus new pipeline to connect to existing water network.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB620807080000: Scilly Isles
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40802G081200: Isles of Scilly (GW)

2.5.4 ISMY4: St. Mary's - Increase Existing Desalination Plant Capacity

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for both water bodies: GB620807080000: Scilly Isles coastal water body and GB40802G081200: Isles of Scilly groundwater body.

Table 2.41: WFD Level 1 assessment outcomes for St. Mary's - Increase Existing Desalination Plant Capacity

St. Mary's - Increase Existing Desalination Plant Capacity	
Option ID	ISMY4
Option description	Increase output of existing RO desalination plant. With increased yield from existing boreholes, or new boreholes Option location is at site of existing desalination plant on St Mary's.
Number of waterbodies passing WFD assessment	0
Waterbodies passing WFD assessment	N/A
Number of waterbodies requiring further WFD assessment	2

Waterbodies failing WFD assessment	GB620807080000: Scilly Isles; GB40802G081200: Isles of Scilly (GW)

2.5.5 IST1: Tresco new borehole

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one water body: GB40802G081200: Isles of Scilly groundwater body.

Table 2.42: WFD Level 1 assessment outcomes for Tresco new borehole

Tresco new borehole	
Option ID	IST1
Option description	Construct new borehole and assume new infrastructure and on-site UV treatment plant at borehole location is required. Plus, new pipeline to connect to existing WTW for full water treatment.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB620807080000: Scilly Isles
Number of waterbodies requiring further WFD assessment	1
Waterbodies failing WFD assessment	GB40802G081200: Isles of Scilly (GW)

2.6 Demand Options

No WFD assessments are required for demand options as these options do not include any direct interaction with WFD waterbodies. These options are not considered further in this report.

3 Level 2 Water Framework Directive assessments

The second stage of WFD assessment has been completed for WRMP24 options that were screened in at Level 1. Further information on WFD classification and the approach adopted can be found in the ACWG, WFD framework. Option BNW8 has been excluded as it has been assessed separately as an SRO.

Section 3.1 to Section 3.5 provides an overview of the Level 2 WFD assessments findings while Section 3.6 provides summary tables for each Level 2 assessment, going into more depth with mitigation measures and scoring.

3.1 Bournemouth WRZ

3.1.1 BNW1: Borehole development, existing borehole remedial works

One water body was identified as requiring further assessment: SW Hants Barton Group groundwater body. The Level 2 WFD assessment identified potential minor localised impacts to quantitative status elements and chemical status elements due to increased abstraction, but these were assessed to not be significant at a waterbody scale. Therefore, no compliance risk has been identified, and no risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.1 and detailed outputs are presented in Appendix B.

3.1.2 BNW6: Longham Aquifer Recharge

One water body was identified as requiring further assessment: Avon Water river water body. The Level 2 WFD assessment identified potential minor localised impacts to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements due to increased abstraction, but these were assessed to not be significant at a waterbody scale. Therefore, no compliance risk has been identified.

The RNAG for Avon Water river water body relate to:

- Phosphate due to ‘pollution from rural areas’, ‘pollution from waste water and ‘pollution from towns, cities and transport’
- Macrophytes and phytobenthos combined due to drought (natural)

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in the groundwater body. No risk to achieving waterbody objectives has been identified.

It should be noted that the deep confined Chalk aquifer which would be used for this scheme is not a WFD waterbody. However, due to the nature of the ASR scheme there are potential impacts, particularly on water quality, that should be considered when evaluating this option.

A summary of the Level 2 WFD assessment is included in Table 3.2 and detailed outputs are presented in Appendix B.

3.1.3 BNW11: Christchurch WTW to Longham Lakes

Two water bodies were identified as requiring further assessment: Christchurch Harbour transitional water body and the Lower Dorset Stour and Lower Hampshire Avon groundwater body.

The Level 2 WFD assessment for the groundwater body identified potential risk of deterioration to quantitative dependent surface water body status due to temporary dewatering associated with the below ground infrastructure. Suggested mitigation included the discharge of dewatering into the local surface water courses to maintain flow. Following the inclusion of such mitigation risks reduced to minor localised, which are not significant at a waterbody scale. Assuming suitable mitigation is applied no compliance risk is anticipated for this waterbody.

The Level 2 WFD assessment for the Christchurch Harbour transitional water body identified minor localised risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements. This is primarily due to the cessation of the existing discharge into Christchurch Harbour which is being diverted to a separate water body. Further assessment is required to investigate the potential deterioration in this water body. However, at this stage no compliance risk has been identified for this waterbody.

The RNAG for the Christchurch Harbour transitional water body relate to Mitigation measures assessment due to physical modifications and dissolved Inorganic Nitrogen due to ‘pollution from rural areas’ and pollution from unspecified sources. The RNAG for the Lower Dorset Stour and Lower Hampshire Avon groundwater body relate to unspecified ‘pollution from towns, cities and transport’. Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in either of the water bodies. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.3 and detailed outputs are presented in Appendix B.

3.2 Colliford WRZ

3.2.1 COL2: Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction

Two water bodies were identified as requiring further assessment: Lower River Camel water body and the North Cornwall groundwater body.

The Level 2 WFD assessment for the Lower River Camel water body identified significant deterioration risks to biological quality elements and hydromorphological supporting elements and potential risk of deterioration to physico-chemical quality elements associated with the new surface water abstraction. The proposed abstraction (90Ml/d) is large in comparison to mean flow and a reduction in flow downstream of the abstraction may significantly affect the hydrological regime and conditions for biology. Further assessment is required to investigate the potential deterioration risk in this water body.

The Level 2 WFD assessment for the groundwater body identified minor localised risks to the quantitative status elements and chemical status elements due to temporary dewatering associated with the construction of the below ground infrastructure. Therefore, no compliance risk has been identified for this waterbody.

The RNAG for the North Cornwall groundwater body relate to chemical status due to ‘pollution from abandoned mines’ and ‘pollution from rural areas’. Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.4 and detailed outputs are presented in Appendix B.

3.2.2 COL3: Colliford Reservoir Compensation Flow Abstraction

One water body was identified as requiring further assessment: Lower River Fowey water body.

The Level 2 WFD assessment identified possible deterioration risks to hydromorphological supporting elements and minor localised risks to biological quality elements and physico-chemical elements due to a possible reduction in flow volume and velocity associated with the new surface water abstraction. Further assessment is required to investigate the potential deterioration risk in this water body.

A summary of the Level 2 WFD assessment is included in Table 3.5 and detailed outputs are presented in Appendix B.

3.2.3 COL4: Siblyback Lake Compensation Flow Abstraction

One water body was identified as requiring further assessment: Lower River Fowey water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements and hydromorphological supporting elements due to a possible reduction in flow volume and velocity associated with the new surface water abstraction. Further assessment is required to investigate the potential deterioration risk in this water body.

A summary of the Level 2 WFD assessment is included in Table 3.6 and detailed outputs are presented in Appendix B.

3.2.4 COL5: Increase Wendron annual licence and de-couple from Stithians

One water body was identified as requiring further assessment: Upper River Cober water body.

The Level 2 WFD assessment identified deterioration risks to biological quality elements and hydromorphological supporting elements due to a possible reduction in flow volume and velocity associated with the new surface water abstraction. Further assessment is required to investigate the potential deterioration risk in this water body.

The RNAG for the Upper River Cober water body relate to the hydrological regime due to changes to the natural flow and levels of water and fish and zinc due to ‘pollution from abandoned mines. The Level 2 WFD assessment identified potential impediments to meeting Good Ecological Status. The abstraction has the potential to affect flow downstream of the abstraction and may reduce improvements that can be made with respect to the hydrological regime. In addition, a reduction in flow may lead to a reduced dilution potential in the watercourse which could lead to a reduction in improvements which can be made to water quality pressures on fish.

A summary of the Level 2 WFD assessment is included in Table 3.7 and detailed outputs are presented in Appendix B.

3.2.5 COL6: River Hayle abstraction

Two water bodies were identified as requiring further assessment: Hayle transitional water body and Hayle river water body.

The Level 2 WFD assessment for both water bodies identified possible deterioration risk to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements due to reduced flow volume and velocity associated with the new surface water

abstraction. Further assessment is required to investigate the potential deterioration risk in both of these water bodies.

The RNAG for the Hayle transitional water body relate to Mitigation Measures Assessment due to physical modifications and Macroalgae and dissolved inorganic nitrogen due to 'pollution from rural areas'. The Level 2 WFD assessment for the Hayle transitional waterbody identified potential impediments to meeting Good Ecological Status. The new surface water abstraction has the potential to affect the physico-chemical and biological conditions by reducing flow volume and velocity which may restrict improvements that can be made.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in the Hayle river water body.

A summary of the Level 2 WFD assessment is included in Table 3.8 and detailed outputs are presented in Appendix B.

3.2.6 COL 9: Leswidden Pool

Three waterbodies were identified as requiring further assessment: Lands End to Trevose Head coastal water body, Newlyn River water body and Drift Reservoir lake waterbody.

The Level 2 WFD assessment for all water bodes identified possible deterioration risk to biological quality elements, and physico-chemical quality elements due to changes in flow volume and velocity associated with the new surface water abstraction and discharge. Potential beneficial effects from the increased flow in the Newlyn River were also identified.

The Level 2 WFD assessment identified potential impediments to meeting Good Ecological Status in the Drift Reservoir lake water body. The new discharge has the potential to affect the physico-chemical and biological conditions reducing improvements that can be made.

In the Newlyn River, the increase in flow could help in the achievement of water body objectives to improve the hydrological regime.

A summary of the Level 2 WFD assessment outcomes is included in Table 3.9 and detailed outputs are presented in Appendix B.

3.2.7 COL 11: Abstraction from Hawk's Tor Pit

One water body was identified as requiring further assessment: Looe and Fowey groundwater body.

The Level 2 WFD assessment identified possible deterioration risk to quantitative dependent surface water body status and quantitative GWDTE test elements associated with the new abstraction from Hawk's Tor Pit. It is anticipated that Hawk's Tor Pit will be in hydraulic connection with the groundwater and changes in water levels in the pit will impact on groundwater levels. Further assessment is required to investigate the potential deterioration risk in this water body.

The RNAG for the Looe and Fowey groundwater body relate to chemical dependant surface water body status due to 'pollution from abandoned mines'. Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.10 and detailed outputs are presented in Appendix B.

3.2.8 COL12: Stannon daily abstraction increase

Two water bodies were identified requiring further assessment: North Cornwall groundwater body and the Stannon Stream river water body

The Level 2 WFD assessment identified possible deterioration risk to quantitative dependent surface water body status of the North Cornwall groundwater body and hydrological regime of the Stannon Stream river water body. These are primarily due to a potential risk of reduced flow in the watercourse upstream due to increased abstraction from the nearby groundwater source in selected months, which would not be mitigated by the proposed stream support flow. Further investigation is needed to understand the impact of groundwater abstraction on river flow in order to improve confidence in this assessment.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in either waterbody. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.11 and detailed outputs are presented in Appendix B.

3.2.9 COL15: Restormel WTW

One water body was identified as requiring further assessment: Lower River Fowey river water body.

The Level 2 WFD assessment identified minor localised risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements due to an increase in the daily peak abstraction of surface water. Therefore, no compliance risk has been identified.

The Lower River Fowey water body is currently at good status and therefore has no RNAG. This option is not anticipated to negatively impact the current good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.12 and detailed outputs are presented in Appendix B.

3.2.10 COL18: Porth / Rialton

One water body was identified as requiring further assessment: Porth Stream river water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements (fish, invertebrates, macrophytes and phytobenthos combined), hydrological regime and physico-chemical quality elements. These are primarily due to the potential reduction in flow in the downstream watercourse (Porth Stream river water body), due to increased abstraction from this in-line reservoir. Further investigation is needed to understand the impact of increased abstraction on river flow in order to improve confidence in this assessment.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.13 and detailed outputs are presented in Appendix B.

3.2.11 COL19: Boswyn stream / Cargenwen Reservoir / Carwynnen stream

Two water bodies were identified as requiring further assessment: Roseworthy Stream river water body and Cargenwyn Reservoir lake water body.

The level 2 WFD assessment for the Roseworthy Stream river water body identified possible deterioration risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements due primarily to a reduction in flow in the downstream water course associated with the surface water abstraction. Further assessment is required to investigate the potential deterioration risk in this water body.

The level 2 WFD assessment for the Cargenwyn Reservoir lake water body identified minor localised risks to hydromorphological supporting elements due to changes in water levels and sedimentation associated with abstraction/discharge. Therefore, no compliance risk has been identified.

The Roseworthy Stream river water body has an RNAG associated with the hydrological regime due to changes to the natural flow and levels of water. The Level 2 WFD assessment identified potential impediments to meeting Good Ecological Status. A reduction in flow due to the increased abstraction could alter the hydrological regime and lead to a reduction in the improvements that can be made.

A summary of the Level 2 WFD assessment is included in Table 3.14 and detailed outputs are presented in Appendix B.

3.2.12 COL20: River Fal new abstraction

One water was identified as requiring further assessment: Lower River Fal water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements, hydrological regime, morphology and physico-chemical quality elements. These are primarily due to reduced flow volume and velocity relating to the new abstraction. Further investigation is needed to understand the impact of increased abstraction on river flow in order to improve confidence in this assessment.

The Level 2 WFD assessment identified potential impediments to meeting Good Ecological Status. A reduction in flow downstream of the abstraction could lead to a reduction in dilution potential which may reduce improvements that can be made in respect to macrophytes and phosphate.

A summary of the Level 2 WFD assessment is included in Table 3.15 and detailed outputs are presented in Appendix B.

3.3 Roadford WRZ

3.3.1 ROA2: River Erme

One water body was identified as requiring further assessment: Erme river water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements. These are primarily due to reduced flow volume and velocity related to the new surface water abstraction. Further investigation is needed to understand the impact of the new abstraction on river flow in order to improve confidence in this assessment.

Due to the nature of the works, this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.16 and detailed outputs are presented in Appendix B.

3.3.2 ROA3: River Yealm

One water body was identified as requiring further assessment: Lower River Yealm water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements. These are primarily due to the reduction in flow volume and velocity associated with the new surface water abstraction. Further investigation is needed to understand the impact of the new abstraction on river flow in order to improve confidence in this assessment.

The Level 2 WFD assessment identified potential impediments to meeting Good Ecological Status. A reduction in flow downstream of the abstraction could lead to a reduction in dilution potential which may reduce improvements that can be made in respect to pollution pressures on fish and phosphate.

A summary of the Level 2 WFD assessment is included in Table 3.17 and detailed outputs are presented in Appendix B.

3.3.3 ROA4: Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases

One water body was identified as requiring further assessment: Lower River Tamar water body.

The Level 2 assessment identified possible deterioration risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements. These are primarily due to reduced flow volume and velocity relating to the increased surface water abstraction. Further investigation is needed to understand the impact of increased abstraction on river flow in order to improve confidence in this assessment.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.18 and detailed outputs are presented in Appendix B.

3.3.4 ROA6: Upper Tamar Lake increasing annual licence

One water body was identified as requiring further assessment: Upper Tamar Lake water body.

The Level 2 assessment identified possible deterioration risks to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements due to reduced lake water level caused by the increased abstraction.

The Level 2 WFD assessment also identified potential impediments to meeting water body objectives. Increased abstraction could lead to reduction in dilution potential and increased eutrophication of the lake, leading in a reduction in the improvements which can be made.

A summary of the Level 2 WFD assessment is included in Table 3.19 and detailed outputs are presented in Appendix B.

3.3.5 ROA7: Expansion of Northcombe WTW to 60Ml/d

Two water bodies were identified as requiring further assessment: Roadford Lake water body and the Wolf River water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements (phytoplankton) in the Roadford Lake water body and on biological quality elements (fish and invertebrates) in the downstream Wolf River water body. These are primarily due to a potential for reduced lake level and river flow due to the increase in abstraction. Further

investigation is needed to understand the impact of increased abstraction on lake level and river flow in order to improve confidence in this assessment.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in either waterbody. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.20 and detailed outputs are presented in Appendix B.

3.3.6 ROA12: Slade and Horedown WTW (GAC)

One water body was identified as requiring further assessment: Avon Dam Reservoir lake water body.

The Level 2 WFD assessment identified possible deterioration risks to physico-chemical quality elements (total phosphorous), due to changes in water levels and flow volume and velocity relating to the new abstraction. Further investigation is needed to understand the impact of reduced- flow in order to improve confidence in this assessment.

The Level 2 WFD assessment identified potential impediments to meeting Good status. A reduction in flow in the reservoir could lead to increased sedimentation with increased levels of total phosphorus where it is sediment-bound. This may reduce the measures which can be put in place to improve water quality.

A summary of the Level 2 WFD assessment is included in Table 3.21 and detailed outputs are presented in Appendix B.

3.3.7 ROA14: Raise Avon Dam

One water body was identified as requiring further assessment: Avon Dam Reservoir lake water body.

The Level 2 WFD assessment identified possible significant deterioration risks to physico-chemical quality elements (total phosphorous), due to the reduction in water levels and flow volume and velocity associated with the new abstraction. Further investigation is needed to understand the impact of reduced- flow in order to improve confidence in this assessment.

The Level 2 WFD assessment identified potential impediments to meeting Good status. A reduction in flow in the reservoir could lead to increased sedimentation with increased levels of total phosphorus where sediment bound. This may reduce the measures which can be put in place to improve water quality.

A summary of the Level 2 WFD assessment is included in Table 3.22 and detailed outputs are presented in Appendix B.

3.3.8 ROA15: Gatherley Phase 2

One water body was identified as requiring further assessment: Lower River Lyd water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements (invertebrates) and hydromorphological supporting elements. These are primarily due to change in flow and velocity from the increase in abstraction, and the potential for the transfer of invasive non-native species (INNS) to the upstream watercourse due to pipeline maintenance. A hydroecology investigation into impact of changes in flow on the river and biology is required to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.23 and detailed outputs are presented in Appendix B.

3.3.9 ROA16: Littlehempston WTW

One water body was identified as requiring further assessment: Dart transitional water body.

The Level 2 WFD assessment identified possible deterioration risks to the hydrological regime, due to change in flow and velocity from the increase in abstraction. A hydrology investigation into impact of changes in flow on the river, biology and water quality is required to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.24 and detailed outputs are presented in Appendix B.

3.4 Wimbleball WRZ

3.4.1 WIM1: Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases

One water body was identified as requiring further assessment: Exe (Culm to Creedy) river water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements and hydromorphological supporting elements and minor localised risks to physico-chemical quality elements. These are primarily due to the reduced flow volume and velocity associated with the new surface water abstraction. Further investigation is needed to understand the impact of increased abstraction on river flow in order to improve confidence in this assessment.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status. No risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.25 and detailed outputs are presented in Appendix B.

3.4.2 WIM2: Sidford borehole commissioning

One water body was identified as requiring further assessment: Sidmouth-Honiton, Mercia Mudstone groundwater body.

The Level 2 WFD assessment identified only minor localised risks to the quantitative status elements and chemical status elements due temporary dewatering associated with the refurbishment of existing boreholes and increased groundwater abstraction. Further investigation may be required to understand the impact of the temporary dewatering and increased groundwater abstraction on surface water river health and river quality. However, at this stage no compliance risk has been identified, and no risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.26 and detailed outputs are presented in Appendix B.

3.4.3 WIM4: Wilmington springs annual abstraction increase

Two water bodies were identified as requiring further assessment: East Devon – Greensand groundwater body and Umborne Brook river water body.

The Level 2 WFD assessment identified only minor localised risks to quantitative status elements for the East Devon – Greensand groundwater body and to biological quality elements, hydromorphological supporting elements and physico-chemical quality elements for the Umborne Brook river water body. These are due to the increased abstraction, relating to the

lowering of groundwater levels and corresponding reductions in flow volume and velocity in surface watercourse. Further assessment is needed to understand the impact of reduced groundwater levels on surface water river health and river quality due to the potential for reduced baseflow and discharge to surface water courses via springs. However, at this stage no compliance risk has been identified, and no risk to achieving waterbody objectives has been identified.

A summary of the Level 2 WFD assessment is included in Table 3.27 and detailed outputs are presented in Appendix B.

3.4.4 WIM5: Indirect potable reuse - stream support for Dotton WTW

One water body was identified as requiring further assessment: Sid River water body.

The Level 2 WFD assessment identified potential deterioration risks to biological quality elements and hydrological regime and minor localised risks to physico-chemical quality elements due to the cessation of an existing discharge to the surface water course. Further assessment is required to investigate the potential deterioration in this water body.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status.

A summary of the Level 2 WFD assessment is included in Table 3.28 and detailed outputs are presented in Appendix B.

3.4.5 WIM7: Increase Pynes to licence limit 66.46Ml/d

One water body was identified as requiring further assessment: Lower Creedy river water body.

The Level 2 WFD assessment identified possible deterioration risks to biological quality elements (fish and invertebrates), and hydrological regime and minor localised risks to physico-chemical quality elements. These are primarily due to a reduced flow relating to increased abstraction, and the additional intake structure required. A hydroecology investigation into impact of changes in flow on the river and biology is required to improve confidence in this assessment.

The Level 2 assessment identified potential impediments to meeting water body objectives. As the new abstraction will reduce flows there is likely to be increased sedimentation and a change water quality which could lead to an impact on fish / biology.

A summary of the Level 2 WFD assessment is included in Table 3.29 and detailed outputs are presented in Appendix B.

3.4.6 WIM8: Brampford Speke borehole

One water body was identified as requiring further assessment: Permian Aquifers in Central Devon groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative dependent surface water body status and quantitative water balance elements. This is due to increased abstraction of groundwater. Further investigation into the possible long-term impacts on the groundwater environment are required.

A summary of the Level 2 WFD assessment is included in Table 3.30 and detailed outputs are presented in Appendix B.

3.4.7 WIM9: Stoke Canon borehole

One water body was identified as requiring further assessment: Permian Aquifers in Central Devon groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative dependent surface water body status and quantitative water balance elements. This is due to increased abstraction of groundwater. Further investigation into the possible long-term impacts on the groundwater environment are required.

A summary of the Level 2 WFD assessment is included in Table 3.31 and detailed outputs are presented in Appendix B.

3.5 Isles of Scilly WRZ

3.5.1 ISB4: Bryher - Increase Existing Desalination Plant Capacity

Two water bodies were identified as requiring further assessment: Scilly Isles coastal water body and the Isles of Scilly groundwater body.

The Level 2 WFD assessment for the coastal waterbody identified possible deterioration risks to biological quality elements, primarily due to impacts from the discharge of highly saline water into the coastal water body. Detailed hydrodynamic assessment of the impacts of saline discharge on water quality and biology are required to better understand the possible implications.

The Level 2 WFD assessment on the groundwater body identified possible deterioration risks to quantitative and chemical saline intrusion. This is a precautionary assessment due to potential changes in groundwater levels as a result of abstraction, leading to increased risk of saline intrusion from the coast. Detailed assessment on the groundwater and surface water interaction within the area, particularly with respect to saline intrusion is needed to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.32 and detailed outputs are presented in Appendix B.

3.5.2 ISMY1: St. Mary's new borehole (location 1)

One water body was identified as requiring further assessment: Isles of Scilly groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative and chemical saline intrusion. This is a precautionary assessment due to potential changes in groundwater levels as a result of abstraction, leading to increased risk of saline intrusion from the coast. Detailed assessment on the groundwater and surface water interaction within the area, particularly with respect to saline intrusion is needed to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.33 and detailed outputs are presented in Appendix B.

3.5.3 ISMY2: St. Mary's new borehole (location 2)

One water body was identified as requiring further assessment: Isles of Scilly groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative and chemical saline intrusion. This is a precautionary assessment due to potential changes in groundwater levels as a result of abstraction, leading to increased risk of saline intrusion from the coast.

Detailed assessment on the groundwater and surface water interaction within the area, particularly with respect to saline intrusion is needed to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.34 and detailed outputs are presented in Appendix B.

3.5.4 ISMY4: St. Mary's - Increase Existing Desalination Plant Capacity

Two water bodies were identified as requiring further assessment: Scilly Isles coastal water body and the Isles of Scilly groundwater body.

The Level 2 WFD assessment for the coastal waterbody identified possible deterioration risks to biological quality elements, primarily due to impacts from the discharge of highly saline water into the coastal water body. Detailed hydrodynamic assessment of the impacts of saline discharge on water quality and biology are required to better understand the possible implications.

The Level 2 WFD assessment on the groundwater body identified possible deterioration risks to quantitative and chemical saline intrusion. This is a precautionary assessment due to potential changes in groundwater levels as a result of abstraction, leading to increased risk of saline intrusion from the coast. Detailed assessment on the groundwater and surface water interaction within the area, particularly with respect to saline intrusion is needed to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.35 and detailed outputs are presented in Appendix B.

3.5.5 IST1: Tresco new borehole

One water body was identified as requiring further assessment: Isles of Scilly groundwater body.

The Level 2 WFD assessment identified possible deterioration risks to quantitative and chemical saline intrusion. This is a precautionary assessment due to potential changes in groundwater levels as a result of abstraction, leading to increased risk of saline intrusion from the coast. Detailed assessment on the groundwater and surface water interaction within the area, particularly with respect to saline intrusion is needed to improve confidence in this assessment.

A summary of the Level 2 WFD assessment is included in Table 3.36 and detailed outputs are presented in Appendix B.

3.6 Summary tables

Summary tables of the Level 2 WFD outcomes are provided below, and detailed outputs are presented in Appendix B.

Table 3.1: *BNW1: Borehole development, existing borehole remedial works* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Bournemouth	**GB40702G503500**	**SW Hants Barton Group**	**Low / Low**	**1 (minor localised effects)**	Hydrogeological assessment of deep confined aquifer to prove no connection to the upper aquifer. Hydrological assessment of the impacts of temporary dewatering abstraction on flow in the watercourses and groundwater levels at Groundwater Dependent Terrestrial Ecosystems (GWDTE). Further information about option.	Dewatering to be discharged to local watercourse to help maintain flow (if water quality not of concern). Ensure any new boreholes are located as far away from GWDTE as possible.	**No**	**No**	**No**	Assumes target aquifer for abstraction is deep confined and that there is no connection with the surface water or upper aquifer.

Table 3.2: *BNW6: Longham Aquifer Recharge* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Bournemouth	**GB107042011300**	**Avon Water**	**Low / Low**	**1 (minor localised effects)**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further assessment of abstraction conditions and volume to increase confidence in impacts associated with additional abstracted volume. Further investigation into other biology within river (fish, invertebrates etc.) would improve confidence. Abstraction increase likely to have greater impact on these than on macrophytes. Further information about option and operation of intake.	Adjustment of abstraction conditions could be considered to reduce impact on flow downstream where appropriate. Check appropriate fish and eel screening is in place.	**No**	**No**	**No**	Assumes that ASR into deep confined chalk aquifer. Chalk is not a WFD waterbody; however, due to the nature of the ASR scheme, there are potential impacts on chemistry that should be considered when evaluating this option.

Table 3.3: *BNW11: Christchurch WTW to Longham Lakes* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Bournemouth	**GB40802G805800**	**Lower Dorset Stour and Lower Hampshire Avon**	**Low / Low**	**1 (minor localised effects)**	Detailed hydrogeological assessment of the impacts of below ground structures on water balance and flows to surface water courses and GWDTE. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Dewatering discharge to surface water courses to maintain flow. Clay Stanks or similar to be used in pipeline trench to ensure trench does not form a preferential flow path for groundwater.	**No**	**No**	**No**	None.

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Bournemouth	**GB520804315900**	**Christchurch Harbour**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydroecological assessment of the impacts of cessation of discharge on flow and biology. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, where available.	N/A	**No**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of Clockhouse stream is maintained post discharge cessation if necessary. Cain BioEngineering have previously installed erosion control measures along the stream, which has been beneficial in restoring a more natural meander. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.4: COL2: *Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108049000190**	**Lower River Camel**	**Low / Low**	**3 (adverse effect – significant risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional hydroecological assessment of implications on flow, water quality and biology of Camel River as a result of new large abstraction. Further information about option, including details on abstraction conditions.	Fish and eel screening at intake from new River Camel intake. Abstraction conditions to be set in order to minimise changes to hydrological regime. Compensation flow could be required.	**Possible**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Camel is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.
Colliford	**GB40802G800300**	**North Cornwall**	**Low / Low**	**1 (minor localised effects)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional hydrogeological assessment of the potential implications on groundwater balance and flow of North Cornwall as a result of below ground activity. Further information about option, including details on abstraction conditions.	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered. Any shafts to be sealed to ensure minimal groundwater egress after construction.	**No**	**No**	**No**	None.

Table 3.5: COL3: *Colliford Reservoir Compensation Flow Abstraction* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108048001420**	**Lower River Fowey**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological & hydroecology assessment of the impacts of 2.3Ml/d abstraction from watercourse on flow, hydromorphology, water quality and biology. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions, Hands Off Flow (HOF) etc.	N/A	**Possible**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Fowey is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.6: COL4: *Siblyback Lake Compensation Flow Abstraction* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108048001420**	**Lower River Fowey**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological and hydroecological assessment of the impacts of 1.5Ml/d abstraction from watercourse on flow, hydromorphology, water quality and biology Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	N/A	**Possible**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Fowey is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.7: COL5: *Increase Wendron annual licence and de-couple from Stithians* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108048001171**	**Upper River Cober**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological and hydroecological assessment of the impacts of 1-2Ml/d abstraction from watercourse on flow, hydromorphology, water quality and biology Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	N/A	**Possible**	**Possible**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Cober is maintained post anticipated reduced flow. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.8: COL6: *River Hayle abstraction* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108049000380**	**Hayle**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological and hydroecological assessment of the impacts of abstraction from watercourse on flow, hydromorphology, water quality and biology Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	Fish and eel screening at modified intake.	**Possible**	**Possible**	**No**	None.
Colliford	**GB530804906700**	**Hayle**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological and hydroecological assessment of the impacts of abstraction from watercourse on flow, hydromorphology, water quality and biology Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	N/A	**Possible**	**Possible**	**No**	None.

Table 3.9: COL9: *Leswidden Pool* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB610807680001**	**Lands End to Trevose Head**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed hydroecology assessment of the impacts of abstraction on flow, hydromorphology, water quality and biology within Lewisdden Pool. Further information about option, including details on abstraction conditions (HOF etc.).	Operation of abstraction should be agreed to minimise any potential impact on biology from changes in water level or quality.	**Possible**	**No**	**No**	None.
Colliford	**GB108048002090**	**Newlyn River**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed water quality assessment undertaken to establish quality of source water (Lewisdden Pool) and quality difference. Detailed hydroecology assessment of the impacts of new discharge on flow, water quality and biology.	Appropriate treatment of water prior to discharge into Sancreed Stream if deemed necessary. Explore river restoration / channel adjustment opportunities to allow Sancreed Stream to withstand increased flow volume and velocity if required upon further assessment.	**Uncertain**	**No**	**Possible**	Upcoming PR24 guidance encourages the usage of nature-based solutions, becoming increasingly BAU practice. River restoration, as a type of NbS could address flow concerns within the Sancreed Stream and contribute environmental and social value in line with PR24 if implemented.

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
					Further information about option, including details on discharge conditions (volume discharged etc.).					
Colliford	**GB30846547**	**Drift Reservoir**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Detailed water quality assessment undertaken to establish quality of source water (Lewisdden Pool) and quality difference. Detailed hydroecology assessment of the impacts of new discharge on flow, water quality and biology. Further information about option, including details on discharge conditions (volume discharged etc.).	Appropriate treatment of source water prior to discharge into Sancreed Stream.	**Possible**	**Possible**	**No**	None.

Table 3.10: *COL11: Hawk's Tor Pit* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB40802G806600**	**Looe and Fowey**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of below ground structures on water balance and flows to surface water courses and GWDTE. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Dewatering discharge to surface water courses to maintain flow. Clay Stanks or similar to be used in pipeline trench to ensure trench does not form a preferential flow path for groundwater	**Possible**	**Possible**	**No**	None.

Table 3.11: *COL12: Stannon daily abstraction increase* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108049007040**	**Stannon Stream**	**Low / Medium**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological assessment of the impacts of new abstraction and associated support facility. Carry out additional assessment of the potential implications on flow upstream of Stannon Stream as a result of new support facility. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Changes to abstraction patterns where appropriate. Ensure areas upstream of new stream support are also supported where appropriate.	**Possible**	**Possible**	**No**	None.
Colliford	**GB40802G800300**	**North Cornwall**	**Low / Medium**	**2 (adverse effect – risk of deterioration)**	Detailed groundwater investigation to better understand groundwater interactions around the option. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Ensure that surface water bodies (such as Stannon Stream) which depend on the groundwater body has appropriate level of flow supplementation. Further investigation into exact impact of abstraction on groundwater levels.	**Possible**	**Possible**	**No**	None.

Table 3.12: *COL15: Restormel WTW* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108048001420**	**Lower River Fowey**	**Low / Low**	**1 (minor localised effects)**	Detailed hydrological assessment of the impacts on watercourse of daily peak increase from 100Ml/d to 110Ml/d on flow, hydromorphology and water quality / concentration of key physicochemical parameters. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	Continuation of appropriate compensation flow from Colliford Reservoir and Siblyback Lake to supply River Fowey with enough flow volume and velocity for new abstraction daily peak increase. Ensure abstraction conditions are still set in order to minimise changes to hydrological regime.	No	No	No	Explore river restoration measures to address flow concerns in stream and ensure health of River Fowey is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.13: *COL18: Porth / Rialton* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108049000000**	**Porth Stream**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydroecological assessment of the impacts of 6Ml/d abstraction from watercourse on flow, hydromorphology and water quality / concentration of key physicochemical parameters as well as biology. Detailed review of baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Fish and eel screening at new intake. Minimisation of changes to hydrological regime and water quality through adjustment of abstraction conditions if appropriate.	**Possible**	**Possible**	**No**	None.

Table 3.14: *COL19: Boswyn stream / Cargenwen Reservoir / Carwynnen stream* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108049000560**	**Roseworthy Stream**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken (e.g. macrophyte and fish surveys). Detailed hydroecological assessment of the impacts of abstraction on flow, water quality / concentration of key physicochemical parameters and therefore no biology. Review of cycle 3 RBMP baseline data (2019), and update of assessment as necessary. Further information about option.	Inclusion of appropriate fish/eel screens on intake structures. Ensure no contamination of waterbody during construction of new pumping station and WwTW Abstraction conditions to be set to minimise changes to hydrological regime.	**Possible**	**Possible**	**No**	None.
Colliford	**GB30846509**	**Cargenwyn Reservoir**	**Low / Low**	**1 (minor localised effects)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken (e.g. macrophyte and fish surveys). Review of EA mitigation measures assessment and any HMWBMM. Further information about option.	N/A	**Possible**	**Possible**	**No**	None.

Table 3.15: *COL20: River Fal new abstraction* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Colliford	**GB108048001270**	**Lower River Fal**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydroecological assessment of the impacts of up to 25Ml/d abstraction from watercourse on flow, hydromorphology, water quality / concentration of key physicochemical parameters, especially TP / Phosphate and biology. Detailed review of baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Fish and eel screening at all new intakes. Minimisation of changes to hydrological regime through adjustment of abstraction conditions.	**Possible**	**Possible**	**No**	Currently assumes that abstraction would operate across the whole flow range. In reality it seems likely that a HOF would be applied to the source.

Table 3.16: *ROA2: River Erme* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB108046005200**	**Erme**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken (e.g. macrophyte and fish surveys). Detailed hydrological/hydroecology assessment of the impacts of abstraction on flow, water quality / concentration of key physicochemical parameters and biology. Further information about option.	Fish and eel screening at new intake.	**Possible**	**Possible**	**No**	None.

Table 3.17: *ROA3: River Yealm* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB108047004010**	**Lower River Yealm**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken (e.g. macrophyte and fish surveys). Detailed hydrological and hydroecological assessment of the impacts of abstraction on flow, water quality / concentration of key physicochemical parameters and biology. Further information about option.	Fish and eel screening at new intake.	**Possible**	**Possible**	**No**	None.

Table 3.18: *ROA4: Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB108047007860**	**Lower River Tamar**	**Medium / Medium**	**2 (adverse effect – risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken (e.g. macrophyte and fish surveys). Detailed hydrological and hydroecological assessment of the impacts of abstraction on flow, water quality / concentration of key physicochemical parameters and biology. Further information about option.	Fish and eel screening at new intake.	**Possible**	**Possible**	**No**	None.

Table 3.19: *ROA6: Upper Tamar Lake increasing annual licence* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB30845277**	**Upper Tamar Lake**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological / hydroecological assessment of the impacts of abstraction increase on water quality and biology Further information about option.	N/A	**Possible**	**Possible**	**No**	None.

Table 3.20: *ROA7: Expansion of Northcombe WTW to 60Ml/d* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB30847000**	**Roadford Lake**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Hydroecology investigation into impact of changes in water level in reservoir on biology. Further information about option and operation of intake.	Fish and eel screening at new intake. Further investigation into impact on Environmental Flow Indicator (EFI) flow regime by option.	**Possible**	**No**	**No**	Assumes changes in abstraction from reservoir to provide additional flow to upgraded WTW.

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB108047008020**	**Wolf**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option and operation of intake.	Ensure appropriate compensation flow is discharged into River Wolf to maintain river health and normal flow.	**Possible**	**No**	**No**	Assumes changes in abstraction from reservoir to provide additional flow to upgraded WTW.

Table 3.21: *ROA12: Slade and Horedown WTW (GAC)* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB30843764**	**Slade Lower Reservoir**	**Low /Low**	**3 (adverse effect – significant risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken. Detailed hydrological assessment of the impacts of abstraction on water level, sedimentation, water quality and biology. Ensure no contamination of downstream when raising reservoir by entrainment of contaminated bottom sediment. Assessments of sediment quality should be undertaken to ensure no hazardous chemicals are re-suspended during reservoir modification. Further information about option.	N/A	**Possible**	**Possible**	**No**	None.

Table 3.22: *ROA14: Raise Avon Dam* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB30846291**	**Avon Dam Reservoir**	**Low /Low**	**3 (adverse effect – significant risk of deterioration)**	Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken. Detailed hydrological assessment of the impacts of abstraction on water level, sedimentation, water quality and biology. Ensure no contamination of downstream waterbody when raising reservoir by entrainment of contaminated bottom sediment. Assessments of sediment quality should be undertaken to ensure no hazardous chemicals are re-suspended during reservoir modification. Further information about option.	N/A	**Possible**	**Possible**	**No**	None.

Table 3.23: *ROA15: Gatherley phase 2* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB108047007731**	**Lower River Lyd**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological assessment of the impacts of 40Ml/d abstraction from watercourse on flow, hydromorphology and water quality / concentration of key physicochemical parameters. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including consideration to HOF and abstraction profile across different conditions (wet, average, dry or drought). Further investigation of hydromorphology and EFI flow regime to be undertaken before option taken forward.	Potential adjustment of licence / abstraction conditions or HOF to minimise impact on biology and hydrological regime.	**Possible**	**Possible**	**No**	None.

Table 3.24: *ROA16: Littlehempston WTW* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Roadford	**GB510804605900**	**DART**	**Low / Low**	**2 (adverse effect – risk of deterioration)**	Hydrological investigation to understand the impact of increased surface water abstraction on flow, water quality and biology. Update assessment based on 2019 Cycle 3 RBMP data.	N/A	**Possible**	**Possible**	**No**	None.

Table 3.25: *WIM1: Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB108045009060**	**Exe (Culm to Creedy)**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Hydrological and hydroecological assessment of the impacts of 9Ml/d abstraction from watercourse on flow, hydromorphology, water quality and biology Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc).	N/A	**Possible**	**Possible**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Exe is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.26: *WIM2: Sidford borehole commissioning* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB40802G802800**	**Sidmouth-Honiton, Mercia Mudstone**	**Low /Low**	**1 (minor localised effects**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Ensure Salt Hill Stream receives appropriate level of compensation flow if necessary. SWW to confirm current / historical usage and review previous assessments to confirm if borehole can operate sustainably within new licence conditions of this option.	No	No	No	Explore river restoration measures to address possible flow concerns in stream and ensure health of River Sid is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.27: *WIM4: Wilmington springs annual abstraction increase* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB40801G802400**	**East Devon - Greensand**	**Low /Low**	**1 (minor localised effects**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on groundwater balance and flow of East Devon Greensands as a result of increased groundwater abstraction to licence limit. Further information about option, including details on abstraction conditions.	If necessary consider need for compensation flow in Umborne River.	**No**	**No**	**No**	None.
Wimbleball	**GB108045008880**	**Umborne Brook**	**Low / Low**	**1 (minor localised effects**	Detailed hydrological assessment of the impacts of increased abstraction on Umborne Stream. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on flow of Umborne stream as a result of reduced water from springs / reduced baseflow supplying it. Further information about option, including details on abstraction conditions.	If necessary consider need for compensation flow in Umborne River.	**No**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of Umborne stream is maintained post anticipated reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.28: *WIM5: Indirect potable reuse - stream support for Dotton WTW* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB108045009160**	**Sid**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrological assessment of the impacts of cessation of discharge. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Carry out additional assessment of the potential implications on flow of Sid River as a result of seasonal cessation of discharge. Further information about option, where available.	N/A	**Possible**	**No**	**No**	Explore river restoration measures to address flow concerns in stream and ensure health of River Sid is maintained post anticipated seasonal reduced flow if necessary. Could be an option to consider particularly as PR24 methodology encourages further implementation of NbS like river restoration and integrating said solutions as BAU practice.

Table 3.29: *WIM7: Increase Pynes to licence limit 66.46Ml/d* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB108045009070**	**Lower Creedy**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydroecological assessment of the impacts of 6.5Ml/d increase in abstraction from watercourse on flow, hydromorphology and water quality / concentration of key physicochemical parameters, especially TP / Phosphate due to Reasons for Not Achieving Good. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Fish and eel screening at new intake. Supplementation of flow via Wimbleball reservoir via River Haddeo if needed to maintain natural river flow. Further investigation into impact on EFI flow regime by option.	**Possible**	**Possible**	**No**	None.

Table 3.30: *WIM8: Brampford Speke borehole* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB40801G801700**	**Permian Aquifers in Central Devon**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	N/A	**Possible**	**No**	**No**	None.

Table 3.31: *WIM9: Stoke Canon borehole* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Wimbleball	**GB40801G801700**	**Permian Aquifers in Central Devon**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	N/A	**Possible**	**No**	**No**	None.

Table 3.32: *ISB4: Bryher - Increase Existing Desalination Plant Capacity* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Isles of Scilly	**GB620807080000**	**Scilly Isles**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrodynamic assessment of the impacts of 0.1-0.2Ml/d abstraction on water quality, biology and concentration of key physicochemical parameters within the coastal environment. Further information about option operation.	Abstraction conditions to be set to minimise changes to hydrological regime that could cause deterioration of biological and physicochemical WFD elements. Consideration to dilution of waste stream prior to discharge if further assessment deems necessary.	**Possible**	**No**	**No**	A precautionary approach has been followed throughout because of the uncertainty associated with this project (lack of scientific study, esp. modelling) and scheme detail. Construction impacts should be mitigable through mechanisms such as sediment management, as part of a Construction Environment Management Plan (CEMP).
Isles of Scilly	**GB40802G081200**	**Isles of Scilly (GW)**	**Low /Low**	**1 (minor localised effects)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Further information about option, including details on abstraction conditions.	Abstraction rate should be set at a sustainable level at this site, to ensure no adverse saline intrusion.	**No**	**No**	**No**	None.

Table 3.33: *ISMY1: St. Mary's new borehole (location 1)* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Isles of Scilly	**GB40802G081200**	**Isles of Scilly (GW)**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance, flows to surface water courses and saline intrusion. Further information about option, including details on abstraction conditions.	Abstraction rate should be set at a sustainable level at this site, to ensure no adverse saline intrusion.	**No**	**No**	**No**	None.

Table 3.34: *ISMY2: St. Mary's new borehole (location 2)* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Isles of Scilly	**GB40802G081200**	**Isles of Scilly (GW)**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance, flows to surface water courses and saline intrusion. Further information about option, including details on abstraction conditions.	Abstraction rate should be set at a sustainable level at this site, to ensure no adverse saline intrusion.	**No**	**No**	**No**	

Table 3.35: *ISMY4: St. Mary's - Increase Existing Desalination Plant Capacity* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Isles of Scilly	**GB620807080000**	**Scilly Isles**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrodynamic assessment of the impacts of 0.1-0.25Ml/d abstraction on water quality, biology and concentration of key physicochemical parameters within the coastal environment. Further information about option operation.	Abstraction conditions to be set to minimise changes to hydrological regime that could cause deterioration of biological and physicochemical WFD elements. Consideration to dilution of waste stream prior to discharge if further assessment deems necessary.	**Possible**	**No**	**No**	A precautionary approach has been followed throughout because of the uncertainty associated with this project (lack of scientific study, esp. modelling) and scheme detail Construction impacts should be mitigable through mechanisms such as sediment management, as part of a Construction Environment Management Plan (CEMP)
Isles of Scilly	**GB40802G081200**	**Isles of Scilly (GW)**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance, flows to surface water courses and saline intrusion Further information about option, including details on abstraction conditions.	Abstraction rate should be set at a sustainable level at this site, to ensure no adverse saline intrusion.	**Possible**	**No**	**No**	None.

Table 3.36: *IST1: Tresco new borehole* Level 2 WFD summary

WRZ	Waterbody ID	Waterbody name	Confidence in WFD data and option design	Maximum Level 2 impact score	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
Isles of Scilly	**GB40802G081200**	**Isles of Scilly (GW)**	**Low /Low**	**2 (adverse effect – risk of deterioration)**	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance, flows to surface water courses and saline intrusion Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions.	Ensure Lakes receives enough compensation volume if risk assumed significant enough to alter volume within then (assumed this is not essential / impact will be very minimal due to size of abstraction). Abstraction rate should be set at a sustainable level at this site, to ensure no adverse saline intrusion.	**No**	**No**	**No**	None.

4 In combination effects

4.1 Introduction

For the assessment of WFD, in combination effects considers the additional impact on a waterbody caused by multiple options operating within it. The three SWW plans that have been assessed for in combination effects are as follows:

- Best Value Plan
- Least Cost Plan
- Worst Case Plan

4.2 Best Value Plan

4.2.1 Options selected

In combination effects have been assessed for options which fall under the Best Value Plan (BVP) laid out by SWW. The options selected as part of the BVP for the SWW WRMP24 are presented in Table 4.1.

Table 4.1: SWW WRMP24 BVP options

Option ID	Option title	Brief description
BNW1	Borehole development, existing borehole remedial works	Borehole development, existing borehole remedial works. Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole development, existing borehole works. Third borehole to be drilled at site - new licence = +1Ml/d
BNW3	Wimborne/Longham conjunctive use	Conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW6	Longham Aquifer Recharge	Pumping and storage of water into ground during winter months for subsequent abstraction.
BNW7	Mendips Quarry - 30Ml/d scheme option – Raw water transfer and augmentation of the River Stour	Raw water transfer (30Ml/d) and augmentation of the River Stour. This is a Strategic Resource option (SRO) and as such, has been assessed separately. This option is therefore not presented in this report but the findings are included in the in-combination effects assessment
BNW8	Poole Harbour FE reuse	Poole Harbour final effluent reuse. This is a Strategic Resource option (SRO) and as such, has been assessed separately. This option is therefore not presented in this report but the findings are included in the in-combination effects assessment
BNW11	Christchurch WWTW IPR 2 Transfer to Longham Lakes	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.
COL2	Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction.	New river intake and pumping station for new abstraction from River Camel. Raw water then pumped to Colliford Reservoir via existing main.
COL9	Lewisdden Pool	Transfer of former quarry water to Drift Reservoir via Sancreed stream.
COL11	Hawk's Tor Pit	Development of disused mineral extraction workings at Hawk's Tor Pit. Transfer to Colliford Reservoir.
COL15	Restormel WTW	Increase Restormel WTW capacity to 110Ml/d. This option would take Restormel WTW up to its maximum licensed capacity and enable more effective use to be made of the Colliford/River Fowey resources system.
ROA7	Expansion of Northcombe WTW to 60Ml/d.	Treatment works to be able to deliver a minimum of 60Ml/d. Additional 10Ml/d pumping capacity at Roadford reservoir.
ROA10	Avon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity (7-5Ml/d).

Option ID	Option title	Brief description
ROA15	Gatherley Phase 2	Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125Ml/d to be transferred to Roadford Reservoir.
ROA16	Littlehempston WTW	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs.
WIM2	Sidford borehole commissioning	Equip and make operational existing borehole. New groundwater source treatment system.
WIM5	Indirect potable reuse - stream support for Dotton WTW.	Pump treated effluent from Sidmouth WWTW directly to the River Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods.
WIM7	Increase Pynes to licence limit 66.46Ml/d.	Upgrade WTW to treat an additional 6.5Ml/d. with distribution network improvements.
WIM8	Brampford Speke borehole	Increase in existing licence to permit discharge to the River Exe for abstraction further downstream.
WIM9	Stoke Canon borehole	Increase in existing licence to permit discharge to the River Exe for abstraction further downstream.

4.2.2 In combination effects assessment

Table 4.2 identifies waterbodies which are impacted by more than one of the BVP options and/or planning projects, but where the high level in combination effect assessment has shown that it is unlikely that the multiple BVP options and planning projects will lead to a risk of WFD deterioration at the waterbody scale. Additional assessment will be required once the Level 2 assessments have been completed.

Table 4.2: BVP Waterbodies where in combination effects are unlikely to a lead to an increased risk of WFD deterioration.

Waterbody ID and name	Options	Comments
GB108045015050 Exe (Barle to Culm)	• WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Options WIM8 and WIM9 feature a discharge into the waterbody that is the same or higher WFD status. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected. **Remains as minor localised effect,** no further assessment required.
GB40802G806600 Looe and Fowey (groundwater)	• COL2: Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction • COL11: Hawk's Tor Pit • COL15: Restormel WTW	COL2 features below ground structures and installation of new shallow pipelines. Option COL15 features modification of an existing pumping station and the installation of shallow pipelines. COL11 involves a new groundwater abstraction licence, but this abstraction is relatively small at the scale of the groundwater body. It is anticipated that there will not be an in-combination effect to this waterbody despite overlapping construction periods (2025-2026 and 2026-2027) outside of what is already described in the COL11 assessment, since the construction works will be minor and temporary. **Remains as amber adverse effect (as per COL11)**, no further assessment required.
GB40802G806700 Tamar (groundwater)	• ROA7: Expansion of Northcombe WTW to 60Ml/d. • ROA15: Gatherley Phase 2	Both options involve the installation of pipelines and ROA7 also involves the modification of an existing WTW/ pumping station, which is unlikely to have a detrimental impact on the groundwater body. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required
GB40802G800700 Teign, Avon, Dart and Erme (groundwater)	• ROA10: Reduce Avon minimum capacities • ROA16: Littlehempston WTW	Option ROA10 involves the potential below ground implications of WTW maintenance. Option ROA16 involves below ground structures within this water body. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required
GB30847000 Roadford Lake	• ROA7: Expansion of Northcombe WTW to 60Ml/d	ROA7 involves the use of an existing surface water abstraction licence outside of recent actual abstraction conditions. ROA15 involves a new water discharge of

	• ROA15: Gatherley Phase 2	equal water quality to that of the lake. This discharge is of larger volume than the proposed increase in abstraction. In combination, following review of the Level 2 assessment undertaken for both options, it is anticipated that there will be no increased risk of deterioration, over that already identified for the ROA7 assessment. **Remains as amber adverse effect**, no further assessment required.
GB108047008020 Wolf	• ROA7: Expansion of Northcombe WTW to 60Ml/d • ROA15: Gatherley Phase 2	ROA7 involves the use of an existing surface water abstraction licence outside of recent actual abstraction conditions and the modification of a WTW in this water body. ROA15 involves the installation of below ground structures and pipelines within this water body. In combination, it is anticipated that there will be no additional risk of deterioration over that already assessed (**amber adverse risk of deterioration**) in the ROA7 assessment. Following suggested mitigation, risk could be lowered to minor and localised effect, but this is subject to further assessment.
GB108045009160 Sid	• WIM2: Sidford borehole commissioning • WIM5: Indirect potable reuse - stream support for Dotton WTW	WIM2 features new pipelines and below ground structures associated with the modification of an existing WTW. WIM5 features the cessation of an existing discharge leading to a reduction in river flow. It is anticipated that there is no additional risk of deterioration due to the combination of options, over that already assessed in the WIM5 assessment. **Remains as amber adverse effect**, no further assessment required.
GB40802G802800 Sidmouth-Honinton, Mercia Mudstone (GW)	• WIM2: Sidford borehole commissioning • WIM5: Indirect potable reuse - stream support for Dotton WTW	WIM5 features the installation of new underground pipelines in this water body. WIM2 features the use of an existing ground water abstraction licence outside of recent actual rates as well as the laying of new underground pipe and the modification of an existing WTW. It is anticipated that there is no additional risk of deterioration due to the combination of options, over that already assessed in the WIM2 assessment. **Remains as amber adverse effect**, no further assessment required.

Table 4.3 below, identifies waterbodies which have been assessed as having the potential for in combination effects from multiple BVP options and other major projects leading to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.3: BVP Waterbodies where in combination effects could lead to WFD deterioration risk

Waterbody ID and name	Options	Comments
GB108048001420 Lower River Fowey	• COL2: Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction • COL15: Restormel WTW	COL2 features construction of underground pipelines and modification of an existing WTW. Option COL15 features the construction of underground pipelines and a change in abstraction licence which is an increase in recent actual abstraction rates. The combination of these effects could lead to significant changes in flow and water quality which could also have implications for biological status elements and thus increase risk of WFD deterioration. COL15 will be bought forward 2025-2026 and COL2, 2026-2027, leading to potential overlap. Potential for increase in effect due to the combination of these options. Further assessment is required.
GB108043011040 Stour (Lower)	• BNW6: Longham Aquifer Recharge • BNW11: Christchurch WWTW IPR 2Transfer to Longham Lakes • BNW3: Wimborne transfer to Longham – licence change	Option BNW6 is associated with the drilling of new abstraction boreholes and refurbishment of existing boreholes which is unlikely to have a significant impact at the waterbody scale. Option BNW11 features a new discharge of treated effluent into the waterbody. Option BNW3 features the continued utilisation of an abstraction within this waterbody within licence conditions and recent actual conditions. The combination of the effects from these options could lead to significant changes in flow and water

		quality which could exacerbate impacts on biology and thus increase risk of WFD deterioration. BNW6 and BNW11 have overlapping proposed construction dates (2030-2031 and 2031-2032 respectively) while BNW3 Is proposed to be bought forward 12 years later from 2044-2045. The in-combination assessment of these options is anticipated to lead to an **amber adverse effect** on this waterbody. Further assessment is required to confirm this effect.
GB40801G801700 Permian Aquifers in Central Devon (groundwater)	• WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Options WIM8 and WIM9 include an increase in abstraction outside of recent actual abstraction rates. Combination of these activities could lead to changes in groundwater levels and flow and thus increase risk of WFD deterioration. Both options will be bought forward at the same time (2025-2026) and as such the in-combination assessment for this waterbody is anticipated to lead to a potential **amber adverse effect**. Further assessment is required to confirm this effect.
GB40802G805800 Lower Dorset Stour and Lower Hampshire Avon (groundwater)	• BNW6: Longham Aquifer Recharge • BNW11: Christchurch WWTW IPR 2Transfer to Longham Lakes	Both of these options involve construction and operation of pipelines within this groundwater body. BNW6 will pass within 500m of two GWDTE. As the construction periods overlap: 2030-2031 and 2031-2032 respectively, the in-combination assessment for this waterbody is anticipated to lead to a potential **amber adverse effect**. Further assessment is required to confirm this effect.

4.3 Least Cost Plan

4.3.1 Options selected

In combination effects have been assessed for options which fall under the Least Cost Plan (LCP) laid out by SWW. The options selected as part of the LCP for the SWW WRMP24 are presented in Table 4.4.

Table 4.4: SWW WRMP24 LCP options

Option ID	Option title	Brief description
BNW1	Borehole development, existing borehole remedial works	Borehole development, existing borehole remedial works. Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole development, existing borehole works. Third borehole to be drilled at site - new licence = +1Ml/d
BNW3	Wimborne transfer to Longham – licence change	Conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW6	Longham Aquifer Recharge	Pumping and storage of water into ground during winter months for subsequent abstraction.
BNW11	Christchurch WWTW IPR 2Transfer to Longham Lakes	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.
COL3	Abstraction of Colliford Reservoir compensation flow when making supply releases	Abstraction of Colliford Reservoir compensation flow when making supply releases. No infrastructure changes required.
COL4	Abstraction of Siblyback Reservoir compensation flow when making supply releases	Abstraction of Siblyback Reservoir compensation flow when making supply releases. No infrastructure changes required.
COL5	Increase Wendron annual licence and de-couple from Stithians	Increase Wendron annual licence and de-couple from Stithians. No infrastructure changes required.
ROA4	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases No infrastructure changes required.
ROA6	Upper Tamar Lake increasing annual licence	Increasing Upper Tamar Lake annual licensed volume. Increase daily abstraction limit, upgrades to WTW and distribution network.
ROA10	Avon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity (7-5Ml/d).
WIM1	Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases.	Abstraction of Wimbleball Reservoir compensation flow when making supply releases. No infrastructure changes required.
WIM4	Wilmington springs annual abstraction increase	Wilmington springs annual abstraction increase. No infrastructure changes required.

Option ID	Option title	Brief description
WIM8	Brampford Speke borehole	
WIM9	Stoke Canon borehole.	Re-introduction of North Exeter groundwater source east of the Exe.

At this time one of the options have not been assessed, and this in combination assessment will need to be updated, in November 2022.

4.3.2 In combination effects assessment

Table 4.5 below, identifies waterbodies which are impacted by more than one of the LCP options and/or planning projects, but where the high level in combination effect assessment has shown that it is unlikely that the multiple LCP options and planning projects will lead to a risk of WFD deterioration at the waterbody scale. Additional assessment will be required once the Level 2 assessments have been completed.

Table 4.5: LCP Waterbodies where in combination effects are unlikely to a lead to an increased risk of WFD deterioration.

Waterbody ID and name	Options	Comments
GB108045015050 Exe (Barle to Culm)	• WIM1: Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases. • WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Option WIM1 features the modification of an existing WWTW on the water body. Options WIM8 and WIM9 feature a discharge into the waterbody that is the same or higher WFD status. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB40802G806600 Looe and Fowey (groundwater)	• COL3: Abstraction of Colliford Reservoir compensation flow when making supply releases • COL4: Abstraction of Siblyback Reservoir compensation flow when making supply releases	Options COL3 and COL4 will not produce any impact on the groundwater body as no modifications to the groundwater body have been planned. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB40802G806700 Tamar (groundwater)	• ROA4: Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases • ROA6: Upper Tamar Lake increasing annual licence	Each option involves the installation of pipelines and modification of an existing WTW/pumping station, which is unlikely to have a detrimental impact on the ground waterbody. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.

Table 4.6 below, identifies waterbodies which have been assessed as having the potential for in combination effects from multiple LCP options and other major projects leading to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.6: LCP Waterbodies where in combination effects could lead to WFD deterioration risk

Waterbody ID	Options	Comments
GB108048001420 Lower River Fowey	• COL3: Abstraction of Colliford Reservoir compensation flow when making supply releases • COL4: Abstraction of Siblyback Reservoir compensation flow when making supply releases	Potential significant adverse effects associated with new abstractions outlined in options COL3 and COL4 in this waterbody may impact on GWDTE. The combination of these effects could lead to significant changes in flow and water quality which could exacerbate impacts on biology and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB108043011040 Stour (Lower)	• BNW6: Longham Aquifer Recharge • BNW11: Christchurch WWTW IPR 2Transfer to Longham Lakes	Option BNW6 is associated with the drilling of new abstraction boreholes and refurbishment of existing boreholes which is unlikely to have a significant impact at the waterbody scale. Option BNW11 features a new discharge of treated effluent into the waterbody. Option

	• BNW3: Wimborne transfer to Longham – licence change	BNW3 features the continued utilisation of an abstraction within this waterbody within licence conditions and recent actual conditions. The combination of the effects from these options could lead to significant changes in flow and water quality which could exacerbate impacts on biology and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB40801G801700 Permian Aquifers in Central Devon (groundwater)	• WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Options WIM8 and WIM9 include an increase in abstraction outside of recent actual abstraction rates. Combination of these activities could lead to changes in groundwater levels and flow and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB40802G805800 Lower Dorset Stour and Lower Hampshire Avon (groundwater)	• BNW6: Longham Aquifer Recharge • BNW11: Christchurch WWTW IPR 2Transfer to Longham Lakes	Both of these options involve construction and operation of pipelines within this groundwater body. BNW6 will pass within 500m of two GWDTE. While the combination of these options is unlikely to lead an in-combination effect, further analysis of the Level 2 option delivery dates is required to confirm this.

4.4 Worst Case Plan

4.4.1 Options selected

In combination effects have been assessed for options which fall under the Worst Case Plan (WCP) laid out by SWW. The options selected as part of the WCP for the SWW WRMP24 are presented in Table 4.7.

Table 4.7: SWW WRMP24 WCP options

Option ID	Option title	Brief description
BNW1	Borehole development, existing borehole remedial works	Borehole development, existing borehole remedial works. Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole development, existing borehole works. Third borehole to be drilled at site - new licence = +1Ml/d
BNW3	Wimborne transfer to Longham – licence change	Conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW6	Longham Aquifer Recharge	Pumping and storage of water into ground during winter months for subsequent abstraction.
BNW8	Poole Harbour FE reuse	SRO, assessed separately, outcomes from assessment used in in-combination effects assessment.
BNW11	Christchurch WWTW IPR 2Transfer to Longham Lakes	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.
COL2	Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction.	New river intake and pumping station at Nanstallon to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15Ml/d). Raw water is then pumped to Colliford Reservoir via existing main.
COL3	Abstraction of Colliford Reservoir compensation flow when making supply releases	Abstraction of Colliford Reservoir compensation flow when making supply releases. No infrastructure changes required.
COL4	Abstraction of Siblyback Reservoir compensation flow when making supply releases	Abstraction of Siblyback Reservoir compensation flow when making supply releases. No infrastructure changes required.
COL5	Increase Wendron annual licence and de-couple from Stithians	Increase Wendron annual licence and de-couple from Stithians. No infrastructure changes required.
COL9	Leswidden Pool.	Transfer of former quarry water to Drift Reservoir via Sancreed stream
COL12	Stannon daily abstraction increase	Increase to the daily limit to the abstraction licence of 4Ml/d to 8Ml/d for up to three months in any one year. A stream support facility will be constructed discharging from the lake to the adjacent stream.
COL15	Restormel WTW	Increase Restormel WTW capacity to 110Ml/d.

Option ID	Option title	Brief description
		This option would take Restormel WTW up to its maximum licensed capacity and enable more effective use to be made of the Colliford/River Fowey resources system.
ROA2	River Erme	New intake point to be constructed on River Erme
ROA3	River Yealm	River Yealm re-location of surface water abstraction
ROA4	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases No infrastructure changes required.
ROA6	Upper Tamar Lake increasing annual licence.	Increasing Upper Tamar Lake annual licensed volume. Increase daily abstraction limit, upgrades to WTW and distribution network.
ROA7	Expansion of Northcombe WTW to 60Ml/d.	Treatment works to be able to deliver a minimum of 60Ml/d. Additional 10Ml/d pumping capacity at Roadford reservoir.
ROA8	Tottiford WTW - reduce WTW minimum capacity.	Tottiford WTW - reduce WTW minimum capacity.
ROA10	Avon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity (7-5Ml/d).
ROA15	Gatherley Phase 2.	Roadford Reservoir Winter Pump Storage - Gatherley Phase 2. Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125Ml/d to be transferred to Roadford Reservoir.
ROA16	Littlehempston WTW	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs
WIM1	Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases.	Abstraction of Wimbleball Reservoir compensation flow when making supply releases. No infrastructure changes required.
WIM4	Wilmington springs annual abstraction increase	Wilmington springs annual abstraction increase. No infrastructure changes required.
WIM5	Indirect potable reuse - stream support for Dotton WTW.	Pump treated effluent from Sidmouth WWTW directly to the River Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods.
WIM6	Increase Allers WTW capacity	Increase Allers WTW capacity. To cover East Devon and East coast in the winter, Dotton at a minimum in the winter. Will require an increase in the Bolham licence (winter) and a reduction in the Dotton licence (winter).
WIM8	Brampford Speke borehole	Re-introduction of North Exeter groundwater source west of the Exe
WIM9	Stoke Canon borehole	Re-introduction of North Exeter groundwater source east of the Exe.

At this time one of the options have not been assessed, and this in combination assessment will need to be updated, in November 2022.

4.4.2 In combination effects assessment

Table 4.8 below, identifies waterbodies which are impacted by more than one of the WCP options and/or planning projects, but where the high level in combination effect assessment has shown that it is unlikely that the multiple WCP options and planning projects will lead to a risk of WFD deterioration at the waterbody scale. Additional assessment will be required once the Level 2 assessments have been completed.

Table 4.8: WCP Waterbodies where in combination effects are unlikely to a risk of WFD deterioration.

Waterbody ID and name	Options	Comments
GB108045015050 Exe (Barle to Culm)	• WIM1: Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases. • WIM6: Increase Allers WTW capacity • WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Option WIM1 and WIM6 features the construction of or modification of a WTW which is unlikely to have a significant impact on the waterbody. Options WIM8 and WIM9 feature a discharge into the waterbody that is the same or higher WFD status. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.

GB40802G800100 West Cornwall (groundwater)	• COL5: Increase Wendron annual licence and de-couple from Stithians • COL9: Leswidden Pool	Option COL5 will feature the modification of an existing WTW which is unlikely to have any significant impact on the groundwater body. Option COL9 will feature underground pipelines which are not anticipated to impact on the groundwater body. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB40802G800700 Teign, Avon, Dart and Erme (groundwater)	• ROA2: River Erme • ROA8: Tottiford WTW - reduce WTW minimum capacity. • ROA10: Reduce Avon minimum capacities • ROA16: Littlehempston WTW	Option ROA2 and ROA8 feature the modification and maintenance of an existing pumping station, which in isolation is unlikely to have an impact on the groundwater body. Option ROA10 involves the installation of pipelines, which is not anticipated to impact on the groundwater body. ROA16 involves construction of below ground structures. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB40802G806600 Looe and Fowey (groundwater)	• COL2: Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction. • COL3: Abstraction of Colliford Reservoir compensation flow when making supply releases • COL4: Abstraction of Siblyback Reservoir compensation flow when making supply releases • COL15: Restormel WTW	Options COL2 and COL15 will feature the installation of underground pipelines which and the modification of existing pumping station, which is considered to have a minor impact on the groundwater body. Options COL3 and COL4 will not produce any impact on the groundwater body as no modifications to the waterbody have been planned. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB40802G806700 Tamar (groundwater)	• ROA3: River Yealm • ROA4: Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases • ROA6: Upper Tamar Lake increasing annual licence • ROA7: Expansion of Northcombe WTW to 60Ml/d. • ROA15: Gatherley Phase 2.	All options involve the installation of underground pipelines, which is unlikely to have a detrimental impact on the ground waterbody, with potential minor localised impacts. Options ROA6 and ROA7 will feature the modification of an existing pumping station which is unlikely to cause detrimental impacts on the groundwater body. In combination effects are unlikely to be significant at a waterbody scale so no increased risk of deterioration expected**. Remains as minor localised effect**, no further assessment required.
GB30847000 Roadford Lake	• ROA7: Expansion of Northcombe WTW to 60Ml/d • ROA15: Gatherley Phase 2	ROA7 involves the use of an existing surface water abstraction licence outside of recent actual abstraction conditions. ROA15 involves a new discharge of larger volume than proposed increased abstraction water that is of equal water quality to that of the lake. In combination, following review of the Level 2 assessment undertaken for both options, it is assumed that risk of deterioration will not increase outside of what is already assessed (moderate risk) in the ROA7 assessment. **Remains as amber adverse effect**, no further assessment required.
GB108047008020 Wolf	• ROA7: Expansion of Northcombe WTW to 60Ml/d • ROA15: Gatherley Phase 2	ROA7 involves the use of an existing surface water abstraction licence outside of recent actual abstraction conditions and the modification of a WTW in this water body. ROA15 involves the installation of below ground structures and pipelines within this water body. In combination, it is assumed that risk of deterioration will not increase outside of what is already assessed (**amber adverse risk of deterioration**) in the ROA7 assessment. Following suggested mitigation, risk could be lowered to minor and localised effect, but this is subject to further assessment.

Table 4.9 below, identifies waterbodies which have been assessed as having the potential for in combination effects from multiple WCP options and other major projects leading to a risk of WFD deterioration at a waterbody scale. Additional assessment will be required once the Level 2 WFD assessments have been completed.

Table 4.9: WCP Waterbodies where in combination effects could lead to WFD deterioration risk

Waterbody ID and name	Options	Comments
GB108048001420 Lower River Fowey	• COL3: Abstraction of Colliford Reservoir compensation flow when making supply releases • COL4: Abstraction of Siblyback Reservoir compensation flow when making supply releases • COL15: Restormel WTW	Potential significant adverse effects associated with new abstractions outlined in options COL3 and COL4 in this waterbody may impact on GWDTE. Moreover, the increase in abstraction above recent actual abstraction rates associated with option COL15 may impact the flow and river water quality in this groundwater body. The combination of these effects could lead to significant changes in flow and water quality which could exacerbate impacts on biology and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB108043011040 Stour (Lower)	• BNW6: Longham Aquifer Recharge • BNW11: Christchurch WWTW IPR 2Transfer to Longham Lakes • BNW3: Wimborne transfer to Longham – licence change • BNW8: Poole Harbour FE reuse	Option BNW6 is associated with the drilling of new abstraction boreholes and refurbishment of existing boreholes which is unlikely to have a significant impact at the waterbody scale. Option BNW11 features a new discharge of treated effluent into the waterbody. Option BNW3 features the continued utilisation of an abstraction within this waterbody within licence conditions and recent actual conditions. BNW8 option is associated with new abstraction and discharge activities within this waterbody. The combination of the effects from these options could lead to significant changes in flow and water quality which could also have implication for biological status elements and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB40801G801700 Permian Aquifers in Central Devon (groundwater)	• WIM8: Brampford Speke borehole • WIM9: Stoke Canon borehole	Options WIM8 and WIM9 include an increase in abstraction outside of recent actual abstraction rates. Combination of these activities could lead to changes in groundwater levels and flow and thus increase risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.
GB40802G800300 North Cornwall (groundwater)	• COL2: Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction. • COL12: Stannon daily abstraction increase	Potential significant adverse effects associated with increased abstraction in option COL12 in this waterbody may impact flow in dependent surface water bodies and GWDTE. Option COL2 may impact the water levels at a GWDTE. The combination of these effects could lead to significant changes in groundwater levels, in turn impacting on dependent surface water bodies and GWDTE and potentially increasing risk of WFD deterioration. Further information on dates options will be brought forward for construction and operation is required to confirm significance of in-combination effect.

5 Conclusions

5.1 Level 1 Summary

For the SWW WRMP, 60 options have been reviewed within the WFD assessment. An initial review scoped out the 15 demand options as not requiring a WFD assessment. In addition, two of these options are SROs and assessments are presented in the separate SRO reports. For one option there was insufficient information available at the time of writing to complete an assessment (BNW17). WFD Level 1 assessments have been carried out on the remaining 42 options.

The Level 1 WFD assessments indicated that 6 options are anticipated to have very low risks of being non-compliant with WFD objectives, and do not require further assessment (as shown in Table 5.1):

Table 5.1: SWW WRMP options which require no additional assessment

WRZ	Option ID	Option title
Bournemouth	BNW3	Wimborne transfer to Longham – licence change
Roadford	ROA8	Tottiford WTW - reduce WTW minimum capacity
Roadford	ROA10	Avon WTW - reduce WTW minimum capacity
Roadford	ROA11	Meldon WTW - reduce WTW minimum capacity
Roadford	ROA13	Duckaller and Vennbridge
Wimbleball	WIM6	Increase Allers WTW capacity

5.2 Level 2 Summary

WFD Level 2 assessments are required for the remaining 36 options. These options are set out in Table 5.2.

Table 5.2: SWW WRMP options which have been subject to Level 2 assessment

WRZ	Option ID	Option title
Bournemouth	BNW1	Borehole development, existing borehole remedial works
Bournemouth	BNW6	Longham Aquifer Recharge
Bournemouth	BNW11	Christchurch WTW to Longham Lakes
Colliford	COL2	Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction
Colliford	COL3	Colliford Reservoir Compensation Flow Abstraction
Colliford	COL4	Siblyback Lake Compensation Flow Abstraction
Colliford	COL5	Increase Wendron annual licence and de-couple from Stithians
Colliford	COL6	River Hayle abstraction
Colliford	COL9	Leswidden Pool
Colliford	COL11	Hawk's Tor Pit
Colliford	COL12	Stannon daily abstraction increase
Colliford	COL15	Restormel WTW
Colliford	COL18	Porth / Rialton
Colliford	COL19	Boswyn stream / Cargenwen Reservoir / Carwynnen stream

WRZ	Option ID	Option title
Colliford	COL20	River Fal new abstraction
Roadford	ROA2	River Erme
Roadford	ROA3	River Yealm
Roadford	ROA4	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases
Roadford	ROA6	Upper Tamar Lake increasing annual licence
Roadford	ROA7	Expansion of Northcombe WTW to 60Ml/d
Roadford	ROA12	Slade and Horedown WTW (GAC)
Roadford	ROA14	Raise Avon Dam
Roadford	ROA15	Gatherley Phase 2
Roadford	ROA16	Littlehempston WTW
Wimbleball	WIM1	Abstraction of Wimbleball Reservoir compensation flow at Northbridge when making supply releases
Wimbleball	WIM2	Sidford borehole commissioning
Wimbleball	WIM4	Wilmington springs annual abstraction increase
Wimbleball	WIM5	Indirect potable reuse - stream support for Dotton WTW
Wimbleball	WIM7	Increase Pynes to licence limit 66.46Ml/d
Wimbleball	WIM8	Brampford Speke borehole
Wimbleball	WIM9	Stoke Canon borehole
Isles of Scilly	ISB4	Bryher - Increase Existing Desalination Plant Capacity
Isles of Scilly	ISMY1	St. Mary's new borehole (location 1)
Isles of Scilly	ISMY2	St. Mary's new borehole (location 2)
Isles of Scilly	ISMY4	St. Mary's - Increase Existing Desalination Plant Capacity
Isles of Scilly	IST1	Tresco new borehole

The majority of the options assessed as part of the three plans have only been subject to high level design and if they are taken forward would require additional design and assessment as they progress to next stage of optioneering. Due to this, the confidence in the option design has been rated as low throughout all of the Level 2 assessments undertaken.

The findings indicate that there are precautionary WFD compliance risks for surface water bodies were associated primarily with the operation of additional/new abstractions and new or ceased discharges (see summaries provided in Section 3). The potential hydrological effects of these activities, among several other varying impacts, could conflict with achieving WFD status objectives. This is particularly the case where hydrology/river flow is an existing limiting factor, recorded in WFD baseline data as a ‘reason for not achieving good’. The potential biological effects, particularly on fish, and physio-chemical changes (for example, reduced dilution as a result of a new or increased abstraction) would require further assessment to improve certainty of the scale of effects.

Deterioration risks on coastal waterbodies where generally attributed to the intake and discharge of water for desalination projects, leading to changes in biological status elements, morphology and water quality.

For groundwater bodies deterioration risks were primarily associated with either changes to quantitative and chemical saline intrusion and chemical drinking water protected area status, as a result of new groundwater abstractions, or construction of below ground structures close to GWDTE.

For new or modified intakes, it is recognised that appropriate fish and eel screening would be required to prevent entrainment. At this stage, this has been considered as likely mitigation. The same approach has been taken with other likely mitigation such as using trenchless methods to cross larger watercourses where feasible or discharging construction dewatering into a watercourse to maintain flow.

5.3 Further investigations and assessment

Subject to their progression through the approvals process, of those options which have been assessed at Level 2, further WFD mitigation and assessment would be required for the options set out in Table 5.3. At this stage the Level 2 assessments have assessed a potential risk of deterioration to some waterbodies due to these options. Additional investigations and information are required to improve the certainty of the levels of WFD risk outlined in the WRMP WFD Level 2 assessments.

Table 5.3: SWW WRMP Level 2 assessed options which require further investigation

WRZ	Option ID	Waterbodies currently at risk of deterioration
Colliford	COL2	GB108049000190: Lower River Camel
Colliford	COL4	GB108048001420: Lower River Fowey
Colliford	COL5	GB108048001171: Upper River Cober
Colliford	COL6	GB108049000380: Hayle GB530804906700: HAYLE
Colliford	COL11	GB40802G806600: Looe and Fowey
Colliford	COL12	GB108049007040: Stannon Stream GB40802G800300: North Cornwall
Colliford	COL18	GB108049000000: Porth Stream
Colliford	COL19	GB108049000560: Roseworthy Stream
Colliford	COL20	GB108048001270: Lower River Fal
Roadford	ROA2	GB108046005200: Erme
Roadford	ROA3	GB108047004010: Lower River Yealm
Roadford	ROA4	GB108047007860: Lower River Tamar
Roadford	ROA6	GB30845277: Upper Tamar Lake
Roadford	ROA7	GB30847000: Roadford Lake GB108047008020: Wolf
Roadford	ROA12	GB30843764: Slade Lower Reservoir
Roadford	ROA14	GB30846291: Avon Dam Reservoir
Roadford	ROA15	GB108047007731: Lower River Lyd
Wimbleball	WIM5	GB108045009160: Sid
Wimbleball	WIM7	GB108045009070: Lower Creedy
Isles of Scilly	ISB4	GB620807080000: Scilly Isles
Isles of Scilly	ISMY4	GB620807080000: Scilly Isles

5.4 In combination effects assessment

In combination effects have been assessed for each of the three preferred plans. These assessments include all options within these plans that operate within the same waterbodies. These assessments are based upon the WFD Level 1 assessment outputs and review of WFD Level 2 assessment if applicable.

5.4.1 Best Value Plan

The Best Value Plan identifies 19 WRMP options to meet the demand deficit. The in-combination effects assessment highlighted that in eight of the waterbodies where more than one option is planned, there is no change to the risk of deterioration for the combination of options. These are:

- GB108045015050: Exe (Barle to Culm);
- GB40802G806600: Looe and Fowey (groundwater);
- GB40802G806700: Tamar (groundwater);
- GB40802G800700: Teign, Avon, Dart and Erme (groundwater);
- GB30847000: Roadford Lake;
- GB108047008020: Wolf;
- GB108045009160: Sid; and
- GB40802G802800 Sidmouth-Honinton, Mercia Mudstone (groundwater).

However, four waterbodies were identified where there is a possible for an increased risk of WFD deterioration from the combination of different BVP options. These are:

- GB108048001420: Lower River Fowey;
- GB108043011040: Stour (Lower);
- GB40801G801700: Permian Aquifers in Central Devon (groundwater); and
- GB40802G805800: Lower Dorset Stour and Lower Hampshire Avon (groundwater).

5.4.2 Least Cost Plan

The Least Cost Plan identifies 14 WRMP options to meet the demand deficit. The in-combination effects assessment highlighted that in three of the waterbodies where more than one option is planned, there is no change to the risk of deterioration for the combination of options. These are:

- GB108045015050: Exe (Barle to Culm);
- GB40802G806600: Looe and Fowey (groundwater); and
- GB40802G806700: Tamar (groundwater).

However, four waterbodies were identified where there is a possible for an increased risk of WFD deterioration from the combination of different LCP options. These are:

- GB108048001420: Lower River Fowey;
- GB108043011040: Stour (Lower);
- GB40801G801700 Permian Aquifers in Central Devon (groundwater); and
- GB40802G805800 Lower Dorset Stour and Lower Hampshire Avon (groundwater).

5.4.3 Worst Case Plan

The Worst Case Plan identifies 27 WRMP options to meet the demand deficit. The in-combination effects assessment highlighted that in seven of the waterbodies where more than one option is planned, there is no change to the risk of deterioration for the combination of options. These are:

- GB108045015050: Exe (Barle to Culm);
- GB40802G800100: West Cornwall (groundwater);
- GB40802G800700: Teign, Avon, Dart and Erme (groundwater);
- GB40802G806600: Looe and Fowey (groundwater);

- GB40802G806700: Tamar (groundwater);
- GB30847000: Roadford Lake; and
- GB108047008020: Wolf

However, four waterbodies were identified where there is a possible for an increased risk of WFD deterioration from the combination of different WCP options. These are:

- GB108048001420: Lower River Fowey;
- GB108043011040: Stour (Lower);
- GB40801G801700: Permian Aquifers in Central Devon (groundwater); and
- GB40802G800300: North Cornwall.

5.5 Next Steps

Areas for future focus for any options carried forward include:

- Consultation with the Environment Agency to present and discuss key WFD risks and proposed approach to improving certainty of assessments;
- Collation and review of HMWB measures, programme of measures and mitigation measures assessments information from the Environment Agency for inclusion into the assessment of potential impediment to obtaining Good Ecological Potential (GEP);
- Collation and review of detailed baseline data concerning WFD biological, physicochemical and hydromorphological elements identified as being at yellow, amber, or red risk in the Level 2 assessments. This may include existing Environment Agency and South West Water long term WFD and water quality monitoring data within the relevant water bodies, and targeted baseline surveys being undertaken specifically for the option assessments;
- Further development of conceptual models linking together how potential hydrological changes (from abstractions or discharges) could influence water quality and the sensitivity of aquatic communities to those changes. This will include a diagrammatic/visual presentation of linkages between abstraction impacts and the direct and indirect effects on physico-chemical and biological WFD status elements, indicating thresholds of WFD classes or tolerance to change. This step would aid consultation and discussion with stakeholders and the requirement for/scoping of any detailed modelling;
- Further information on the design and operation of the options;
- Update Level 2 WFD assessments to incorporate any additional information; and
- For the ASR option, a hydrogeological assessment of deep confined aquifer is required to prove no connection to the upper aquifer.

A. WFD Level 1 output tables

The SWW WFD Level 1 outputs can be provided upon request.

B. Further assessment Level 2 output tables

The SWW WFD Level 2 outputs can be provided upon request.

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SEA ER ANNEX 4: APPENDIX J Natural Capital and Biodiversity Net Gain Technical Note

South West Water: Draft Water Resouces Management Plan 2024 (WRMP24)

Project:	South West Water Draft WRMP24: SEA Environmental Report ANNEX 4: APPENDIX J		
Our reference:	100107117-MMD-TN-NCA-010-E		
Prepared by:	Amy Nyiri, Sowmya Shah, Ruby Plackett, Alex Harrison	**Date:**	07 February 2023
Approved by:	Melanie Reid	**Checked by:**	Tim Kelly
Subject:	Natural Capital (NC) and Biodiversity Net Gain (BNG) Technical Note		

1 Introduction

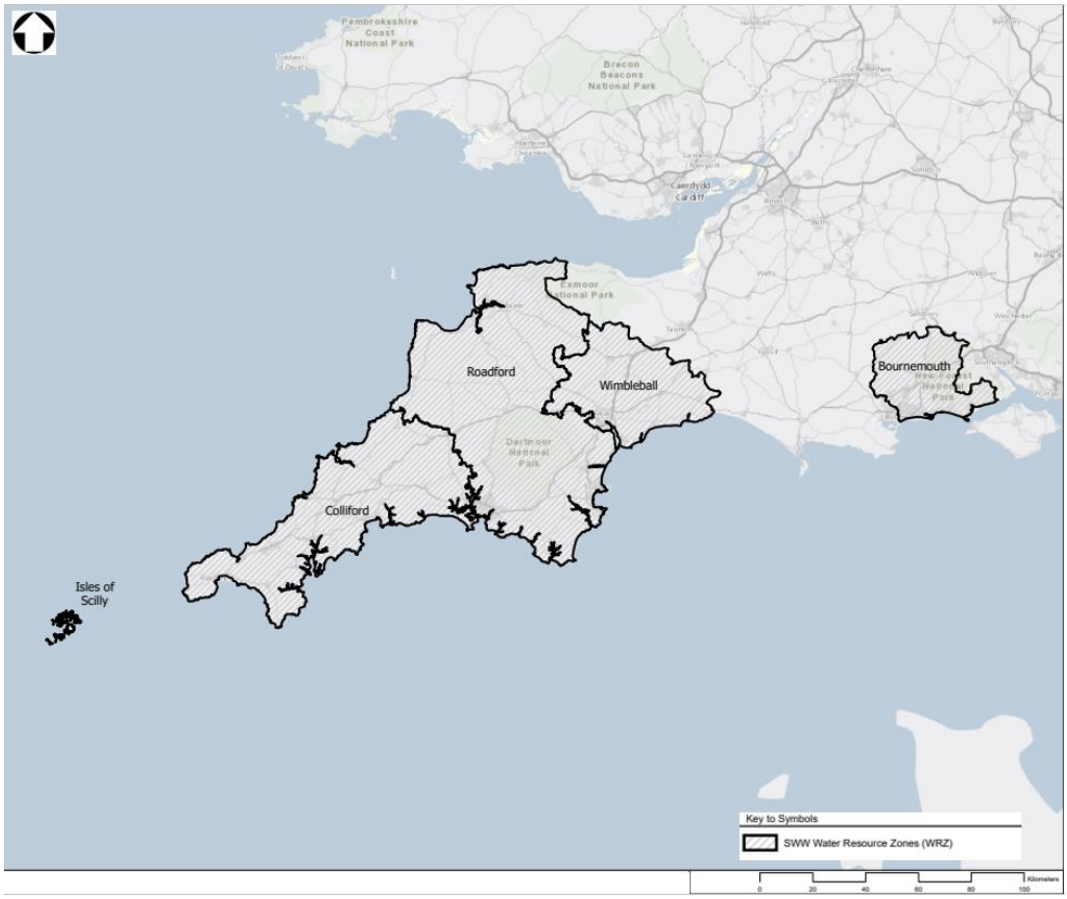
1.1 South West Water WRMP24

Water companies have a statutory obligation to produce a Water Resource Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. New WRMPs are prepared every five years and South West Water (SWW) is due to publish its next WRMP in 2024. The new WRMP24 is the subject of this technical note.

The SWW supply area covers Devon, Cornwall, the Isles of Scilly and parts of Dorset, Somerset, Wiltshire, and Hampshire, and provides drinking water to a population of 1.7 million. Water resources in the SWW supply area consist of three large reservoirs, several smaller reservoirs, river intakes, and some groundwater sources which are predominantly in East Devon.

The SWW supply area is split into five Water Resource Zones (WRZs) in total. Three WRZs are operated in conjunction with one another to maximise water availability, these are Colliford, Roadford, and Wimbleball WRZs. Bournemouth WRZ and Isles of Scilly WRZ operate independently. The five WRZs are outlined in Figure 1.1 below.

Figure 1.1: South West Water WRZs



Source: Copyright Esri, Intermap, NASA, NGA, USGS (2022), Mott MacDonald (2022).

1.2 Options Description

The WRMP24 includes supply options. The broad supply option types that are being considered by SWW, which are also the focus of this technical note, include:

- Abstraction from rivers – including increases in existing abstraction licences; abstraction of compensation flows; or reuse of previously discussed water intake points.
- Reservoirs – reservoir options include the creation of new reservoirs, increases in abstraction limits for existing reservoirs, or the enhancement of existing reservoirs to increase their capacity e.g., by dam raising.
- Groundwater sources – including new boreholes or recharge of aquifers.
- Water treatment works (WTW) – including construction of new or replacement WTW, or improvements to efficiency or increased capacity of existing WTW.

The options assessed as part of this technical note are outlined in Section 2, Table 2.1.

1.3 Assumptions and Limitations

The following assumptions have been used within the assessments in this technical note:

For Natural Capital Assessments (NCAs):

- The costs for constructing, operating, and maintaining the options was not considered within the assessments.

- Natural capital stocks identified within the areas allocated for above ground infrastructure have been assumed to be completely lost because of the option construction.
- Natural capital stocks presumed temporarily lost are expected to be reinstated/compensated.

For Biodiversity Net Gain (BNG) Assessments:

- No enhancement of biodiversity post construction was considered. BNG habitat units were assigned to the pre-construction land use according to the habitats present within each option boundary. The post construction land use, including agreed mitigation, was used to calculate the post construction biodiversity score.
- The desk-based assessment was carried out using open-source data. As such, a precautionary approach was applied, presuming that where not specifically known, habitats were assigned the maximum habitat score. Habitat identification will need to be refined with habitat survey data at later stages to refine the accuracy of the BNG calculations for each option.
- The duration of disturbance and timeline for habitat creation has not been included in the assessment. Durations of disturbance, including proposals for creating habitats in advance of disturbance, will need to be refined with greater design detail at later stages to refine the accuracy of the BNG calculations for each option.

2 Methodology

2.1 Overview

This technical note accompanies the SWW WRMP24 SEA Environmental Report as an Annex. This Annex presents the findings of the NCA, BNG and related opportunities applied to the options.

2.1.1 Natural Capital and Ecosystem Services

Natural capital refers to the elements of the natural world that provide benefits to society and includes aspects such as woodland, grassland, freshwater, marine, urban greenspace, and wetland habitats. Ecosystem services are benefits that are provided to humans by the natural environment vary from regulating services such as natural flood management to cultural services such as recreational value.

2.1.2 Biodiversity Net Gain

BNG refers specifically to the combination of habitats present within a site and their ability to support biodiversity. Each habitat is given a distinct score that relates to its area, condition, distinctiveness, and connectivity. The change in habitat due to the construction and operation of the regional plan options informs the overall BNG score and whether they are likely to contribute to a net gain in biodiversity.

2.1.3 Options Overview

The options assessed as part of this technical note are outlined in Table 2.1 below. A total of 42 options were assessed; the natural capital and ecosystem services impacts and BNG impacts for each assessed option are outlined in further detail in Section 3. Scoped out options are further outlined in Table 3.5 in Section 3.

Table 2.1: WRMP24 Supply Options

Option ID	Option	High-level description
BNW3	Bournemouth - Wimborne transfer to Longham - Licence Change	Smarter conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW11	Christchurch WWTW IPR 2 Transfer to Longham Lakes	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.
BNW6	Longham Aquifer Recharge	Aquifer storage and recovery at Longham.
BNW17	Cheddar 2 new strategic regional reservoir and transfer	The scheme is to fill a new, Cheddar 2 reservoir, alongside the existing reservoir, from Cheddar Springs and the river Axe, under the constraints of Bristol Water's (BRL) existing abstraction licences.
COL12	Stannon daily abstraction increase	Increase to the daily limit to the abstraction licence of 4 Ml/d to 8 Ml/d for up to three months in any one year. Pumps to be uprated and possible power upgrade. A 0.2 Ml/d stream support facility will be constructed discharging from the lake to the adjacent stream.
COL15	Restormel WTW	This option would take Restormel WTW up to its maximum licensed abstraction and enable more effective use to be made of the Colliford/River Fowey resources system.
COL19	Boswyn stream/Cargenwen Reservoir/Carwynnen stream	Re-introduce abstractions at Boswyn stream / Cargenwen Reservoir / Carwynnen stream.
COL2	Colliford PS Stage 2 - River Camel Abstraction	New abstraction licence. New river intake and pumping station at Nanstallon, for 90 Ml/d at 120 m head. ~9 mile of 900mm diameter pipeline, from the intake to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110 Ml/d (an increase of 15 Ml/d) Raw water is then pumped to Colliford Reservoir via existing main.

Option ID	Option	High-level description
COL20	River Fal new abstraction	New abstraction on the River Fal near Ruan Lanihorne. New intake, onsite WTW and connection to distribution system.
COL3	Abstraction of Colliford compensation flows when making supply releases	No infrastructure changes required.
COL4	Abstraction of Siblyback compensation flows when making supply releases	No infrastructure changes required.
COL5	Increase Wendron annual licence and de-couple from Stithians	No infrastructure changes required.
COL6	River Hayle abstraction	Abstraction from River Hayle at existing, disused intake, treat abstracted water at new onsite treatment works.
COL9	Leswidden Pool	Transfer of former quarry water to Drift Reservoir via Sancreed stream.
COL11	Hawk's Tor Pit	Transfer to Colliford Reservoir
COL18	Porth/Rialton	New intake structure required at Rialton. RWPS and pipeline to Coswarth SRES site. Building new WTW at Coswarth SRES site to treat river water. To treat 6 Ml/d. Connection to existing distribution system.
ISB4	Bryher - Increase Existing Desalination Plant Capacity	Additional process stream at existing RO plant plus increased borehole yield &/or new borehole source.
ISMY1	St. Mary's new borehole (location 1)	Drilling of new supply borehole 30m depth 150mm dia.borehole / c. 1 kW pump. Associated infrastructure (headworks, kiosk, and pipework) w. water piped via raw main (est. 32mm dia. / 500m distance) to existing WTW. Assumes spare capacity at WTW. No additional requirement.
ISMY2	St. Mary's new borehole (location 2)	Drilling of new supply borehole 30m depth, 150mm dia. / c. 1 kW pump
ROA12	Slade and Horedown WTW (GAC)	Installation of new pumping station at Slade reservoir and new 4 Ml/d GAC plant at Horedown WTW.
ROA13	Duckaller and Vennbridge	Changes to abstraction licences and 4 Ml/d nitrate removal plant installation at Duckaller pumping station to facilitate full use of sources.
ROA14	Raise Avon Dam	Raise dam by 2 m. Subject to structural engineering approval.
ROA15	Gatherley Phase 2	Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125 Ml/d to be transferred to Roadford Reservoir. Dual main required between River Lyd and Roadford Reservoir.
ROA16	Littlehempston WTW	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs.
WIM5	Indirect potable reuse - stream support for Dotton WTW	Pump treated effluent from Sidmouth WWTW directly to the river Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods.
ISMY4	St. Mary's - Increase desalination plant capacity	Additional process stream at existing RO plant
IST1	Tresco new borehole	Drilling of new supply borehole to south or east of island.
ROA10	Avon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity
ROA11	Meldon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity
ROA2	River Erme	Intake relocation
ROA3	River Yealm	Intake relocation
ROA4	Abstraction of Roadford compensation flow at Gunnislake when making supply releases	No infrastructure changes required.
ROA6	Upper Tamar Lake increasing annual license	Increase daily abstraction limit, upgrades to WTW and distribution network
ROA7	Expansion of Northcombe WTW to 60 Ml/d	Treatment works to be able to deliver a minimum of 60 Ml/d.
ROA8	Tottiford WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity

Option ID	Option	High-level description
WIM1	Abstraction of Wimbleball compensation flow at Northbridge when making supply releases	No infrastructure changes required.
WIM2	Sidford borehole commissioning	Equip and make operational existing borehole.
WIM4	Wilmington springs annual abstraction increase	No infrastructure changes required.
WIM6	Increase Allers WTW capacity	Increase daily abstraction licence 36 Ml/d.
WIM7	Increase Pynes to licence limit 66.46 Ml/d	Upgrade WTW to treat an additional 6.5 Ml/d. with distribution network improvements.
WIM8	Brampford Speke borehole	Agree licence changes with EA. Site Commissioning.
WIM9	Stoke Canon borehole	Agree licence changes with EA. Install new power supply. Site Commissioning.

A new option, BNW17 Cheddar 2 new strategic regional reservoir and transfer has been identified as a future potential SRO. This option builds upon the concept design that has been developed for the Cheddar 2 reservoir and transfer SRO gate 2 submission to RAPID and will be included in future iterations of the Report. An NCA and BNG assessment was not undertaken for the option BNW17 to date due to available information.

2.2 Guidance

The draft Water Resource Planning Guidelines (WRPG) that states Water Resource Management Plans (WRMPs) should “use natural capital in decision-making and provide environmental net gain through their WRMPs”.

Each WRMPs must set out how water resources will be managed to deliver secure supplies of water for customers and the environment over the long term. This supports the Government’s ambition of leaving the environment in a better state that we found it as described in the 25 Year Environment Plan and Defra’s Guiding Principles.

The methodology for the Natural Capital Approach and Biodiversity Net Gain assessment has been produced in line with best practise and guidance where possible including:

- Defra, (2020) Enabling a Natural Capital Approach
- HM Treasury and government finance, (2018) The Green Book: appraisal and evaluation in central government
- Natural England, (2019) The Biodiversity Metric 3.1 auditing and accounting for biodiversity
- Natural England, (2020), Natural Capital Indicators: for defining and measuring change in natural capital.
- The Environment Agency, (2020) Draft Water Resource Planning Guidance
- The Environment Agency, (2020) Water resources planning guideline supplementary guidance – Environment and society in decision-making.

2.3 Principles for the Natural Capital Approach

The NCA has been developed in accordance with the following principles:

- The assessment will include the valuation of natural capital assets and ecosystem services within the footprint of each option and their zone of influence.
- The assessment methodology uses the most relevant qualitative, quantitative and/or monetary valuation approaches for the NCA. The assessment of the option’s impact on the natural capital metrics will be undertaken in a sequential manner with an initial qualitative assessment, follow by a quantitative analysis and finally a monetised assessment if enough confidence exists in the values.

- Not all ecosystem services can be monetised within the NCA however those that are will be assessed against a consistent methodology. The monetised natural capital metrics will be incorporated into the cost benefit ratio as a discreet input. This monetised value will be a single figure defined by the maximum natural capital benefit. The cost of the option will not be considered within this assessment as it is captured elsewhere within the multi criteria assessment.
- Ecosystem services that are not monetised will be quantified and incorporated into the regional plan decisioning making process within the SEA assessment.
- The NCA will be undertaken using open-source data in accordance with the guidance for regional assessments and to ensure that the approach is consistent across the entire study area.
- The assessment criteria have been designed to enable the maximisation of the potential benefits from the regional plan.

2.4 Methodology Overview

2.4.1 Stage 1: Defining the natural capital baseline

2.4.1.1 Zone of influence

The zone of influence was defined as the area of receiving (i.e., a watercourse receiving a discharge) or providing (i.e., an aquifer where abstraction will occur) environment with the potential to be altered or changed because of the options.

This can include the operational catchment for a surface water abstraction or an aquifer for a groundwater abstraction in addition to the footprint of the options.

2.4.1.2 Developing a natural capital baseline

As part of the NCA, a natural capital baseline was developed for the study area. This baseline was developed using open-source data as described in the National Natural Capital Atlas: Mapping Indicators (NECR285)[1] to generate a natural capital account of the stocks within the zone of influence. The list of stocks considered within the accounts and the methodology for mapping them are shown in Appendix A. The methodology used to map natural capital utilises the same breakdown of stocks as the National Natural Capital Atlas where possible. However, the list has been supplemented with additional abiotic stocks and key habitats that are vital such as chalk streams and rivers.

The Natural Capital baseline reported the total quantity of each stock within the study area, and where suitable, an indication of natural capital condition.

2.4.2 Stage 2: Option Level Natural Capital Assessment

A natural capital assessment has been undertaken on the options in accordance with the Water Resources Planning Guideline[2] (WRPG) and Enabling a Natural Capital Approach (ENCA) requirements. ENCA is recommended for use by HM Treasury's Green Book: appraisal and evaluation in central government (2020)[3] and represents supplementary guidance to the Green Book.

In August 2021, ENCA updated its guidance. Therefore, the NCA were updated in line with the values used to quantify the provision of ecosystem services.

[1] http://publications.naturalengland.org.uk/publication/4578000601612288

[2] 2021, Available online at Water resources planning guideline - GOV.UK (www.gov.uk).

[3] 2020. The Green Book Central Government Guidance On Appraisal And Evaluation. [online] London: HM Treasury. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf> [Accessed 16 March 2022].

The August 2021 ENCA guidance (GOV.UK, 2021[4]) includes updated values within the Asset Databook and Service Databook. Within the Service Databook, the carbon reduction tab now includes BEIS (2022) carbon values - a set of values produced by the government to be used in policy appraisal and evaluation, reflecting the latest evidence. The climate regulation section of the assessment has been updated in line with this.

The impact of the options on the natural capital stocks and indicators of condition was reported for each option quantitatively. This impact was reported for during construction and post construction to give an estimation of the impact of the options' whole lifecycle. The results of the stock assessment were reported in total losses and gains within each option's zone of influence.

The results of the change in natural capital stocks informed the assessment against the six natural capital metrics (ecosystem services) listed below using the Natural England logic chains (Figure 2.1). The cost / benefit assessment was informed by the option type, option description and any embedded mitigation. The outputs of the NCA were compared to the pre-construction provision of impacted services to assess the impact of the options. Five ecosystem services were monetised, and the results of the assessment reported as a discreet monetary figure, water purification was assessed quantitatively.

Figure 2.1: Ecosystem Services valuation logic chain

The metrics used to assess the impact on natural capital include:

- Carbon sequestration (Climate regulation)
- Natural Hazard management
- Water purification * Qualitative
- Water Regulation * Qualitative
- Biodiversity and Habitats * Biodiversity net gain.
- Air pollutant removal
- Recreation & amenity value
- Food production

Both natural capital assessment strategies, as outlined in the Environment Agency's Water Resource Planning Guidelines (GOV.UK, 2020[5]) and the Defra: Enabling a Natural Capital Approach (GOV.UK, 2021[7]),

[4] GOV.UK. 2021. Enabling a Natural Capital Approach guidance. [online] Available at: <https://www.gov.uk/government/publications/enabling-a-natural-capital-approach-enca-guidance/enabling-a-natural-capital-approach-guidance> [Accessed 16 March 2022].

[5] GOV.UK. 2020. Water resources planning guideline. [online] Available at: <https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline> [Accessed 16 March 2022].

discuss taking a proportionate approach to the assessment. It is therefore important to accommodate this when integrating a natural capital approach within the options. A natural capital approach has the potential to inform concept design and aid decision making, by quantifying the relative cost benefits and disbenefits of the options to aid the initial assessment of the identified strategic solutions.

2.4.3 Ecosystem Services screening

During the initial phase of the NCA, all the seven ecosystem services listed were reviewed and scoped in or out due to the geographical or socio-economic context of the options and its zone of influence. Guidance on the screening process for individual metrics is provided below.

2.4.3.1 Climate regulation

The climate regulation metric focuses on carbon sequestration, which can be defined as the capture and secure storage of carbon that would otherwise be emitted to, or remain, in the atmosphere. The carbon sequestration NCA will be in addition to construction and operational carbon calculations and provides a holistic assessment of carbon emissions for the options.

The assessment was determined by land management within the options footprint which influenced the carbon store for prolonged periods of time and results in a change in net emissions. The estimate of the carbon stocks for the options footprint was based on the area of broad land use types according to literature and research. The estimated carbon stocks for broad habitat types are listed below and the sequestration rates are show in Table 2.2.

Table 2.2: Carbon sequestration rates for broad habitat types (JBA Consulting) [6] [7]

Land use type	C Seq rate (t/CO2e/ha/yr)
Woodland - (deciduous)	4.97
Woodland – (coniferous)	12.66
Arable Land	0.107
Pastoral land	0.397
Peatland - Undamaged	4.11
Peatland - Overgrazed	-0.1
Peatland - Rotationally burnt	-3.66
Peatland - Extracted	-4.87
Grassland	0.397
Heathland	0.7
Shrub	0.7
Saltmarsh	5.188
Urban	0
Green Urban	0.397

The carbon sequestration rates were converted to monetary values using standard methods and the Department for Business, Energy, and Industrial Strategy (BEIS) Interim Non-Traded Carbon Values from 2022 (Table 2.3).

[6] Alonso, I., Weston, K., Gregg, R. and Morecroft, M. 2012. Carbon storage by habitat - Review of the evidence of the impacts of management decisions and condition on carbon stores and sources. Natural England Research Reports, Number NERR043.

[7] The Environment Agency, (2020) Water resources planning guideline supplementary guidance – Environment and society in decision-making.

Table 2.3: BEIS updated short-term traded sector carbon values for policy appraisal, £/tCO2e (£2020)

Year	Low series	Central series	High series
2020	120	241	361
2021	122	245	367
2022	124	248	373
2023	126	252	378
2024	128	256	384
2025	130	260	390
2026	132	264	396
2027	134	268	402
2028	136	272	408
2029	138	276	414
2030	140	280	420
2031	142	285	427
2032	144	289	433
2033	147	293	440
2034	149	298	447
2035	151	302	453
2036	155	307	460
2037	156	312	467
2038	158	316	474
2039	161	321	482
2040	163	326	489
2041	165	331	496
2042	168	336	504
2043	170	341	511
2044	173	346	519
2045	176	351	527
2046	178	356	535
2047	181	362	543
2048	184	367	551
2049	186	373	559
2050	189	378	568

2.4.3.2 Natural hazard regulation

Different habitat types have intrinsic flood risk management values by intercepting, storing, and slowing water flows. This is known as natural flood management (NFM) and is listed as a policy within the 25-year Environment Plan[8]. The capacity of habitats to achieve this can be quantified, and then a monetary value can be assigned based on the damage-costs avoided from flooding or replacement costs due to their capacity to regulate flood waters. The capacity for a given natural capital asset to provide a flood regulation service will depend on two factors:

- Its capacity to slow overland flows
- Whether the asset is in an area of flood risk

[8] 25 Year Environment Plan - GOV.UK (www.gov.uk)

This ecosystem service also applies in urban areas, where vegetation can reduce surface water flooding from heavy rainfall, with benefits to sewerage capacity. Coastal flood risk, which has been predicted to increase with future climate change, is reduced by coastal margin habitats such as saltmarsh.

The options were assessed on their ability to impact flood risk positively or negatively through the comparison of pre and post construction natural capital stocks and the catchment in which it is located. The assessment is restricted to catchment areas which drain to downstream communities impacted by flooding. These communities were identified using the Environment Agency's Indicative Flood Map[9], which overlays areas at risk of fluvial flooding and the National Receptor Database.

Reduced flood damage to downstream or coastal settlements because of reduced magnitude / frequency of flood / storm events; and / or lower sewer capacity or water storage costs was valued in line with Broadmeadow et al, 2018[10]. This assessment was developed to provide indicative national estimates of water regulation services of woodland to inform natural capital accounts, this is based on modelling to estimate the potential volume of flood water avoided by woodland ecosystems in flood risk catchment. The methodology adopts a replacement-cost (rather than damage cost) approach to valuing the flood regulation service of woodland by applying annualised average capital and operating costs of flood reservoir storage that would be required in the absence of the ecosystem service.

Central estimate of the average annual costs of reservoir floodwater storage is £0.42 / m^3. The range is from £0.10 to £1.19 /m^3 per year. These "replacement costs" can be considered a lower bound of the benefit if it can be assumed that such expenditure would be deemed value for money by the flooding authorities within flood risk catchments in terms of avoided flood damage costs.

2.4.3.3 Water purification

Based on their ecological functioning, different habitat types, have varying capacities for absorbing pollutants from a given water source. This service is dependent on the location of the natural capital asset and the nature of the surrounding area. If a natural capital asset has a high capacity to remove pollutants but is not close to a water source, the service will not be provided. Due to this, valuation of the static water purification services of different natural capital assets as part of the NCA was not considered appropriate. A common value for different habitat types could not be applied due to extensive variation in local factors which determine the provisioning of this service.

To account for the provision of this service within the NCA the impact of the options associated with the provision or removal of woodland and semi-natural grassland was assessed using the modelling results from the NEVO[11] tool. The tool defines the resulting changes for the following water quality variables:

- Dissolved oxygen concentration
- Nitrogen concentration (including organic nitrogen, nitrate, nitrogen dioxide, ammonium)
- Phosphorous concentration (including organic and mineral phosphorous)
- Pesticide concentration (for eighteen different pesticide types

This approach followed the methodology that if an area of woodland were to be lost, the resultant impacts on water quality can be quantified within the options zone of influence. Any negative changes to the natural capital in theory, reflects the loss of this service within the options zone of influence.

[9] https://flood-map-for-planning.service.gov.uk/

[10] Broadmeadow, S., Thomas, H., Nisbet, T. and Valatin, G., 2018. Valuing flood regulation services of existing forest cover to inform natural capital accounts. *Forest Research*.

[11] Luizzo, L., (2019) Natural Environment Valuation Online Tool - Chapter 6a: Water Quantity & Quality Model

2.4.3.4 Air pollutant removal

Air pollution presents a major risk to human health, resulting in premature deaths and reduced quality of life. By removing air pollution, habitats help to lessen these impacts on health and wellbeing. The provisioning of the service is positively related to several key aspects:

- The surrounding area of the natural capital assets with regards to background pollution, especially particulate pollutant
- The quantity and type of natural capital asset, woodland is the major service provider
- The density of population potentially benefiting from reduced exposure. Because pollutants are transported, beneficiaries may be downwind of the ecosystem

The options were screened against the provision of air pollutant removal according to its location. Air pollutant removal was only be considered within built up areas or when the zone of influence includes Air Quality Management Areas. The impact of the options was assessed according to changes in natural capital stocks.

The value provided by natural capital assets was taken from the UK government's air quality economic assessment methodology[12]. The assessment embeds these values (based on the damage cost approach, i.e., damage to health avoided from reductions in air pollution) and estimates the present value automatically based on the quantitative estimates provided.

Indicative average values for air pollution removal in 2015 for different habitats were calculated from aggregate UK values published in February 2019, as shown in Table 2.4.

The value of each habitat will be combined with the changes expected in natural capital stocks to provide a value for the change in service provision. The final impact will be reported as a single value that will be incorporated within the NCA metric.

Table 2.4: Air pollutant value by habitat type

Habitat group	Value (£ per hectare per year)
Urban Woodland	771
Rural Woodland	245
Urban grassland	149
Enclosed farmland	14
Coastal margins	26

2.4.3.5 Recreation and amenity

The recreational value of green spaces can be significant. This value reflects both the natural setting and the facilities on offer at the site and often has a strong non-market element. It varies with the type and quality of habitat, location, local population density and the availability of substitute recreational opportunities. Recreational values can be beneficially affected by enhancements in green spaces, or adversely affected by new developments or infrastructure. The wider tourism and outdoor leisure sector are also dependent upon nature to varying degrees. This metric depends on the extent to which the natural capital stocks the options provide will enhance the opportunity for recreation.

The key parameter needed to estimate in this category is the number of additional or enhanced recreational visits created because of the option. This was estimated using the Outdoor Recreation Valuation Tool (ORVal). ORVal[13] is referenced in HM Treasury Green Book[14]. Random utility / travel cost model of

[12]Jones L., Vieno M., Morton Dan et al. (2019) Developing Estimates For The Valuation Of Air Pollution Removal In Ecosystem Accounts. Final Report For Office Of National Statistics - NERC Open Research Archive.

[13] ORVal | Land, Environment, Economics and Policy Institute | University of Exeter

[14]The Green Book: appraisal and evaluation in central government - GOV.UK (www.gov.uk)

recreational demand for all sites in England and Wales and generates probabilistic predictions of visitor numbers for any publicly accessible outdoor recreation park, path, or beach. It takes account of scarcity of sites and substitution possibilities, as well as travel distances to sites and their attributes. This is useful for baseline initial assessment, accounting, and multiple sites. This should be seen as an estimation in the absence of site-specific data on visitor numbers.

The change in natural capital stocks and the creation or removal of greenspace was entered into ORVal according to the NCA. The change in visitors and estimated change in value will be reported for using the ORVal online tool.

2.4.3.6 Food production

Food is produced by a range of ecosystems and in some cases, the food for human consumption is effectively the same as the ecosystem service (e.g., wild fruit, fishing). More often the provisioning service is a raw material (e.g., crops) that is harvested and processed by humans and produced capital into added value processed food (e.g., bread). The boundary between what is provided by natural capital and the contribution of other forms of capital is often a grey area, e.g., crops require agricultural management; livestock need grassland ecosystems.

Food production has been calculated using the Natural Environment Valuation Online Tool (NEVO) agricultural model. The NEVO Tool is a web application developed by the Land, Environment, Economics and Policy (LEEP) Institute at the University of Exeter with support from Department for Environment, Food & Rural Affairs (Defra) and Natural Environment Research Council (NERC). NEVO's primary purpose is to help explore, quantify, and make predictions about the benefits that are derived from existing and altered land use across England and Wales. This is a structural model of agricultural land use and production for Great Britain estimated using Farm Business Survey (2005 – 2011) and June Agricultural Census data. The agricultural land use component in NEVO builds upon the approach developed by Fezzi and Bateman[15]. NEVO was used to assess the impact of the creation or removal of agricultural land for the options. The change in value of food provision for the footprint of the options was calculated using this online tool and reported within the NCA.

2.4.4 Stage 3: Reporting of results

The results of the NCA will be summarised in the NCA report which will be produced at the end of the detailed assessment and appended to the WRSE environmental report. The baseline natural capital assets within the regional plan study area will be reported key benefits, issues and opportunities summarised.

The changes in natural capital stocks will be reported for each option with the results of the ecosystem services screening and detailed assessment. The separate natural capital metrics will be aggregated into a single metric that will be considered within the WRSE investment model. The impacts of each option against the individual natural capital metrics will also be reported to allow for further analysis and optimisation. The results for each option will be summarised in proforma that will demonstrate the results of the assessment and for the justification behind the assessment.

The results of the NCA and biodiversity net gain assessments will be incorporated into WRSE decision making process through the conversion of the results into metrics as described below:

- **Natural capital metric:** A single discreet monetised value reported in £/year generated by combining the outputs of each of the six monetised natural capital metrics to provide a single cost / benefit figure.
- **Biodiversity net gain metric**: A single score for each option showing the percentage change in biodiversity net gain units for each option according to the metric.

[15] Fezzi, C., Bateman, I., Hadley, D. & Harwood, A. 2019. Natural Environment Valuation Online Tool - Chapter 1: Agriculture Model

2.5 Overview assessment methodology: BNG

The BNG requirement as outlined in the WRPG stipulates that each option should look to maximise BNG. In April 2022, Defra and Natural England launched The Biodiversity 3.1 Metric[16]. The 3.1 metric presents significant improvements for measuring and accounting for nature losses and gains. It encourages users to create and enhance habitats where they are most needed to help establish or improve ecological networks through rural and urban landscapes. By linking to current and future habitat plans and strategies, including the future Local Nature Recovery Strategies (LNRS), the Metric 3.1 incentivises habitat creation and enhancement where most needed. It also 'rewards' landowners who undertake work early, creating or enhancing habitats in advance, allowing them to generate more biodiversity units (BUs) from their land. Condition assessment approaches have also been significantly updated and simplified for Metric 3.1 and some key changes made.

The Defra 3.1 metric is the recommended approach to net gain assessments. The government anticipates the 3.1 metric to become the industry standard for biodiversity assessments for on-land and intertidal development types in England. As proposed in the Environment Act 2021[17] in November 2021, biodiversity net gain must be measured using a recognised biodiversity metric. The Metric essentially underpins the Environment Bill's provisions for mandatory biodiversity net gain in England, subject to any necessary adjustments for application to major infrastructure projects. The Act further specifies the requirement of biodiversity reports to include specified quantitative data relating to biodiversity, and as such any tool which evaluation is predominantly qualitative is not recommended.

As such, all options have also been assessed using the 3.1 metric, in line with current guidance.

A biodiversity baseline has been developed from spatial data sets of habitats inventories to calculate BNG change through land use. The Priority Habitat Inventory and sites with Site of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Area (SPA) and Ramsar designations were used to identify areas with high biodiversity importance. Units have been assigned to the pre-construction land use according to the habitats present in the options boundary. Post construction land use, including any mitigation described in the options description, has been used to calculate the post construction score. As this assessment will be carried out using only open-source data a precautionary approach is applied, presuming that where not specifically known, habitats will be assigned the moderate habitat score.

2.6 Opportunities

The potential opportunities for the options to enhance NC and BNG were considered following the NCA and BNG assessments, utilising the data and results to inform on the most appropriate potential opportunities for enhancement of the options and wider benefits.

[16] Archive site for the BNG Metric 2.0 and 3.0 http://publications.naturalengland.org.uk/publication/5850908674228224

[17] Environment Act 2021 (legislation.gov.uk)

3 Natural Capital Assessments and Biodiversity Net Gain Assessments

3.1 Natural Capital Assessment and Biodiversity Net Gain Assessments

The NCA and BNG outputs for the options are summarised in Table 3.1, Table 3.2,

Table 3.3. Mitigation has only been considered when outlined in the options description, or where standard mitigation must be applied.

A summary of what is included within each table is as follows:

- Table 3.1 shows the predicted impacts on natural capital during and post construction.

  Note: Only those options having stocks with predicted temporary and permanent impacts are listed.

- Table 3.2 summarises the predicted impacts to the provision of ecosystem services screened in for detailed assessment.

  Note:

  - Carbon sequestration is scoped out when the option does not cause the temporary and/or permanent loss of associated stocks.
  - Natural hazard management is scoped out when the option does not cause the temporary and/or permanent loss of associated stocks within an active floodplain.
  - Air pollutant removal is scoped out when the option does not cause the temporary and/or permanent loss of associated stocks within an AQMA or urban area.
  - Recreation & amenity value is scoped out when the option does not cause the permanent loss of greenspace.
  - Food production is scoped out when the option does not cause the permanent loss of arable and pastoral land.

-

- Table 3.3 summarises the predicted impacts to the provision of water purification for the options screened in for qualitative assessment.

- Table 3.4 shows the unmitigated BNG outputs for the options which have been informed using the predicted permanent impacts on natural capital in Table 3.1.

  Note: At this stage the BNG only takes account reinstatement, not reprovision or additional habitat creation unless outlined in the options description.

The BNG assessments can be revisited, and mitigation or enhancement opportunities developed further to achieve the 10% BNG required within the options. Additionally, where possible, the options could aim to not only reinstate lost habitat, but also provide a greater or more diverse habitat than is lost, to achieve overall Biodiversity Net Gain in line with regulatory requirements for BNG (at the time of the project consenting) as stated as a mandatory requirement within the Environment Act 2021. The latter could be achieved by identifying local sites of ecological interest and proposing measures which enhance these features.

All stocks reported in Table 3.1 are expected to be permanently lost. All woodland and high-level stocks are expected to be reinstated onsite or offsite through re-planting scheme. These natural capital stocks include:

- Coastal and floodplain grazing marsh
- Dwarf shrub heath

- Rivers
- Ponds and linear features
- Reservoirs
- Other-semi natural grassland
- Ancient woodland *this habitat is presumed irreplaceable once lost and therefore should be avoided
- Woodland priority habitat
- Broadleaved, mixed and yew woodland
- Coniferous woodland
- Urban woodland

Table 3.1: Predicted impacts on natural capital stocks

Natural capital stock	Area within option boundary pre-construction (Ha)	Stocks present during construction (Ha)	Stocks present post construction (Ha)	Change (Ha)
ROA13 - Duckaller and Vennbridge				
Arable	0.18	0.00	0.00	-0.18
ROA14 - Raise Avon Dam				
Other semi-natural grassland	7.80	0.00	0.00	-7.80
Dwarf Shrub Heath	5.38	0.00	0.00	-5.38
Active Flood Plain	0.21	0.00	0.00	-0.21
Rivers	0.97	0.00	0.00	-0.97
ROA12 - Slade and Horedown WTW (GAC)				
Arable	0.02	0.00	0.00	-0.02
Pastoral	4.03	0.00	0.00	-4.03
Active Flood Plain	0.36	0.00	0.00	-0.36
Lakes and Standing Waters	0.01	0.00	0.00	-0.01
Rivers	64.23	0.00	0.00	-64.23
Reservoirs	0.01	0.00	0.00	-0.01
Ponds and Linear Features	0.12	0.00	0.00	-0.12
ISMY4 - St. Mary's - Increase desalination plant capcity				
Pastoral	0.02	0.00	0.00	-0.02
COL6 - River Hayle abstraction				
Arable	0.06	0.00	0.00	-0.06
Active Flood Plain	0.19	0.18	0.18	-0.01
COL2 - Colliford PS Stage 2 - River Camel Abstraction				
Pastoral	12.52	0.00	8.84	-3.68
Ancient Woodland	0.15	0.00	0.00	-0.15
Active Flood Plain	0.54	0.38	0.38	-0.16
Rivers	233.14	105.43	105.43	-127.70
COL18 - Porth/Rialton				
Arable	6.11	0.00	5.00	-1.11

Natural capital stock	Area within option boundary pre-construction (Ha)	Stocks present during construction (Ha)	Stocks present post construction (Ha)	Change (Ha)
Active Flood Plain	0.59	0.00	0.00	-0.59
BNW11 - Christchurch WWTW IPR 2 - Transfer to Longham Lakes				
Coastal and Floodplain Grazing Marsh	0.54	0.00	0.54	0.00
Pastoral	1.17	0.00	1.17	0.00
Broadleaved, Mixed and Yew Woodland	0.53	0.00	0.53	0.00
Woodland Priority	1.01	0.00	1.01	0.00
Greenspace	0.13	0.00	0.13	0.00
Urban Semi Natural Habitat	0.02	0.00	0.02	0.00
Urban Woodland	0.14	0.00	0.14	0.00
COL9 - Leswidden Pool				
Arable	1.78	0.00	1.78	0.00
Dwarf Shrub Heath	0.35	0.00	0.35	0.00
ROA15 - Gatherley Phase 2				
Arable	5.39	0.00	5.39	0.00
Pastoral	7.96	0.00	7.96	0.00
Other semi-natural Grassland	0.19	0.00	0.19	0.00
Broadleaved, Mixed and Yew Woodland	0.41	0.00	0.41	0.00
Woodland Priority	2.02	0.00	2.02	0.00
COL11 - Hawk's Tor Pit				
Pastoral	1.22	0.00	1.22	0.00
Dwarf Shrub Heath	1.46	0.00	1.46	0.00
WIM5 - Indirect potable reuse - stream support for Dotton WTW				
Pastoral	2.03	0.00	2.03	0.00
Coniferous Woodland	0.07	0.00	0.07	0.00
Greenspace	0.01	0.00	0.01	0.00
BNW3 - Bournemouth - Wimborne transfer to Longham - Licence Change				
Coastal and floodplain Grazing Marsh	1.20	0.00	1.20	0.00
Pastures	0.87	0.00	0.87	0.00
Woodland Priority Habitat	0.001	0.00	0.001	0.00
Coniferous Woodland	0.59	0.00	0.59	0.00
Active Floodplain	0.38	0.38	0.38	0.00
Rivers (length)	0.09	0.09	0.09	0.00
ROA16 - Littlehempston WTW				
Arable	2.68	0.00	2.68	0.00

Table 3.2: Quantitative detailed assessment of the unmitigated predicted permanent impacts on the provision of ecosystem services

Ecosystem services	Baseline value (£/year)	Estimated value post construction (£/year)	Temporary impact from construction (£/year)	Total future value (£/year)	Overall change in value (£/year)
ROA13 - Duckaller and Vennbridge					
Carbon storage	£6.90	£0.00	-6.90	£0.00	-£6.90
Food production	£57.00	£0.00	-57.00	£0.00	-£57.00
Total	£63.90	£0.00	-£63.90	£0.00	-£63.90
ROA14 - Raise Avon Dam					
Carbon storage	£1,137.07	£0.00	-£1,137.07	£0.00	-£1,137.07
Total	£36,812.47	£0.00	-£36,812.47	£29,024.98	-£7,787.49
ROA12 - Slade and Horedown WTW (GAC)					
Carbon storage	£594.74	£0.00	-£594.74	£5.40	-£589.34
Natural hazard management	£0.35	£0.00	-£0.35	£0.26	-£0.09
Food production	£1,100.00	£0.00	-£1,100.00	£0.00	-£1,100.00
Total	£1,695.09	£0.00	-£1,695.09	£5.67	-£1,689.42
ISMY4 - St. Mary's - Increase desalination plant capacity					
Carbon storage	£3.16	£0.00	-£3.16	£0.00	-£3.16
Total	£3.16	£0.00	-£3.16	£0.00	-£3.16
COL6 - River Hayle abstraction					
Carbon storage	£2,608.60	£0.00	-£2,608.60	£1,954.58	-£654.02
Natural hazard management	£126.59	£0.00	-£126.59	£94.94	-£31.65
Food production	£36.00	£0.00	-£36.00	£0.00	-£36.00
Total	£2,771.19	£0.00	-£2,771.19	£2,049.52.00	-£721.67
COL2 - Colliford PS Stage 2 - River Camel Abstraction					
Carbon storage	£3,700.13	£0.00	-£3,700.13	£2,574.75	-£1,125.39
Natural hazard management	£73.93	£0.00	-£73.93	£45.72	-£28.21
Food production	£1,200.00	£0.00	-£1,200.00	£0.00	-£1,200.00
Total	£4,974.06	£0.00	-£4,974.06	£2,620.47	-£2,353.60
COL18 - Porth/Rialton					
Carbon storage	£252.10	£0.00	-£252.10	£205.53	-£46.57
Natural hazard management	£0.60	£0.00	-£0.60	£0.45	-£0.15
Food production	£373.00	£0.00	-£373.00	£0.40	-£373.00
Total	£625.69	£0.00	-£625.69	£205.97	-£419.72
BNW11 - Christchurch WWTW IPR 2 Transfer to Longham Lakes					
Carbon storage	£3,242.77	£0.00	-£3,242.77	£2,475.41	-£767.36
Natural hazard management	£149.10	£0.00	-£149.10	£111.82	-£37.27
Air Pollutant Removal	£485.85	£0.00	-£485.85	£364.98	-£120.87
Total	£3,877.72	£0.00	-£3,877.72	£2,952.21	-£925.50
COL9 - Leswidden Pool					
Carbon storage	£69.94	£0.00	-£69.94	£69.94	£0.00
Total	£69.94	£0.00	-£69.94	£69.94	£0.00
ROA15 - Gatherley Phase 2					
Carbon storage	£5,839.25	£0.00	-£5,839.25	£4,729.15	-£1,110.09

Ecosystem services	Baseline value (£/year)	Estimated value post construction (£/year)	Temporary impact from construction (£/year)	Total future value (£/year)	Overall change in value (£/year)
Natural hazard management	£215.69	£0.00	-£215.69	£161.77	-£53.92
Total	£6,054.94	£0.00	-£6,054.94	£4,890.92	-£1,164.02
COL11 - Hawk's Tor Pit					
Carbon storage	£177.06	£0.00	-£177.06	£177.06	£0.00
Total	£177.06	£0.00	-£177.06	£177.06	£0.00
WIM5 - Indirect potable reuse - stream support for Dotton WTW					
Carbon storage	£722.19	£150.02	-£622.17	£690.57	-£81.61
Natural hazard management	£6.23	£0.00	-£6.23	£4.67	-£1.56
Total	£778.41	£150.02	-£628.39	£695.24	-£83.17
BNW3 - Bournemouth - Wimborne transfer to Longham - Licence Change					
Carbon storage	£2,851.44	£0.00	-£2,851.44	£2,170.41	-£681.03
Natural hazard management	£52.05	£0.00	-£52.05	£39.03	-£13.01
Total	£2,903.49	£0.00	-£2,903.49	£2,209.45	-£694.04
ROA16 - Littlehempston WTW					
Carbon Storage	£105.42	£0.00	-£105.42	£105.42	£0.00
Total	£105.42	£0.00	-£105.42	£105.42	£0.00

Table 3.3: Qualitative assessment of the unmitigated predicted impacts on the provision of water purification

Option	Likely baseline provision	Construction impacts	Likely future provision	Overall change in provision
Water purification				
ROA12 - Slade and Horedown WTW (GAC) COL6 - River Hayle abstraction COL2 - Colliford PS Stage 2 - River Camel Abstraction COL18 - Porth/Rialton BNW 10 - Christchurch WWTW IPR 1 BNW11 - Christchurch WWTW IPR 2 - Transfer to Longham Lakes ROA15 - Gatherley Phase 2 WIM5 - Indirect potable reuse - stream support for Dotton WTW. BNW3 - Bournemouth - Wimborne transfer to Longham - Licence Change	The stock likely provides a high provision of the ecosystem service due to the natural capital asset's high capacity to store and absorb pollutants and the proximity of the asset to a water source.	The provision of services will be lost during construction.	The future provision of the ecosystem service provided by the stock will likely be reduced	--
Water flow regulation				
BNW11 - Christchurch WWTW IPR 2 - Transfer to Longham Lakes COL6 - River Hayle abstraction COL9 - Leswidden Pool BNW3 - Bournemouth - Wimborne transfer to Longham - Licence Change	The stocks provide a regulation of water flow, both retaining water within the catchment and providing water to local communities. The preservation of stocks will reduce negative impacts to the ecosystem service.	The provision of services will be retained during construction.	The future provision of the ecosystem service provided by the stock will likely remain.	0
COL2 - Colliford PS Stage 2 - River Camel Abstraction .	The stocks provide a regulation of water flow, both retaining water within the catchment and providing water to local communities. The preservation of stocks will reduce negative impacts to the ecosystem service.	The provision of services will be retained during construction of the pipeline, but there will be losses where the stock overlaps with aboveground infrastructure.	The loss of contributing stocks has the potential to impede water flow on site. The loss of existing stocks will require a Level 2 WFD to further assess the impact of the option on water flow regulation.	--

ROA14 - Raise Avon Dam	The stocks provide a regulation of water flow, both retaining water within the catchment and providing water to local communities. The loss of stocks will increase negative impacts to the ecosystem service.	The provision of water flow regulation services of contributing stocks will be lost during construction. However, the addition of a reservoir will bring additional water flow regulation to the environment.	The loss of contributing stocks has the potential to impede water flow on site. The addition of a reservoir will regulate flows, control water movement, and maintain water supplies in dry periods, enabling a resilient supply of water to consumers, however the loss of existing stocks will require a Level 2 WFD. As such, the impact of the option on water flow regulation cannot be assessed at this stage.	++

Table 3.4: Summary of the unmitigated BNG Metric outputs

Option	Option element	On-site Baseline (BU)	On-Site Post Intervention (BU)	Total Net Unit change (BU)	Total Percentage Change
ROA13	Duckaller and Vennbridge	0.36	0.00	-0.36	-100.00
ROA14	Raise Avon Dam	211.60	115.84	-95.76	-45.26
ROA12	Slade and Horedown WTW (GAC)	17.37	0.01	-17.36	-99.97
ISMY4	St. Mary's - Increase desalination plant capacity	0.56	0.08	-0.48	-86.13
COL6	River Hayle abstraction	17.40	2.28	-15.12	-86.89
COL2	Colliford PS Stage 2 - River Camel Abstraction	74.52	47.73	-26.79	-35.95
COL18	Porth/Rialton	12.34	9.66	-2.68	-21.70
BNW11	Christchurch WWTW IPR 2 - Transfer to Longham Lakes	29.56	10.82	-18.74	-63.40
COL9	Leswidden Pool	7.88	4.24	-3.64	-46.26
ROA15	Gatherley Phase 2	72.50	43.10	-29.40	-40.55
COL11	Hawk's Tor Pit	22.41	7.06	-15.35	-68.51
WIM5	Indirect potable reuse - stream support for Dotton WTW	16.08	14.54	-1.54	-9.55
BNW3	Bournemouth - Wimborne transfer to Longham - Licence Change	20.32	7.18	-3.14	-64.67
ROA16	Littlehempston WTW	5.37	5.18	-0.19	-3.50

The unmitigated BNG outputs have been informed using the predicted impacts on natural capital stocks listed in Table 3.1.

3.2 Summary of NCA and BNG assessments

3.2.1 Natural Capital Assessment

The options identified in Table 3.1 will likely cause temporary and permanent loss of stocks during construction.

Potential temporary loss of woodland stocks (broadleaved, yew, mixed, priority and coniferous) and other habitat stocks is expected during construction. However, best practice mitigation (such as directional drilling) and reinstatement/compensation of habitat means that most natural capital stocks post construction will have little change. Additionally, when habitat is destroyed during construction or implementation and then replaced it is unlikely to retain the same natural capital value.

Potential permanent loss of arable stocks, pastoral stocks, other-semi natural grassland stocks, dwarf heath shrub stocks, active floodplain stocks, river stocks, reservoir stocks and lake stocks are expected to occur under the construction of some options considered. Priority habitats should be avoided whenever possible as certain features within them are irreplaceable once destroyed. Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction will likely cause the permanent loss of ancient woodland. Ancient woodland is a high value natural capital stock that cannot be replaced or replicated once lost, therefore, future provision of stock presumed permanently lost.

The NCA and BNG assessments undertaken are considered the worst case-scenario of the impact the options will likely have on the environment.

3.2.2 Ecosystem Services

The options are likely to generate the temporary and permanent loss of natural capital stocks during construction. However, habitat expected to be reinstated/compensated to pre-construction conditions following best practice technique will likely have no permanent impact to the provision of ecosystem services. Broadleaved, mixed and yew, priority, coniferous and urban woodland have a significant maturity time with a delay of 30 years. Therefore, this delay is considered within potential future provision of this stock through the ecosystem services assessment. This can be accounted to the tree mortality rate presumed after woodland areas are replanted.

Construction impacts include the release of CO_2 due to habitat clearance, loss of natural hazard management, loss of removal of air pollutants and a reduction in water purification. However, it is not expected to affect the future value as temporarily affected stocks are expected to be reinstated. However, permanently impacted stocks will likely not be replaced post-construction hence construction impacts will lead to the permanent loss of the above-mentioned ecosystem services. Permanent loss of arable and pastoral stocks will likely result in the loss of food production.

Priority habitats such as ancient woodland are irreplaceable and once lost cannot be replaced. Therefore, the future provision of ecosystem services provided by ancient woodland, namely carbon sequestration, natural hazard management, water purification and air pollutant removal will be permanently lost.

The options present an opportunity to improve the existing habitats through post construction remediation and replacement of low value habitats with higher value habitats. The scheme element crosses several priority habitats Network Enhancement Zones and is therefore suitable for the planting of new high value habitats.

3.2.3 Biodiversity Net Gain

Applying the methodology, the scheme element will result in the loss of BNG habitat units due to the temporary and permanent removal of habitats during construction.

3.3 Scoped Out Options

A total of 28 options were scoped out. Table 3.5 below outlines the scoped-out options.

Further Natural Capital and Biodiversity Net Gain Assessment has been scoped out due to the option setting and available option information. The options are not expected to generate any land use change or direct impacts on natural capital. No future natural capital creation has been specified as part of the option. Any additional impacts within the option ZoI will be captured within the SEA, WFD & resilience assessments.

Table 3.5: Summary of scoped out options.

Option ID	Option
COL3	Abstraction of Colliford compensation flows when making supply releases
COL4	Abstraction of Siblyback compensation flows when making supply releases
COL5	Increase Wendron annual licence and de-couple from Stithians
COL12	Stannon daily abstraction increase
COL15	Restormel WTW
COL19	Boswyn stream/Cargenwen Reservoir/Carwynnen stream
COL20	River Fal new abstraction
COL2	Colliford PS Stage 2 - River Camel Abstraction
ROA2	River Erme
ROA3	River Yealm
ROA4	Abstraction of Roadford compensation flow at Gunnislake when making supply releases
ROA6	Upper Tamar Lake increasing annual license
ROA7	Expansion of Northcombe WTW to 60 Ml/d
ROA8	Tottiford WTW - reduce WTW minimum capacity
ROA10	Avon WTW - reduce WTW minimum capacity
ROA11	Meldon WTW - reduce WTW minimum capacity
WIM1	Abstraction of Wimbleball compensation flow at Northbridge when making supply releases
WIM2	Sidford borehole commissioning
WIM4	Wilmington springs annual abstraction increase
WIM6	Increase Allers WTW capacity
WIM7	Increase Pynes to licence limit 66.46 Ml/d
WIM8	Brampford Speke borehole
WIM9	Stoke Canon borehole
BNW1	Lymington groundwater source development and remedial works
BNW6	Longham Aquifer Recharge
ISMY1	St. Mary's new borehole (location 1)
ISMY2	St. Mary's new borehole (location 2)
ISB4	Bryher - Increase Existing Desalination Plant Capacity
IST1	Tresco new borehole

4 Cumulative and in-combination effects assessment

4.1 Introduction

The final task in SWW's option appraisal process is the programme appraisal. Fundamentally, the aim of the programme appraisal process is to find the 'best value' programme of supply and/or demand management options to secure a supply-demand balance across the SWW supply region.

This Chapter provides a summary of the outputs of the NCA and BNG for SWW's programme appraisal for the constrained options that were considered to inform decisions on the development of the WRMP24.

4.2 Methodology

For NCA and BNG, the in-combination and cumulative effects only consider the Best Value Plan and does not include an assessment of the Best Value Alternative or Least Cost Plan. The in-combination effects assessment for the Best Value Plan considers the option assessments as a whole and the habitat units that would be required to be purchased to achieve a 10% net gain in BNG. This provides an estimate of the value of the potential mitigation or enhancement opportunities that will need to be developed further to achieve the 10% BNG required within the options. Additionally, where possible, the Best Value Plan could aim to not only reinstate lost habitat, but also provide a greater or more diverse habitat than is lost, to achieve overall Biodiversity Net Gain in line with regulatory requirements for BNG (at the time of the project consenting) as stated as a mandatory requirement within the Environment Act 2021. The latter could be achieved by identifying local sites of ecological interest and proposing measures which enhance these features.

The in-combination and cumulative effects assessment for NCA and BNG considers the major planning applications, allocations, and major projects, that have been reviewed as part of the project, in conjunction with the Best Value Plan, and provides a high-level overview of the potential impacts, mitigation and enhancement opportunities SWW could look to increase BNG and the provision of ecosystem services.

4.3 Best Value Plan

4.3.1 Options selected for the Best Value Plan

As stated in the introduction, the purpose of the update to this technical is to reflect the updated selection of options for the BVP and to update the Natural Capital Assessment and Biodiversity Net Gain assessments accordingly.

In combination and cumulative effects have been assessed for options which fall under the Best Value Plan (BVP) laid out by SWW. The options selected as part of the Best Value Plan for the SWW WRMP24 are presented in Table 4.1. Those options scoped out of the NCA and BNG in combination and cumulative effects assessment are presented in Table 4.2. It should be noted that options BNW 7 and BNW 8, which comprise the Mendip Quarry SRO, have been excluded from the in-combination and cumulative effects assessment at this stage, due to the available information.

Table 4.1: SWW WRMP24 BVP options

Option title	Brief description
BNW1 - Lymington groundwater source development and remedial works	Lymington groundwater source development and remedial works. Redevelopment of existing sources with increased yields (changes to system operation). Reintroduce more regular use of existing sources. Borehole development, existing borehole works. Third borehole to be drilled at site - new licence = +1Ml/d
BNW3 - Wimborne transfer to Longham - licence change	Smarter conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour.
BNW6 - Longham Aquifer Recharge	Pumping and storage of water into ground during winter months for subsequent abstraction.
BNW11 - Christchurch WWTW IPR 2 - Transfer to Longham Lakes	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.

Option title	Brief description
COL2 - Colliford PS Stage 2 - River Camel Abstraction	New abstraction licence. New river intake and pumping station at Nanstallon, for 90 Ml/d at 120 m head. ~9 mile of 900mm diameter pipeline, from the intake to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110 Ml/d (an increase of 15 Ml/d) Raw water is then pumped to Colliford Reservoir via existing main.
COL9 - Leswidden Pool	Transfer of former quarry water to Drift Reservoir via Sancreed stream.
COL11 - Hawk's Tor Pit	Transfer to Colliford Reservoir
COL15 - Restormel WTW	Increase Restormel WTW capacity to 110 Ml/d. This option would take Restormel WTW up to its maximum licensed capacity and enable more effective use to be made of the Colliford/River Fowey resources system.
ROA7 - Expansion of Northcombe WTW to 60 Ml/d.	Treatment works to be able to deliver a minimum of 60 Ml/d. Additional 10 Ml/d pumping capacity at Roadford reservoir.
ROA10 - Avon WTW - reduce WTW minimum capacity	Reduce WTW minimum capacity (7-5Ml/d).
ROA15 - Gatherley Phase 2	Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125 Ml/d to be transferred to Roadford Reservoir. Dual main required between River Lyd and Roadford Reservoir.
ROA16 - Littlehempston WTW	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs.
WIM2 – Sidford borehole commissioning	Sid Valley groundwater source commissioning. Equip and make operational existing borehole. New groundwater source treatment system.
WIM5 - Indirect potable reuse - stream support for Dotton WTW.	Pump treated effluent from Sidmouth WWTW directly to the river Otter using a new pipeline (3 km) and outfall to augment the river during low flow periods.
WIM7 - Increase Pynes to licence limit 66.46 Ml/d	Increase Pynes to licence limit 66.46Ml/d. Upgrade WTW to treat an additional 6.5Ml/d. with distribution network improvements.
WIM8 - Brampford Speke borehole.	Re-introduction of North Exeter groundwater source west of the Exe
WIM9 - Stoke Canon borehole.	Re-introduction of North Exeter groundwater source east of the Exe.

4.3.2 In-combination and cumulative effects assessment

Table 4.2: Options scoped out of the NCA and BNG in-combination and cumulative effects assessment

Option
BNW1 - Lymington groundwater source development and remedial works
BNW6 - Longham Aquifer Recharge
BNW7 - SRO - New storage: Mendips Quarry to River Stour (30 Ml/d)
BNW8 - SRO - New source: Poole Harbour effluent reuse
COL12 - Stannon daily abstraction increase
COL3 - Abstraction of Colliford compensation flows when making supply releases
COL4 - Abstraction of Siblyback compensation flows when making supply releases
COL5 - Increase Wendron annual licence and de-couple from Stithians
COL15 - Restormel WTW
ROA4 - Abstraction of Roadford compensation flow at Gunnislake when making supply releases
ROA6 - Upper Tamar Lake increasing annual license
ROA7 - Expansion of Northcombe WTW to 60 Ml/d
ROA10 - Avon WTW - reduce WTW minimum capacity
WIM1 - Abstraction of Wimbleball compensation flow at Northbridge when making supply releases
WIM2 - Sidford borehole commissioning
WIM4 - Wilmington springs annual abstraction increase
WIM7 - Increase Pynes to licence limit 66.46 Ml/d
WIM8 - Brampford Speke borehole

Option
WIM9 - Stoke Canon borehole

Table 4.3: Predicted temporary and permanent impacts on natural capital stocks for the BVP

Natural capital stock	Area within option boundary pre-construction (Ha)	Stocks present during construction (Ha)	Stocks present post construction (Ha)	Change (Ha)
Coastal and floodplain grazing marsh	1.74	0.00	1.74	0.00
Arable	26.93	0.00	26.93	0.00
Pastures	27.90	0.00	24.22	-3.68
Other semi-natural grassland	0.19	0.00	0.19	0.00
Dwarf Shrub Heath	2.34	0.00	2.34	0.00
Broadleaved, Mixed and Yew Woodland	1.01	0.00	1.01	0.00
Woodland Priority Habitat	3.74	0.00	4.15	0.41
Coniferous Woodland	0.67	0.00	0.67	0.00
Ancient Woodland	0.15	0.00	0.00	-0.15
Greenspace	0.20	0.00	0.20	0.00
Urban Semi Natural Habitat	0.02	0.00	0.02	0.00
Urban Woodland	0.14	0.00	0.14	0.00
Active floodplain	7.57	7.41	7.41	--0.16
Lakes and Standing Waters	0.03	0.03	0.03	0.00
Modified waters (reservoirs)	0.01	0.01	0.01	0.01
Rivers	1621.86	1494.15	1494.15	-127.71
Ponds & linear features	0.05	0.05	0.05	0.00

Table 4.4: Quantitative detailed assessment of the unmitigated predicted permanent impacts on the provision of ecosystem services for the BVP

Ecosystem services	Baseline value (£/year)	Estimated value post construction (£/year)	Temporary impact from construction (£/year)	Total future value (£/year)	Overall change in value (£/year)
Carbon storage	£17,458.99	£0.00	-£17,458.99	£14,202.03	-£3,256.96
Natural hazard management	£505.91	£0.00	-£505.91	£396.71	-£109.20
Air Pollutant Removal	£1,852.59	£0.00	-£1,852.59	£1,532.22	-£320.37
Food Production	£1,200.00	£0.00	-£1,200.00	£0.00	-£1,200.00
Total	£21,017.49	£0.00	-£21,017.49	£16,130.95	-£4,886.54

Table 4.5: Qualitative assessment of the unmitigated predicted impacts on the provision of water purification and water flow regulation for the BVP

Option	Likely baseline provision	Construction impacts	Likely future provision	Overall change in provision
Water provision				
BVP	Scoped in as the option causes the temporary loss of associated stock. Stock is expected to be replaced/compensated through inset re-planting schemes. However broadleaved/coniferous/priority/urban woodland have significant maturity time with a delay of 30 years. As a result, the potential provision of these stocks will be reduced. Ancient Woodland is a high value natural capital stock that cannot be replaced or replicated once lost, therefore, future provision of stock presumed permanently lost.	The provision of services will be lost during construction.	The future provision of the ecosystem service provided by the stock will likely be reduced	-
Water flow regulation				
BVP	The stocks provide a regulation of water flow, both retaining water within the catchment and providing water to local communities. The preservation of stocks will reduce negative impacts to the ecosystem service.	The provision of services will be retained during construction.	The future provision of the ecosystem service provided by the stock will likely remain.	0

Table 4.6: Summary of the unmitigated BNG Metric outputs for the BVP and the BNG habitat units required to be purchased to achieve 10% BNG

BVP	On-site Baseline (BU)	On-Site Post Intervention (BU)	Total Net Unit change (BU)	Total Percentage Change	BNG habitat unit purchase (BU)
BVP	275.18	159.05	-116.13	-42.20%	143.65

4.4 Opportunities

Opportunities should be considered to ensure that the natural environment is left in a better condition than pre-construction conditions for the BVP. This should be achieved by one or both of the following:

- **Mitigation**: Opportunities to offset the net loss of biodiversity asset(s) and/or natural capital stock(s) (ecosystem service).
- **Enhancements**: Opportunities that, once introduced and established, would result in a net gain to a biodiversity asset and/or natural capital stock(s) (ecosystem service).

As a core principle, where possible, the BVP should aim to not only reinstate lost habitat, but also provide a greater or more diverse habitat than is lost, to achieve overall BNG. The latter could be achieved by identifying local sites of ecological interest and proposing measures. Any habitats that are created or enhanced to achieve BNG are required to be secured for 30 years, through management, maintenance, and monitoring. The natural capital map which is based on the methodology described in the NECR285 (see Section 2) should be utilised, where possible, to assist in identifying opportunities to improve natural capital.

A summary of the potential NCA, BNG mitigation and enhancement measures for each sub-component type of the BVP are outlined in Table 4.7. Further explanation into the potential enhancement measures is provided within the sections below.

Table 4.7: Summary of potential net gain mitigation and enhancement opportunities

Option element	Mitigation opportunity	Enhancement opportunity
All option elements	Option layouts to be amended to avoid the permanent loss of high value natural capital assets that once lost, cannot be easily reinstated. Assets include ancient woodland and traditional orchards.	Creation of higher value habitat within grassland, arable and pasture natural capital assets onsite to achieve an increase in Biodiversity Units (BU) and work towards a 10% uplift in BNG.
	Options to identify area for the creation and/or reinstatement of high value natural capital assets, including: Coastal and floodplain grazing marsh Lowland fens Lowland raised bog Reedbeds Blanket bog Hay meadows Dwarf shrub heath Broadleaved, mixed and yew woodland Coniferous woodland Bluespace Greenspace	Habitat creation work within the adjacent priority habitats. Options fall within or are in the vicinity of habitat network zones[18]: Habitat restoration-creation Restorable habitat Fragmentation action zone Network enhancement zones 1 and 2 Expansion zone These areas identify specific locations for a range of actions to help improve the ecological resilience for each of the habitats/habitat networks. The options should look to identify habitat network zones and priority habitats within the near vicinity and look to improve/create/restore habitats which would help to work towards increasing BU and work towards a 10% uplift in BNG.
	Construction practices to be considered to reduce the amount of clearance required for, especially in areas that include high value natural capital assets (see above for list).	Increase the quality/quantity of freshwater assets, including lakes, ponds located in designated SSSIs, pending detailed assessment of local conditions and available space.
	Directional drilling to be used where possible to avoid loss of high value natural capital assets (see above for list).	Options to identify suitable areas offsite for the creation, enhancement and/or restoration to develop off-site net gains, working towards achieving a 10% uplift in BNG.
		Identify areas of local peatland restoration
Wastewater treatment works, abstraction and treatment works, and other option elements that contain above ground infrastructure		Seeding of grassland within footprints of the above ground infrastructure, where possible.

4.4.1 BNG Unit Purchase

BNG can be achieved via a new statutory biodiversity credits scheme. Credits can be bought by developers as a last resort when onsite and local offsite provision of habitat cannot deliver the BNG required. The price

[18] Edwards J, Knight M, Taylor S & Crosher I. E (May 2020) 'Habitat Networks Maps, User Guidance v.2', Natural England

of biodiversity credits will be set higher than prices for equivalent biodiversity gain on the market and are expected to be purchased through a national register for net gain delivery sites. Natural England is in the process of running pilot schemes to provide a practical insight into the implications of the scheme, which is expected to go live spring 2023. The estimated BU credits that the BVP would be required to purchase to achieve a 10% BNG is 143.65.

Habitat creation possibilities, other than unit purchase, to achieve a 10% BNG gain include:

- On-site: Improve the existing habitats on-site through post construction remediation and replacement of low BNG value habitats with higher BNG value habitats
- Off-site: Purchase suitable areas of off-site land within the local area and/or at a regional scale to offset BNG decrease by improving the existing habitats within the off-site land and/or by replacing existing habitats with higher BNG value habitats.
- On-site and off-site: Improve existing habitats and/or replacement of low BNG value habitats with higher BNG value habitats as part of the catchment management options.

It is important that, where possible, SWW starts to consider reaching out to local non-government organisation and planning authorities who may potentially be able to carry out BNG both onsite and offsite. Early engagement may help to get the best ideas of local opportunities for enhancement, how this can be achieved, local priorities and limiting factors.

SWW and Mott MacDonald are looking at the BNG opportunities through Opensource spatial datasets to produce opportunity mapping for the SWW operational area and relevant Local Planning Authority. This will enable SWW to understand how they may provide 10% net gain in BNG for their options going forward.

5 Conclusions and Next Steps

5.1 Overall Conclusion

The NCA, BNG and ecosystem services outputs identified the following:

- NC: The options will cause the temporary and permanent loss of natural capital stocks. Colliford Reservoir Pumped Storage Stage 2 - Lower River Camel Abstraction is likely to cause the permanent loss of ancient woodland, that once lost cannot be replaced.
- BNG: The options are likely to result in a loss of BNG habitat units due to the temporary loss of natural capital assets during construction. Mitigation and enhancement opportunities for the scheme have been suggested within Section 4, which can work in tandem to reducing the loss of BNG and introducing net gain.
- Ecosystem services: The scheme presents opportunities to improve the existing habitats along the route through post construction remediation and replacement of low value habitats with higher value habitats. The potential permanent loss of ancient woodland, river stocks and active flood plain, could result in the permanent loss of several ecosystem services that the stocks provide in synergy, including water purification, carbon sequestration, natural hazard management and air pollutant removal. The potential permanent loss of pastoral stock could result in the permanent loss of food production.

5.2 Next Steps

The opportunities identified in the BNG/NC assessment have the potential to contribute to government ambitions for environmental net gain. This could take the form of habitat compensation, creation and/or species relocation schemes. Any options would need to be taken forward based on a comprehensive understanding on the interaction between natural systems and between natural systems and social uses of land.

The options could consider some opportunities to create and improvement habitat on-site and off-site through local schemes, NRNs and wildlife corridors to achieve a 10% net gain in BNG units and increase the provision of ecosystem services, therefore aiding in developing more resilient options for the future provision of water for SWW WRMP24.

6 Appendix

6.1 Natural capital stocks and mapping methodology

Table 6.1: Sources for the mapping methodology of natural capital stocks.

Broad Natural Group	Subgroup	Mapping Methodology
Freshwater	Active flood plain	Areas at high or medium risks within the Environment Agency (EA)'s Risk of Flooding from Rivers and Sea dataset.
	Blanket Bog	Area of blanket bog mapped using Natural England's Priority Habitat Inventory.
	Chalk Rivers*	Mapped using the EA chalk rivers dataset and mapping intersections with OS watercourse polygons
	Coastal and floodplain grazing marsh	Area of coastal floodplain and grazing marsh mapped using Natural England's Priority Habitat Inventory
	Lakes and standing waters	Area of lakes and reservoirs mapped using the Centre for Ecology and Hydrology (CEH)'s UK Lakes Portal dataset.
	Lowland Fens	Area of lowland fens mapped using Natural England's Priority Habitat Inventory.
	Lowland raised bog	Area of lowland raised bog mapped using Natural England's Priority Habitat Inventory
	Modified waters e.g., reservoirs	Area of reservoirs mapped by selecting Ordnance Survey (OS) surface water polygons (VectorMap District) that coincide with CEH's Inventory of UK reservoirs (points).
	Other semi-natural habitats	Area of other semi-natural habitat mapped using Natural England's Priority Habitat Inventory (including upland and lowland grasslands, heathland and saltmarsh).
	Ponds and ditches	Mapped by selecting surface waterbodies (from OS VectorMap District) that do not intersect rivers, are smaller than 2ha in size.
	Reedbeds	Area of reedbed habitat mapped using NE's Priority Habitat Inventory
	Rivers	Length of rivers mapped using EA's Water Framework Directive (WFD) river waterbodies dataset (cycle 1, to include coastal streams
Mountain, Moor and Heath	Blanket bog	Area of blanket bog mapped using Natural England's Priority Habitat Inventory.
	Dwarf shrub heath	Mapped using Natural England's Priority Habitat Inventory ('fragmented heath', 'lowland heathland' and 'upland heathland')
	Inland rock, scree and pavement (AML*)	Area of inland rock and limestone pavement above the moorland line, mapped using CEH's LCM2015 ('inland rock'), Natural England's Priority Habitats Inventory ('limestone pavement') and the Rural Payment Agency (RPA)'s Moorland Line dataset.
	Lakes and Reservoirs	Area of lakes and reservoirs above the moorland line, mapped using CEH's UK Lakes dataset, CEH's Inventory of UK reservoirs dataset and RPA's Moorland Line dataset.
	Mountain heath and willow scrub	Area of mountain heath and willow scrub mapped using Natural England's Priority Habitat Inventory.
	Rivers (AML)	Length of rivers mapped using EA's WFD river waterbodies dataset and RPA's Moorland Line dataset.

Broad Natural Group	Subgroup	Mapping Methodology
	Semi-natural grassland (AML*)	Area of semi-natural grassland above the moorland line, mapped using Natural England's Priority Habitat Inventory and RPA's moorland line dataset.
	Upland flushes fens and swamps	Area of upland flushes, fens and swamps, mapped using Natural England's Priority Habitat Inventory.
	Wood pasture (AML*)	Area of wood pasture above the moorland line, mapped using Natural England's provisional Wood-Pasture and Parkland BAP Priority Habitat Inventory and RPA's Moorland line dataset.
	Woodland (AML*)	Area of woodland above the moorland line, mapped using FC's National Forest Inventory and RPA's moorland line dataset.
Urban	Blue space	Mapped by intersecting OS VectorMap District Surface Water with the Office for National Statistic (ONS)'s Built-Up areas dataset.
	Green space - not semi-natural	Area of urban green space (not semi-natural), mapped using the OS Open Greenspace Layer.
	Open mosaic habitats	Area of open mosaic habitats on previously developed land, mapped using Natural England's draft Open Mosaic Habitat dataset
	Woodland, scrub and hedge	While urban scrub and hedge are difficult to map at a national scale, the area of urban woodland is mapped here by intersecting FC's National Forest Inventory with ONS Built-Up Areas.
	Semi-natural habitats	Mapped by intersecting Natural England's Priority Habitat Inventory habitats (excluding woodland, good quality semi-improved grassland and traditional orchards) with ONS Built-Up Areas
Farmland	Arable and rotational leys	Area of arable and rotational leys, and horticulture individually, this map shows the area of arable and horticulture combined. Mapped using UK Land Cover 2018 Sub Classes.
	Horticulture	Area of arable and rotational leys, and horticulture individually, this map shows the area of arable and horticulture combined. Mapped using CEH's Land Cover Map 2015 (LCM2015).
	Improved grassland	Area of improved grassland mapped using CEH's LCM2015.
	Orchards and top fruit	Area of orchards and top fruit mapped using Natural England's Priority Habitat Inventory ('traditional orchards')
Woodland	Ancient Woodland	Mapped using Natural England's Ancient Woodland dataset.
	Broadleaved, mixed and yew woodland	Mapped using FC's National Forest Inventory.
	Coniferous woodland	Area of coniferous woodland mapped using FC's National Forest Inventory
	Woodland priority habitats	Mapped using Natural England's Priority Habitat Inventory ('deciduous woodland').
Grasslands	Hay meadows	Area of hay meadow mapped using Natural England's Priority Habitat Inventory ('upland meadow' and 'lowland meadow').
	Other semi-natural grasslands	Area of other semi-natural grassland, mapped using Natural England's Priority Habitat Inventory ('upland calcareous', 'lowland calcareous', 'lowland dry acid', 'good quality semi-improved', 'grass moorland' and 'purple moor grass and rush pasture').
Coastal	Beach	Area of beach mapped using OS VectorMap District ('foreshore'). Note that this dataset includes areas of intertidal sediment as well as beaches.
	Coastal lagoons	Area of coastal lagoons mapped using Natural England's Priority Habitat Inventory ('saline lagoons').
	Mudflats	Area of intertidal mudflats mapped using the EMODnet (Natural England) Intertidal Mudflats dataset.
	Salt marsh	Area of saltmarsh mapped using EA's Saltmarsh Extent dataset.
	Sand dunes	Area of sand dunes mapped using Natural England's Priority Habitat Inventory ('coastal dunes')
	Sea Cliff	Area of sea cliff habitat mapped using Natural England's Priority Habitat Inventory ('maritime cliff and slopes').

Broad Natural Group	Subgroup	Mapping Methodology
	Shingle	Area of shingle mapped using Natural England's Priority Habitat Inventory ('coastal vegetated shingle').
Marine	Intertidal rock	Area of intertidal rock mapped using Natural England's Open Marine Evidence Base (EUNIS code A1).
	Maerl beds	Area of maerl beds mapped using Natural England's Open Marine Evidence Base (EUNIS code A5.51).
	Reefs	Area of potential reefs mapped using JNCC's Potential Annex 1 Reefs
	Sea grass beds	Area of seagrass beds mapped using Natural England's Open Marine Evidence Base (EUNIS code A2.61)
	Shallow subtidal sediment	Area of shallow subtidal sediment mapped using JNCC's UKSea Map 2018 (biozone = shallow circalittoral or infralittoral and substrate = sediment, sand or mud).
	Shelf subtidal sediment	Area of shelf subtidal sediment mapped using JNCC's UKSea Map 2018 (biozone = deep circalittoral and substrate = sediment, sand or mud).
	Subtidal rock	Area of subtidal rock mapped using JNCC's UKSea Map 2018 (substrate = rock).
Soils	Nutrient Status of Soil	Mean estimates of total nitrogen concentration in topsoil (0-15cm depth) - % dry weight of soil, mapped using data produced from Natural England and CEH's 'Mapping Natural Capital' project (2016).
	Soil Carbon/Organic Matter	Mean estimates of carbon density in topsoil (0-15cm depth) – tonnes per hectare, mapped using data produced from Natural England and CEH's 'Mapping Natural Capital' project (2016)
	Soil Biota	Mean estimates of total abundance of invertebrates in topsoil (0-8 cm depth), mapped using data produced from Natural England and CEH's 'Mapping Natural Capital' project (2016)
Indicators of condition	Natural Aquifer Function	Area of groundwater catchment with 'good' quantitative status for WFD 2016, mapped using EA's WFD data and groundwater catchment boundaries (C2).
	Naturalness of Flow Regime	The WFD hydrological regime classification describe the naturalness of river flows. This map shows the length of river with 'high' WFD hydrological status in 2016, mapped using EA's WFD data and river water bodies (C2)
	Lack of Physical Modifications of Water Bodies	Lack of physical modification of rivers, mapped using EA's Reasons for Not Achieving Good Status data (SWMI = 'physical modification'), 2013-2016.
	Presence and Frequency of Pollinator Food Plants	Mean estimates of number of nectar plant species for bees per 2x2m plot, mapped using data produced from Natural England and CEH's 'Mapping Natural Capital' project (2016)
	Chemical status of water bodies	River chemical status for WFD 2016, mapped using EA's WFD data and river water bodies (C2)

* The list of natural capital stocks as described in NERC285 have been supplemented with additional abiotic stocks and key habitats that are vital to the SWW region.

MOTT MACDONALD

SEA Environmental Report ANNEX 5: APPENDIX K

Invasive Non-Native Species (INNS) Risk Assessment

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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SEA Environmental Report ANNEX 5: APPENDIX K

Invasive Non-Native Species (INNS) Risk Assessment

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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Contents

Tables

Tables – Appendices

1 Introduction

1.1 Background

The South West Water (SWW) supply area covers Devon, Cornwall, the Isles of Scilly and parts of Dorset, Somerset, Wiltshire and Hampshire, and provides drinking water to a population of 1.7 million. Water resources in the SWW supply area consists of three large reservoirs, a number of smaller reservoirs, river intakes, and some groundwater sources which are predominantly in East Devon.

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. In the development of a WRMP, companies must follow the Water Resource Planning Guidelines[1] ('Guidelines'). WRMPs should ensure a secure and sustainable supply of water and focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment. The Guidelines state that in developing a WRMP in England and Wales, water companies should screen for a Strategic Environmental Assessment (SEA) and carry out a full SEA if required.

A SEA is required for the South West Water WRMP 2024 ('WRMP24') under the *Environmental Assessment of Plans and Programmes Regulations 2004* ('SEA Regulations')[2], which require an assessment of the effects of certain plans and programmes on the environment.

The SEA also works to inform the decision-making process through the identification and assessment of significant and cumulative effects that a plan or programme may have on the environment. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders.

One of the objectives for the South West Water WRMP24 is to reduce the spread or presence of Invasive Non-Native Species (INNS).

1.2 Scope of this report

The scope of this report is to identify and evaluate the potential for options within the WRMP24 to spread INNS – plants and animals which can spread, and cause harm to the environment and cost to the economy[3]. This report assesses the INNS risk of 42 options in the WRMP, including 17 within the best value plan (BVP). Two Strategic Resource Options (SROs) have been assessed in separate studies, and the results are presented in this report.

At the time of report production, insufficient information was available to undertake any INNS risk assessment of option BNW17 (Cheddar 2 new strategic regional reservoir and transfer).

The aims of this assessment are to:

- Undertake a high-level 'Level 1 screening' of 42 options in the WRMP (non-SROs).

[1] EA, NRW, Defra and Ofwat (2021) *Water Resources Planning Guideline*. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

[2] The SEA Regulations were transposed into United Kingdom (UK) law from the European Union Directive 2001/42/EC, more commonly known as the SEA Directive. The SEA Regulations remain UK law following the UK's exit from the EU.

[3] GB Non-Native Species Secretariat (2022) *Non-native species.* [online] Available at: <Non-native species » NNS (nonnativespecies.org)> [Accessed 26th September 2022]

- Use the results of the Level 1 screening to identify options that require a more detailed 'Level 2 assessment'.
- For those options initially screened as having a Low, Moderate, or High risk, undertake a more detailed 'Level 2 assessment'.
- Outline the results of INNS risk assessments for Strategic Resource Options (SROs).

1.3 Level 1 screening option descriptions

Section 2.1 of the SEA for the WRMP24 provides a high-level description of each of the options screened within this report. The SEA report (document reference: 100107117 | 100107117-MMD-RP-SEA-006-C) should be read in conjunction with this document.

A Level 1 screening was undertaken in order to highlight INNS risk, and to identify options requiring a more detailed Level 2 assessment. The Level 1 screening was applied to 42 options – 37 mainland options and 5 options on the Isles of Scilly (IoS).

The two SROs were not given a Level 1 screening, as Level 2 assessments are undertaken as standard for all SROs.

As described in Section 1.2, insufficient information was available to undertake any INNS risk assessment of option BNW17.

1.4 Level 2 assessment option descriptions

Following the Level 1 screening, 14 mainland options were identified as requiring a Level 2 assessment. No IoS options required a Level 2 assessment. The descriptions of all options for which a Level 2 assessment was undertaken, in addition to the two SROs, are presented below in Table 1.1:

Table 1.1: Descriptions of options for which a Level 2 assessment was undertaken

Option ID	Scheme type	Option name	Option Description
COL2	Direct river abstraction	Colliford PS Stage 2 – River Camel Abstraction	Construction of a new river intake on River Camel and pumping station at Nanstallon to transfer 90 Ml/d to Restormel Water Treatment Works (WTW) via a new 14.4km pipeline. Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15 Ml/d). Raw water is then pumped to Colliford Reservoir via existing main.
COL6	Direct river abstraction	River Hayle Abstraction	Abstraction from River Hayle at existing, disused intake, treat abstracted water at new onsite treatment works.
COL9a and COL9b	New reservoir or development of existing source or development of disused mineral extraction workings	Leswidden Pool	To options under consideration COL9a: Transfer of former quarry water to Drift Reservoir via Sancreed stream.COL9b: Transfer of former quarry water to Drift Reservoir via pipeline. Distance from Leswidden Pool to Sancreed stream is approximately 5km.
COL11	New reservoir or development of existing source or development of disused mineral extraction workings	Hawk's Tor Pit	New transfer from existing Hawk's Tor Pit to existing Colliford Reservoir.

Option ID	Scheme type	Option name	Option Description
COL12	Groundwater sources	Stannon daily abstraction increase	Increase to the daily limit of the abstraction licence of 4 Ml/d to 8 Ml/d for up to three months in any one year. Pumps to be uprated and possible power upgrade. A 0.2 Ml/d stream support facility will be constructed discharging from the lake to the adjacent stream.
COL18	Reintroduce more regular use of existing sources.	Porth/Rialton	This option would approximately yield 4 Ml/day. A new intake structure would be built at existing SWW WTWs at the Rialton site. A Raw Water Pumping Station (RWPS) and pipeline would be required between Rialton and Coswarth. A new WTW would be built at the Coswarth site to treat 6 Ml/day.
COL19	Reintroduce more regular use of existing sources	Boswyn stream/Cargenwen Reservoir/Carwynnen stream	Re-introduce abstractions at Boswyn stream, Cargenwen Reservoir and Carwynnen stream. New WTW at Boswyn Reservoir.
ROA2	Direct river abstraction	River Erme	Relocation of intake on River Erme
ROA3	Direct river abstraction	River Yealm	Relocation of intake on River Yealm
ROA4	Direct river abstraction	Abstraction of Roadford compensation flow at Gunnislake when making supply releases	Abstraction of Roadford compensation flow at Gunnislake when making supply releases. The raw water is transferred to Mayflower WTW in Roborough, using existing infrastructure (pipework and pumping station).
ROA12	Reintroduce more regular use of existing sources	Slade and Horedown WTW (GAC)	Installation of a new pumping station at Slade reservoir and new 4 Ml/d granular activated carbon (GAC) plant at Horedown WTW.
ROA14	Increasing existing resource capacity	Raise Avon Dam	Increased capacity of Avon Dam. Dam to be raised by 2m.
ROA15	Direct river abstraction	Gatherley phase 2	The Roadford ROA15 option would involve the construction of a pipeline to abstract 125 Ml/day from the River Lyd to Roadford Reservoir.
BNW6	Aquifer recharge (AR)	Longham Aquifer Recharge	Bournemouth BNW6 is an aquifer storage and recovery (ASR) option at Longham. The option requires boreholes to be constructed on existing SWW site. Water would come from the Matchams intake site. The approximate yield would be 10 Ml/day.
BNW7	SRO	Mendips Quarry – 30 Ml/d scheme option – Raw water transfer and augmentation of the River Stour	Repurposing an existing quarry into a public water supply reservoir.
BNW8	SRO	Poole Harbour FE-reuse	Poole Harbour effluent reuse.

2 Methodology

2.1 Level 1 Screening

2.1.1 Assessment methodology

The Level 1 screening is based on the concept of risk as the product of the frequency and severity of INNS being transferred as the result of a water resource management option. Therefore, the methodology involves an assessor determining a Frequency of Impact and Severity of Impact which are combined to give an overall Magnitude of Risk.

The Level 1 screening methodology is informed by the Environment Agency's Position Statement on managing the risk of INNS through raw water transfers[4]. The approach to reducing the risk of INNS transfer outlined within this document is focused upon the pathways that transfers create, rather than current INNS distribution. Therefore, the risk magnitude assessment produced by this Level 1 screening relates to the nature of any pathways created by water resource options and the impacts they are likely to have. Thus, the severity of risk is greater if a transfer links previously unconnected waterbodies, or if it involves the transfer of raw fresh or saline water (rather than treated water or groundwater).

2.1.2 Frequency of Risk rating

Table 2.1 below shows the criteria for determining the Frequency of Impact rating.

Table 2.1: Frequency of Impact risk criteria used to assess INNS risk.

Frequency of Impact	Criteria
None	No additional frequency of impact risk beyond risk associated with existing operations
Infrequent	Only occurs in emergency or during situations not considered part of the normal running of the scheme
Periodical	Will happen during start up or shut down, or periodically during routine maintenance or operation of the option
Regular	Will occur throughout the regular operation of the option

Source: Mott MacDonald, 2022.

2.1.3 Severity of Risk rating

Table 2.2 below shows the criteria for determining the Severity of Impact rating.

Table 2.2: Severity of Impact risk criteria used to assess INNS risk.

Severity	Criteria
None	No additional severity of impact risk beyond risk associated with existing operations.
Very Low	Treated water, effluent or groundwater

[4] Environment Agency (2022). Position Statement. Managing the Risk of Spread of Invasive Non-Native Species Through Raw Water Transfers.

Severity	Criteria
Low	Existing pathway between waterbodies or treated water/groundwater/effluent with no INNS risk being transferred
Medium	Change in volume of transfer between waterbodies which are already connected.
High	New pathway between waterbodies not current connected or potential to introduce new INNS not currently observed in the UK

Source: Mott MacDonald, 2022.

2.1.4 Overall Risk rating

Once Frequency of Impact and Severity of Impact have been determined for a WRMP option, the results are combined in the Magnitude of Risk calculation matrix (shown in Table 2.3), in order to generate an overall Magnitude of Risk. Where 'None' was selected for Frequency of Impact and/or Severity of Impact, 'No additional risk' was assigned as the Magnitude of Risk level.

Table 2.3: Calculation matrix for overall INNS risk of option operation.

Frequency/Severity	None	Infrequent	Periodical	Regular
None	0 = No additional risk	0 = No additional risk	0 = No additional risk	0 = No additional risk
Very Low	0 = No additional risk	1 = Very Low	1 = Very Low	1 = Very Low
Low	0 = No additional risk	2 = Low	2 = Low	3 = Low
Medium	0 = No additional risk	3 = Low	4 = Moderate	4 = Moderate
High	0 = No additional risk	4 = Moderate	5 = High	6 = High

Source: Mott MacDonald, 2022.

2.1.5 Progression to Level 2 assessment

All non-SRO options initially screened as having a Low, Moderate or High INNS transfer risk were progressed to Level 2 assessment. Mendip Quarries and Poole Harbour SROs were not screened at Level 1 as Level 2 assessments are undertaken as standard for all SROs.

2.2 Level 2 assessment

2.2.1 Assessment methodology

The Level 2 assessment methodology utilised the SRO Aquatic INNS Risk Assessment Tool (SAI-RAT) ("the tool") developed by APEM on behalf of the Environment Agency (EA) to quantify the INNS risk associated with all WRMP options (both SRO and non-SRO), based on the conceptual design information currently available.

Risk assessments are processes by which the level of risk presented by certain hazards can be assessed, where hazards are anything that can cause harm. The level of risk is typically the combination of the chance and extent of the harm which could be caused. In the case of this tool, the hazard is the potential movement of INNS along key pathways, and the risk is the chance of that movement occurring combined with the extent of the harm this could cause.

The tool takes a pragmatic pathway and source-pathway-receptor model approach to the assessment of INNS risk relating to assets and raw water transfers. A desk-based search for INNS within 1km of the source and pathway is undertaken. The list of High Impact INNS that were cross-referenced for these assessments is detailed within the *UK Technical Advisory Group on the Water Framework Directive Revised classification of aquatic alien species according to their level of impact*[5] revised classification of aquatic alien species - this includes aquatic and riparian species.

The SAI-RAT takes the form of a Microsoft Excel spreadsheet, into which data and information about water transfer options are entered by the assessor to automatically generate an overall risk score. Risk scores are presented as a percentage of the highest potential score, with a higher score signifying an increased risk of introducing and transferring INNS.

For the SRO INNS assessments, the latest environmental assessment results available at the time of writing have been used to inform the INNS assessment. These results are subject to change following any further refinement of the Gate 2 SRO assessment but are unlikely to, given the maturity of the Gate 2 designs. These results will be made available upon publication of the Gate 2 Environmental Assessment Reports for the SROs.

The SAI-RAT requires a significant amount of information about options to be entered in order to assess the level of risk. As WRMP options are in an early stage of conceptualisation, the full range of information was not available for WRMP options. It is likely that a failure to complete fields in the absence of information would result in the general under-estimation of risk; therefore, an alternate approach was adopted for the assessment of INNS risk for non-SRO WRMP options. This method was adopted to find a consistent way to populate the tool for the non-SRO options with limited information available. This approach uses pre-determined default values for criteria where information is not yet available. Appropriate default 'assumed values' were agreed during a workshop in June 2022 (attended by water companies undertaking INNS risk assessments for WRMP24, and assessors working on their behalf). These assumed values are intended to represent the most likely or realistic input values. The use of assumed values in this way gives an estimation of a typical interaction with a pathway or asset, allowing a cautious assessment of risk to be made in the absence of specific information. Assumed values are described and detailed in Appendix A.

The proposed decision process for entering information into the SAI-RAT tool are shown below:

1. For any given criterion, if information is available for the option, then this should be entered into the tool.
2. If information is not available, 'Unknown' should be selected if available.
3. If 'Unknown' is not available to select, then an assumed value should be entered.

2.2.2 Level 2 option input data

Fourteen non-SROs were assessed using the SAI-RAT RA tool and are listed below in Table 2.4. Full details of input data are available in Appendix B.

[5] UK TAG WFD (2015), UK Technical Advisory Group on the Water Framework Directive Revised classification of aquatic alien species according to their level of impact. [online]. Available at: <https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20classification%20of%20alien%20species%20working%20paper%20v7.6.pdf> [Accessed 26th September 2022].

Table 2.4: Options given a Level 2 assessment and the assessed components.

Option name	Level 2 assessment components
COL2 – Colliford PS Stage 2 – River Camel Abstraction	The WTW and transfer to Colliford reservoir in this option is existing infrastructure and therefore only the new water transfer component of the option and pumping station with river intake was assessed.
COL6 – River Hayle Abstraction	This option comprised of one new RWT and WTW. Abstraction is via a disused intake and has therefore been assessed due to new INNS risk associated with abstraction.
COL9a/COL9b – Leswidden Pool	Two routes were assessed for this option. For COL9a two RWT were assessed for the Level 2 INNS assessment. For COL9b, one RWT was assessed. No new assets are planned with either route associated with this option.
COL11 – Hawk's Tor Pit	One RWT was assessed for the Level 2 INNS assessment. No new assets were associated with this option.
COL12 – Stannon daily abstraction increase	Infrastructure is pre-existing, however one RWT was assessed at Level 2 to account for changes in the INNS risk in relation to increase in transfer volume.
COL18 – Porth/Rialton	This option comprised of one new WTW asset, one new Raw Water Pumping Station (RWPS) asset and a new RWT, which were assessed at Level 2.
COL19 – Boswyn stream/Cargenwen Reservoir/Carwynnen stream	This option was comprised of one new WTW asset, two new RWPS assets and one new reservoir asset which were assessed for the Level 2 INNS assessment. Four RWT components were also assessed.
ROA2 – River Erme	One RWPS asset and two RWTs were assessed for the Level 2 INNS assessment.
ROA3 – River Yealm	One RWPS and one RWT were assessed for the Level 2 INNS assessment.
ROA4 – Abstraction of Roadford compensation flow at Gunnislake when making supply releases	The WTW and PS associated with this option are existing infrastructure so were not included within this assessment. RWT uses existing pipework but has been assessed at Level 2 to account for changes in flow.
ROA12 – Slade and Horedown WTW (GAC)	Two assets and one RWT has been assessed for the Level 2 INNS assessment.
ROA14 – Raise Avon Dam	The reservoir associated with this option is pre-existing but has been assessed to account for the new additional INNS risk associated with the increase in water volume.
ROA15 – Gatherley Phase 2	Reservoir associated with this asset is pre-existing and was not assessed. New RWT was assessed at Level 2. No new assets associated with this option.
BNW6 – Longham Aquifer Recharge	Three new RWTs were assessed at Level 2. No new assets were associated with this option.

2.2.3 BNW7 Mendips Quarry – 30 Ml/d scheme option – Raw water transfer and augmentation of the River Stour

This option's Level 2 INNS assessment is documented in a separate report titled *Mendip Quarries SRO Invasive and Non-Native Species Risk Assessment* (Document reference:

100106586 A). The report describes the scenarios tested and includes the input data used in the SAI-RAT. Two raw water transfers and three assets were included in the assessment. A summary of the results is presented within this report.

2.2.4 BNW8 Poole Harbour FE-reuse

Full information regarding this SRO is not yet available and will be updated at a later date.

2.3 Limitations and assumptions

2.3.1 Level 1 screening

These assessments are based on operational INNS transfer risk in accordance with the focus on pathways outlined within the EA position statement on raw water transfers[6]. Construction-phase impacts are best evaluated and mitigated on a case-by-case basis and at a more advanced stage in option design and implementation. It is therefore assumed that construction-phase impacts will be assessed at the appropriate phase of option design, that any construction-phase impacts will be appropriately mitigated, and that biosecurity best practice will be followed.

In accordance with the EA position statement on raw water transfers[4], the Level 1 screening does not account for INNS distribution and other specific local considerations. By progressing all options screened as Low, Moderate or High risk to a Level 2 assessment, all options which may be affected by local issues such as important nature conservation sites or high impact INNS will be subject to this more detailed risk assessment. By their nature, it is unlikely that those options initially screened as presenting No additional risk or Very Low risk would be affected by such local issues, as they will not involve the transfer of raw water likely to contain INNS.

Where no information was available regarding the frequency of water transfers for these options, it was assumed transfer frequency would be Regular, which may not provide a true reflection of the overall frequency of risk within the risk assessment but represents a cautionary approach.

Desalination options were treated with the same methodology as for freshwater options, as saline or brackish environments may harbour invasive species with a tolerance for different salinity levels. The use of saline boreholes was not specifically accounted for in the Severity of Risk details, and therefore these options were considered as sea water. This is because due to the location and type of saline water source, it is possible that these water sources harbour species associated with saline habitats.

At the time of report production, insufficient information was available to undertake any INNS risk assessment of option BNW17 (Cheddar 2 new strategic regional reservoir and transfer). As such, it is not known whether this option would require a Level 2 assessment.

2.3.2 Level 2 assessment

These assessments are based on operational INNS transfer risk as the SAI-RAT does not account for construction-phase impacts, which are best evaluated and mitigated on a case-by-case basis at a more advanced stage in option design and implementation. It is therefore assumed that construction-phase impacts will be assessed at the appropriate phase of option design, that any construction-phase impacts will be appropriately mitigated, and that biosecurity best practice measures will be followed.

[6] Environment Agency (2022). Position Statement. Managing the Risk of Spread of Invasive Non-Native Species Through Raw Water Transfers.

Desalination options were treated with the same methodology as for freshwater options, as saline or brackish environments may harbour invasive species with a tolerance for different salinity levels.

Several input values within the risk assessment tool were not known at this stage of the design and therefore the value 'Unknown' was selected (see Appendix A). Selecting Unknown within the tool results in a median risk score being added for that criterion.

As described in section 2.1.1, 'assumed values' (detailed in Appendix A) were used where 'Unknown' was not available as an option within the tool. For this purpose, it was assumed that staff visits to WTW, wastewater treatment sites and sewerage treatment works will be frequent. Whilst staff visits to reservoirs may still be frequent, maintenance activities are likely to be less so. Sealed water tanks are associated with the storage of treated water and therefore should not involve raw water, or human contact with water. Staff visits and maintenance activities of sealed water tanks are considered likely to be less frequent than for other assets.

The overall level of risk indicated may be subject to change as further information about options become available and more representative input data can be entered.

Recommendations for operation-phase biosecurity measures are not being considered at this stage due to the limited information available for the non-SRO options. Biosecurity recommendations for SRO options may be discussed within their respective reports.

Cumulative effects from the combined risks of interacting options, such as from successive transfer pathways or additional asset maintenance schedules, have not been included in these assessments. It is noted however, that as options are taken forward and more information is available, that the potential for cumulative effects should be considered.

Mitigation is not being considered at this stage due to the limited information available for the non-SRO options. Mitigation for the SRO options is discussed within their respected reports.

3 Results

3.1 Level 1 screening results

3.1.1 Mainland INNS Level 1 screening results

As described in Section 1.2, insufficient information was available to undertake any INNS risk assessment of option BNW17.

Table 3.1As described in Section 1.2, insufficient information was available to undertake any INNS risk assessment of option BNW17.

Table 3. below summarises the results from the INNS risk Level 1 screening assessment of the WRMP24 options for the mainland. Of the 37 options subject to a Level 1 screening, 15 were assessed as having No additional risk, eight were assessed as Very Low risk, eight Low risk, three Moderate risk and three as High risk. Key assumptions associated with each option are highlighted in bold.

As described in Section 1.2, insufficient information was available to undertake any INNS risk assessment of option BNW17.

Table 3.1: Summary of mainland WRMP24 INNS Level 1 screening results.

Option ID	Option name	Description of Risk	Level 1 Risk Magnitude	Level 2 assessment required?
COL2	Colliford PS Stage 2 – River Camel Abstraction	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
COL3	Abstraction of Colliford compensation flows when making supply releases	**No infrastructure changes required, option is licence change to existing reservoir, with increases in abstraction anticipated.** Redevelopment of existing resources with increased yields. No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
COL4	Abstraction of Siblyback compensation flow when making supply releases	**No infrastructure changes required, option is licence change to existing reservoir, with increases in abstraction anticipated.** Redevelopment of existing resources with increased yields. No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
COL5	Increase Wendron annual license and de-couple from Stithians	**No infrastructure changes required, option is licence change to existing reservoir, with increases in abstraction anticipated.** Redevelopment of existing resources with increased yields. No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
COL6	River Hayle Abstraction	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumes any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes

Option ID	Option name	Description of Risk	Level 1 Risk Magnitude	Level 2 assessment required?
COL9a and COL9b	Leswidden Pool	Physical transfer of untreated water (between two locations assumed currently unconnected). Additional risks from pipeline washout and pipeline bursts.	High	Yes
COL11	Hawk's Tor Pit	Physical transfer of untreated water (between two locations assumed currently unconnected). Additional risks from pipeline washout and pipeline bursts.	High	Yes
COL12*	Stannon daily abstraction increase	Increase in physical transfer of untreated water. **Assumed Stannon Lakes already connected to nearby stream but increased discharge could increase INNS transfer risk.**	Moderate	Yes
COL15	Restormel WTW	Increase WTW capacity. **Assumed no new connections between waterbodies or new infrastructure for transporting water.** No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
COL18*	Porth/Rialton	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
COL19	Boswyn stream/ Cargenwen Reservoir/ Carwynnen stream	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
COL20*	River Fal new abstraction	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility at the site of the abstraction. Assumed abstraction is at WTW site and therefore minimal risk of INNS transfer.** Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Very Low	No
ROA2	River Erme	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
ROA3	River Yealm	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
ROA4	Abstraction of Roadford compensation flow at Gunnislake when making supply releases	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility**. Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Low	Yes
ROA6	Upper Tamar Lake increasing annual license	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No

Option ID	Option name	Description of Risk	Level 1 Risk Magnitude	Level 2 assessment required?
ROA7*	Expansion of Northcombe WTW to 60 Ml/d	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
ROA8	Tottiford WTW – reduce WTW minimum capacity	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
ROA10	Avon WTW – reduce WTW minimum capacity	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
ROA11	Meldon WTW – reduce WTW minimum capacity	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
ROA12	Slade and Horedown WTW (GAC)	Physical transfer of untreated water (between two locations assumed currently unconnected). **Assumed any transferred INNS would be treated/removed at water treatment facility.** Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal	Low	Yes
ROA13	Duckaller and Vennbridge	Changes of abstraction licences and redevelopment of existing resources with increased yields. Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS, and that abstraction and transfer will not cause or increase INNS transfer risk. No addition of a new raw water pipeline has been confirmed and therefore this has not been considered in the assessment.**	Very Low	No
ROA14	Raise Avon Dam	This is not a new reservoir, however there is a risk that increased water levels could change the habitat suitability for any INNS present or functionality as a reservoir with respect to usage and connectivity, which could facilitate INNS spread to other waterbodies. Additional risk of option would be connectivity to the wider environment. The additional risk would come from potential periodical transfers with the wider environment associated with recreation or wildlife.	High	Yes
ROA15*	Gatherley Phase 2	Physical transfer of untreated water (between two locations assumed currently connected). Additional risks from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal.	Moderate	Yes
ROA16	Littlehempston WTW	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
WIM1	Abstraction of Wimbleball compensation flow at Northbridge when making a supply releases	Redevelopment of existing resources with increased yields. No additional risk of transfer/movement of invasive or non-native species with this option type. **Assumed sufficient treatment at existing facilities.**	No additional risk	No
WIM2	Sidford borehole commissioning	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS.	Very Low	No

Option ID	Option name	Description of Risk	Level 1 Risk Magnitude	Level 2 assessment required?
WIM4	Wilmington springs annual abstraction increase	**Assumed no infrastructure changes.** No additional risk of transfer/movement of invasive or non-native species with this option type. **Assumed sufficient treatment at existing facilities.**	No additional risk	No
WIM5	Indirect potable reuse – stream support for Dotton WTW	Physical transfer of treated water (between two locations assumed currently unconnected) (no INNS risk as treated water will be free from INNS).	Very Low	No
WIM6*	Increase Allers WTW capacity	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
WIM7*	Increase Pynes to licence limit 66.46 Ml/d	Increase WTW capacity (additional treatment and conventional use). No additional risk of transfer/movement of invasive or non-native species with this option type. **It is assumed that water is taken from existing sources**.	No additional risk	No
WIM8	Brampford Speke borehole	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS.	Very Low	No
WIM9	Stoke Canon borehole	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS.	Very Low	No
BNW1*	Borehole development, existing borehole remedial works	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that abstraction will not cause or increase INNS transfer risk.	Very Low	No
BNW3	Wimborne transfer to Longham - Licence change	Abstraction licence trading. No additional risk of transfer/movement of invasive or non-native species with this option type.	No additional risk	No
BNW6*	Longham Aquifer Recharge	Physical transfer of untreated water (between two locations assumed currently already connected). **Assumed to be stored as open waterbody. Assumed that recharge is over short term and/or intermittent according to conditions, and that water will be re-extracted for use at a later date.**	Moderate	Yes
BNW11	Christchurch WWTW IPR 2 Transfer to Longham Lakes	Physical transfer of treated water (between two locations assumed currently unconnected) (no INNS risk as treated water will be free from INNS).	Very Low	No
BNW7	Mendips Quarry – 30 Ml/d scheme option – Raw water transfer and augmentation of the River Stour	N/A	N/A	SRO – Level 1 assessment not required
BNW8	Poole Harbour FE-reuse	N/A	N/A	SRO – Level 1 assessment not required

Note: Options with an asterisk symbol* are listed as priority options. Source: Mott MacDonald, 2022.

3.1.2 IoS INNS Level 1 screening results

Table 3.2 below summarises the results from the INNS risk Level 1 screening assessment of the WRMP 5 options for the Isles of Scilly. Of the 5 options subject to a Level 1 screening, all were assessed as having Very Low risk. Key assumptions associated with each option are highlighted in bold.

Table 3.2: Summary of Isles of Scilly WRMP24 INNS Level 1 screening results.

Option ID	Option name	Description of Risk	Level 1 risk magnitude	Level 2 assessment required
ISMY1	St. Mary's new borehole (location 1)	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS.	Very Low	No
ISMY2	St. Mary's new borehole (location 2)	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS.	Very Low	No
ISMY4	St. Mary's - Increase Existing Desalination Plant Capacity	Very limited risk as the source water is likely to be entirely free of INNS. It is assumed that groundwater is free of INNS, and that accessing it will not permit any additional inputs of INNS. **Assumed the new borehole be within the desalination plant site.** Increase desalination plant capacity (additional treatment and conventional use) will not create additional risk of transfer/movement of invasive or non-native species.	Very Low	No
ISB4	Bryher - Increase Existing Desalination Capacity	Very limited risk as the source water is likely to be entirely free of INNS**. It is assumed that groundwater is free of INNS**, and that accessing it will not permit any additional inputs of INNS. **Assumed the new borehole be within the desalination plant site.** Increase desalination plant capacity (additional treatment and conventional use) will not create additional risk of transfer/movement of invasive or non-native species.	Very Low	No
IST1	Tresco new borehole	Very limited risk as the source water is likely to be entirely free of INNS. **It is assumed that groundwater is free of INNS,** and that accessing it will not permit any additional inputs of INNS.	Very low	No

Note: Options with an asterisk symbol* are listed as priority options. Source: Mott MacDonald, 2022.

3.2 Level 2 assessment results

As detailed in section 2, Level 1 screenings and Level 2 assessments differ in methodology and risk level scoring, with Level 2 assessments based on a more detailed understanding of each option. The additional details used in a Level 2 assessment may therefore mean that the more detailed assessment results in an apparent lower or higher risk than indicated by the initial screening. Furthermore, the Level 2 assessment produces a final score based on the average of its constituent RWT and asset components. Therefore, the risk score generated by individual components may be masked by this averaging; for example, the relatively high-risk score associated with a reservoir may be averaged with lower risk infrastructure (e.g. pipelines and sealed service reservoirs). In understanding the risk presented by an option, the risk scores of individual components should be examined alongside the overall risk score.

3.2.1 Level 2 INNS risk assessment results

The Level 2 INNS risk assessment results for the options progressed to Level 2 are summarised in Table 3.3 below. It should be noted that these scores do not take into account any engineering interventions that may be required as mitigation to prevent the spread of INNS.

Table 3.3: Level 2 INNS risk assessments results.

Option ID	Option Name	Level 1 Risk Magnitude	Asset component	Asset score	RWT component	RWT score	Overall Risk Level
COL2	Colliford PS Stage 2 - River Camel Abstraction	Low	Pumping station	17.25%	River Camel to Restormel WTW pipeline	32.60%	24.92%
COL6	River Hayle Abstraction	Low	Pumping station	16.05%	River Hayle to new WTW pipeline	46.95%	33.89%
			WTW	25.60%			
COL9a	Leswidden Pool	High	N/A	N/A	Leswidden Pool to Sancreed stream	38.38%	39.38%
					Sancreed stream to Drift reservoir	40.38%	
COL9b			N/A	N/A	Leswidden Pool to Stancreed stream	36.38%	36.38%
COL11	Hawk's Tor Pit	High	N/A	N/A	Hawk's Tor Pit to Colliford Reservoir pipeline	36.98%.	36.98%
COL12	Stannon daily abstraction increase	Moderate	N/A	N/A	Stannon Reservoir discharge to adjacent stream	53.60%	53.60%
COL18	Porth/Rialton	Low	WTW at Coswarth	28.00%	Rialton to Coswarth pipeline	35.98%	31.69%
			RWPS at Rialton	26.80%			
COL19	Boswyn stream/Cargenwen Reservoir/Carwynnen stream	Low	Cargenwen RWPS	16.05%	Cargenwen to Boswyn Reservoir pipeline	51.48%	41.25%
			Carwynnen RWPS	16.05%	Carwynnen to Boswyn Reservoir pipeline	50.48%	
			Boswyn Reservoir	67.49%	Boswyn stream to Boswyn Reservoir gravity abstraction	55.10%	

Option ID	Option Name	Level 1 Risk Magnitude	Asset component	Asset score	RWT component	RWT score	Overall Risk Level
			Boswyn WTW	29.21%	Boswyn Reservoir to Boswyn WTW pipeline	44.20%	
ROA2	River Erme	Low	River Erme RWPS	16.05%	River Erme to South Devon Spine Main pipeline	52.10%	32.91%
					South Devon Spine Main to Littlehempston WTW	47.45%	
ROA3	River Yealm	Low	River Yealm RWPS	16.05%	River Yealm to South Devon Spine Main pipeline	55.10%	33.66%
					South Devon Spine Main to Littlehempston WTW	47.45%	
ROA4	Abstraction of Roadford compensation flow at Gunnislake when making supply releases	Low	N/A	N/A	Gunnislake intake to Mayflower WTW via existing pipeline	50.58%	50.58%
ROA12	Slade and Horedown WTW (GAC)	Low	Slade Reservoir RWPS	17.25%	Slade Reservoir to Horedown WTW pipeline	43.58%	31.87%
			Horedown WTW	23.08%			
ROA14	Raise Avon Dam	High	Avon Dam Reservoir	66.29%	N/A	N/A	66.29%
ROA15	Gatherley Phase 2	Moderate	N/A	N/A	River Lyd to Roadford Reservoir pipeline	46.25%	46.25%
BNW6	Longham Aquifer Recharge	Moderate	N/A	N/A	River Stour to Longham Lakes	40.13%	36.07%
					River Avon to Aquifer	33.60%	
					Longham Lakes to Aquifer	32.98%	
BNW7	Increase Pynes to licence limit 66.46 Ml/d [7]	N/A (SRO)	Newton Meadow WTW-PS	28.31%	River Avon to Torr Reservoir	48.00%	35.48%
			Torr Quarry WTW-PS	26.50%		38.75%	

[7] Mott MacDonald (2022). Mendip Quarries SRO. Invasive and Non-Native Species Risk Assessment. Document reference: 100106586 A

Option ID	Option Name	Level 1 Risk Magnitude	Asset component	Asset score	RWT component	RWT score	Overall Risk Level
			Torr reservoir	51.56%	Torr Reservoir to the River Stour		
BNW8	Poole Harbour FE-reuse	N/A (SRO)	To be assessed				

Source: Mott MacDonald, 2022.

The principal risk associated with the RWTs assessed is the release of raw water into adjacent waterbodies in the event of pipeline bust or leak, which could functionally create a new link for INNS transference.

Options COL2, COL6, ROA2, ROA3 and ROA4 involve the abstraction of water from rivers, which may also increase INNS risk at the source, as a reduction in flow may impact the habitat suitability for INNS in the surrounding environment. However, as the receptors for these transfers are WTWs, there overall risk of INNS transfer is low.

Options ROA15, COL19 and part of BNW6 also involve the abstraction of river water and so face the same risks as the previously discussed options. However, as the receptor of each of these transfers is an open reservoir, any INNS transferred from the source rivers could be introduced into the reservoir. As a result, there is additional risk off INNS spread beyond this point as a result of transference via wildlife, boats, or safety and recreational equipment entering the water and transferring INNS to or from this waterbody.

A transference of INNS risk is also apparent with options COL9a/COL9b and COL11, as although the source of each option is an offline waterbody, there remains a possibility that INNS will have been transferred into these waterbodies (depending on waterbody use and maintenance activities).

As option ROA12 transfers water from a reservoir to a WTW, the main risk associated with this option is likely to be pipeline bursts as INNS will be removed before further transfer within the network. Similarly, the second RWT associated with BNW6 involves the transfer of water to groundwater, which means the main risk associated with transfer is also pipeline bursts.

COL12 and COL9a pose an additional risk as these options both discharge from an offline waterbody into an adjacent stream. This means there is a risk that any INNS present in the source waterbody may be transferred into the stream, and also that additional flows in the receiving stream during operation may spread both introduced and existing INNS further downstream.

While there are no new raw water inputs or transfers into the reservoir associated with ROA14, the increase in water capacity – and therefore surface area of the dam – theoretically creates a greater likelihood of INNS being transferred via wildlife or equipment. This increase in volume may also create additional habitat for INNS.

As option COL18 involves the transfer of raw water from the existing Rialton infrastructure to a service reservoir, the principal risk associated with this option is pipeline bursts as SRs are typically sealed and filled with treated water. Therefore, there is negligible risk of INNS transfer after this point of transfer.

4 Conclusions and recommendations

4.1 Conclusions

4.1.1 Level 1 screenings

Thirty seven mainland options within the WRMP24 were considered for screening to assess the operational risk of INNS spread:

- Fifteen options were given a Risk Magnitude of No additional risk and therefore did not require further assessment
- Eight options scored a Risk Magnitude of Very Low and therefore did not require additional assessment
- Fourteen options scored a Risk magnitude of Low or above and therefore required a Level 2 INNS risk assessment
- The two SRO were not screened at Level 1, as Level 2 assessments are undertaken for all SROs

Five Isles of Scilly options within the WRMP24 were screened to assess the operational risk of INNS spread:

- The Five options were given a risk rating of Very Low and therefore did not require further assessment

4.1.2 Level 2 assessments

Sixteen options were subject to Level 2 INNS assessment, including two SROs. Two sub-options for COL9 have been assessed, COL9a and COL9b. The results are summarised in Table 4.1 below, which shows the highest risk components for each option, in addition to the overall risk scores.

Higher risk scores for both individual components and overall risk indicate a higher INNS transfer risk. Where an option comprises multiple components, the risk scores associated with individual components are likely to be more informative than the overall risk score. Therefore, those schemes which contain the highest risk components may present a high risk, even though other components may act to reduce the average overall risk score.

Table 4.1: Summary of highest risk components and overall risk scores for Level 2 INNS risk assessments.

Option ID	Highest risk component	Highest risk component score	Overall risk score
COL2	RWT pipeline from River Camel to Restormel WTW	32.60%	24.92%
COL6	River Hayle to new WTW pipeline	46.95%	33.89%
COL9a	RWT from Leswidden Pool to Drift Reservoir via Sancreed stream	40.38%	39.38%
COL9b	RWT from Leswidden Pool to Drift Reservoir	36.38%	36.38%
COL11	RWT pipeline from Hawk's Tor Pit to Colliford Reservoir	36.98%	36.98%
COL12	Stannon Reservoir discharge to adjacent stream	53.60%	53.60%
COL18	RWT pipeline from Rialton to Coswath WTW	35.98%	31.69%
COL19	Boswyn Reservoir	67.49%	41.25%

Option ID	Highest risk component	Highest risk component score	Overall risk score
ROA2	River Erme to South Devon Spine Main pipeline	52.10%	32.91%
ROA3	RWT pipeline from River Yealm to South Devon Spine Main pipeline vis a new RWPS	55.10%	33.66%
ROA4	Gunnislake intake to Mayflower WTW via existing pipeline	50.58%	50.58%
ROA12	RWT pipeline from Slade Reservoir to Horedown WTW	43.58%	31.87%
ROA14	Avon Dam Reservoir	66.29%	69.29%
ROA15	RWT pipeline from River Lyd to Roadford Reservoir	46.25%	46.25%
BNW6	Longham RWT	40.31%	36.07%
Mendip Quarries SRO[7]	Torr Reservoir	51.56%	35.48%
Poole Harbour SRO	Assessment to be updated	To be updated	To be updated

Source: Mott MacDonald, 2022.

A lack of detailed information about some options means that risk scores may be subject to change as assessments are re-evaluated in the future.

Of the options for which Level 2 assessments have been undertaken, higher risk scores were given for schemes most likely to create new habitats for INNS or facilitate connectivity between waterbodies. The options assessed as having the lowest risk were those which, based on current understanding, would present a lower risk of creating connections between waterbodies. Therefore, despite the current lack of detailed information about some options, these results are considered to provide an informative assessment of INNS transfer risk.

4.2 Recommendations

It is recommended that the Level 2 INNS risk assessments are revised using the SAI-RAT for options which are taken forward, as more information becomes available.

Appropriate mitigation of INNS risk should be considered for all options which are progressed. The SAI-RAT should be used to highlight those biosecurity and mitigation options of which there is the most confidence of effectiveness.

For options which are likely to be implemented, the INNS risks associated with the construction phase should also be considered and mitigated through best practice measures at an appropriate stage.

It is acknowledged that cumulative effects arising from the interaction of options may arise – such as from successive water transfers or risks or increased use of assets. It is therefore advised that for options being implemented, further consideration is given on a case-by-case basis regarding the potential for cumulative effects through interaction with other options being taken forward. Assessments of this type should account for both inter- and intra-regional effects.

A. Appendix A: Assumed Values for SAI-RAT

With respect to staff visits and maintenance activities at assets, the SAI-RAT requires an estimate of frequency to be entered. The options are the same for each criterion, as follows:

- 0 – never
- 0.5 – rarely (once every 2 years)
- 1 – annually
- 1.5 – monthly
- 2 – weekly

It is likely that the frequency of such visits would vary according to asset type; therefore the 'assumed value' for each activity and asset type within the SAI-RAT is shown in Table A. 1 below.

Table A. 1: Assumed values for staff visit and maintenance activities at assets.

Asset type	Visit or maintenance activity	Assumed value (frequency)	Comment/rationale
Reservoir	Staff site visit (not entering water)	2 (weekly)	Assumes visit frequency should be at least weekly
	Staff site visit entering or in contact with raw water	2 (weekly)	Assumes visit frequency should be at least weekly
	Road vehicle site visit	2 (weekly)	Aligned with staff visits, assuming arrival is most likely to be by road vehicle
	Maintenance not entering water	1 (annually)	Assumes maintenance visits would be relatively infrequent
	Maintenance in water	1 (annually)	Assumes maintenance visits within water would be relatively infrequent
	Transfer of waste sludge to land	0 (never)	Sludge removal not associated with this asset type
Water treatment works	Staff site visit (not entering water)	2 (weekly)	Assumes visit frequency should be at least weekly
	Staff site visit entering or in contact with raw water	2 (weekly)	Assumes visit frequency should be at least weekly
	Road vehicle site visit	2 (weekly)	Aligned with staff visits, assuming arrival is most likely to be by road vehicle
	Maintenance not entering water	2 (weekly)	Assumes maintenance would need to be at least weekly
	Maintenance in water	2 (weekly)	Assumes maintenance would need to be at least weekly
	Transfer of waste sludge to land	1 (annually)	Sludge removal occasionally likely to be needed

Asset type	Visit or maintenance activity	Assumed value (frequency)	Comment/rationale
Sealed water tank	Staff site visit (not entering water)	1.5 (monthly)	Assumes visit frequency should be at least monthly
	Staff site visit entering or in contact with raw water	0 (never)	Sealed water tanks are likely to be used to store treated rather than raw water
	Road vehicle site visit	1.5 (monthly)	Aligned with staff visits, assuming arrival is most likely to be by road vehicle
	Maintenance not entering water	1.5 (monthly)	Assumes relatively frequent maintenance
	Maintenance in water	0 (never)	Maintenance should not involve contact with treated water
	Transfer of waste sludge to land	0 (never)	Asset type should not generate sludge
Wastewater treatment site	Staff site visit (not entering water)	2 (weekly)	Assumes visit frequency should be at least weekly
	Staff site visit entering or in contact with raw water	2 (weekly)	Assumes visit frequency should be at least weekly
	Road vehicle site visit	2 (weekly)	Aligned with staff visits, assuming arrival is most likely to be by road vehicle
	Maintenance not entering water frequency	2 (weekly)	Assumes maintenance would need to be at least weekly
	Maintenance in water frequency	2 (weekly)	Assumes maintenance would need to be at least weekly
	Transfer of waste sludge to land frequency	0.5 (rarely)	Sludge removal occasionally likely to be needed
Sewerage treatment works	Staff site visit (not entering water) frequency	2 (weekly)	Assumes visit frequency should be at least weekly
	Staff site visit entering or in contact with raw water frequency	2 (weekly)	Assumes visit frequency should be at least weekly
	Road vehicle site visit frequency	2 (weekly)	Aligned with staff visits, assuming arrival is most likely to be by road vehicle
	Maintenance not entering water frequency	2 (weekly)	Assumes maintenance would need to be at least weekly
	Maintenance in water frequency	2 (weekly)	Assumes maintenance would need to be at least weekly
	Transfer of waste sludge to land frequency	0.5 (rarely)	Sludge removal occasionally likely to be needed

Source: Mott MacDonald, 2022.

Assets also require assessment for recreational use within the SAI-RAT. In practice, four of the five asset types included (water treatment works, sealed water tank, wastewater treatment site, sewerage treatment works) are unlikely to be accessible for recreational use or by wildlife.

Therefore, these asset types should be assigned a value of 0 ('never') for all recreational activities.

Reservoirs are frequently host to recreational activities and accessible by wildlife, though the extent of this is likely to be variable. In the potential absence of available information, the assumed values for activities relating to recreation or wildlife are shown in Table A. 2 below.

Table A. 2: Assumed values for recreational activities at assets.

Asset	Asset recreational or associated activity	Assumed value (frequency)	Comment/rationale
Reservoir	Angling equipment	2 (weekly)	Angling is a relatively common activity at reservoirs. If permitted at a reservoir, likely to occur frequently
	Live bait	0 (never)	Live bait is not typically allowed at reservoirs
	Fish stocking	1 (annually)	Considered a typical stocking frequency
	Large vessels (over 28ft)	0.5 (rarely)	Vessels of this large size are rarely likely to be brought onto a reservoir
	Small vessels (under 28ft)	2 (weekly)	Boating is a relatively common activity at reservoirs. If permitted at a reservoir, likely to occur frequently
	Water sports equipment (Stand-up paddleboards, canoe, kayaks)	2 (weekly)	Boating is a relatively common activity at reservoirs. If permitted at a reservoir, likely to occur frequently
	Water safety equipment (temporary moorings, jetties, inflatables, buoys)	0.5 (rarely)	It is considered that such equipment is rarely brought to a reservoir
	Mammals/waterfowl on-site	2 (weekly)	If a reservoir is accessible to mammals and waterfowl, they are likely to access the asset frequently
	Recreational walker/jogger/runner	2 (weekly)	Relatively common activities at reservoirs. If reservoir is accessible for this purpose, likely to occur frequently
Water treatment works Sealed water tank Wastewater Treatment site Sewerage Treatment works	Angling equipment	0 (never)	Angling not expected at these asset types
	Live bait	0 (never)	Angling not expected at these asset types
	Fish stocking	0 (never)	Angling not expected at these asset types
	Large vessels (over 28ft)	0 (never)	Boating not expected at these asset types
	Small vessels (under 28ft)	0 (never)	Boating not expected at these asset types
	Water sports equipment (SUPs, Canoe, Kayaks)	0 (never)	Water sports not expected at these asset types
	Water safety equipment (temporary moorings, jetties, inflatables, buoys)	0 (never)	Associated activities not expected at these asset types
	Mammals/waterfowl on-site	0 (never)	Mammals/waterfowl unlikely to access these asset types

Asset	Asset recreational or associated activity	Assumed value (frequency)	Comment/rationale
	Recreational walker/jogger/runner	0 (never)	Walking/jogging/running not expected at these asset types

Source: Mott MacDonald, 2022.

B. Appendix B: SAI-RAT input values for mainland non-SRO options

B.1 COL2

Option description: Requires new abstraction licence. New river intake and pumping station at Nanstallon, for 90 Ml/d at 120m head. 9 mile (14.4km) of 900mm diameter pipeline, from the intake to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15 Ml/d). Water is then pumped to Colliford Reservoir via existing main.

For option COL2 one RWPS asset and one RWT were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.1 and Table B.2.

Table B.1: COL2 RWT SAI-RAT input data.

SAI-RAT criterion	COL2 RWT River Camel to Restormel WTW pipeline	Assumptions/comments
Source Name	River Camel	N/A
Source Management Catchment	North Cornwall Seaton Looe and Fowey Management Catchment	N/A
Source Operational Catchment	Camel	N/A
Source Waterbody ID	GB108049000190	N/A
Source Type	River	N/A
Number of RWT inputs into source	Unknown	Input value not known at time of assessment
Pathway Type	Pipeline	N/A
Receptor Name	Restormel WTW	N/A
Receptor Management Catchment	North Cornwall Seaton Looe and Fowey Management Catchment	N/A
Receptor Operational Catchment	Fowey	N/A
Receptor Waterbody ID	N/A	N/A
Receptor Type	WTW	N/A
Isolated Receptor Catchment	No	N/A
Volume of Water (Ml/day)	51-100	N/A
Frequency of Operation	Year round - continuous, full flow	Assumed worst case scenario
Transfer Distance (km)	10.1-15	N/A
Washout/maintenance points outside of catchments	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	N/A	N/A
Source Navigable	No	Information taken from Canal and River Trust[8]
Pathway Navigable	No	N/A
Angling at Source	Members only, no matches	Assumed to be most likely scenario based on available information[9]
Angling on Pathway	No	N/A

[8] Canal and River Trust, n. d. *Our canal & river network.* [online]. Available at: < https://canalrivertrust.org.uk/enjoy-the-waterways/canal-and-river-network> [Accessed 27/10/2022]

[9] Get Hooked, 2022. Butterwell Farm Fishery. [online] Available at: <Butterwell Farm Fishery | Get Hooked> [Accessed 30/09/2022]

SAI-RAT criterion	COL2 RWT River Camel to Restormel WTW pipeline	Assumptions/comments
Water sports at Source	No	No evidence of water sports operating in area
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Not surveyed unknown	No Environment Agency (EA) records of INNS
Presence of high priority INNS Pathway	Not surveyed unknown	No EA records of INNS
Details of INNS present	N/A	N/A
Highest order site designation Receptor	None	N/A
Presence of priority habitat pathway	Known to be present	N/A
Presence of priority habitat receptor	Not known to be present	N/A
Details of priority habitat present	River Camel Valley and Tributaries SSSI River Camel SAC	N/A
Other existing connections between source and receptor	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

Table B.2: COL2 asset SAI-RAT input data.

SAI-RAT criterion	COL2 Nanstallon RWPS	Assumptions/comments
Asset Type	Pumping station	N/A
Asset Size (m^2)	Unknown	Input value not known at time of assessment
Asset Location	Unknown	Input value not known at time of assessment
Existing high impact INNS records on site/area of proposed site?	Not surveyed / unknown	Input value not known at time of assessment
Details of high impact INNS present	N/A	N/A
Existing Priority Habitats on Site?	Known to be present	N/A
Details of existing priority habitats present	River Camel Valley and Tributaries SSSI River Camel SAC	N/A
Highest order site designation of asset	International	N/A
Staff site visit (not entering water) frequency	1.5 (monthly)	Assumed value
Staff site visit entering or in contact with raw water frequency	0.5 (bi-annually)	Assumed value
Road Vehicle site visit frequency	1.5 (monthly)	Assumed value
Maintenance not entering water frequency	1.5 (monthly)	Assumed value
Maintenance in contact with raw water frequency	0.5 (bi-annually)	Assumed value
Angling equipment frequency	0 (never)	Assumed value
Live bait frequency	0 (never)	Assumed value

SAI-RAT criterion	COL2 Nanstallon RWPS	Assumptions/comments
Fish stocking frequency	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	Assumed value
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	Assumed value
Mammals/waterfowl on site frequency	0 (never)	Assumed value
Transfer of waste sludge to land frequency	0 (never)	Assumed value
Recreational walker/jogger/runner frequency	0 (never)	Assumed value

Source: Mott MacDonald, 2022.

B.2 COL6

Option description: Abstraction from River Hayle at existing, disused intake, treat abstracted water at new water treatment works. The new water treatment works may be up to 10km away from the intake.

For option COL6 one RWT and two assets were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.3 and Table B.4.

Table B.3: COL6 asset SAI-RAT input data.

SAI-RAT criterion	COL6 River Hayle RWPS and intake	COL6 new WTW	Assumptions/comments
Asset Type	RWPS and intake	WTW	N/A
Asset Location	South of Hayle, Cornwall	Unknown	N/A
Asset Size (m^2)	Unknown	Unknown	Input value not known at time of assessment
Existing high impact INNS records on site/area of proposed site?	Known to be present	Unknown	N/A

SAI-RAT criterion	COL6 River Hayle RWPS and intake	COL6 new WTW	Assumptions/comments
Details of high impact INNS present	Information provided by SWW: CEC 2015 report on STW north of grid reference. Survey map includes data from Cornwall Environmental Records Centre for River Hayle south of STW but north of NGR: Japanese knotweed, *Fallopia japonica* Parrots feather *Myriophyllum aquaticum* Japanese knotweed, *Fallopia japonica* Rainbow trout *Oncorhynchus mykiss* Common carp *Cyprinus carpio* recorded within 1km.	Unknown	N/A
Existing Priority Habitats on Site?	Known to be present	Unknown	N/A
Details of existing priority habitats present	Priority Habitat Inventory - Coastal Saltmarsh Priority Habitat Inventory - Mudflats Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - No main habitat but additional habitat exists	Unknown	N/A
Highest order site designation of asset	None	Unknown	N/A
Staff site visit (not entering water) frequency	1.5 (monthly)	2 (weekly)	Assumed value
Staff site visit entering or in contact with raw water frequency	0.5 (bi-annually)	2 (weekly)	Assumed value
Road Vehicle site visit frequency	1.5 (monthly)	2 (weekly)	Assumed value
Maintenance not entering water frequency	1.5 (monthly)	2 (weekly)	Assumed value
Maintenance in contact with raw water frequency	0.5 (bi-annually)	2 (weekly)	Assumed value
Angling equipment frequency	0 (never)	0 (never)	Assumed value
Live bait frequency	0 (never)	0 (never)	Assumed value
Fish stocking frequency	0 (never)	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	0 (never)	Assumed value

SAI-RAT criterion	COL6 River Hayle RWPS and intake	COL6 new WTW	Assumptions/comments
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	0 (never)	Assumed value
Mammals/waterfowl on site frequency	0 (never)	0 (never)	Assumed value
Transfer of waste sludge to land frequency	0 (never)	1 (annually)	Assumed value
Recreational walker/jogger/runner frequency	0 (never)	0 (never)	Assumed value

Source: Mott MacDonald, 2022.

Table B.4: COL6 RWT SAI-RAT input data.

SAI-RAT criterion	COL6 River Hayle intake to new WTW via RWPS	Assumptions/comments
Source Name	River Hayle	N/A
Source Management Catchment	Cornwall West and the Fal	N/A
Source Operational Catchment	Hayle Red River and Northern Streams	N/A
Source Waterbody ID	GB108049000380	N/A
Source Type	River	N/A
Number of RWT inputs into source	Unknown	N/A
Pathway Type	Pipeline	N/A
Receptor Name	New WTW	N/A
Receptor Management Catchment	Cornwall West and the Fal	Assumed to be in the same catchment as the source.
Receptor Operational Catchment	Hayle Red River and Northern Streams	Assumed to be in the same catchment as the source.
Receptor Waterbody	N/A	N/A
Receptor Type	WTW	N/A
Isolated Receptor Catchment	Yes	N/A
Volume of Water (Ml/day)	0 – 5	N/A
Frequency of Operation	Year round – continuous full flow	It is assumed the option will be utilised continuously.
Transfer Distance (km)	5.1 -10	This distance is assumed based on current available information.
Washout/maintenance points outside of catchments	None	N/A
Details of washout/maintenance points	N/A	N/A
Source Navigable	Yes	It is assumed Hayle River could be used for recreational boating.
Pathway Navigable	No	N/A
Angling at Source	Unknown	N/A
Angling on Pathway	No	N/A
Water sports at Source	Unknown	N/A

SAI-RAT criterion	COL6 River Hayle intake to new WTW via RWPS	Assumptions/comments
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Known to be present.	N/A
Presence of high priority INNS Pathway	Not surveyed – unknown	N/A
Details of INNS present	SWW provided information: CEC 2015 report on STW north of grid reference. Survey map includes data from Cornwall Environmental Records Centre for River Hayle south of STW but north of NGR: Japanese knotweed, *Fallopia japonica* Parrots feather *Myriophyllum aquaticum*	N/A
Highest order site designation Receptor	Unknown	N/A
Presence of priority habitat pathway	Unknown	N/A
Presence of priority habitat receptor	Unknown	N/A
Details of priority habitat present		N/A
Other existing connections between source and receptor	Unknown	N/A
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.3 COL9a/COL9b

Option description: Transfer of former quarry water to Drift Reservoir via Sancreed stream (COL9a), or transfer of water to Drift Reservoir via pipeline (COL9b). Distance from Leswidden Pool to Sancreed stream is approximately 5km.

For option COL9a, two RWTs were assessed for the Level 2 INNS assessment. For option COL9b, one RWT was assessed. The SAI-RAT input values are outlined below in Table B.5.

Table B.5: COL9a/COL9b RWT SAI-RAT input data.

SAI-RAT criterion	COL9a Leswidden Pool to Sancreed stream.	COL9a Sancreed stream to Drift Reservoir	COL9b Leswidden Pool to Drift Reservoir	Assumptions/ comments
Source Name	Leswidden Pool	Stancreed Stream	Leswidden Pool	N/A
Source Management Catchment	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	N/A
Source Operational Catchment	Penwith Peninsula	Penwith Peninsula	Penwith Peninsula	N/A
Source Waterbody ID	N/A	N/A	N/A	N/A
Source Type	Offline waterbody	Offline waterbody	Pipeline	Source is Stancreed stream, however additional flow (therefore INNS risk) originates from Leswidden pool so offline waterbody was selected to reflect this

SAI-RAT criterion	COL9a Leswidden Pool to Sancreed stream.	COL9a Sancreed stream to Drift Reservoir	COL9b Leswidden Pool to Drift Reservoir	Assumptions/ comments
Number of RWT inputs into source	Unknown	Unknown	Unknown	Unknown
Pathway Type	Pipeline	River*	Pipeline	*Selected as closest option based on methodology
Receptor Name	Stancreed Stream	Drift Reservoir	Drift Reservoir	N/A
Receptor Management Catchment	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	N/A
Receptor Operational Catchment	Penwith Peninsula	Penwith Peninsula	Penwith Peninsula	N/A
Receptor Waterbody ID	N/A	N/A	N/A	N/A
Receptor Type	River	Online waterbody	Online waterbody	Selected as closest option based on RA methodology
Isolated Receptor Catchment	Yes	Yes	Yes	N/A
Volume of Water (Ml/day)	6-50	6-50	6-50	Actual transfer volume is 5.5 Ml/d which is not an available option within the tool. The larger volume of 6-10Ml/d was selected to prevent underestimation of risk
Frequency of Operation	Unknown	Unknown	Unknown	Input value not known at time of assessment
Transfer Distance (km)	1.1-5	1.1-5*	1.1-5	*Input value estimated based on distance between end of pipeline and distance to Drift Reservoir
Washout/maintenance points outside of catchments	Unknown	Unknown	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	N/A	N/A	N/A	N/A
Source Navigable	No	No	No	N/A
Pathway Navigable	No	No	No	N/A
Angling at Source	No	No	No	No evidence of fishing clubs operating in waterbody
Angling on Pathway	No	No	No	No evidence of fishing clubs operating in waterbody

SAI-RAT criterion	COL9a Leswidden Pool to Sancreed stream.	COL9a Sancreed stream to Drift Reservoir	COL9b Leswidden Pool to Drift Reservoir	Assumptions/ comments
Water sports at Source	No	No	No	No evidence of water sports clubs operating in waterbody
Water sports on Pathway	No	No	No	No evidence of water sports clubs operating in waterbody
Presence of high priority INNS Source	Not surveyed - unknown	Not surveyed - unknown	Not surveyed - unknown	No EA records of INNS
Presence of high priority INNS Pathway	Known to be present	Known to be present*	Known to be present	*Final route not known
Details of INNS present	Jenkins spire shell *Potamopyrgus antipodarum*	Jenkins spire shell *Potamopyrgus antipodarum*	Jenkins spire shell *Potamopyrgus antipodarum*	N/A
Highest order site designation Receptor	None	Not known to be present	Not known to be present	N/A
Presence of priority habitat pathway	Known to be present	Not known to be present*	Not known to be present*	*Final pipeline route not known
Presence of priority habitat receptor	Not known to be present	Not known to be present	Not known to be present	N/A
Details of priority habitat present	Lower Bostraze & Leswidden SAC Lower Bostraze & Leswidden SSSI	N/A	N/A	N/A
Other existing connections between source and receptor	Unknown	Unknown	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A	N/A	N/A

Source: Mott MacDonald, 2022.

B.4 COL11

Option description: New transfer from existing Hawk's Tor Pit to existing Colliford Reservoir.

For option COL11 one RWT was assessed, the SAI-RAT input values are outlined below in Table B.6.

Table B.6: COL11 RWT SAI-RAT input data.

SAI-RAT criterion	COL 11 Hawk's Tor Pit to Colliford Reservoir	Assumptions/comments
Source Name	Hawk's Tor Pit	N/A
Source Management Catchment	North Cornwall Seaton Looe and Fowey	N/A
Source Operational Catchment	Fowey	N/A
Source Waterbody ID	N/A	N/A
Source Type	Offline waterbody	Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Input value not known at time of assessment

SAI-RAT criterion	COL 11 Hawk's Tor Pit to Colliford Reservoir	Assumptions/comments
Pathway Type	Pipeline	Assumed transfer to Sancreed Stream is via pipeline
Receptor Name	Colliford Lake	Colliford Lake is the same waterbody as Colliford Reservoir
Receptor Management Catchment	North Cornwall Seaton Looe and Fowey	N/A
Receptor Operational Catchment	Fowey	N/A
Receptor Waterbody ID	N/A	N/A
Receptor Type	Online waterbody	Selected as closest option based on RA methodology
Isolated Receptor Catchment	No	N/A
Volume of Water (Ml/day)	0-5	N/A
Frequency of Operation	Unknown	Input value not known at time of assessment
Transfer Distance (km)	1.1-5	N/A
Washout/maintenance points outside of catchments	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	Unknown	N/A
Source Navigable	No	N/A
Pathway Navigable	No	N/A
Angling at Source	No	No evidence of fishing clubs operating in waterbody
Angling on Pathway	No	No evidence of fishing clubs operating in waterbody
Water sports at Source	No	No evidence of water sports clubs operating in waterbody
Water sports on Pathway	No	No evidence of water sports clubs operating in waterbody
Presence of high priority INNS Source	Known to be present	N/A
Presence of high priority INNS Pathway	Known to be present	N/A
Details of INNS present	Northern River/ Florida crangoynx *Crangonyx pseudogracilis/floridanus*	N/A
Highest order site designation Receptor	National	N/A
Presence of priority habitat pathway	Known to be present	N/A
Presence of priority habitat receptor	Known to be present	N/A
Details of priority habitat present	Dozmary Pool SSSI Bodmin Moor, North SSSI	N/A
Other existing connections between source and receptor	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.5 COL12

Option description: Increase to the daily limit of the abstraction licence of 4 Ml/d to 8 Ml/d for up to three months in any one year. Pumps to be uprated and possible power upgrade. A 0.2 Ml/d stream support facility will be constructed discharging from the lake to the adjacent stream.

These waterbodies are assumed to be already connected but there will be greater volume of transfer.

For option COL12 one RWT was assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.7.

Table B.7: COL 12 RWT SAI-RAT input data.

SAI-RAT criterion	Stannon Reservoir discharge to adjacent stream	Assumptions/comments
Source Name	Stannon Reservoir	N/A
Source Management Catchment	North Cornwall Seaton Looe and Fowey	N/A
Source Operational Catchment	Camel	N/A
Source Waterbody ID	N/A	N/A
Source Type	Offline waterbody	Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Input value not known at time of assessment
Pathway Type	Partial open water, partial pipeline	Selected as closest option based on RA methodology
Receptor Name	Stream adjacent to Stannon Reservoir	N/A
Receptor Management Catchment	North Cornwall Seaton Looe and Fowey	N/A
Receptor Operational Catchment	Camel	N/A
Receptor Waterbody ID	Stannon Stream	N/A
Receptor Type	River	Selected as closest option based on RA methodology
Isolated Receptor Catchment	No	N/A
Volume of Water (Ml/day)	0-5	N/A
Frequency of Operation	Year round - continuous, full flow	It is assumed the option will be utilised continuously.
Transfer Distance (km)	>1	This distance is assumed based on current available information.
Washout/maintenance points outside of catchments	None	N/A
Details of washout/maintenance points	N/A	N/A
Source Navigable	No	N/A
Pathway Navigable	No	N/A
Angling at Source	Unknown	N/A
Angling on Pathway	No	N/A
Water sports at Source	Unknown	N/A
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Known to be present	A 1km buffer around a towards the point northeast of Stannon Reservoir was assessed.
Presence of high priority INNS Pathway	Known to be present	A 1km buffer around a towards the point northeast of Stannon Reservoir was assessed.

SAI-RAT criterion	Stannon Reservoir discharge to adjacent stream	Assumptions/comments
Details of INNS present	Information provided by SWW: INNS recorded at Stannon Lake are: New Zealand pigmyweed *Crassula helmsii* at small pool.	No NBN or EA records of INNS.
Highest order site designation Receptor	National	Bodmin Moor, North Special Site of Scientific Interest
Presence of priority habitat pathway	Known to be present	A 1km buffer around a towards the point northeast of Stannon Reservoir was assessed.
Presence of priority habitat receptor	Known to be present	A 1km buffer around a towards the point northeast of Stannon Reservoir was assessed.
Details of priority habitat present	Priority Habitat Inventory - Upland Heathland Priority Habitat Inventory - Blanket Bog	N/A
Other existing connections between source and receptor	Unknown	N/A
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.6 COL18

Option description: This option would approximately yield 4 Ml/day. A new intake structure would be built at existing SWW WTWs at the Rialton site. A raw water pumping station (RWPS) and pipeline would be required between Rialton and Coswarth. A new WTW would be built at the Coswarth site to treat 6 Ml/day.

For option COL18 one WTW asset, one RWPS asset and one RWT was assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.8 and Table B.9.

Table B.8: COL18 asset SAI-RAT input data.

SAI-RAT criterion	COL18 Coswarth WTW	COL18 Rialton RWPS	Assumptions/comments
Asset Type	WTW	RWPS	N/A
Asset Location	Coswarth	Rialton	N/A
Asset Size (m^2)	11356.676	Unknown	N/A
Existing high impact INNS records on site/area of proposed site?	Not surveyed / unknown	Not recorded	N/A
Details of high impact INNS present	None	None	N/A
Existing Priority Habitats on Site?	Known to be present	Known to be present	N/A
Details of existing priority habitats present	Priority Habitat Inventory - Deciduous Woodland (England)	Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England) Priority Habitat Inventory - Deciduous Woodland (England)	N/A
Highest order site designation of asset	None	None	N/A

SAI-RAT criterion	COL18 Coswarth WTW	COL18 Rialton RWPS	Assumptions/comments
Staff site visit (not entering water) frequency	2 (weekly)	2 (weekly)	Assumed value
Staff site visit entering or in contact with raw water frequency	2 (weekly)	2 (weekly)	Assumed value
Road Vehicle site visit frequency	2 (weekly)	2 (weekly)	Assumed value
Maintenance not entering water frequency	2 (weekly)	2 (weekly)	Assumed value
Angling equipment frequency	0 (never)	0 (never)	Assumed value
Live bait frequency	0 (never)	0 (never)	Assumed value
Fish stocking frequency	0 (never)	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	0 (never)	Assumed value
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	0 (never)	Assumed value
Mammals/waterfowl o sit frequency	0 (never)	0 (never)	Mammals/waterfowl unlikely to access these asset types
Transfer of waste sludge to land frequency	1 (annually)	1 (annually)	Assumed value
Recreational walker/jogger/runner frequency	0 (never)	0 (never)	Assumed value

Source: Mott MacDonald, 2022.

Table B.9: COL 18 RWT SAI-RAT input data.

SAI-RAT criterion	COL18 Rialton to Coswath SRES pipeline	Assumptions/comments
Source Name	Rialton	N/A
Source Management Catchment	North Cornwall Seaton Looe and Fowey Management Catchment	N/A
Source Operational Catchment	Gannel Porth and Menalhyl Operational Catchment	N/A
Source Waterbody ID	GB108049000000	N/A
Source Type	River	N/A
Number of RWT inputs into source	Unknown	Input value not known at time of assessment
Pathway Type	Pipeline	N/A
Receptor Name	Coswarth SRES	N/A
Receptor Management Catchment	North Cornwall Seaton Looe and Fowey Management Catchment	N/A
Receptor Operational Catchment	Gannel Porth and Menalhyl Operational Catchment	N/A

SAI-RAT criterion	COL18 Rialton to Coswath SRES pipeline	Assumptions/comments
Receptor Waterbody	GB108049000000	N/A
Receptor Type	WTW	N/A
Isolated Receptor Catchment	No	N/A
Volume of Water (Ml/day)	6-50	N/A
Frequency of Operation	Unknown	N/A
Transfer Distance (km)	1.1-5	N/A
Washout/maintenance points outside of catchments	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	Unknown	N/A
Source Navigable	Unknown	N/A
Pathway Navigable	No	N/A
Angling at Source	Unknown	N/A
Angling on Pathway	No	N/A
Water sports at Source	Unknown	N/A
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Not recorded	N/A
Presence of high priority INNS Pathway	Not surveyed - unknown	N/A
Details of INNS present	None found	N/A
Highest order site designation Receptor	None	N/A
Presence of priority habitat pathway	Known to be present	N/A
Presence of priority habitat receptor	Known to be present	N/A
Details of priority habitat present	Priority Habitat Inventory - Deciduous Woodland (England)	N/A
Other existing connections between source and receptor	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.7 COL19

Option Description: Re-introduce abstractions at Boswyn Stream, Cargenwen Reservoir and Carwynnen Stream. New WTW at Boswyn Reservoir. There is a possibility that the existing abandoned infrastructure including the transfer pipeline are reusable, however this will be subject to survey and satisfactory inspection, but it is recognised that these have been out of use for 20 years. It was therefore assumed that minor works will be required to recommission the infrastructure. Boswyn Reservoir is presently high fill only, the reservoir will need to be fully inspected prior to its refilling.

For option COL19 one WTW asset, two RWPS assets and one reservoir asset were assessed for the Level 2 INNS assessment. Four RWT components were also assessed. The SAI-RAT input values are outlined below in Table B.10 and Table B.11.

Table B.10: COL19 asset SAI-RAT input data.

SAI-RAT criterion	COL19 Boswyn Reservoir WTW	COL19 Cargenwen Reservoir RWPS	COL19 Boswyn Reservoir	COL19 Carwynnen Stream RWPS	Assumptions /comments
Asset Type	WTW	RWPS and intake pipe	Reservoir	RWPS and intake pipe	N/A
Asset Location	South of Troon, Cornwall	West of Praze-an-Beeble, Cornwall	South of Troon, Cornwall	Southeast of Barripper, Cornwall	N/A
Asset Size (m^2)	4935	Unknown	4935	Unknown	This is an estimate based on the current information available.
Existing high impact INNS records on site/area of proposed site?	Known to be present	Known to be present	Known to be present	Known to be present	N/A
Details of high impact INNS present	*Fallopia japonica*.	Records provided by SWW, CEC report 2014: Montbretia New Zealand pygmyweed *Crassula helmsii* Curly Waterweed, *Lagarosiphon major* Brazilian waterweed *Egeria densa* Japanese knotweed *Fallopia japonica* Cornwall Environmental Records centre additional map records: Himalayan balsam *Impatiens glandulifera* on stream feeding reservoir from west. Japanese knotweed *Fallopia japonica* and Rainbow Trout *Oncorhynchus mykiss* also recorded.	Japanese knotweed *Fallopia japonica*	Himalayan balsam *Impatiens glandulifera*	No EA records of INNS

SAI-RAT criterion	COL19 Boswyn Reservoir WTW	COL19 Cargenwen Reservoir RWPS	COL19 Boswyn Reservoir	COL19 Carwynnen Stream RWPS	Assumptions /comments
Existing Priority Habitats on Site?	Known to be present	Known to be present	Known to be present	Known to be present	N/A
Details of existing priority habitats present	Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Lowland Heathland Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards	N/A
Highest order site designation of asset	None	None	None	None	N/A
Staff site visit (not entering water) frequency	2 (weekly)	1.5 (monthly)	2 (weekly)	1.5 (monthly)	Assumed value
Staff site visit entering or in contact with raw water frequency	2 (weekly)	0.5 (bi-annually)	2 (weekly)	0.5 (bi-annually)	Assumed value
Road Vehicle site visit frequency	2 (weekly)	1.5 (monthly)	2 (weekly)	1.5 (monthly)	Assumed value
Maintenance not entering water frequency	2 (weekly)	1.5 (monthly)	1 (annually)	1.5 (monthly)	Assumed value
Angling equipment frequency	0 (never)	0.5 (bi-annually)	1 (annually)	0.5 (bi-annually)	Assumed value
Live bait frequency	0 (never)	0 (never)	2 (weekly)	0 (never)	Assumed value
Fish stocking frequency	0 (never)	0 (never)	0 (never)	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	0 (never)	1 (annually)	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	0 (never)	0.5 (rarely)	0 (never)	Assumed value
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	0 (never)	2 (weekly)	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	0 (never)	2 (weekly)	0 (never)	Assumed value

SAI-RAT criterion	COL19 Boswyn Reservoir WTW	COL19 Cargenwen Reservoir RWPS	COL19 Boswyn Reservoir	COL19 Carwynnen Stream RWPS	Assumptions /comments
Mammals/waterf owl o sit frequency	0 (never)	0 (never)	0.5 (rarely)	0 (never)	Assumed value
Transfer of waste sludge to land frequency	1 (annually)	0 (never)	2 (weekly)	0 (never)	Assumed value
Recreational walker/jogger/ru nner frequency	0 (never)	0 (never)	0 (never)	0 (never)	Assumed value

Source: Mott MacDonald, 2022.

Table B.11: COL19 RWT SAI-RAT input data.

SAI-RAT Criterion	COL19 Boswyn Stream to Boswyn Reservoir gravity abstraction	COL19 Cargenwen Reservoir to Boswyn Reservoir pipeline	COL19 RWT from Carwynnen Stream to Boswyn Reservoir	COL19 RWT from Boswyn Reservoir to Boswyn WTW	Assumptions/ comments
Source Name	Boswyn Stream	Cargenwen Reservoir	Carwynnen Stream	Boswyn Reservoir	N/A
Source Management Catchment	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	N/A
Source Operational Catchment	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	N/A
Source Waterbody ID	GB1080490005 60*	GB30846509**	GB1080490005 60	N/A	*Roseworthy Stream Water Body. **Cargenwen Reservoir.
Source Type	River	Offline waterbody*	River	Offline waterbody*	*Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Unknown	Unknown	Unknown	Unknown value
Pathway Type	Partial open water, partial pipeline	Pipeline	Pipeline	Pipeline	N/A
Receptor Name	Boswyn Reservoir	Boswyn Reservoir	Boswyn Reservoir	Boswyn WTW	N/A
Receptor Management Catchment	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	Cornwall West and the Fal	N/A
Receptor Operational Catchment	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	Hayle Red River and Northern Streams	N/A
Receptor Waterbody	N/A	N/A	N/A	N/A	N/A

SAI-RAT Criterion	**COL19 Boswyn Stream to Boswyn Reservoir gravity abstraction**	**COL19 Cargenwen Reservoir to Boswyn Reservoir pipeline**	**COL19 RWT from Carwynnen Stream to Boswyn Reservoir**	**COL19 RWT from Boswyn Reservoir to Boswyn WTW**	**Assumptions/ comments**
Receptor Type	Offline waterbody*	Offline waterbody*	Offline waterbody*	WTW	*Selected as closest option based on methodology
Isolated Receptor Catchment	Yes	Yes	Yes	Yes	N/A
Volume of Water (Ml/day)	0 – 5	0 – 5	0 – 5	0 – 5	N/A
Frequency of Operation	Year round – continuous full flow	Year round – continuous full flow	Year round – continuous full flow	Year round – continuous full flow	N/A
Transfer Distance (km)	<1*	1.1 – 5	1.1 – 5	<1	*This distance is assumed based on the distance between the source and receptor.
Washout/maintenance points outside of catchments	None	None	None	None	N/A
Details of washout/maintenance points	N/A	N/A	N/A	N/A	N/A
Source Navigable	No	No	No	No	N/A
Pathway Navigable	No	No	No	No	N/A
Angling at Source	Unknown	Unknown	Unknown	Unknown	N/A
Angling on Pathway	No	No	No	No	N/A
Water sports at Source	Unknown	Unknown	Unknown	Unknown	N/A
Water sports on Pathway	No	No	No	No	N/A
Presence of high priority INNS Source	Known to be present*	Known to be present*	Known to be present*.	Known to be present	*The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed

SAI-RAT Criterion	**COL19 Boswyn Stream to Boswyn Reservoir gravity abstraction**	**COL19 Cargenwen Reservoir to Boswyn Reservoir pipeline**	**COL19 RWT from Carwynnen Stream to Boswyn Reservoir**	**COL19 RWT from Boswyn Reservoir to Boswyn WTW**	**Assumptions/ comments**
Presence of high priority INNS Pathway	Known to be present*	Known to be present*t.	Known to be present*	Known to be present	*The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Details of INNS present	*Fallopia japonica.*	SWW provided records of multiple invasive plant species at Cargenwen Reservoir (see Table B.13) *Fallopia japonica* and *Oncorhynchus mykiss* recorded.	*Impatiens glandulifera, Fallopia japonica.*	*Fallopia japonica.*	N/A
Highest order site designation Receptor	None	None	None	None	N/A
Presence of priority habitat pathway	Known to be present*	Known to be present*	Known to be present*	Known to be present	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of priority habitat receptor	Known to be present	Known to be present	Known to be present	Known to be present	N/A

SAI-RAT Criterion	COL19 Boswyn Stream to Boswyn Reservoir gravity abstraction	COL19 Cargenwen Reservoir to Boswyn Reservoir pipeline	COL19 RWT from Carwynnen Stream to Boswyn Reservoir	COL19 RWT from Boswyn Reservoir to Boswyn WTW	Assumptions/ comments
Details of priority habitat present	Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Lowland Heathland Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - No main habitat but additional habitat exists	Priority Habitat Inventory - Deciduous Woodland	N/A
Other existing connections between source and receptor	Unknown	Unknown	Unknown	Unknown	Unknown value
Details of other existing connections	N/A	N/A	N/A	N/A	N/A

Source: Mott MacDonald, 2022.

B.8 ROA2

Option description: Within this option there were several further design options, this assessment was based on option 1 (Ivybridge sewage treatment works) as this is the preferred option. Within this design option a new RWPS is constructed on a vacant plot of land within Ivybridge sewage treatment works, approximately 80 m from the abstraction point. This is then connected to the South Devon Spine Main via a new pipeline approximately 900m away. All the design variations being considered within the ROA2 option are within 1km of each other.

For option ROA2 one RWPS asset and two RWT were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.12Table B.13.

Table B.12: ROA2 asset SAI-RAT input data.

SAI-RAT criterion	ROA2 River Erme RWPS	Assumptions/comments
Asset Type	Pumping station and intake pipe	N/A
Asset Location	South of Ivybridge, South Devon.	N/A
Asset Size (m^2)	Unknown	N/A
Existing high impact INNS records on site/area of proposed site?	Known to be present	N/A
Details of high impact INNS present	*Potamopyrgus antipodarum, Impatiens glandulifera and Claytonia sibirica.*	N/A
Existing Priority Habitats on Site?	Known to be present	N/A

SAI-RAT criterion	ROA2 River Erme RWPS	Assumptions/comments
Details of existing priority habitats present	Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - No main habitat but additional habitat exists	N/A
Highest order site designation of asset	None	N/A
Staff site visit (not entering water) frequency	1.5 (monthly)	Assumes visit frequency should be at least monthly
Staff site visit entering or in contact with raw water frequency	0.5 (bi-annually)	Assumes sealed structure with regular access to water unlikely
Road Vehicle site visit frequency	1.5 (monthly)	Aligned with staff visits, assuming
Maintenance not entering water frequency	1.5 (monthly)	Assumes relatively frequent maintenance
Maintenance in contact with raw water frequency	0.5 (bi-annually)	Assumes sealed structure with regular access to water unlikely
Angling equipment frequency	0 (never)	Associated activities not expected at these asset types
Live bait frequency	0 (never)	Associated activities not expected at these asset types
Fish stocking frequency	0 (never)	Associated activities not expected at these asset types
Large vessels (over 28ft) frequency	0 (never)	Associated activities not expected at these asset types
Small vessel (under 28ft) frequency	0 (never)	Associated activities not expected at these asset types
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	Associated activities not expected at these asset types
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	Associated activities not expected at these asset types
Mammals/waterfowl on site frequency	0 (never)	Mammals/waterfowl unlikely to access these asset types
Transfer of waste sludge to land frequency	0 (never)	Asset type should not generate sludge
Recreational walker/jogger/runner frequency	0 (never)	Associated activities not expected at these asset types

Source: Mott MacDonald, 2022.

Table B.13: ROA2 RWT SAI-RAT input data.

SAI-RAT criterion	ROA2 River Erme to existing pipe network pipeline	ROA2 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Source Name	River Erme	South Devon Spine Mian	N/A
Source Management Catchment	Devon South	Tamar	N/A
Source Operational Catchment	Erme	Yealm	N/A
Source Waterbody ID	GB108046005200	N/A	N/A

SAI-RAT criterion	ROA2 River Erme to existing pipe network pipeline	ROA2 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Source Type	River	Offline waterbody*	*Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Unknown	N/A
Pathway Type	Pipeline	Pipeline	N/A
Receptor Name	South Devon Spine Main	Littlehempston WTW	N/A
Receptor Management Catchment	Devon South	Devon South	N/A
Receptor Operational Catchment	Erme	Dart Start Bay and Torbay	N/A
Receptor Waterbody	N/A	N/A	N/A
Receptor Type	Offline waterbody*	WTW	*Selected as closest option based on RA methodology
Isolated Receptor Catchment	Yes	Yes	N/A
Volume of Water (Ml/day)	1Ml/day	3Ml/day	N/A
Frequency of Operation	Year round - continuous full flow	Year round - continuous full flow	Assumption
Transfer Distance (km)	<1	25.1-30*	*This distance is assumed based on the likely distance between the source and receptor.
Washout/maintenance points outside of catchments	None	Unknown	N/A
Details of washout/maintenance points	N/A	N/A	N/A
Source Navigable	No	No	N/A
Pathway Navigable	No	No	N/A
Angling at Source	Unknown	No	N/A
Angling on Pathway	No	No	N/A
Water sports at Source	Unknown	No	N/A
Water sports on Pathway	No	No	N/A
Presence of high priority INNS Source	Known to be present	Known to be present	N/A
Presence of high priority INNS Pathway	Known to be present	Known to be present*	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Details of INNS present	Within 1km of water source: *Potamopyrgus antipodarum, Impatiens glandulifera* and *Claytonia sibirica.*	Within 1km of water source: *Potamopyrgus antipodarum, Impatiens glandulifera* and *Claytonia sibirica.*	N/A
Highest order site designation Receptor	None	None	N/A

SAI-RAT criterion	ROA2 River Erme to existing pipe network pipeline	ROA2 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Presence of priority habitat pathway	Known to be present	Known to be present*	*The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of priority habitat receptor	Known to be present	Known to be present	N/A
Details of priority habitat present	Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - No main habitat but additional habitat exists Priority Habitat Inventory - Traditional Orchards	Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - No main habitat but additional habitat exists Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England) Woodpasture and Parkland BAP Priority Habitat	N/A
Other existing connections between source and receptor	Unknown	Unknown	N/A
Details of other existing connections	N/A	N/A	N/A

Source: Mott MacDonald, 2022.

B.9 ROA3

Option description: Within this option there were several further design options, this assessment was based on option 3 (Lee Mill South of A38 on left bank). Within this design option a new RWPS is constructed on a vacant plot of land approximately 45m from the abstraction point. This is then connected to the South Devon Spine Main via a new pipeline approximately 200m away. All the design variations being considered within the ROA2 option are within 1km of each other.

For option ROA3 one asset and two RWT components were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.14 and Table B.15.

Table B.14: ROA3 asset SAI-RAT input data.

SAI-RAT criterion	ROA3 River Yealm RWPS	Assumptions/comments
Asset Type	Pumping station and intake	N/A
Asset Location	Lee Mill, South Devon.	N/A
Asset Size (m^2)	Unknown	N/A
Existing high impact INNS records on site/area of proposed site?	Known to be present	No EA records of INNS
Details of high impact INNS present	*Fallopia japonica, Impatiens glandulifera.*	N/A
Existing Priority Habitats on Site?	Known to be present	N/A

SAI-RAT criterion	ROA3 River Yealm RWPS	Assumptions/comments
Details of existing priority habitats present	Priority Habitat Inventory - Good quality semi-improved grassland Priority Habitat Inventory - Purple Moor Grass and Rush Pasture Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - No main habitat but additional habitat exists	N/A
Highest order site designation of asset	None	N/A
Staff site visit (not entering water) frequency	1.5 (monthly)	Assumed value
Staff site visit entering or in contact with raw water frequency	0.5 (bi-annually)	Assumed value
Road Vehicle site visit frequency	1.5 (monthly)	Assumed value
Maintenance not entering water frequency	1.5 (monthly)	Assumed value
Maintenance in contact with raw water frequency	0.5 (bi-annually)	Assumed value
Angling equipment frequency	0 (never)	Assumed value
Live bait frequency	0 (never)	Assumed value
Fish stocking frequency	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	Assumed value
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	Assumed value
Mammals/waterfowl on site frequency	0 (never)	Assumed value
Transfer of waste sludge to land frequency	0 (never)	Assumed value
Recreational walker/jogger/runner frequency	0 (never)	Assumed value

Source: Mott MacDonald, 2022.

Table B.15: ROA3 RWT SAI-RAT input data.

SAI-RAT criterion	ROA3 River Yealm to South Devon Spine Main pipeline	ROA3 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Source Name	River Yealm	South Devon Spine Mian	N/A
Source Management Catchment	Tamar	Tamar	N/A
Source Operational Catchment	Yealm	Yealm	N/A
Source Waterbody ID	GB108047004010	N/A	N/A

SAI-RAT criterion	ROA3 River Yealm to South Devon Spine Main pipeline	ROA3 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Source Type	River	Offline waterbody*	*Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Unknown	N/A
Pathway Type	Pipeline	Pipeline	N/A
Receptor Name	South Devon spine main	Littlehempston WTW	N/A
Receptor Management Catchment	Tamar	Devon South	N/A
Receptor Operational Catchment	Yealm	Dart Start Bay and Torbay	N/A
Receptor Waterbody	N/A	N/A	N/A
Receptor Type	Offline waterbody	WTW	N/A
Isolated Receptor Catchment	Yes	Yes	N/A
Volume of Water (Ml/day)	0-5	0-5	N/A
Frequency of Operation	Year round - continuous full flow	Year round - continuous full flow	Assumed value
Transfer Distance (km)	<1	25.1-30	Assumed value
Washout/maintenance points outside of catchments	None	Unknown	N/A
Details of washout/maintenance points	N/A	N/A	N/A
Source Navigable	No	No	N/A
Pathway Navigable	No	No	N/A
Angling at Source	Unknown	No	N/A
Angling on Pathway	No	No	N/A
Water sports at Source	Unknown	No	N/A
Water sports on Pathway	No	No	N/A
Presence of high priority INNS Source	Known to be present	Known to be present*	*The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of high priority INNS Pathway	Known to be present	Known to be present	N/A
Details of INNS present	*Fallopia japonica, Impatiens glandulifera.*		No EA records of INNS
Highest order site designation Receptor	None	None	N/A
Presence of priority habitat pathway	Known to be present	Known to be present*	*The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of priority habitat receptor	Known to be present	Known to be present	N/A

SAI-RAT criterion	ROA3 River Yealm to South Devon Spine Main pipeline	ROA3 South Devon Spine Main pipeline to Littlehempston WTW	Assumptions/comments
Details of priority habitat present	Priority Habitat Inventory - Good quality semi-improved grassland Priority Habitat Inventory - Purple Moor Grass and Rush Pasture Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - No main habitat but additional habitat exists	Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - No main habitat but additional habitat exists Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England) Woodpasture and Parkland BAP Priority Habitat	N/A
Other existing connections between source and receptor	Unknown	Unknown	N/A
Details of other existing connections	N/A	N/A	N/A

Source: Mott MacDonald, 2022.

B.10 ROA4

Option description: Abstraction of Roadford compensation flow at Gunnislake when making supply releases. The raw water is transferred to Mayflower WTW in Roborough, using existing infrastructure (pipework and pumping station).

For option ROA4 one RWT was assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.16.

Table B.16: ROA4 RWT SAI-RAT input data.

SAI-RAT criterion	ROA4 Gunnislake intake to Mayflower reservoir via existing pipeline	Assumptions/comments
Source Name	River Tamar	N/A
Source Management Catchment	Tamar	N/A
Source Operational Catchment	Tamar Lower	N/A
Source Waterbody ID	GB108047007860	N/A
Source Type	River	N/A
Number of RWT inputs into source	Unknown	N/A
Pathway Type	Pipeline	Existing pipeline infrastructure
Receptor Name	Mayflower WTW	N/A
Receptor Management Catchment	Tamar	N/A
Receptor Operational Catchment	Plym	N/A
Receptor Waterbody ID	N/A	N/A
Receptor Type	WTW	N/A
Isolated Receptor Catchment	Yes	N/A
Volume of Water (Ml/day)	0-5	N/A
Frequency of Operation	Year round - intermittent	Only used when making supply releases

SAI-RAT criterion	ROA4 Gunnislake intake to Mayflower reservoir via existing pipeline	Assumptions/comments
Transfer Distance (km)	10.1-15	This distance is assumed based on the distance between the source and receptor
Washout/maintenance points outside of catchments	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	N/A	N/A
Source Navigable	No	N/A
Pathway Navigable	No	N/A
Angling at Source	Unknown	N/A
Angling on Pathway	No	N/A
Water sports at Source	Casual use by individuals/clubs	Value based on known water sports activities
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Known to be present	N/A
Presence of high priority INNS Pathway	Known to be present	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Details of INNS present	Within 1km of Source: Potamopyrgus antipodarum, Elodea canadensis, Fallopia japonica, Impatiens glandulifera, Heracleum mantegazzianum.	N/A
Highest order site designation Receptor	None	N/A
Presence of priority habitat pathway	Known to be present	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of priority habitat receptor	Known to be present	N/A
Details of priority habitat present	Priority Habitat Inventory - Good quality semi-improved grassland Priority Habitat Inventory - Lowland Dry Acid Grassland Priority Habitat Inventory - Lowland Heathland Priority Habitat Inventory - Deciduous Woodland (England), including ancient woodland Priority Habitat Inventory - No main habitat but additional habitat exists	N/A
Other existing connections between source and receptor	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.11 ROA12

Option description: Installation of a new pumping station at Slade reservoir and new 4 Ml/d GAC plant at Horedown WTW.

For option ROA12 two assets and one RWT were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.17 and Table B.18.

Table B.17: ROA12 asset SAI-RAT input data.

SAI-RAT criterion	ROA12 Slade Reservoir	ROA 12 Horedown WTW	Assumptions/comments
Asset Type	Pumping station	GAC WTW	N/A
Asset Location	North of Lower Slade reservoir, North Devon	South of Ilfracombe, North Devon	N/A
Asset Size (m^2)	Unknown	Unknown	Input value not known at time of assessment
Existing high impact INNS records on site/area of proposed site?	Known to be present	Not Surveyed – unknown	N/A
Details of high impact INNS present	*Fallopia japonica* and *Lagarosiphon major* within 1km of Slade Reservoir. SWW also provided records of multiple invasive plants at Slade Reservoir. Slade Reservoir report Tamar Ecology 2015: Winter heliotrope Japanese Knotweed Variegated yellow archangel Additional site records: Cherry Laurel Three cornered garlic Canadian waterweed	N/A	No EA records of INNS
Existing Priority Habitats on Site?	Known to be present	Known to be present	N/A
Details of existing priority habitats present	Priority Habitat Inventory - Maritime cliffs and slopes Priority Habitat Inventory - deciduous woodland (including ancient, replanted woodland) Priority Habitat Inventory - Traditional orchards Priority Habitat Inventory - no main habitat but additional habitat exists	Priority Habitat Inventory - deciduous woodland (including ancient, replanted woodland)	N/A
Highest order site designation of asset	Local	None	Cairn woodland local nature reserve present within 1km.
Staff site visit (not entering water) frequency	1.5 (monthly)	2 (weekly)	Assumed value
Staff site visit entering or in contact with raw water frequency	0.5 (bi-annually)	2 (weekly)	Assumed value
Road Vehicle site visit frequency	1.5 (monthly)	2 (weekly)	Assumed value
Maintenance not entering water frequency	1.5 (monthly)	1 (annually)	Assumed value

SAI-RAT criterion	ROA12 Slade Reservoir	ROA 12 Horedown WTW	Assumptions/comments
Maintenance in contact with raw water frequency	0.5 (bi-annually)	1 (annually)	Assumed value
Angling equipment frequency	0 (never)	0 (never)	Assumed value
Live bait frequency	0 (never)	0 (never)	Assumed value
Fish stocking frequency	0 (never)	0 (never)	Assumed value
Large vessels (over 28ft) frequency	0 (never)	0 (never)	Assumed value
Small vessel (under 28ft) frequency	0 (never)	0 (never)	Assumed value
Water sports equipment (SUPs, Canoe, Kayaks) frequency	0 (never)	0 (never)	Assumed value
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0 (never)	0 (never)	Assumed value
Mammals/waterfowl on site frequency	0 (never)	0 (never)	Mammals/waterfowl unlikely to access these asset types
Transfer of waste sludge to land frequency	0 (never)	1 (annually)	Asset type should not generate sludge
Recreational walker/jogger/runner frequency	0 (never)	0 (never)	Associated activities not expected at these asset types

Source: Mott MacDonald, 2022.

Table B.18: ROA12 RWT SAI-RAT input data.

SAI-RAT criterion	Slade Reservoir to Horedown WTW pipeline	Assumptions/comments
Source Name	Lower Slade Reservoir	N/A
Source Management Catchment	North Devon	N/A
Source Operational Catchment	Taw and North Devon Streams	N/A
Source Waterbody ID	N/A	N/A
Source Type	Offline Waterbody	Selected as closest option based on RA methodology
Number of RWT inputs into source	Unknown	Input value not known at time of assessment
Pathway Type	Pipeline	N/A
Receptor Name	Horedown WTW	N/A
Receptor Management Catchment	North Devon	N/A
Receptor Operational Catchment	Taw and North Devon Streams	N/A
Receptor Waterbody	N/A	N/A
Receptor Type	WTW	N/A
Isolated Receptor Catchment	Yes	N/A
Volume of Water (Ml/day)	0 – 5	New WTW would process 4Ml/day
Frequency of Operation	Year round - continuous full flow	It is assumed the option will be utilised continuously.

SAI-RAT criterion	Slade Reservoir to Horedown WTW pipeline	Assumptions/comments
Transfer Distance (km)	1.1 -5	This distance is assumed based on the distance between the source and receptor.
Washout/maintenance points outside of catchments	None	N/A
Details of washout/maintenance points	N/A	N/A
Source Navigable	No	N/A
Pathway Navigable	No	N/A
Angling at Source	Unknown	N/A
Angling on Pathway	No	N/A
Water sports at Source	Unknown	N/A
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Known to be present	N/A
Presence of high priority INNS Pathway	Known to be present	N/A
Details of INNS present	*Fallopia japonica* and *Lagarosiphon major* within 1km of Slade Reservoir. SWW also provided records of multiple invasive plants at Slade Reservoir (see table B.27 above).	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed. No EA records of INNS
Highest order site designation Receptor	None	N/A
Presence of priority habitat pathway	Known to be present	The exact pathway was unknown at the time of the survey. A 1km buffer around a direct route between the source and receptor was assessed.
Presence of priority habitat receptor	Known to be present	N/A
Details of priority habitat present	Priority Habitat Inventory - deciduous woodland (including ancient, replanted woodland) Present within 1km of pathway: Priority Habitat Inventory - Maritime Cliffs and Slopes Ancient Woodland Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Traditional Orchards Priority Habitat Inventory - No main habitat but additional habitat exists	N/A
Other existing connections between source and receptor	Unknown	N/A
Details of other existing connections	N/A	N/A

Source: Mott MacDonald, 2022.

B.12 ROA14

Option description: Increased capacity of Avon Dam. Dam to be raised by 2m.

For option ROA14, one asset was assessed for the Level 2 INNS assessment. This option will require (permanent) additional land around the edge of the reservoir. The SAI-RAT input values are outlined below in Table B.12 and Table B.13.

Table B.19: ROA14 asset SAI-RAT input data.

SAI-RAT criterion	Avon Dam Reservoir	Assumptions/comments
Asset Type	Reservoir	N/A
Asset Location	Dartmoor National Park, North of Shipley Bridge	N/A
Asset Size (m^2)	146000	Approximate area of the reservoir surface.
Existing high impact INNS records on site/area of proposed site?	Known to be present	No EA or NBN records of INNS
Details of high impact INNS present	SWW provided a record of *Impatiens glandulifera*.	N/A
Existing Priority Habitats on Site?	Known to be present	N/A
Details of existing priority habitats present	Priority Habitat Inventory – Upland Heath Priority Habitat Inventory - Blanket Bog Priority Habitat Inventory - Upland Flushes, Fens and Swamps Priority Habitat Inventory - Deciduous Woodland Priority Habitat Inventory - Grass Moorland (non-priority)	N/A
Highest order site designation of asset	National	One Site of Special Scientific Interest within 1km of the site.
Staff site visit (not entering water) frequency	2 (weekly)	Assumed value
Staff site visit entering or in contact with raw water frequency	2 (weekly)	Assumed value
Road Vehicle site visit frequency	2 (weekly)	Assumed value
Maintenance not entering water frequency	1 (annually)	Assumed value
Maintenance in contact with raw water frequency	1 (annually)	Assumed value
Angling equipment frequency	2 (weekly)	Assumed value
Live bait frequency	0 (never)	Assumed value
Fish stocking frequency	1 (annually)	Assumed value
Large vessels (over 28ft) frequency	0.5 (rarely)	Assumed value
Small vessel (under 28ft) frequency	2 (weekly)	Boating is a relatively common activity at reservoirs. If permitted at a reservoir, likely to occur frequently
Water sports equipment (SUPs, Canoe, Kayaks) frequency	2 (weekly)	Associated activities not expected at these asset types
Water Safety Equipment Temporary moorings, jetties, inflatables, buoys) frequency	0.5 (rarely)	Boating is a relatively common activity at reservoirs. If permitted at a reservoir, likely to occur frequently
Mammals/waterfowl on site frequency	2 (weekly)	If a reservoir is accessible to mammals and waterfowl, they are likely to access the asset frequently
Transfer of waste sludge to land frequency	0 (never)	Asset type should not generate sludge

SAI-RAT criterion	Avon Dam Reservoir	Assumptions/comments
Recreational walker/jogger/runner frequency	2 (weekly)	Relatively common activities at reservoirs. If reservoir is accessible for this purpose, likely to occur frequently

Source: Mott MacDonald, 2022.

B.13 ROA15

Option description: The Roadford ROA15 option would involve the construction of a pipeline to abstract 125 Ml/day from the River Lyd to Roadford Reservoir.

For option ROA15 one RWT was assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.20.

Table B.20: ROA15 RWT SAI-RAT input data.

SAI-RAT criterion	Gatherly Phase 2	Assumptions/comments
Source Name	River Lyd	N/A
Source Management Catchment	Tamar Management Catchment	N/A
Source Operational Catchment	Thrushel Wolf and Lyd Operational Catchment	N/A
Source Waterbody ID	GB108047007731	N/A
Source Type	River	N/A
Number of RWT inputs into source	Unknown	Input value not known at time of assessment
Pathway Type	Pipeline	N/A
Receptor Name	Roadford Lake Reservoir	N/A
Receptor Management Catchment	Tamar Management Catchment	N/A
Receptor Operational Catchment	Thrushel Wolf and Lyd Operational Catchment	N/A
Receptor Waterbody	GB30847000	N/A
Receptor Type	Online waterbody	N/A
Isolated Receptor Catchment	Yes	N/A
Volume of Water (Ml/day)	101-150	N/A
Frequency of Operation	Unknown	Input value not known at time of assessment
Transfer Distance (km)	5.1-10	N/A
Washout/maintenance points outside of catchments	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	Unknown	Input value not known at time of assessment
Source Navigable	No	Information taken from Canal and River Trust[8]
Pathway Navigable	No	N/A
Angling at Source	Members and day ticket holders, local matches	Assumed most likely based on available information[10]
Angling on Pathway	No	N/A
Water sports at Source	None	No evidence of clubs

[10] Fly Fishing Devon: Instruction and Guiding on Dartmoor and in South Devon, 2016. Fly fishing venues on Dartmoor and South Devon rivers and lakes. [online] Available at: < http://www.flyfishingdevon.co.uk/dartmoor-rivers-lakes.shtml> [Accessed 27/10/2022]

SAI-RAT criterion	Gatherly Phase 2	Assumptions/comments
Water sports on Pathway	No	N/A
Presence of high priority INNS Source	Not recorded	N/A
Presence of high priority INNS Pathway	Not surveyed / unknown	N/A
Details of INNS present	None known	N/A
Highest order site designation Receptor	Local	N/A
Presence of priority habitat pathway	Known to be present	N/A
Presence of priority habitat receptor	Not known to be present	N/A
Details of priority habitat present	Priority Habitat Inventory - Lowland Meadows (England) Priority Habitat Inventory - Purple Moor Grass and Rush Pasture (England) Priority Habitat Inventory - Traditional Orchards (England) Priority Habitat Inventory - Deciduous Woodland (England)	N/A
Other existing connections between source and receptor	Unknown	N/A
Details of other existing connections	Unknown	N/A

Source: Mott MacDonald, 2022.

B.14 BNW6

Option description: Bournemouth BNW6 is an aquifer storage and recovery (ASR) option at Longham. The option requires boreholes to be constructed on existing SWW site. Water would come from the Matchams intake site. The approximate yield would be 10 Ml/day.

For option BNW6 three RWT were assessed for the Level 2 INNS assessment. The SAI-RAT input values are outlined below in Table B.21.

Table B.21: BNW6 RWT SAI-RAT input data.

SAI-RAT criterion	River Stour to Longham Lakes	River Avon to Aquifer storage	Longham Lakes to Aquifer storage	Assumptions/ comments
Source Name	River Stour	River Avon	Longham Lakes	Input value not known at time of assessment
Source Management Catchment	Dorset Management Catchment	Avon Hampshire Management Catchment	Dorset Management Catchment	N/A
Source Operational Catchment	Stour Dorset Operational Catchment	Avon Hampshire Operational Catchment	Stour Dorset Operational Catchment	N/A
Source Waterbody ID	GB108043011040	GB108043015842	N/A	Input value not known at time of assessment
Source Type	River	River	Offline waterbody	N/A
Number of RWT inputs into source	Unknown	Unknown	Unknown	Input value not known at time of assessment

SAI-RAT criterion	River Stour to Longham Lakes	River Avon to Aquifer storage	Longham Lakes to Aquifer storage	Assumptions/ comments
Pathway Type	Pipeline	Pipeline	Pipeline	Input value not known at time of assessment
Receptor Name	Longham Lakes	Aquifer	Aquifer	N/A
Receptor Management Catchment	Dorset Management Catchment	Dorset Management Catchment	Dorset Management Catchment	N/A
Receptor Operational Catchment	Stour Dorset Operational Catchment	Stour Dorset Operational Catchment	Stour Dorset Operational Catchment	N/A
Receptor Waterbody	N/A	N/A	N/A	N/A
Receptor Type	Offline waterbody	Ground water	Ground water	N/A
Isolated Receptor Catchment	No	No	No	N/A
Volume of Water (Ml/day)	51-100	51-100	51-100	N/A
Frequency of Operation	Year round intermittent	Year round intermittent	Year round intermittent	N/A
Transfer Distance (km)	<1	5.1-10	<1	Assumes discharge area is location of boreholes
Washout/maintenance points outside of catchments	Unknown	Unknown	Unknown	Input value not known at time of assessment
Details of washout/maintenance points	Unknown	Unknown	Unknown	Input value not known at time of assessment
Source Navigable	Yes*	Unknown	No	*Information taken from River Stour Trust[11] Unclear if River Avon is navigable at this location
Pathway Navigable	No	No	No	N/A
Angling at Source	Members only, no matches*	Members and day ticket holders, national events**	Members only, no matches***	*Assumed most likely value[12] **Assumed worst case scenario [13] ***Assumed most likely scenario[14]
Angling on Pathway	No	No	No	Input value not known at time of assessment

[11] River Stour Trust, n.d. Paddling the River Stour. Available at: < https://www.riverstourtrust.org/boat-trips/paddling-the-river-stour/> [Date accessed: 28/10/2022]

[12] Live4Fishing, 2022. *River Stour Longham.* [online] Available at:<https://www.live4fishing.com/river-stour-longham-2/>. [Accessed 28/10/2022].

[13] R&DAA, n.d. *Welcome to Ringwood & District Anglers Association*. [online]. Available at <https://www.ringwoodfishing.co.uk/about-us.html>. [Accessed 28/10/2022].

[14] SW Lakes, n.d. *Coarse Fishing*. [online]. Available at: <https://www.swlakestrust.org.uk/longham-lake>. [Accessed 28/10/2022].

SAI-RAT criterion	River Stour to Longham Lakes	River Avon to Aquifer storage	Longham Lakes to Aquifer storage	Assumptions/ comments
Water sports at Source	Casual use by individuals/clubs	Unknown	Unknown	Dorset Stour has evidence of casual use[15], other input values not known at time of assessment
Water sports on Pathway	No	No	No	N/A
Presence of high priority INNS Source	Not surveyed - unknown	Not surveyed - unknown	Not surveyed - unknown	N/A
Presence of high priority INNS Pathway	Known to be present	Not surveyed - unknown	Known to be present	Final pipeline route not known
Details of INNS present	Northern river/ Florida crangonid *Crangonyx pseudogracilis/floridanus* Jenkin's spire shell *Potamopyrgus antipodarum* Gastropod sp. *Physella sp.*	N/A	Northern river/ Florida crangonid *Crangonyx pseudogracilis/floridanus* Jenkin's spire shell *Potamopyrgus antipodarum* Gastropod sp. *Physella sp.*	Intake location unknown
Highest order site designation Receptor	Known to be present	Known to be present	Known to be present	N/A
Presence of priority habitat pathway	Not known to be present	Not known to be present	Not known to be present	Pipeline route not known
Presence of priority habitat receptor	Known to be present	Known to be present	Known to be present	N/A
Details of priority habitat present	Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England)Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England)Priority Habitat Inventory - Deciduous Woodland	Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England)Priority Habitat Inventory - Deciduous Woodland	N/A
Other existing connections between source and receptor	Unknown	Unknown	Unknown	Input value not known at time of assessment
Details of other existing connections	N/A	N/A	N/A	Input value not known at time of assessment

Source: Mott MacDonald, 2022.

[15] SVCC, 2022. *Stour Valley Canoe Club*. [online]. Available at: <https://stourvalleycanoe.club/>. [Accessed 28/10/22].

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Strategic Environmental Assessment (SEA) Environmental Report ANNEX 6: APPENDICES L - Q

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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Strategic Environmental Assessment (SEA) Environmental Report ANNEX 6: APPENDICES L - Q

South West Water: Draft Water Resources Management Plan 2024 (WRMP24)

February 2023

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Contents

L. Bournemouth WRZ SEA Assessment

MOTT MACDONALD

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix L: Bournemouth Options Assessment

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessment (SEA) Environment Report		
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Prepared by:	Georgina Luck	**Date:**	08/02/22
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environmental Report Appendix L: Bournemouth - SEA Options		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water Draft WRMP24 SEA Environmental Report (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, abbreviations, scoring criteria and scoring definitions for these assessments.

It is acknowledged that Bournemouth supply side options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported. The following Options Assessments are for the Bournemouth Water Resources Zone (WRZ). Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key and Example Scoring Definitions

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS

++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

Bournemouth Water Resources Zone (WRZ)

The below Option Assessment Matrices cover the following draft WRMP24 options for Bournemouth WRZ:

- BNW1
- BNW3
- BNW6
- BNW11

L.1 BNW1

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	BNW1				
Option:	Borehole development, existing borehole remedial works.				
Scheme type:	New Groundwater				
Option description:	Borehole development, existing borehole remedial works.				
Approx. Yield (Ml/d):	1				
WRZ:	Bournemouth				
Date Completed:	20/05/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	01/06/22, 08/02/23	***Checker:***	Katharine Mason, Georgina Luck		
Date Approved:	30/08/22, 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	--	**Construction Effects** The option is situated within the Solent and Southampton Water Ramsar Site and SPA, and located approximately 1.5km north-east from The New Forest SAC, SPA and Ramsar Site, all of which are classified as GWDTE. The Solent Maritime SAC is approximately 2.3km downstream of the site, the Solent and Isle of Wight Lagoons SAC is approximately 3.5km downstream of the site, and the Solent and Dorset Coast SPA is located approximately 4.3km downstream of the option. The option directly encroaches upon Lymington River SSSI (100% unfavourable – no change) and Lymington River Reedbeds SSSI (35.5% favourable, 64.5%	Best practice mitigation to minimise impacts on SSSIs should be implemented throughout construction through a CEMP. When drilling boreholes, best practice measures to reduce risk of contamination include, locating the borehole as far as possible from a surface waterbody, and ensuring drilling fluids are	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				unfavourable – recovering), both of which are GWDTE. The option is located within three SSSI Impact Risk Zones. The option is located within 5km of five other sites that are classified as both SSSI and GWDTE: The New Forest SSSI (54.92% favourable, 41.36% unfavourable – recovering, 2.17% unfavourable – no change, and 1.55% unfavourable – declining); Hurst Castle and Lymington River Estuary (21.46% favourable, 75.67% unfavourable - recovering, and 2.88% unfavourable – declining); Norley Copse and Meadow SSSI (41.33% unfavourable condition – recovering, and 58.67% unfavourable – no change); Sowley Pond SSSI (66.62% favourable condition, and 33.38% unfavourable – no change); and Roydon Woods SSSI (63.93% favourable condition, and 36.07% unfavourable - recovering). There are no LNRs within 500m of the site, and no NNRs within 1km of the site. The HRA AA concluded there is a hydrological connection between the site and the option via the WFD groundwater waterbody GB40702G503500 (SW Hants Barton Group). However, there will be no adverse impacts on the integrity of New Forest SPA, Solent Maritime SAC and Solent SAC and Solent and Isle of Wight Lagoons SAC, if mitigation listed is implemented effectively. Pollution of the water environment is the only potential impact pathway during construction between the option and habitats sites, however there may be other impact pathways that cannot be ruled out.	free from contaminants. CIRIA guidance to be followed to ensure no adverse impacts in construction phase by pollution prevention measures. Sensitive timing of any construction works to avoid peak times for passage and overwintering waterbirds (October to March inclusive). Additional survey data is required to confirm qualifying features of Solent and Southampton SPA are associated primarily with coastal areas, and so less likely to be present near construction works. Additional assessments on ecological sites regarding abstraction yield and water discharges would be required as further effects cannot be ruled out.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once the option is operational there is the potential for significant impacts to occur due to the increased abstraction from the new borehole, with effects on groundwater levels a possibility. The HRA AA concluded that qualifying features are dependent on groundwater levels, namely the Solent and Southampton Water Ramsar Site, SPA and GWDTE, the New Forest SAC, SPA, Ramsar and GWDTE, and Lymington River and Lymington Reed Beds SSSIs and GWDTEs (particularly if the abstracted groundwater is discharged into the Lymington River). However, as the increase in abstraction yield of 1Ml/d is relatively small, this is expected to result in minor negative effects to these receptors. Additionally, it is unknown where water will be discharged to, and this may have adverse effects on habitat sites due to changes in groundwater levels. It is not possible to rule out significant effects at this time. The works during the operational phase are unlikely to have an impact on any SSSI Impact Risk Zones. The stated mitigation measures will result in no residual impacts on the integrity of the habitat sites during operation. However, adverse impacts on the sites in the absence of additional information on abstraction activities and discharge point of abstracted groundwater cannot be ruled out at this stage. As a result, a moderate effect has been identified on a precautionary basis.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable	-	-	**Construction Effects** The option is located approximately 460m west of an unnamed Ancient Woodland. It is assumed that the construction activities would take place within the existing site's footprint, therefore negative effects from	Best practice mitigation measures to minimise disturbance on the local ecology is expected during construction,	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	habitats and habitat connectivity			the loss of habitats would be minimised. However, construction activities such as noise and vibration (e.g. from construction plant and vehicles and the drilling of the borehole) may have a short-term effect on wildlife in the surrounding woodland habitats, resulting in minor negative effects. Excavations during construction may increase the risk of trapping small animals, presenting a minor negative effect on wildlife. The effects are minor pre mitigation but may not be completely eliminated post mitigation. **Operational Effects** Abstraction via groundwater could reduce the groundwater quality or levels, which would have a negative effect on the GWDTEs that this option encroaches on. However, as the increase in abstraction yield is relatively minor (1Ml/d) this effect would be minor negative. There are no salmon rivers in proximity to the option that are likely to be affected by the abstraction. The effects are minor pre mitigation but may not be completely eliminated post mitigation.	including carrying out pre-construction checks, surveys and covering excavations to prevent trapping small mammals.		
	Reduce the spread or presence of INNS	0	0	**Construction Effects** Records from surveys completed in 2016 identified the presence of Japanese knotweed and Himalayan balsam in the area. However, as the works consist of drilling a borehole within the existing site footprint, it is unlikely that INNS will be encountered and spread during the construction phase, therefore the risk is assessed as very low.	Best practice measures to appropriately remove INNS where identified will be implemented.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Whilst there may be INNS present within abstracted groundwater, it is assumed that INNS will not be distributed further due to treatment and removal at the WTW. Operational risk is therefore neutral.			
Water	Protect and enhance the quality of the water environment and water resources	---	--	**Construction Effects** The option is located within the Lymington River WFD River Catchment and the SW Hants Barton Group WFD groundwater body. The WFD Level 1 assessment concluded there is potential for low impact on SW Hants Barton Group (SW) and Lymington River due to construction of below ground structures. The option is within Groundwater Source Protection Zone (SPZ) 1 and 2c. Pollutants from construction runoff may reach surface and groundwaters which could deteriorate the WFD classification of the Lymington River and the Groundwater Body SW Hants Barton Group, however this effect would be short-term. The site is not located within a Nitrate Vulnerable Zone. It is also not located within a Drinking Water Protection Area, and so the construction of the option is unlikely to have an impact on the quality of drinking water. **Operational Effects** The option seeks to abstract via a third groundwater borehole on the site, increasing yield by 1Ml/d which could result in minor decreases in groundwater quality or levels. Due to its proximity to the coast, there is also	Best practice measures during construction will likely be implemented through a CEMP. Monitoring during the operation phase would reduce the risk of negatively impacting groundwater quality in the long term. Dewatering to be discharged to local watercourse to help maintain flow (if water quality is not of concern). Adjustment of abstraction conditions if upon further investigation they are discovered to be impactful to nearby GWDTE's.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				possibility of water being abstracted from the new borehole being unusable due to its salinity. The WFD Level 1 assessment indicated that this additional abstraction will have potential for high impact on preventing target WFD objectives from being achieved for the SW Hants Barton Group WFD groundwater body. Therefore, a Level 2 WFD assessment was undertaken, which concluded a possible deterioration between status classes and possible impediments to GES/GEP for the SW Hants Barton Group.			
	Increase resilience and reduce flood risk	-	0	**Construction Effects** The option is located within both Flood Zones 2 (1 in 1000-year risk of flooding from rivers or the sea) and 3 (1 in 100-year risk). Construction runoff e.g. from washout, and excavations may result in minor and short-term increases of flood risk in surface and groundwater. The new borehole will be located within the existing site footprint, therefore there is a low risk of increasing hardstanding areas around the site. **Operational Effects** It is not anticipated that there will be any coastal flood interventions implemented during operation in the coastal area located immediately south of the option. A neutral impact is expected.	Best practice measures to reduce the impact on flooding during the construction phase is likely to be implemented.	0	0
	Deliver reliable and resilient water supplies	0	- +	**Construction Effects** Water supply is predicted to be delivered as per the existing yield during the construction phase, therefore there would be no short-term effects.	Ongoing monitoring during operation will reduce the risks of over-abstraction.	0	- +

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The option will provide an additional 1Ml/d for use within the Bournemouth WRZ, which would improve the resilience of water supply in the region. However, there is the risk that water may be over-abstracted, and that the quality of the water may decrease, resulting in potential impacts on long-term water availability.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** This option is predominately within Grade 3 Agricultural Land (good to moderate quality Agricultural Land). It is assumed that the works will take place in the existing site footprint, so there would be minimum impacts on surrounding undeveloped soils outside the site. However, the works include the requirement for a new borehole, therefore drilling will be required, along with excavations to install pipes to connect the borehole to existing SWW water mains. There is therefore a risk of contamination to the soils from accidental leaks and spillage of fuels and chemicals. This has the potential for a short-term negative impact on the quality of soils. Lymington River SSSI (100% unfavourable – no change), Hurst Castle and Lymington River Estuary SSSI (21.46% favourable, 75.67% unfavourable - recovering, and 2.88% unfavourable – declining) and The New Forest SSSI (54.92% favourable, 41.36% unfavourable – recovering, 2.17% unfavourable – no change, and 1.55% unfavourable – declining) are geological SSSIs located within 5km from the option. As Hurst Castle and Lymington River Estuary and The	Best practice measures during the construction phase will likely be implemented, through the use of a CEMP. When drilling boreholes, best practice measures to reduce risk of contamination include locating the borehole as far as possible from a waterbody, and ensuring drilling fluids are free from contaminants.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				New Forest SSSIs are both further than 500m away from the site, there will unlikely be any impacts to these SSSIs due to the distance and nature of the works. Although short-term contamination from drilling activities may impact the Lymington River SSSI, the option is unlikely to change the designation of the SSSI as it is already in 100% unfavourable condition. The option is located over 200m from any Authorised Landfill Sites and does not intersect with any Historic Landfill Sites. **Operational Effects** No effects on Agricultural Land and soils are anticipated during operation. The option is located on a brownfield site and will unlikely have an effect on soils or existing land use. A neutral impact on soil resources is expected.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The site is located over 500m from any AQMAs. Construction of new minor infrastructure will likely generate dust and air pollutants in the short term from passing construction vehicles through the neighbourhood and the use of plant and equipment (e.g. drill rigs), affecting nearby local residents. Minor negative effects to the surrounding air quality are therefore expected.	Best practice mitigation measures would likely be implemented during the construction phase, e.g. using water to suppress dust, adhering to a CTMP, or turning off construction plant when not in use to reduce emissions.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Pumping systems may emit minor amounts of air pollutants and greenhouse gases during the operational phase, however the- overall effect of this is likely to be neutral due to the nature of the works (i.e. an additional borehole).			
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The construction of new minor infrastructure will require new materials which would increase embodied carbon, along with short-term greenhouse gas emissions during construction associated with energy use and construction plant. The embodied carbon emissions (total embodied carbon from construction) for this option will be 31 tCO_2 equivalent. The effects are minor pre mitigation but may not be completely eliminated post mitigation. **Operational Effects** The option involves the operation of an additional borehole, resulting in a minor increase in energy consumption. Energy will be required to pump water from the borehole to increase abstraction yields. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 104 tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. The effects are minor pre mitigation but may not be completely eliminated post mitigation.	Investigate the use of substitute materials with lower embodied carbon and use of renewables. Decarbonisation of the National Grid is likely to help reduce future emissions.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST	LT				ST	LT
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** All construction effects would be short-term and are not expected to have any significant effects on climate change risks. **Operational Effects** Increased rate of abstraction may have a negative effect on the environment (e.g. shortage of water groundwater supply) if not properly monitored or licensed. However, the increased yield from the properly monitored abstraction will likely have a minor beneficial effect on climate change resilience, particularly in times of drought.	Monitor to reduce the risk of effects on the environment due to increased abstraction.	0	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** Within 500m of the option, there are two Conservation areas including Forest South East approximately 80m east of the option and Buckland (Lymington) approximately 280m west of the option. There are also five Grade II Listed buildings, and one Scheduled Monument (Hillfort at Buckland Rings), situated approximately 440m south-west of the option. Whereas the closest Grade II Listed Building (Passford Farmhouse) is situated approximately 340m west of the option within the Buckland Conservation area. The works are unlikely to have any impact on the nearby heritage assets due to the nature of work and distance to the assets. As the new borehole development is within an existing site, the potential for encountering previously unknown archaeology is unlikely. However, the option may affect the Forest South East Conservation Area, due to the close proximity to the	There are no mitigation measures anticipated at this stage. Ongoing best practice and management of historic assets are recommended throughout construction and should be implemented through a CEMP.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				option. Visible construction activities have the potential to result in a negative impact on the setting of nearby heritage assets in the short term. However, these are likely to be screened from the nearest heritage receptors through vegetation. There are no World Heritage Sites, Registered Park and Garden, or Registered Battlefield within 500m of the option. There are also no Protected Wrecks located within 5km. The option is, however, located 120m west of the Forest South East Protected Conservation Area. **Operational Effects** The option is not expected to have any adverse effect on cultural heritage assets, or their settings during the operational phase. It is also unlikely to have any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** The option is located within the New Forest National Park, near the National Park boundary. It is assumed from the scale of the proposed works that the construction activities would be minor and contained within the existing site footprint. However, certain elements such as stockpiles and drilling rigs might be visible, reducing the visual amenity of the National Park. This effect would be temporary and minor. **Operational Effects** No operational effects on landscape anticipated.	Best practice mitigation measures for reducing visual impacts during construction would likely be implemented, including setting up visual screening, though residual effects might still remain.	-	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST		LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	0	**Construction Effects** Within 500m of the option there is a hospital, a special needs education centre and a business park that may experience negative effects from the noise and emissions of construction vehicles passing through the area. This hospital and education centre are assumed to have particularly vulnerable community receptors. However, considering the existing use of the surrounding site (i.e. a business park) the increase in noise and disturbance from construction vehicles is likely to be minor. There are several PRoW within 500m of the option. However, the works will take place within an existing SWW site and therefore will not result in the loss of any community facilities and will not affect public accessibility. The option has an IMD Decile of 6, and impacts on economic wellbeing are not expected. During construction, the capital expenses for the construction phase is expected to occur within one year (2025). This initial cost is expected to be very substantial. Therefore, presenting opportunity to improve the local economy, through job creation and working with local suppliers for materials and resources. **Operational Effects** No community facilities are likely to be affected during operation. There are also no local economic or social enhancements expected. Operational effects have been identified as neutral.	Best practice mitigation measures to manage construction traffic, e.g. through the implementation of a CTMP will likely be implemented to reduce disturbance in the local area.	0	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST		LT			ST	LT
	Maintain and enhance tourism and recreation	-	0	0	**Construction Effects** The option is within the New Forest National Park, which offers recreational opportunities. Increased traffic from construction activities (e.g. construction traffic and large deliveries such as drill rigs), may have a negative but short-term impact on public access to the surrounding tourism and recreational sites. However, given the small scale of the works and context within an existing site and adjacent business park, the effects are predicted to be neutral. **Operational Effects** The works are assumed to be within the existing site footprint, so will not affect nearby tourism or recreational activities.	Best practice mitigation measures to manage construction traffic, e.g. through a CTMP, will likely be implemented, including viewing alternative routes and managing deliveries.	0	0
Material Assets and Waste	Minimise resource use and waste production	-		-	**Construction Effects** Energy consumption is likely to increase in construction. The option requires new minor infrastructure, which would require resources and raw materials. Excavated material may also be generated in the development of the borehole, which would require reuse or appropriate disposal. **Operational Effects** Energy consumption is likely to increase in the operational phase, as a result of increased abstraction and pumping. However, the quantity of water is relatively small and therefore the effects are likely to be minor.	There is an opportunity to implement sustainable design measures to reduce the impact of construction activities. Additionally, there is further opportunity to reuse the spoil generated from excavation for landscaping and backfilling, reducing waste streams.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST		LT			ST	LT
	Avoid negative effects on built assets and infrastructure	-	0	0	**Construction Effects** It is anticipated that the upgrades will be carried out within the existing site footprint. The scale of the works is likely to be minor, although may require HGVs to pass through the A337 and other local roads, to reach the option. Thus creating a minor impact on the road network due to increased construction traffic. However, as the scale of the works are anticipated to be small, there is likely to be neutral impacts on built assets and infrastructure in the short term. **Operational Effects** The new borehole would operate within an existing site, and no ongoing effects on built assets are expected.	Best practice mitigation measures to reduce and manage construction traffic if required through a CTMP. This includes managing the timing of deliveries and reviewing alternate routes.	0	0

L.2 BNW3

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	BNW3				
Option:	Wimborne transfer to Longham - licence change				
Scheme type:	Conjunctive use				
Option description:	Smarter conjunctive use of the Stour sources. Transfer of the current Wimborne groundwater licence (c.4Ml/d) to the Longham licence on the Stour. This is expected to occur in 2027 when the Longham licence is due to be cut. This would mean that no additional changes would be required on site at Longham.				
Approx. Yield (Ml/d):	4				
WRZ:	Bournemouth				
Date Completed:	17/10/22, updated 03/02/23	***Completed By:***	Ceri Jones	***Version:***	B
Date Checked:	20/10/22, 08/02/23	***Checker:***	Georgia Luck		
Date Approved:	31/10/22, 08/02/23	***Approver:***	Melanie Reid, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** Dorset Heathlands SAC, Dorset Heathlands Ramsar site, and Dorset Heathlands SPA, all classified as GWDTEs, are located approximately 3.5km south at their closest points from the option. There are four SSSIs within 5km of the option. These are; Canford Heath SSSI, approximately 4km south of the option (54% unfavourable - recovering, 45% unfavourable –	Due no construction being required for the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				no change and 1% destroyed), Corfe & Barrow Hills SSSI, approximately 3.5km south of the option (93% unfavourable – recovering, 6% unfavourable – declining and 1% unfavourable – no change), Corfe-Mullen Pastures SSSI, approximately 4.5km south west of the option (71% favourable, 28% unfavourable – recovering), and Holt and West Moors Heaths SSSI approximately 4.5km north east of the option (60% unfavourable – recovering, 25% favourable, 12% unfavourable – no change and 2% unfavourable). These are all GWDTEs. The option is situated within a SSSI Impact Risk Zone. There are no Local Nature Reserves or National Nature Reserves within 500m of this option. No construction works are anticipated with this option. Therefore, there are not expected to be any effects to any ecological sites in the short term. **Operational Effects** The HRA concluded that the option is sufficiently distant and/or not hydrologically connected to any of the SAC, SPA or Ramsar sites. There are not expected to be any long-term effects on ecological sites as a result of the licence transfer.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** The option is directly within three priority habitats including coastal and floodplain grazing marsh, deciduous woodland and an area of no main habitat but additional habitats present. The option is within the distance at which nightjar are known to commute when foraging (~7km). However,	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				the habitats surrounding the option are not considered to be optimal habitats for this species. Due to the nature of the option and the fact it does not require any additional construction, these sites are highly unlikely to experience any effects as a result of the implementation of this option. **Operational Effects** There is expected to be no significant infrastructure changes associated with this option. There is not expected to be long term effects on priority species or habitats.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The INNS Assessment stated that there is no risk of transfer/movement of invasive or non-native species with this option type, as there are no construction activities anticipated or new infrastructure required. **Operational Effects** Due to the option type, there is no risk of transfer/movement of invasive or non-native species.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	0	**Construction Effects** The option is located within both SPZ 1 and 2. The waterbodies associated with this option are the River Allen, the Reading Beds Groundwater body, which are both within the Wimborne option site area, and the River Stour which runs approximately 1km south of the site. The option is located within the South Wessex NVZ. The option is located within a Drinking Water Safeguard Zone.	No impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				As this option type is a licence transfer, it is assumed there will be no significant infrastructure changes or construction at the site which could impact water quality. The WFD Level 1 assessment concluded that no impacts on waterbodies are expected with this option. **Operational Effects** The WFD Level 1 assessment concluded that no impacts on waterbodies are expected with this option.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000-year risk) and Zone 3 (1 in 100-year risk) and is therefore vulnerable to flood risk. There is no construction anticipated therefore there will not to be any change to the existing hardstanding. Flood risk to the site is expected to stay the same. **Operational Effects** As this option involves a transfer of a licence rather than and significant new infrastructure or additional abstraction, there is not expected to be any effects on flood risk during operation.	No impacts have been identified and therefore no mitigation is required.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** There is not expected to be any short-term effects on water resilience and supply. It should be considered whether any existing water supplies will be temporarily affected when the licence transfers.	No impacts are anticipated as a result of the works and therefore no mitigation identified at this stage. Best practice measures could still be implemented	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational, smarter conjunctive use of the Stour sources should result in a more resilient water supply in the Bournemouth area. There should be no overall change in abstraction, as 4Ml/d is being transferred from Wimborne to Longham.	at the site, for example to ensure workers and site visitors are aware of pollution prevention.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** Corfe Mullen Pastures SSSI is located approximately 4.5km south west of the option. This SSSI was designated due to its distinct geologies which have a strong and contrasting influence on the overlying vegetation and the pastures. The option is located within Grade 4 (poor quality), Grade 5 (very poor quality) and non- agricultural land. The option is located over 200m from any Authorised Landfill Sites and Historic Landfill Sites. There are not expected to be any contamination risks associated with a licence transfer. There is expected to be no construction activities or significant infrastructure changes therefore soils will likely be unaffected. **Operational Effects** Long-term operation is unlikely to have any effects on soil, due to there being no additional land take.	No impacts are anticipated as a result of the works and therefore no mitigation identified at this stage.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located over 500m from any AQMAs. As this option involves a licence transfer, there is not expected to be any construction works. There could	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				potentially be a temporary small increase in traffic at the site when the licence is changed, however overall this option is unlikely to result in any effects on air pollution. **Operational Effects** It is unlikely that the operation of the option will cause any effects on air quality. This is because it involves a transfer of an existing licence, meaning overall no additional energy (fuel) will be required during operation.			
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** This option is unlikely to result in any increases or decreases in embodied carbon or carbon emissions as it involves the transfer of an existing licence. **Operational Effects** As the licence is being transferred, there are expected to be no effects on carbon emissions as they are expected to remain the same.	No impacts are anticipated as a result of the works during construction and therefore no mitigation identified. If appropriate, investigate the use of renewables to power abstraction under the existing licence. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	0
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** There are no anticipated construction works associated with this option. Therefore, there are currently no known climate resilience measures in place relating to short-term effects of the option.	No significant impacts are anticipated as a result of the works during construction.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The timing of the licence transfer should be carefully considered to ensure there are no effects associated with a potential shortfall. This could happen if the current licence is decommissioned before the new licence is stet up. **Operational Effects** This option is in flood zone 2 therefore there is some risk from flooding to the site. However, there is not anticipated to be any new infrastructure, therefore this option is expected to have no impact on flood risk. A licence transfer is expected to result in the smarter conjunctive use of the Stour sources, resulting in increased resilience across to the effects of climate change.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located within 500m of heritage sites including fifteen Grade II Listed Buildings including Walford Bridge; 116 West Borough; 63 West Borough; 83 and 85 East Borough; Angel Cottage; Boundary Wall to Angel Cottage; Guildcraft Construction Walford Mill; Hartlands; Industrial Building adjoining Mill House on East; Lodge and Gateway to cemetery; Mill House; St Margaret's; two Chapels in cemetery; Walford Farmhouse; and Wimborne United Reform Church. There are no Scheduled Monuments, World Heritage Sites, Registered Parks and Gardens, or Registered Battlefields within 500m of the option. The Wimborne Minster Conservation area is approximately 250m south of the option. There are also three other Conservation areas; Pamphill, Burts	No impacts are anticipated as a result of the works and therefore no mitigation has been identified. Recommendation for additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Hill/Merrifield and Ashington within 500m – 2km from the option. This option type is not expected to have any effect the historic environment as there is not anticipated to be any construction activities. **Operational Effects** This option type is not expected to have any adverse effects on the historic environment. There is also unlikely to be any enhancement or improvement on public access and /or enjoyment to heritage assets. If groundwater tables were to be altered due to a change in abstraction, there is potential for effects upon water-dependent heritage assets and water sensitive environments to occur. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is within 200m of Crambourne Chase and West Wiltshire Downs AONB. There is not expected to be any significant changes to infrastructure, therefore this option type is not expected to result in any effects on the landscape. **Operational Effects** There is not expected to be any significant changes to infrastructure, therefore this option type is not expected to have any adverse effects on the landscape.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** This option involves a licence transfer from Wimborne to Longham. Within 500m of the Wimborne site there are three places of worship and two schools. These are all within the built-up area to the south of the site consisting of an industrial estate and residential properties. There are no PRoW within 500m of the site. It is expected that receptors close to the site would not be affected by this option as there are not anticipated to be any construction activities. The option is almost completely within an IMD Decile rank of 10, meaning it is among the least deprived areas of England. However, there are very small areas within the south west of the site which lie in IMD Decile rank of 5 and 7, which are more deprived areas. This option would result in a neutral effect due to the utilisation of existing facilities with no new land take or additional infrastructure. **Operational Effects** The option does not promote a reduction in water consumption however does help to secure resilient water supplies for the health and wellbeing of customers. During operation, there are yearly costs however these are not substantial. There would likely be no effect on the local economy.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The Wimborne site is surrounded by open fields, with an industrial estate and residential development to the south. This option is unlikely to affect tourism because there is not expected to be any construction works or infrastructure changes. **Operational Effects** As this option is a licence transfer, it is anticipated that there will be no effects on any existing recreational facilities and/or tourism during operation. The licence is being transferred to Longham, which is downstream of Wimborne. Therefore, water levels will not be reduced at Wimborne and there should be no effect on recreational activities on the water.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option is not anticipated to involve any construction or major infrastructure upgrades. Therefore, no resources or waste products are anticipated. The option involves the transfer of an existing licence. This licence transfer may require minor quantities of new resources; at this stage this is unknown. It is currently assumed that no additional land uptake is expected.	No impacts are anticipated as a result of the works. However, if subsequent infrastructure upgrades are required, opportunities to implement sustainable design should be taken.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The operation of the option is unlikely to result in any increase in resource use or waste production meaning effects are likely to be neutral. Should upgrades to the existing infrastructure be required, minor quantities of new resources may be needed.			
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** This option is not expected to affect built assets and infrastructure, as it is a licence transfer between existing SWW sites. **Operational Effects** There are no long-term operational impacts foreseen on built assets and infrastructure.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

L.3 BNW6

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	BNW6				
Option:	Longham Aquifer Recharge				
Scheme type:	Aquifer recharge/Aquifer Storage Recovery				
Option description:	Aquifer storage and recovery at Longham. Pumping and storage of water in winter months for subsequent abstraction.				
Approx. Yield (Ml/d):	10				
WRZ:	Bournemouth				
Date Completed:	24/05/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	22/07/22, 08/02/23	***Checker:***	Becky Mulley, Georgina Luck		
Date Approved:	30/08/22, 08,02,23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	-	+	**Construction Effects** Dorset Heaths SAC and Dorset Heathlands SPA both classified as a GWDTE, are located approximately 1.2km north at their closest points from the option. Dorset Heathlands Ramsar Site also classified as a GWDTE is approximately 1.4km south-east at the closest point from the option. There are 10 SSSI within 5km of the option, the closest ones include: Turbary and Kinson Commons SSSI situated approximately 2km south of the option (17.83% unfavorable condition – recovering, 74.92% unfavorable – no change); Ferndown Common SSSI (100% unfavorable – no change) approximately 1km north-east of the option; and Canford Heath SSSI approximately 2km south-	Best practice mitigation to minimise impacts on SSSIs should be implemented throughout construction through a CEMP. When excavating or drilling boreholes, best practice measures to reduce risk of contamination could include, locating the works as far as possible from a surface waterbody and ensuring drilling fluids are free from contaminants.	-	-	+

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
					west of the option (53.94% unfavorable – recovering, 45.08% unfavorable – no change). There are a further six designated sites located over 5km from the option including Solent and Dorset Coast SPA (14km downstream), River Avon SAC (17.5km downstream), Avon Valley SPA and Ramsar Site (18km downstream), Poole Harbour SPA and Ramsar Site (7.2km south-west). The HRA AA, stated that there is a hydrological connection between the designated sites and the option, via the WFD groundwater waterbody GB40802G805800 (Lower Dorset Stour and Lower Hampshire Avon). However, it was concluded that there would be no adverse impacts on the integrity of Dorset Heaths SAC and Dorset Heathlands SPA if mitigation measures are effectively implemented. During construction there is the ongoing risk of potential impact pathways between designated habitats (Dorset Heaths SAC; Dorset Heathlands SPA; Avon Valley SPA Dorset Heathlands Ramsar; Solent and Dorset Coast SPA; River Avon SAC; Avon Valley Ramsar; Poole Harbour SPA, Poole Harbour Ramsar) and the option, resulting in pollution to the water environment. As the option lies within the Goose and Swan Functional Land IRZ associated with Avon Valley SPA, mitigation will be required. Application of stated mitigation measures will avoid adverse impacts on all habitat sites, with no residual impacts. The generation of dust and waste (e.g., through excavation) may pose a risk on the SSSI IRZ's in the short term. Milhams Mead LNR is located approximately 400m south of the site, along with	Adhere to CIRIA guidance to allow for effective pollution measures. Sensitive timing considerations of any construction works should be considered to avoid peak times for overwintering Bewick's swan (October to March inclusive) and where feasible implemented to reduce the likelihood of adverse impacts on the integrity of Avon Valley SPA. If work must commence during this period, they must not be undertaken if more than 1% of the cited SPA population of this species is present within a distance at which adverse impacts may be felt.			

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Kinson Common LNR approximately 1km south-west of the site. **Operational Effects** Once operational, abstraction of surface water at the Matchams site will reduce the amount of water available for downstream habitats, e.g. in Milhams Mead LNR, which may depend on the water supplied from this option. This may lead to seasonal (i.e. intermittent) adverse effects on these ecological receptors, resulting in overall minor negative effects. Water is to be discharged into new boreholes during the winter, for subsequent abstraction in the summer. The source of the storage water is the Matchams Intake on the River Stour. There will be no changes in groundwater levels, for which some qualifying features are dependent, and therefore no significant effects are anticipated during operation. Recharging of the aquifers could result in minor positive effects for GWDTEs near the option by providing minor increases in groundwater levels.				
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	--	+	**Construction Effects** The option is located within 500m of coastal and floodplain grazing marsh priority habitat, deciduous woodland priority habitat, and areas with no main habitat but classified as having additional habitats present. Deciduous woodland is the closest to the option, approximately 10m west at the closest point, with other priority habitats spread sporadically across the 500m buffer zone of the option. The option is located over 500m from any areas of ancient	Best practice measures during construction to reduce disturbance to wildlife and habitats, including carrying out pre-construction checks, surveys, and covering any excavations to prevent trapping small mammals.	-	-	+

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
					woodland. The installation of new infrastructure (i.e. pumps) to abstract water from the surface of the River Stour could disturb aquatic habitats. The River Stour is also classified as a salmon river, with abstraction potentially resulting in adverse impacts on Salmon habitats, through degradation. Priority habitats around the location of the proposed discharge area and pumps, e.g. woodlands, may experience temporary disturbance from construction arising from noise, vibration, and construction dust. Additionally, excavation may increase the risk of trapping small animals in pits during the construction phase. There is potential for habitat loss to occur, as a result of building the new infrastructure required to facilitate the increased abstraction, and to possibly extend the intake Motor Control Centre (MCC) building on the site. However, the scale of the works and new infrastructure required is likely to be minor, therefore the negative effects will potentially be minor. **Operational Effects** During operation, the moderate increase in abstraction of water (1500Ml to be injected continuously into the aquifer at a time of low demand in the year) will increase the risk of lowering water levels and the quality of water downstream, affecting aquatic habitats and wildlife. However, there is potential for increased groundwater and discharge back to rivers, which would enhance the conditions of GWDTE and resilience of water-dependent habitats particularly during drier seasons.	A Salmon Action Plan is in place here and should be consulted, prior to undertaking any works. Monitoring abstraction during operation will reduce the risks of over-abstraction, ensuring that effects on the environment are minimised.			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Expansion of existing infrastructure may result in the permanent loss of habitats, although the scale is expected to be minor.			
	Reduce the spread or presence of INNS	--	--	**Construction Effects** The INNS assessment detailed that The Ebsford Environmental Survey 2016, recorded the presence of Japanese knotweed Sch 9 (hybrid), New Zealand pigmy weed, pale galligale, and Nuttall's waterweed in the study area. There is the risk of the periodical spread of INNS during the construction phase, for example through the use of shared equipment across the construction sites without proper cleaning. **Operational Effects** Due to the nature of the works, there is a moderate risk of spread of INNS through the transfer of untreated water from the Matchams site to Longham. However, there is negligible risk of spreading INNS through groundwater storage.	Best practice mitigation to remove INNS during construction. Whilst ensuring all construction equipment, machinery and PPE is correctly stored and cleaned prior to moving or leaving the site.	-	--
Water	Protect and enhance the quality of the water environment and water resources	--	--	**Construction Effects** The option is located within both SPZ 1 and 2. The River Stour runs approximately 50m to the west and 100m to the south of the option. The option intersects with the Lower Dorset Stour and Lower Hampshire Avon (groundwater), the Stour (Lower) and the Avon Water WFD waterbodies. The option is not located within a Nitrate Vulnerable Zone. There is potential for the works during construction to generate pollution (e.g. accidental chemical spillages and fuel leaks from plant and vehicles, and	Best practice measures during construction will likely be implemented through a CEMP. Monitoring during the operation phase would reduce the risk of negatively impacting groundwater quality in the long term. The treatment of water before pumping into groundwater aquifers, will likely reduce	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				contamination during drilling for boreholes), that could enter and contaminate surface and groundwater sources via runoff. This would create a short-term adverse effect on the affected waterbodies and have minor potential to prevent any target WFD objectives from being achieved. The option is located within a Drinking Water Protected Zone, and so pollution during construction of the option has the potential to impact upon water quality in the area. **Operational Effects** There would be a risk that pumping oxygenated surface water into groundwater aquifers would mobilise contaminants such as heavy metals or fluoride, deteriorating groundwater quality. Considering the additional volumes to be pumped and abstracted (10Ml/d), this could result in moderate negative effects on groundwater quality. The WFD Level 1 assessment indicates that the increased abstraction rates at Matchams, are likely to have moderate potential leading to a widespread or prolonged effect on the quality of the water environment of the Avon Water WFD waterbody, which may prevent target WFD objectives from being achieved. Therefore, a WFD Level 2 assessment has been undertaken, which concluded possible deterioration between status classes and possible impediments to Good Ecological Status (GES) or Good Ecological Potential (GEP) for the Avon Water.	the risk of deteriorating groundwater quality. however there may still be minor negative effects. Adjustment of abstraction conditions could be considered to reduce impacts on the reservoir where appropriate. Additionally checks are recommended to be undertaken to ensure appropriate fish and eel screening is in place prior to abstraction.		

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
	Increase resilience and reduce flood risk	--	-	+	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000-year risk) and Zone 3 (1 in 100-year risk). There is potential for a short-term increase in flood risk due to excavation works during the construction of the new aquifer storage and recovery (ASR) boreholes. **Operational Effects** Pumping of water to be stored in the aquifer may reduce overland flows and run-off, potentially reducing the risk of surface flooding in the area. However, risks of groundwater flooding may increase and could reduce the capacity for infiltration, due to a higher water table. Given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rises.	Best practice measures to reduce the impact on flooding during the construction phase is likely to be implemented. An FRA is recommended to help inform specific mitigation measures. Ongoing monitoring of recharge rates and groundwater levels during operation is recommended to reduce the risk of groundwater flooding.	-	-	+
	Deliver reliable and resilient water supplies	0	++		**Construction Effects** It is currently not envisaged that water supply will be affected during the construction phase, therefore there would be no effect. **Operational Effects** The option will deliver a moderate improvement in resilience and demand during the summer periods, with an increased yield of 10Ml/d.	There are currently no identified mitigation measures.	0	++	
Soil	Protect and enhance the functionality, quantity and quality	-	-		**Construction Effects** Part of the option is located within Grade 2 classified (very good quality) Agricultural Land (37,300m^2). The option may require construction works, including	Best practice to manage soils during construction including soil reinstatement should be considered.	-	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	of soils, including the protection of sites of geological importance			excavation on undeveloped areas of the existing site, construction of minor new infrastructure and expansion of existing infrastructure. This will lead to minor losses of versatile Agricultural Land and therefore a minor reduction in soil quality. Contamination from accidental leaks or spills of fuels or chemicals, particularly when drilling boreholes, may occur, resulting in further degradation. The option does not intersect with any Historic Landfill Sites and is located over 200m from any Authorised Landfill Sites. Therefore, there is low potential for contamination from landfill sites. The option does not intersect with any geological SSSI. **Operational Effects** During operation, there is a risk of localised ground heave at the aquifer storage and recharge (ASR) site, resulting in upward movement of soils which could potentially damage overlying structures. This is due to groundwater levels rising during aquifer recharge.	Geotechnical investigations should be carried out to determine whether soil is prone to heave, with appropriate mitigation measures implemented (e.g. underpinning or monitoring groundwater levels) following the findings.		
Air	Reduce and minimise air emissions	-	-	**Construction Effects** The option is located over 500m from any AQMAs. There is potential for dust and pollutants to be generated from construction plant and vehicles, which could affect nearby residential receptors, however the effects are likely to be temporary and minor.	Best practice mitigation measures during construction should be detailed within a CEMP including, using water to suppress dust, adhering to a CTMP, and turning off construction plant when not in use, to reduce emissions.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The pumping and treatment of water may lead to potential increased air emissions, and pollutants during operation.			
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** New infrastructure for recharge, treatment and abstraction, and the potential expansion of existing infrastructure, could require a moderate increase in embodied carbon. The embodied carbon emissions (total embodied carbon from construction) for this option will be 49 tCO_2 equivalent. **Operational Effects** Due to an increase in water abstraction rates and the need for water treatment, more power is expected to be required. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 187 tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	Opportunity to use sustainable design principles and choose materials with lower embodied carbon, along with renewable energy.	-	-
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** The construction of new infrastructure has the potential to result in short-term construction emissions. however, due to the temporary and geographical scale of the works, the impacts on climate change are likely to be neutral.	Monitor the abstraction rates to reduce the negative effects on the environment.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Increased abstraction rates may increase vulnerability to droughts in the long term without proper monitoring. Although, storing water in aquifers could help build resilience in times of drought. Therefore, there would likely be minor positive effects on resilience to climate change, particularly in relation to the effects of droughts.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There are several Grade II Listed Buildings within 500m of the option situated along the A348 approximately 16m east of the option, which include: Longham Bridge; Stour Cottage; 57 Ringwood Road; Granary; Longham Farmhouse; Home Farmhouse; Longham House; Post Office; White Hart Inn; Longham United Reform Church; and The Manse. There are no Scheduled Monuments, World Heritage Sites, Registered Park and Gardens, or Registered Battlefields within 500m of the option. There are also no Protected Wrecks within 5km. Hampreston Conservation Area is located approximately 540m north-west from the option and is therefore unlikely to be impacted due to the distance and scale of the works. The setting of heritage assets (Listed Buildings), located close to the option could experience minor negative impacts due to increased construction traffic. There is also a risk of uncovering unknown archaeology when drilling new boreholes, within previously undisturbed land.	Best practice mitigation measures will likely be implemented to minimise setting effects during construction. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects No effects are anticipated on heritage receptors during the operational phase, as the proposed works will be within the existing site footprint. The option is also unlikely to have any significant enhancement or improvement on public access and/or enjoyment of heritage assets. Due to the option consisting of aquifer recharge and subsequent abstraction, there is potential for lowering of the groundwater table during certain periods, which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located over 200m from any AONBs and National Parks. Due to the distance of the works from these landscape receptors, effects from construction activities will be neutral. **Operational Effects** There will be no effects on the surrounding landscape receptors in the operational phase as all works will be undertaken within the existing Longham Water Treatment site footprint.	Best practice mitigation measures for reducing visual impacts during construction would likely be implemented, including setting up visual screening.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community,	- / ++	+	**Construction Effects** Within 500m of the option there is a place of worship and medical care accommodation to the north-west along the A348, and numerous residential properties.	Best practice mitigation measures to manage construction impacts and traffic (e.g. through a	- / ++	+

SEA Topic	SEA Objective	Effects ST	Effects	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects	Residual effects LT
	including economic and social wellbeing				There are also several PRoW located within 500m of the option. The option is within an IMD Decile rank of 9, meaning it is among the least deprived areas of England. As the works are going to be within the existing SWW site, there will be no direct impacts on these receptors, although they may experience disturbance from a minor increase in construction traffic (e.g. traffic noise and dust) passing along the A348. The option is expected to require very substantial capital costs over the period of 2025-2029, implying there will be significant short-term benefits to the economy during construction, e.g. through job creation and working with local suppliers for materials. **Operational Effects** During operation, the yearly operational costs will be moderate. This may have resultant effects on the local economy as additional staff may be required to run the enhanced facilities, generating jobs for the local community.	CTMP) will reduce effects although minor negative effects may still occur.			
	Maintain and enhance tourism and recreation	-		-	**Construction Effects** Longham Lakes is adjacent to the option and serves as a recreation centre, enabling activities such as fishing and yachting. Within 500m of the option is a golf course. There may be temporary negative impacts for users of the Lakes as construction works to install abstraction points and pumps in the area could reduce amenity of the area (e.g. via visual disturbance and increase in noise, dust and increased traffic).	Best practice mitigation measures will likely be implemented to minimise effects during construction, including visual screening of works. However, minor and temporary effects are likely to still occur.	-		-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The pumping of water from surface water and storage of water in aquifers may reduce downstream flows, which would negatively impact recreation, angling and other water-based activities downstream of the option.			
Material Assets and Waste	Minimise resource use and waste production	--	--	**Construction Effects** New infrastructure is required to pump, abstract, and treat water. This will likely require a moderate amount of energy and new resources/materials over five-year construction period, amounting to substantial costs and resource use. The option will also result in an increase in waste volumes and type including excavated material, construction waste and general solid waste. However, there is opportunity to use renewable sources of energy and sustainable materials in construction. **Operational Effects** To produce an additional yield of 10Ml/d, this would likely require a moderate amount of energy during operation as suggested by moderated yearly Opex costs. However there is an opportunity to use renewable energy options which would reduce negative impacts on energy consumption to minor.	Follow waste hierarchy in waste management and adhere to a SWMP. There is the opportunity to implement sustainable design measures to minimise the use of new resources. The option should seek to set target and monitor the use of resources including energy and materials throughout construction.	-	-
	Avoid negative effects on built assets and infrastructure	0	-	**Construction Effects** It is anticipated that the works will be carried out within the existing site footprint, therefore the effect is likely to be neutral.	There is an opportunity to use renewable sources of energy and sustainable materials during both construction and operation.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Recharge into aquifers may result in soil heave which could damage the foundations of built infrastructure including roads, resulting in minor negative impacts to these receptors. This may deteriorate over time without proper monitoring.	Ground conditions would need to be monitored for any changes in ground levels due to heave.		

L.4 BNW11

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	BNW11				
Option:	Christchurch WWTW IPR 2 - Transfer to Longham Lakes.				
Scheme type:	Water Reuse				
Option description:	Additional treatment (nutrient removal) at Christchurch before pumped transfer (29km of rising main) to Longham Lakes.				
Approx. Yield (Ml/d):	14				
WRZ:	Bournemouth				
Date Completed:	17/06/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	25/07/22, 08/02/23	***Checker:***	Becky Mulley, Georgina Luck		
Date Approved:	30/08/22 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	-	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from Christchurch WWTW to Longham Lakes, where it will be discharged. The pipeline and outfall point will be constructed within the Avon Valley SPA, Solent and Dorset Coast SPA, River Avon SAC, and the Avon Valley Ramsar Site. The HRA Assessment concludes that there may be the potential for significant effects on these sites during construction due to the potential habitat loss. The pipeline and outfall point will also be constructed within the River Avon System SSSI (2.82% Favourable,	Best practice construction methods should be applied to minimise the effects on designated and non-designated sites (e.g., dust suppression, pollution control measures). Site walkovers are recommended to identify areas of in-river habitat stress. Water resource and quality should be carefully	--	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				7.46% Unfavourable – Recovering, 85.61% Unfavourable – No change, 4.10% Unfavourable – Declining), the Avon Valley (Bickton to Christchurch) SSSI (59.34% Favourable, 26.81% Unfavourable – Recovering, 6.06% Unfavourable – No change and 7.79% Unfavourable - Declining). The option will also pass through the Stour Valley LNR and intersect the Solent and Dorset Coast MPA. The pipeline and outfall point will be constructed across multiple SSSI Impact Risk Zones. Construction activities, excavation works, and construction runoff have the potential to disturb the wildlife and habitats within these areas, which could deplete their ecological status. The WWTW and the associated pipeline is located within 500m of Dorset Heaths SAC, Dorset Heathlands Ramsar Site, Purewell Meadows SSSI (100% Unfavourable – Recovering) and Turbary and Kinson Commons SSSI (17.83% Unfavourable – Recovering, 74.92% Unfavourable – No change, 7.25% Unfavourable – Declining). The closest is Purewell Meadows SSSI, located approximately 40m away from the proposed pipeline. The WWTW and associated pipeline is also located within 500m of Purewell Meadows LNR, Iford Meadows LNR, Redhill Common LNR, Stour Valley LNR, Kinson Common LNR and Millhams Mead LNR. The closest of these is Millhams Mead LNR, which is located directly adjacent to the proposed pipeline. Although these sites do not directly intersect the area of proposed construction, construction runoff could potentially negatively affect the wildlife and habitats situated within these areas. For example, the HRA concludes that the Dorset Heathlands Ramsar Site is hydrologically connected to the option via a groundwater body. Any pollution	monitored to ensure that designated and non-designated sites are not impacted downstream		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				incidents may be transferred to the site and cause potentially significant effects. Dorset Heathlands SPA, areas of Dorset Heaths SAC, areas of Dorset Heathlands Ramsar Site, Stanpit Marsh LNR, Hengistbury Head LNR, and Turbary Common LNR are located between 500m and 2km from the option. Christchurch Harbour SSSI, Town Common SSSI, Moors River System SSSI, Parley Common SSSI, Ferndown Common SSSI, and Canford Heath SSSI are also located between 500m and 2km from the option. There are no NNRs or MCZs within 2km of the option. As these sites are further away from the proposed scheme, they are unlikely to be affected in the short term by construction works. **Operational Effects** The additional treatment of water will take place on the existing Christchurch WWTW site. Sites which are situated close to the Clockhouse Stream may experience some decreased surface water flows which may negatively affect the area's wildlife. This is because the discharge it currently receives from Christchurch WWTW is being redirected to Longham Lakes. However, the HRA concludes that none of the sites are anticipated to experience effects during operation. The pipeline is anticipated to pass through the Solent and Dorset Coast SPA and SSSI, the Avon Valley SPA, Ramsar Site and SSSI, as well as the River Avon SAC and SSSI, separating the WWTW from the discharge location. However, this is not anticipated to cause effects on the designated sites.			

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	+	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from Christchurch WWTW to Longham Lakes, where it will be discharged. The proposed pipeline would encroach upon multiple areas of priority habitats including coastal and floodplain grazing marsh, and deciduous woodland. These habitats are anticipated to be affected from direct land take during construction. There are also areas of priority habitat located adjacent to and within 500m of the WWTW and proposed pipeline. These include purple moor grass and rush pastures, and lowland meadows. Excavation works and construction runoff, noise, and vibration have the potential to indirectly affect the habitats and species living within these areas. The construction of the pipeline is expected to intersect the River Avon and River Stour, both of which are classified as salmon rivers. Construction has the potential to adversely affect Salmon species and how able the river channel will be to pass. The option is expected to cause the permanent loss of BNG units due to habitat clearance associated with construction. The option is also likely to cause the temporary loss of stocks during construction. Best practice mitigation and reinstatement / compensation of habitats means that most natural capital stocks post construction will have no to little change. This will reduce the permanent impacts on the provision of ecosystem services. Broadleaved / mixed / yew / priority / urban woodland is expected to be temporarily	Best practice mitigation during construction to minimise impacts on biodiversity, vulnerable habitats, stocks, and habitat connectivity (e.g., dust suppression, pollution control measures, directional drilling). Site walkovers are recommended to identify areas of in-river habitat stress. Water quantity and quality downstream should be regularly monitored to reduce effects on habitats, species, and biodiversity.	--	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				lost during construction. It has a significant maturity time with a delay of 30 years, which is considered within potential future provision of this stock through the ecosystem services assessment. No loss of active floodplain is expected, and lakes/standing waters/rivers are not presumed to be temporarily lost, due to construction mitigation measures. The proposed pipeline is located within two GWDTEs (River Avon System SSSI and Avon Valley (Bickton – Christchurch) SSSI). There are also two GWDTEs within 500m of the proposed pipeline (Turbary & Kinson Commons SSSI and Purewell Meadows SSSI). The groundwater within these areas could be polluted by construction runoff, which could disturb the species living within this sensitive ecosystem. The proposed pipeline is located within an Important Bird Area. Construction noise, vibration, runoff and emissions have the potential to negatively affect bird species sensitive to change. The option is located over 500m away from any areas of ancient woodland, however there are multiple areas of woodland which directly encroach upon Christchurch WWTW and the proposed pipeline. The option is located over 5km away from any Shellfish Classification Zones, so this species should not be impacted by the scheme.			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The additional treatment of water will take place on the existing Christchurch WWTW. Sites which are situated close to the Clockhouse Stream may experience some decreased surface water flows which may negatively affect the wildlife living within the stream. This is because the discharge it currently receives from Christchurch WWTW is being redirected to Longham Lakes. Species and habitats close to the WWTW may experience disturbance from this, particularly those that are sensitive to change and live within the encroaching priority habitats and nearby GWDTEs. Sites which are situated close to the Longham Lakes may experience increased surface water flows which may positively enhance the surrounding area's wildlife. The Christchurch WWTW discharge will be redirected to this area. Species living within deciduous woodland priority habitat and coastal and floodplain grazing marsh priority habitat may benefit from this extra flow, as these areas are located within 500m of the lake.			
	Reduce the spread or presence of INNS	-	0	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from Christchurch WWTW to Longham Lakes, where it will be discharged. There is potential to introduce or spread INNS during construction, due to excavation works and increased use of shared equipment.	Best practice methods to be implemented to minimise the disturbance and spread of INNS, as far as practicable during construction.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option involves the physical transfer of treated water between two locations which are currently unconnected. INNS risk is considered neutral as treated water will be free from INNS.			
Water	Protect and enhance the quality of the water environment and water resources	--	-	**Construction Effects** The option is located within Lower Dorset Stour and Lower Hampshire Avon Groundwater body. The option is not located within a NVZ however Longham Lake itself is located within an SPZ (Zone I and Zone II). It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from Christchurch WWTW to Longham Lakes, where it will be discharged. Construction runoff has the potential to pollute close by waterbodies such as the River Avon, The Clockhouse Stream, the River Stour, and Longham Lakes. The proposed pipeline is located within two GWDTEs (River Avon System SSSI and Avon Valley (Bickton – Christchurch) SSSI). There are also two GWDTEs within 500m of the proposed pipeline (Turbary & Kinson Commons SSSI and Purewell Meadows SSSI). Construction runoff has the potential to deplete the quality of groundwater within these ecosystems. The option is also located within a Drinking Water Protected area, and so pollution during construction of the option has the potential to severely impact upon water quality in the area. The WFD Level 1 screening concluded moderate impacts from construction of below ground structures	Best practice construction methods should be applied to minimise the effects on water resource and water quality (e.g., dust suppression, pollution control measures). Appropriate precautionary measures will be taken when working in channels of watercourses, to appropriately manage the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. Risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. If impacts are likely appropriate mitigation should be considered and put in place	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					on Lower Dorset Stour and Lower Hampshire Avon (Groundwater) and moderate impacts from reduction/cessation of existing discharge to a watercourse on Christchurch Harbour. **Operational Effects** The WFD Level 1 concludes there is the potential for minor localised effects on the Stour (Lower) WFD waterbody. This is due to the new WWTW discharge and the maintenance/use of the river outfall point. However, this would not lower the WFD status of the waterbody. The WFD Level 1 screening concluded no moderate or high impacts for the option.	It is recommended that any dewatering discharge should be treated before discharge.			
	Increase resilience and reduce flood risk	-	-	+	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000-year risk of flooding from rivers or the sea) and Flood Zone 3 (1 in 10-year risk). Construction runoff e.g. from washout may result in minor and short-term increases of flood risk in surface and groundwater. **Operational Effects** Longham Lake is located within Flood Zone 2 and its surrounding area is located within Flood Zone 3. Increased discharge may increase the risk of flooding downstream of the site outfall, particularly in periods of heavy rainfall. Clockhouse Stream is in an area of Flood Zone 2 and Flood Zone 3. In the long term, the risk of flooding in this area may decrease, as the discharge into this stream is being redirected to Longham Lakes.	Best practice measures to reduce the impact of flooding are likely to be implemented, through implementation of a CEMP. Careful monitoring of river and groundwater levels to mitigate the risk of flooding during operation.	-	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				The proposed pipeline will be located within the Christchurch Harbour Transitional and Coastal Waterbody. Therefore, there is potential that the option could experience increased flood risk from associated sea-level rise.			
	Deliver reliable and resilient water supplies	0	++	**Construction Effects** Until operation, the option will not deliver any increased reliability or resilient water supplies, and so short-term impacts are not anticipated. It should be considered whether water supplies will be temporarily disrupted during any construction works. **Operational Effects** The option will provide an additional 14ml/d of water for use within the Bournemouth region, with an increase in treatment and pumping likely to result in positive long-term effects on the resilience of water supplies.	No notable effects have been identified and therefore no mitigation required.	0	++
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** Most of the option is located within urban land, with sections of the pipeline crossing land classified as Grade 3 Agricultural, Grade 4 Agricultural, and non-Agricultural Land. It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Christchurch WWTW to the Longham Lakes, where it will be discharged. This may require excavation works which has the potential to decrease the functionality and quality of the surrounding soils. However, the effect of this on soils is		-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				likely to be minor. This is because there are already existing mains pipelines within the construction footprint. Therefore, this land has already been excavated in the past, and soils have already been disturbed to some extent. The option directly encroaches upon two Historic Landfill Sites and there are several Historic Landfill Sites within 500m of the option. Construction works within these sites may release contamination contained in the soils. There is also a risk that contamination within these Historic Landfill Sites will contaminate the construction runoff and leach into nearby waterbodies. The option is located over 500m from any geological SSSIs, so these sites should not be affected. **Operational Effects** All treatment and pumping during operation are assumed to take place within the Christchurch WWTW site and within the mains pipelines. Therefore, the functionality and quality of soils should not be impacted by operational activities.			
Air	Reduce and minimise air emissions	-	-	**Construction Effects** The option is located over 500m away from any AQMAs. However, it is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Christchurch WWTW to the Longham Lakes, where it will be discharged. Construction is likely to have a negative impact on air quality in the local area. There is the potential for construction dust during construction.	Best practice mitigation measures likely to be implemented during the construction phase include dust suppression and pollution control and any further mitigation outlined within a CEMP. However, minor and temporary	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				There is also potential for increased emissions from vehicle as construction machinery and vehicles travel to and within the site. **Operational Effects** It is unlikely that the operation of the option will result in any significant change to existing air quality. However, there may be minor effects because of additional treatment and nutrient removal. The WWTW may operate at an increased frequency and prolonged duration due to the extra water treatment and pumping, therefore leading to potential increased air emissions due to plant and equipment operating over longer durations and more regularly.	impacts on air quality are still likely to occur.		
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Christchurch WWTW to Longham Lakes, where it will be discharged. The construction of the pipeline will result in an increased use of machinery, vehicles, and construction materials. This construction activity will increase the release of carbon emissions in the local area. Any congestion caused by construction will also increase the release of vehicle emissions. This option requires new infrastructure which has the potential to increase the embodied carbon within the asset. The combination of these emissions will result in negative effects in the short term.	Investigate the use of substitute materials with lower embodied carbon and renewables to power the facilities. Operational emissions should be investigated during optimisation. Decarbonisation of the National Grid is likely to help reduce operational carbon emissions.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					The embodied carbon emissions (total embodied carbon from construction) for this option would be 4,931tCO_2 equivalent. **Operational Effects** The implementation of this option will require the additional treatment and pumping of 14Ml/d of water, which will increase operational carbon emissions in the long term. If the option operated at 25% of maximum output for nine months of the year, and full throughput for the remaining three months, operational carbon emissions will be 95 tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of this option. **Operational Effects** The additional treatment at the WWTW, could result in an increase in resilience towards climate change effects, through enabling increased nutrient loading and more regular operation. This may increase water supplies through dry conditions. However, an increase in discharge within Longham Lakes could contribute to climate related flooding during periods of heavy rainfall. A decrease in water flow within the Clockhouse Stream (situated next to Christchurch WWTW) could	Water levels of the Longham Lakes should be monitored during operation to mitigate against flooding events. Best practice measures should be applied to prevent potential climate related flooding and negative impacts on the environment.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				also lead to a reduced water resource, particularly during drought. This could increase vulnerability to climate change risks and hazards.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	--	0	**Construction Effects** There are multiple Listed Buildings and Structures that directly encroach or are within 500m of Christchurch WWTW and the associated pipelines to Longham Lakes. There is a distinctive cluster of these within Christchurch parish. There are several Scheduled Monuments within 500m of the WWTW or the pipeline. These include Staple Cross, Site of Town Walls, and Pre-Conquest monastery, Augustinian priory and a motte and bailey castle at Christchurch. The closest of these is Site of Town Halls, approximately 45m away from the proposed pipeline. Construction of the option will involve excavation works. This activity, as well as any associated road closures, vehicle activity, or vibrations, has the potential to disturb the setting of the Listed Buildings and Scheduled Monuments, or prevent access to them. There are no World Heritage Sites, Registered Parks and Gardens, or Registered Battlefields located within 500m of the WWTW or the pipelines, so no sites of this nature should be affected by construction. There are also no protected wrecks located within 5km. There are several conservation areas within 500m of the WWTW and pipelines. These include Purewell Conservation Area, Christchurch Central Conservation Area, Avon Buildings Conservation Area, and Burton Conservation Area. The closest Conservation area is Christchurch Central, which is located approximately 230m away from the WWTW. The proposed pipeline	Best practice mitigation measures should be implemented through a CEMP to minimise disruption to the historic environment.	--	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				will also pass through this area. This option involves construction works, so the visual amenity of the conservation areas may be temporarily disturbed. There are already existing mains pipelines within the construction footprint. Therefore, this land has already been excavated in the past, so it is unlikely that this option will affect any unknown archaeology. **Operational Effects** All operational activities are expected to take place within the existing Christchurch WWTW site and pipelines. Therefore, the effects of operation on the historic environment should not extend beyond the option footprint, meaning that historic assets should not be impacted in the long term. It is also unlikely to have any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	--	0	**Construction Effects** There are no AONBs or National Parks within 1km of the option. The option intersects Dorset Heaths NCLA. The Christchurch WWTW and a section of the associated pipeline is located within the Bournemouth Green Belt. It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Christchurch WWTW to Longham Lakes, where it will be discharged. In the short term, construction may impact the surrounding visual amenity due to excavation works, increased use of machinery, and increased vibration. There is also the potential for reduced access and views of	Ground to be reinstated post-construction to mitigate against any construction effects. Best practice measures to reduce the impact of construction on landscape.	--	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
					designated historic features within the area. Most of the pipeline will be constructed within an urban area, so construction works will be clearly visible to residents and there will be limited screening. Landscape effects will be particularly prominent in summer periods where levels of tourism are high. Vegetation will be in full growth during the summer period, so this is likely to reduce this effect. The option is located within a Historic NCLA consisting of mainly housing and residential extension which have the potential to experience adverse short-term effects as a result of construction of the option. **Operational Effects** All operational activities are assumed to take place within the WWTW, and the option will utilise the proposed pipeline, which will be situated underground. It is assumed that any disturbed land will be reinstated post construction. It is also assumed that there will not be any change to existing infrastructure because of the additional treatment and pumping, therefore effects on landscape are not expected in the long term.				
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	0	**Construction Effects** There are several functional sites and important buildings within 500m of the WWTW and the associated pipelines. These include schools, religious buildings, retail services, and sports and leisure centres. The closest of these sites are located adjacent to the proposed pipeline location. There are also several major roads, sections of the National Cycle Network, and a rail line within 500m of the option. These sites may experience some temporary effects	Best practice mitigation measures to minimise the effects of construction on the health and wellbeing of the local community. If road closures are required, careful consideration for construction phases and delivery timings should be considered to minimise	-	+	0

SEA Topic	SEA Objective	Effects ST	Effects	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects	Residual effects LT
					from increased noise, vibration, and traffic arising from the construction of the pipeline. There are sections of PRoW located within 500m of the option. These areas may be temporarily disrupted during construction which may result in accessibility issues for the public. The option is within 500m of several Greenspace sites. The closest sites are located adjacent to the proposed pipeline location. An area of this stock (presumably a playing field) will be temporarily lost during construction and excavation, which may temporarily impact recreational activities. The pipeline will be constructed across several roads, so road closures, diversions, and increased congestion is expected in the local area. There could be a rise in noise and dust because of increased vehicle movements and construction activity, potentially affecting the local community. Upfront capex costs are anticipated to be very substantial over the four-year period from 2025 to 2028. This potentially creates jobs as well as local material and resource supply chain opportunities, all of which will improve the local economy, providing short-term positive effects. **Operational Effects** Once the option is operational, it is anticipated to result in moderate ongoing Opex costs from 2029. This is likely due to the increase in nutrient removal and pumping requirements. Resultant economic effects for the local community are not expected.	congestion on nearby roads.			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The proposed pipeline is located within 500m of several Greenspace sites. The proposed pipeline will pass through the closest of these sites, a playing field. The construction phase is likely to involve excavation works, along with increased noise, dust, and vibration. In the short term, there may be limited accessibility and loss of this stock due to construction. The construction phase is also likely to increase congestion within the local community, which has the potential to disturb tourism in the area, particularly during the summer. **Operational Effects** In the long term, operational activities are assumed to take place within the existing WWTW site and proposed pipelines. It is assumed that any land disturbed in the short term will be re-instated post construction. Therefore, recreational activities and tourism are unlikely to experience any disturbance in the long term.	To mitigate the effects on tourism and recreation, construction of the option should be scheduled outside of summer periods, where tourism is at its peak. However, it is likely that some construction impacts will remain.	-	0
Material Assets	Minimise resource use and waste production	--	-	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Holdenhurst WWTW to the Longham Lakes, where it will be discharged. There is likely to be moderately significant quantities of new materials used to construct this pipeline. There will also be an increase in waste excavation material and construction waste. Energy consumption is likely to increase from machinery and construction vehicles travelling to and from the site.	There is an opportunity for sustainable design measures to be implemented into the scheme, including consideration of materials with less embodied carbon, and the reuse of excavated material. However, it is likely that some minor residual effects will remain.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term, there may be a need for increased chemicals and energy consumption, to accommodate for the additional treatment and pumping of treated water.	Best practice measures should be implemented to minimise the effect on resource use and waste production during operation.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** It is assumed that this option will involve the construction of a 29km rising main pipeline. This will transfer treated water from the Christchurch WWTW to the Longham Lakes, where it will be discharged. Constructing the pipeline is likely to involve excavation works. The majority of this will be completed on existing road infrastructure, meaning temporary road closures and diversions are expected. This has the potential to increase traffic within the area. There may also be limited access to facilities and historic assets within 500m of the option. Nearby residential properties may experience vibration and noise pollution from construction works. **Operational Effects** It is unlikely that there will be any notable impacts on built assets and infrastructure as a result of the proposed option, due to the fact that the main extent will be located underground, and transport infrastructure will be reinstated.	Design the new pipeline to be located where there will be the least disruption to built assets and infrastructure. Carefully plan closures and diversions to minimise disruption and ensure infrastructure is reinstated post construction. Ensure best practice measures are always implemented.	-	0

M. Colliford WRZ SEA Assessment

MOTT MACDONALD

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix M: Colliford Options Assessment

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessments (SEA) Environment Report		
Our reference:	100107117-MMD-RP-SEA-019-A	**Rev**	B
Prepared by:	Georgina Luck	**Date:**	08/02/23
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environmental Report Appendix M: Colliford WRZ - SEA Options Assessments		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water Draft WRMP24 SEA Environmental Report (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, scoring criteria and definitions, and abbreviations for these assessments.

It is acknowledged that Colliford supply side options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported.

The following Options Assessments are for the Colliford Water Resources Zone (WRZ). Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS

++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

Colliford Water Resources Zone (WRZ)

The below Option Assessment Matrices cover the following draft WRMP24 options for Colliford WRZ:

- COL2
- COL3
- COL4
- COL5

- COL6
- COL9
- COL11
- COL12
- COL15
- COL18
- COL19
- COL20

M.1 COL2

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL2				
Option:	Colliford PS Stage 2 – River Camel Abstraction				
Scheme type:	New Surface Water				
Option description:	New abstraction licence. New river intake and pumping station at Nanstallon, for 90Ml/d at 120m head. Approximately 9 miles of 900mm diameter pipeline, from the intake to Restormel WTW. Upgrade to existing Restormel WTW intake to pump 110Ml/d (an increase of 15Ml/d). Raw water is then pumped to Colliford Reservoir via existing main.				
Approx. Yield (Ml/d):	15				
WRZ:	Colliford				
Date Completed:	12/05/22, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	31/05/22 updated 08/02/23	***Checker:***	Katharine Mason, Georgina Luck		
Date Approved:	30/08/22 updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	---	**Construction Effects** The option is located within 5km of the River Camel SAC (also classified as a GWDTE) and Breney Common & Goss and Tregoss Moors SAC, close to the new river intake and pumping station construction and WTW upgrade works at Nanstallon. There is a possibility for disturbance to local habitats and species, especially within the River Camel SAC, where construction of the new intake could result in habitat losses, air pollution and visual and aural disturbance. The northern part of the option directly encroaches upon the River Camel Valley	Best practice construction measures should be followed on site e.g., dust suppression, pollution control, emergency response plans. Reinstatement of habitats where pipeline is constructed.	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				and Tributaries SSSI (10.19% favourable, 48.5% unfavourable – recovering, 40.35% unfavourable – no change and 0.95% unfavourable -declining). A large extent of the option involves a 9 mile pipeline being installed underground with associated groundworks expected to have a substantial effect on land. However, due to the fact this is not expected to take place within any designated sites, effects on important habitats and species are expected to be limited. There are additional SSSIs and SACs along the extent of the option which may experience short-term effects from increased vehicle movements and activity associated with construction of the pipeline. There are no SPAs or Ramsar Sites located within 5km of the extent of the option, and no NNRs within 1km. Bodmin Beacon LNR, Lanhydrock CWS, Red Moor CWS and Boscarne Wood CWS are however located within 500m of a section of the pipeline, with potential for short-term effects involving habitats and increased construction vehicle movements and activity. **Operational Effects** The River Camel SAC, Breney Common & Goss and Tregoss Moors SAC, and the River Camel Valley and Tributaries SSSI, may be affected in the long term due to the increased abstraction associated with the new abstraction license. The River Camel SAC is also hydrologically connected to the site, with potential for habitats to be damaged through pollution and change in water levels. There are additional SSSIs and SACs along the extent of the option, but due to the nature of the			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				option, these are unlikely to be affected in the long term. The HRA assessment concluded that the River Camel is hydrologically connected throughout the River Camel and North Cornwall groundwater waterbody, with potential for habitats to be damaged through pollution, leading to habitat loss, air pollution and visual and aural disturbance. The assessment also concluded that whilst there are multiple other SACs hydrologically connected, there is unlikely to be any significant effect due to the distance and the direction of impact pathways.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	--	**Construction Effects** There are several priority habitats located along the extent of and directly intersecting the pipeline and pumping station, including areas of deciduous woodland priority habitat and traditional orchard priority habitat. There is a high likelihood for short-term effects during the construction phase, especially in the areas intersected by the 9 mile pipeline construction and new pumping station at Nanstallon. It is expected that there will be multiple areas of deciduous woodland priority habitat which could be affected by additional vehicle movements and excavations associated with the proposed option, with likelihood to cause short-term disruption to species with temporary loss of habitats and food sources. It is not anticipated that any Shellfish Waters or fisheries will be affected by the option, due to the fact there are none within 500m. Effects are likely to be experienced in areas across the whole extent of the 9 mile pipeline, due to the substantial nature of the excavations associated with the option. The BNG assessment concluded that there would be a change of –35.95% in habitat units and –52.17% in	Follow best practice construction measures to minimise impacts on ecology and habitats.	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				river units. This 8.18 hectares of cereal crops and 12.52 hectares of modified grassland both with low distinctiveness. An area of 0.61 hectares of lowland mixed deciduous woodland with high distinctiveness will be affected. **Operational Effects** The option will involve the abstraction of an additional 15Ml/d from the River Camel SAC, which is classified as a GWDTE. This reduction in water flow therefore has the potential for an adverse effect on this designated site. The increased abstraction also has the potential to affect fish and other ecology which exist within the current River Camel system, due to the reductions in water flows. The River Camel is a salmon river, with potential for adverse effects on salmon movements as a result of the increased abstraction of the river. It is unlikely that there will be any long-term effects associated with the new pipeline as land will be reinstated. There may however be some potential for interruption to habitat connectivity as a result of the presence of the new pumping station, although this depends on its exact location which is currently unknown. There may also be some interruption to Shellfish Waters located downstream through potential reductions in river flows. This has been assessed as a potential moderate negative effect.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** During construction there is the risk of increased spread of INNS due to the movement of excavated material and tracking plant and equipment. There is also a small risk	Best practice and consultation of the INNS risk assessment in order to minimise spread of INNS.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				of construction workers introducing INNS during any upgrade works to Restormel WTW, although this is expected to be minimised by the following of site biosecurity practices. **Operational Effects** The option is likely to result in the physical transfer of untreated water (between two locations which have been assumed currently unconnected). It is however assumed that any transfer of INNS would be treated/removed from the water treatment facility. There is additional risk from possible pipeline washout, pipeline burst, wash-water discharge and sludge disposal which could result in the spread of INNS during operation. This is an existing main therefore there is a low risk that additional flows inputted into Colliford Reservoir could change the habitat suitability for any INNS present which could facilitate further spread of INNS. The frequency of this is regular, with a low risk of INNS transfer.	Construction sites to follow best practice biosecurity measures.		
Water	Protect and enhance the quality of the water environment and water resources	-	---	**Construction Effects** Across the extent of the new pipeline, several watercourses are crossed which has the potential for impacts on the water bodies during construction from sediment runoff or pollution. There may also be a localised deterioration of water quality in the Lower River Camel due to contamination and runoff from construction activity associated with the new intake point, although this is expected to be mitigated through good practice construction. Construction of the new pumping station may also have the potential for localised impacts on water quality, depending on the location of the works.	Best practice mitigation methods should be used here to ensure residual effects will be minimised. Directional drilling may be used where possible for the construction of the pipeline to mitigate potential impacts. However, stock overlapping with above ground infrastructure will be permanently affected.	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				There are however no Nitrate Vulnerable Zones along the extent of the option, and so effects on water quality here will be minimal. Part of the option is located within a Drinking Water Protected area, and so there is a risk of pollution arising from the construction phase with the potential to severely impact upon water quality in the area. The WFD Level 1 assessment concluded that during the construction phase there is potential for low impact on Lower River Fowey, Looe and Fowey (GW) and North Cornwall (GW) as a result of construction of below ground structures. There is a medium impact on North Cornwall (GW) due to construction of below ground structures, particularly on the river crossings of Lanivet Stream and St Lawrence Stream within 500m of the River Camel Valley & Tributaries SSSI. There is a low impact on the Lower River Fowey, Looe and Fowey (GW) and North Cornwall (GW) from the trenching and laying of pipelines. There is a low impact on the North Cornwall (GW) due to construction of the new pumping station. The NCA concluded that there would be a change of –127.70 in river (length) with the option. **Operational Effects** Increased abstraction of the Lower River Camel could potentially result in the long-term deterioration of the water quality due to reduced flows. In addition, as this is classified as a GWDTE, the reduction in water flows may have a long-term effect on receptors. This presents the potential to lead to a significant effect and permanent deterioration of WFD Status of the Lower River Camel. The WFD Level 1 assessment concluded that during the	During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. Dewatering discharge will be treated before discharge. During operation, land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow. During construction, it is assumed that bedding material for pipelines will be constructed such that they do not form preferential pathways for groundwater flow. During construction, it is assumed that watercourse crossings will be carried out using directional drilling or if the watercourse needs to be		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				operational phase there is potential for a low impact on Lower River Fowey, Looe and Fowey (GW) and North Cornwall (GW) as a result of the presence of a new underground structure and a low impact due to draining of pipelines for maintenance.	temporarily diverted, appropriate measures will be in place to protect ecology and watercourse will be returned back to its natural state.		
	Increase resilience and reduce flood risk	--	-	**Construction Effects** The option is located predominantly within Flood Zone 1, however some areas are within Flood Zone 2 (1 in 1000 year) and Zone 3 (1 in 100 year), particularly within the area of the new river intake and pumping station, and also where the pipeline crosses some waterbodies along its extent. These areas may be liable to flooding which could affect construction activity. **Operational Effects** Long-term operational impacts are likely to be low given that the majority of option (the pipeline) will be buried. However, the new pumping station at Nanstallon has potential for a small increase in hardstanding and subsequent risk of flooding, depending on the precise location of construction. It is likely that this will be located within Flood Zone 2 and 3. The upgraded WTW at Restormel is located around 100m away from an area of Flood Zone 2 and 3, however with increased abstraction, this is unlikely to be of significant effect. Given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise. However, the exact location of the pumping station is not yet known, so the potential future flood risk of this infrastructure is not certain.	Measures to reduce the impact of flooding during the construction phase may be required, especially in areas of Flood Zones 2 and 3. Consider timing of construction works to avoid likely flood periods. Ensure electrical equipment and sockets are located above potential flood levels. Mitigation measures are unlikely to be required during operation as the scheme is unlikely to have an effect on ongoing flood risk.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	++	**Construction Effects** During construction, the option will not deliver any increased reliability or resilient water supplies, and so no construction effects are anticipated. It should be considered as to whether construction activities will be likely to interrupt any water supplies. **Operational Effects** The option will provide an additional 15Ml/d of water for use within the SWW region, with the increase in abstraction likely to result in positive long-term effects on the resilience of water supplies. It should however be considered whether the river has the capacity to provide for this increased abstraction, especially during periods of drought.	Consider whether any water supplies are likely to be interrupted as a result of construction, and appropriately mitigate using best practice measures.	0	++
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** Temporary land take will be required for construction of the new 9 mile pipeline. This is expected to include small areas of greenfield land, however land take will be minimised by the pipeline following roads. Parts of the option are located within Grade 3 Agricultural Land (good to moderate quality Agricultural Land) and so there will be potential for effects on soil quality such as through vegetation and habitat losses. Land remediation works are likely to occur post-construction to keep these effects to a minimum. The location of the new pumping station is not yet known however, construction may be on greenfield Agricultural Land. The upgrade works to the WTW are assumed to be contained within the existing	Any land required for the pipeline construction should be reinstated following the scheme. Stock overlapping with above ground infrastructure will be permanently lost. New pumping station to be situated on brownfield land if possible.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				site, with no impacts on soils. The NCA concluded there would be a change of –3.68 with pastures farmland. **Operational Effects** The location of the pumping station is not yet known, and this may result in permanent loss of a small area Grade 3 or 4 Agricultural Land, with a minor but permanent effect on soils. However, should the pumping station be situated in brownfield land, this will not affect agricultural land and soils. The option is located over 200m from any Authorised or Historic Landfill Sites, and so there are no anticipated related effects.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however short-term construction may have a minor and temporary impact on air quality within the local area due to dust and exhaust fumes from construction equipment. **Operational Effects** It is not expected for operation of the option to cause any impacts on air quality.	Best practice mitigation measures should be implemented during construction to supress any potential air quality effects.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	--	--	**Construction Effects** Notable new infrastructure, such as new intake, pipeline and pumping station, plus refurbishment works means that it is highly likely that there will be an increase in embodied carbon emissions. This will occur through materials used in construction and during construction activities, such as the use of machinery and vehicles. There is an option to refurbish the dry well pumps within the existing Restormel WTW. If this approach is taken,	Investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	--	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				the embodied carbon emissions (total embodied carbon from construction) will be 6570tCO_2 equivalent. There is also an option to replace the dry well pumps within the existing Restormel WTW. If this approach is taken, the embodied carbon emissions (total embodied carbon from construction) will be 6581tCO_2 equivalent. **Operational Effects** There is expected be an increase in operational carbon emissions due to the increased energy requirements of the operation of the new pumping station, and increased operation of the upgraded WTW. The inclusion of any renewable energy supplies is not yet known. There is an option to refurbish the dry well pumps within the existing Restormel WTW. There is also an option to replace the dry well pumps within the existing Restormel WTW. Under both of these scenarios, the operational carbon emissions will be the same. Operation at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, will result in operational carbon emissions of 1665tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. Operational carbon emissions under a maximum utilisation scenario will be 3806tCO_2 equivalent per annum.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There will be increased abstraction of the River Camel which could have the potential to slightly alleviate any effects of climate change related flooding, especially in the areas along the extent of the option classified as Flood Zone 2 and 3. However due to the option being predominantly located within Flood Zone 1, this is unlikely to result in substantial reductions in risk. There is also potential that the river could be subject to climate related drought, where the increased abstraction along with periods of drought could lead to a depletion in water levels within the waterbody. This has the risk of both interrupting the River Camel ecosystem and the efficiency of the new intake and pumping station.	Monitor water levels during operation to ensure abstraction does not adversely affect water levels within the River Camel.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	-	**Construction Effects** There are multiple historical assets likely to experience effects as a result of the implementation of this option. There are three Grade II Listed Buildings which are directly encroached upon by the option along its extent. These have the potential to experience negative effects, including increased vibration from vehicle movements during construction, and potential for excavations in close proximity to the buildings. An additional 25 Listed Buildings and two Scheduled Monuments are located within 500m, however given the nature of the construction activities, effects are not expected. The option also directly encroaches upon the Lanhydrock Grade II* Listed Registered Park and Garden and Registered Battlefield, with the pipeline lying adjacent/encroaching upon the edge of the site where there may be increased vehicle movements and	Best practice mitigation measures should be implemented to minimise disruption to these historic assets. Consider the route of the pipeline to potentially reduce effects on assets which are directly encroached upon. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				excavations during construction. There is also the potential for previously undiscovered archaeology to be encountered in areas of construction on greenfield land, however this risk is minimised along the parts of the pipeline route that follow the road network. There are no Protected Wrecks located within 5km of the option. There are no Conservation Areas within 500m. **Operation Effects** Long-term effects on the historic environment are not expected, as the proposed pipeline will be underground, and above ground infrastructure and changes to abstraction will have no ongoing impacts on heritage assets. It is unlikely that the option will result in any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the fact there is an increased river abstraction, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character	-	-	**Construction Effects** Whilst the option is located outside of any National Parks or AONBs, there will still be localised visual impacts from construction activities associated with the pipeline, pumping station and also potentially for the new intake. During construction, there is potential for receptors' views to be interrupted by increased levels of construction activity, equipment and excavations. This has the	Ground to be reinstated post-construction to mitigate against any long-term effects. Situate new pumping station in a position with adequate screening from trees/hedgerows.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	and visual amenity			potential to cause minor negative effects on the landscape during construction. The WTW upgrades are within an existing site so they are not expected to result in landscape impacts, and it is expected that ground from the pipeline construction would be reinstated post-construction. **Operational Effects** The new pumping station will require permanent above-ground infrastructure, however the precise location of the pumping station is not yet certain. It is likely that this may be screened by trees/hedgerows, however depending on the final location, there may be minor long-term effects relating to visual amenity from residential properties in Nanstallon or PRoW to the east and south of the pumping station. The option is located within a Historic National Landscape character area consisting of mainly enclosed agriculture and recreational parks and gardens, which have potential to experience minor adverse effects as a result of the new above ground infrastructure.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	**Construction Effects** The main route of the pipeline roughly follows the route of both minor and major roads. This may result in roads being excavated during the construction phase, creating access issues for residents or traffic delays/diversions for road users. There is also a likelihood of noise and dust from increased vehicle movements and construction activity during the short term, thus impacting residents and the local community. The option is likely to require substantial Capex costs over the four-year period from 2025 to 2028. This creates	Any diversion routes should be carefully considered to minimise any disruption to journey time for road users. Ensure best practice in terms of timings and volume of work to mitigate the effects on residents and other road users.	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				the potential for job creation which could improve the local economy. **Operational Effects** Once the option is operational, it is anticipated to require substantial Opex costs per annum, indicating that there are potential opportunities for job creation and supporting the local economy.			
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** It is expected that recreational land is likely to be used during the construction phase and so could result in certain areas being temporarily disrupted to accommodate the works. **Operational Effects** Increased abstraction of the River Camel may result in long-term effects on recreational use due to reduced water flows. Abstraction during summer periods, and potentially during periods of drought, may affect those using the river for recreational purposes such as canoeing, paddle boarding or fishing due to reduced water quality and capacity. Due to the pipeline being located mainly underground, it is expected that there will be limited long-term effects on recreational land as it will be returned to its existing use post-construction. It is considered that the effects are minor pre mitigation but may not be completely eliminated post mitigation.	Ensure disruption is kept to a minimum, and all land used during construction is reinstated if possible.	-	-
Material Assets	Minimise resource use	--	-	**Construction Effects** Whilst there is likely to be significant new infrastructure associated with this scheme, efforts have been taken to	There is opportunity for sustainable design measures to be implemented into the	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	and waste production			ensure existing facilities are utilised to minimise new resource use during construction, such as the upgrade of the existing Restormel WTW. There will, however, be large amounts of new material used for the 9 mile pipeline, materials for the construction of the new pumping station and intake, as well as increased waste excavation material and construction waste. **Operational Effects** There is expected to be a minor increase in energy consumption once the option is operational, due to increased pumping and water treatment. The increase in water treatment will also require a minor increase in ongoing resource use and waste consumption.	scheme, including consideration of materials with less embodied carbon, and the reuse of excavated material. Utilise renewable energy sources to avoid consumption of fossil fuels.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** As the main extent of the option crosses multiple roads and waterways, it is likely that some negative effects will occur during the short term construction phase including possible road closures and diversions. **Operational Effects** It is unlikely that there will be long-term impacts on built assets and infrastructure as a result of the option due to the fact the main extent will be underground. The upgraded WTW and new pumping station are not expected to have any operational effects on built assets.	Ensure any road closures and diversions are kept to a minimum and all built assets and infrastructure are reinstated post-construction. Ensure best practice is used at all times.	-	0

M.2 COL3

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL3			
Option:	Abstraction of Colliford Reservoir compensation flow when making supply releases.			
Scheme type:	Surface Water Enhancement			
Option description:	No infrastructure changes required.			
Approx. Yield (Ml/d):	1			
WRZ:	Colliford			
Date Completed:	19/05/2022, updated 03/02/23	***Completed By:***	George Britton / Georgia Luck	***Version:*** D
Date Checked:	14/06/2022, updated 07/11/22 and 08/02/23	***Checker:***	Nicola Levy / Melanie Reid, Georgina Luck	
Date Approved:	30/08/22, updated 07/11/22 and 08/02/23	***Approver:***	Jacqueline Fookes / Melanie Reid, Katharine Mason	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	-	**Construction Effects** The option is located within 5km of Breney Common and Goss & Tregoss Moors SAC, which is also classified as a GWDTE. The option is located just over 2km upstream of Upper Fowey and Pont Pill MCZ. Boconnoc Park and Woods SSSI (34.2% favourable, 13.45% unfavourable – recovering and 52.35% unfavourable – declining), Mid Cornwall Moors SSSI (2.42% favourable, 57.38% unfavourable – recovering and 40.21% unfavourable – declining), Luxulyan Quarry SSSI (100% favourable) and Redlake Meadows & Hoggs Moor SSSI (100% unfavourable – recovering) are also located within 5km of the option.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Monitoring of the water levels within the River Fowey should be undertaken to mitigate any operational impacts.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Mid Cornwall Moors SSSI and Redlake Meadows & Hoggs Moor SSSI are both also classified as GWDTEs. The option is within one SSSI Impact Risk Zone with multiple Impact Risk Zones located within 5km. It is also located within 500m of Lanydrock CWS. Due to the fact the option does not require any new infrastructure and therefore any construction, it is highly unlikely that these designated and non-designated sites will be adversely affected. The HRA concluded that as there are no infrastructure changes for the option, there is not likely to be any significant effects during the construction phase. **Operational Effects** There may be some minor negative effects on ecological sites associated with the increase in abstraction at Restormel WTW. There is a potential for certain ecosystems downstream of the WTW to experience reduced flows and be affected by this, especially sites which are classified as GWDTEs. A reduction in water flows due to the increased abstraction could have an adverse impact on biodiversity in that particular designated site. The option is located just over 2km upstream of Upper Fowey and Pont Pill MCZ. Potential for decreases in water levels in the River Fowey could affect aquatic ecology and the MZC. However, as the increased abstraction is 1Ml/d, these effects are unlikely. The HRA concluded that whilst there are several sites hydrologically connected upstream of the option, potential effects are only likely to be experienced downstream.			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** The option is directly adjacent to multiple areas of deciduous woodland priority habitat, and within 500m of Higginsmoor Wood Ancient Woodland. Due to the nature of the option and the fact it does not require any additional construction, these sites are highly unlikely to experience any effects as a result of the implementation of this option. **Operational Effects** Any operational effects on biodiversity and habitats are expected to be minimal due to the nature of the option. However, as a result of increased abstraction, water levels could potentially be lower downstream, and so species may become more vulnerable in such areas. It may also affect habitat connectivity and aquatic ecology in some areas, with some habitats potentially becoming more vulnerable as a result of decreased water levels and flows. The option is not anticipated to have any effect on salmon rivers.	Include best practice mitigation to minimise impacts on biodiversity, vulnerable habitats and habitat connectivity. Due to the nature of the option however, these are unlikely to be required.	0	-
	Reduce the spread or presence of INNS	0	0	**Construction Effects** Due to the lack of any additional infrastructure works to accommodate the option, and the transfer of water between two already connect waterbodies, there are not likely to be any spread of INNS as a result of the construction phase of the option. **Operational Effects** Downstream of Restormel WTW, the River Foy will have a reduction in flow as water will be abstracted. There is a low risk that reduced flows could change the	Best practice mitigations measures to be implemented.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				habitat suitability for any INNS present which could facilitate further spread as the river is hydrologically connected to other waterbodies. There is likely to be no risk of transfer/movement of invasive or non-native species for this option.			
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** Due to the nature of the option requiring no additional infrastructure or construction, there are no effects on quality and resource in the short-term implementation. The WFD Level 1 assessment concluded a low impact on the Lower River Fowey as a result of intake from raw water. **Operational Effects** Increased abstraction has the potential to result in a reduction in river flows and river levels downstream, however, due to the minimal additional abstraction, the effects of the reduced flows and levels downstream are anticipated to be minimal. The area is located within Groundwater Source Protection Zone 3 and outside of a Nitrate Vulnerable Zone, and so is unlikely to experience any long-term effects. Part of the option is however located within a Drinking Water Protected area, and so any risk of pollution arising from operation has the potential to severely impact upon water quality in the area. The WFD Level 1 assessment concluded high impacts on Lower River Fowey during operation due to new surface water abstraction of Colliford Lake compensation flow at Restormel WTW, supported by upstream compensation flows and releases from the WTW. There is a low impact on Lower River Fowey due to maintenance and the use of river intakes.	During construction and operation, appropriate precautions will be taken when working in the channels of watercourses to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The River Fowey from which the increased abstraction will occur is located within Flood Zone 3 (1 in 100 year), giving the WTW (the main site for this option) a chance of flooding in a 1 in 100 year event. However, due to the fact no construction is anticipated to take place here, there are no short-term effects beyond those already experienced by the current WTW. **Operational Effects** Whilst the River Fowey and surrounding areas are considered to be within Flood Zone 3 (1 in 100 year) and therefore at risk of flooding, increased abstraction has the potential to alleviate this risk both at the site of the option, but also downstream which will be subject to 1Ml/d less water. However, the level of abstraction is quite low, so it is unlikely to have any impact. Also, given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise. Because of these factors, effects from implementation of the option on flood risk are considered minimal.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Mitigation measures are unlikely to be required during operation as the scheme is unlikely to have an effect on ongoing flood risk.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no short-term effects are anticipated. **Operational Effects** The option is expected to provide an additional 1Ml/d of water for use with the SWW region, with increases in abstraction likely to result in positive long-term effects on the resilience of water supplies within the area. It should be considered as to whether the River	No negative impacts have been identified as a result of the option and therefore no mitigation has been identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Fowey has capacity to provide for this increased abstraction and provide a reliable source for the region, especially during periods of drought.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	-	**Construction Effects** Luxulyan Quarry is a Geological SSSI, however, it is not anticipated that any additional land will be required for the option, as it will be using existing infrastructure to support the increase in abstraction. Therefore, there will be no impacts on quantity and quality of the soils surrounding the option. **Operational Effects** Long-term operation of the option is unlikely to have many effects on soils, due to there being no additional land take or land required at the site of the option. An increase in abstraction from the river and possible decreases in water levels could potentially destabilise soils on the riverbanks causing subsidence, however due to the limited additional abstraction, water levels are not expected to decrease drastically and so the likelihood of this issue is low.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. During operation, it is recommended to monitor levels of abstraction and subsidence in the area.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is not located within any AQMAs, and the fact there is no construction associated with the option means that there will be no short-term effects on air quality. **Operational Effects** It is highly unlikely that the operation of the option will cause any impacts on air quality, however it should be considered as to whether pumping additional water will	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				produce any increase in emissions subsequently affecting air quality.			
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As the option does not require any new infrastructure, there will be no short-term effects associated with carbon emissions. **Operational Effects** Operational carbon emissions are likely to be limited, with potential for a small amount of increased emissions through the pumping of higher volumes of water from the River Fowey. Due to all infrastructure being existing, there is not expected to be any additional embodied carbon associated with the option.	Consider use of renewables to power pumping facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	0
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** Due to the option not requiring any additional infrastructure or construction, there are no climate resilience measures relating to this phase currently in place. **Operational Effects** There will be an increased abstraction on the river which could have the potential to slightly alleviate any effects of climate related flooding, especially considering the fact the option is located within Flood Zone 3 (1 in 100 year). There is also potential however, that the river could become subject to climate related drought in the future, where increased abstraction in addition to climate issues could rapidly deplete water levels within the waterbody. This could	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Monitor the effects on water levels where they are subjected to additional abstraction as part of the option.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				have an effect on many factors downstream, such as biodiversity, habitats and water quality.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	**Construction Effects** There are no Listed Buildings and Structures, Scheduled Monuments, Conservation Areas or World Heritage Sites located within 500m of the option. There are also no Protected Wrecks within 5km. The option is, however, directly adjacent to Lanhydrock Grade II* Listed Registered Park and Garden, and within 500m of the Registered Battlefield of Lostwithiel. Due to the lack of any construction to accommodate the option, these will not experience any effects. **Operational Effects** Increased abstraction has the potential to decrease the volume of water within the groundwater waterbody, possibly making surrounding areas of Registered Park and Garden and Registered Battlefields less susceptible to flooding and damage. However, this also could have negative effects, with de-watering of waterlogged sites destabilising any historical assets present. This has potential to impact public access and enjoyment of heritage assets and has potential to devalue them. There is currently not enough information available about the history of flood damage in this site, therefore the option has been assessed as having the potential for minor negative effects.	Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and	0	0	**Construction Effects** As the option will utilise the existing infrastructure, there will be no impacts to any landscape receptors as a result of the implementation of the option.	Due to the fact no construction is involved with the option, no impacts have been identified and	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	seascape character and visual amenity			**Operational Effects** As the option will utilise the existing infrastructure, there are not likely to be any impacts to any landscape receptors as a result of the implementation of the option. The option is located within a Historic National Landscape character area consisting of mainly woodland, agricultural and recreational land. However, due to the fact existing infrastructure is being used as part of the option, it is unlikely there will be significant effects. There is potential however for a reduction in water levels as a result of abstraction, potentially exposing riverbanks in some areas and impacting on visual amenity, although effects of this on the landscape would be considered neutral.	therefore no mitigation is required.		
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, it is unlikely for there to be any short-term effects on population and human health. PRoWs will not be affected in the short term as no construction works are required. It is anticipated that upfront Capex costs will be minimal. This could potentially create jobs during this period which would benefit the local economy. However, the overall impact on population and human health is considered neutral. **Operational Effects** Opex costs during operation of the option are expected to be extremely minimal and so will not result in any notable effects on the local economy. Local community effects are also not anticipated.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects on recreation or tourism. **Operational Effects** Whilst the option will not be utilising any additional recreational/public land, potential for reduced water levels within the River Fowey could impact recreational activities involving the water, such as sailing, swimming or paddle boarding, especially during the summer months and at peak tourist seasons. It should also be considered as to whether the pumping of additional water will produce an increase in noise pollution or longer periods of noise affecting those using the area recreationally.	Due to the fact no construction is involved with the option, no impacts have been identified in the short term and therefore no mitigation is required. Best practice mitigation measures to be implemented to minimise effects on tourism and recreational land in the long term.	0	-
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving resource use and waste. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there is not expected to be any additional resource use or waste as a result of the operation of the option.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving built assets and infrastructure.	Due to the fact no construction is involved with the option, no impacts have been identified and	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Due to the nature of the option utilising existing infrastructure, there are no anticipated negative effects on built assets and infrastructure. There should however be considerations made as to whether the existing main pipeline infrastructure has the appropriate capacity to handle the additional water abstracted.	therefore no mitigation is required.		

M.3 COL4

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL4				
Option:	Abstraction of Siblyback Reservoir compensation flows when making supply releases.				
Scheme type:	Surface Water Enhancement				
Option description:	No infrastructure changes required.				
Approx. Yield (Ml/d):	0.75				
WRZ:	Colliford				
Date Completed:	20/05/2022, updated 03/02/23	***Completed By:***	George Britton / Georgia Luck	***Version:***	D
Date Checked:	01/07/2022, updated 07/11/22 and 08/02/23	***Checker:***	Sophie Robinson / Melanie Reid, Georgina Luck		
Date Approved:	30/08/22, updated 07/11/22 and 08/02/23	***Approver:***	Jacqueline Fookes / Melanie Reid, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	-	**Construction Effects** The option is located within 5km of Breney Common and Goss & Tregoss Moors SAC, which is also classified as a GWDTE. Mid Cornwall Moors SSSI (2.42% favourable, 57.38% unfavourable – recovering and 40.21% unfavourable – declining), Redlake Meadows and Hoggs Moor SSSI (100% unfavourable – recovering), and Boconnoc Park and Woods SSSI (34.2% favourable, 13.45% unfavourable – recovering and 52.35% unfavourable – declining) are also located within 5km of the option. Mid Cornwall Moors SSSI and Redlake Meadows and Hoggs Moor SSSI are also classified as GWDTEs. The option is also located	Due to the fact no construction is required, no impacts have been identified and therefore no mitigation is required. For any minor operational impacts identified, best practice measures should be implemented.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				within 500m of Lanhydrock CWS. As these sites are all classified as GWDTEs, they all have potential to be adversely affected by linkages to the option. However, given the fact that no construction works are proposed, this is very unlikely. The HRA assessment also concluded that as there are no infrastructure changes required for the option so there is not likely to be any significant effects during the construction phase. **Operational Effects** There is potential for minor negative effects on designated and non-designated ecological sites associated with increased abstraction at Restormel WTW. Ecosystems downstream have the potential to be affected by reduced flows, especially those of which are classified as GWDTEs. Subsequent decreases in water levels could limit the number of species able to survive within the River Fowey. However, as abstraction increase is only 0.75Ml/d, these effects are unlikely. Whilst the site is hydrologically connected to several other designated sites, these are not anticipated to be adversely affected. The River Camel SAC is sufficiently distant from the option. Breney Common and Goss & Tregoss Moors SAC is positioned so effects will only be experienced downstream, away from the site. Falmouth Bay to St Austell Bay SPA is marine specialist and will not be affected by reduced flows.			
	Protect, conserve and enhance biodiversity, including priority	0	-	**Construction Effects** The option is directly adjacent to an area of deciduous woodland priority habitat, as well as being located within 500m of Higginsmoor Wood Ancient Woodland.	Include best practice mitigation to minimise impacts on biodiversity, vulnerable habitats and	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	species, vulnerable habitats and habitat connectivity			Due to the nature of the option and the fact it does not require any additional construction, these sites are highly unlikely to experience any effects as a result of this option. **Operational Effects** Operational effects on biodiversity and habitats are expected to be minimal as the nature of the option only involves a relatively small increase in surface water abstraction. However, there is a chance that water levels could decrease within the river channel as a result of this, and as such some species may become more vulnerable in some areas. Habitat connectivity may also be affected, with some habitats becoming more vulnerable as a result of decreased water levels and flows. The option is not anticipated to have any effect on salmon rivers.	habitat connectivity. Due to the nature of the option however, these are unlikely to be required.		
	Reduce the spread or presence of INNS	0	-	**Construction Effects** Due to the lack of any additional infrastructure and construction works, there is not likely to be any spread of INNS during the short term. **Operational Effects** Increased abstraction of the River Fowey could result in INNS spreading and colonising river sediments left exposed with the varying water levels. The INNS risk assessment concluded that there will be a low risk of INNS spread though, considering the waterbodies that will potentially be impacted are already connected.	Best practice and consultation of an INNS risk assessment in order to mitigate these effects as much as possible.	0	-
Water	Protect and enhance the quality	0	--	**Construction Effects**	Due to the fact no construction is involved with	0	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	of the water environment and water resources			Due to the nature of the option not requiring any infrastructure or construction, there are not expected to be any effects on water quality or resource in the short term. The WFD Level 1 assessment concluded no impacts during construction for the same reason. **Operational Effects** The increased abstraction in the operational phase has the potential to result in a reduction in river flows and river levels downstream. However, due to the minimal amount of additional abstraction, the effects of the reduced flows and levels downstream are anticipated to be minimal. The option is located within Groundwater Source Protection Zone 3 and outside of a Nitrate Vulnerable Zone, and so is unlikely to experience any long-term effects. However, the WFD Level 1 assessment concluded high impact on the Lower River Fowey as a result of introducing a new increased surface water abstraction. Part of the option is also located within a Drinking Water Protected area, and so any risk of pollution arising from operation has the potential to severely impact upon water quality in the area. The maintenance and use of the river intake itself is likely to have low impacts on Lower River Fowey.	the option, no impacts have been identified and therefore no mitigation is required. During operation, Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).		
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The River Fowey, from which the increased abstraction will occur, is located within Flood Zone 3 (1 in 100 year), giving the WTW (the main site for this option) a chance of flooding in a 1 in 100 year event. However, due to the fact no construction is anticipated to take	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				place, there are no short-term effects from flooding expected. **Operational Effects** The River Fowey and areas surrounding the option are located predominantly within Flood Zone 3 (1 in 100 year) and are therefore at risk of flooding. However, the levels of abstraction associated with the option are fairly low, so abstraction is unlikely to have any impact on the flood risk. Given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise. Mitigation measures should however be put in place noting that the option is located within Flood Zone 3.	Mitigation measures may be required to alleviate the risks of flooding impacts on the WTW during its operation.		
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no short-term effects are anticipated. **Operational Effects** The option is expected to provide an additional 0.75Ml/d of water for use within the SWW region, with increases in abstraction likely to result in positive long-term effects on the resilience of water supplies within the area. However, it should be considered whether this level of abstraction is sustainable, especially during periods of drought.	No negative impacts have been identified as a result of the option and therefore no mitigation has been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including	0	0	**Construction Effects** It is not anticipated that any additional land will be required for the option, as it will be using existing infrastructure to support the increase in abstraction.	Due to the fact no construction is involved with the option, no impacts have been identified and	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	the protection of sites of geological importance			Therefore, there will be no impacts on quantity and quality of the soils surrounding the option. **Operational Effects** Operation of the option is unlikely to result in any adverse effects on soils, due to there being no additional land take or land required. Abstraction increases could reduce the volume of water within the water channel, potentially destabilising riverbanks and causing subsidence. However, water levels are not expected to decrease drastically, so the effect is considered neutral.	therefore no mitigation is required.		
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is not located within an AQMA. There is no construction associated with the option meaning that there will be no short-term effects on air quality. **Operational Effects** It is highly unlikely that the operation of the option will cause any impacts on air quality. However, it should be considered as to whether pumping additional water will produce any increase in emissions subsequently effecting air quality.	Due to the fact no construction is involved with the option and no operational impacts have been identified, no mitigation is required.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As the option does not require any new infrastructure, there will be no short-term effects associated with carbon emissions. Embodied carbon emissions from infrastructure are likely to be low, due to the fact that the option is utilising existing infrastructure. **Operational Effects**	Consider use of renewables to power pumping facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Carbon emissions produced as a result of the option will likely be limited, with potential for a small amount of increased emissions through the pumping of higher volumes of water from the River Fowey.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** Due to the option not requiring any additional infrastructure or construction, there are no climate resilience measures relating to this phase currently in place. **Operational Effects** There is potential for climate related flooding during operation, especially as the option is currently located within Flood Zone 3. Appropriate mitigation measures should be put in place here to best mitigate against any effects. There is also a potential that the river could become subject to climate related drought in the future, where an increase abstraction in addition to climate issues, could rapidly deplete water levels within the waterbody. This could have an effect on biodiversity, habitats and water quality throughout the river system.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Implementation of appropriate flood mitigation measures to mitigate against flooding. Monitoring of the effects on water levels where they are subjected to additional abstraction as part of the option.	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** There are no Listed Buildings and Structures, Scheduled Monuments, Conservation Areas or World Heritage Sites located within 500m of the option. There are also no Protected Wrecks located within 5km. The option is directly adjacent to Lanhydrock Grade II* Registered Park and Garden and a Registered Battlefields. However, due to lack of construction, there is not likely to be any short-term effects here.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Additional baseline collection and assessment to be undertaken to	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There is potential for negative effects on the Registered Park and Garden and Registered Battlefields as a result of the operation of the option, with potential de-watering of groundwater sources and waterlogged sites from increased abstraction and/or climate related drought, destabilising any heritage assets present. This has potential to impact public access and enjoyment of heritage assets and has potential to devalue them. There is currently not enough information available about the history of flood damage in this site, therefore effects have been assessed as neutral.	determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** There are no landscape designations located within proximity of the option. Also, as the option will utilise the existing infrastructure in place at the WTW, there is not anticipated to be any effects on other landscape receptors as a result of the implementation of the option. **Operational Effects** As the option will utilise existing infrastructure, there are not likely to be any impacts on landscape receptors as a result of the implementation of the option. The option is located within a Historic National Landscape character area consisting of mainly recreational parks and gardens and Agricultural Land. However, as the option will utilise existing infrastructure, it is unlikely there will be any effects here. There is potential, however, for a reduction in water levels as a result of	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				abstraction. This could potentially expose riverbanks in some areas and impact upon visual amenity. Effects of this on the landscape though are considered neutral.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects on population and human health. PRoWs will not be affected because construction works are not required. Although the option is expected to have a minimal upfront Capex cost in the year 2025, there will still be potential benefits to the local economy through job creation. **Operational Effects** No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there is not likely to be any short-term effects on recreational activity or tourism. **Operational Effects** The option is highly unlikely to require any recreational or public land due to the fact that it does not require any new infrastructure and subsequent land take. Potential for reduced water levels within the River Fowey could impact on recreational activities involving water, such as sailing, swimming or paddle boarding.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Best practice mitigation measures to be implemented to minimise operational effects on tourism and recreational land.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				This may be of more significant effect during summer months and peak tourist seasons. There could also be effects on water quality, however these effects are considered low.			
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving resource use and waste. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there is not expected to be any additional resource use of waste as a result of the operation of the option.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving built assets and infrastructure. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there are no anticipated negative effects on built assets and infrastructure. There should however be considerations made as to whether the existing main pipeline infrastructure has the appropriate capacity to handle the additional water abstracted.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

M.4 COL5

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL5				
Option:	Increase Wendron annual licence and de-couple from Stithians				
Scheme type:	Surface Water Enhancement				
Option description:	No infrastructure changes required.				
Approx. Yield (Ml/d):	1.5				
WRZ:	Colliford				
Date Completed:	20/05/22, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	01/07/22 updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22 updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	-	**Construction Effects** The option does not directly encroach upon any designated or non-designated ecological sites and there are no SACs, SPAs or Ramsar Sites located within 5km of the option. However, the option is located within 5km of two SSSIs. These are Loe Pool SSSI (22.52% favourable, 77.48% unfavourable – no change) and West Cornwall Bryophytes SSSI (67.81% favourable, 32.19% unfavourable – recovering). Due to the nature of the option requiring no additional infrastructure and construction, and the fact that these sites are located a distance away from the option, it is highly unlikely that they will experience any short-term effects. The HRA assessment concluded that as there are no infrastructure changes required, there is not	Best practice measures should be implemented to ensure any effects on designated and non-designated ecological sites will be minimised.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				likely to be any significant effects during the construction phase. **Operational Effects** There is potential for minor negative effects on designated and non-designated ecological sites associated with the increased river abstraction. Ecosystems downstream from the abstraction point have the potential to be affected by the reduced flows and potential reduced water levels. This could result in fewer species being able to survive. However, as abstraction increase would only be 1.5Ml/d, these effects are highly unlikely. The HRA also concluded that the option location is situated sufficiently distant from the sites and so will not have an effect on designated ecological sites.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** The option is located within 500m of multiple areas of deciduous woodland priority habitat. However, due to the nature of the option and the fact that it does not require any additional infrastructure and construction, these sites are highly unlikely to experience any effects as a result of this option. **Operational Effects** Operational effects on biodiversity and habitats are expected to be minimal as the nature of the option only involves a relatively small increase in abstraction. However, there is a chance that water levels could decrease within the river channel and as a result of this, lakes and some species may become more vulnerable in certain areas. Habitat connectivity may	Best practice mitigation measures should be put in place to minimise impacts on biodiversity, vulnerable habitats and habitat connectivity. However, due to the nature of the option, it is unlikely that these will be necessary.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				become an issue, with some areas of deciduous woodland priority habitat becoming more vulnerable as a result of decreased water levels and flows. The option is not anticipated to have any effect on salmon rivers.			
	Reduce the spread or presence of INNS	0	-	**Construction Effects** Due to the lack of any additional infrastructure and construction works, there is not likely to be any spread of INNS as a result of the construction phase of the option. **Operational Effects** Increased abstraction could result in INNS spreading and colonising river sediments left exposed with the varying water levels. The INNS risk assessment concluded that there will be a low risk of INNS spread though, considering the waterbodies that will potentially be impacted are already connected.	Best practice and consultation of an INNS risk assessment in order to mitigate these effects as much as possible.	0	-
Water	Protect and enhance the quality of the water environment and water resources	0	--	**Construction Effects** Due to the nature of the option not requiring any infrastructure or construction, there are not expected to be any effects on water quality or resource in the short-term implementation of the option. The WFD Level 1 assessment concluded there is likely to be no change in relation to treated water for Helford River, West Cornwall (GW) and South Cornwall (GW), due to no modification of WTW. **Operational Effects** Increased abstraction during the operational phase has the potential to result in a reduction in river flows	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Minor effects arising as a result of the option being located within a Nitrate Vulnerable Zone should be mitigated using best practice measures at all times.	0	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and river levels downstream, however, due to the abstraction of this option only being around 1.5Ml/d, the effects of these reduced flows and levels downstream are expected to be minimal. The option is located within The Loe Eutrophic Lake Nitrate Vulnerable Zone, and so the river from which the abstraction is taking place has the potential to be subject to agricultural nitrate pollution. The option is located within Groundwater Source Protection Zone 3, and so there is a low potential for effects. It is not located within any Drinking Water Protected areas. However, the WFD Level 1 assessment concluded high impact on Upper River Cober as a result of a new increased surface water abstraction. The maintenance and use of the river intake itself is likely to have a low impact on Upper River Cober.	During operation, appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).		
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The option is predominantly located within Flood Zone 1, however the nearby River Cober from which water is abstracted is located within both Flood Zone 2 (1 in 1000 year) and Flood Zone 3 (1 in 100 year). Due to the fact that no construction is anticipated to take place here though, there is no short-term effects from flooding expected. **Operational Effects** Although the majority of the option is located within Flood Zone 1 and therefore is at a low risk of flooding,	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Mitigation measures are unlikely to be required during operation as the scheme is unlikely to have an effect on ongoing flood risk.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				there are still several areas within Flood Zone 2 and Zone 3, and therefore more at risk. The levels of abstraction associated with the operation of the option are fairly low though, and so are unlikely to have any impact on the flood risk of the option. Additionally, given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise.			
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supply, and so no short-term effects are anticipated. **Operational Effects** The option is expected to deliver an additional 1.5Ml/d of water for use within the SWW region, with increases in abstraction likely to result in positive long-term effects on the resilience of water supplies within the area. It should however be considered whether this level of abstraction is sustainable, especially during periods of potential drought.	No impacts have been identified as a result of the option and therefore no mitigation has been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** Loe Pool SSSI is a Geological SSSI, however, it is not anticipated that any additional land will be required for the option, as it will be using existing infrastructure to support the increase in abstraction. Therefore, there will be no impacts on quantity and quality of soils surrounding the option. **Operational Effects** Operational effects of the option on soils are expected to be minimal due to there not being any additional land take required. An increase in abstraction could	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				result in decreases of water within the river channel though, potentially destabilising riverbanks and causing subsidence. Water levels are not expected to decrease drastically though, and so the likelihood of this becoming an issue is low.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is not located within an AQMA, and the fact there is no construction associated with the option means that there will be no short-term effects on air quality. **Operational Effects** It is highly unlikely that the operation of the option will cause any impacts on air quality, however it should be considered as to whether pumping additional water will produce any increase in emissions subsequently effecting air quality.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As the option doesn't require any new infrastructure there will be no short-term effects associated with carbon emissions. Embodied carbon emissions from infrastructure are also expected to be low, given the fact that the option is utilising existing infrastructure. **Operational Effects** There is expected to be a very minimal effect on carbon emissions produced as a result of the option. There may be potential for a small amount of increased emissions through the pumping of higher volumes of water from the River Cober.	Consider use of renewable to power pumping facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** Due to the option not requiring any additional infrastructure or construction, there are no climate resilience measures relating to this phase currently in place. **Operational Effects** Due to the relatively low levels of abstraction, it is unlikely that there will be any significant impact on flood risk. There is potential for the river to become subject to climate related drought in the future, where increase in levels of abstraction, in addition to climate issues, could rapidly deplete water levels within the waterbody. This has the potential to impact directly upon biodiversity, habitats and water quality throughout the river system.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Monitoring of the effects on water levels where they are subjected to additional abstraction as part of the option.	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located within 500m of 27 Grade I, II and II* Listed Buildings and Structures, including multiple residential properties, churches and other assets. Due to the lack of any additional infrastructure or construction associated with the option though, it is highly unlikely that these listed assets will experience any short-term effects. The option also directly encroaches upon the Cornwall and West Devon Mining Landscape World Heritage Site. Again, due to option using existing infrastructure, this site is unlikely to be adversely affected. There are no Conservation Areas within 500m and no Protected Wrecks located within 5km of the option.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Due to the nature of the option, there is unlikely to be any substantial effects on the Listed Buildings and Structures in the area. The option is unlikely to have any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the Carnmenellis NCLA. However, as the option will utilise the existing infrastructure in place at the WTW, there is not expected to be any landscape receptors affected as a result of the implementation of the option. **Operational Effects** As the option will be utilising existing infrastructure, there are not likely to be any impacts to landscape receptors as a result of the option. The option is located within a Historic National Landscape character area consisting of mainly enclosed Agricultural Land. However, as there will no additional above ground infrastructure, it is unlikely that this will be adversely affected. There is potential however for a reduction in water levels as a result of the increased abstraction and therefore riverbanks could potentially become exposed, leading to impacts on visual amenity. However, effects from this on landscape would be considered low.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community,	0	+	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects on population and human health. PRoWs will	Due to the fact no construction is involved with the option, no impacts have been identified and	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	including economic and social wellbeing			not be affected because construction works are not required. The upfront Capex costs of the option are expected to be minimal during the year 2025, so this is not expected to result in potential for job creation and improvement to the local economy. **Operational Effects** There will be a moderate ongoing Opex cost per annum once the option becomes operational from 2026, which may result in job creation or security, and enhance spending which could improve the local economy.	therefore no mitigation is required.		
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there is not likely to be any short-term effects on recreational activity or tourism. **Operational Effects** Whilst the option will not be utilising any additional recreational/public land, potential for reduced water levels within the River Cober could impact on recreational activities involving the river itself. Activities such as sailing, swimming or paddleboarding could be impacted by reduced river flows and levels, especially during the summer months or peak tourist seasons. There could also be an impact on water quality here, although effects are considered low.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required. Best practice mitigation measures to be implemented to minimise operational effects on tourism and recreational land.	0	-
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects**	Due to the fact no construction is involved with the option, no impacts have	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving resource use and waste. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there is not expected to be any additional resource use or waste as a result of the operation of the option.	been identified and therefore no mitigation is required.		
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short-term effects involving built assets and infrastructure. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there are no anticipated negative effects on built assets and infrastructure. There should however be considerations made as to whether the existing main pipeline infrastructure has the appropriate capacity to handle the additional water abstracted.	Due to the fact no construction is involved with the option, no impacts have been identified and therefore no mitigation is required.	0	0

M.5 COL6

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL6				
Option:	River Hayle Abstraction.				
Scheme type:	Surface Water Enhancement				
Option description:	Abstraction from the River Hayle at existing, disused intake. Treat abstracted water at new onsite treatment works.				
Approx. Yield (Ml/d):	1.5				
WRZ:	Colliford				
Date Completed:	23/05/2022, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	01/07/2022 updated 08/02/23	***Checker:***	Sophie Robinson / Georgina Luck		
Date Approved:	30/08/22 updated 08/02/23	***Approver:***	Jacqueline Fookes / Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	-	**Construction Effects** The option does not directly encroach upon any ecological sites and there are no Ramsar Sites or SACs within the area. The option is however located within 5km of Marazion Marsh SPA, Treloweth Woods CWS and St Erth Pools CWS, as well as seven SSSIs. Loggans Moor SSSI (100% unfavourable – recovering) and Marazion Marsh SSSI (2.47% favourable, 97.53% unfavourable – recovering) are also both classified as GWDTEs. Other SSSIs include Gwithian to Mexico Towans SSSI (99.92% unfavourable – recovering and 0.08% destroyed), Hayle Estuary & Carrack Gladden SSSI (91.57% favourable and 8.43% unfavourable – recovering), Penberthy Croft Mine SSSI (100% favourable), St. Erth Sand Pits SSSI (100%	Best practice mitigation measures to be put in place to ensure residual effects are kept to a minimum	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				unfavourable – declining) and Wheal Alfred SSSI (100% favourable). Due to the fact the option does not directly encroach upon these sites, any effects arising from construction are expected to be minimal. However, there may still be short-term effects associated with increased vehicle movements and activity associated with the construction of the new WTW. **Operational Effects** There is potential for reduced flows further downstream of the River Hayle due to the increased abstraction, with potential for effects on ecosystems, especially those which are classified as GWDTE. Subsequent decreases in water levels could limit the number of species able to survive within the river channel. However, as abstraction increase is only 1.5Ml/d, these effects are unlikely. The HRA concluded that the option is located sufficiently distant away from any designated or non-designated sites, so they are unlikely to experience significant effects.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** There are no Shellfish Waters or fisheries within 500m of the option and so there are no anticipated effects on those sites. However, the option directly encroaches upon multiple areas of deciduous woodland priority habitat, and other areas of unspecified habitats. These areas have the potential for effects as a result of the construction of the new WTW, such as the removal of certain parts to make room for the option, or an increase in vehicle movements and other construction activities. The BNG assessment concluded that the	Implement best practice construction methods to minimise disturbance. Best efforts should be made to avoid habitat losses. Where this is unavoidable, compensation should be implemented.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				option is expected to cause the loss of BNG units due to habitat clearance associated with construction. **Operational Effects** Operational effects of the option on biodiversity and habitats are expected to be low as once operational, the option will only abstract a relatively small amount of water from the River Hayle. However, there is a chance that water levels could decrease as a result of this, and as such some species may become more vulnerable in certain areas. Habitat connectivity could also be affected in some areas, with some habitats becoming more vulnerable as a result of decreased water levels and flows. There are no Shellfish Waters or fisheries downstream likely to be affected by this. The option is not anticipated to have any effect on salmon rivers, due to the fact the River Hayle is not classified as a salmon river.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Movement of excavated material during the construction phase may result in an increased spread of INNS from different areas, and colonising sediments left exposed post-construction. There is also a small risk of construction workers introducing INNS during any works on the intake on the River Hayle, although this is expected to be minimal with the following of site biosecurity practices. **Operational Effects** The INNS risk assessment concluded that there is a low risk that reduced flows could change the habitat	Best practice and consultation of an INNS risk assessment in order to mitigate these effects as much as possible.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				suitability for any INNS present which could facilitate further spread as the river is hydrologically connected to other waterbodies.			
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** Whilst the abstraction part of the option will not require any construction and therefore there will not be any short-term impacts, construction of the WTW may have some effect on water quality. This could be through contamination of the waterbody or waste arising from construction activity. There are no Source Protection Zones in proximity to the option and no Drinking Water Protected Areas. The WFD Level 1 assessment concluded a low impact on West Cornwall (GW) and Hayle (transitional), due to construction of below ground structures. There is a low impact on Hayle, West Cornwall (GW) and Hayle (transitional) due to construction of new onsite treatment works. **Operational Effects** Increased abstraction could potentially result in long term deterioration of water quality, especially given the fact there are areas classified as GWDTE nearby. The WFD Level 1 assessment concluded high impact on Hayle and Hayle (transitional) due to new abstraction. There is a low impact on West Cornwall (GW) and Hayle (transitional) due to the presence of a new underground structure. There is a low impact on Hayle and Hayle (transitional) due to the maintenance and use of river intakes. There is a low impact on Hayle, West Cornwall (GW) and Hayle (transitional) due to the draining of pipelines for maintenance.	Best practice mitigation required to ensure any residual effects are kept to a minimum. During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. Dewatering discharge will be treated before discharge. During construction and operation, appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
					Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). During operation, land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow.		
	Increase resilience and reduce flood risk	--	--	**Construction Effects** The option is located predominantly within Flood Zone 2 and Zone 3, with potential for effects on construction as a result of flooding from the River Hayle, especially at the site of the new WTW and intake. **Operational Effects** The operation of the option has potential to alleviate flooding downstream, especially the areas that are in higher risk zones 2 and 3. However, as the abstraction levels are fairly low, it is unlikely to have an impact on this. Given its distance from the coast, it is unlikely that the option will be subject to flooding from sea level rise. There is potential for increased levels of hardstanding which could increase flood risk.	Flood risk mitigation strategies during construction may be required, especially in areas of Flood Zones 2 and 3. Consider timing of construction works to avoid likely flood periods.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no short-term effects are anticipated. **Operational Effects** The option is expected to provide an additional 1.5 Ml/d of water for use within the SWW region, with increases in abstraction likely to result in positive long-term effects on the resilience of water supplies within the area. It should be considered as to whether the River Hayle has capacity to provide for this increased abstraction and provide a reliable source for the region, especially during periods of drought.	No negative effects have been identified and therefore no mitigation measures are required.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** The area surrounding the option is predominantly located within Grade 3 Agricultural Land (good to moderate quality Agricultural Land). This land is likely to be required for both construction and construction access in the short term. This means there is a high likelihood that soils will be adversely affected by increased vehicle movements and any construction activity, such as excavations. It is likely that there will be a permanent loss of land to accommodate the new infrastructure. Infrastructure may also be required underground. Land remediation works are expected to occur post-construction to keep any effects to a minimum. The NCA concluded that the option will result in a change of –0.06 in arable farmland with stock that will be permanently lost.	Reinstatement of land used during construction to mitigate against residual effects.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects It is not anticipated that there will be further loss of land as a result of the operation of the option. Rainwater run-off is also likely to increase as a result of increased hardstanding associated with the option and soils could become saturated. The option is located over 500m from any Authorised or Historic Landfill Sites.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however, short-term construction may have a minor and temporary impact on air quality within the area in terms of potential for dust vehicle exhaust emissions. **Operational Effects** It is unlikely that the operation of the option will cause any impacts on air quality, however it should be considered as to whether additional pumping of water will result in an increase in emissions subsequently effecting air quality.	Best practice mitigation measures to be put in place to supress dust arising from construction as much as possible.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** Notable new infrastructure, such as the new WTW and infrastructure associated with the abstraction of the River Hayle, means that it is likely that there will be an increase in embodied carbon emissions. This will particularly occur during construction activities, such as through the use of machinery and vehicles, and from materials used in construction. The extent of carbon associated with the option would be determined by the materials chosen and whether measures were taken to reduce the carbon footprint of activities.	Investigate the use of substitute materials with lower embodies carbon and use of renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					There is an option to use an existing intake at the new WTW site. If this approach is taken, the embodied carbon emissions (total embodied carbon from construction) will be 5757tCO_2 equivalent. There is also an option to use a new intake and WTW compound at Hayle SWT. If this approach is taken, the embodied carbon emissions (total embodied carbon from construction) will be 5744tCO_2 equivalent. **Operational Effects** It is expected that there would be an increase in operational carbon emissions through operation of the new pumping and abstraction station. There is an option to use an existing intake at the new WTW site. If this approach is taken and operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 62tCO_2 equivalent per annum. There is also an option to use a new intake and WTW compound at Hayle SWT. If this approach is taken and operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 62tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. Operational carbon emissions under a maximum utilisation scenario would be 141tCO_2 equivalent per annum for both options.				
	Reduce vulnerability to climate change risks and hazards	0	+	-	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option.	No negative effects have been identified and therefore no mitigation measures are required.	0	+	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Due to the low relatively low levels of abstraction, it is unlikely that there will be any significant impact on flood risk. There may be a minor positive effect with regards to resilience of water supply against drought by improving yield, however there is a small chance that the river could be subject to climate related drought, where increased abstraction along with periods of drought, could lead to a depletion of water levels within the waterbody. This could risk interrupting the River Hayle ecosystem and the efficiency of the new abstraction and WTW.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** The option is in close proximity to multiple Grade II Listed Buildings and Structures and one Scheduled Monument, with a potential for direct encroachment depending on the exact location and footprint of the WTW and any associated infrastructure. The option is also located within 500m of St Erth Conservation Area. These have the potential for negative construction effects, with increased vibration and vehicular movements during construction, with the potential for excavations in close proximity to these assets. There is also the potential for previously undiscovered archaeology to be encountered in areas of construction on greenfield land. There are no Registered Parks and Gardens, Registered Battlefields or World Heritage Sites within the 500m of the option. There are also no Protected Wrecks located within 5km. There may be ongoing damages to Listed Buildings damaged directly from the construction phase, and potential for heritage	Best practice mitigation measures should be put in place to minimise disruption. Consideration of construction access or roads which are used. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				loss should these assets be removed as a result of the implementation of the option. **Operational Effects** Long-term effects are likely to be low, due to the fact that operation of the option is unlikely to have any adverse effects on heritage assets. It is also not anticipated that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the increased abstraction of the River Hayle, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** Whilst the option is located outside of any AONBs or National Parks, there may still be localised effects on land quality as a result of the construction of the option, especially the new WTW as there is a significant amount of new infrastructure associated with this. Construction of the WTW may result in requirements for land excavation, increase in vehicular movements on the land and potential for resident's views to be interrupted by construction activity. Depending on the exact location of the new WTW, there is also potential for impacts to areas of recreational land. The effects are minor pre mitigation but may not be completely eliminated post mitigation.	Ground to be reinstated post-construction to mitigate against any residual effects. There may also be potential to introduce screening around the site to minimise visual impacts both during construction and operation. This could also be through planting of hedges or other vegetation.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST	LT				ST	LT
					Operational Effects It is expected that the ground would be reinstated where possible post-construction, limiting the amount of land experiencing long-term damage. Depending on the exact location and dimensions of the new WTW, there may be long-term residual effects relating to visual amenity from residential properties or PRoW. The option is located within a Historic National Landscape character area consisting of mainly enclosed Agricultural Land and fields, and so has the potential to be adversely affected by the new infrastructure. The effects are minor pre mitigation but may not be completely eliminated post mitigation.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	-	+	**Construction Effects** Whilst the precise location of the new WTW is not confirmed, areas of recreational land are likely to be required to be temporarily closed to accommodate nearby construction works. There may also be periods of construction noise and vibration effects on local receptors during the construction phase of the option, impacting upon the health and wellbeing of the local community. Additionally, there could be impacts on visual amenity from machinery or other construction operations. Upfront Capex costs are expected to be very substantial from 2025 to 2027. This has the potential to boost the local economy through job creation. **Operational Effects** There are high ongoing Opex costs from 2028 per annum associated with the operation of the option which may result in job creation or security, and	Timings and volume of work taking place during these closures to be considered to mitigate effects on users.	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				enhance spending which could improve the local economy. However, the effects from potential noise of the pumping station on surrounding receptors, such as residential properties, should be considered and mitigated.			
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** A large proportion of the option is within/surrounding The Green Lane Park and St Erth Playing fields. BK Fisheries is also located within proximity of the option. These recreational facilities have the potential to be adversely affected by construction and implementation of the option, as land may be required for access to the site, and for construction of the WTW. This means that there is potential for certain areas to be temporarily closed during the construction phase and a reduction in local recreational space for residents of St Erth. There may be effects from ongoing loss of land as a result of the new WTW, reducing the amount of recreational space for residents in the long term too. There could also be a potential for noise and dust from increased vehicle movements and other construction activity during the short-term, thus impacting residents and the local community. **Operational Effects** Operationally, there is likely to be fewer effects than there were during construction, with recreational land used for access reinstated post-construction where possible. Abstraction may result in a reduction in water levels within the River Hayle, affecting those who use it	Ensure disruption is kept to a minimum, and land used in construction to be reinstated where possible.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				recreationally for activities such as sailing, swimming or paddle boarding.			
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option is likely to require substantial new infrastructure, with the construction of the new WTW, and infrastructure associated with the new abstraction and refurbishment of the existing intake. The scheme will, however, make use of the existing intake rather than constructing a new one, and there is also a possibility of utilising the existing pipeline which encroaches upon the site. Both of these factors will help reduce material use on site. There is also likely to be an increase in waste excavation material and construction waste as part of the scheme. **Operational Effects** It is unlikely that there will be any resource use and waste production during the operation of the option, meaning effects are likely to be neutral.	There is opportunity for sustainable design measures to be implemented into the scheme, including the consideration of materials with less embodied carbon, and the reuse of excavated material. It is however likely that some residual effects will remain.	-	0
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** It is unlikely that there will be any effect on built assets and infrastructure, as the majority of the option is located on land not currently occupied by any built assets. There may however be increased construction traffic on local roads and so there could be traffic delays and parking restrictions in certain areas. **Operational Effects** Due to the nature of the location of the proposed option, it is unlikely that there will be long-term impacts on built assets and infrastructure.	Ensure construction traffic is kept to a minimum. Use best practice measures at all times.	-	0

M.6 COL9

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL9				
Option:	Leswidden Pool.				
Scheme type:	New reservoir				
Option description:	Transfer of former quarry water to Drift Reservoir via Sancreed Stream. The distance from Leswidden Pool to Sancreed Stream is estimated to be 5km.				
Approx. Yield (Ml/d):	5.46				
WRZ:	Colliford				
Date Completed:	26/05/2022, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	01/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson / Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes / Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	-	**Construction Effects** The option is located immediately adjacent to Lower Bostraze and Leswidden SAC, with potential for adverse effects on the designated site through linkages to the option. The HRA concluded that the SAC is particularly susceptible to air pollution and construction air pollution is likely to be of adverse effect. It is also located within 5km of multiple SSSIs, including Aire Point to Carrick Du SSSI (60.53% favourable, 23.37% unfavourable – no change, 16.10% unfavourable – declining), Lower Bostraze and Leswidden SSSI (100% unfavourable – declining) and Chyenhal Moor SSSI (100% unfavourable – declining). Additionally, the option is located within 500m of	Best practice mitigation measures to minimise impacts on SSSIs and SACs.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Busvargus & Tregeseal Common to Dowran Common & Boswarlas CWS and Botrea Downs CWS. There is expected to be some excavation works associated with the construction phase of the scheme, however this is not expected to encroach upon any designated or non-designated ecological sites, and so any effects are considered low. There may also be a requirement for these designated sites to be used as access, such as to Leswidden Reservoir, however, as they are existing facilities this is anticipated to be low. Lands End and Cape Bank SAC is located around 3.5km west of the option and is hydrologically connected. This has the potential to lead to contamination from the construction of the option and impact its qualifying features. **Operational Effects** It is not expected that there will be any impact on designated sites as a result of the operation of the option, however potential for a decrease in water levels at Leswidden Reservoir may result in levels which affect habitat connectivity to designated sites surrounding the reservoir. The HRA concluded that there are not expected to be any significant effects due to the distance and the fact there are no other impact pathways during operation.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable	-	-	**Construction Effects** The option directly encroaches upon multiple areas of priority habitat, such as Lowland Heathland in Leswidden Reservoir and areas of deciduous woodland around Drift Reservoir and along the extent of the pipeline/Sancreed Stream. These sites have the	HRA to be consulted to ensure methods of best practice are put in place. Methods of best practice to be implemented to minimise impacts on biodiversity,	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	habitats and habitat connectivity			potential to be adversely affected by the construction phase, especially along the extent of the transfer where there is potential for vehicle movements where access is required, and excavations. The option is unlikely to have any effects on Shellfish Waters or fisheries due to the fact there are none located within 500m. The BNG assessment concluded that the option is expected to cause the loss of BNG units due to habitat clearance associated with construction. **Operational Effects** There may be some potential for disturbance to habitats as a result of the operation of the scheme, with increased flows within Sancreed Stream, decreasing water levels in Leswidden Reservoir and increasing water levels at Drift Reservoir. There are no Shellfish Waters or fisheries located downstream and so no effects are anticipated here. It is also not anticipated that the option will have any effect on salmon rivers.	vulnerable habitats and habitat connectivity. However, due to the nature of the option, it is unlikely that these measures will be necessary.		
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Movement of excavated material during the construction phase may result in increased spread of INNS from different areas, and colonising sediments left exposed post-construction. There is also a small risk of construction workers introducing INNS during works on the potential new discharge point at Sancreed Stream, although this is expected to be minimal with the following of site biosecurity practices. **Operational Effects**	Bets practice and consultation of an INNS risk assessment in order to mitigate as much as possible.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				As a result of a potential increased transfer to Drift Reservoir, there could be a chance of INNS spreading and colonising river sediments exposed in Leswidden Pool with the decrease in water levels. The INNS risk assessment concluded that any additional flows would not change the habitat suitability for INNS and so this could facilitate further spread.			
Water	Protect and enhance the quality of the water environment and water resources	-	-	**Construction Effects** Across the extent of the option, several minor watercourses have the potential to be intercepted by Sancreed Stream and/or the transfer pipeline, which could potentially have an effect on WFD. Due to the nature of the option requiring minimal new infrastructure, short-term effects are likely to be low. There may however be a potential for deterioration in water quality due to contamination and water arising from construction activity. The WFD Level 1 assessment concluded that there is a potential for low impact during construction across all waterbodies due to the new outfalls, pipelines and trenching associated with this infrastructure. **Operational Effects** There is expected to be an additional 5.46Ml/d of water resource available across the region, however the decreasing water levels at Leswidden Pool has the potential to decrease water quality, with any contaminants in the water less diluted. It is not however located within any Drinking Water Protected areas. The WFD Level 1 assessment concluded that during the operation phase there is potential for a high impact on Lands End to Trevose Head (coastal) as a	Best practice mitigation measures to ensure residual effects are minimised.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				result of the new abstraction from Leswidden Pit. It was also concluded that there would be a medium impact on Newlyn River and Drift Reservoir, due to the transfer to Drift Reservoir via Sancreed Stream. West Cornwall (GW) was given a low impact, given the potential for pipeline maintenance in the long-term operation of the option.			
	Increase resilience and reduce flood risk	--	--	**Construction Effects** A large proportion of the option is located within Flood Zone 1, with limited potential for effects. However, areas further towards drift reservoir (where there may be a new discharge point required) are within Flood Zone 2 (1 in 1000 year) and Zone 3 (1 in 100 year), and so are at an increased chance of flooding and having an effect on construction, especially along the extent of Sancreed Stream where the majority of works will take place. **Operational Effects** The operation of the option is at risk of flooding due to the fact the location of the option is within areas of Flood Zone 2 and Zone 3. This would be most likely along the extent of Sancreed Stream and Drift Reservoir from the increase in water flows from Leswidden Pool, where there are multiple areas located within Flood Zone 2 and 3. Given its distance from the coast though, it is unlikely that the option will be adversely affected by sea level rise.	Measures to reduce the impact on flooding during the construction phase may be required, especially in areas of Flood Zone 2 and Zone 3. Consider timing of construction works to avoid likely flood periods. Implementation of flood mitigation measures should be considered for the operation of the option, especially in areas particularly susceptible to flooding.	-	-
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so	No negative impacts have been identified as a result of the option and therefore no	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				no construction effects are anticipated. It should however be considered as to whether construction activities will be likely to interrupt any existing pipelines/water supplies. **Operational Effects** The option will provide an additional 5.46Ml/d of water for use within the SWW region, with the increase in transfer likely to result in positive long-term effects on the resilience of water supplies. It should however be considered whether Leswidden Pool has the capacity to provide for this increased transfer, and whether this would have adverse effects on water quality or WFD status, especially during periods of drought.	mitigation measures have been identified.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The option is located across Grade 3, Grade 4 and Grade 5 Agricultural Land, with the location of most of the construction works located within Grade 3 Agricultural Land (good to moderate quality Agricultural Land). This land may be required to be excavated in some areas to accommodate the pipeline, along with related vehicle movements and other construction activity occurring during the short term. This has the potential to damage the soils, however, it is expected that land remediation works will take place post-construction to keep these effects to a minimum. Aire Point to Carrick Du SSSI is also a Geological SSSI, with potential to be affected by these activities too, although this is unlikely given its distance from the option. The NCA concluded that the option is expected to cause the temporary loss of arable farmland,	Any land required for the construction of the option to be reinstated following the scheme to ensure long-term effects are kept to a minimum.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				pastures farmland and dwarf shrub heath stocks due to construction works. **Operational Effects** There is unlikely to be a long-term impact on soil quality, due to the fact that the land will be remediated following the works. A decrease in water levels in Leswidden Pool could potentially destabilise soils on the banks of the lake though, causing subsidence. However, the effect of this is considered neutral.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however short-term construction may have a minor and temporary impact on air quality within the area in terms of potential for dust and vehicle exhaust emissions. **Operational Effects** It is unlikely that the operation of the option will cause any impacts on air quality, however it should be considered as to whether increased pumping of water will result in emissions subsequently effecting air quality.	Best practice mitigation measures should be implemented during construction to supress any potential air quality effects.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** New infrastructure will be required as part of the scheme, such as potential for a new pipeline and a new discharge structure. This means that there will likely be an increase in embodied carbon emissions occurring during construction activities, such as during the use of machinery and vehicles, and from materials used for this infrastructure. The extent of carbon associated with the option though would be	Investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				determined by the materials chosen and whether measures were taken to reduce the carbon footprint of activities. One option involves the transfer of water to Leswidden Pool-Drift via a Sancreed Stream. If this approach is taken, the embodied carbon emissions (total embodied carbon from construction) will be 182tCO_2 equivalent. There is also an option for the transfer of water to Leswidden Pool-Drift via a pipeline, which will avoid any stream impact. If this approach is taken, the embodied carbon emissions (total embodied carbon from construction) will be 360tCO_2 equivalent. **Operational Effects** It is likely that there would be a small increase in operational carbon as part of the scheme due to the need for additional pumping of water from Leswidden into the transfer at Sancreed Stream. Under both options, operation at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months would generate operational carbon emissions of 39tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. For both options, operation under a maximum utilisation scenario would be 89tCO_2 equivalent per annum.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option.	Continue to assess the impacts of climate change within the area and implement best-practice in order to mitigate against these. Monitoring of water	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Due to the relatively low levels of abstraction, it is unlikely that there will be any significant impact on flood risk. Further downstream, the option may make certain areas more susceptible to climate related flooding, as there will be more water within the river channel, especially following severe rainfall events.	levels during operation to ensure flooding/drought is best mitigated against.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	--	-	**Construction Effects** There are multiple historical assets along the extent of the option which are likely to experience effects as a result of the implementation of this option. Whilst there are none of these assets immediately within the proximity of Leswidden Pool and Drift Reservoir, there are several assets located along the extent of the new transfer win Sancreed Stream. These have the potential to be affected by excavations to accommodate a transfer pipeline. Leswidden Pool is also located directly within the Cornwall and West Devon Mining Landscape World Heritage Site, which has the potential to experience construction effects from increased vehicle movements and excavations, although due to the small amount of construction required, this is not expected to be significant. The option is also located within Sancreed Churchtown Conservation Area. Depending on the implementation and precise location of the pipeline from Leswidden Pool to Sancreed Stream, there is also the potential for previously undiscovered archaeology to be encountered. There are however no Protected Wrecks located within 5km. **Operational Effects**	Bets practice mitigation measures should be implemented to minimise disruption to these sites. The route of transfer should be considered to reduce effects on any assets concerned.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Long-term effects on historic assets are anticipated to be low, due to the fact there are limited assets along the extent of the pipeline, and the fact the infrastructure required for the scheme is limited. It should however be considered as to whether increased flows within Sancreed Stream could destabilise historical assets such as bridges which cross it, or whether flooding as a result of these flows could affect further assets. This has potential to impact upon public access and enjoyment of any such assets and may impact upon its significance within the local area. Effects are expected to be avoided through the proposed mitigation measures. Due to the option consisting of water transfer there is a very low potential of adverse effects upon groundwater-dependent assets or paleoenvironmental remains. It is currently unknown as to whether there are any of these assets in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	--	0	**Construction Effects** The option is located within the Cornwall AONB and so is likely to experience effects. There is potential for impacts on landscape during the construction phase relating to the increased excavations along the extent of the proposed transfer and new discharge facility. During construction, there will also be potential for resident's views to be interrupted by increased levels of construction activity and equipment, and local recreational land and countryside to be affected by excavations. Due to the levels of the construction required for the scheme though, this is expected to be kept to a minimum.	Ground to be reinstated post-construction and methods of best practice used to mitigate.	--	0

SEA Topic	SEA Objective	Effects ST		Effects LT		Commentary	Mitigation	Residual effects ST		Residual effects LT
						Operational Effects There is likely to be neutral long-term operational effects, as it expected all land-required for the construction of these scheme will be remediated. Also, due to the limited amount of infrastructure associated with the scheme, there is unlikely to be any ongoing effects relating to visual amenity. The option is located within a Historic National Landscape character area consisting of mainly enclosed Agricultural Land, however as there will no additional above ground infrastructure, it is unlikely that this will be adversely affected.				
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	-	+	**Construction Effects** There is potential for a requirement for roads to be excavated to accommodate the pipeline, potentially creating access issues for residents or delays for road users. There could also be a chance of related noise and dust from increased vehicle movements and construction activity in the short term, thus impacting the residents and local community. There are several sections of PRoW within 500m of the option. Construction works could reduce their accessibility and create access issues for users. The option has a very substantial upfront Capex cost during the year 2025, which has the potential to create jobs and subsequently improve the local economy. **Operational Effects** There are moderate ongoing Opex costs associated with the operation of the option from the year 2026	Any diversion routes required should be carefully considered to minimise any disruption to journey time for road users. Ensure best practice in terms of timings and volume of work is put in place to mitigate the effects on residents during the construction phase.	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				which may result in job creation or security, and enhance spending which could improve the local economy. However, the effects from potential noise of the pumping station on surrounding receptors, such as residential properties, should be considered and mitigated.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** Depending on the precise route of the transfer pipeline and infrastructure towards Sancreed Stream, there is a chance that recreational land may be required during the construction phase, and so certain areas may be temporarily closed to accommodate the works. **Operational Effects** It is not expected that there will be any long-term effects on recreational land, as any used will be returned to its existing use post-construction where possible.	Ensure disruption is kept to a minimum, and all land used in construction is to be reinstated.	-	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** Whilst there is likely to be new infrastructure involved with the implementation of the option, efforts have been taken to ensure existing facilities are utilised to minimise resource use during construction, such as the use of existing pumping and treatment facilities at Drift Reservoir. There will, however, be large amount of new material used for pipelines and the links to main pipelines, as well as waste excavation material and construction waste. **Operational Effects**	There is opportunity for sustainable design measures to be implemented into the scheme, including the consideration of materials with less embodied carbon, and the reuse of excavated material.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				It is unlikely that there will be any resource use and waste production during operation of the option, meaning effects are likely to be neutral.			
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** There is potential for several roads and waterways to be crossed by the transfer pipeline/stream, and so it is likely that some negative effects will be seen during the short-term construction phase including road closures and diversions. **Operational Effects** It is unlikely, however, that there will be any long-term impacts on built assets and infrastructure as a result of the scheme, due to the fact the option utilises existing infrastructure and a proportion of new infrastructure will likely be underground.	Ensure any road closures and diversions are kept to a minimum and all built assets and infrastructure are reinstated.	-	0

M.7 COL11

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL11				
Option:	Hawk's Tor Pit.				
Scheme type:	New reservoir				
Option description:	New reservoir or development of existing source or development of disused mineral extraction workings.				
Approx. Yield (Ml/d):	3				
WRZ:	Colliford				
Date Completed:	27/05/2022, updated 03/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	01/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	--	**Construction Effects** The option is located within 5km of the River Camel SAC and GWDTE which is to the north of the site. There is potential for effects due to changes in yield abstraction from the new intake. Increases in construction vehicles for development of new pipeline may have short-term negative effects including dust and noise pollution impacts, this is due to the option requiring new pipelines to connect Hawk's Tor Pit and Colliford Reservoir. The option is over 5km from any SPAs, pSPAs and Ramsar sites has so has a low potential for effects. The option directly encroaches upon Bodmin Moor, North SSSI and GWDTE (79.68% unfavourable – recovering, 20.06% unfavourable – no change, 0.26% unfavourable – declining). This pipeline	Excavated material should be reinstated post-construction to minimise impact on SSSI. Monitoring of change in reservoir level at Hawk's Tor Pit to assess new abstraction point impact. Best practice mitigation measures should be implemented to minimise potential impacts arising from dust and noise pollution. Recommendations made in the HRA should be followed	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				will be constructed through ground in this area in order for the water from Hawks Tor Pit to travel south-east to Colliford Reservoir. In addition Cabilla Manor Wood SSSI and GWDTE (100% favourable); Dozmary Pool SSSI and GWDTE (2.65% favourable, 76.14% unfavourable – recovering, 21.20% unfavourable – no change); River Camel Valley and Tributaries SSSI and GWDTE (10.19% favourable, 23.54% unfavourable – recovering, 65.31% unfavourable – no change, 0.95% unfavourable – declining); and Upper Fowey Valley SSSI and GWDTE (62.89% favourable, 37.11% unfavourable – recovering) are all located within 5km of the option. This option is also located within eight SSSI Impact Risk Zones that are located directly on the route of the new pipeline, and thus are highly likely to be negatively impacted during the construction phase. The HRA concluded that the River Camel SAC (2.5km north) is not hydrologically connected to the option and is sufficiently distant that there will be no significant effects on qualifying habitats or aquatic features. There is no suitable connected habitats to support otters and so no disturbance during construction is anticipated. Crowdy Marsh SAC (8km north) is sufficiently distant from the site that the proposed works as well as not being hydrologically connected to the option footprint. As such there are unlikely to be any effects furring the construction phase. Polruan to Polperro SAC (30km downstream) is hydrologically connected with the Neot River and the River Fowey downstream of the option, as well as via WFD groundwater waterbody Looe and Fowey. At this distance downstream it is unlikely that there will be	to ensure that best practice mitigation measures are implemented.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				significant effects from any water pollution events during the construction phase. **Operational Effects** The site does not impact upon any MCZ or MPA within 5km. Hawk's Tor Pit SSSI will be negatively impacted in the long term due to the new intake abstracting water from the reservoir to be channelled to Colliford Reservoir, with the potential for changes in reservoir levels. The ground that is excavated is expected to be reinstated reducing the impact on SSSI Risk Zones but due to the location of these and the transect of the new pipeline, the long-term effects of this are likely to be negative. The HRA concluded that during the operational phase the River Camel SAC will not experience significant effects from water transfer between the reservoirs. Crowdy Marsh SAC is unlikely to experience any effects during the operational phase. For Polruan to Polperro SAC there is no direct interface between the option and the site, due to qualifying features being on or above the cliff faces.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	**Construction Effects** The option has no direct encroachment upon a NNR and non-direct encroachment on LNR so has low potential for effects. The option is also located over 500m from an Ancient Woodland so has low potential for effects. But the option does directly encroach upon areas of lowland heathland priority habitat, upland heathland habitat and fragmented heath priority habitat. These areas are likely to experience significant impact as the new pipeline will pass directly through these priority habitat areas, increasing vulnerability by	Best practice mitigation measures should be implemented to reduce disruption and impact to priority habitat that is directly encroached upon. Excavated material should be reinstated to minimise impact on priority habitat.	--	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				vibrations, noise and dust pollution through construction below ground. The BNG assessment concluded that there is an expected change of -68.51% habitat units. This is 1.46 hectares of Lowland Heathland equating to 17.54 units lost and Modified Grassland of 1.22 hectares equating to 4.86 units lost. **Operational Effects** Post-construction impacts associated with the option should be minimised as the pipeline is located below ground but residual effect of reinstating ground could remain for a period of time. Habitat connectivity may be impacted by the below ground construction works and excavation of materials, but once reinstated and works have been completed over time should be returned to previous state. The option is not anticipated to have any effect on salmon rivers.			
	Reduce the spread or presence of INNS	-	--	**Construction Effects** Movement of excavated material during construction may increase the risk of INNS and colonising of sediments left exposed post construction. **Operational Effects** A new intake at Hawk's Tor Pit may increase the risk of INNS due to the new abstraction that will be taking place at the option site, potentially leading to INNS spread and colonising of sediments left exposed post construction. The INNS risk assessment concluded that there is a high risk of INNS spread due to a regular frequency and a high severity. This is due to	Best practice mitigation measures to be implemented along with INNS risk assessment to minimise the risk where possible. Biosecurity best practice measures to be followed during construction phase.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				the physical transfer of untreated water between two previously unconnected locations.			
Water	Protect and enhance the quality of the water environment and water resources	--	---	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 with potential for impacts. During construction surface water quality could be impacted during the excavating of material to construct the new pipeline. During construction raw water quality could be impacted by the excavating of materials due to the building of a new intake. Part of the option is also located within a Drinking Water Protected Area, with potential for contaminants arising from the construction phase from the new raw water intake from Hawk's Tor Pit. The WFD Level 1 assessment concluded that during the construction phase there is potential for low potential effects from tunnelling the A30 in regards to the Warelggan River and Looe and Fowey groundwater. There are also low potential risks from constructing below ground infrastructures for these areas. The new intake and outfall that is required has potential for low effects at the St Neot River and Colliford Lake. **Operational Effects** The option is likely to reduce the quantity of surface water at Hawk's Tor Pit due to the new intake abstracting water and transporting it into Colliford Reservoir. With this there could also be a decrease in water quality. The option is contributing toward WFD objectives by creating a new surface water abstraction point from Hawk's Tor Pit to increase the surface water quantity at Colliford Reservoir, which will be in turn	Best practice measures need to be implemented in order to minimise the potential impact of excavating materials to create the new intake. Water quality assessments may need to take place to assess the effect of construction of raw surface water quality. Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				increasing the output of the WTW on site. The option will not affect bathing waters or shellfish water protected areas. The option is unlikely to slow flow rates in the upper catchments or reduce soil losses to the river system. The WFD Level 1 assessment concluded that during the operational phase there is potential for low effects from the new below ground infrastructure that will need to be in place, with effects on the Warleggan River and Looe and Fowey groundwater. Draining of pipelines for maintenance has potential for low level effects if drained o local watercourse, effects would be short term and temporary. There is potential for a beneficial aspect during operation with the low volume of discharge with an element of lower WFD status than the receiving body for Colliford Lake. The new intake and outfall has potential for low effects at St Neot River and Colliford Lake during operation. The new abstraction licence would present potential for significant effects during operation at Hawk's Tor Pit.			
	Increase resilience and reduce flood risk	-	+	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000 year) and Flood Zone 3 (1 in 100 year), so may have the potential to impact the construction phase. Particularly as a section of the new pipeline is located in Flood Zone 2 and a large section of Hawk's Tor Pit. **Operational Effects** Once operational, the new intake could improve flood risk management within the area as Hawks Tor Pit may be able to provide a larger capacity to store flood waters during storm events. As well as increasing	Flood risk management plans may be required during the construction phase to minimise the potential for impacts. During operation the option is unlikely to negatively impact on flood risk and so no mitigation is suggested. Ensure electrical outputs are located above flood risk levels where possible.	-	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				water resources for the local community and increasing resilience to drought periods. The construction of the pipeline will be located below ground and thus is unlikely to lead to increased flood risk. This is further reciprocated as the new intake is unlikely to have a major increase in above ground hard infrastructures that could increase flood risk. Additionally, given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise.			
	Deliver reliable and resilient water supplies	-	+	**Construction Effects** During construction the level of containments within the water may increase due to the excavation of materials and installation of a new intake and pipeline. The nature of the works may mean a short-term negative impact upon local water supplies may be possible, but this is likely to be mitigated through SWW management plans. The construction period should not negatively impact on water reliability due to the option only becoming an additional input into a current reservoir. **Operational Effects** The option is increasing the availability of water to be processed at the WTW for Colliford Reservoir and in doing so increases the reliability and sustainably of the water supply within the area.	Ensure best practice mitigation measures are implemented to minimise the potential for contamination of surface waters. Mitigation measures of potential pipeline closures are implemented to prevent disruption to local water supplies.	0	+
Soil	Protect and enhance the functionality, quantity and quality	-	0	**Construction Effects** The option will involve the use of greenfield land but is located within Grade 4 and Grade 5 Agricultural Land with low potential for effects. Soil excavated during	Monitoring of water quality abstracted from Hawk's Tor Pit to assess any potential impact of underlying historic	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	of soils, including the protection of sites of geological importance			construction is to be reinstated as pipeline is underground and thus should minimise impacts upon these. The option is located over 200m from an Authorised Landfill Site with low potential for effects. Construction of new intake and discharge points may require the land take of small sections but is unlikely to cause overall negative impacts due to the low grade quality of the soil. Furthermore, construction vehicles may negatively impact soils in the short term to access new access and discharge points. Temporary loss of pastures stock is expected as a result of construction. Reinstatement will occur and therefore no impact on food production is expected with appropriate mitigation. **Operational Effects** The option directly encroaches upon the historic Hawk's Tor China Clay Historic Landfill Site, as Hawk's Tor Pit is located upon this and so has potential for effects. Ground to be reinstated post-construction and with low quality grade of soil impacts are likely to be neutral.	landfill site. Best practice mitigation measures to be implemented to minimise potential impact on soils when accessing new abstraction and discharge points. Directional drilling and reinstatement of habitats and farmland means most the will be little loss of production farmland.		
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs so has a low potential for effects. During construction there is likely to be dust emissions arising from the commencing of vehicular movement that could have a minor effect on local air quality. **Operational Effects**	Best practice mitigation measures are to be implemented to minimise the impact of increased vehicular movement.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				During operation the option is likely to have a neutral impact upon air quality due to the pipeline being located underground. The new intake could result in noise pollution and local receptors should be considered but these are likely to be minor due to the 3Ml/d yield expected.			
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** The option is likely to require new minor above ground infrastructure in the form of a new intake which has the potential to result in increased levels of embodied carbon. The new pipeline is likely to require significant machinery and materials in order to be implemented. The embodied carbon emissions (total embodied carbon from construction) for this option will be 845tCO_2 equivalent. **Operational Effects** During operation there is expected to be an increase in operational carbon due to the new abstraction point and the capacity in the Colliford Reservoir to be processed at the WTW. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 40tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	Decarbonisation of the National Grid is likely to reduce the carbon emissions in the future. Investigate use of renewable energy sources.	--	-
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** Installation of new intake and pipeline could explore use of carbon neutral materials where possible sourced from the local area to prevent further increase to climate vulnerability from the option.	Monitor the potential impacts of climate change within the local area in order to implement best practice	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The new abstraction point at Hawk's Tor Pit is likely to decrease the water level, therefore potentially allowing for an increased capacity of surface water to be stored within this during flood events. Due to the low levels of water being abstracted the overall impact on reducing long-term vulnerability to climate change risks is likely to be neutral.	mitigation measures where possible.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	--	-	**Construction Effects** The option is located over 500m from any Listed Buildings and Structures, World Heritage Sites, Registered Parks and Gardens and Registered Battlefields presenting low potential for effects. There are also no Conservation Areas or Protected Wrecks located within 5km of the option. The option does however directly encroach upon several Scheduled Monuments, including: Cairn 485m WSW of Colquite Farm; Platform Cairn 460m SW of Colquite Farm and Two Platform Cairns centred 485m SW of Colquite Farm. These are located directly upon the route of the new pipeline and thus will be detrimentally impacted, which also includes Registered Common Land in the form of Redhill Downs, Brockabarrow Common and Menacrin Downs. There are also an additional eight Scheduled Monuments located within 500m of the option. There are no Protected Wrecks or Registered Battlefield within 500m of the option site. There is potential for construction of new below ground infrastructure in the form of the pipeline to create vibrations during the construction phase. This has potential for negative effects on the historic	Avoid development upon or in proximity to Scheduled Monuments. Excavated materials to be reinstated post-construction but residual effects to remain as loss or alteration of historical land cannot be mitigated against. Best practice mitigation measures to be implemented to minimise potential impacts arising from vibrations on historic environment.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				environment that cannot be mitigated against once damage has occurred. There is also the possibility of discovering new archaeology that along the extent of the new pipeline. **Operational Effects** There are unlikely to be long-term effects of the option due to the pipeline being located underground and the new intake being located on an existing reservoir. There may be residual effects that occur on Scheduled Monuments and Registered Common Land that should be reinstated post-construction, but residual effects may remain. This could potentially impact upon public access to the heritage asset and possibly reduce its significance within the local area. Due to the option consisting of water transfer there is a very low potential of adverse effects upon groundwater-dependent assets or paleoenvironmental remains. However it is currently unknown as to whether there are any of these assets in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** The option directly encroaches upon Cornwall AONB with potential for effects during the construction phase due to the excavation of materials. The new abstraction point is a minor above ground infrastructure development that will be constructed for this option. The option is located over 200m from any National Parks with low potential for effects. **Operational Effects**	Reinstatement of land post-construction should take place to minimise impact on excavated land in AONB.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Once operational the option is unlikely to have an impact upon the landscape as pipeline is located underground, and new above ground infrastructure is likely to be minor and contained to the two sites. The option is located within a Historic National Landscape character area consisting of mainly rough, unimproved land, with a small potential to be adversely affected by new infrastructure. There may be a slight increase in noise pollution generated by the new abstraction point at Hawk's Tor Pit, but this is likely to be minor due to the expected yield to be 3Ml/d and the close proximity to the A30.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	0	**Construction Effects** During the construction phase access land will be impacted surrounding the option site to excavate materials for the new pipeline. The option should not have an impact upon active lifestyles as there are no National Cycle Networks within the 5km boundary or National Trails. However, there are PRoWs located within 500m of the option. Disruption to these areas may create access issues for their users. A place of worship is located within the 5km boundary to the south-west of the site that could be impacted by construction traffic during peak hours. Road infrastructure should not be impacted by the construction works due to the pipeline being moulded underneath the A38. Increased vehicular movement to assist with development of works may lead to minor local traffic disruption during peak hours. The construction works are expected to occur within the next two years (2025). During construction, the capital expenses for the works are anticipated to be very	Best practice measures to be implemented to minimise the potential impacts on local communities, with consideration of haulage routes and times.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				substantial over a two year period (2025 to 2026). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** Once the option is operational it is anticipated to result in very low ongoing Opex costs from 2027. No local economic or social enhancements are anticipated. Operational effects have been identified as neutral.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** During construction access to Hawk's Tor Pit may have to be limited to ensure the safety of local residents and thus may reduce recreation access within the area. **Operational Effects** Increased abstraction of Hawk's Tor Reservoir may lead to reduced water levels which could negatively impact recreational activities including fishing and paddleboarding, although this is likely to be neutral due to the volume of abstraction taking place, and the potential impact this would have on such activities.	Monitor impact of abstraction on water levels in Hawk's Tor Pit.	-	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option is developing upon existing infrastructure by utilising the WTW at Colliford Reservoir, although new materials will need to be used to construct the new intake. A significant volume of material assets may be required to construct the new pipeline connecting Hawk's Tor Pit and Colliford Reservoir.	Sourcing of materials needed for construction from local areas where possible to minimise transport aspects. Use of sustainable materials where possible to reduce need for materials.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects During operation there could be a slight increase in waste production from the increased use of the WTW at Colliford Reservoir, although this may be counter-balanced by the retreatment of wastewater from Hawk's Tor Pit.			
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** There will be the need for increased vehicle movement during the construction phase to construct the pipeline and new intake, which may increase traffic on the A38 and surrounding road networks during peak times. **Operational Effects** Once operational is not expected that there will be a negative impact upon built infrastructure for the option.	Best practice mitigation measures to be implemented to minimise the potential impacts upon built infrastructure in the surrounding area, with consideration to haulage routes and timings.	-	0

M.8 COL12

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL12				
Option:	Stannon daily abstraction licence increase.				
Scheme type:	Groundwater enhancement				
Option description:	Increase the daily limit to the abstraction licence of 4Ml/d to 8Ml/d for up to three months in any one year. Pumps to be uprated and possible power upgrade. A 0.2Ml/d stream support facility will be constructed discharging from the lake to the adjacent stream.				
Approx. Yield (Ml/d):	4				
WRZ:	Colliford				
Date Completed:	17/05/2022, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	01/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	-	**Construction Effects** The option does not directly encroach upon any designated and non-designated ecological sites, however it is located within 5km of Crowdy Marsh SAC and the River Camel SAC – both of which are GWDTE. Both of these sites are hydrologically connected to the option, however the HRA AA concluded that that there will be no adverse impacts upon the integrity of Crowdy Marsh as long as mitigation measures set out are implemented. Pollution of the water environment is the only potential impact pathway between the option and the River Camel SAC, Crowdy Marsh SAC, Tintagel-Marsland-Clovelly	Best practice to be put in place in order to mitigate against the effects of construction traffic as much as possible. CIRIA guidance to be followed to allow for effective implementation of pollution control measures to take place.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Coast SAC and Bristol Chanel Approaches. Bodmin Moor North SSSI (79.68% unfavourable – recovering, 20.06% unfavourable – no change and 0.26% unfavourable – declining), is also located within 5km of the option. This SSSI is also classified as a GWDTE. Although not directly encroached upon, these sites have potential to be negatively affected by increased vehicular movements and activities associated with the construction of any supporting infrastructure for the option. However, due to the nature of the option and no current plans for significant infrastructure, any works are likely to be minimal. **Operational Effects** Once operational the option has the potential to have minor negative impacts upon designated sites. This is because the Bodmin Moor, North SSSI is classified as a GWDTE and therefore the increased abstraction from this groundwater waterbody may have a long-term impact upon the site. Although this will require further assessment at a later stage to determine the impact of the option.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	---	---	**Construction Effects** There are multiple priority habitats located within 500m of the option, including areas of grass moorland, deciduous woodland and blanket bog, however none directly encroach upon the main option. There may however be some effects from construction activity for the discharge supporting facility, such as excavation and increased vehicle movements. The option is unlikely to have any effects on Shellfish Waters or Fisheries due to the fact there are none located within	During construction, passage upstream must be maintained for these species, and disturbance within the watercourse limited to maintain in-channel vegetation and the substrate. Avoiding excess noise and illumination through implementation of	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				500m. The HRA AA concluded that Atlantic salmon and bullhead may be adversely impacted during the construction phase with appropriate mitigation required. **Operational Effects** Any operational effects on biodiversity and habitats are expected to be minimal due to the current nature of the site. There will however be some significant infrastructure associated with the stream support facility which has potential to have an effect. There may also be a bigger variation in water levels within the lake relating to increased abstraction, which could limit the number of species able to survive in the area. There are no Shellfish Waters or Fisheries located downstream and so no effects will be anticipated here. The HRA AA concluded that Atlantic salmon and bullhead may be adversely impacted during the operational phase and will require mitigation.	best practice measures will also help to reduce impacts on fish species. Appropriate buffers around any nesting sites must be enforced, alongside sensitive timings of works to avoid periods of greater activity and/or breeding holt for otters. If resting places will be damaged or destroyed to facilitate construction, replacements must be constructed on the same watercourse. This must happen before construction happens. More information is required for any more mitigation measures to be effective including the use of targeted surveys. Passage upstream must be maintained for Atlantic salmon and bullhead as well as avoiding excess noise and illumination through implementation of best practice measures.		
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Although not anticipated on a large scale, any movement of excavated material during the construction phase may result in increased spread of	Best practice and consultation of an INNS risk assessment in order to	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				INNS from different areas, and colonising sediments left exposed post-construction. There is also a small risk of construction workers introducing INNS during works on the new stream support facility, although this is expected to be minimal with the following of site biosecurity practices. **Operational Effects** There is potential for INNS to be present in abstracted water, however as the water will be treated, INNS are not anticipated to be distributed any further.	mitigate these effects as much as possible.		
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** Increasing the abstraction licence of the lake is unlikely to have an adverse effect on water quality during the short term, as any construction inputs are likely to be minimal. There may be minor effects associated with construction of the stream support facility, with potential for water contamination arising from construction activity. The option is also partially located within a Drinking Water Protected Zone, and so any contamination during the construction phase has the potential to be detrimental to water quality. The WFD Level 1 assessment concluded low impact on Stannon Stream and North Cornwall (GW) due to construction of below ground structures. There will be a low impact on Stannon Stream due to construction of a new outfall. There will be a low impact on Stannon Stream and North Cornwall (GW) due to construction of a new stream support facility. **Operational Effects**	Best practice mitigation methods should still be used to ensure residual effects will be minimised. During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. Dewatering discharge will be treated before discharge. Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Increased abstraction of the lake during operation could potentially result in a reduction of downstream flows, however this is likely to be of neutral effect due to the provision of the stream support facility discharging 0.2Ml/d to the nearby stream and therefore providing additional water provision. The area is located within Groundwater Source Protection Zone 3 and outside of a Nitrate Vulnerable Zone and so is unlikely to experience long-term effects. The WFD Level 1 assessment concluded medium impact on Stannon Stream and North Cornwall (GW), regarding using existing abstraction licences within the existing licence conditions but outside of the recent actual rates. There is a low impact on Stannon Stream and North Cornwall (GW) due to presence of new underground structure. Therefore, a WFD Level 2 assessment was undertaken, which concluded possible deterioration between status classes, possible impediments to GES/GEP and possible compromises on water body objectives for Stannon Stream and North Cornwall (GWB).	material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). During operation, land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow. For Stannon Stream, changes to abstraction patterns where appropriate and ensure areas upstream of new stream support are also supported where appropriate, are recommended. For North Cornwall (GWB), ensure Stannon Stream has appropriate level of flow		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
					supplementation and further investigation into exact impact of abstraction on groundwater levels are recommended.		
	Increase resilience and reduce flood risk	-	-	**Construction Effects** The option is located predominantly within Flood Zone 1, meaning that it is highly unlikely that there will be any effects on construction arising from flooding. There is however an area of Flood Zone 2 and 3 around 50m south of the option, which may have an effect on the construction of the stream support facility, depending on its precise location. **Operational Effects** Long-term operational impacts are likely to be low given the fact the option is focussed on land considered as having very limited flood risk. There is potentially a risk that increased discharge into the nearby stream could increase flood risk along its extent, and capacity should be assessed to establish this. Given its distance from the coast, it is unlikely that the option will be adversely affected by sea level rise.	Flood risk mitigation strategies during construction should still be considered even though the main site is located within Flood Zone 1. Depending on the precise location of the construction of the stream support facility, consideration should be given to avoid likely flood periods. Mitigation measures are unlikely to be required during operation as the scheme is unlikely to have an effect on ongoing flood risk, especially given the fact water levels will be reduced as a result of the option. However, depending on the precise location of the stream support capacity, stream capacity should be assessed to establish flood risk during operation.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no construction effects are anticipated. It should be established as to whether any construction activities would be likely to interrupt any current water supplies/pipelines. **Operational Effects** The option is expected to provide an additional 4Ml/d of water for use within the SWW region, with increases in abstraction from the lake likely to result in positive long-term effects on the resilience of water supplies within the area. It should be considered as to whether the lake has capacity to provide for this increased abstraction and provide a reliable source for the region, especially during periods of drought.	Consider whether any water supplies are likely to be interrupted as a result of construction, and appropriately mitigate using best practice measures.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The option is located within both Grade 4 land (poor quality agricultural) and Grade 5 land (very poor quality agricultural), and so there will be low potential for effects from construction, especially given that there will be very little land required for the option. There may however be requirement for a small amount of excavations for the stream support facility and associated infrastructure, of which land would be remediated post-construction where possible. There may also be a chance of increase vehicle movements during the construction phase. **Operational Effects**	Additional residual effects unlikely as any land used during the construction phase will be reinstated.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				It is anticipated that the limited area of land used for construction would be remediated post-construction, as most infrastructure and connections to main pipelines will be underground. All soils would be returned to their original state. There may be a small increase in hardstanding at the site of the stream support facility, and associated loss of land.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, and the limited amount of short-term construction is unlikely to have an impact on air quality. There may be potential for dust and vehicle exhaust emissions as part of the construction, but the effects will be limited due to the nature of the option and its minimal requirement for infrastructure. **Operational Effects** It is highly unlikely that the operation of the option will cause any impacts on air quality, however it should be considered as to whether uprated pumps will produce any additional emissions effecting air quality.	Best practice mitigation measures should be implemented during construction to supress any potential air quality effects.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The option will require very minor new infrastructure and so there will be limited carbon emissions from construction activity and embodied carbon from materials used for construction. The main emissions anticipated from construction is likely to be increased vehicular movements from construction of the new stream support facility. The extent of carbon associated with the option would be determined by the	Investigate the use of substitute materials with lower embodied carbon and use of renewables to power facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				materials chosen and whether measures were taken to reduce the carbon footprint of activities. The embodied carbon emissions (total embodied carbon from construction) for this option will be 282tCO_2 equivalent. **Operational Effects** Operational carbon emissions are likely to be limited, with potential for a small amount of increased emissions from operation of the upgraded pump. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 133tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** There is potential that the lake could become subject to climate related drought in the future, and when coupled with the increase in abstraction, could lead to depleting water levels in the waterbody and subsequent reductions in yield for supply. This is highly unlikely though, given the fact that the option will consist of a stream support facility to aid this.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Monitoring of the effects on water levels where they are subjected to additional abstraction/discharge as part of the option.	0	0
Historic Environment	Conserve, protect and enhance the historic	-	0	**Construction Effects** There are several historic assets which have the potential to be affected in the short term with	Best practice mitigation measures should be implemented to minimise	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	environment, including archaeology			implementation of the option. These include two Grade II Listed Buildings and Structures – Whitewalls Farmhouse and Clapperbridge – and a Scheduled Monument – Stonehut Circle Settlement. The option does not directly encroach upon these assets; however, the setting of these assets have potential to be impacted upon by increased levels of construction activity and vehicle movements through vibration and debris. This is anticipated to be limited though, due to the minimal construction works required for the scheme. There is a small possibility however that there could be ongoing damages to these assets directly from the construction phase. Depending on the precise location of the stream support facility, there is also the potential for previously undiscovered archaeology to be encountered in areas of construction on greenfield land. There are no Conservation Areas or Protected Wrecks located within 5km of the option. **Operational Effects** Long-term effects are likely to be negligible, given the fact that the option requires very limited new infrastructure and the fact that the historic assets are located a distance away from the option. Because of this, it is unlikely that there will be any notable enhancement or improvement on public access/enjoyment to heritage assets within the area. Due to the increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether any of these	any disruption to these historic sites during the construction phase. Routes of construction traffic should be considered in order to best mitigate against potential impacts. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				assets are present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** The option is located within 200m of the Cornwall AONB, however due to the limited amounts of new infrastructure required for the option, it is highly unlikely that this area will be adversely affected by construction activity. There may however be views of construction activity from areas surrounding the site, such as from roads or PRoW. **Operational Effects** There is likely to be neutral long-term operational effects, as it is expected any ground used during construction would be reinstated post-construction. Depending on the location and size of the additional stream support facility, there may be long-term residual effects relating to visual amenity from residential properties, roads or ProW. Due to the nature of the option, these effects are considered to be negligible. The option is located within a Historic National Landscape character area consisting of mainly industrial land and so is not likely to be adversely affected by any new infrastructure.	No impacts are anticipated as a result of the works and therefore no mitigation has been identified.	-	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	- +	- +	**Construction Effects** Due to the majority of the option being located within an area not publicly accessible, any impacts as a result of the construction of the option on population and human health are thought to be minimal. There will however be an expected increase in construction traffic movements on local roads, with potential for	Methods of construction best practice should be implemented in order to minimise the effects on population and human health.	- +	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				congestion, noise, dust and vibrations, thus impacting residents. There is expected to be a very high upfront Capex cost during the year 2025, which has the potential to create local jobs and improve the economy. **Operational Effects** There are moderate ongoing Opex costs associated with the operation of the option from the year 2026 which may result in job creation or security and enhance spending which could improve the local economy. It should however be considered as to whether the power upgrades to uprated pumps are likely to produce increased noise pollution, and any effects should be mitigated.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The main scope of works is not anticipated to encroach upon any existing recreational land, with the uprated pumps and stream support facility being located within land which is not publicly accessible. **Operational Effects** Due to both the nature and location of the option, it is not anticipated that there will be any negative operational effects on tourism and recreation within the area.	Best practice mitigation measures to be implemented to minimise effects on tourism and recreational land.	-	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** There is highly likely to be a number of new resources required for the construction of the option, especially associated with the new stream support facility and	There could be opportunity for sustainable design measures to be implemented into the	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				possibility of new/uprated pumps. There also may be new infrastructure materials required relating to any new pipelines to accommodate the new abstraction capacity. There is also likely to be an increase in waste excavation material and other construction waste. **Operational Effects** Operationally, there is not likely to be any significant resource use or waste, meaning overall effects are considered neutral.	scheme, including consideration of materials with less embodied carbon and the reuse of excavated material. It is however likely that some minor negative residual effects will remain.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** There is unlikely to be any significant effect on built assets and infrastructure due to the fact the option is located on land not publicly accessible, in a location which does not currently have much/any built assets or infrastructure. There may however be effects arising from temporary increase in construction traffic on local roads and towns, such as delays, noise and vibration effects. There may also be requirement for temporary excavations of certain roads in order to accommodate additional infrastructure for connections to main pipelines. **Operational Effects** It is unlikely that there will be long-term impacts on built assets and infrastructure as a result of the scheme due to the minor nature of the scheme and that the main extent of the option will be located some distance away from any existing infrastructure, including residential areas.	Ensure that where/if there Is disruption to built assets and infrastructure, any closures and diversions are kept to a minimum and reinstated post-construction. Ensure best practice is implemented at all times.	-	0

M.9 COL15

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL15				
Option:	Restormel WTW				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	This option would take Restormel WTW up to its maximum licensed abstraction and enable more effective use to be made of the Colliford/ River Fowey resources system.				
Approx. Yield (Ml/d):	5				
WRZ:	Colliford				
Date Completed:	17/05/2022, updated 03/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	14/06/2022, updated 08/02/23	***Checker:***	Nicola Levy, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	---	**Construction Effects** The option is located within 5km of Breney Common and Goss & Tregoss Moors SAC, also classified as a GWDTE. The option is located within 5km of four SSSIs including Mid Cornwall Moors SSSI, classified as a GWDTE (57.38% unfavourable – recovering, 40.21% unfavourable – declining, 2.42% favourable); Redlake Meadows and Hoggs Moor SSSI, classified as a GWDTE (100% unfavourable – recovering); Boconnoc Park and Woods SSSI (52.35% unfavourable – declining, 34.2% favourable, 13.45% unfavourable – recovering) and Luxulyan Quarry (100% favourable). The option is within one SSSI Impact Risk Zone with multiple Impact Risk Zones located within 5km. The option is located just over 2km	Best practice methods to be implemented to minimise potential effects on designated sites (e.g., measures in the CEMP should be followed, pollution control measures). Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				upstream of Upper Fowey and Pont Pill MCZ. The option involves the construction of new pumps and new buildings to store the additional treatment equipment. Construction works at the WTW may cause pollution which could enter the river. However, there are no in-river works proposed therefore, effects are likely to minor and mitigatable. The HRA concluded that there were no likely significant effects from construction for the River Camel SAC (7km north), Polruan to Polpperro SAC (12km downstream) and Falmouth Bay to St. Austell Bay SPA (9.5km south and 13km downstream). This is most likely because construction works will take place within the footprint of the existing Restormel WTW. **Operational Effects** In the long term due to the nature of the option increasing maximum abstraction rates by 10Ml/d for the daily peak, the water levels downstream are likely to be reduced. This is likely to negatively impact upon aquatic ecology and biodiversity in the MCZ downstream. A shellfish classification zone is located south of the option site within the 10km boundary that could be potentially impacted by the reduction in water flow in the River Fowey. The HRA concluded that even though the site may be hydrologically connected to the option and the River Fowey via smaller upstream watercourses, there is no groundwater connectivity. Therefore, during operation the River Camel SAC will not likely have significant effects as the effects of the abstraction will only be applicable downstream of the option. The site is also sufficiently distanced from the River Camel SAC and not hydrologically connected to the option footprint. As such, there are unlikely to be	material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). Monitoring of impact of abstraction on water levels downstream of the option.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				any effects during operation. The Polruan to Polperro SAC is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody of Looe and Fowey. Increased abstraction from the River Fowey is not expected to have any significant effects on the site during operation. Whilst there is a hydrological connection, there is no direct interface between the option and the site, due to the qualifying features being on or above the cliff faces. For Falmouth Bay to Austell Bay SPA the site is hydrologically connected to the southern end of the option via the River Fowey and WFD groundwater waterbody of Looe and Fowey. The qualifying features of the site are marine specialists and will not be affected by a reduction in flow into the bay, through prey availability or water quality/quantity. As a result, no effects are anticipated during the operational phase.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	--	**Construction Effects** The option is located within 500m of Higginsmoor Wood Ancient Woodland. The existing WTW is directly adjacent to areas of deciduous woodland priority habitat. There is potential for these habitats and their associated species to be disturbed by construction dust, noise and vibrations in the short term. The construction of new infrastructure could also have negative impacts on existing aquatic and riparian habitats and species. Construction run off may deplete water quality in the nearby surface water bodies. There is potential for river wildlife and habitats to be adversely affected by this. There are no Shellfish Waters or fisheries within the option perimeters so these areas should not be affected. As construction works will take place within the existing Restormel	Areas of Ancient Woodland and deciduous woodland priority habitat should be avoided during construction to minimise disturbance. Best practices measures should be implemented where possible to minimise any impacts on biodiversity and habitats (e.g., measures in the CEMP should be followed, pollution control measures). Appropriate precautions will be taken when working in the channels of or adjacent	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				WTW site footprint, short-term effects are likely to be minor. **Operational Effects** Increased abstraction rates could potentially impact upon the flow rates of surrounding waterbodies downstream, with impacts upon subsequent connected wildlife likely to be detrimentally affected. But this is unlikely to occur due to the works only increasing abstraction at the maximum licensed and downstream sites are not anticipated to be hydrologically connected. However, the River Fowey is classified as a salmon river, and any increased abstraction has the potential to adversely affect Salmon movements within the waterbody.	to watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).		
	Reduce the spread or presence of INNS	-	0	**Construction Effects** Construction works have potential to introduce INNS through plant/equipment sharing and material movements. **Operational Effects** The capacity of existing infrastructure is increased and no new connections between waterbodies are made. Therefore, there is negligible risk of spreading INNS to adjacent priority habitats or protected sites.	Best practice and consultation of an INNS risk assessment in order to mitigate where possible. Construction sites to follow best practice biosecurity measures, including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	0	0
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option site lies in two WFD waterbodies, the Lower River Fowey (River) and Looe and Fowey (Groundwater). Construction runoff has potential to cause negative effects on these waterbodies through	Monitoring of water quality and flow rates downstream from the abstraction works should take place to assess	0	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				water contamination. The WFD Level 1 assessment concluded that during the construction phase there is potential for low effects from potential modifications to Restormel WTW involving below ground structures. **Operational Effects** The option involves the use of increased abstraction from an Environment Agency Main River and may potentially reduce the flow rate through this over time, although this is unlikely due to the abstraction rate change only being applied to the maximum abstraction rate. The option is also partially located within a Drinking Water Protected Zone, with potential to be impacted by operation of the option. This option will be contributing to WFD targets by increasing abstraction rates for water supplies within the wider catchment. The Level 1 WFD assessment concluded that during operation there is potential for moderate effects on the Lower River Fowey due to the new daily peak being outside of RAA rates. There are low effects for Lower River Fowey for maintenance and use of river outfall. There are low effects for Lower River Fowey and Looe and Fowey (Groundwater) due to presence of new underground structure.	the impact of increased abstraction. During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses. Dewatering discharge will be treated before discharge. During operation, appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). During operation, land drainage will be provided on the upgradient side of the scheme, such that the		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
					option will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow.		
	Increase resilience and reduce flood risk	--	-	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year) and Flood Zone 3 (1 in 100 year). The option is located directly adjacent to the River Fowey. There is a risk that this waterbody could flood and disrupt construction during periods of heavy rainfall. There is also potential that construction runoff could increase the risk of flooding in the short term, particularly in periods of heavy rainfall. **Operational Effects** Due to the nature of the option the increased yield abstraction is not expected to have an impact upon flood risk. The 5Ml/d yield is not expected to have an overall impact on flood risk within the catchment. The option is located within Flood Zone 2 and Flood Zone 3. There is a risk that the new buildings and pumps within the existing WTW site could be at risk from flooding during periods of heavy rainfall. Due to the distance from the coast, it is unlikely that the option will be adversely affected by sea level rise.	Measures to reduce the impacts of flooding during construction may be required, such as keeping electrical equipment and power sources above possible flood level. Monitoring of impact increased peak abstraction has on river water levels during flood events.	-	0
	Deliver reliable and resilient water supplies	-	+	**Construction Effects** Until operational the option is unlikely to increase water supplies. Water supplies may be slightly decreased	Best practice measures to be implemented to reduce time to complete any required changes to	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				during construction if changes to abstraction settings are required to increase the maximum. **Operational Effects** The option increases abstraction of the River Fowey and so should increase resilience of water supply, and aid toward the increased demand of water supply for the area Additionally, the option is likely to increase catchment resilience to drought by increasing water availability to the local population. Increased abstraction from the river may increase the catchments vulnerability to climate change impacts due to removing more water from the system, though this is unlikely. The option may also decrease the areas vulnerability to drought by increasing water availability to the local population.	increase abstraction maximum.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The SSSI of Luxulyan Quarry and Boconnoc Park & Woods are geological SSSIs. The option is located within Grade 3 Agricultural Land. Construction works are anticipated, but the quantity and quality of soils should not change. This is because construction works will take place on an existing WTW site, where soils have been previously disturbed. There is expected to be no impacts on soil health and peatland restoration. **Operational Effects** There are no present day or historical landfill sites located within 2km of the site, so these areas are not expected to experience impacts. The option could potentially decrease nutrient loading whilst operational due to the decrease in the volume of water within the	Best practices measures to be implemented where possible to keep any impacts that may arise to soils to be mitigated.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				river, but this is very unlikely. As such, effects are considered neutral.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however short-term construction may have an impact on air quality within the area. There is potential for construction dust and emissions during the construction of new buildings and pumps. This will result in a minor negative effect on air quality. **Operational Effects** It is unlikely that increased yield capacity of the option will impact upon air quality as maximum abstraction will not be occurring at all times.	Implementation of best practices measures should be used to reduce potential air quality impacts (e.g., dust suppression, pollution control measures). However, minor and temporary impacts on air quality are still likely to occur.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** The option may require the use of activities to change the maximum abstraction which could involve the use of energy dependant machinery causing the release of carbon emissions. The construction of additional WTW infrastructure will result in an increase of embodied carbon. The embodied carbon emissions (total embodied carbon from construction) for this option will be 1218tCO_2 equivalent. **Operational Effects** The option has potential for requiring increased pumping. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 132tCO_2 equivalent per annum. This	Investigate use of substitute material with lower embodied carbon and renewables to power the upgraded facilities. Decarbonisation of the National Grid will help reduce future emissions.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				assessment considers the worst-case scenario of full operation. The environmental resilience of the area may be slightly lower due to more water being abstracted from the river system.			
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** If abstraction rates are negatively impacted during construction, the rivers susceptibility to flooding during this phase may increase during a storm event. However, this is unlikely, and no short-term effects are anticipated during construction. **Operational Effects** Reductions in flow rates may also increase catchment resilience by reducing water flow in peak times of flooding. Increased abstraction may impact the effects of drought on the river which would pose a risk to the pumping station efficiency.	Monitoring of river levels during operation to assess impact of increased abstraction. Assess local area impacts of climate change and if increased abstraction is influencing the areas risk to climate change impacts.	0	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There are no Listed Buildings and Structures, Scheduled Monuments, Conservation Areas or World Heritage sites located within 500m of the option, so these historic assets should not experience short-term effects. The current WTW is adjacent to Lanhydrock Grade II* Listed Registered Park and Garden. This has potential to experience disturbance effects arising from construction dust, noise, and vibrations. Construction machinery and associated traffic may also negatively impact the visual amenity and setting of this historic asset. There are no Protected Wrecks located within 5km of the option.	Best practice mitigation should be used in order to minimise potential impacts upon local heritage. If construction activities are required, construction travel routes should be considered to avoid close proximity to heritage sites where possible, this will significantly lower potential impacts upon heritage sites. Additional baseline collection and assessment to be undertaken to	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Long term impacts upon heritage are highly likely to be neutral as maximum abstraction rate should not affect this. This means there will be no effect on public access and/or enjoyment to heritage assets. Due to the increased abstraction of the River Fowey, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.	determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located over 200m from any AONBs, and National Parks so has a low potential for significant effects. The nearest AONBs are located on the south-eastern boundary edge of 5km from the option site and over 5000m to the north-east. There are no National Parks within 5km of the site. However, there is still potential for landscape effects during construction. There may be potential for views to be interrupted from increased construction activity and equipment. The option is located on an existing site, so no additional greenfield land is expected to be required. Nearby trees and hedgerows are likely to provide some screening to construction activity, however it is likely that minor effects will remain. **Operational Effects** When operational the option should not have an impact upon the views of the landscape regarding	Best practice construction measures to minimise any adverse effects on landscape (measures in the CEMP should be followed). Mitigation measures to be considered to reduce potential noise pollution during maximum abstraction.	-	-

SEA Topic	SEA Objective	Effects				Commentary	Mitigation	Residual effects			
		ST		LT				ST		LT	
						designated sites. The option is over 500m from NCLAs with the closest being to the east of the site. The option is however located within a Historic National Landscape character area consisting of mainly enclosed Agricultural Land and recreational parks and gardens. The option will increase above ground infrastructure, however this will be contained within an existing WTW site, so it is unlikely to cause any adverse impacts. There may be an increase in noise pollution during maximum abstraction times which may have a minor impact on the area's tranquillity.					
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	-	+	**Construction Effects** There are no Important Buildings or Functional Sites within 500m of the option. There is a PRoW situated adjacent to the existing Restormel WTW, however this should not be affected as construction works will be contained within the WTW site. During the short term, there is potential for increased construction traffic on the local roads, particularly as large machinery and vehicles will need to travel to the construction site. The construction works are expected to occur within the next two years (2025). During construction, the capital expenses for the works are anticipated to be very substantial over a two-year period (2025-2026). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** Once the option is operational it is anticipated to result in moderate ongoing Opex costs from 2027, which may result in job creation or security, and enhance spending which could improve the local economy.	Best practice construction methods should be implemented to minimise effects on the health and wellbeing of the local community. Monitor impact of increased abstraction on river flow rates downstream of the abstraction works.	-	+	+	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** The scope of works is not anticipated to encroach upon any recreational land, as the WTW upgrades will be located on an existing site. However, the Lanhydrock Registered Park/Garden is located directly adjacent to the WTW site. Construction noise, dust and vibrations may negatively impact this area, which could temporarily impact its recreational users. Construction works could also temporarily increase traffic in the local area. However, effects are likely to be minor. **Operational Effects** During summer months there may be negative impacts on tourism and the local economy from the abstraction, due to potential decreases in water flows especially during drought periods. Recreational uses of the river such as sailing, paddleboarding and fishing may be negatively impacted downstream of the option due to the decrease in water flow from increased abstraction.	It is recommended that standards in the Considerate Constructors Scheme are followed to ensure best practice. Monitor impact of increased abstraction on river flow rates downstream of the abstraction works.	-	-
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** The option is located on a brownfield existing site, so no additional land take is expected. The new buildings and pumps may require the use of new resources and production of waste material. Energy consumption is expected to increase through construction vehicles and machinery. However, the effects will likely be minor. **Operational Effects** There will be increased management capacity of sludge and wastewater and so will reduce the production of those from the water system. Energy	There is an opportunity for sustainable design measures to be implemented into the scheme, including the consideration of materials with less embodied carbon. However, it is likely that some minor residual effects will remain. Investigate the use of renewable energy sources in regard of the water	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				usage may increase with the increased abstraction that requires higher levels of pumping. This energy is currently assumed to come from fossil fuel sources.	treatment works and pumping stations.		
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** No construction impacts are expected as the option will be located on an existing brownfield site and much of the surrounding area consists of fields. **Operational Effects** Once construction has been completed it is not expected that the option will have any effect on the built infrastructure in the local area. The development will take place on an existing site.	No effects on built assets are expected so no mitigation is suggested.	0	0

M.10 COL18

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL18				
Option:	Porth/Rialton				
Scheme type:	Surface Water Enhancement				
Option description:	New intake structure required at Rialton. RWPS and pipeline to Coswarth SRES site. Building new WTW at Coswarth SRES site to treat river water. To treat 6Ml/d. Connection to existing distribution system.				
Approx. Yield (Ml/d):	4				
WRZ:	Colliford				
Date Completed:	13/05/2022, updated 03/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	01/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The HRA concluded that the Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC (2km north-west at the nearest point) is hydrologically connected to the option through a groundwater waterbody, with potential for pollution effects arising from construction damaging the site's habitats and related species. However, with effective mitigation there should be no residual effects on Bristol Channel Approaches SAC. Other SACs – Breney Common & Goss and Tregoss Moors SAC and Penhale Dunes SAC are located sufficient distances away from the option so as to not be affected by any construction.	CIRIA guidance to be followed to allow for effective implementation of pollution prevention measures.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				There are no SSSI's or GWDTE within 5km of the option site. **Operational Effects** There are not expected to be any effects on designated sites during operation due to the fact that there are none within the direct vicinity of the option. The HRA AA concluded that there are not likely to be any operational effects on designated or non-designated ecological sites, mainly due to the distance of the sites from each other.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The option is located within 500m of multiple areas of deciduous woodland priority habitat, with one lying adjacent to the southern edge of the option. Whilst the footprint of the option is not expected to encroach upon this priority habitat, there is potential for the land to be required during the construction phase and so could be adversely affected during this period. There is also potential for habitat connectivity between areas of deciduous woodland within the area which should be carefully considered when any additional development takes place. There are however no Shellfish Waters or Fisheries within 500m of the option and so there is not expected to be any effects on these. The effects are minor pre mitigation but may not be completely eliminated post mitigation. **Operational Effects** It is unlikely that any additional land take will be required in the long term, and so any operational	A HRA assessment should be consulted to ensure methods of best practice are put in place.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				effects to the habitats are considered to be low. Operation of the option may also have an effect, with increased levels of water being abstracted for treatment. There are no Shellfish Waters or Fisheries located downstream and therefore no effects will be anticipated here. The option is also not anticipated to have any effect on salmon rivers. The effects are minor pre mitigation but may not be completely eliminated post mitigation			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Movement of excavated material during the construction phase may result in increased spread of INNS from different areas, and colonising sediments left exposed post-construction. There is also a small risk of construction workers introducing INNS during works on the new pipelines, although this is expected to be minimal with the following of site biosecurity practices. The effects are minor pre mitigation but may not be completely eliminated post mitigation. **Operational Effects** The INNS risk assessment concluded that operational risk of INNS would be low given that the majority of water transfer will be through a closed pipeline system, and so is highly unlikely to spread to the adjacent environment. Any transferred INNS would then be treated/removed at a water treatment facility. There is potential for risk though from pipeline washout, pipeline bursts, wash water discharge, overflows and sludge disposal. The effects are minor pre mitigation but may not be completely eliminated post mitigation.	Best practice and consultation of an INNS risk assessment in order to mitigate as much as possible. Construction sites to follow best practice biosecurity measures, Including equipment being thoroughly cleaned between locations to prevent INNS from spreading. During operation ongoing monitoring is recommended to minimise the risk of contamination and spread of INNS.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** Construction of the new intake structure, along with additional pipeline infrastructure associated with it, has potential to result in contamination of waterbodies through construction activities. The option is also partially located within a Drinking Water Protected Area, with potential for contamination effects. The WFD Level 1 screening concluded low impact on Porth Stream and North Cornwall (Groundwater waterbody) due to construction of below ground structures. There is a low impact on Porth Stream due to the new intake at Rialton WTW. There is a low impact on Porth Stream and North Cornwall waterbodies due to new WTW at Coswarth SREA site and new raw water Pumping Station at Rialton WTW. **Operational Effects** Increased water intake during operation of the option could result in a deterioration of water quality and see impacts on WFD occur. The WFD Level 1 screening concluded there is a low impact on Porth Stream and North Cornwall (Groundwater waterbody) due to presence of new underground structure. There is a low impact on Porth Stream due to new abstraction. There is a low impact on Porth Stream and North Cornwall waterbodies due to draining of pipelines for maintenance. There are potential for high impacts on Porth Stream as a result of assumed increase in abstraction. Therefore, a WFD Level 2 assessment was undertaken, which concluded possible deterioration between status classes, possible	Best practice mitigation methods should be used here to ensure residual effects will be minimised. During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impact on watercourses, wetland habitats or abstractions. Dewatering discharge will be treated before discharge. During operation, land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow. Fish and eel screening at new intake. Minimisation of changes to hydrological regime through adjustment of abstraction conditions if appropriate.	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				impediments to GES/GEP and possible compromises to water bodies for Porth Stream.			
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The main option consisting of the WTW at Rialton and Coswarth is likely to be located predominantly within Flood Zone 1, meaning that it is highly unlikely that there will be any effects on construction arising from flooding. The new RWPS is located adjacent to the River (Porth Stream), which is within both Flood Zone 2 (1 in 1000 year) and Zone 3 (1 in 100 year), and so is at risk of flooding during construction. The precise location of the new pumping station and intake is currently unknown, and so potential flood risk of this infrastructure is not certain. A river to the south of the option is also located within Flood Zone 2 and 3, and so this should be considered should the location of new infrastructure be nearby. **Operational Effects** Long-term operational impacts are likely to be low given that the current known locations of the option is majority focussed on land with very limited flood risk, which is unlikely to have any increased effect on flooding. The levels of pumping and abstraction associated with the operation of the option are fairly low though, and so are unlikely to have any impact on the flood risk of the option. Due to the northern part of the option's proximity to the coast, there is potential for the option to be affected by flooding arising from sea level rise. There are currently no known interventions to manage sea level rise or flooding within the area.	Flood risk mitigation strategies during construction should still be considered even though the main site is located within Flood Zone 1. Mitigation measures are unlikely to be required during operation as the option is unlikely to have an effect on ongoing flood risk, especially considering the fact water levels will be reduced as a result of the option. Mitigation measures for operation should however be considered, should the locations of the pumping station and intake be confirmed as within Flood Zone 2 and 3.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no construction effects are anticipated. It should be considered as to whether construction activities will be likely to interrupt any water supplies. **Operational Effects** The option is expected to provide an additional 4Ml/d of water for use within the SWW region, with the increase in abstraction likely to result in positive long-term effects on the resilience of water supplies within the area. The new WTW is likely to increase the resilience of water supplies and ensure a reliable water quality.	Consider whether any water supplies are likely to be interrupted as a result of construction, and appropriately mitigate using best practice measures.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** The option is located predominantly within Grade 3 Agricultural Land (good to moderate quality Agricultural Land), which has the ability to support a small range of crops. Construction of the pipeline extent of the option could have an adverse effect on the functionality and quality of this land with increased vehicle movements and associated construction activities. **Operational Effects** It is anticipated that most land will be remediated post-construction, as the pipeline will be underground, and so any soils impacted will be returned to their original state. Depending on the location of the new build WTW and RWPS however, there may be an increase in hard standing and therefore loss of Agricultural Land use.	Any land required for the construction phase to be reinstated following the scheme and so residual effects will be unlikely.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however short-term construction may have a minor and temporary impact on air quality within the area in terms of potential for dust and vehicle exhaust emissions. **Operational Effects** It is unlikely that the operation of the option will cause any impacts on air quality, however, it should be considered as to whether operation of the new intake, WTW, RWPS and associated infrastructure will result in an increase in emissions subsequently effecting air quality.	Best practice mitigation measures should be implemented during construction to supress any potential air quality effects	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** Notable new infrastructure, such as for the new RWPS, WTW and associated pipelines means that there is a high likelihood that there will be an increase in embodied carbon emissions. This will particularly occur during construction activities, such as use of machinery and vehicles, and from materials used in the construction. The extent of carbon associated with the option though would be determined by the materials chosen and whether measures were taken to reduce the carbon footprint of activities. The embodied carbon emissions (total embodied carbon from construction) for this option will be 9950tCO_2 equivalent. **Operational Effects**	Investigate the use of substitute materials with lower embodied carbon and use renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	--	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				It is anticipated that there could be an increase in operational carbon emissions through operation of the new RWPS and WTW. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 204tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** There is the potential that rivers subject to additional intake could be further subjected to climate related droughts, leading to risks of both interrupting ecosystems and efficiency of water resourcing/availability across the region. It is highly unlikely that increased intake of water will alleviate effects of climate related flooding though, due to the fact the yields will be fairly low.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Monitoring of the effects on river water levels where they are subjected to additional intake as part of the option.	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There is one Grade II Listed Building and structure located around 200m north of the main WTW/RWPS – a Milestone at SW 863 601. It is highly unlikely that this will be adversely affected by the option, however there is a possibility that there could be additional works to connect the site to mainline pipelines, of which one runs within approximately 2m of the Milestone. It could also be subject to additional vibration due to	Best practice mitigation measures should be implemented to minimise disruption to these sites – consider the route of the pipeline to potentially reduce effects on assets which are directly encroached upon.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				surrounding works. In the case of the new WTW at Coswarth and intake structure being constructed on Greenfield land, there is potential for previously undiscovered archaeology to be encountered. There are no additional Listed Buildings and Structures, Scheduled Monuments, Conservation Areas, World Heritage Sites or Registered Parks & Gardens and Battlefields within the proximity of the option. There are also no protected wrecks within 5km. **Operational Effects** Long-term effects are likely to be negligible, due to the fact that the proposed pipeline will be underground, and ground effected by construction should be returned to its previous condition. There is however a minimal chance that the Grade II Listed Building and Structure could be subject to ongoing damages from the construction phase. This has the potential to impact upon public access to the heritage asset, reducing understanding and significance of it within the local area. Mitigation measures are proposed to avoid these effects. Due to the increased abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.	Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		
Landscape	Conserve, protect and enhance landscape,	-	-	**Construction Effects** Whilst the option is located outside of any National Parks or AONBs there will still be effects from	Ground to be reinstated post-construction to mitigate against any residual effects.	-	-

SEA Topic	SEA Objective	Effects ST		Effects LT		Commentary	Mitigation	Residual effects ST		Residual effects LT
	townscape and seascape character and visual amenity					requirements for land excavation to accommodate the connecting pipelines and pumping stations. During construction, there may be potential for views to be interrupted by increased levels of construction activity and equipment, and local recreational land and countryside to be affected as a result of excavations and land use changes. This has the potential to cause minor negative effects during construction. **Operational Effects** There is likely to be neutral long-term operational effects, as it is expected that the ground would be reinstated post-construction. There is however likely to be significant new above ground infrastructure from the new WTW, which has potential to impact upon visual amenity for local receptors. The option is located within a Historic NCLA consisting of mainly enclosed Agricultural Land which also could be subject to visual effects from the new infrastructure.	Use best practice construction measures to reduce any impacts on landscape. Introduce shielding where possible during the construction and operational phase. Possibility of using natural shielding such as hedges or other vegetation.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	-	+	**Construction Effects** During the construction phase of the option, there will likely be an increase in construction traffic on roads surrounding the site, potentially causing delays for local residents. There could also be an increase in noise and dust as a result of increased vehicle movements and construction activity, potentially impacting locals. However, the closest main residential area to the option is around 750m west, and so effects arising from construction noise and dust is considered minimal. There are no PRoWs located within 500m therefore these areas should not be impacted by the option.	Best practice mitigation measures (including noise mitigation) to be implemented to minimise effects on population and human health	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				There is a very substantial upfront Capex cost associated with the option over the four year period from 2025 to 2028. This is likely to create employment for locals and subsequently boost the local economy. **Operational Effects** The option also has a very substantial ongoing Opex cost from 2029, which may result in job creation or security, and enhance spending which could improve the local economy. However, effects from potential noise emissions from the new intake, WTW, RWPS and associated infrastructure on surrounding receptors should be considered, and any effects mitigated.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The main scope of works is not anticipated to encroach upon any existing recreational land, with the WTW and RWPS being located on land not publicly accessible. However, connections from rivers to the site and onwards to main pipelines may encroach upon areas of recreational land and so these areas may be required to be temporarily closed to accommodate the works. Construction is unlikely to have an impact on tourism, however construction traffic levels should be kept to a minimum where possible, especially during peak tourist seasons. **Operational Effects** Due to the main WTW and RWPS being located on non-recreational land, and any associated pipelines likely to be underground, it is expected that there will	Best practice mitigation measures to be implemented to minimise effects on tourism and recreational land.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				be limited long-term effects on recreational land as any used will be returned to its existing use post-construction. However, any additional intake from rivers as part of the new intake structure may result in more significant long-term effects on recreational use associated with rivers.			
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** There is likely to be significant amounts of new material used for the new WTW, RWPS and associated main pipeline connections. There will also likely be an increase in waste excavation material and construction waste. **Operational Effects** It is unlikely that there will be any resource use and waste production during the operation of the option, meaning effects are likely to be neutral.	There is opportunity for sustainable design measures to be implemented into the scheme, including consideration of materials with less embodied carbon, and the reuse of excavated material. It is however likely that some minor negative residual effects will remain.	-	0
	Avoid negative effects on built assets and infrastructure	-	-	**Construction Effects** There is unlikely to be any effect on built assets and infrastructure due to the fact the option is located off a main road, on an area of private land. There may however be a temporary increase in construction traffic on local roads and towns, potentially resulting in delays. There may also be requirement for temporary excavations of certain roads in order to accommodate additional infrastructure for connections to main pipelines. **Operational Effects** It is unlikely that there will be long-term impacts on built assets and infrastructure as a result of the	Ensure where/if there is disruption to built assets and infrastructure, any closures and diversions are kept to a minimum and reinstated post-construction. Ensure best practice is implemented at all times.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				scheme due to the fact the main extent will be located away from existing assets.			

M.11 COL19

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL19				
Option:	Boswyn stream/Cargenwen Reservoir/Carwynnen stream				
Scheme type:	New Surface Water				
Option description:	Re-introduce abstractions at Boswyn Stream/Cargenwen Reservoir/Carwynnen Stream.				
Approx. Yield (Ml/d):	3				
WRZ:	Colliford				
Date Completed:	01/06/2022, updated 03/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	06/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	-	**Construction Effects** There are no GWDTE within 5km of the option. The option is located over 5km from any SACs or cSACs, SPA or pSPA and Ramsar sites. The HRA concluded that there were no likely significant effects for Dynesfeydd Mor Hafren SAC (7km north) as there is sufficient distance from the proposed works, and it is only hydrologically connected to the option footprint via the marine environment. For Tregonning Hill SAC (6.5km south-west), the HRA concluded that although the site is connected via a WFD groundwater waterbody of West Cornwall, the site is also sufficient distance from the works so there is unlikely to be effects during construction or operation.	Best practice construction mitigation measures should be implemented to minimise the impact on SSSIs. (e.g. follow measures outlined in the CEMP, pollution control measures). CIRIA guidance should be followed to allow for effective pollution prevention measures to be implemented. Ongoing monitoring is recommended during	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The option is located within 5km of West Cornwall Bryophytes SSSI (68% - favourable, 32% unfavourable – recovering) but none of the sites within the option are anticipated to impact the conservation status of the SSSI. Due to the abstraction points being reinstated and only requiring minor infrastructure, the impact upon the biodiversity is reduced. At Boswyn Stream the option site is expected to directly impact SSSI Risk Zones by construction with the commission of minor works expected to reinstate abstraction point at the south-east corner of the Boswyn Reservoir. At Cargenwen Reservoir, two SSSI Risk Zones are anticipated to be directly impacted by the recommission of abstraction points and new WTW. At Carwynnen Stream a SSSI Risk Zone is anticipated to be directly impacted on the option site. The option will not impact upon any MCZ or MPA. The option is over 5km from an LNR or NNR so has low potential for direct or indirect effects. Overall, a precautionary minor negative impact has been identified. **Operational Effects** The construction of a new WTW may have long-term impacts upon the SSSI Risk Zones directly impacted by the option site at Cargenwen Reservoir. Changes in water flow at Boswyn Stream and Carwynnen Stream due to recommissioning of abstraction points may negatively impact habitat connectivity and potential conservation status of the site in the long term.	operation to ensure no harm is caused during abstraction.		
	Protect, conserve and enhance biodiversity,	-	-	**Construction Effects** The option is located over 500m from an Ancient Woodland so has low potential for effects. The option	Best practice mitigation measures to be implemented to suppress	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	including priority species, vulnerable habitats and habitat connectivity			directly encroaches upon multiple areas of priority habitat including deciduous woodland with areas of purple moor grass and rush pastures, lowland heathland Calaminarian within 5km of the site. Increased construction vehicle movements are likely to produce dust and noise pollution that will negatively impact biodiversity on the option sites. At Boswyn Stream woodland to the south-east of the option site within the 500m boundary is expected to be directly impacted. At Cargenwen Reservoir woodland and deciduous woodland is expected to be directly impacted by the option on the north and east of the reservoir. At Carwynnen Stream a large proportion of the option site is deciduous woodland and will be directly impacted by the recommissioning of abstraction points. **Operational Effects** The recommissioning of abstraction points at Boswyn Stream is likely to alter flow rates and thus could negatively impact woodland habitat on site. During operation at Cargenwen Reservoir, deciduous woodland to the east of the option could be impacted by abstraction and the new WTW works, with changes in water flow likely. Recommissioning of the abstraction points at Carwynnen Stream could alter flow rates at the site and thus could impact habitat connectivity. The option overall could have effects upon aquatic ecology. The option is not anticipated to have any effect on salmon rivers, due to the fact there are no salmon rivers in proximity to the option.	potential impacts on priority habitats. Avoid habitat loss where possible and if not possible, reinstate or compensate losses. Risk assessments will be undertaken for excavation works to ensure no adverse impact on watercourses and wetland habitats.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Minor infrastructure development to recommission abstraction points at Boswyn Stream and Carwynnen Stream may increase the risk of INNS spreading due to the potential movement of excavated material. At Cargenwen Reservoir, the construction of new a WTW may involve movement of excavated material and could result in increased risk of INNS as well as colonising of sediments left post-construction. **Operational Effects** The INNS risk assessment concluded that the frequency risk was regular, but the severity and overall risk were low for the physical transfer of untreated water between two points that were previously unconnected. Assumption that INNS would be removed at WTW. However, there is additional risk of spread from pipeline washout, pipeline bursts, washwater discharge, overflows and sludge disposal. There is a low risk that changes in flow rate could change habitat suitability for any INNS present which could facilitate further spread due to hydrological connections present.	Best practice mitigation measures are to be implemented and the consultation of an INNS risk assessment. Construction sites to follow best practice biosecurity measures, Including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	-	-
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is located within a small area of Groundwater Source Protection Zone 2 (outer protection zone) and Zone 1 (inner protection zone) to the south of the option and has potential for effects. The option is also located in The Hayle Nitrate Vulnerable Zone with potential for effects and is also located in the WFD River Waterbody Catchment Cycle	Best practice mitigation measures to be implemented to minimise potential impacts arising from construction activities. Monitoring impact of reintroduction of abstraction	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				1 and 2. There is the potential for reduced water flows downstream of Boswyn Stream and Carwynnen Stream due to the recommissioning of abstraction points. Within 5km of the site at Boswyn Stream there is a Zone 2 Outer Protection Zone. At Cargenwen Reservoir the option directly impacts upon WFD Groundwater Body of West Cornwall. There are no Shellfish Classification Zones or Bathing Waters within 5km of the option. The WFD Level 1 assessment concluded that the construction of the new WTW at Cargenwen reservoir could involve new below ground structures with a potential for low effects on West Cornwall (Groundwater). The modifications of the three existing intakes poses a low potential for effects at Roseworthy Stream and Cargenwyn Reservoir. **Operational Effects** Increased abstraction could result in the reduction of water quality, which could have a substantial impact given the fact the option is located within a Drinking Water Protected Area. The WFD Level 1 assessment concluded that there is a potential for high effects from the new abstraction licence effecting West Cornwall waterbody and Cargenwyn Reservoir. There is potential for low impacts to West Cornwall waterbody due to presence of new underground structure. There is potential for low impacts on Cargenwyn Reservoir due to maintenance and use of river intakes/outfalls. Further WFD assessment is required.	at the three sites on water quality. During construction, risk assessments will be undertaken for excavation works and dewatering to ensure no adverse impacts on watercourses. Dewatering discharge will be treated before discharge. During operation, land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk. This drainage will be discharged into local watercourses to maintain flow. Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
					Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). Undertake WFD Level 2 Assessment.		
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The option at Carwynnen Stream is located within small areas of Flood Zone 2 (1 in 1000 year) and Zone 3 (1 in 100 year) and therefore there is potential for flood risk during construction. Trenching and laying of pipelines involving watercourse crossings is likely to have a neutral impact upon groundwater flood risk and resilience. The other sites are within Flood Zone 1 therefore at low risk of flooding. **Operational Effects** The option is likely to reduce water flows downstream at Bosywyn Stream and Carwynnen Stream from the increased abstraction, with reductions in water at Carwgenwen Reservoir. However, this is unlikely to have an impact on flood risk due to the volume of yields being abstracted. These will likely increase the resilience to floods by increasing water storage potential. Given the fact the option is located a distance away from the coast, it is unlikely to be subject to flood risk associated with sea level rise.	Flood risk mitigation measures should be implemented during the construction phase on the Carwynnen Stream, this will be in the form of land drainage on the upgradient side of the scheme so there is no increase in groundwater flood risk. Appropriate precautions will be taken when working in the channels of or adjacent to watercourses, providing new culverts and or extending culverts, if required, to appropriately manage flood risk. Flood risk assessment will be carried out to ensure that new in channel features will not adversely impact on flood risk.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until the option is operational it is unlikely to result in any impact upon water supplies in the short term, so no impacts are anticipated. **Operational Effects** Once operational the option is expected to produce a yield of 3Ml/d for additional water provisions resulting in a positive impact for the resilience of supplies.	Best practice mitigation measures to be implemented to reduce potential impact of construction on raw water quality.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The options are located within Grade 3 and Grade 4 Agricultural Land. Recommissioning of abstraction points at Boswyn Stream and Carwynnen Stream may negatively impact soils due to increases in vehicle movement during the construction phase although this is likely to be minor. The option sites are located over 500m from an Authorised Landfill Site therefore low potential for effects. At Cargenwen Reservoir to the west of the site, within the 2km, there is a Historic Landfill Site, however no effects are likely given the distance. The option is unlikely to involve the permanent loss of Agricultural Land due to the location of the site and the close proximity to the road. **Operational Effects** Once operational it is not expected that the option will have any significant long-term effects on soil due to the nature and location of the options.	Excavated material to be reinstated where possible to minimise potential impact on soils. Best practice mitigation measures should be implemented to reduce potential impacts on soils	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within 500m of any AQMAs. Minor works will be required to recommission existing extraction points at all three sites with an increase in construction traffic and other construction related activities which will result in increased air emissions and dust. **Operational Effects** Once operational the option is likely to have a neutral impact upon air quality in the area.	Best practice mitigation measures should be implemented to suppress potential air quality impacts where possible.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** Recommissioning of abstraction points and the new WTW at Cargenwen Reservoir will require new infrastructure and construction works, resulting in embodied carbon. **Operational Effects** The increased levels of pumping and abstraction will result in increased levels of operational carbon from the option sites.	Consider use of renewable to power pumping facilities. Decarbonisation of the National Grid will likely help to mitigate against future carbon emissions.	-	-
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are currently no climate resilience measures in place relating to the construction phase of the option. **Operational Effects**	Monitoring of the impact increased abstraction has upon the local environment.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The option involves the abstraction of water out of the natural environment, this is likely to negatively affect the local environment through reduction in flows. This could reduce the resilience of the local environment to climate change, and in particular drought events.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There is one Grade II Listed Building within 500m of the Boswyn Stream site to the north-east. There are no listed buildings within 500m of Cargenwen Reservoir. At Carwynnen Stream there are five Grade II Listed Buildings within 500m of the option site which may be negatively impacted by construction works as a result of increased vibration from construction activities and vehicle movements. Although, these are only likely to be minor due to the nature of the works being recommissioning a pre-existing abstraction point. There are no Protected Wrecks, Registered Parks and Gardens, Conservation Areas, Scheduled Monuments or World Heritage Sites within 500m of the site at Boswyn Stream, Cargenwen Reservoir and Caarwynnen Stream. The excavation works have the potential to impact archaelogy during the construction phase. **Operational Effects** Long-term effects on historic assets are not expected due to the nature of the works including recommissioning of pre-existing abstraction points. The new WTW is not anticipated to require significant long-term upkeep and so is unlikely to negatively impact historic assets in the area. This means there is unlikely to be any enhancement or improvement on	Best practice mitigation measures are to be implemented to minimise the potential for effects on historic sites, with consideration given to haulage routes to sites. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				public access and/or enjoyment to the heritage assets in the area. Due to increased abstraction of the Boswyn Stream and Carwynnen Stream, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** All the sites within the option are located over 500m from any AONBs or National Parks. At Cargenwen Reservoir there is going to be a new WTW which would result in a new above ground infrastructure, although this is likely to replace the old WTW so the land use is not changing significantly. Construction of WTW likely to include increase vehicle movement and construction activities that may negatively impact tranquillity of the area in the short term. All of the option sites are located within the NLCA of Carnmenellis. **Operational Effects** Recommissioning of pre-existing abstraction points are likely to a have a neutral effect on the surrounding landscape. The option is located within a Historic NLCA consisting of mainly enclosed Agricultural Land. However, as there will no significant above ground infrastructure, it is unlikely that this will be adversely affected.	Ground to be reinstated where possible to minimise residual effects. Screening to be implemented to reduce effects of option on landscape.	-	0

SEA Topic	SEA Objective	Effects				Commentary	Mitigation	Residual effects		
		ST		LT				ST		LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	-	+	**Construction Effects** The option sites are located within IMD rank 4. There are no important buildings located within 500m of the option sites. Recommissioning of abstraction points has the potential to require infrastructure development and so will increase vehicle movements on access roads around the site. As such, there is potential for disturbance effects to the local community. There are PRoWs located adjacent to Cargenwen Reservoir. During construction of the new WTW, these may be closed off, creating accessibility issues for the public. Carwynnen Stream is located within 500m of the Registered Common Land and Open Access Area of Pendarves Woods to the north and east of the option site. The construction works are expected to occur within the next two years (2025). During construction, the capital expenses for the works are anticipated to be very substantial over a two year period (2025 to 2026). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** There is not expected to be significant long-term negative effects of the option on local communities. Once the option is operational it is anticipated to result in moderate ongoing Opex costs from 2027, which may result in job creation or security.	Ensure vehicle traffic is kept to a minimum where possible, and consideration is given to haulage routes and peak times during construction. Further assessments on long-term water flow impacts.	-	+	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** During the construction phase Open Access Land to the north and east of the site at Carwynnen Stream may have to be closed off to ensure public safety, but the works are not anticipated to have a direct impact this area. **Operational Effects** Once operational changes in water flows could negatively impact upon tourism and recreational activities downstream including fishing and paddleboarding.	Monitoring effect of increased abstraction on watercourses downstream of works.	-	-
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option is recommissioning existing abstraction points and so is reusing existing infrastructure rather than developing new ones, although minor improvements may be required. Any land that is excavated for the new WTW will likely be reinstated. **Operational Effects** Once operational the option is likely to have minimal effect on resource use in the long term and is unlikely to be a producer of waste so is likely to have neutral impacts.	There is opportunity for sustainable design measures to be implemented into the scheme, including the consideration of materials with less embodied carbon, and the reuse of excavated material. It is however likely that some residual effects will remain.	-	0
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** The option will require minor infrastructure upgrades and so is likely to involve increases in vehicle movements within and around the site. Including construction plant and equipment that will be used	Use best practice mitigation measures where possible to minimise the impact on built infrastructure including road traffic.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				during the recommissioning of the abstraction points. along access roads to site. However, due to the scope and scale of works with appropriate mitigation any damage to the existing assets and infrastructure is likely to be minor and cause neutral effects. **Operational Effects** In the long term the option is not expected to influence built assets and infrastructure due to the nature of the option.			

M.12 COL20

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	COL20				
Option:	River Fal new abstraction				
Scheme type:	New Surface Water				
Option description:	New abstraction on the River Fal near Ruan Lanihorne. New intake, onsite WTW and connection to distribution system				
Approx. Yield (Ml/d):	25				
WRZ:	Colliford				
Date Completed:	23/05/2022, updated 03/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	06/07/2022, updated 08/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	30/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	--	**Construction Effects** The HRA AA concluded that Fal & Helford SAC (4.5km downstream) is hydrologically connected to the option via the River Fal and WFD groundwater waterbody of South Cornwall. Any pollution events may be transferred to the site and impact qualifying features; damage or degradation to habitats or shore dock may be significant. However, with mitigation measures implemented the effect of this is likely to be minor. For Falmouth Bay to Austell SAC (12.8km downstream), the HRA identified that there are no likely significant effects even though the site is hydrologically connected via the River Fal and WFD groundwater waterbody of South Cornwall. Any pollution events	Best practice mitigation measures should be put in place to minimise impacts upon SSSIs and SACs where possible. CEMP should be put in place during construction. CIRIA guidance to be implemented to allow for effective pollution control measures.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				may be transferred to the site and impact qualifying features foraging areas, however, considering the distance from the site of the option, adverse effects are not anticipated to be significant. The HRA AA concluded no adverse effects on the habitat sites listed above as long as CIRIA guidance is followed. Pollution of the water environment is the only potential impact pathway to these habitat sites during the construction phase. Cuckoo Rock to Turbot Point SSSI (100% favorable) and is located on the south-east 5km boundary. Gerrans Bay to Camels Cove SSSI (63.44% unfavorable – recovering and 36.56% favorable), Malpas Estuary SSSI and GWDTE (98% favorable, 2% unfavourable – no change) is also located within 5km. These sites have potential for minor indirect impacts during the construction phase. Upper Fal Estuary & Woods SSSI (72% favorable, 28% unfavorable – recovering) and GWDTE is located 2.3km west of the site at the nearest point. With construction mitigation measures implemented effectively the effects are likely to be minor, due to this factor and the combination of being sufficiently distance from the option site. To the south-eastern tip of the 5km boundary there is Falmouth Bay to St Austell Bay MPA with impacts upon this unlikely. There are no LNR or NNR within 10km of the site so unlikely to experience effects either directly or indirectly. There are no Marine Conservation Zones within 10km of the site. **Operational Effects** In the long term the Upper Fal Estuary and Woods SSSI and Fal and Helford SAC is unlikely to be impacted by decreased river flow rates occurring as a			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				result of the increased abstraction from the works. Further SSSIs and SPAs located within 5km of the site are unlikely to be affected in the long term. The HRA AA concluded that during operation, the reduced flow into the site from the River Fal is not anticipated to have a significant effect on the qualifying features of the Fal and Helford SAC. For Falmouth Bay SAC during operation there are not expected to be any likely significant effects as the qualifying features are marine specialists and will not be impacted by reduced flows into the bay.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	**Construction Effects** The option directly encroaches upon multiple areas of priority habitat with Lamorran Wood Ancient Woodland and Ruan Lanihorne Ancient Woodland, these will likely be permanently lost as construction of the WTW is likely to place directly upon these areas. These will also be affected by noise and dust emissions from construction works. Potential habitat loss from works associated with the increase in pipeline capacity is likely. **Operational Effects** There is potentially long-term impacts upon biodiversity with potential losses in habitat connectivity due to increased abstraction rates resulting in lower flow rates with the option site. The option is not anticipated to have any effect on salmon rivers.	Where possible priority habitats should be avoided to minimise effects. Best practice measures to be implemented to reduce disturbance and impact upon habitats within local area. Appropriate precautions will be taken when working in the channels of watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
					Pollution; PPG5: Works and maintenance in or near water).		
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Excavating of materials is likely to increase the risk of INNS across the area, colonising of sediments post-construction from exposed sediments may occur. **Operational Effects** The INNS risk assessment concluded that the physical transfer of untreated water between two previously unconnected locations was a risk, however it is assumed that any transferred INNS would be removed at the WTW. There were additional risks from pipeline washout, pipeline bursts, wash water discharge, overflows and sludge disposal. Reduced water flows downstream of the abstraction points at the River Fal could lead to a low risk of changes to habitat suitability for any INNS present which could facilitate further spread as receptor is hydrologically connected to other waterbodies. The frequency of this ranked as a regular risk but the overall severity and risk was very low. This is because the water will be treated at the source so there is negligible risk of spreading INNS to adjacent protected sites and priority habitats.	Best practice measures should be implemented to prevent the occurrence of INNS. Construction sites to follow best practice biosecurity measures, Including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	-	-
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The Nitrate Vulnerable Zone for the option site is Truro, Tesillian and Falmouth with potential for effects. Water from new sources may be of varying levels of quality and mineral makeup so may require treatment. Shellfish Water Protected Areas will not be affected by	Best practice measures should be used in order to reduce the residual effects of the option. Risk assessments will be undertaken for excavation	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				the option. WFD River Waterbody Catchments Cycle 2 will be directly impacted by the option site with the lower River Fal. The site is located in a WFD Groundwater Bodies Cycle 2 of South Cornwall. There is the potential for dust emissions to impact water features and other aspects of the water environment. No bathing waters are located within 5km of the site, and bathing waters within the 10km boundary are unlikely to be affected. The option is also not located within any Drinking Water Protected Areas. The WFD Level 1 assessment concluded that during the construction phase there is a potential for low effects from the construction of the new WTW requiring below ground infrastructure effecting Lower River Fal, South Cornwall groundwater, Tresillian River (Upper and Lower) and Brighton Stream. The new intake at the River Fal also has potential for low level effects on the Lower River Fal. Further WFD assessment is not required for construction effects. **Operational Effects** The new intake would be taking place on the Lower River Fal, designated an Environment Agency Main River. During operation the quantity of groundwater and surface water may be detrimentally affected due to increased abstraction. In turn this may also result in a decrease in the quality of both surface and ground water. The WFD Level 1 assessment concluded that during the operational phase the presence of a new below ground structure has potential for low effects on Lower River Fal, South Cornwall groundwater, Tresillian River (Upper and Lower) and Brighton Stream. The new intake at the Lower River Fal has	works and dewatering to ensure no adverse impact on watercourses, wetland habitat or abstractions. Dewatering will be treated before discharge. For Lower River Fal, fish and eel screening at all new intakes and minimisation of changes to hydrological regime through adjustment of abstraction conditions should be implemented.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				potential for significant effects due to the new abstraction licence. Therefore, a WFD Level 2 assessment was undertaken, which concluded possible deterioration between status classes, possible impediments to GES/GEP and possible compromises of water body objectives for Lower River Fal.			
	Increase resilience and reduce flood risk	-	+	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000 year risk) and 3 (1 in 100 year risk) so is potentially at risk to effects of flooding during the construction phase. Environment Agency Flood Defences are in place along various routes of the river and but are unlikely to be affected by the new intake and WTW. **Operational Effects** As the new WTW will be located in both Flood Zone 2 and 3 there is potential for risk during the operational phase. The increased abstraction from the river may potentially reduce flow rates downstream. However, this is unlikely to decrease flood risk within this section of the catchment due to the volume of water involved. Land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in surface water flood risk. This drainage will be discharged into local watercourses to maintain flow. Given the fact the option is located over 5km from the coast, it is unlikely to be subject to flood risk associated with sea level rise.	Flood risk mitigation strategies during construction should be considered. Flood risk assessment will be carried out to ensure that new in channel features will not adversely impact on flood risk. Best practice construction measures should be put in place to reduce the potential for water quality to be affected during the construction phase.	-	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational the option is unlikely to improve reliability or resilience of water supplies to users in the local area. **Operational Effects** Additional water will be available due to the introduction of new WTW and abstraction. The option would be providing an influx of freshwater that has been treated and to be used by the local community.	Best practice mitigation measures to be implemented to maintain quality of raw water.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** The option is located over 200m from an Authorised Landfill Site and does not intersect any Historic Landfill Sites thus resulting in low potential for effects. It is also located in Grade 3 Agricultural Land (low to moderate quality soil). The option will not improve soil health due to land take that will be needed for the infrastructure development. **Operational Effects** The option is has the potential to result in permanent loss of Agricultural Land due to the construction of the new WTW. However, following mitigation and the reinstatement of excavated material there is unlikely to be any long-term impacts on soil.	Reinstating excavated material on Agricultural Land should mitigate any residual long-term effects of the option.	-	0
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. The option may affect local air quality in the short term due	Best practice mitigation measures should be put in place during the construction phase to	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				to the construction activity, generating increased dust and emissions. **Operational Effects** Once operational it is unlikely that option will require actions that result in significant air quality impacts.	minimise the potential effects on air quality.		
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** The option is expected to require new infrastructure associated with the new WTW. New infrastructure is likely to include a new intake, pipeline and pumping station. The Carbon Costing identified four potential options including two of which involve constructing a 300mm rising main pipeline and two of which involve constructing a 400mm rising main pipeline. The worst case option's embodied carbon emissions (total embodied carbon from construction) will be 9781 tCO_2 equivalent per annum. This option involves constructing a 400mm rising main to Summercourt. **Operational Effects** A substantial increase in infrastructure in the form of an abstraction and pumping stations is expected. There are four options proposed, two of which involve constructing a 300mm rising main pipeline and two of which involve constructing a 300mm rising main pipeline. If the worst-case option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 931tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. If the worst-case option	Investigate the use of substitute materials with lower embodied carbon and use renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				operated under a maximum utilisation scenario, operational carbon emissions will be 2127tCO_2 equivalent per annum. If Option 1 operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 880 tCO_2 equivalent per annum. If Option 2 operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 743tCO_2 equivalent per annum. If Option3 operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 931tCO_2 equivalent per annum. If Option 4 operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 789tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** There are no climate resilience measures in place currently for the option. **Operational Effects** The increased abstraction of water from the river system through this option, is unlikely to reduce the climate change related risks to the area in regard to flood risk. This is because the volumes involved within the option are unlikely to have a large-scale impact across the water environment to affect flood risk. However, there is a risk that this option could impact	Implement best practice measures where possible to reduce the potential of impacts arising from climate change in the local area. Monitoring of the river levels before, during and after construction of the abstraction works to assess changes to the river levels.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				climate related drought in the river by the removal of water, potentially further impacting the local ecosystem.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	-	**Construction Effects** Two Listed Buildings Grade II are located within the site and are directly impacted. These are Ruan Cottage which is located on the south of the River Fal and is likely to be affected by dust and vibration emissions, though is separated from construction works by the River Fal. Tregony Bridge is also located on site and would be to the east of the proposed WTW and new intake with similar impacts from dust and vibrations likely to occur. The setting of the buildings within 500m of the indicative boundary have potential to be affected. Within 500m of the site there are 21 Listed Buildings Grade II. These have the potential to be impacted by dust emissions and vibrations from construction vehicles. There is one Registered Park and Garden to the west of the site within the 2km boundary and one to the north within the 5km boundary. There is one Scheduled Monument to the north-east of the site within the 2km boundary and one north of the site, both with low potential for impacts. Tregony Conservation Area is also located within 500m. There are no Registered Battlefields or Protected Wrecks within 5km of the site. There is potential for uncovered archaeological to be damaged during excavation phase to support increased pipeline capacity. **Operational Effects**	Best practice mitigation measures should be implemented to minimise disruption to heritage sites. Haulage routes should be considered to minimise potential dust pollution and vibrations on the local area. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Once operational there may be requirement for minor management and maintenance, however this should not result in impacts upon local heritage. Ruan Cottage is located on the south of the River Fal with the new WTW to be constructed to the north of the River Fal and so is unlikely to cause long-term impacts. Pipeline connections will be located underground, and above ground infrastructure is highly unlikely to cause impacts to Grade II Listed Buildings within 500m of the site. This also means there is unlikely to be any significant enhancement tor improvement on public access and/or enjoyment to heritage assets. Due to the increased abstraction of the River Fal, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	--	--	**Construction Effects** The option directly encroaches upon the Cornwall AONB, however it is located over 200m from any National Parks. There is potential for short-term impacts on landscape during the construction phase. During construction local residents will likely have views and tranquillity disrupted by construction traffic and activities. **Operational Effects** The option is likely to have moderate negative impacts upon the landscape due to the new WTW being located within Cornwall AONB. The setting of this will	Excavated material will need to be reinstated where possible, but residual effects to remain. Screening to be implemented to reduce impacts that arise from associated construction of new WTW.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				result in new above ground infrastructure which will permanently impact the landscape. The option is located within a Historic National Landscape character area consisting of mainly enclosed Agricultural Land, which will be likely to experience similar effects.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	- +	+	**Construction Effects** Significant infrastructure is required and thus will result in an increased volume of traffic in the local region. The option does not have a national cycle network within 2km of the site, but increased traffic congestion may impact upon active lifestyles such as disruption to local cycle routes and PRoW. There are sections of PRoW, including bridleway, within 500m of the construction site which may experience these disruption effects. There is also a school to the north-east of the site that may also be influenced by the traffic congestion during peak times. Dust and noise emissions are likely to be more prominent due to increased construction vehicle movement resulting in disturbance effects on the local community. The construction works are expected to occur within the next two years (2025). During construction, the capital expense for the works are anticipated to be very substantial for the first 5 years. **Operational Effects** Once the option is operational it is anticipated to result in very substantial ongoing Opex costs from 2030, which may result in job creation or security, and enhance spending which could improve the local economy.	Diversion routes should be carefully considered to minimise disruption to road users. Best practice measures should be considered in respect of vehicle transport and construction works to minimise effects on local residents.	- +	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** There is no recreational land likely to be affected by the option. Traffic disruption may negatively impact upon recreation and tourism activities in the area during peak times. **Operational Effects** The increased level of abstraction is likely to reduce flow rate within the river and could impact upon recreational uses downstream including fishing, canoeing and paddleboarding.	Monitoring of river levels is required to assess the impact of increased abstraction on the watercourse. Diversion routes should be carefully considered to minimise disruption to road users. Best practice measures should be considered in respect of vehicle transport and construction works to minimise effects on local residents and tourists.	-	-
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option will require significant new material but where possible will reuse excavated materials and other materials to minimise resource use and waste production. **Operational Effects** There is unlikely to be any significant long-term effects on built infrastructure and assets as new pipelines will be located underground.	Opportunity for sustainable design measures to be implemented, through the re-use of materials with lower levels of embodied carbon.	-	0
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** The option site is already directly in contact with SWW pipelines but the route of the pipelines cross major roads and may require excavation. This has the potential to result in road closures and diversions	Post-construction all road infrastructure that has been excavated needs to be reinstated. Ensure best practice is used at all times. Ensure road closures and	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				during the construction phase. During construction the option should have no impact upon railways. **Operational Effects** In the long term it is not expected that there will be a significant effect on local infrastructure and material assets, due to piping networks being located underground and abstraction works not requiring further enhancement once constructed.	diversions are kept to a minimum.		

N. Roadford WRZ SEA Assessment

MOTT MACDONALD

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix N: Roadford Options Assessment

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessments (SEA) Environment Report		
Our reference:	100107117-MMD-RP-SEA-019-A	**Rev**	B
Prepared by:	Georgina Luck	**Date:**	08/02/23
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environment Report Appendix N: Roadford WRZ - SEA Options Assessments		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water Draft WRMP24 SEA Environmental Report (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, scoring criteria and definitions, and abbreviations for these assessments.

It is acknowledged that Roadford supply side options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported. The following Options Assessments are for the Roadford Water Resources Zone (WRZ). Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS
++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species

		Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

Roadford Water Resources Zone (WRZ)

The below Option Assessment Matrices cover the following draft WRMP24 options for Roadford WRZ:

- ROA2
- ROA3
- ROA4
- ROA6
- ROA7
- R0A8
- ROA9

- ROA10
- ROA11
- ROA12
- ROA13
- ROA14
- ROA15
- ROA16

N.1 ROA2

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA2				
Option:	River Erme				
Scheme type:	Surface Water Enhancement				
Option description:	Direct River Abstraction of the River Erme and new pumping station and addition pipework. Two possible locations have been proposed, Option ROA2a is situated within arable farmland whereas Option ROA2b is proposed within the existing Ivybridge STW. Relocate the intake, update the River Erme licence and new pumping station.				
Approx. Yield (Ml/d):	1.5				
WRZ:	Roadford				
Date Completed:	12/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	14/06/22, updated 09/02/23	***Checker:***	Katharine Mason, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	--	**Construction Effects** There are two proposed locations for the option including ROA2a and ROA2b which are situated approximately 3.1km and 3.6km north from The Erme Estuary SSSI respectively and are located within three SSSI Impact Risk Zones. The Erme Estuary is identified as a GWDTE and is designated for its international importance for wintering wildfowl and waders and rare species of Exminster Marshes, with	Best practice mitigation measures should be followed to minimise the impact on River Erme, including review of equipment and methodologies, designated refuelling spots, dust suppression, review of vehicle movements	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				sandbanks and mudflats supporting nationally significant populations of invertebrates (87.5% favourable condition, 4.8% unfavourable – recovering condition and 7.7% unfavourable – no change condition). There are no other designated ecological sites located within 5km of the option and the option does not encroach upon any NNR or LNR. The HRA concluded that although Start Point to Plymouth Sound & Eddystone SAC (7.5km downstream) and Dartmoor SAC (6km north) are hydrologically connected via the WFD groundwater body of Teign, Avon, Dart and Erme. They are sufficiently distant from the proposed works, that no likely significant effects are anticipated in the construction phase. Plymouth Sound & Estuaries SAC (8km south-west) is sufficiently distant from the proposed works and not hydrologically connected to the option footprint and so is unlikely to have any effects during the construction phase. It is currently unknown if new pipework is required between the new intake and existing pipework. However, there is potential for temporary minor effects on ecological sites as a result of construction activities from increased vehicle movements, noise and vibration, potential for contamination to ground and surface water and generation of dust and increased emissions. **Operational Effects** The option is likely to result in an increased abstraction from the River Erme by 1.5Ml/d, resulting in reduced flow downstream and changes in habitat and water quality which could have a knock-on effects to fish and other ecology within the River Erme. In the long term it	including personnel and deliveries and the use of equipment with lower noise levels.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				is not anticipated that there will be an effect on the River Erme Estuary SSSI noting the distance from the option. The HRA concluded that due to the distance for Start Point to Plymouth Sound & Eddystone SAC (7.5km downstream), no effects are anticipated during operation. The qualifying feature of the site is a marine component and is therefore not dependent on freshwater provision. Dartmoor SAC (6km north) is not expected to experience effects due to distance. Plymouth Sound & Estuaries SAC (8km south-west) is sufficiently distant from the proposed works and not hydrologically connected to the option footprint and so is unlikely to have any effects during the operational phase.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	---	---	**Construction Effects** There are two proposed locations as part of the option, both of which are located adjacent to multiple areas of deciduous woodland priority habitat, which directly encroach Option ROA2b. The Wadland and Ermington Woodland, Ancient Woodland is located directly to the west of ROA2b and within 600m from ROA2a. The exact location of the intake on the River Erme, new pumping station and pipeline is to be confirmed, however it will either be within the existing SWT (ROA2b) or within an area of unmade ground consisting of Grade 3 Agricultural Land. The installation of the new intake is likely to require minor construction activities including the use of a drilling rig. There is potential for construction effects including de-stabilisation of the banks of the River Erme resulting in increased sedimentation and the disturbance to local aquatic and terrestrial species.	Areas of deciduous woodland situated along the riverbank should be avoided as potential locations of the new intake to minimise disturbance. Best practice methods for the installation of the new intake point should be implemented to minimise the disturbance of local species and habitats as far as practicable. Due to the nature of the works there should be limited opportunity to enhance the existing biodiversity.	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Additional pipework to connect with existing network could result in the removal of woodland. The construction of the new pumping station is likely to result in short-term disruption to species with the temporary loss of habitats and food sources. There is also potential for construction works to interact with priority habitats and green networks along the river edge as a result of increased vehicle movements and pollution including the risk of contamination, increased noise and vibration, release of dust and increased emissions. **Operational Effects** It is assumed that the new intake and pumping station will tie into the existing pipework, however additional connection maybe required. Whilst both options pose the risk of long-term loss of habitats, Option ROA2a offers the greatest potential for negative impacts as the new pumping station within an area of Greenfield compared to Option ROA2b, which is proposed within the existing hardstanding of the STW. As part of the Option there is the potential for long-term effects on the quality of the existing habitats including the Erme Estuary as a result of the increased abstraction and reduced flows downstream. The option involves abstraction from the River Erme, which is classified as a salmon river. There is potential for salmon movements to be interrupted during the operation of the option and its abstraction of the River. Further NCA and BNG assessments have been scoped out due to the current available spatial information. It is identified that ROA2a is located within an area of Greenfield, encroached by areas of priority	The following best practice mitigation measures should be adhered to during construction including: Providing designated refuelling spots; Dust suppression; Review of vehicle movements including personnel and deliveries; and – Prioritise the use of equipment with lower noise levels. During operation, ongoing review of the abstraction limits and water quality should be undertaken.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				habitat that maybe lost in the long term. Therefore, following option development further assessment maybe required.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Rhododendron's and laurel are a non-native invasive species present along the banks of the river. The INNS assessment concluded that, during construction, there is the risk of increased spread of INNS due to the movement of excavated material and tracking plant and equipment. There is also a small risk of construction workers introducing INNS during any works on the intake on the River Erme, although this is expected to be minimal as a result of following site biosecurity practices. **Operational Effects** The option is likely to result in the physical transfer of untreated water (between two locations which have been assumed as not previously connected). The INNS assessment, however, assumed that any transfer of INNS would be treated and removed from the water during treatment. There is additional risk from the pipeline washout, pipeline burst, wash-water discharge and sludge disposal which could result in the spread of INNS during operation. Further risks are associated with the reduced water flows downstream of the abstraction points at the River Erme. There is a low risk that the reduced flow could change the habitat suitability of any INNS present which could facilitate further spread as receptors are hydrologically connected for both proposed Options.	Best practice methods to be implemented to minimise disturbance and spread of INNS, as far as practicable. Construction sites should follow best practice biosecurity measures, including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	--	---	**Construction Effects** The option is located within the Teign, Avon, Dart groundwater waterbody and ERME WFD waterbody. The option is situated within the Erme Estuary, where there are existing abstraction points. The option may result in the removal and relocation of the intake point within the estuary and the potential for trenching and laying of pipes within the interfluves of a catchment. There is not anticipated to be any water crossings required. The option will also involve the construction of a new pumping station, which could involve above and below ground structures as a result of either option. However, there is the potential for modifications to existing WTW if Option ROA2b is pursued to facilitate intake within the existing site boundary. The option is not located within a Groundwater SPZ or NVZ however the option is directly located within the Erme Estuary. The WFD Level 1 assessment concluded that the option has the potential to result in short-term impacts as a result of construction activities which have the potential to negatively impact the water environment through spills or leaks resulting in pollution events, increased sedimentation or increased dust and emissions. The option is also located within a Drinking Water Protected Area, with potential for similar effects. **Operational Effects** Increased abstraction from the Erme Estuary could potentially result in the deterioration of the water quality, the reduction in river flow and the water levels downstream however due to the minor increase in	During construction best practice mitigation methods should be adhered to including establishing a secure, designated refuelling location and concrete washout. Review of methodologies, plant and equipment required and the phasing of construction activities. Dust suppression should also be used to minimise dust and emissions associated with the construction phase. Special precautions should be taken whilst working within the estuary to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column, in line with the Environment Agency's PPGs. During the laying of pipes, it is assumed that the bedding material will be constructed such that they do not form preferential pathways for groundwater flow. During operation, ongoing review of the abstraction	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				abstraction of 1.5Ml/d these effects are considered to be low. As part of the option ongoing maintenance maybe required for the new intake and pumping station facility. Appropriate precautions should be taken to minimise the risk of flooding and the potential for deposition of silt, or release of other forms of suspended material or pollution within the water column. The WFD Level 1 assessment concluded a high impact on the Teign, Avon, Dart groundwater waterbody and a low impact on ERME WFD waterbody. This has been assessed as a moderate negative effect due to the volume of abstraction and the proposed mitigation measures.	limits and water quality should be undertaken.		
	Increase resilience and reduce flood risk	-	-	**Construction Effects** Both of the proposed locations for the option are situated within a Flood Zone 2 (1000 chance of river flooding annually). The option is directly situated within the Erme Estuary and the removal of the existing intake and relocation is not anticipated to result in any affects to the existing flood risk. However, the construction of the new pumping station and installation of new pipework has the potential to result in the loss of large areas of unmade ground especially for Option ROA2a, which could result in a short-term increase in flood risk during the construction phase. **Operational Effects** The removal and relocation of the intake point is likely to result in an increased abstraction of 1.5Ml/d, as such there is likely to be limited long-term effects associated with the flood risk as part of the option.	An FRA should be consulted to calculate the potential impact of unmade ground removal on flood risk, as well as the impact of additional hardstanding infrastructure.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Option ROA2a is likely to require additional land and has the potential to result in long-term change in land use through increasing areas of hardstanding, leading to the potential for increased flooding. Whereas option ROA2b is proposed within the existing footprint and is unlikely to affect the risk of flooding. Given the fact that both of the options are located away from the coastline, it is not anticipated that they will be subject to flooding arising from sea level rise.			
	Deliver reliable and resilient water supplies	-	+	**Construction Effects** The removal and relocation of the existing intake point could result in the temporary reduction in abstraction from the Erme Estuary during construction. **Operational Effects** The option is predicted to provide an increased yield of 1.5Ml/d hence providing increased water efficiency and water supplies to SWW network.	The effects should be temporary, and a review of construction phasing can be undertaken to minimise the effects.	-	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	--	**Construction Effects** Both options are located within Grade 3 Agricultural Land, consisting of good to moderate quality with moderate limitation, situated within the Erme Estuary. There are no Historic Landfills and Authorised Landfill sites within the option footprint or within 200m of the option respectively. Additionally, there are no Geological designated SSSI sites within 5km of the option. There are two proposed locations for the option. One within the existing site footprint of the STW and one within an area of arable farmland consisting of unmade	Review design to ensure no impact to stabilisation of the riverbank or Best practice mitigation measures are likely to prevent the risk of contamination during construction.	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Greenfield land. The option involves the construction of a new pumping station which will require additional land take and a new intake point along the River Erme Estuary. However, there may be additional pipework required to tie into the existing network, resulting in the loss of agricultural farmland surrounding the estuary. There is potential that the construction works could interact with the banks of the river resulting in changes to ground stability, resulting in increased sedimentation. There are areas of farmland and deciduous woodland along the banks of the estuary that may be impacted as a result of construction activities and require further assessment. **Operational Effects** The relocation of the intake point, and the increased abstraction is not anticipated to have any effect on soils, sediments or land use within the footprint of the option. However, the operation of the new pumping station situated within ROA2a would result in the permanent loss of arable farmland land, leading to a moderate adverse effect,			
Air	Reduce and minimise air emissions	--	0	**Construction Effects** The option is located over 500m from any AQMAs. Construction works will be required to relocate the intake and build a new pumping station as well as the potential installation of new pipework as part of the option. During construction, there is potential for the works to result in an increase in dust and air emissions	Best practice mitigation measures likely to be implemented during construction phase including use of low emission NRMM, dust suppression and review of deliveries and traffic management. Although,	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				from the operation of plant, equipment and increased vehicle movements (deliveries, waste and personnel). **Operational Effects** The operation of the new intake and updated licence is unlikely to result in any significant effects to air quality.	minor and temporary impacts on air quality are still likely to occur.		
Climatic Factors	Reduce embodied and operational carbon emissions	---	-	**Construction Effects** The option is predicted to generate an increase in embodied carbon during relocation of the intake point and additional pipework as well as the construction of a new pumping station. Through the use of materials (concrete, steel), the increase in vehicles movements (deliveries, waste and personnel) and the use of construction equipment. Option ROA2a may require the demolition of existing structures, which could result in increased emissions. Whereas Option ROA2b is proposed within a Greenfield area and in turn may result in increased groundworks. The embodied carbon emissions (total embodied carbon from construction) for Option ROA2a is predicted to be 499tCO_2 equivalent. The embodied carbon emissions (total embodied carbon from construction) for Option ROA2b will be 708tCO_2 equivalent. **Operational Effects** There is potential for an increase in embodied carbon as a result of increased yield of abstraction from the Erme Estuary as well as through the operation of the new pumping station.	Best practice mitigation measures should be implemented during the construction phase to reduce the consumption of energy, review construction methodologies and explore opportunities to substitute materials with lower embodied carbon and recycled materials. Additionally, the use of renewable energy should be explored during construction and operation.	---	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				If Option ROA2a operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, carbon emissions will be 111tCO_2 equivalent per annum. If Option ROA2b operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, carbon emissions is predicted to be 111tCO_2 equivalent per annum. This assessment considers the worst-case scenario of each operation.			
	Reduce vulnerability to climate change risks and hazards	0	- +	**Construction Effects** There are currently no known climate resilience measures as part of the option during construction. **Operational Effects** The relocation of the intake is unlikely to affect the options vulnerability to climate change. By increasing the yield through increased abstraction (1.5Ml/d) the option will provide a more reliable source of water to SWW network and alleviate any effects of climate change related flooding. However there is potential that the Estuary may become subject to climate related drought in the future, where increased abstraction and climate change could deplete water levels and impact water quality, also resulting on impacts downstream if not properly monitored.	The licence should be updated as part of the option scope. Water levels should be monitored during abstraction and best practice measures applied to prevent over abstraction ensuring compliance with licence conditions as well as negative impacts on the environment.	0	- +
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** There are two proposed locations for the option. Option ROA2b is located within 500m of 6 Grade II Listed Buildings including Greenwood, Ivybridge Aqueduct, the remains of the mill wheel house, Methodist church including boundary wall, Rose	No impacts are anticipated as a result of the works and therefore no mitigation identified. Recommendation for additional baseline collection and assessment to be undertaken at a more	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Cottage, Victoria House and Westover Farmhouse. Rose Cottage is the closest to Option ROA2b and is a Grade II Listed Building located 130m north-east. All listed buildings are located to the north of the A38 and are not anticipated to be impacted by the construction of the option. There are no Listed Buildings located within 500m of ROA2a. There are also no non-designated heritage assets within this area. Furthermore, there are no Scheduled Monuments, Conservation Areas, World Heritage Sites, Registered Parks and Gardens and Registered Battlefields within 500m of either of the proposed option locations. There are also no Protected Wrecks within 5km. The proposed new abstraction point is predicted to be situated to the north of the river and new pipelines and are not anticipated to directly affect any of the identified Listed Buildings. **Operational Effects** There are no operational effects anticipated. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. There is potential for effects upon water-dependent heritage assets and water sensitive environments to occur, due to the nature of the option involving abstraction which could impact upon groundwater tables. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.	detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located within the South Devon NLCA. There are no AONB, National Parks, Greenbelt land within 500m of the option and as such the removal and relocation of the intake point and any additional required pipework, are unlikely to result in any visual impacts. There is potential that the construction of the new pumping station may result in temporary visual impacts affecting the local character of the area across either of the proposed locations, however due to option ROA2b being proposed within the existing STW this is anticipated to be less of an impact compared to ROA2a. During construction there is potential for minor impacts associated with increased vehicle movements, stockpiles, plant and equipment. **Operational Effects** There will be no change to the visual infrastructure as a result of the option at the existing STW facility. However, should ROA2a be selected as the preferred option there is potential to result in negative visual impacts. The existing intake will be relocated within the Erme Estuary and will therefore not result in any changes to townscape or the visual amenity of the area. The option is located within a Historic NLCA, consisting of fields, agriculture and industrial land.	During construction best practice should be followed to ensure visual impact associated with construction activities are mitigated including review of methodologies, equipment and programme phasing as well as limiting vehicle movements to designated times and minimising the height of stockpiles onsite.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	+	**Construction Effects** There are two proposed locations of the option. ROA2a is situated to the west of the village of Cleeve and the A38 is within 500m to the north of the option. Whereas, ROA2b is proposed within the existing STW facility footprint, situated to the north of the South Devon Tennis Centre and directly to the south of the A38. A national cycle path is located within 500m of ROA2b across the A38, There are no further cycle routes identified for either option. Both proposed locations are located within IMD Decile 6, they are also both situated within the Erme Estuary and are bordered by areas of farmland and deciduous woodland. There are no noise action important areas, railways, PRoW, National Parks or County Parks within 500m. The option footprint is within 500m of one school, one place of religious worship, one fire station and areas of sports and leisure. During construction there is the potential for increased vehicle movements impacting traffic flows and resulting in increased congestion and risk of collision within the smaller country lanes. During the construction phase there is an increased pollution risk from noise, dust, emissions which could impact the local community. The construction works are expected to occur within the next two years (2025). During construction, the capital expenses for the works are anticipated to be substantial over the two year period from 2025 to 2026, This presents opportunity to improve the local economy through job creation and working with local suppliers for materials and resources.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times and ongoing consultation with respective stakeholders and local community to minimise disturbance. Best Practice should be applied to minimise noise and air emissions as a result of construction activities.	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the option is operational it is anticipated to result in moderate ongoing opex costs from 2027. This will provide minor positive impacts upon economic wellbeing within the local area, due to economic activities taking place and supporting local economies.			
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** During Construction there might be restricted access to the Erme Estuary, resulting in potential closure of access for recreational use, to facilitate the removal and relocation of the existing intake point and pipework. Throughout the construction phase there is anticipated to be increased vehicle movements (materials, waste and personnel), due to the rural nature of the site, access is required be via small country lanes which in summer months could lead to increased congestion and risk of accident. **Operational Effects** During operation there is not anticipated to be a significant impact on tourism or recreational use. However over abstraction from the Erme Estuary could result in reduced water levels, quality and flow rates within the water network and subsequently impact the water leisure activities.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times. During operation water levels and quality should be continuously monitored and limits implemented during periods of drought.	-	-
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option where feasible will utilise the existing infrastructure including pipelines and the relocation of the inlet. However, the construction of the new	The option should explore the use of renewable energy, rainwater harvesting and grey water and review design	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				pumping station will result in increased use of raw materials including concrete, steel, timber. Furthermore, the relocation of the inlet and construction activities may involve excavation of spoil, increased energy consumption and water usage through dust suppression and concrete mixing. **Operational Effects** Due to the nature of the option, there is potential for minor increases in energy demand through the increased abstraction 1.5Ml/d, potentially requiring higher levels of pumping. Although the effect of this is predicted to be neutral.	requirements to minimise the use of concrete. Where feasible the project should seek to utilise excavated material and reinstate the existing land use following construction. Waste mitigation should be prioritised with a focus on diversion from landfill. Where feasible existing access routes should be utilised to minimise the need for additional temporary construction infrastructure.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** There is potential that the works could result in disruption to the existing operation of the STW facility as part of ROA2b during the relocation of the inlet and construction of the new pumping station. No impacts are anticipated as a result of ROA2a, due to the proposed location. **Operational Effects** Following completion of construction it is not anticipated that there will be any significant impacts on the built asset and infrastructure.	Construction phasing should be reviewed to ensure impacts on local roads should be minimised, taking into account seasonal changes, peak times and alternate haul routes.	0	0

N.2 ROA3

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA3				
Option:	River Yealm				
Scheme type:	Surface Water Enhancement				
Option description:	Yealm intake relocation and new pumping station. Additional pipeline may be required to connect new intake point with existing South Devon Spine Main pipe network.				
Approx. Yield (Ml/d):	3				
WRZ:	Roadford				
Date Completed:	12/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	15/07/22, updated 09/02/23	***Checker:***	Amy Cox, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The option is situated approximately 4.7km north-west of the Erme Estuary SSSI (87.5% favourable, 4.8% unfavourable – recovering and 7.7% unfavourable – no change), which is a GWDTE. The option is located within two SSSI Impact Risk Zones. The option involves the construction of a new intake point and pumping station. It is currently unknown if new pipework is required between the new intake and existing pipework. Although ecological sites are not directly connected there is potential for temporary minor effects on ecological sites as a result of	Best practice mitigation measures should be followed to minimise the impact on Yealm River, including review of equipment and methodologies, designated refuelling spots, dust suppression, review of vehicle movements including personnel and deliveries and the use of	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				construction activities from increased vehicle movements, noise and vibration, potential for contamination to ground and surface water and generation of dust and increased emissions. However, these effects are likely to be minimal due to the distance from the SSSI and the extent of construction. There are no SPAs, SACs or Ramsar sites within 5km of the option or NNRs or LNRs directly encroached by the option. The HRA concluded that Plymouth Sound & Estuaries SAC (6.8km downstream), Dartmoor SAC (5.5km north), South Dartmoor Woods SAC (9.5km north-west), Blackstone Point SAC (9.7km south-west) and Start Point to Plymouth Sound & Eddystone SAC (7.5km south) are all hydrologically connected to the site by Tamar WFD groundwater waterbody, but are all sufficiently distant from the proposed works that no likely significant effects are anticipated during the construction phase. **Operational Effects** The option is not anticipated to result in any long-term effect on the Erme Estuary SSSI noting the distance from the option. The HRA concluded that the reduced flow and increase in energy downstream of the option is unlikely to result in significant effects on Plymouth Sound & Estuaries SAC (6.8km downstream) in the operational phase due to its distance. Other surface water feeds into the site and the yield of 3Ml/d is unlikely to have significant effects over the distance stated. Due to the distance Dartmoor SAC (5.5km north), South Dartmoor Woods SAC (9.5km north-west), Blackstone Point SAC (9.7km south-west) and	equipment with lower noise levels.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Start Point to Plymouth Sound & Eddystone SAC (7.5km south) are all not expected to have effects during operation.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	**Construction Effects** The option is located directly adjacent to multiple areas of priority habitat including deciduous woodland and areas of local and regional woodland. The Southwood Ancient Woodland is situated approximately 300m south of the option. There is a likelihood here for construction to have negative impacts on these woodlands, through increases in vehicle movements, excavations associated with the new infrastructure and the potential for additional land-take for the construction of new pumping station, which could result in loss of habitats. Additional pipework to connect with existing network, may be required and could result in the removal of woodland from excavations required. The new location of the intake within the Yealm River, has not been confirmed. However, the installation is likely to require minor construction activities including the use of a drilling rig, which may require access through woodland. There is potential for construction effects to include de-stabilisation of the banks of the Yealm River resulting in increased sedimentation and the disturbance to local aquatic and terrestrial species. There is also potential for construction works to interact with priority habitats and green networks along the river edge as a result of increased vehicle movements and pollution including the risk of contamination, increased noise and vibration, release of dust and increased emissions.	Areas of deciduous woodland and Ancient Woodland are situated along the river bank. These areas should be avoided as potential locations of the new intake to minimise disturbance to habitats and species here. Best practice methods for the installation of the new intake point should be implemented to minimise the disturbance of local species and habitats as far as practicable through the implementation of a CEMP. Due to the nature of the works there may be limited opportunity to enhance the existing biodiversity. However, where woodland is removed, tree replanting and or translocation maybe required. The following best practice mitigation measures should be adhered to during construction including:	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The new pumping station may result in the permanent loss of habitats. However, it is assumed that the new intake will tie into the existing pipework although additional connections maybe required. This could result in further habitat loss following excavations and implementation of new pipelines. There is the potential for long-term effects on the quality of the existing habitats including the Yealm River as a result of the increased abstraction and reduced flows downstream. As the option involves abstraction from the River Yealm, which is classified as a salmon river, there is potential for salmon movements to be interrupted during the operation of the option and its abstraction of the river. Further NCA and BNG assessments have been scoped out due to the current available spatial information. It is identified that the option is located within an area of Greenfield, encroached by multiple areas of priority habitat that maybe lost in the long term. Therefore, following option development further assessment maybe required.	providing designated refuelling spots; dust suppression; review of vehicle movements including personnel and deliveries; prioritise the use of equipment with lower noise levels and provide tree protection around all trees to minimise harm. Any woodland removal should ensure bird nesting seasons are avoided, and any protected species or habitats are protected appropriately. During operation, ongoing review and monitoring of the abstraction limits and water quality should be undertaken. Habitat reinstatement could be considered at a later stage.		
	Reduce the spread or presence of INNS	-	-	**Construction Effects** The INNS assessment concluded that, during construction, there is the risk of increased spread of INNS due to the movement of excavated material and tracking plant and equipment. There is also a small risk of construction workers introducing INNS during construction of the proposed works on the River	Best practice and consultation of an INNS risk assessment in order to mitigate where possible. Construction sites to follow best practice biosecurity measures, including equipment being thoroughly	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Yealm, although this is expected to be minimal as a result of following site biosecurity practices. **Operational Effects** The INNS assessment concluded that the option has the potential to result in the physical transfer of intreated water (between two locations which have been assumed as not previously connected). It is however assumed that any transfer of INNS would be treated and removed from the water during treatment. There is additional risk from the pipeline washout, pipeline burst, wash-water discharge and sludge disposal which could result in the spread of INNS during operation. Further risks are associated with the reduced water flows downstream of the abstraction points at the River Yealm. There is a low risk that the reduced flow could change the habitat suitability of any INNS present which could facilitate further spread as receptors are hydrologically connected to the option.	cleaned between locations to prevent INNS from spreading.		
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is directly adjacent to the River Yealm and is located with the Lower River Yealm and Tamar groundwater waterbody catchment. There is an existing intake within the river that will be relocated as part of the option. It is assumed that new pipelines may be required to link intake to network, requiring trenching and pipe laying within the interfluves of the catchment. As such there is the potential for effects on groundwater flow as a result of the construction works. The option is located within Groundwater Source Protection Zone 3 (total catchment) and outside a NVZ. The option involves the construction of a new	During construction best practice mitigation methods should be adhered to including establishing a secure, designated refuelling location and concrete washout. Review of methodologies, plant and equipment required and the phasing of construction activities. Dust suppression should also be used to minimise dust and	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				pumping station, which may require above and below ground structures. Construction activities have the potential to cause negative effects on the water environment through spills or leaks resulting in pollution events, increased sedimentation or increased dust and emissions. It is not however, located within any Drinking Water Protected Areas. The WFD level 1 assessment concluded no high or medium impact as a result of the options. **Operational Effects** Increased abstraction from the Yealm River could potentially result in the deterioration of water quality, the reduction in river flow and the water levels downstream however due to the minor increase in abstraction of 3Ml/d these effects are considered to be low. The WFD Level 1 assessment concluded a high impact on the Lower River Yealm water body due to the increased surface water abstraction.	emissions associated with the construction phase. During trenching activities it is assumed that bedding material will be constructed such that they do not form potential pathways for groundwater flow During operation, ongoing review of the abstraction limits and water quality should be undertaken.		
	Increase resilience and reduce flood risk	0	+	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). The option is directly situated within the Yealm River and the removal of the existing intake and relocation is not anticipated to result in any effects on changes to the existing surface water flood risk. However, if large areas of unmade ground are required for site	The effects should be temporary, and review of construction phasing can be undertaken to minimise the effects. During operation, ongoing review of the abstraction limits and water quality should be undertaken.	0	+

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
					compounds and the construction of the new pumping station, further assessment maybe required. **Operational Effects** The removal and relocation of the intake point will likely result in an increased abstraction of 3Ml/d. As such this could potentially result in increased resilience, with the provision of increased water supply within the SWW network and increased retention of rain, and surface water during periods of heavy rainfall; therefore, reducing flooding risk. However, ongoing maintenance of the proposed infrastructure maybe required. Appropriate precautions should be taken whilst undertaking maintenance activities to minimise the risk of flooding and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. Additionally, given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** The removal and relocation of the existing intake point will likely result in temporary reduction in abstraction from the Yealm River during construction. This may result in a temporary decrease in water supply within the SWW region, given the relatively low existing yield, this is unlikely to be a significant issue.	The effects should be temporary, and review of construction phasing can be undertaken to minimise the effects. During operation, ongoing review of the abstraction limits and water quality should be undertaken.	0	-	+

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
					Operational Effects The removal and relocation of the intake point, and new pumping station will result in an increased abstraction of 3Ml/d, as such this could potentially result in increased resilience with the provision of increased water supply within the SWW network. However, over abstraction could result in deterioration of water quality resulting in reduced flow downstream and reduced water levels. This would result in reduced resilience and supply of water resources within the network.				
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-		**Construction Effects** The option is located predominantly within Grade 4 Agricultural Land, with areas of Grade 3 Agricultural Land to the north-west and south-west of the option. The land consists of good to moderate quality Agricultural Land with moderate limitation. There is one Authorised Landfill Site, Strashleigh Ham, directly encroached on by the option with a further Authorised Landfill, Challonsleigh, located 290m from the option. Additionally, there are two Historic Landfills including Challonsleigh Farm and New England Quarry Historic Landfill Sites, located 290m and 650m from the option respectively. There are no Geological designated SSSI sites within 5km of the option. The relocated intake point has yet to be confirmed however, it is anticipated that It will likely be within the Yealm River and as such is unlikely to result in any additional land take, however there may be additional pipework required to tie into the existing network, resulting in the loss of agricultural farmland surrounding the river. The construction of the	Review design to ensure no impact to stabilisation of the riverbank. Best practice mitigation measures are likely to prevent the risk of contamination during construction. Reinstatement of land used during construction to mitigate against residual effects.	-	-	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				new pumping station may also require additional land take and the reduction in agricultural land. There is potential that the construction works could interact with the banks of the river resulting in changes to ground stability, resulting in increased sedimentation. There are areas of farmland and deciduous woodland along the banks of the estuary that may be affected as a result of construction activities and require further assessment. **Operational Effects** The new pumping station has the potential to result in permanent loss of agricultural land, leading to an anticipated minor negative effect. However, the relocation of the intake point, and the increased abstraction is not anticipated to have any effect on soils, sediments or land use within the footprint of the option.			
Air	Reduce and minimise air emissions	--	0	**Construction Effects** There are no AQMAs within 500m of the proposed option. Construction works will be required to relocate the intake and to build the new pumping station as well as the potential installation of additional pipework. During construction there is the potential for the works to result in an increase in dust and air emissions from the operation of plant, equipment and increased vehicle movements (deliveries, waste and personnel). The A38 is also located within close proximity to the option, with potential for existing effects on local air quality and local receptors.	Best practice mitigation measures likely to be implemented during construction phase including use of low emission NRMM, dust suppression and review of deliveries and traffic management. Although, minor and temporary impacts on air quality are still likely to occur.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The operation of the new intake and updated licence is unlikely to result in any significant long-term effects to air quality.			
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** The option has the potential to generate an increase in embodied carbon during relocation of the intake point and additional pipework as well as the construction of a new pumping station, through the use of materials (concrete, steel and timber), the increase in vehicle movements (deliveries, waste and personnel) and the use of construction equipment. Increased groundworks, such as excavations for the new pipeline and infrastructure, also have the potential to result in increased emissions. The embodied carbon emissions (total embodied carbon from construction) for this option is predicted to be 533tCO_2 equivalent. **Operational Effects** There is potential for an increase in embodied carbon as a result of increased yield of abstraction from the Yealm River as well as through the operation of the new pumping station. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions are predicted to be 103tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	Best practice mitigation measures should be implemented during the construction phase to reduce the consumption of energy, review construction methodologies and explore opportunities to substitute materials with lower embodied carbon and recycled materials. Additionally, the use of renewable energy should be explored during construction and operation.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures as part of the option during the construction phase. **Operational Effects** The relocation of the intake is unlikely to affect the options vulnerability to climate change. By increasing the yield through increased abstraction, the option is likely to provide a more reliable source of water to SWW network and alleviate any effects of climate change related flooding. However, there is potential that the Estuary may become subject to climate related drought in the future, where increased abstraction and climate change could deplete water levels and impact water quality, also resulting on impacts downstream.	The licence should be updated as part of the option scope. Water levels should be monitored during abstraction and best practice measures applied to prevent over abstraction ensuring compliance with licence conditions as well as negative impacts on the environment.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** There are no Listed Buildings or Structures located within 500m of the option., Scheduled Monuments, Conservation Areas, World Heritage Sites, Registered Parks and Gardens or Registered Battlefields. There are also no non-designated heritage assets within this area. There are also no Protected Wrecks within 5km of the option. There is potential for previously undiscovered archaeology to be discovered and damaged during excavation and other construction activities. The proposed new intake point is predicted to be located within the Yealm River and new pipelines and pumping station are not anticipated to impact any heritage assets due to the fact they are located sufficiently distant from the option.	No impacts are anticipated as a result of the works and therefore no mitigation identified. Additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments.	0	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There are no operational effects anticipated. Once operational, no additional activities are anticipated to affect the historic environment and designated / non-designated sites. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. However, due to increased abstraction of the Yealm, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located within the South Devon NLCA and Historic NCLA consisting of mainly amalgamated fields and enclosed agricultural land. There are no AONB, National Parks, Greenbelt land within 500m of the option and as such the removal and relocation of the intake point, the construction of the new pumping station and any additional required pipework, should not result in any loss of character. The option is however located directly adjacent to an area of residential housing around 150m north, across the A38, and as such there is the potential to cause visual impacts during the construction phase. During construction there is also the potential for minor visual effects associated with increased vehicle movements, stockpiles and plant and equipment.	During construction best practice should be followed to ensure visual impact associated with construction activities are mitigated including review of methodologies, equipment and programme phasing as well as limiting vehicle movements to designated times and minimising the height of stockpiles onsite.	-	-

SEA Topic	SEA Objective	Effects ST		Effects LT		Commentary	Mitigation	Residual effects ST		Residual effects LT	
						Operational Effects The option involves the construction of a new pumping station which has the potential to result in permanent changes to the landscape. The existing intake is proposed to be relocated within the Yealm River and is therefore unlikely to result in any changes to townscape or the visual amenity of the area.					
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	+	-	**Construction Effects** The option runs along the Yealm River situated within a rural area surrounded by farmland and deciduous woodland. The A38, lies directly to the north of the option with one noise improvement area situated north-west within 2km of the option along the main A road. There is one place of worship and play space within 500m of the option. There are several sections of PRoW within 500m of the option. There are no other notable areas of community use, recreation, businesses or residential within 500m of the option. The option is situated within IMD Decile 8 towards the south with the remainder of the option falling within IMD Decile 6. During construction there is the potential for increased vehicle movements impacting traffic flows and resulting in increased congestion and risk of collision within the smaller country lanes. During the construction phase there is an increased pollution risk from noise, dust, emissions which could impact the local community. The construction works are expected to occur within the next two years (2025). During construction, the capital expenses for the works are anticipated to be substantial over the two-year period from 2025 to 2026, This presents opportunity to improve the local	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times and ongoing consultation with respective stakeholders and local community to minimise disturbance. Best practice should be applied to minimise noise and air emissions as a result of construction activities.	-	+	+	-

SEA Topic	SEA Objective	Effects ST		Effects LT		Commentary	Mitigation	Residual effects ST		Residual effects LT	
						economy through job creation and working with local suppliers for materials and resources. Additionally, this through increased engagement opportunities to enhance the environment through BNG may be achieved. **Operational Effects** The option seeks to provide resilient water supplies for the SWW network. Once the option is operational it is anticipated to result in moderate ongoing opex costs from 2027. This has the potential to continue to provide jobs through the operation and maintenance of the pumping station and supporting infrastructure. This should continue to provide jobs through the operation and maintenance of the pumping station and supporting infrastructure.				
	Maintain and enhance tourism and recreation	-		-		**Construction Effects** During construction there may be restricted access to the Yealm River, resulting in potential closure of access for recreational use, to facilitate the removal and relocation of the existing intake point and pipework. Throughout the construction phase there is likely to be increased vehicle movements (materials, waste and personnel). The option is situated directly to the south of the A38, with small laneways leading to the river. Due to the rural access of the option leading onto the main road, construction activities could result in increased congestion and risk of collision. Within 500m of the option, there are no cycle paths or national trails.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times. During operation water levels and quality should be continuously monitored and limits implemented during periods of drought.	-		-	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects During operation there is not anticipated to be a significant impact on tourism or recreation. However, over abstraction from the Yealm River could result in reduced water levels, quality and flow rates within the water network and subsequently impact the water leisure activities			
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option is likely to utilise the existing infrastructure including pipelines and the relocation of the inlet. The relocation of the inlet has the potential to result in minor construction activities including the excavation of spoil, increased energy consumption and water usage through dust suppression and concrete mixing. **Operational Effects** Due to the nature of the option, there is potential for minor increases in energy demand through the increased abstraction 1.5Ml/d, potentially requiring higher levels of pumping. Although the effect of this is predicted to be neutral.	The option should explore the use of renewable energy, rainwater harvesting and grey water and review design requirements to minimise the use of concrete. Where feasible the project should seek to utilise excavated material and reinstate the existing land use following construction. Waste mitigation should be prioritised with a focus on diversion from landfill. Where feasible existing access routes should be utilised to minimise the need for additional temporary construction infrastructure.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** There is potential that the works could result in disruption to the existing infrastructure during the relocation of the inlet and construction of the new pumping station. **Operational Effects** Following completion of construction, it is not anticipated that there will be any significant impacts on the built asset and infrastructure.	Construction phasing should be reviewed to ensure impacts on local roads should be minimised, taking into account seasonal changes, peak times and alternate haul routes.	-	0

N.3 ROA4

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA4				
Option:	Abstraction of Roadford Reservoir compensation flow at Gunnislake when making supply releases.				
Scheme type:	Surface Water Enhancement.				
Option description:	Abstraction of Roadford compensation flow at Gunnislake when making supply releases.				
Approx. Yield (Ml/d):	3.7				
WRZ:	Roadford				
Date Completed:	01/06/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	06/07/2022. updated 09/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	--	**Construction Effects** The option is located less than 400m from the Plymouth Sound & Estuaries SAC classified as a GWDTE, and within 5km of the Tamar Estuaries Complex SPA. The option directly encroaches upon the Tamar-Tavy Estuary SSSI and GWDTE (97.0% favourable condition, 3.0% unfavourable – recovering). Within 5km of the option are Sylvia's Meadow SSSI classified as a GWDTE (100.0% favourable condition), Greenscoombe Wood, Luckett SSSI classified as a GWDTE (100.0% unfavourable – declining), and Grenofen Wood and West Down SSSI 100.0% favourable). The option is located within multiple SSSI Impact Risk Zones.	Monitor the rates of abstraction during operation to avoid and mitigate negative effects on water resources and habitats that are dependent on water quality and levels.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				The option has no direct encroachment on a NNR nor a LNR. There are two County Wildlife Sites located within 1km of the site. As there are no infrastructure changes or construction works required, there will be no disturbance to the nearby designated sites during the construction phase. **Operational Effects** There may be potential for significant effects on the upper reaches of the Plymouth Sound & Estuaries SAC, which are immediately downstream of the abstraction point. It is currently unknown how the reduction in water flow and increase in energy will affect the qualifying features of the site. The option will yield a minor increase in abstraction from River Tamar by 3.7Ml/d, which will likely have a minor negative effect on water levels and water quality on Tamar-Tavy Estuary SSSI and GWDTE downstream of the site.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** The option directly intersects Clitters Wood and Old Canal Wood Ancient Woodlands. It directly encroaches upon multiple priority habitats, including areas of deciduous woodland and coastal and floodplain grazing marsh. The option is directly next to River Tamar. As no construction works are required in this option, the surrounding habitats are not considered to be affected. **Operational Effects** Increased abstraction rates of 3.7Ml/d may have minor effects in reducing the quantity and quality of water downstream, with potential effects for aquatic ecology, and	Monitor the rates of abstraction during operation to avoid and mitigate negative effects on water resources and habitats that are dependent on water quality and levels.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				other species and habitats. As the option involves abstraction from the River Tamar, which is classified as a salmon river, there is potential for salmon movements to be interrupted during the operation of the option and its abstraction of the River.			
	Reduce the spread or presence of INNS	0	-	**Construction Effects** No construction works are anticipated so there is no increased risk of spreading INNS. **Operational Effects** There is the risk that transfer of water will increase the risk of INNS spreading, however water will be treated at the source so there is negligible risk of spreading INNS. There are additional risks from pipeline washout, pipeline bursts, wash-water discharge, overflows and sludge disposal, however these are considered low risk. There is a low risk that reduced flows downstream of the abstraction points at River Tamar could change the habitat suitability for INNS, which could facilitate further spread. No new waterbodies will be connected. Overall, the risk during operation is considered to be low.	Best practice during operation to avoid the spreading of INNS should be adopted, including ensuring water is properly treated before discharge and that pipes are regularly checked and cleaned.	0	-
Water	Protect and enhance the quality of the water environment and water resources	0	---	**Construction Effects** The option is located within Groundwater Source Protection Zone 2. The option interacts with the following WFD waterbodies: Lower River Tamar, Plymouth Tamar, and Tamar (Groundwater). It is outside of a NVZ. As no new infrastructure is required, there will be no construction activities and therefore likely no effects to water environment and resources through construction.	Monitor the rates of abstraction during operation to ensure compliance with licence avoid and mitigate negative effects on water resources.	0	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects An increase in abstraction yield of 9Ml/d could result in the deterioration of water levels and water quality. The WFD Level 1 Assessment identified that an increased abstraction from the Gunnislake abstraction intake will likely have a significant effect and permanent deterioration of the WFD status of the Lower River Tamar WFD waterbody. This will trigger the need for a WFD Level 2 Assessment. The option is also located within a Drinking Water Protected Area, where any deterioration in water quality could have significant impacts.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). As no construction activities are expected, no changes in flood risk are anticipated. **Operational Effects** Increased abstraction rates of 3.7Ml/d may have minor effects in reducing flows downstream. However, as the abstraction yield is relatively low, the impact on flood risk is considered neutral. Given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise.	There are no mitigation measures identified at this stage. However best practice should be followed during abstraction.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** No construction works are expected as no infrastructure changes are required. Therefore, it is not anticipated that there would be an effect to water supply due in the short term.	There are no mitigation measures identified at this stage.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option will result in an increase in yield of 9Ml/d, representing a minor improvement in the resilience and reliability of water supply across the area.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is located within Grade 3 (good to moderate quality) and Grade 4 (poor quality) Agricultural Land. The option is located over 200m from an Authorised Landfill Site, but directly encroaches upon King George's Field Historic Landfill Site. Within 5km of the site, there are three geological SSSIs: Lockridge Mine SSSI (100.0% favourable condition), Devon Great Consols SSSI (100.0% favourable condition), and Hingston Down Quarry and Consols SSSI (100.0% favourable condition). There are two County Geological Sites within 1km of the site. As no infrastructure changes are required, it is not anticipated that works to soils, i.e. excavation during construction, will be undertaken. Therefore, no effects to the soils and agricultural land are anticipated and no new pathways for contamination from the Historic Landfill Site to potential receptors is unlikely. **Operational Effects** There are no anticipated effects to the quantity or quality of soils during operation.	There are no mitigation measures identified at this stage.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located within 500m of Gunnislake AQMA. As there are no construction works expected, therefore no air emissions are anticipated.	Best practice during operation could be implemented, such as exploring	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Increased yield of abstraction would require additional treatment of water, which may result in small increases in air emissions as energy is required to power the additional treatment process. However, these increases will likely be negligible, therefore the effects are likely to be neutral.	cleaner sources of energy to power the abstraction and water treatment to reduce air pollution.		
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As no new infrastructure is required, the option is unlikely to result in an increase in embodied carbon due to construction activities. **Operational Effects** Operational carbon emissions may see a small increase due to the increased water treatment and distribution required for the increase in yield.	Explore opportunities to use renewable sources of energy to power the treatment and distribution of additional water during operation. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-
	Reduce vulnerability to climate change risks and hazards	0	- / +	**Construction Effects** No new infrastructure is required and therefore no construction works are expected. There will be no short-term changes to the area's vulnerability to climate change risks and hazards. **Operational Effects** The additional abstraction could provide increased resilience to water shortages and droughts, though it could	Continuous monitoring during operation will need to be implemented to ensure compliance with licence and mitigate against negative effects	0	- / +

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				also increase the risk of reducing flows, exacerbating the effects of droughts downstream of the site. However, these effects are likely to be minor considering the relatively small increase in yield.	on the environment.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located directly adjacent and within 500m of one Grade I Listed Building the New Bridge. The option is also located within 500m of multiple Grade II Listed Buildings including the Lock Cottage, Church of St Ann and Butterfly Cottage. The option directly encroaches on a Scheduled Monument known collectively as the Tamar Canal. The option directly encroaches on the Cornwall and West Devon Mining Landscape World Heritage Site. There are no Registered Parks or Gardens, Conservation Areas or Registered Battlefields located within 500m of the option. There are also no Protected Wrecks within 5km of the option, or any non-designated heritage assets. As there are no new infrastructure changes required, no construction works are anticipated and therefore no effect to the setting of nearby heritage assets. **Operational Effects** The increased abstraction of Roadford compensation flow when making supply releases will unlikely affect nearby heritage assets. Abstraction may impact on buried or waterlogged archaeology. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.	Recommendation for additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the Tamar Valley AONB. It is over 200m from any National Parks. As no construction works are expected, there are no anticipated effects. **Operational Effects** The option is located within a Historic NLCA consisting of mainly woodland and forestry land and enclosed agriculture, however due to the lack of significant above-ground infrastructure, it is not anticipated that this will be adversely affected.	N/A	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** The option is predominately within an area with an IMD Decile of 5, though encroaching on an area with an IMD Decile of 4 on the western bank of River Tamar at the site of abstraction. Within 500m of the site there is a Greenspace site, playing field, PRoW, place of worship, post office, and an educational centre. As there will be no construction required, there will be no construction effects to the local community. The option is anticipated to result in minimal upfront capex costs, therefore the potential of upfront expenditure during the construction phase is predicted to be minimal. **Operational Effects** Ongoing opex costs are anticipated to be very minimal during operation of the option. This is unlikely to have any significant impact in the local community.	There are no mitigation measures identified at this stage.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The Tamar Valley AONB offers recreational value to tourists. As there will be no construction required, there will be no construction effects to tourism and recreational sites within the area. **Operational Effects** Due to the location and nature of the option, there is not anticipated to be any effects on tourism or recreation in the area.	There are no mitigation measures identified at this stage.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** As no new infrastructure is required, no resources are required for construction nor waste produced, therefore there will be no effects. **Operational Effects** It is unlikely that there will be any significant resource use and waste production during the operation of the option, meaning effects are likely to be neutral.	Explore opportunities to use renewable sources of energy to power the additional water treatment requirements.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** There are existing SWW Water Mains infrastructure on site. As no new infrastructure is required, no construction works are anticipated and therefore no effects are expected. **Operational Effects** There are no effects anticipated during operation.	N/A	0	0

N.4 ROA6

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA6				
Option:	Upper Tamar Lake increasing annual licence				
Scheme type:	Surface Water Enhancement				
Option description:	Increase daily abstraction limit, upgrades to WTW and distribution network				
Approx. Yield (Ml/d):	1				
WRZ:	Roadford				
Date Completed:	26/05/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	27/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	-	**Construction Effects** The HRA concluded that Culm Grasslands SAC (3.5km south) has potential for significant effects as the site is hydrologically connected through small watercourses upstream of the River Tamar and is hydrologically connected via the WFD groundwater waterbody of Tamar. Any pollution events may be transferred to the site and impact qualifying features. Habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species. The Tintagel-Marsland-Clovelly Coast SAC (5km north-west) and Bristol Channel	Best practice construction measures to reduce disturbance will likely be implemented. This includes the use of a CEMP detailing ways to suppress air emissions and reduce construction noise.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Approaches / Dynesfeydd Mor Hafren SAC (8.5km west) are both not likely to experience effects as there is sufficient distance from the proposed works and these sites are not hydrologically connected to the option footprint. The option is located within 5km of nine SSSI, including: Bradworthy Common SSSI (100% favourable condition); Brendon and Wealand Fen SSSI (100% favourable condition); Grimscott SSSI (100% favourable condition); Kingford Fen SSSI (100% favourable condition); Lymsworthy Meadows (100% favourable condition); Meddon Moor SSSI (100% favourable condition); Small Brook SSSI (27.5% favourable, 72.5% unfavourable - declining); Dunsdon Farm SSSI (100% favourable condition) and Steeple Point to Marsland Mouth SSSI (80.7% favourable condition, 16.7% unfavourable – recovering, and 2.6% unfavourable – no change) – all of which are also GWDTEs. The option is also located within two SSSI Impact Risk Zones. The western half of Upper Tamar Lake has been designated as a County Wildlife Site (CWS). The option is located over 5km from any SPAs or cSPAs, and 5km from any Ramsar Sites. The option has no direct encroachment upon a NNR nor an LNR. Works to the upgrade of the WTW and distribution network are assumed to require minor new infrastructure or improvements to			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				existing ones, and therefore minor construction works may be needed. It is likely that these works will be contained within the existing site footprint and will not directly impact any nearby designated sites, particularly the Tamar Lakes CWS. However, disturbances from construction, such as noise and air quality emissions along with pollutants in construction runoff, may have short-term impacts to the CWS. Works to the pipelines involved in the upgrades to the distribution network and air pollution emitted during the works may have an impact on the SSSI Risk Zones. **Operational Effects** The option will result in a minor increased yield in abstraction, which may result in a minor reduction in water downstream and subsequently into Lower Tamar Lake, a part of which is included in the Tamar Lakes CWS. The change in water level and flow within the CWS may negatively affect the species and habitats which depends on the hydrological regime of the waterbody. Additional emissions due to the treatment of water will have an impact on the SSSI Risk Zones, however this is expected to be a minor change. The HRA concluded that Culm Grasslands SAC is not anticipated to experience any significant effects, as the site's hydrology is not dependent on the Tamar, downstream of		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT	
				the option. Tintagel-Marsland-Clovelly Coast SAC and Bristol Channel approaches / Dynesfeydd Mor Hafren SAC are sufficiently distant from the option and not hydrologically connected to experience significant effects during the operational phase.				
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The site is directly adjacent to areas of deciduous woodland priority habitat and areas classified as having no main designation but having additional habitats present. The option is located over 500m from an Ancient Woodland. As the works are assumed to be contained within the existing site footprint, it is unlikely to have direct impacts to the surrounding habitats and species they support. However, the works could generate air pollutants, noise and vibration, though this will likely be minor and temporary. There may be short-term effects of pollutants in construction run-off entering nearby surface water bodies (e.g. the Upper Tamar Lake). **Operational Effects** An upgrade to the WTW may increase the amount of chemicals used during operation, which could present a risk of water contamination, negatively affecting the	Best practice construction measures to reduce disturbance will likely be implemented. This includes the use of a CEMP detailing ways to suppress air emissions and reduce construction noise. However, minor residual effects will still be likely. The surrounding surface waterbodies should be carefully monitored to minimise impacts on species and habitats dependent on them. Fish screening on the intake is recommended. There may be opportunity to explore the option of habitat creation within the footprint of the existing WTW and within the surrounding areas where priority habitats are identified.	-	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				wildlife in nearby waterbodies, such as Upper Tamar Lake. The option will result in a minor increased yield in abstraction, which may result in a minor reduction in water downstream in the River Tamar. This is classified as a salmon river. The operation of the option has the potential to interrupt salmon movements within the waterbody. A minor increased yield in abstraction may result in a minor reduction in water level in the Lower Tamar Lake. The species and habitats living in this lake may experience negative effects from reduced water levels, particularly those which are dependent on the hydrological regime of the waterbody.				
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Records from the site in 2015 and 2020/2021 indicated the presence of terrestrial and aquatic INNS around the River Tamar. There is potential for increased spread or presence of INNS due to minor construction works taking place at the WTW. INNS spreading could increase through the sharing of equipment between different sites. **Operational Effects** During operation, water will be transported in a closed pipeline and treated at the source so there is negligible risk of spreading INNS to adjacent protected sites and priority habitats. No new waterbodies	Best practice measures during construction to reduce the spread of INNS, including the cleaning of equipment between sites and consulting specialists to remove INNS identified within construction footprint.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				will be connected. Therefore, the risk during operation is considered neutral.			
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 (total catchment) and within Tamar Lakes Eutrophic Lake NVZ. The site intersects with the Tamar WFD groundwater body, the Upper River Tamar and the Upper Tamar Lake WFD surface waterbodies. Upgrades to the WTW could result in pollutants in the construction run off contaminating nearby waterbodies, such as the Upper and Lower Tamar Lakes which are connected through the River Tamar. The modification / upgrade of the WTW could involve construction of below ground structures. Pollutants during excavation may also enter groundwater and have a negative impact on groundwater quality, however these effects are likely to be localised. The option is also located within a Drinking Water Protected Zone, during construction there is potential for water quality to be negatively impacted as a result of contamination. Overall, this could result in minor short-term negative effects on both surface and groundwater quality.	Best practice mitigation measures will likely be implemented to minimise the effects on water quality in the surrounding water bodies. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). Monitoring to prevent over-abstraction during operation is recommended to prevent further negative effects on the water environment.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The WFD Level 1 Screening concluded that there is potential for significant negative effects and the permanent deterioration of WFD status of Upper Tamar Lake WFD waterbody. This score is a result of the increased surface water abstraction from 6.3Ml/d to 7.3Ml/d. The presence of new underground structures and the maintenance of pipelines and intakes have the potential to lead to minor effects on the Upper Tamar Lake and Upper River Tamar WFD surface water body and the Tamar (Groundwater) WFD groundwater body. However, this should not result in the lowering of WFD status.			
	Increase resilience and reduce flood risk	--	-	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000 year risk) and Zone 3 (1 in 100 year risk). There is potential that construction runoff could increase the risk of flooding in the short term, particularly in periods of heavy rainfall. There is also potential that the construction of the option will be vulnerable to flood risk during heavy rainfall. **Operational Effects** The nature of the activities is unlikely to cause surface water flooding and is unlikely to increase the risk of flooding given that it involves abstraction from surface	Best practice mitigation measures to reduce the effects of flooding during construction may be required. However, the site is situated within a Flood Zone 3 and will be at risk of surface water flooding. Designs to minimise the impacts of flooding during operation should be investigated.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					waterbodies. Also, given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise. There is potential that the WTW will be vulnerable to flooding from the nearby lakes and river, particularly in periods of heavy rainfall.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** There is unlikely to be an effect to water supply during the construction phase. **Operational Effects** The option will increase the yield by 1Ml/d from 6.3Ml/d to 7.3Ml/d, resulting in a minor improvement in the resilience of the water supply. However, increased abstraction from the Upper Tamar Lake has the potential to lead to a widespread or prolonged effect on the quality of the existing water environment. This means there is potential for decreased water resources and quality, meaning minor negative effects on water supplies are possible.	Best practice mitigation measures (e.g., pollution control measures) to minimise the impacts on water availability and supplies. Regular monitoring of the nearby waterbodies to ensure potential impacts on water resources and supplies are minimised.	0	-	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of	-	+		**Construction Effects** The option is located within Grade 3 Agricultural Land (good to moderate quality agricultural land) and Grade 4 Agricultural Land (poor quality agricultural land). The minor expansion of existing infrastructure on site as part of the WTW	Any ground that will need to be excavated during the works will be reinstated, with best practice implemented for the sustainable management of soils during construction.	0	+	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	sites of geological importance			and distribution network upgrades may create minor disturbance to the soils on the site. However, assuming the works will be contained within the existing site footprint and on brownfield land and considering that the surrounding agricultural land is of lower grade, the negative impact to soils is likely to be minor. There are no Authorised or Historic Landfill Sites within 200m of the option. The site has no direct encroachment upon a Geological SSSI. **Operational Effects** Long-term operation is unlikely to have any significant effects on soil, due to there being no additional land take. An increase in abstraction from the lake and possible decreased water levels could potentially destabilise soils and cause subsidence. However, the likelihood of this effect is low. The option is located on a brownfield site and will likely have no effect on soils, therefore presenting a minor positive impact to soils.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. Works to upgrade the WTW and distribution network may generate minor and short-term air emissions, leading to minor negative impacts to air quality.	Best practice mitigation to reduce the impacts of air emissions during the construction phase will likely be implemented, however minor and temporary impacts on air quality are still likely to occur.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects It is unlikely that the operation of the option will cause any significant effects on air quality. The option requires a small ongoing increase in energy consumption due to an additional yield of 1Ml/d requiring water treatment. If sourced from fossil fuels, this would cause emissions to air, however the effects as a result of the option would be neutral.			
Climatic Factors	Reduce embodied and operational carbon emissions	-	0	**Construction Effects** The short-term emissions of GHG are likely to be emitted during works to upgrade the WTW and distribution network. This could be generated from the increased use of construction plant, vehicles, and materials, along with increase in embodied carbon to upgrade the infrastructure. The embodied carbon emissions (total embodied carbon from construction) for this option are predicted to be 5221tCO_2 equivalent. **Operational Effects** More energy will be required to increase the yield of abstraction, resulting in an increase in operational carbon emissions, however this increase is likely to be minor. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months,	There is an opportunity to use substitute materials with lower embodied carbon and renewable energy for the upgrades.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					operational carbon emissions are predicted to be 15tCO_2 equivalent per annum. This assessment considers the worst case scenario of full operation. Operational carbon emissions under a maximum utilisation scenario are predicted to be 35tCO_2 equivalent per annum. As the predicted emissions are considered low, the effect is considered neutral.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no climate resilience measures in place relating to the construction phase. **Operational Effects** An increase in surface water abstraction may increase the effects of climate-induced droughts, which could lead to the depletion of water resources/availability across the region in the long term. However, a slight increase in river abstraction may mitigate the effects of surface water flooding.	The potential impacts of climate change should be regularly assessed to ensure that increased abstraction will not result in reduced water sources.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** The option is located within 500m of several Grade II and II* Listed Buildings and Structures, including: Boundary Stones, Lower Alsworthy Farmhouse; Barn; and Alfardisworthy Well. The closest of these Listed Buildings is Alfardisworthy Well, approximately 440m south-east from the WTW. Due to the distance, scope of works	Recommendation for additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified.	0	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and proposed option being situated within the existing site footprint, there are no anticipated direct effect to the heritage receptors in this area. Heritage receptors may experience indirect effects from construction, such as disturbance from increased noise, dust, and vibrations. However, due to their distance away from the option, the impact is considered neutral. There are no Scheduled Monuments, World Heritage Sites, Conservation Areas, Registered Park and Garden, or Registered Battlefield within 500m of the site, so these historic assets are unlikely to experience effects from construction. There are also no Protected Wrecks within 5km of the option, or any non-designated heritage assets, so these are not anticipated to experience effects. **Operational Effects** There is a minimal chance that the infrastructure upgrades will disrupt the views from historic assets in the long term. As this infrastructure will be relatively small scale, the effect is considered neutral. It is unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** There are no AONBs or National Parks within 200m of the site, and the site is not within a greenbelt. The site is within The Culm NCLA. Construction works may temporarily cause some interrupted views, from increased construction activity and equipment. However, the effect from the works and upgrades are considered neutral, as construction will take place on an existing site. **Operational Effects** There is a minimal chance that the infrastructure upgrades will disrupt the views of the surrounding landscape in the long term. As this infrastructure will be relatively small scale, the effect is considered neutral. The option is located within a Historic NLCA consisting of mainly ancient and amalgamated fields. However, because there is already existing above ground infrastructure on the site, any new infrastructure upgrades are considered to have a neutral impact on the landscape.	Best practice mitigation to minimise any adverse effects on landscape will be implemented, to ensure sufficient shielding of the site from the local receptors.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including	-	0	**Construction Effects** The site has an IMD Decile of 4 and is not in an area classified within IMD20pc. There is potential for increased construction traffic on the local roads, which also results in the potential for dust, noise and vibration	Best practice construction methods to minimise effects on the health and wellbeing of the local community will likely be implemented, such as suppressing dust and managing traffic through a CTMP.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	economic and social wellbeing			generation. The nearest residential area to the site is the hamlet of Alfardisworthy, 400m south-west of the site, which may feel the impacts of increased construction traffic. There are no PRoWs located within 500m of the construction works, therefore these areas will not be impacted. The upfront capex for the upgrades are anticipated to be minimal over two years from 2025 to 2026, which indicates there is limited opportunity to improve the local economy through job creation. **Operational Effects** The ongoing opex is estimated to be very minimal, showing a neutral contribution to the economic wellbeing of the local community during operation.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** Upper Tamar Lake is used for recreational activities, such as angling and water sports. Works to upgrade the WTW and distribution network may disturb users of Upper Tamar Lake, through construction vehicles generating noise and air pollution. However, the scale of the works, and therefore the effects, are likely to be minor.	Best practice mitigation measures will likely be implemented to minimise the impacts on tourism and recreation within the area. Including scheduling works outside of busy periods, exploring alternative construction methodologies to reduce noise and air emissions and implementing a CEMP to manage vehicle movements.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects As it is unlikely that the option would require new infrastructure, there would be no effects on the existing recreational facilities and/or tourism during operation. The minor increase in yield of 1Ml/d is unlikely to have significant long-term effects on the recreational use associated with the waterbodies in the area.			
Material Assets and Waste	Minimise resource use and waste production	-	-	**Construction Effects** The upgrade of existing infrastructure may require minor quantities of new resources. It is currently assumed that no additional land uptake is expected. **Operational Effects** The additional uptake and treatment of 1Ml/d of water may increase operational energy consumption. Energy is currently assumed to come from fossil fuel sources. Additional treatment may also require higher consumption of materials and chemicals along with an increase in the generation of waste, however, this change is expected to be minor.	There is opportunity to implement sustainable design measures when upgrading, which would reduce effects to neutral in the long term. However minor effects will still be likely during construction.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The works are not anticipated to affect built assets and infrastructure, as the works are on existing site where there is already existing infrastructure for SWW Water Mains. **Operational Effects** There are no long-term operational impacts foreseen on built assets and infrastructure. The development will take place on an existing site and the infrastructure to connect to SWW Water Mains already exists. Some pipeline upgrades may be required but the extent and location of these are currently unknown.	Best practice mitigation is recommended to minimise effects on surrounding built infrastructure.	0	0

N.5 ROA7

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA7				
Option:	Expansion of Northcombe WTW to 60Ml/d.				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	Treatment works to be able to deliver a minimum of 60Ml/d. Additional 10Ml/d pumping capacity at Roadford reservoir.				
Approx. Yield (Ml/d):	10				
WRZ:	Roadford				
Date Completed:	26/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	D
Date Checked:	22/07/22, updated 09/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	-	**Construction Effects** There are no SPAs, SACs, SSSIs, Ramsar sites, or NNRs located within 500m of the option. The WTW is located approximately 4.5km away of the Culm Grasslands SAC. The HRA AA concluded there will be no adverse impacts on the integrity of Culm Grasslands SAC as long as widely effective mitigation is implemented. Pollution of the water environment is the only potential pathway present during the construction phase as the site is connected to the option via Torridge and Hartland Streams groundwater waterbody. Any pollution events during construction may be transferred to the site and impact its qualifying features. This could degrade suitable habitat and	Best practice construction methods should be applied in the short term (measures from the CEMP should be followed). Careful monitoring of groundwater quality to minimise any potential impacts on designated and non-designated sites. Monitoring of water quality and flowrates downstream from the abstraction works	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				foraging areas for qualifying species. The WTW has no direct encroachment upon any NNR, LNR or Ancient Woodlands, however Roadford LNR and Roadford Reservoir County Wildlife are located approximately 500m south-west of the option within Roadford Lake. It is assumed that infrastructure upgrades will take place within the existing WTW, so these sites are unlikely to be impacted in the short term. Whiddon Moor, Luckroft and Odham Marshes SSSI (100% Favourable) and Hollow Moor & Odham Moor SSSI (100% Favourable) are also located within 5km of the WTW. These two SSSI should not experience any impacts due to their distance away from the option and the nature of the works. The option is situated within a SSSI Impact Risk Zone. Construction activities and infrastructure upgrades have potential to disturb these zones due to increases in air pollutants and noise. The option is located over 10km away from any MCZs or MPAs, so these sites will not be affected in the long term. **Operational Effects** The HRA AA concluded that there are no anticipated impacts on the identified sites during the operational phase. Roadford Lake is designated as a local nature reservoir, due to its open water, swampy and marshy ground. Therefore, increased abstraction and changes in water levels could impact on these habitats and their associated species. There are several County Wildlife Sites located within the River Wolf. These include Lower Blagrove and Lower Brockscombe Farm. Abstraction increase from Roadford Lakes is likely to lead to changes in flow downstream within the River Wolf, there is potential for the species and habitats	should take place to assess the impact on LNRs and County Wildlife Sites. CIRIA guidance should be followed to allow for effective pollution prevention measures to be implemented.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				within these County Wildlife Sites to experience negative effects as a result of increased abstraction.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The option is located within 500m of deciduous woodland priority habitat and purple moor grass and rush pastures priority habitat. Due to their proximity, there is potential for these habitats to be affected by increased construction activity, such as dust and vibration. Construction runoff could potentially contaminate nearby surface water bodies, which could deplete their habitats and species. There are also GDTE within 5km of the WTW. However, as the option only requires minor new infrastructure, the effect on species and habitats is likely to be limited. There are no Shellfish Classification Zones or Important Bird areas located within 5km of the WTW or Roadford Reservoir. **Operational Effects** The additional amount of water abstracted from Roadford Lake could lead to minor and localised changes in water level and flow velocity around the intake structure. The lake is designated as a local nature reservoir, due to its open water, swampy and marshy ground. Changes in water levels could impact on these habitats. There are multiple areas of priority habitat surrounding Roadford Lakes which have potential to experience similar effects. These include deciduous woodland, lowland meadows, and purple moor grass and rush pastures. Increased abstraction could also lead to changes downstream of the River Wolf. Changes in flow as a result of the increased	Best practice mitigation to minimise impacts on biodiversity, vulnerable habitats and habitat connectivity (measures from the CEMP should be followed). Areas of priority habitat situated close to the WTW should be avoided as much as possible to minimise disturbance. Monitoring of water quality and flowrates downstream from the abstraction works should take place to assess the impact on species, habitats, and biodiversity. Due to the nature of the works, there will be limited opportunity to enhance existing biodiversity.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				abstraction could lead to an impact on the biology within the River Wolf. It is assumed that any new infrastructure will be contained within an existing WTW site, however there is potential for Greenfield grassland to be permanently disturbed within the site. This will only result in a minimal effect on habitats and species. It is not anticipated that there will be any effects on salmon rivers as a result of the option.			
	Reduce the spread or presence of INNS	-	0	**Construction Effects** There is potential for increased spread or presence of INNS due to minor construction works taking place at the WTW and pumping station. INNS spreading could increase through the sharing of equipment between different sites. **Operational Effects** Operation involves additional water treatment and conventional use at Northcombe WTW. There is no risk of transfer/movement of INNS with this option type.	Best practice mitigation measures to be implemented along with INNS risk assessment to minimise the risk where possible. Biosecurity best practice measures to be followed during construction phase.	-	0
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 and outside of a NVZ, which indicates there is a low potential for effects on groundwater bodies. The option involves minor construction works. Pollutants and construction run off could potentially contaminate nearby waterbodies and reduce their quality, such as the River Wolf and Upper River Lew.	Appropriate precautions should be taken when working in channels of watercourses. All measures should be in line with requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				There are however no Drinking Water Protected Areas within proximity of the option. Expansion work at Northcombe WTW is assumed to include construction of temporary or permanent below ground structures. This has potential to lead to a minor localised, short-term and fully reversible effects on the Upper River Lew, Tamar (Groundwater), the River Wolf, and Torridge and Hartland Streams (Groundwater). It is likely that this would not result in the lowering of WFD status. The modification of a raw water pumping station at Roadford Lakes has potential to lead to a minor localised, short-term and fully reversible effect on Roadford Lake, Tamar (Groundwater), the River Wolf, and Torridge and Hartland Streams (Groundwater). However, it is also likely that this would not result in the lowering of the waterbody's WFD status. The WFD Level 1 Assessment concluded no impacts as a result of the construction phase. **Operational Effects** The option involves increased abstraction of water and may potentially reduce the flow rate of associated waterbodies and the water quality during operation. Abstraction from Roadford Lakes from 50Ml/d to 60Ml/d has potential to lead to a widespread or prolonged effects on the quality of the water within Roadford Lake and the River Wolf. The WFD Level 1 assessment concluded moderate impacts on the River Wolf WFD waterbody, due to use of abstraction outside of licence conditions. Therefore, a WFD Level 2 assessment was undertaken, which concluded	maintenance in or near water). Risk assessments should be undertaken for excavation works to ensure no adverse impact on watercourses, wetland habitats or destruction. Monitoring of water quality and flowrates downstream from the abstraction works should take place to assess the impact of increased abstraction. Adjustment of abstraction conditions for Roadford Lake could be considered to reduce impact on reservoir where appropriate. Ensure appropriate compensation flow is discharged into River Wolf to maintain river health and normal flow. Measures from the CEMP should be followed.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				possible deterioration between status classes for Roadford Lake and possible deterioration between status classes and possible impediments to GES/GEP for River Wolf. The additional amount of water abstracted from Roadford Lake could lead to minor and localised changes in its water level and the flow velocity around the intake structure. Abstraction increase from Roadford Lake could also lead to changes downstream of the River Wolf, considering its size. Changes in flow as a result of the increased abstraction could lead to an impact on biology within the River Wolf.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within Flood Zone 1, so there is low potential for effects related to flooding. The option only involves minor infrastructure, so flood risk is unlikely to present any impact in the short term. **Operational Effects** Due to the option being located within Flood Zone 1, it is unlikely that the operation will result in negative flood related effects. Given the fact the option is located away from the coastline, it is also not anticipated that it will be subject to flooding arising from sea level rise.	No notable impacts identified, therefore, no mitigation required.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** There is not expected to be any short-term effects on water resilience and supply. It should be considered whether any existing water supplies will be temporarily affected by construction works.	No notable impacts identified, therefore no mitigation required.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option involves increased abstraction, resulting in an approximate yield of 10Ml/d of water for the Roadford region. This creates a more resilient and reliable water supply.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The option is located within Grade 4 Agricultural Land. The option does not encroach upon any Authorised Landfill Sites or Historic Landfill Sites. The option involves minor construction works to accommodate for the expansion of the WTW. This has potential to negatively affect any undisturbed soil on the existing site, reducing its functionality, quantity, and quality. It is assumed that the construction works will not require any additional land take, so the effect on soil and geology (including unknown) will be minor. It is assumed that pump upgrades will take place on an existing Roadford site and will therefore not affect undisturbed soil. **Operational Effects** Long-term operation is unlikely to have any significant effects on soil, due to there being no additional land take. An increase in abstraction from the lake and possible decreased water levels could potentially destabilise soils and cause subsidence. However, the likelihood of this effect is low. The option does not intersect any Authorised Landfill Sites or Historic Landfill Sites, so these should not be affected by operation.	Any additional infrastructure required should be situated on existing hard-standing ground to reduce effects on soil as far as practicable. Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc).	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. However, there is potential for a deterioration of local air quality in the short term. The option will involve construction activity, which will increase dust, noise, and vibrations, which could decrease air quality temporarily. **Operational Effects** It is unlikely that the operation of the option will cause any significant effects on air quality. The option requires a small ongoing increase in energy consumption due to additional water treatment and pumping. If sourced from fossil fuels, this would cause emissions to air, however effects as a result of the option would be neutral.	Best practice construction methods should be implemented such as dust suppression to minimise the impact on air quality. Minor impacts are expected to remain.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	--	**Construction Effects** The option involves minor construction works which will potentially increase energy consumption and emissions from machinery in the short term. Minor infrastructure and upgrades are likely to increase the volume of embodied carbon within the option. The embodied carbon emissions (total embodied carbon from construction) for this option predicted to be 10,090tCO_2 equivalent.	The option should consider the use of renewables to power the pumping and treatment facilities. Decarbonisation of the National Grid is likely to reduce any future carbon emissions. Minor impacts are expected to remain for the construction phase and moderate for the operational phase.	-	--

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects The additional abstraction, pumping and treatment of 10Ml/d of water will increase energy consumption. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, carbon emissions predicted to be 2518tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to short-term effects of the option. **Operational Effects** Upgrades to the WTW could result in an increased resilience towards climate change effects through enabling the WTW to process more water in drier conditions, creating provision for those across the region. However, climate change related droughts could lead to a reduction in water levels within the reservoir. This coupled with increased abstraction could result in the depletion of the lake and its water quality.	The potential impacts of climate change should be regularly assessed to ensure that increased abstraction will not result in a depletion of surface water quality and quantity.	0	-	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** The option is located over 500m from any Listed Buildings, World Heritage Sites, Conservation Areas, Registered Parks and Gardens, and Registered Battlefields. There are also no Protected Wrecks within 5km, or any non-designated heritage assets. The option is located within 500m of Two bowl barrows on Broadbury Scheduled Monument. The construction works should not directly affect this historic asset, however there is potential for there to be increased construction traffic, dust, and noise. The visual amenity is unlikely to be affected by this option as construction works are likely to be screened by surrounding trees and vegetation. The option is not located within a conservation area. Construction works are assumed to take place within the existing sites, so there is low potential for undiscovered archaeology to be disturbed. **Operational Effects** Any additional infrastructure is likely to be minor. Due to the nature of the option, it is not anticipated for there to be any long-term permanent effects on the historic environment. It is therefore unlikely that there will be any enhancement or improvement on public access and/or enjoyment to heritage assets.	Recommendation for additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified. Best practice mitigation measures to be implemented during the construction phase, such as through a CTMP.	0	0

SEA Topic	SEA Objective	Effects ST	Effects	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects	Residual effects LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-		0	**Construction Effects** The option is located over 1km from any AONBs or National Parks, so these sites should not be affected by construction. However, the option is located within North Devon's Biosphere Reserve (transition zone), which aims to enhance the environment and develop sustainable lifestyles within the community. The option involves minor construction works, so there is potential for minor disturbances to the surrounding landscape and visual amenity, caused by dust and machinery. **Operational Effects** Landscape is not expected to be affected as a result of the operation of the option, since the option will be located within an existing WTW site. This means there is a low likelihood on visual amenity and township in the long term. The option is located within a Historic National Landscape character area consisting of mainly amalgamated fields and woodland, however due to the lack of significant above-ground infrastructure, it is not anticipated that this will be adversely affected.	Best practice measures to reduce the construction impacts on landscape (measures from the CEMP should be followed).	-		0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	+	**Construction Effects** The option is within an area classed with an IMD Decile of 5. During the construction of the option, there will likely be an increase in construction traffic in the local area, potentially disturbing local residents. There could also be an increase in noise and dust as a result of increased vehicle movements and construction activity. There is a section of PRoW (bridleway)	Best practice construction methods should be applied to minimise impacts on the health and wellbeing of the local community (measures from the CEMP should be followed).	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				located within 500m of the WTW. It is assumed that the majority of the construction works will take place on the existing WTW site, so accessibility to this area should not be affected. There are no important buildings, functional sites or Greenspace sites within 500m of the option. Although there will be increased construction activity, effects on the wellbeing of the local community are anticipated to be minor as construction works are assumed to take place on an existing site and will be temporary. The option has an expected five-year lead time, with construction works expected to start 2025. During construction, the capital expenses for the works are anticipated to be very substantial over the five consecutive year from 2025 to 2029, This presents opportunity to improve the local economy through job creation and working with local suppliers for materials and resources. However, although there will be increased construction activity, effects on the wellbeing of the local community are not anticipated as construction works are assumed to take place on an existing site and will be temporary. **Operational Effects** Once the option is operational it is anticipated to result in high ongoing opex costs from 2028.This will continue to provide jobs through the operation and maintenance of the option.	It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice).		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** It is not anticipated for there to be disturbance to recreational land during construction. Construction activity has potential to disturb nearby receptors, as a result of increased traffic movements and increased pollution as a result of noise, dust and emissions However, due to the nature of the option it is anticipated that these effects are likely to be minimal. **Operational Effects** Due to the WTW being located on non-recreational land and an existing site, it is expected that there will be limited long-term effects on recreation. However, reduced water levels may have an impact on people using the Roadford reservoir for recreational activities, such as rowing or paddle-boarding.	Best practice measures and careful monitoring of reservoir abstraction to minimise the operational effects on tourism and recreation. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	0	0
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** It is assumed that there will be construction required and some infrastructure upgrades at the existing WTW. It is also assumed that there will be some pump upgrades at Roadford reservoir, although it is assumed this will be on an existing site. It is likely that new material will be used and there will be an increase in waste during the construction phase. Energy consumption is also likely to increase from machinery and vehicles in the short term. **Operational Effects** The extra treatment of 10Ml/d of water may require an increased consumption of chemicals as well as energy.	There is an opportunity to implement sustainable design measures, including the consideration of materials with less embodied carbon, and the reuse of excavated material. However, it is likely that some residual effects will remain.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operation may also increase the level of wastewater generated, leading to a minor impact on resource and waste.			
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** During the construction of the option, there will likely be an increase in construction traffic in the local area, potentially disturbing local residents and major road infrastructure. Construction is assumed to take place on the existing WTW site, and any pump upgrades are assumed to use existing infrastructure. Therefore, effects on built assets and infrastructure are considered minor. **Operational Effects** It is unlikely that there will be significant long-term impacts on built assets or infrastructure as a result of the option due to the assumption the upgrades will be contained within an existing WTW.	Best practice construction methods should be applied to minimise impacts on build assets and infrastructure (measures from the CEMP should be followed). It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice).	-	0

N.6 ROA8

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA8				
Option:	Tottiford WTW – reduce WTW minimum capacity.				
Scheme type:	Conjunctive Use				
Option description:	Reduce WTW minimum capacity. Through process control changes to allow lower minimum flowrates to be treated. Enabling the WTW to a reduced flow during periods of low demand, reserving water resources for use at time of increased demand. The source optimisation will improve control systems, principally chemical dosing, with some allowance for flow controls, isolation and ICA / SCADA improvements. Changes will occur within the existing WTW site footprint. Through reducing the minimum output allows the WTW to run at a lower output over a longer period of time				
Approx. Yield (Ml/d):	1				
WRZ:	Roadford				
Date Completed:	16/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	22/07/22, updated 09/02/23	***Checker:***	Sophie Robinson, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	0	**Construction Effects** South Darmoor Woods SAC is situated 500m south-west from the option and is classified as a GWDTE. There are also five SSSIs located within 5km of the option including Bovey Valley Woodlands SSSI (100% favourable condition), Yarner Wood & Trendlebere Down SSSI (99% favourable condition, 1% unfavourable - recovering), both of which are	Best practice mitigation measures are to be implemented to minimise potential impacts upon designated and non-designated ecological sites during the construction phase.	--	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				GWDTE's situated approximately 3.2km and 3.6km south-west respectively. The option is located within two SSSI Impact Risk Zones, with potential for moderate/ minor adverse effects on designated sites through linkages to the option. It is unlikely that any major infrastructure will be required as a result of the option, with only updates to control systems required. Therefore, there are no anticipated direct impacts as a result of air pollution, noise or increased traffic as a result of the works due to the distance from the designated sites. However, there is the potential for moderate/ minor adverse effects on designated sites through linkages to the option during construction as a result of ground pollution. The HRA concluded that there is potential for significant effects on the South Dartmoor Woods SAC (3km south-west) as the site is hydrologically connected via the groundwater WFD, Teign, Avon, Dart and Erme waterbody. Any pollution events as a result of construction activities have the potential to be transferred to the site, and impact qualifying features. Resulting in potential damage to habitats through pollution, which could subsequently degrade suitable habitat and foraging areas for qualifying species. As the WTW infrastructure already exists there is not expected that there will be any other impact pathways. South Hams SAC (6.5km south-west) and Dartmoor SAC (9km west) are both hydrologically connected via the WFD groundwater waterbody of Teign, Avon, Dart, Erme waterbody but are sufficiently distant from the proposed works that no likely significant effects are anticipated during the construction phase. The option is outside of the 4km Sustenance Zone for the greater horseshoe bat but is within the wider Landscape	A HRA AA has not been undertaken to date. However, this should be considered given the likely significant effects identified for the South Darmoor Woods SAC during the construction phase.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Connectivity Zone in relation to South Hams SAC. However, any construction involved in the option is not likely to cause effects. **Operational Effects** The option would result in a reduction in the minimum capacity of the WTW, however the operation is not anticipated to affect the conservation status of any of the SSSI's or SAC. The HRA concluded that reduction of the WTW capacity will have no operational effects on any of the three designated sites during the operational phase.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** Along the northern and eastern edges of the WTW footprint there are areas of priority habitat consisting of broadleaved deciduous woodland, and to the south there are areas of ancient and semi natural woodland. There are also areas of lowland meadows priority habitat located within 500m of the option. No major construction is anticipated as a result of the option. There is the potential for nuisance including air, noise and water pollution during construction, as a result of increased vehicle movements, construction and activities. However, due to the scale of the proposed works it is not anticipated habitats will be interfered within during the construction phase. It is not anticipated that the option will have any effect on any salmon rivers.	There are no identified impacts associated with the option. However, where feasible best practice should be explored to ensure appropriate controls are in place to aid in protecting priority habitats as well as exploring the opportunity for habitat creation and restoration, during construction.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational due to the nature of the option there is not anticipated to be any significant negative effects upon biodiversity.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** No new connections of waterbodies are anticipated as a result of the option. However, INNS have been recorded at Tottiford Reservoir. The INNS assessment concluded there is not anticipated to be a risk of transfer or movement of invasive or non-native species during the construction phase. **Operational Effects** The INNS assessment concluded that the spreading of INNS is not anticipated during the operational phase.	Best practice methods to be implemented to minimise disturbance and spread of INNS, as far as practicable.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	0	**Construction Effects** The option is located within the Beadon Brook and Teign, Avon, Dart and Erme WFD waterbody catchment. Located outside a NVZ and within Groundwater Protection Zone 3. There are also no Drinking Water Protected Areas within the area. There is no major construction activities anticipated as part of this option and it is assumed there will be no changes to abstraction licences as part of the option. The WFD Level 1 assessment concluded no moderate or high construction impacts as a result of the option.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified. During operation ongoing review of water quality should be undertaken however no long-term effects are anticipated.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There is the possibility that through optimising the WTW and reducing the minimum flowrate of the plant, the option should enable the plant to operate at reduced water levels, enabling the plant to treat less flow at times of low demand enabling the WTW to reserves water resources for use at other times. The WFD Level 1 assessment concluded no moderate or high operation impacts as a result of this option.			
	Increase resilience and reduce flood risk	0	+	**Construction Effects** The option is located within a Flood Zone 1 area with a low potential for effects. This option doesn't involve any major construction activities. The option would involve minor updates to control systems. However, there is not anticipated to be any change to existing hardstanding or risk of flooding, as the option is likely to be developed within the existing site footprint. **Operational Effects** There is unlikely to be any impact during operation as a result of the option. However, it is noted that by reducing the minimum capacity, the WTW is likely to be able to operate on a more continuous basis and therefore have increased capacity during increased rainfall events reducing the risk of flooding. Given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** This option doesn't involve any construction activities, with updates to the control systems only. It is predicted that the existing WTW will operate as usual during source optimisation. **Operational Effects** The process control changes are anticipated to allow lower minimum flowrate to be treated. Thus enabling the plant to treat less flow at times of low demand, reserving water resource for use during peak periods of demand. Therefore, providing a more reliable and resilient water supply. The option would result in minor increased water efficiency providing an additional 1Ml/d.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is located within Non-Agricultural Land and Grade 3 Agricultural Land which is considered as good to moderate quality with moderate limitations which affect the choice of crops, timing, cultivation and level of yield. There are no Historic landfills or Authorised Landfill Sites within the option footprint or within 200m of the option respectively. Crockham Quarry SSSI (100% favourable condition) situated 3.65km south-east of the option, Spara Bridge SSSI (100% unfavourable conditions) and Ryecroft Quarry SSSI (100% unfavourable conditions) both situated 3.9km and 4.1km north-east of the option. This option doesn't involve any construction activities, with updates to the control systems only, and therefore	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
					it is not anticipated that the functionality or quality of the soil is likely to change. **Operational Effects** The improved control system and upgrades to the WTW are likely to be located within the existing site footprint with no additional land take. Therefore, reducing the WTW minimum capacity is not anticipated to have any effect on soils, sediments or land use within the footprint of the option as a result of the operation of the WTW.				
Air	Reduce and minimise air emissions	0	+	-	**Construction Effects** The option is located over 500m from any AQMAs. No construction works are anticipated as a result of the option, with only minor updates to the existing control system anticipated. **Operational Effects** It is unlikely that the operation of the option will result in any significant change to existing air quality. However, there may be minor effects as a result of reviewing efficiencies within the equipment and infrastructure as part of the source optimisation resulting in a reduction in air emissions. There is also the potential that the WTW will operate at an increased frequency and prolonged duration due to the reduced minimum capacity, therefore leading to potential increased air emissions as a result of plant and equipment operating over longer durations.	Ongoing air quality monitoring is recommended during operation, to monitor for increased emissions as a result of the WTW optimisation.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
Climatic Factors	Reduce embodied and operational carbon emissions	0	0		**Construction Effects** There is not anticipated to be any major construction with the option involving process control changes and improved control systems. The embodied carbon emissions (total embodied carbon from construction) for this option predicted to be 16tCO_2 equivalent, and result in neutral impacts overall. **Operational Effects** Through source optimisation of the WTW and via enabling the WTW to operate at a lower capacity there is the potential for operational energy to decrease during periods of low demand. However, through the optimisation the plant it is predicted it will be able to operate at a reduced minimum output enabling the plant to run over longer periods of time, thus resulting in the potential for increased operational energy. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions predicted to be 2tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	No impacts are anticipated as a result of the works during construction and therefore no mitigation identified. Operational carbon emissions should be investigated during optimisation.	0	0	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There is not anticipated to be any construction with updates to the control systems only, and as such there are no climate resilience measures in place with the option during the construction phase.	There are no significant impacts identified with the option during the construction phase therefore no mitigation measures are suggested. Ongoing monitoring should be undertaken during	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The optimisation of the WTW could result in an increase in resilience towards climate change effects through enabling the WTW to process water on a continuous basis, providing a more efficient water supply. Through treating less water at times of low demand, this enables the facility to reserve water resources for times of high demand and drought periods. However, climate change related drought could lead to a reduction in water levels within the waterbody and therefore reducing the quantity of water available.	operation, to monitor water levels and quality.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located within 500m of a Grade II Listed Structure 'direction post at Pollmill Crossroads'. There are no Scheduled Monuments, Conservation Areas, Registered Parks and Gardens or Registered Battlefields within 500m of the option. There are also no Protected Wrecks within 5km or any non-designated heritage assets. No major construction activities are anticipated as part of the option, with changes and improvements to existing systems only. As such there are no anticipated effects on cultural heritage assets or archaeology during construction. **Operational Effects** There is not anticipated to be any new infrastructure as part of this option. The operation of the existing WTW is not anticipated to affect the historic environment as a result of increasing the yield. It is therefore unlikely that there will be any significant enhancement or	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the Dartmoor NCLA and within Dartmoor National Park. The option is not located within a Greenbelt or within an area classified as an AONB. No construction works are planned for this option, with only minor updates to existing control systems within the existing site footprint and existing structures anticipated. **Operational Effects** There is not anticipated to be any change to existing infrastructure as a result of reducing the WTW minimum capacity and enabling an increased yield of approximately 1Ml/d. The option is located within a Historic NCLA consisting of mainly enclosed fields and woodland, however due to the lack of significant above-ground infrastructure, it is not anticipated that this will be adversely affected	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** The option is located within Dartmoor National Park within the existing WTW facility which is currently not accessible to members of the public. There are no schools, places of religious worship, medical practices or other community centres within 500m of the option. The A382 (Main road) is located within 2km south-west of the option. There are sections of PRoW located within 500m of the existing WTW facility. The site has	No impacts are anticipated as a result of the construction works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				an IMD Decile of 6 and is not located within an area classified within IMD20pc. No construction works are planned for this option with only minor improvements to control systems anticipated and as such there is unlikely to be any effect on the local community as a result of this option. The option is expected to commence in 2025 and spans a two year period where upfront capex costs are expected to be very substantial. This option is likely to involve skilled workers and is unlikely to directly impact the local economy during this time. **Operational Effects** Once the option is operational it is anticipated to result in very minimal ongoing opex costs from 2027.However, this still has the potential to create jobs through the maintenance and monitoring of the resource.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** There are no recreational or tourism activities located within the footprint of the option or within 500m of the option including National Cycle paths or Trails. No major construction works are planned, with the option involving minor improvements to the existing control systems. **Operational Effects** The option does not anticipate any changes to the existing recreational activities and tourism hotspots within the area. Changes in flow and quality are	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				unlikely to be impacted and should not result in any effect on recreational activities.			
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option is anticipated to utilise the existing WTW infrastructure. No construction is anticipated, with updates to the existing control systems only. **Operational Effects** Due to the nature of the option, there is not anticipated to be any change in operational activities.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option is likely to utilise the existing WTW infrastructure by increasing the daily yield through source optimisation and improved control systems. No construction is anticipated. **Operational Effects** Process control changes to allow a lower minimum flowrate to be treated at the WTW is not expected to have any ongoing impacts on wider infrastructure or other assets.	No Impacts are anticipated as a result of the construction phase. Therefore, no mitigation has been identified.	0	0

N.7 ROA10

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA10				
Option:	Avon WTW - reduce WTW minimum capacity				
Scheme type:	Conjunctive Use				
Option description:	Reduce WTW minimum capacity through process control changes to allow lower minimum flowrates to be treated. Enabling the WTW to operate at a reduced flow during periods of low demand, reserving water resources for use at time of increased demand. The source optimisation will improve control systems, principally chemical dosing, with some allowance for flow controls, isolation and ICA / SCADA improvements. Changes will occur within the existing WTW site footprint. Through reducing the minimum output allows the WTW to run at a lower output over a longer period of time.				
Approx. Yield (Ml/d):	1				
WRZ:	Roadford				
Date Completed:	17/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	27/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	0	**Construction Effects** The option is located 1.65km from Dartmoor SAC, also classified as a GWDTE. There are also three SSSIs located within 5km of the option including Lady's Wood and Viaduct Meadow SSSI 3.8km south (100% favourable condition), Piles Copse SSSI 2.75km south-west (100% favourable condition) and South Dartmoor SSSI 1.75km west (4% favourable, 51.7%	Best practice mitigation measures are to be implemented during any construction to minimise impacts upon designated and non-designated sites, however due to the nature of the option not requiring any significant new	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				unfavourable - recovering, 22% unfavourable - no change and 21.4% unfavourable – declining), of which the latter is connected to the option via GWDTE. The option directly intersects one SSSI Impact Risk Zone. It is unlikely that there will be any major infrastructure required as a result of the option, with only updates to existing control systems required. Therefore, there is not anticipated to be any direct impacts as a result of air pollution, noise or increased traffic during the construction phase, due to the scale and type of proposed works and the distance from designated sites. The HRA concluded that the option is hydrologically connected to the Dartmoor SAC via Teign, Avon, Dart and Erme WFD groundwater waterbody. Any pollution arising from the construction of the option may be transferred to the site and impact on its qualifying features, however due to the fact construction associated with the option is very minor, these effects are unlikely. The South Dartmoor Woods SAC (7km north-east) and South Hams SAC (7km east) are both hydrologically connected to the option by the Teign, Avon, Dart and Erme WFD groundwater waterbody, however both are sufficiently distant from the works that no effects are anticipated. **Operational Effects** The option would allow the WTW to operate at lower flow rates therefore allowing less treatment of water during periods of low demand. The WTW could thus draw down lower volumes of water from the Avon Dam during periods of low demand, leaving the water in the dam for periods when there is an increased demand. This would lead to an increase in resilience from the	infrastructure, it is unlikely any mitigation measures will be necessary.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				option. South Dartmoor SSSI (also classified as a GWDTE) and Dartmoor SAC are located approximately 520m away from the Avon Dam. However, the impact on these designated sites is considered neutral due to the small scale yield savings that are expected and the fact that this option involves surface water abstraction.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** The option is located within the existing WTW which is 500m from multiple areas of upland heathland and areas of deciduous woodland, both of which are classified as priority habitats. No major construction is anticipated as a result of the option and there is not anticipated to be any loss of habitat as a result of this option. Due to the nature of the option not requiring any significant new infrastructure and therefore construction, it is unlikely that there will be any effects on biodiversity and habitats from nuisance or pollution. As such, any short-term effects from the implementation of the option are considered neutral. **Operational Effects** At the time of assessment no NCA has been undertaken and it is assumed that there will be no change in existing land use or direct impact on Natural Capital. The increased abstraction could result in a reduction of groundwater quality and levels which could result in negative effect on GWDTEs. Once operational, the option is not anticipated to have any significant negative effects upon biodiversity or habitats. The option will lead to lower volumes of	Best practice should be explored for protecting priority habitats and the installation of habitat creation and restoration. Ongoing monitoring and review of groundwater levels and condition maybe required.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				abstraction from the Avon Dam during periods of low demand, however the overall impact of this on the water environment and biodiversity is likely to be neutral. This is because of the small-scale yield savings that are expected. It is not anticipated that there will be any effect on salmon waters as a result of the option.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option is not anticipated to require major construction works, so no risk of transfer/spread of INNS from construction vehicles and machinery is anticipated. The INNS assessment concluded that no new waterbodies will be connected as a result of the option. However, the option will be connected via a groundwater waterbody to two designated ecological sites including Dartmoor SAC and South Dartmoor SSSI. There is not anticipated to be a risk of transfer or movement of invasive or non-native species. **Operational Effects** The INNS assessment concluded that the spreading of INNS is not anticipated during the operational phase.	No impacts are anticipated during construction or operation of the option. However best practice methods will be implemented to minimise any disturbance and spread of unexpected INNS, as far as practicable.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option is located within Teign, Avon, Dart and Erme WFD groundwater waterbody and Avon – Upper and Upper Avon WFD surface waterbodies. The option is situated outside a NVZ and within Groundwater protection zone 3, in which all groundwater can potentially feed into the Avon Dam. It is also located within a Drinking Water Protected Zone.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified. Adjustment of abstraction conditions if it is identified upon further investigation that the operation of the	0	+

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
					The WFD Level 1 assessment concluded that the option is not anticipated to involve construction activities, and as such there will be limited risk of pollution or deterioration of WFD waterbodies. It is assumed there will be no changes to abstraction licences in terms of increase/reduction in the existing licences. **Operational Effects** The option will result in lower levels of water to be treated during periods of reduced demand, with this there will be less water abstracted from the Avon Dam. Therefore, this will lead to an increase in resilience for the water environment which will result in minor positive effects. The WFD Level 1 assessment concluded no moderate or high operational impacts as a result of this option.	option will be impactful to nearby GWDTE.			
	Increase resilience and reduce flood risk	0	-	+	**Construction Effects** The option is located within a Flood Zone 1 area with land comprising of less than 1 in 1000 annual probability of river or sea flooding. The option would involve minor updates to control systems. However, there is not anticipated to be any change to existing hardstanding, as the option will be developed within the existing site footprint. Therefore, there is no risk to the option from flooding or risk that the option would increase flood risk.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified. During operation, ongoing reviews of water levels within the dam should be undertaken to minimise future flooding events	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once operational, the option may increase flood risk within the Avon Dam and its surrounding area, which is located in Flood Zone 2 and Flood Zone 3. This is due to more water being left within the system rather than being abstracted, which means larger volumes of water will remain in the system filtering into the dam. However, the option will increase the resilience during rainfall events as it will allow the WTW to operate at a higher capacity and remove water from the system. Also, given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise.			
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** There are no major construction activities (with only minor updates to the control systems anticipated) as part of the option. It is predicted that the existing WTW will operate as usual during source optimisation. **Operational Effects** The process control changes will allow lower minimum flowrate to be treated. Thus, enabling the plant to treat less flow at times of low demand, reserving water resource for use during peak periods of demand. This will provide a more reliable and resilient water supply. The option would result in minor increased water efficiency by providing an additional 1Ml/d of water for reserve within the Avon Dam.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is located directly adjacent to Grade 4 and Grade 5 Agricultural Land. The land consists of poor-quality grassland with occasional arable crops with variable yields and very poor quality with very severe limitations restricting use to permanent pasture or rough grazing. The South Dartmoor SSSI (4% favourable, 51.7% unfavourable - recovering, 22% unfavourable - no change and 21.4% unfavourable – declining) is located 1.65km west of the option and is designated for its geological status. There are no Historic landfills or Authorised Landfill Sites within the option footprint or within 200m of the option respectively. This option doesn't involve any construction activities, with updates to the control systems only. Therefore, it is not anticipated that the functionality or quality of the soil will change. **Operational Effects** The improved control system and upgrades to the WTW are anticipated to be located within the existing site footprint with no additional land take. Therefore, reducing the WTW minimum flowrate is not anticipated to have any effect on soils, sediments or land use within the footprint of the option as a result of the operation of the WTW.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
Air	Reduce and minimise air emissions	0	+	-	**Construction Effects** The option is located over 500m from any AQMAs. No construction works are anticipated as a result of the option, with only minor updates to the existing control system anticipated and therefore no effects to air quality are anticipated. **Operational Effects** It is unlikely that the operation of the option will result in any significant change to existing air quality. However, there may be minor improvements as a result of reviewing efficiencies within the equipment and infrastructure as part of the source optimisation resulting in a reduction in air emissions. There is also the potential that the WTW will operate at an increased frequency and prolonged duration due to the reduced minimum capacity, therefore leading to potential increased air emissions as a result of plant and equipment operating over longer durations.	No impacts are anticipated as a result of the works during construction of the option and therefore no mitigation identified. Investigate the use of renewable energy sources to power the WTW facilities during operation.	0	-	+
Climatic Factors	Reduce embodied and operational carbon emissions	0	0		**Construction Effects** There is not anticipated to be any major construction with the option involving process control changes and improved control systems. As such this option is unlikely to result in any noticeable increase in carbon emissions during the construction phase. The embodied carbon emissions (total embodied carbon from construction) for this option are predicted to be 14tCO_2 equivalent.	If appropriate, investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	0	

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects Through source optimisation of the WTW and via enabling the WTW to operate at a lower flowrate there is the potential for operational carbon to decrease during periods of low demand. However, through the optimisation of the plant it is anticipated that it will be able to operate at a reduced minimum output, enabling the plant to run over longer periods of time thus resulting in the potential for increased operational carbon. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions are predicted to be 2tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. If the option operated under a maximum utilisation scenario, operational carbon emissions are predicted to be 6tCO_2 equivalent per annum. Due to the low carbon emissions during operation, the effect of this is considered neutral.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There is not anticipated to be any construction activities, with updates to the control systems only, and as such this option is not anticipated to result in any effect on climate change through increases or decreases in embodied carbon or carbon emissions, from plant or machinery operation. **Operational Effects** The optimisation of the WTW could result in an increase in resilience towards climate change effects through enabling the WTW to process water on a	No major impacts are anticipated as a result of the works during construction. However best practice should be considered during the construction phase to review energy use and material selection. A carbon risk assessment should be undertaken to embed climate mitigation during optimisation of the WTW.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				continuous basis, providing a more efficient water supply. Through treating less water at times of low demand, this enables the facility to reserve water resources for times of high demand and drought periods. However, climate change related drought could lead to a reduction in water levels within the waterbody and therefore reduce water which the WTW can abstract.	It is proposed that ongoing monitoring is undertaken to ensure compliance with abstraction licences and to minimise climatic effects.		
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** There are two Listed Buildings within 500m of the option including: Barn immediately south of Zeal Farmhouse, and Shipley Bridge. There are also five Scheduled Monuments including: Enclosure with hut circles north of Bala Brook intake; Two hut circles on the right bank of Red Brook; Enclosure with hut circles and rectangular pens, South of Bala Brook; Two conjoined huts between two enclosures north of Bala Brook intake; and Three enclosed hut groups, Black Tor and Shipley Bridge There are no Registered Parks and Gardens, Conservation Areas or Registered Battlefields within 500m of the option. There are also no Protected Wrecks within 5km of the option or any non-designated heritage assets. No major construction activities are anticipated as part of the option, with changes and improvements to existing control systems only. As such there is no anticipated effect on cultural heritage assets or archaeology during construction.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There is not expected to be any new infrastructure as part of this option. The operation of the existing WTW is not anticipated to affect the historic environment as a result of increasing the yield. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the Dartmoor National Park. The option is within 500m of two areas of common land including Brent Moor and Extensions of Brent Moor. The option is not located within a greenbelt or within an area classified as an AONB. No construction works are planned for this option though, and so there is not anticipated to be any short-term effects on any landscape features. **Operational Effects** The option is located within a Historic National Landscape Character Area consisting of mainly unimproved rough ground. However, there is not anticipated to be any change to existing infrastructure as a result of reducing the WTW minimum capacity and enabling an increased yield of approximately 1Ml/d. Therefore, it is not anticipated that this landscape feature will be adversely affected.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** Whilst the option is located within the Dartmoor National Park, the existing WTW facility is currently not accessible to members of the public. There are no schools, places of religious worship, medical practices or other community centres within 500m of the option. There is a section of PRoW (bridleway) located within 500m of the option, although it will not be affected due to works taking place within the WTW facility. The site has an IMD Decile of 5. No construction works are planned for this option, with only minor updates to existing control systems within the existing site footprint and existing structures anticipated. The option is expected to commence in 2025 and spans a two year period where upfront capex costs are anticipated to be high. This option is likely to involve skilled workers and is unlikely to directly impact the local economy during this time. **Operational Effects** Once the option is operational it is anticipated to result in extremely minimal ongoing opex costs from 2027.This is unlikely to have any impact on the local economy through job creation etc.	No impacts are anticipated as a result of the construction works and therefore no mitigation identified.	0	0
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** There are no recreational or tourism activities located within the footprint of the option. No major construction works are planned, with the option involving minor improvements to the existing control systems. Therefore, no short-term effects are anticipated.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option is not anticipated to result in changes to the existing recreational activities and tourism hotspots within the area. Changes in flow and quality are unlikely to be impacted and therefore is not likely to result in any effect on recreational activities downstream. The Avon Dam reservoir is however used recreationally, primarily for fishing activities and walking and so it should be considered as to whether implementation of the option will have any effect on this.			
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option is proposed to utilise the existing WTW infrastructure. No construction is anticipated, with updates to the existing control systems only. Therefore, it is not anticipated that there will be any effects in resource use or waste production. **Operational Effects** Due to the nature of the option, there is not anticipated to be any major changes in operational activities. There may be a minor increase in energy consumption as a result of increased yield, which may result in an increase in operational carbon emissions and fossil fuel use.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option is expected to utilise the existing WTW infrastructure by increasing the daily yield through source optimisation and improved control systems. No construction is anticipated and therefore built assets	No effects are anticipated as a result of the construction phase. Therefore, no mitigation has been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and infrastructure are not likely to be adversely affected. **Operational Effects** During the operational phase there is not anticipated to be any impact upon built assets and infrastructure as no continuous works will be required involving construction vehicles.			

N.8 ROA11

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA11				
Option:	Meldon WTW – Reduce WTW minimum capacity				
Scheme type:	Conjunctive Use				
Option description:	Source optimisation – reducing Meldon WTW minimum capacities through process control changes to allow lower minimum flowrates to be treated. Enabling the WTW to a reduced flow during periods of low demand, reserving water resources for use at time of increased demand. The source optimisation will improve control systems, principally chemical dosing, with some allowance for flow controls, isolation and ICA / SCADA improvements. Changes will occur within the existing WTW site footprint. Through reducing the minimum output allows the WTW to run at a lower output over a longer period of time.				
Approx. Yield (Ml/d):	1				
WRZ:	Roadford				
Date Completed:	17/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	28/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** There are two SSSIs located within 5000m of the option including North Dartmoor SSSI (0.22% favourable, 46.28% unfavourable – recovering and 54.50% unfavourable – no change) which is classified as a GWDTE, and Okehampton Park Flush SSSI (100% unfavourable – recovering). The option is also located within two SSSI Impact Risk Zones. The HRA assessment concluded that, although the Dartmoor SAC is upstream of the option, it is still	Although the construction associated with the scheme will be limited, for any impacts identified, best practice mitigation measures should be implemented.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				connected by the Tamar WFD waterbody. Any pollution events arising from construction may transfer to the site and affect qualifying features, although due to the nature of the option the potential transfer of pollution is likely to be low. It is however unlikely that any major infrastructure will be required as a result of the option, with only updates to control systems required. Therefore, there is not anticipated to any direct impacts as a result of air pollution, noise or increased traffic due to the scope of the works. This extends to a risk identified by the HRA which highlighted otter populations within the SAC as being at risk, which is unlikely due to the anticipated low-scale works associated with the option. However, there is the potential for minor adverse effects on designated sites as a result of ground pollution, but this is dependent on the scope of the works that will be identified at a later stage during construction. **Operational Effects** The option would allow the WTW to operate at lower flow rates therefore allowing less treatment of water during periods of low demand. The WTW could thus draw down lower volumes of water from the dam during periods of low demand, leaving the water in the dam/river for periods when there is an increased demand. This would lead to an increase in resilience from the option. As well as this the reduction in removal of water from the water system during periods of low demand is likely to have a minor positive effect on the SAC as less water is being removed. However,			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				the overall impact of this is likely to be neutral due to the small scale yield savings that are expected.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	0	**Construction Effects** The option has multiple areas of deciduous woodland and areas of grass moorland priority habitats within the site boundary. There are also multiple areas of grass moorland priority habitat located within 500m of the option. No major construction is anticipated as a result of the option. There is the potential for nuisance including air, noise and water pollution during construction, as a result of increased vehicle movements, construction and activities. This is deemed to be unlikely due to the scope of the works and any potential effects of this are anticipated to be minimal. However due to the scale of the proposed works, it is not anticipated habitats will be interfered with during the construction phase. **Operational Effects** Once operational the option is not anticipated to have any significant negative effects upon biodiversity or habitats. The option will lead to lower volumes of abstraction during periods of low demand, however the overall impact of this on the water environment and biodiversity is likely to create a neutral effect. It is not anticipated that this option will result in any effects on salmon rivers.	Best practice should be explored for protecting priority habitats and the installation of habitat creation and restoration. There is the potential for the option to explore the possibility of habitat creation and restoration within the existing footprint of the WTW as well as protecting existing priority habitats situated within the northern section of the footprint.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option is not anticipated to require major construction works. No new waterbodies are likely to be connected as a result of the option. There has been one individual record of Rhododendron located within Meldon Reservoir. The INNS assessment concluded that the option has no risk of transfer/movement of INNS. **Operational Effects** The INNS assessment concluded that the spreading of INNS is not anticipated during the operational phase.	Best practice methods to be implemented to minimise disturbance and spread of INNS as far as practicable.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option is located within Lew (Tamer) and Tamar Groundwater WFD waterbodies. The option is located outside a NVZ and within Groundwater protection zone 3. It is also located within a Drinking Water Protected Area. It is assumed there are no changes to abstraction licences in terms of increase/reduction in the existing licences. The WFD Level 1 assessment concluded no moderate or high construction impacts as a result of this option. **Operational Effects** The option will result in lower levels of water to be treated during periods of reduced demand, with this there will be less water abstracted from the dam. Therefore, this will lead to an increase in resilience for the water environment which will result in minor positive effects. The WFD Level 1 assessment concluded no moderate or high operational impacts as a result of this option.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified. During operation ongoing review of water quality should be undertaken.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
	Increase resilience and reduce flood risk	0	-	+	**Construction Effects** The option is located within a Flood Zone 1 area with a low potential for effects from flooding. This option doesn't involve any major construction activities. The option would involve minor updates to existing control systems. However, there is not anticipated to be any change to existing hardstanding as the option is anticipated to be developed within the existing site footprint. Therefore, there is no risk to the option from flooding or risk that the option would increase flood risk. **Operational Effects** Once operational the option may increase flood risk within the local water environment. This is due to more water being left within the system rather than being abstracted, which means larger volumes of water will remain in the system filtering into the dam. With this the areas adjacent to the dam are likely to be at a minor increased risk to flooding. However, the option will increase resilience during rainfall events as it will allow the WTW to operate at a higher capacity and remove water from the system. Also, given the fact the option is located away from the coastline, it is not anticipated that it will be subject to flooding arising from sea level rise.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified. During operation, ongoing reviews of water levels within the dam should be undertaken to minimise future flooding events.	0	-	+
	Deliver reliable and resilient water supplies	0	+		**Construction Effects** This option doesn't involve any construction activities, with updates to the control systems only. It is predicted that the existing WTW will operate as usual during source optimisation.	No impacts are anticipated during construction as a result of the works and therefore no mitigation has been identified.	0	+	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The process control changes are likely to allow lower minimum flowrates to be treated. Thus, enabling the plant to treat less flow at times of low demand, reserving water resources for use during peak periods of demand. This will provide a more reliable and resilient water supply. The option would result in minor increased water efficiency by providing an additional 1Ml/d of water for reserve within the dam/river.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** There are areas of Grade 4 and Grade 5 Agricultural Lands within the WTW site. This consists of poor quality grass with occasional arable crops with variable yields and very poor quality with very severe limitations restricting use to permanent pasture or rough grazing. There are no Historic landfills or Authorised Landfill Sites within the option footprint or within 200m of the option respectively. This option doesn't involve any construction activities, with only upgrades to the existing control systems required. Therefore, it is not anticipated that the functionality or quality of the soil will change. **Operational Effects** Reducing the WTW minimum flowrate is not anticipated to have any effect on soils, sediments or land use within the footprint of the option as a result of the operation of the WTW.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
Air	Reduce and minimise air emissions	0	-	+	**Construction Effects** The option is located over 500m from any AQMAs. No construction works are anticipated as a result of the option, with only minor upgrades to the existing control system required. **Operational Effects** It is unlikely that the operation of the option will result in any significant change to existing air quality. However, there may be minor improvements as a result of reviewing efficiencies within the equipment and infrastructure as part of the source optimisation resulting in a reduction in air emissions. There is also the potential that the WTW could operate at an increased frequency and prolonged duration due to the reduced minimum capacity, therefore leading to potential increased air emissions as a result of plant and equipment operating over longer durations.	No impacts are anticipated as a result of the works during construction. Therefore, no mitigation identified. Investigate the use of renewable energy sources to power the WTW facilities during operation.	0	-	+
Climatic Factors	Reduce embodied and operational carbon emissions	0	-		**Construction Effects** There is not anticipated to be any major construction, with the option involving process control changes and improved control systems. As such this option is unlikely to result in any increases or decreases in embodied carbon or carbon emissions during the construction phase. **Operational Effects** Through source optimisation of the WTW and via enabling the WTW to operate at a lower flowrate there is the potential for operational carbon to decrease during periods of low demand. However, through	No impacts are anticipated as a result of the works during construction and therefore no mitigation identified. If appropriate, investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the National Grid is likely to	0	-	

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					optimisation the plant is likely to be able to operate at a reduced minimum output enabling the plant to run over longer periods of time, thus resulting in the potential for increased operational carbon.	help reduce any future carbon emissions.			
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There is not anticipated to be any construction with updates to the control systems only and as such this option is not anticipated to result in any increases or decreases in embodied carbon or carbon emissions during the construction phase from plant equipment and materials. **Operational Effects** The optimisation of the WTW could result in an increase in resilience towards climate change effects through enabling the WTW to process water on a continuous basis, providing a more water supply. Through treating less water at times of low demand, this enables the facility to reserve water resources for times of high demand and drought periods. However, climate change could lead to less water available for the WTW to abstract and therefore a reduction in water levels within the WTW.	No major impacts are anticipated as a result of the works during construction. However, best practice should be considered during the construction phase to review energy use and materials selection. A carbon risk assessment should be undertaken to embed climate mitigation during optimisation of the WTW.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** The option is located over 500m from any Listed Buildings, Scheduled Monuments, Conservation Areas, World Heritage Sites, Registered Parks and Gardens and Registered Battlefields. There are no Protected Wrecks within 5km, or any non-designated heritage assets. There are no major construction activities anticipated as part of the option with changes	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and improvements to existing control systems only. As such there is no anticipated effect on cultural heritage assets or archaeology during construction. **Operational Effects** There is not anticipated to be any new infrastructure as part of this option. The operation of the existing WTW is not anticipated to affect the historic environment as a result of increasing the yield. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the Dartmoor National Park. No construction works are planned for this option. The option could involve the optimisation and improvement of control systems within the existing WTW facilities. As the changes will occur within the existing WTW site, there are not anticipated to be any effects on these landscape features. **Operational Effects** There is not anticipated to be any change to existing infrastructure as a result of reducing the WTW minimum flowrate and enabling an increased yield of approximately 1Ml/d. Therefore, there are not anticipated to be any effects on landscape features during operation.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** The option is located within an existing WTW facility. There are no schools, places of religious worship, medical practices or other community centres within 500m of the option. There are sections of PRoW (bridleway) located within 500m of the option however these should not experience impacts. This is because no construction works are planned for this option with only minor improvements to control systems anticipated. The option is expected to commence in 2025 and spans a two year period where upfront capex costs are expected to be very substantial. This option is likely to involve skilled workers and is unlikely to directly impact the local economy during this time. **Operational Effects** Once the option is operational it is anticipated to result in very minimal ongoing opex costs from 2027. This has the potential to create jobs through the maintenance and monitoring of the resource, however these effects would likely be neutral.	No impacts are anticipated as a result of the construction works and therefore no mitigation identified.	0	0
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** There are no recreational or tourism activities located within the footprint of the option. No major construction works are planned, with the option involving minor improvements to the existing control systems. **Operational Effects** The option is not anticipated to result in changes to the existing recreational activities and tourism hotspots within the area. Changes in flow and quality are	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				unlikely to be impacted and will not result in any effect on recreational activities downstream.			
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option is anticipated to utilise the existing WTW infrastructure. No construction is anticipated, with updates to the existing control systems only. Therefore, no effects are anticipated on resource use and waste production. **Operational Effects** Due to the nature of the option, there is not anticipated to be any change in operational activities that affect resource use and waste production.	No impacts are anticipated as a result of the works and therefore no mitigation identified.	0	0
	Avoid negative effects on built assets and infrastructure	0	+	**Construction Effects** The option is likely to utilise the existing WTW infrastructure by increasing the daily yield through source optimisation and improved control systems. No construction is anticipated, and all works will be contained within the existing WTW site. Therefore, the effect on built assets and infrastructure is considered neutral. **Operational Effects** Source optimisation could be utilised to increase the yield of the existing asset and enabling the WTW to operate at a lower capacity over a longer period of time. Operational activities will be contained within the existing WTW site, therefore no effects on surrounding built assets and infrastructure are anticipated.	No impacts are anticipated as a result of the construction phase. Therefore, no mitigation has been identified.	0	+

N.9 ROA12

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA12				
Option:	Slade and Horedown WTW (GAC)				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	Installation of new pumping station at Slade reservoir and new 4Ml/d GAC plant at Horedown WTW.				
Approx. Yield (Ml/d):	2				
WRZ:	Roadford				
Date Completed:	30/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	28/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The option covers two areas consisting of a new pumping station and a new GAC plant. An area of The Cairn and Old Railway CWS is located within the proposed site of the new pumping station. Construction works within this site have potential to cause minor habitat loss as well as disturbance effects from construction noise, dust and emissions. There are several other CWS within 2000m of the option, including Torrs Park, Langleigh Manor Fields, Winsham Farm, and Mullacott Cleave & Shelfin Wood. The pumping station is situated approximately 780m away from the Cairn Woodland LNR and approximately 3000m away from the Hillsborough LNR. The pumping station is situated approximately	Best practice mitigation measures should be followed to minimise the impact on designated and non-designated ecological sites, including review of equipment and methodologies, designated refuelling spots, dust suppression, review of vehicle movements including personnel and deliveries and the use of equipment with lower noise levels.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				4850m away from Morte Point SSSI (100% favourable condition) and it is located within SSSI Risk Zones. Construction has potential to indirectly affect the surrounding ecological sites as a result of increased vehicle movements, noise and vibration, potential for contamination to ground and surface water and generation of dust and increased emissions. The new GAC plant is located within 2000m of several CWS, including Mullacott Cleave & Shelfin Wood, Warmscombe Wood, Winsham Farm, and The Cairn and Old Railway. The new GAC plant is not located within 5000m of any biological SSSI's, although it is located within SSSI Impact Risk Zones. The new GAC plant is located approximately 1820m away from Cairn Woodland LNR and approximately 3295m away from Hillsborough LNR. The GAC plant is anticipated to be located within the existing Horedown WTW site footprint. Construction has the potential to indirectly affect the ecological sites as a result of increased vehicle movements, noise and vibration, potential for contamination to ground and surface water and generation of dust and increased emissions. However, these effects are likely to be minimal due to the distance from the designated and non-designated sites and the extent of construction. The HRA concluded that although Exmoor Heaths SAC and Braunton Burrows SAC are hydrologically connected to the option via the River Taw and North Devon Streams WFD groundwater waterbody, they are sufficiently distant from the proposed works so that no likely significant effects are anticipated during construction. Exmoor Heaths SAC is located approximately 7420m away from the new GAC plant			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT	
				8874m away from the new pumping station. Braunton Burrows SAC is located approximately 9500m away from the new GAC plant and is located approximately 9485m away from the new pumping station. **Operational Effects** The option is not anticipated to have an effect in the long term on designated and non-designated ecological sites. The Cairn and Old Railway County Wildlife Site (CWS) is located directly adjacent to the Slade Lower Reservoir. This reservoir will experience reduced water levels due to the increase in surface water abstraction from the new pumping station. There is potential for the habitats and species within this site to experience some negative effects, however as the abstraction yield is relatively low, the long-term effect is considered neutral. The other designated and non-designated ecological sites are not likely to experience any impacts due to their distance from the option. The HRA concluded that there are no impact pathways between the option and Exmoor Heaths SAC and Braunton Burrows SAC during operation.				
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	---	-	**Construction Effects** The new pumping station at Slade Reservoir is surrounded by areas of deciduous woodland, priority habitat and located within an area of greenfield. The construction of the new infrastructure at Slade Reservoir has the potential to result in the removal of habitats and the potential to disturb aquatic and terrestrial habitats. The new GAC plant is anticipated to be located within the existing footprint of the Horedown WTW site and as such is anticipated to be	Removal of areas of deciduous woodland should be avoided to minimise loss of high priority habitat. Best practice methods for the installation of the new infrastructure should be implemented to minimise disturbance on local species and habitats as far as practicable. These	--	--	+	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				constructed on areas of existing hardstanding or amenity grassland. Throughout the construction phase for both facilities there is a risk of increased disturbance from vehicle movements (materials, waste and personnel), air pollution from dust and emissions and risk of ground and groundwater contamination. The NCA identified that during the construction of the new facilities there is the potential for permanent loss of low value arable land and pastures and the potential for temporarily loss of high value habitats such as broadleaved, mixed and yew woodland as well as woodland priority habitat. The BNG assessment identified the loss of lowland mixed deciduous woodland and moderate alkalinity lakes, with high distinctness, and modified grassland, other woodland (broadleaved), reservoirs, and ponds (non-priority habitat), with moderate distinctness during the construction phase. **Operational Effects** There is potential for negative effects on aquatic species and habitats associated with operation. The increased regular use and abstraction from the Slade Reservoir will result in decreased water levels, both within the reservoir and within the river downstream. Decreased water levels as well as new infrastructure could affect fish and aquatic habitats who depend on the hydrological regime of the waterbodies. The new GAC plant will improve the existing water quality for drinking purposes. It is currently unknown as to how waste will be disposed of during operation. Woodland	measures include: providing designated refuelling spots, dust suppression, review of vehicle movements including personnel and deliveries and prioritise the use of equipment with lower noise levels. Due to the nature of the works there is an opportunity to improve existing habitats and biodiversity through post construction remediation and replacement of low value habitats with high value habitats. Any loss of high distinctiveness habitat should be replaced with the same habitat. Any loss of moderate distinctiveness habitat should be replaced with the same broad habitat or a higher distinctiveness habitat.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				habitats are expected to be reinstated/compensated to pre-construction conditions, reducing any permanent impacts from construction. The option presents an opportunity to improve the existing habitats through post construction remediation and replacement of low value habitats with high value habitats. The option has been identified as overlapping the Natural England Network Enhancement Zone 2. It is not anticipated that the option will result in any effects on salmon rivers.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** The INNS assessment recognised the risk of spreading INNS during the construction phase as a result of movement of excavated material around the site. Additionally, during construction there is a small risk of construction workers introducing INNS across the site including areas of priority habitat and waterbodies such as the Slade Reservoir. **Operational Effects** The INNS assessment has identified the option as not currently being connected with the physical transfer of untreated water and assumes that any transferred INNS would be treated/removed at the water treatment facility. There are additional risks of the spread of INNS from pipeline washout, pipeline bursts, wash water discharge, overflows and sludge disposal during the maintenance, which could result in a negative impact and spread of INNS. Due to the increased abstraction, there is the potential for a reduction in water within the Slade Reservoir, leading to a change in habitat suitability for INNS currently present. This in turn could	Best practice and consultation of an INNS risk assessment in order to mitigate as much as possible. All construction staff must follow the site biosecurity practices.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					facilitate further spread due to the receptor being hydraulically connected to other waterbodies.				
Water	Protect and enhance the quality of the water environment and water resources	--	--	+	**Construction Effects** Both developments as part of the option are located within the River Taw and North Devon Streams WFD catchment and the Bristol Channel Outer South WFD waterbody. The option is located within Groundwater Protection Zone 3 (low potential for effects) with the new pumping station at Slade Reservoir situated within the Slade Lower Reservoir WFD waterbody and a Eutrophic Lake NVZ. There is potential for temporary effects during the construction phase, including risk of surface water and groundwater pollution from above ground and below ground structures including chemical and fuel spills as well as excavation and increased vehicles movements. The option is also located within a Drinking Water Protected Zone, with potential for significant effects as a result of any contamination. The WFD Level 1 assessment concluded no moderate or high construction impacts as a result of this option. **Operational Effects** The option involves the increased abstraction and treatment through the new GAC plant. Therefore, there is the potential for both positive and negative effects as a result of the option. Negative effects include over abstraction leading to a decrease in water levels and quality. The WFD Level 1 assessment concluded moderate effects on Slade Lower Reservoir WFD waterbody due to the use of existing surface water and groundwater abstraction licences, within existing	A risk assessment should be undertaken for excavation works and dewatering to ensure no adverse impacts. Best practice construction measures should be implemented to minimise the risk of pollution, through establishing designated refuelling areas and correct storage of chemicals and fuel within double bunded COSHH storage areas. Additionally, construction methodologies should be reviewed to mitigate any further risk of groundwater pollution during construction. Ongoing monitoring and review of water levels and quality should be undertaken during operation to prevent over abstraction.	-	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					licence conditions but outside of the recent actual rates. Positive effects include the nitrate treatment having the potential to improve water quality through removal of nitrate within the water.				
	Increase resilience and reduce flood risk	--	---	+	**Construction Effects** The new pumping station will be located within Flood Zone 2 (1 in 1000 year) and Flood Zone 3 (1 in 100 year). The new GAC plant is located within 500m of areas of Flood Zone 2. During construction of both the new GAC plant and pumping station, there is likely to be a risk of surface water flooding as a result of excavation and construction. The exact location of the plant is not confirmed however, it is anticipated that the GAC is likely to be located within the existing WTW on an existing area of hardstanding. The pumping station is anticipated to be located within a greenfield area and may require the removal of vegetation. **Operational Effects** The proposed new GAC Plant is likely to be located within the existing WTW footprint. Therefore, this plant is unlikely to experience significant increases in flood risk during operation of the option given the existing nature of the site. However, the new pumping station is anticipated to be located to the north of the Slade Reservoir within an area of greenfield (unmade land). The new pumping station may result in the removal of vegetation and increase in hardstanding, thus leading to an increased risk of surface water flooding. Removal of vegetation will increase flood risk as less water will be intercepted during heavy rainfall events and increased hardstanding will reduce the ability of land to	During construction best practice mitigation measures should be applied. The option should explore the use of Sustainable Urban Drainage (SUDs) and opt to build on existing hardstanding where feasible.	--	--	+

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					absorb rainfall through the introduction of hard, impermeable surfaces. However, the increased yield and the continuous operation of the facilities could result in an increased capacity during heavy rainfall events leading to reduced risk of flooding. The option is located over 500m from the coast, and so is unlikely to be affected by sea-level rise in the future.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** During construction the option is unlikely to result in any change to the existing reliability and resilience of water supplies. **Operational Effects** The option is expected to provide an additional 1Ml/d of water for use within SWW region. The increase in abstraction is likely to result in increased resilience of water supplies within the area, providing additional supply and a more reliable water source for SWW. There is potential for over abstraction, leading to a decrease in water levels and quality and a reduction in WFD status. This could negatively affect water resilience and supplies in the long term.	During design and construction water resources should be maintained. Ongoing monitoring and review of water levels and quality should be undertaken during operation to prevent over abstraction.	0	-	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	--	--		**Construction Effects** The option is situated across two locations. The new pumping station is situated to the north of the Slade Reservoir within Grade 3 Agricultural Land, consisting of good to moderate quality with moderate limitations. Construction works will take place on this greenfield land, which will contain undisturbed soils. Excavation works, as well as increased use of machinery, plant and vibrations has potential to decrease the	Review design to ensure no impact to stabilisation of the riverbank or soil subsidence. Best practice mitigation measures are likely to prevent the risk of contamination during construction.	--	--	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				functionality and quality of soils in this area resulting in a moderate negative impact. The new GAC plant is situated within the existing WTW footprint. Areas of Grade 4 Agricultural Land are found within the site. Areas of Grade 3 Agricultural Land are located adjacent to the site, consisting of poor-quality grass with occasional arable crops. The soils within the WTW site are likely to have been previously disturbed by the installation of existing infrastructure. Therefore, as the new GAC plant will be constructed on previously disturbed hardstanding ground, the effect on soils in this area are considered negligible. The Hele, Samson's and Combe Martin Bays geological SSSI (100% favourable condition), is situated approximately 3776m away from the new GAC plant and approximately 3730m away from the new pumping station. Due to its large distance away from the option, this site is not likely to experience any negative effects during construction. **Operational Effects** The new pumping station is anticipated to be constructed on an area of greenfield and result in long-term change to the land use, resulting in a moderate negative impact. Whereas the New GAC is likely to be located within an area of existing hardstanding and is not anticipated to have any long- term effect on soils, sediments or land use within the footprint of the option.			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	--	-	**Construction Effects** The option is located over 500m from any AQMAs. The option could result in significant civil and infrastructure construction works which has the potential to result in increased dust and air emissions from the operation of plant, equipment and increased vehicle movements (deliveries, waste and personnel). **Operational Effects** The operation of the new pumping station and plant has the potential to result in increased emissions during operation as a result of increased energy intake and use of plant and equipment.	Best practice mitigation measures likely to be implemented during construction phase including use of low emission NRMM, dust suppression and review of deliveries and traffic management. Although, minor and temporary impacts on air quality are still likely to occur.	-	-
Climatic Factors	Reduce embodied and operational carbon emissions	--	0	**Construction Effects** The option is likely to generate an increase in embodied carbon and carbon emission during the construction of the new pumping station at the Slade Reservoir and new GAC plant at the existing WTW through the use of materials (concrete, steel), the increase in vehicle movements (deliveries, waste and personnel) and the use of construction equipment. The total embodied carbon from construction for this option is predicted to be 495tCO_2 equivalent. **Operational Effects** There is likely to be a minor increase in carbon emissions as a result of the operation of the new facilities including new pumping station and GAC plant. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions are	Best practice mitigation measures should be implemented during the construction phase to reduce the consumption of energy, review construction methodologies and explore opportunities to substitute materials with lower embodied carbon and recycled materials. Additionally, the use of renewable energy should be explored during construction and operation.	--	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					predicted to be 15tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. If the option operated under a maximum utilisation scenario, operational carbon emissions are predicted to be 34tCO_2 equivalent per annum.				
	Reduce vulnerability to climate change risks and hazards	0	-	+ +	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** The option provides a new pumping station enabling a greater abstraction rate from the Slade Reservoir leading to a reduction in water levels. This increased abstraction could cause increased vulnerability during periods of drought in the long term as water levels may become depleted impacting the aquatic life and reducing water resources and water quality. However, the new GAC plant has the potential to allow for improved treatment and increasing the usability of water sources present, therefore, offering a more secure water supply and resource for the Roadford region increasing resilience to climate change effects.	Monitor the abstraction rates to reduce the negative effects on the environment.	0	-	+ +
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0		**Construction Effects** There are two Grade II Listed Buildings, Haverstock Farmhouse and Haverstock Cottage located within 500m of the new pumping station at Slade Reservoir and none within 500m of the new GAC plant. Moreover, there are no Scheduled Monuments, World Heritage Sites, Conservation Areas, Registered Parks and Gardens or Registered Battlefields located at	Best practice mitigation measures are likely to be implemented during construction including review of Traffic Management Plan and Logistics plan (traffic routes taken during construction),	-	0	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				either site. There are no Protected Wrecks within 5km of the option or any non-designated heritage assets. Construction activities are not anticipated to directly impact the Listed Buildings; however increased vehicle movements, vibrations and dust emitted during the construction phase could have an effect on the Listed Buildings, resulting in a minor negative effect. **Operational Effects** There are no operational effects anticipated. However, due to increased pumping at Slade Reservoir, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral. It is unlikely that there will be any notable enhancement or improvement on public access and/or enjoyment to heritage assets.	dust suppression and review of plant and equipment. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on any water-dependant heritage assets and water sensitive historic environments.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	---	--	**Construction Effects** Both sites as part of the option are located within the Exmoor NLCA. The North Devon AONB is situated to the north/west of the new pumping station approximately 163m away. Whereas the new GAC plant is situated approximately 400m south-west of the Exmoor AONB. During construction of the option, activities are likely to result in increased vehicles movements, stockpiles and plant and equipment required such as cranes and excavators which have the potential to result in negative visual impacts and effects on the local character of this rural location. The	During design visual amenity should be considered and designs developed in keeping with the local landscape characteristics opting to use local materials and screening where feasible. During construction best practice should be followed to ensure visual impact associated with construction	--	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				new pumping station is situated to the north of the Slade Reservoir within an area of greenfield which could be significantly impacted during the removal of vegetation during the construction phase. **Operational Effects** The option involves two new above ground facilities (pumping station and GAC plant). Both have the potential to result in negative visual impacts on the local landscape due to their rural locations. The option is also located within a Historic National Landscape character area consisting of mainly fields, with potential to be affected by the new above ground infrastructure associated with the option.	activities are mitigated including review of methodologies, equipment and programme phasing as well as limiting vehicle movements to designated times and minimising the height of stockpiles onsite. The option should also seek to reinstate and enhance the local character of the site following construction completion.		
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	- +	0	**Construction Effects** Both proposed sites for the pumping station and GAC plant are situated within a rural environment where there are no places of religious worship, medical facilities, community facilities, businesses or residential properties within 500m. The new pumping station is predominantly surrounded by woodland and areas of arable farmland. There is a National Cycle route and PRoW (footpath) running parallel with the Slade Reservoir. The new GAC plant is situated within the existing WTW with no public access and is surrounded by areas of arable farmland. The A3123 runs adjacent to the south of the site. There is potential for minor negative effects as a result of the construction due to increased vehicle movements resulting in increased congestion and inconvenience to local farmers, as well as increased risk of pollution from noise, dust and emissions. However, construction has the potential to	Best practice mitigation measures to manage construction impacts and traffic (e.g. through a Construction Traffic Management Plan and construction Environmental Management Plan) should reduce effects although minor negative effects may still occur. Stakeholder consultation and community engagement should be prioritised and opportunities to provide training, use local suppliers and workforce should be explored.	- +	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				generate jobs and enhance the local community through the use of local suppliers, training and community engagement. The option construction works are expected to occur within the next two years, starting in 2025. During this timeframe the upfront capex is anticipated to be very substantial. **Operational Effects** Once the option is operational it is anticipated to result in minimal ongoing opex costs from 2027, this is likely to help the local economy to some extent through job creation during maintenance, monitoring and daily operations, although overall this effect is likely to be neutral.			
	Maintain and enhance tourism and recreation	--	-	**Construction Effects** The Slade Reservoir is used for fishing, with cycle and walking paths surrounding the waterbody. During construction there is potential for recreational activities to be negatively affected and access to the reservoir prohibited at the northern end to ensure the safety of members of the public during the construction phase. Construction activities have the potential to result in increased vehicle movements resulting in increased congestion and potential for collision as well as increased risk of pollution of noise, vibration, dust and emissions. The new GAC plant is likely to be located within the existing WTW facilities and as such is not anticipated to directly impact tourism, however, there is potential for increased vehicle movements leading to congestion on the local road network.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times. Best practice mitigation should be applied to manage construction. During operation, ongoing monitoring should be undertaken to ensure water levels are not depleted as a result of over abstraction.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Water levels within the Slade Reservoir may decrease as a result of the increased pumping. The decrease in water levels has the potential to negatively affect recreational fishing activities and a decline in water quality could lead to depleted fish stocks. Following the completion of construction, access routes are likely to need to be established to ensure a safe access route is maintained to enable recreation activities within the reservoir. There are not anticipated to be any long-term impacts on tourism or recreational activities as a result of the GAC plant.			
Material Assets	Minimise resource use and waste production	---	-	**Construction Effects** The option is not anticipated to utilise existing infrastructure and although the new GAC plant could be constructed within the existing WTW footprint, the new pumping station at Slade Reservoir is likely to be constructed on a greenfield site and may require significant infrastructure. The construction of two new facilities, has the potential to result in a significant increase in natural resources and materials including increased energy demand and water consumption as well as increased use of materials (steel, concrete, timber and asphalt etc.). The construction phase is anticipated to produce significant quantities of waste including construction, demolition and general solid waste as a result of the works. **Operational Effects** The operation of the new pumping station and GAC plant has the potential to result in an increase in operational energy demand through the pumping and	The option should explore the use of renewable energy, rainwater harvesting and grey water and review design requirements to minimise the use of concrete. Where feasible the project should seek to utilise excavated material and reinstate the existing land use following construction. Waste mitigation should be prioritised with a focus on diversion from landfill. Where feasible existing access routes should be utilised to minimise the need for additional temporary construction infrastructure.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				increased water treatment facilities. Operation of the GAC plant is also likely to increase the volume of waste generated during water treatment.			
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** During the construction of the new GAC plant, the existing WTW may be affected as a result of construction activities including noise and increased vehicle movements. The option is situated to the north of the A3123 Road which may experience congestion as a result of the works. Due to the rural nature of Slade Reservoir, with no main roads or transit network within 500m of the option, the construction phase is likely to rely on the local road network consisting of country lanes. This could result in increased congestion and/or damage to the local road network during large vehicle movements. **Operational Effects** During operation it is not anticipated that there will be any significant impacts on built assets and infrastructure.	Construction phasing should be reviewed to ensure impacts on local roads should be minimised, taking into account seasonal changes, peak times and alternate haul routes.	--	0

N.10 ROA13

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA13				
Option:	Duckaller and Vennbridge				
Scheme type:	Groundwater Enhancement				
Option description:	Changes to abstraction licences and 4Ml/d nitrate removal plant installation at Duckaller pumping station to facilitate full use of sources.				
Approx. Yield (Ml/d):	0.4				
WRZ:	Roadford				
Date Completed:	20/05/22, updated 03/02/23	***Completed By:***	Georgina Luck	***Version:***	C
Date Checked:	02/08/22, updated 09/02/23	***Checker:***	Amy Cox, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	-	**Construction Effects** The option is located approximately 2.3km south-east of Dawlish Warren SAC The Exe Estuary SPA and Exe Estuary Ramsar site, are both located approximately 2km to the east, downstream of option, all of which are GWDTE. The option is also located within a SSSI Risk Impact Zone and there are four SSSI's within 5km of the option, the closest of which is (Dawlish Warren located approximately (2km east of the option The four SSSI's within 5km of the option are Dawlish Warren (6% favourable condition, 79.6% unfavourable – recovering condition and 14% unfavourable – declining condition), Exe Estuary SSSI (83.9% favourable condition, 15.6% unfavourable – recovering condition	Best practice mitigation should be considered and implemented through a CEMP during the construction phase, to minimise the impact on designated ecological sites.	-	-

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				and 0.4% unfavourable – declining condition) and Little Haldon Heaths (90.5% unfavourable – recovering condition and 9.4% unfavourable – declining condition), all of which are GWDTE's. The option involves the construction of a new nitrate removal plant. It is anticipated that the new plant is likely to be built within the existing footprint of the pumping station. However, there is the potential for a new raw water pipeline between Venbridge and Duckaller which could result in the need for additional land take that could result in potential habitat loss. During the construction phase there is also the risk of increased traffic movements, increased emissions, dust and noise and vibration effects, which have the potential to disturb nearby ecological designated sites. The HRA concluded that there was potential for significant effects on the Exe Estuary SPA and Ramsar Site and the Dawlish Warren SAC, as these sites are hydrologically connected to the option via Permian Aquifers in Central Devon WFD groundwater waterbody. This means that there would be potential for pollutants to be transferred to the designated sites which could degrade habitat and foraging opportunities for qualifying species. Due to the distance from the option, East Devon Pebblebed Heaths SAC, East Devon Heaths SPA and South Hams SAC are not likely to be affected. **Operational Effects** The construction of a new nitrate removal plant as part of the existing pumping station has the potential to improve existing water quality. However, increase in			

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				abstraction licence and the increased use of the existing source may result in reduced water quality, impacting the GWDTE. The HRA concluded that there are not likely to be any effects during operation, as there are no impact pathways between the option and the designated sites.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	**Construction Effects** The option is located directly to the east of an area of deciduous woodland classified as priority habitat. Within 500m of the option, there are also areas of coastal and floodplain grazing marsh and additional deciduous woodland, the closest of which is directly adjacent to the south-west of the option. There are no LNRs, NNRs or Ancient Woodland directly encroached on by the option. The construction of the new nitrate removal plant, may result in temporary construction effects including increased noise and vibration, dust, emissions and increased vehicle movements. The new plant is proposed to be built within the existing footprint and therefore would limit the loss of habitat. However, there is the potential for a new raw water pipeline between Venbridge and Duckaller which could result in the removal of habitats including deciduous woodland priority habitat. Construction has been identified as having a permanent loss of stock or arable land, with potential for impacts on ecosystem services such as the loss of carbon storage due to habitat clearance and loss of food production. The BNG assessment identified the loss of cereal crops with a low distinctiveness and significance during the construction phase of the new pipeline.	Best practice mitigation measures to minimise the disturbance on the local ecology through the implementation of the CEMP. The location of the new plant should be designed and constructed to avoid disturbance to habitats and protected species. Ongoing monitoring and review of water quality and abstraction to prevent depletion of the water table and maintain water quality.	-	-

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				Operational Effects There is potential for negative effects on ecological sites associated with the increased regular use and abstraction of the WTW and pumping station. However, the new nitrate removal plant is likely to improve the existing water quality. The construction of the new plant and pipeline has been identified as having a long-term effect on stocks of arable land, with potential long-term impacts on ecosystem services. This is due to habitat clearance and loss of food production during the construction phase. No opportunities have been identified for this option as part of the NCA. There are no salmon rivers/water within 500m of the option. Therefore, the option is not anticipated to have any effect on any salmon waters.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** The INNS states that the redevelopment of resources to increase yields within the existing site footprints offers no risk of transfer/movement of INNS as a result of this option. A relic population of known Zebra Mussels, a high risk species, have been identified as present within the Exeter Canal. During construction there is a small risk on construction workers introducing INNS while working near existing inlets. **Operational Effects** As a result of the option there is a low risk that reduced water levels could change the habitat suitability for any	Best practice and consultation of an INNS risk assessment in order to mitigate these effects as much as possible.	0	-

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					INNS present which could facilitate further spread as a receptor if hydrologically connected to other waterbodies. Although it is noted that no new waterbodies are anticipated to be connected as part of the option.			
Water	Protect and enhance the quality of the water environment and water resources	--	-	+	**Construction Effects** The option is located in two WFD waterbodies including the EXE estuary and the Permian Aquifers in Central Devon WFD Groundwater body the option is also located within the Mid Devon NVZ. The option is located within a Groundwater Source Protection Zone 1 (Inner protection zone) and Zone 2 (outer protection zone). There is potential for temporary effects during the construction phase of above and below ground structures, including risk of surface water and groundwater pollution from chemical and fuel spills as well as excavation and increased vehicles movements. The option is not located within any Drinking Water Protected Areas. It is anticipated that there will be no change to the licence volumes but there is the potential that changes to abstraction licenses may be required. **Operational Effects** The option involves the increased abstraction and treatment through the new nitrate removal plant. Therefore, there is the potential for both positive and negative effects as a result of the option including over abstraction leading to a decrease in water quality however, the nitrate removal plant has the potential to improve water quality through removal nitrate within the water.	A risk assessment should be undertaken for excavation works and dewatering to ensure no adverse impacts on watercourses. Best practice construction measures will be implemented to minimise the risk of pollution, through establishing designated refuelling areas and correct storage of chemicals and fuel within double bunded COSHH storage areas. Additionally, construction methodologies should be reviewed to mitigate any further risk of groundwater pollution during construction. Ongoing monitoring and review of water levels and quality should be undertaken during operation to prevent over abstraction.	-	+

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				The WFD Level 1 assessment concluded low impact on the Permian Aquifer due to the below ground structures and a minimal to no impact on the EXE estuary as a result of the new nitrate removal plant and changes to the existing abstraction licence.			
	Increase resilience and reduce flood risk	-	+	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year rivers or sea flooding). During construction there is likely to be an increased risk of surface water flooding as a result of excavation and construction of the new nitrate removal plant. The exact location of the plant is not confirmed however, it is anticipated to be within the existing footprint of the existing Duckaller pumping station. **Operational Effects** Increased long-term effects during operation of the option are likely to be minimal given the existing nature of the site. However, the increased yield and the continuous operation of the facility has the potential to result in an increased capacity during heavy rainfall events leading to reduced risk of flooding. The option is, however, located close to the coast, and so has potential to be affected by sea-level rise in the future, with it not currently anticipated that there will be any defences implemented.	During construction best practice construction mitigation measures should be applied. The option should explore the use of Sustainable Urban drainage (SUDs) and opt to build on existing hardstanding.	-	+
	Deliver reliable and resilient water supplies	-	++	**Construction Effects** During construction the option is unlikely to result in any change to the existing reliability and resilience of water supplies. During construction there is the potential for increased water consumption for concrete	Best practice should be applied during the construction phase to monitor and reduce water consumption. No further mitigation has been	0	++

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				production, washing down and general construction activities. **Operational Effects** The option is expected to provide an additional 4Ml/d of water for use within Roadford region. The increase in abstraction is likely to result in increased resilience of water supplies within the area, providing additional supply and a more reliable water source for SWW.	identified at this stage however during design and construction water resources should be maintained.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	--	**Construction Effects** The option is located within Grade 3 Agricultural Land, consisting of good to moderate quality land with moderate limitations which affect the choice of crops, timing, cultivation and level of yield. There are no Historic Landfills or Authorised Landfill sites within the option footprint or within 200m of the option respectively. There are three Geological designated SSSI's located within 5km of the option including Dawlish Cliffs SSSI (26.5% favourable condition, 19.3% unfavourable – recovering condition and 54% unfavourable -declining condition), (Mixed designation) Dawlish Warren (6% favourable condition, 79.6% unfavourable – recovering condition and 14% unfavourable – declining condition), Exe Estuary SSSI (83.9% favourable condition, 15.6% unfavourable – recovering condition and 0.4% unfavourable – declining condition). Each situated within approximately 2km to 2.3km south-east of the option. The construction of the new nitrate removal plant is likely to be located within the existing footprint of the Duckaller pumping station, resulting in no loss of arable land. Additionally, the construction of the new	Construction methods should be reviewed to ensure that best practice construction practices are utilised. Following construction, ground should be reinstated to mitigate residual effects. Appropriate mitigation measures should be taken to avoid any release of fuels or chemicals to ground and prevent contamination.	0	--

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				facility may require underground structures that have the potential to impact the underlying geology of the area. There is potential for a new raw pipeline to be constructed between Venbridge and Duckaller which would result in the temporary and / or permanent loss of arable land, along the proposed pipeline. **Operational Effects** The installation and operation of the new nitrate removal plant is unlikely to result in any permanent loss of arable agricultural land. However, the new pipeline has the potential to cause the permanent loss of arable land for above or below ground structures and access for future maintenance.			
Air	Reduce and minimise air emissions	--	-	**Construction Effects** The option is located more than 500m from any AQMAs. During construction of the nitrate removal plant there are likely to be temporary impacts on the air quality from dust and vehicle exhaust emissions. **Operational Effects** The operation of the new nitrate removal plant and the additional treatment of water may cause an increase in emitted pollutants, resulting in a minor decrease in air quality.	Best practice measures should be implemented during the construction phase including review of plant and equipment to minimise the generation of dust, dust suppression (mist cannons and dampening down). Additionally review of NRMM emissions should be reviewed and highest emission standards implemented onsite. However, minor and temporary effects are still likely to occur during the construction phase.	-	-

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Climatic Factors	Reduce embodied and operational carbon emissions	--	0		**Construction Effects** The option involves the construction of notable new infrastructure including a new nitrate removal plant. During construction the option is likely to generate an increase in embodied carbon as a result of GHG emissions from the use of machinery and equipment, materials (concrete, steel and timber etc.) and the increase in vehicles movements (deliveries, waste and personnel). The embodied carbon emissions (total embodied carbon from construction) for this option are predicted to be 495tCO_2 equivalent. **Operational Effects** There is likely to be a minor increase in embodied carbon as a result of the increased capacity of the WTW and the operation of the new pumping station. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions are predicted to be 15tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	Best practice mitigation measures should be implemented during the construction phase to reduce the consumption of energy, review construction methodologies and explore opportunities to substitute materials with lower embodied carbon and recycled materials. Additionally the use of renewable energy should be explored during construction and operation.	-	0	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** The option has the potential to result in an increase in abstraction of 4Ml/d, the increased abstraction has the	During operation water levels should be monitored to reduce impacts associated with over abstraction and seasonal variation and changes to baseline water levels.	0	-	+

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				potential to put stress of the existing water supply within the Duckaller and Vennbridge reservoirs. However, the installation of the new nitrate removal plant could potentially improve the WTW resilience and water quality, enabling increased abstraction during periods of prolonged drought.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There are no Listed Buildings, Scheduled Monuments, World Heritage Sites, Conservation Areas, Registered Parks and Gardens or Registered Battlefields within 500m of the option. There are also no Protected Wrecks within 5km of the option, or any non-designated heritage assets. During excavation there is potential for unknown archaeological finds within the arable farmland to be uncovered. However, this is considered low, due to the majority of the works occurring within the existing site footprint. There is not anticipated to be any further effect on the historic environment during construction phase from noise and vibration, dust or increased traffic movements. **Operational Effects** There is not anticipated to be any operational effects, however if archaeological remains are witnessed during construction phase the removal of these are likely to result in the permanent loss of assets. Permanent loss may also result in the potential for the understanding and significance of the asset to be reduced within the local area. There is potential for effects upon water-dependent heritage assets and water sensitive environments to occur, due to the	During excavations associated with the construction phase it is recommended that a watching brief approach is followed and where archaeological remains are identified, an unexpected finds procedure should be followed.	0	0

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				nature of the option involving abstraction which could impact upon flow. But, at this stage they are currently unknown and with the small-scale yield changes the overall impact is likely to be negligible.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located within the existing footprint of the Duckaller pumping station with potential new pipelines extending across areas of arable farmland between Venbridge and Duckaller. There are no AONBs, National Parks or Greenbelt land within 500m, although the option is located within the Devon Redlands NLCA, there may be localised effects on land quality resulting from construction. The increase to the abstraction licence is unlikely to result in any visual effects or changes to the landscape, however, the construction of the new nitrate removal plant has the potential to result in loss of existing landscapes (farmland) and visual effects associated with construction including plant and machinery, increased vehicle movements and storage compounds. **Operational Effects** The option is located within the existing Duckaller pumping station footprint. There is the potential for permanent effects as a result of the new pipeline where above ground structures are deemed most appropriate. The existing facility, including new nitrate removal plant is likely to be shielded from residential receptors by tree coverage. The option is located within a Historic National Landscape character area consisting of mainly enclosed agriculture and fields	The construction impacts are temporary and should be mitigated through review of traffic movements, construction phasing and best practice mitigation methods. Where there is limited shielding from trees, towards the north of the option, the visual amenity of the pumping station should be considered and designed taking into account the existing landscape, where feasible. Following construction where feasible landscaping should be undertaken to minimise long-term impacts.	-	0

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					which has the potential to be affected by the new infrastructure.				
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+	-	+	**Construction Effects** The option is located predominately within the existing Duckaller pumping station, with a new raw water pipeline which extends across areas of existing arable farmland. There are no noise action important areas, major roads, railways, PRoW, National Parks, County Parks or community facilities within 500m. The northern section of the option is situated within IMD Decile 7, whereas the southern extent is located within IMD Decile 3. The option involves the construction of a new nitrate removal plant and offer the potential to provide employment and enhance the local economy through the use of local suppliers. The construction works are expected to span over four years, during which the capital expenditure is predicted to be very high. However, the option may result in the loss of farmland and areas of greenspace. During construction there is also the potential for increased vehicles movements resulting in congestion within the narrow lanes and increased emissions. **Operational Effects** Once operational it is anticipated that the option may result in high ongoing opex costs from 2029. This is likely to continue to provide jobs through the ongoing operation, maintenance and monitoring of the WTW facilities.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times and ongoing consultation with respective stakeholders and local community to minimise disturbance. Best Practice should be applied to minimise noise and air emissions as a result of construction activities.	+	-	+

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	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The option is predominantly located within the existing Duckaller pumping station footprint and therefore it is likely to have minimal impact on the existing tourism and recreation within the area. However the increased vehicle movements especially during summer months have the potential to cause increased traffic congestion. There is also the potential for increased noise and dust emissions as a result of the construction activities. However, due to the rural location these impacts are anticipated to be low. **Operational Effects** Due to the location of the option there is not anticipated to be any effect on tourism or recreational use during operation.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times.	-	0
Material Assets	Minimise resource use and waste production	--	-	**Construction Effects** The option involves the construction of a new nitrate removal plant and potential pipeline this would involve the use of materials, increased energy and water consumption during the construction phase and the production of construction waste and general solid waste. Where feasible the option should utilise the existing structures although it is assumed a new building may be required. **Operational Effects** The operation of the option may result in a minor increase in energy demand through the treatment of water within the Nitrate Removal Plant and the increased abstraction, requiring higher levels of	The option should explore the use of renewable energy, rainwater harvesting and grey water and review design requirements to minimise the use of concrete. Where feasible the project should seek to utilise excavated material and reinstate the existing land use following construction. Waste mitigation should be prioritised with a focus on diversion from landfill.	-	-

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				pumping. There is the potential for a by-product such as filter cake, to be produced as part of the nitrate treatment process, however this is yet to be confirmed.	Where feasible existing access routes should be utilised to minimise the need for additional temporary construction infrastructure.		
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** There are no major roads located within 500m of the option and as such there is potential for negative effects on country lanes, resulting in the need for traffic diversions during construction leading to increased congestion. Construction may result in the removal of existing structures, leading to the replacement and construction of new buildings. **Operational Effects** Following completion of the construction phase, it is not anticipated that there will be any significant impacts on the built asset and infrastructure.	Construction phasing should be reviewed to ensure impacts on local roads should be minimised, taking into account seasonal changes, peak times and alternate haul routes.	-	0

N.11 ROA14

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA14				
Option:	Raise Avon Dam				
Scheme type:	Reservoir Enlargement				
Option description:	Raise dam by 2 m and increase in reservoir size by 50m from current reservoir edge. Subject to structural engineering approval.				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	Roadford				
Date Completed:	31/05/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	02/08/22, updated 09/02/23	***Checker:***	Amy Cox, Georgina Luck		
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Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	0	**Construction Effects** The Dartmoor SAC lies 450m to the west of the site, and the South Dartmoor Woods SAC is 5km north-east of the site. There are no LNRs, NNRs, SPAs, or Ramsar sites within 5km of the site. South Dartmoor SSSI (4.5% favourable condition, 51.7% unfavourable – recovering, 22.4% unfavourable – no change, and 21.5% unfavourable – declining) is located approximately 1km west of the site. Within 5km of the site are also the Hembury Woods SSSI (100% favourable condition), the Holne Woodlands SSSI (60.0% favourable condition, 40.0% unfavourable - recovering), Piles Copse SSSI (100.0%). The option intersects with three SSSI Risk Zones. There is a CWS	Best practice mitigation should be considered and implemented through a CEMP during the construction phase, to minimise the impact on designated ecological sites.	--	0

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				approximately 1.7km northeast of the option and a further 10 within 5km. The HRA concluded that whilst Dartmoor SAC is upstream of the option, it is hydrologically connected via the Teign, Avon, Dart and Erme groundwater waterbody. This has potential to damage habitats through pollution. There could also be impacts to the otter population due to potential for increases in noise, vibration, airborne pollutants and artificial pollution. During construction, the works may indirectly affect the nearby designated sites through air emissions, noise and vibration, from construction activities and vehicles. However, this is unlikely to change the condition and designation of SSSIs and SACs due to the distance from the proposed works. Construction air emissions may have a negative impact on the three SSSI Risk Zones. **Operational Effects** The reservoir is unlikely to affect the conservation status of any designated sites during operation due to the distance and nature of the works.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	-	**Construction Effects** The site directly intersects with grass moorland and upland heathland habitat types. It is located on the Avon Reservoir on the River Avon. The expansion of the reservoir will require excavation and permanent land uptake 50m from the current edge of the reservoir, leading to a significant loss in area and disturbance (i.e. from construction noise, air pollution, light and vibration) of habitats around the reservoir. Pollution, e.g. from chemical or fuel leaks	Best practice methods to be implemented to minimise the disturbance effects, however minor effects will likely still be seen. Planting will be required to minimise the impact of the works in the long term.	-	+ -

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				and spills, and sedimentation may also result from construction runoff entering the waterbodies, producing a short-term negative effect. The option is expected to cause the loss of BNG units due to habitat clearance associated with construction. The option will likely cause the permanent loss of natural capital stocks during construction. Permanent loss of the floodplain is expected as a result of the option construction due to standard mitigation. Ecosystem services construction impacts include the release of CO_2 due to habitat clearance, loss of natural hazard management and a reduction in water purification. **Operational Effects** There will be permanent loss of habitat around the reservoir due to reservoir expansion. Aquatic habitats downstream may also see reduced transport of sediments and gravels as more water is stored in the reservoir, which would otherwise benefit them. However, there is opportunity to enhance biodiversity and create habitats through landscaping. The option is likely to cause the permanent gain of reservoir natural capital stocks post-construction. The option presents an opportunity to improve the existing habitats through post-construction remediation and replacement of low value habitats with higher value habitats. The option crosses several Natural England habitats, Network Enhancement Zone 1 and is therefore suitable for the planting of new high value habitats. The increase in capacity of the reservoir will bring additional water flow regulation to the			

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				environment. It is likely that the option will have long-term effects on the River Avon, which is a salmon river. This has the potential to interrupt movements of salmon within the waterbody. The HRA concluded that there is unlikely to be any impact pathways between the option and designated sites during operation.			
	Reduce the spread or presence of INNS	-	---	**Construction Effects** Himalayan balsam has been recorded to be present at Avon Reservoir. There is the risk of spreading INNS that could be present in the area from construction activities, e.g. the use of shared equipment and transfer of equipment between sites without proper cleaning. **Operational Effects** There is a risk that increased water levels could change the habitat suitability for any INNS present or functionality as a reservoir with respect to usage and connectivity, which could facilitate INNS spread to other waterbodies. Increased water levels could increase the spread of INNS by more fragments being suspended in the water and transported to different areas of the bank, along with other operational risks such as overflows, sludge disposal, etc. Overall, there is high risk of INNS spreading during the operation phase.	Best practice measures during construction to reduce the spread of INNS including the cleaning of equipment between sites and consulting specialists to remove INNS identified within construction footprint.	-	---
Water	Protect and enhance the quality of the water environment and water resources	--	--	**Construction Effects** The site is located within Avon Dam Reservoir on River Avon. It intersects with the Upper Avon and Avon Dam Reservoir WFD surface water bodies and the Teign,	Best practice construction measures will be implemented to minimise the risk of pollution, through establishing designated refuelling areas and correct	-	-

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				Avon, Dart and Erme WFD groundwater body. It is not within a NVZ, nor within a groundwater SPZ. Construction effects could include pollution from the spills of chemicals, fuels, and increased sediment load from construction runoff. Excavations may also expose groundwater to contaminants. This will lead to a short-term negative impact on the water environment. The WFD assessment indicated that the modification of the dam during construction could lead to hydromorphological changes, with a potential for high impact on preventing target WFD objectives for the Avon Dam Reservoir from being achieved. The option is also located within a Drinking Water Protected area, with potential for such contamination have an impact here. **Operational Effects** Retaining more water by expanding the reservoir may further reduce downstream flows and reduce water quality downstream. The modifications can potentially lead to a significant effect and permanent deterioration of WFD status of the Avon Dam Reservoir WFD surface water body	storage of chemicals and fuel within double bunded COSHH storage areas. Additionally, construction methodologies should be reviewed to mitigate any further risk of groundwater pollution during construction. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).		
	Increase resilience and reduce flood risk	--	+	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). Excavations to expand the reservoir could increase flood risk in the area in the short term.	Best practice to reduce flood risks during construction is recommended, however minor residual effects will likely remain.	-	+

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				Operational Effects The increased reservoir volume could retain more water during periods of heavy rainfall, enabling greater control of flows and reducing flood risk downstream. It is also unlikely that the option will be susceptible to flooding arising from sea level rise, given the fact it is located a distance from the coast.			
	Deliver reliable and resilient water supplies	0	++	**Construction Effects** It is unlikely that there will be a disruption to water supply due to construction around the reservoir, though this is to be looked at as the option develops. **Operational Effects** The elevated height of the dam and increase in reservoir size will likely lead to a moderate increase in the volume of water that could be stored for use by the wider community, thereby increasing the reliability of water supplies.	Measures to ensure resilience during the construction phase, including temporary compensation yields from other sources, is recommended.	0	++
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** There are areas of peaty soils within 200m of the site to the east and west, and areas of deep peaty soils within 800m to the west of the site. The site is located within Grade 5 Agricultural Land Classification (Very Poor Quality). South Dartmoor SSSI 1km west of the site is also designated as a Geological SSSI (mixed designation). There are no Historic or Authorised landfill sites within 2km of the site. The option involves expanding the reservoir by 50m from the current edge of the reservoir. This will require significant excavation, leading to the loss and	Best practice measures for the sustainable management of soils are recommended, however the option will result in the permanent loss of soils due to the expansion of the reservoir.	-	-

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				disturbance of soils around, however as the ALC is Grade 5, there will not be a significant loss in terms of agricultural land. Construction works may damage peaty soils if the soils are within the construction footprint. Contamination of soil from construction activities, e.g. the spillage of fuels and chemicals, could deteriorate the quality of soils in the short-term. It is not likely that construction effects will reach South Dartmoor SSSI and impact its quality as a SSSI due to the distance. **Operational Effects** There will be a permanent loss of soils from the reservoir expansion. The expansion of the reservoir also means more impoundment of water, leading to decreased downstream supply of sediments and gravels that could benefit aquatic ecosystems.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The site is located more than 5km from any AQMAs. Construction works will likely result in air emissions from construction vehicles and plant, though effects are short-term. **Operational Effects** No changes in air emissions are anticipated during operation once the dam walls have increased in height and reservoir expanded.	Best practice measures, including adhering to a CEMP and dust suppression measures, will likely be implemented. However, minor temporary negative effects will likely remain.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
Climatic Factors	Reduce embodied and operational carbon emissions	---	--	+	**Construction Effects** There will potentially be a major increase in embodied carbon as significant amounts of materials (e.g. carbon, steel, etc.) are required to increase the dam height by 2m. Construction activities will likely emit greenhouse gases in the short term. New land beneath the expanded reservoir may result in the degradation of vegetation, causing release of greenhouse gases. **Operational Effects** Due to the increased capacity to store water and increased uptake of land, there is greater potential for vegetation to degrade in the reservoir in the long term, emitting greenhouse gases. There is also the likelihood that energy use will increase moderately during the operation of the dam. However, the increased capacity of the dam could improve its performance as a sink for industrial carbon emissions.	There is opportunity to explore the use of sustainable materials and design to reduce embodied carbon, along with renewable energy to fuel construction activities.	--	--	+
	Reduce vulnerability to climate change risks and hazards	-	++		**Construction Effects** Excavation works around the reservoir may increase flood risk in the short term, which could exacerbate and climate-induced flooding. **Operational Effects** Greater area and volume of water that could be stored in the reservoir could increase resilience to a changing climate. Bigger storage capacity, coupled with potentially increased monitoring and control of flows, could assist in flood alleviation downstream of the reservoir. Due to the increase in volume, these effects will likely have a moderate positive effect.	Best practice measures during construction to reduce flood risk.	-	++	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	---	---	**Construction Effects** There is a Scheduled Monument (Hut circles and two enclosures on Dean Moor, near River Avon) on the northern bank of the reservoir. Two other Scheduled Monuments also lie within 500m of the site; these are Hut circle and fields, Bishop's Mead, and Enclosure and hut circles E of Huntingdon Ford. The works to expand the reservoir by 50m around the edge has the potential to result in the loss and deterioration of the Scheduled Monument to the north. Excavations will likely result in the damage of the structure of the Scheduled Monument Construction works will have a short-term effect on the setting of these Scheduled Monuments. There are no Conservation Areas within 500m of the option. The option is also located over 5km from any Protected Wrecks and any non-designated heritage assets. **Operational Effects** There will be permanent loss of a portion of the Scheduled Monument due to the expansion of the reservoir by 50m along its edge. This may lead to permanent loss of significance regarding the scheduled monument within the local area. There is also potential that through the greater annual take from Avon Dam reservoir, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.	Explore the option of not encroaching on the Scheduled Monuments for the expansion the reservoir. This could reduce the negative effects from a complete loss of a heritage asset, however moderate effects may still be likely due to the proximity of the works to the heritage assets. Additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments.	--	--

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	+	**Construction Effects** The option is located within Dartmoor National Park and within the Dartmoor NCLA. Construction works to increase the height of the dam by 2m and to expand the reservoir will likely result in visual disturbances and temporarily reduce the visual amenity within the landscape. **Operational Effects** The permanent increase in dam height by 2m will result in reduced views of the existing landscape beneath the reservoir. However, due to the relatively small increase in height compared to the existing dam, the negative effect on landscape is likely to be minor. There is also opportunity to enhance the landscape around the reservoir via planting and landscaping. The option is located within a Historic National Landscape character area, however due to the fact it mainly consists of unimproved rough ground, any additional infrastructure is not likely to have significant effect.	Best practice mitigation measures to reduce visual impacts during construction will likely be implemented, although residual effects will be likely. Planting and landscaping opportunities to be undertaken to mitigate impacts arising from option and provide enhancement where possible.	-	-	+
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+ + +	+	**Construction Effects** The site has an IMD Decile of 5. Didworthy is a village located approximately 2km south of the reservoir, and the reservoir is accessible via an unnamed local road from this village. The site is within the Dartmoor Open Access Area. Residents of the village may experience indirect disturbance through an increase in construction traffic passing through. Forms of disturbances may include short-term increase in construction air pollution and noise from construction vehicles. There are also	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority should be given during peak times and ongoing consultation with respective stakeholders and local	-	+ + +	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				several sections of PRoW located in close proximity to the reservoir. During construction, these may be blocked, which could create accessibility issues for the public. However, construction works may generate major economic benefits to the area as the upfront capex is estimated to be approximately very substantial across a period of five years, suggesting there will be significant local job opportunities and the opportunity to support local suppliers. This will significantly improve the local economy in the short term. **Operational Effects** There is opportunity to enhance the land around the reservoir, e.g. through nature provision, to improve the well-being of visitors to the reservoir. The modified dam is expected generate moderate ongoing opex costs, which may suggest minor opportunity to improve the local economy.	community to minimise disturbance. Best Practice should be applied to minimise noise and air emissions as a result of construction activities.		
	Maintain and enhance tourism and recreation	--	+	**Construction Effects** There will be short-term impact on the amenity of the reservoir as a recreational space due to construction works to expand the reservoir and increase the height of the dam. There may be restricted access around the reservoir for recreational use. **Operational Effects** There is the opportunity to enhance the land around the reservoir, e.g. through nature provision, to enhance the amenity of the site for tourism and recreation. Increased water storage capacity could enhance the	Best practice mitigation measures to reduce construction impacts including restricting of access and clear signage. Enhancement opportunities should be implemented where possible including nature provision.	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				space for water-based recreational activities in the reservoir, such as angling, swimming and sailing.			
Material Assets	Minimise resource use and waste production	---	0	**Construction Effects** Increasing dam height be 2m would need significant amounts of resources as estimated by a very high level of capex. Excavations to expand the reservoir will lead to significant waste generation. **Operational Effects** Energy consumption to operate the dam is unlikely to change significantly from current usage. There will unlikely be a substantial amount of waste generated during the operation phase	Follow a Site Waste Management Plan. Opportunity to implement sustainable design measures by looking at recycled materials and opportunities to use renewable energy to power the dam during operation.	--	0
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** There is already connection to SWW Water Mains on the site. There are no major roads or infrastructures surrounding the reservoir that would be impacted by construction works, though local roads may see a temporary increase in construction traffic due to the works at the reservoir. **Operational Effects** It is not anticipated that there will be any effects to built assets and infrastructure following construction.	Best practice measures during construction, including the use of a Construction Traffic Management Plan, is to be implemented.	-	0

N.12 ROA15

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA15				
Option:	Gatherley Phase 2				
Scheme type:	Trunk Mains Renewal/New				
Option description:	Pipeline from abstraction point in River Lyd to Roadford Lake Reservoir. Completion of scheme to allow 125Ml/d to be transferred to Roadford Reservoir. Dual main required between River Lyd and Roadford Reservoir.				
Approx. Yield (Ml/d):	125Ml/d				
WRZ:	Roadford				
Date Completed:	21/06/22, updated 03/02/23	***Completed By:***	Ardianty Nadhira	***Version:***	C
Date Checked:	28/07/22, updated 09/02/23	***Checker:***	Donna Hassett, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** There are no biological SSSIs, SPAs, SACs, Ramsar Sites, nor NNRs, within 5km of the site. There are no GWDTEs within 5km of the site. The option is not within a SSSI Risk Zone. The Roadford Lake LNR is located directly north of Roadford Lake Reservoir where the water will be transferred. There are 12 CWS within 2km of the site, including Portgatehill Marsh, Tinhay Remainder, Coombe Marsh, Coombe Wood, Knaphill Fields, Tredown, Shallaford, Roadford Reservoir, Roadford, Higher Grinacombe, Stowford Bridge and West Wortha Marsh. Construction activities will likely result in pollution emissions from machinery usage and runoff may also	Best practice mitigation measures will be followed to minimise the impact on designated and non-designated ecological sites, including review of equipment and methodologies, designated refuelling spots, dust suppression, review of vehicle movements including personnel and deliveries and the use of equipment with lower noise	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				enter surface waterbodies at Roadford Lake Reservoir, which could present a pollution pathway to the Roadford Lake LNR. This could have transient and temporary effect on the quality of the LNR with the potential for minor negative effects. The HRA concluded that whilst the Plymouth Sound & Estuaries SAC and Tamar Estuaries SAC are hydrologically connected to the option by the River Tamar, it is sufficiently distant from the proposed works so that there will be no significant effects during construction. **Operational Effects** During operation, the pumping station and abstraction of water will unlikely have an effect on the status of any designated sites. The HRA also concluded that the operation of the option is unlikely to have any significant effect on downstream designated sites. Abstraction during operation is not anticipated to result in likely significant effects on Plymouth Sound & Estuaries SAC approximately 29km downstream due to its distance and tidal nature. The Tamar Estuary SAC approximately 40km downstream of the site is unlikely to be affected due to its distance and the face that it is not a GWDTE, as the habitats which support its qualifying features are intertidal.	levels. CIRIA guidance to be followed to allow for effective implementation of pollution prevention measures.		
	Protect, conserve and enhance biodiversity, including priority species, vulnerable	--	--	**Construction Effects** The pipeline intersects with areas of deciduous woodland, along with modified and lowland calcareous grasslands, and other woodland (broadleaved). In terms of aquatic habitats, the pipeline originates first at	Best practice construction mitigation to be implemented, e.g. through the use of a CEMP to minimise disturbance to	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	habitats and habitat connectivity			River Lyd and crosses River Thrushel along the route before ending the route on the western side of Roadford Lake Reservoir. Construction works would directly disturb the areas of woodland through excavation for the pipeline, and air pollution, noise and vibration (e.g. through disturbing burrows, setts, and roots) from the use of construction plant and equipment. Habitats may also experience pollution from the accidental leaks and spills of fuels and chemicals, which may enter surface and groundwater bodies, particularly where there are excavations. The BNG assessment determined that there will potentially be a net loss of 40.55% of habitat units, mainly through the potential loss of habitats such as grasslands and woodland to construct the pipeline. **Operational Effects** The Level 2 WFD assessment identified possible deteriation risks to invertebrates and hydrological regime. Increased abstraction from the River Lyd and River Tamar may lead to reduced water levels downstream of the abstraction points, reducing the water available for aquatic habitats downstream. There is a chance that water levels could decrease as a result of this, and as such some species may become more vulnerable in certain areas. Habitat connectivity could also be affected in some areas, with some habitats becoming more vulnerable as a result of decreased water levels and flows. The option does not intersect any salmon rivers.	habitats, with the possibility to alter the route of the pipeline corridor to avoid intersecting with deciduous woodland.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce the spread or presence of INNS	--	--	**Construction Effects** There is a moderate risk of spreading INNS that could be present in the area from construction activities, e.g. the use of shared equipment without proper cleaning and wash water discharge. **Operational Effects** There is a moderate risk that reduced water levels on the River Tamar and Lyd or increased water levels at Roadford Reservoir could change the habitat suitability for any INNS present, which could facilitate further spread as receptor is hydrologically connected to other waterbodies. INNS risk could increase due to the physical transfer of untreated water (between two locations assumed currently connected) and additional risks from pipeline washout, pipeline bursts, wash water discharge, overflows, sludge disposal, and potential waste from welfare facilities.	Best practice and consultation of an INNS risk assessment in order to mitigate as much as possible.	--	--
Water	Protect and enhance the quality of the water environment and water resources	--	--	**Construction Effects** The pipeline does not cross a groundwater SPZ or a NVZ. The pipeline interfaces with the Tamar (GW), Lower River Lyd, River Thrushel, and Roadford Lake WFD bodies. Construction runoff may enter surface and groundwater bodies, particularly where excavation occurs, and introduce pollution through the accidental spillage of fuels and chemicals. This will deteriorate the quality of the water environment in the short term. There will likely be minor, short-term and reversible effects to the WFD bodies during construction where the pipeline interacts with the waterbodies.	Best practice construction measures will be implemented to minimise the risk of pollution, through establishing designated refuelling areas and correct storage of chemicals and fuel within double bunded COSHH storage areas. Additionally construction methodologies should be reviewed to mitigate any further risk of groundwater pollution during	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There will be a transfer of 125Ml/d to Roadford Reservoir, with abstraction points located at River Tamar and River Lyd. This could result in significantly reduced flows downstream of the abstraction points, which would reduce water levels and quality. The WFD Level 1 assessment indicates that the increased surface water abstraction from the new abstraction point at Lower River Lyd in Colmans of 40Ml/d will have the potential for significant negative effects and high impact on preventing target WFD objectives from being achieved for the Lower River Lyd WFD waterbody. Therefore, a WFD Level 2 assessment was undertaken, which concluded possible deterioration between status classes and possible impediments to Good Ecological Status/Good Ecological Potential for the Lower River Lyd.	construction. All measures will be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). Potential adjustment of licence / abstraction conditions to minimise impact on biology and hydrological regime.		
	Increase resilience and reduce flood risk	--	--	**Construction Effects** The pipeline crosses areas of Flood Zones 2 (1 in 1000 year risk) and 3 (1 in 100 year risk). There are flood defences along River Lyd where the source of the abstraction is proposed. Excavation works could increase the risk of flood risk by severing existing drainage patterns, particularly around areas of Flood Zone 3, and where construction works encroach on a flood defence structure. **Operational Effects** It is assumed that the new pumping station will be built on greenfield land and within Flood Zones 2 and 3, which means there would be an increase in	Best practice mitigation during construction to mitigate the effects of flooding. Investigate the use of SuDS in the design of the pumping station and surrounding area to reduce the risk of flooding.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				impermeable area, with a moderate risk of flooding. The increase in impermeable area is currently unknown. It is not, however, anticipated that there will be any impacts resulting from future sea level rise, due to the fact the option is located a distance away from the coast.			
	Deliver reliable and resilient water supplies	0	+++	**Construction Effects** The effect of construction works on water supply will need to be investigated further as design progresses, but at the moment it is assumed that water can still be delivered via the existing water mains during construction. **Operational Effects** There will be a transfer of 125Ml/d to Roadford Reservoir, which represents a major positive effect to the resilience of the water supply in the area.	No mitigation measures proposed as the option is currently not expected to result in negative effects to water supply.	0	+++
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** There is one Geological SSSI approximately 5km from the option, i.e. Coryton Quarry SSSI (100.0% unfavourable condition – declining), which is now a disused slate quarry, with declining conditions owing to poor exposure of features. The site is within 500m of the East Banbury and Gadcome Cross Historic Landfill Sites. The site intersects with Grade 3 (Good to Moderate quality) and Grade 4 (Poor quality) Agricultural Land Classifications. There is a County Geological Site within 5km southeast of the proposed abstraction point at Colmans. There is a Mineral Consultation Area in relation to aggregates downstream of River Tamar	Best practice in sustainable soil management during construction will likely be implemented. Soil to be reinstated once pipeline has been installed. New pumping station to be located on brownfield land if possible.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				approximately 2km south of Gatherley from where the new pumping station is proposed. There will be a new pumping station at Gatherley, the exact location of which is currently unknown although it can be assumed to take place on greenfield land. This could result in the loss of soils and moderate quality agricultural land. There may also be soil loss from excavation. Construction works may reduce the quality of soils through accidental spills of fuels and chemicals, especially through excavations. Contamination from nearby historic landfill sites may leach down to the construction areas and be exposed during excavation works. As the site does not overlie any identified mineral resources, there is a very low risk of mineral sterilisation. Construction works are unlikely to affect the quality of Coryton Quarry SSSI due to the distance. **Operational Effects** The option may result in the permanent loss of soils in Grade 3 Agricultural Land through the construction of a new pumping station.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The site is more than 5km away from any AQMAs. As with any civil engineering project there is potential that dust will be generated during the construction phase e.g. from earthworks from the excavation for the pipeline, and emissions from construction plant and vehicles. This will likely result in a minor and temporary negative effect to the local air quality, noting that the	Best practice measures to suppress dust and reduce emissions will likely be implemented, e.g. through the use of mist cannons and turning off plant and vehicles when not in use.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Zone of Influence of construction dust is typically very limited. **Operational Effects** Considering the nature of the works and the negligible amount of air emissions likely seen from the pumping station, it is not expected that there will be significant impacts on air quality during operation.			
Climatic Factors	Reduce embodied and operational carbon emissions	---	-	**Construction Effects** Construction activities will likely generate carbon emissions through the use of construction plant and vehicles. New pipelines and pumping station will require new material with the potential to have a significant increase in embodied carbon. The embodied carbon emissions (total embodied carbon from construction) for this option predicted to be 17,275tCO_2 equivalent. **Operational Effects** During operation, energy would be required to power the pumping station. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions predicted to be 443tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	There is opportunity to explore the use of sustainable materials and design to reduce embodied carbon, along with renewable energy to fuel construction activities as well as to power the pumping station during operation.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
	Reduce vulnerability to climate change risks and hazards	-	+	-	**Construction Effects** It is currently not known what measures are in place to reduce vulnerability to climate change during construction. However, construction works e.g. excavation could exacerbate the effects of climate-change induced floods. **Operational Effects** Increased abstraction may reduce downstream flows which would reduce the risk of flooding. Increased water storage in the reservoir could enhance the area's resilience to droughts, however there is the risk that this would reduce the catchment's resilience to drought downstream past the points of abstraction.	Best practice to mitigate the effects of flooding during construction is to be implemented. Monitor abstraction during operation to avoid detrimental effects to the surrounding environment.	-	+	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	--	0		**Construction Effects** The pipeline route intersects with the boundary of a Registered Battlefield: II (Hayne Manor), which is also a Registered Park and Garden. There are 15 Grade II Listed Buildings and one Grade II* Listed Building within 500m of the proposed pipeline route. There is one Scheduled Monument within 500m of the pipeline, described as a Hilltop enclosure 100m north-east of Castle Farm. The setting of the heritage assets, particularly Hayne Manor, will be disturbed in the short term due to the construction works, with views of the works (e.g. construction plant and compounds) potentially visible from the heritage sites. Consideration must be given to how access to the works would be facilitated and how this affects heritage assets intersecting with the site, i.e. Hayne Manor. This might result in moderate	Best practice mitigation to be implemented during construction to reduce effects on the settings of heritage assets. Archaeological watching briefs to be carried out if archaeological assets are discovered during the works, with pre-application trial trenching and ground investigations recommended. Diver surveys of water crossings may also be appropriate. Additional baseline collection and assessment to be undertaken to	-	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				negative effects to the setting of the asset in the short term. The Lifton Conservation Area is located approximately 1km south west of the option while the Stowford Conservation Area is located approximately 1.5km east of the option. There are no Protected Wrecks in proximity to the option. There are also no non-designated heritage assets within 5km of the option. Unknown archaeology may be discovered or damaged during construction works. **Operational Effects** There is likely to be no effect to the settings of heritage assets during operation due to the distance of the new pumping station from the nearest heritage assets. As the pipeline would be below ground, there will be no effects to the setting of heritage assets from this structure. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased abstraction and transfer through the underground pipeline, there is potential for lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and the option does not encroach on areas of peaty soils, thereby reducing the risk of encountering unrecorded archaeological material that depends on anaerobic conditions for preservation.	determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The pipeline is within The Culm NCLA. There are no National Parks within 5km of the pipeline and the option is not within a Green Belt. Construction works, e.g. for excavations to build the pipeline and to build the pumping station, and the passing of construction vehicles, will likely disturb the general visual amenity of the local landscape, however this will be short term. **Operational Effects** The pumping station at Gatherley will introduce new above-ground structure and will likely result in the permanent loss of greenfield land with minor impacts on the local landscape, though effects will be localised. The option is located within a Historic National Landscape character area consisting of areas of enclosed agriculture, woodland and fields, all of which have potential to be adversely affected by above ground infrastructure.	Best practice mitigation to reduce visual intrusions, such as through visual screening, is likely to be implemented.	-	-
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+ + +	-	+	**Construction Effects** The pipeline crosses an area with an IMD Decile of 5 at the southern half, and IMD Decile of 3 at the north. It is not within the 20% most deprived areas for the index of multiple deprivation. There is one place of worship within 500m of the pipeline. The pipeline crosses the A30 and follows an unnamed local road off Station Road and the A30. There are also several PRoWs located within 500m of the proposed pipeline, including footpaths and bridleways.	Best practice measures to reduce the effects of construction on local communities, including the implementation of a Construction Traffic Management Plan to manage traffic flows or find alternative haul routes. Monitor abstraction during operation to ensure the	+ + +	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				The scale of the construction works will likely have a temporary and major beneficial impact on the economy of the local community as there is opportunity to create jobs and source from local suppliers, with an anticipated very high upfront capex cost across a planned construction period of five years. However, the works will directly impact road users of both local and major roads and affect the accessibility to facilities along those roads in the short-term. The communities will also experience disturbance from construction noise and air pollution which could adversely affect health, however this is temporary and transient in nature and will therefore likely be minor. **Operational Effects** There will likely be negligible impacts to the local economy during operation as the pumping station will likely require minimal staff for operation and maintenance. The ongoing opex is estimated to be moderate, suggesting that moderate quantities of resources (e.g. energy and maintenance staff) would be required which could have a minor positive impact to the local economy.	effects of abstraction do not have a detrimental impact on the surrounding environment.		
	Maintain and enhance tourism and recreation	-	+	**Construction Effects** The pipeline will end at Roadford Lake Reservoir which provides several recreational opportunities. The construction works for the pipeline will likely disturb the amenity of the local landscape, e.g. through construction traffic and excavations along roads and woodland, which would negatively impact the experience of visitors and tourists visiting the area in the short term.	Review traffic management and phasing of deliveries. The option should explore options to minimise the vehicle movements from construction personnel. Where traffic movements cannot be reduced priority	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Increased water in the reservoir during operation will be beneficial for certain recreational activities, such as angling and water sports.	should be given during peak times.		
Material Assets	Minimise resource use and waste production	---	--	**Construction Effects** The construction works will require significant amounts of energy and materials (e.g. steel, concrete, timber) to construct the pipeline and new pumping station, as suggested by a very high estimated upfront capex. Significant volumes of site waste will likely be generated from excavation works to install the new pipeline along with general site waste. **Operational Effects** A moderate value for ongoing yearly opex and operational carbon emissions predicted to be 443tCO_2 equivalent per annum suggest that moderate amounts of energy will be required for the new abstraction points at River Tamar and River Lyd, and to power the new pumping station at Gatherley.	Explore opportunities to implement sustainable design measures, such as incorporating recycled materials. Investigate the use of renewable energy to fuel the construction works as well as the new infrastructure during operation. Adhere to a waste management plan and follow the waste hierarchy during construction.	--	--
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** SWW Mains Pipeline already exists at the Reservoir. The new pipeline runs along a local road running from Station Road to Roadford Reservoir and crosses the A30. This will result in moderate, temporary disruption to road users during construction (e.g. through road closures and diversions).	Best practice mitigation measures will likely be implemented to manage traffic, including the use of a Construction Traffic Management Plan.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational, the pumping station and the pipeline will have no likely effects on the surrounding built assets and infrastructure.			

N.13 ROA16

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ROA 16				
Option:	Littlehempston WTW				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	Process upgrades to allow treatment capacity for full licence for all sources - expected to include additional FBC capacity to replace DAFs.				
Approx. Yield (Ml/d):	6				
WRZ:	Roadford				
Date Completed:	17/10/22, updated 03/02/23	***Completed By:***	Ceri Jones	***Version:***	B
Date Checked:	20/10/22, updated 09/02/23	***Checker:***	Georgina Luck		
Date Approved:	31/10/2022, updated 09/02/23	***Approver:***	Melanie Reid, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	--	0	**Construction Effects** This option is over 5km from any SAC, cSACs, SCIs, SPAs, pSPAs or SSSI's. However, it is within a SSSI impact zone. This option is over 10k from any LNR, NNR, CNR or MPA. However, the Dart Estuary MCZ is located approximately 40m west of the option, as the River Hems is included within the zone.	Best practice construction measures to reduce disturbance will likely be implemented. This includes the use of a CEMP detailing ways to suppress air emissions and reduce construction noise.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The HRA concluded that there is potential for significant effects related to the Dartmoor SAC, approximately 14km north west of the option/ 36km upstream. Although impacts would be outside the SAC boundary, they could significantly affect qualifying features of the SAC, namely otter populations which commute and forage on the River Dart and Atlantic salmon which use the River Dart to migrate to and from spawning grounds within the SAC. The South Hams SAC is approximately 5.5km west of the option. The option is outside of the 4km Sustenance Zone for all qualifying features and as a result is not anticipated to have any significant effect on the SAC. It is anticipated that this option will not require significant infrastructure however there may be minor infrastructure changes and upgrades to the existing plant due to the additional FBC capacity. These works could potentially impact upon water quality which could affect qualifying features of the Dorset SAC. **Operational Effects** The HRA concluded that there are no impact pathways between the option and the Dartmoor SAC site or the South Hams SAC site during operation.	Ensure best practices are implemented to prevent any pollution events.		
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	0	**Construction Effects** The option is directly adjacent to deciduous woodland priority habitat. It is within 500m of further areas of deciduous woodland priority habitat, good quality semi-improved grassland priority habitat, and coastal and floodplain grazing marsh priority habitat.	Best practice mitigation to minimise impacts on biodiversity, vulnerable habitats and habitat connectivity (measures from the CEMP should be followed).	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Otter and Atlantic Salmon associated with the Dartmoor SAC may utilise the River Dart which is within the option area. It is possible that any pollution events which affect the river could have a significant effect on salmon, changing water quality downstream of the option. Maintaining good water quality is stated as a target for supporting salmon populations in the conservation objectives supplementary advice for Dartmoor SAC. At this distance from the site, only low densities of otter associated with the SAC are likely to be present and therefore effects from pollution of the water environment are not anticipated to be significant. This option may require upgrade works and potentially minor construction activities due to the changes in treatment processes. These activities could result in noise, dust/air emissions and increased vehicle movements which could impact priority species and adjacent priority habitats. **Operational Effects** This option is not anticipated to require significant infrastructure change and will take place on an existing WTW site. Long-term effects on biodiversity are unlikely.	Best practices followed to avoid pollution of the River Dart and River Hems.		
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option involves minor upgrade works within the existing site footprint, and no new waterbodies are likely to be connected. The INNS Assessment found it is unlikely that INNS will be encountered and spread during the construction phase.	If identified, best practice mitigation should be implemented to remove INNS during construction. Whilst ensuring all construction equipment, machinery and PPE is correctly stored and	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The INNS Assessment identified no risk of transfer/movement of invasive or non-native species with this option type.	cleaned prior to moving or leaving the site.		
Water	Protect and enhance the quality of the water environment and water resources	0	0	**Construction Effects** The option is within Groundwater Source Protection Zone 3. It is located outside of a Nitrate Vulnerable Zone. The River Dart runs approximately 200m of the WTW. It is assumed there will be no significant infrastructure changes or construction at the site which could impact water quality. The WFD Level 1 assessment concluded that no impacts on the River Dart are expected with this option. **Operational Effects** The WFD Level 1 assessment concluded that no long-term impacts on waterbodies are expected as a result of this option.	No notable impacts identified, therefore no mitigation required.	0	0
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within Flood Zone 1 (1 in 1000 year flood). The option involves the minor upgrades to the existing systems and facility. These are not anticipated to change the existing hardstanding as the option will be developed within the existing site footprint. **Operational Effects** Due to the option being located within Flood Zone 1, it is unlikely that once operational there will be any changes to flood risk.	No notable impacts identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** It is assumed that during upgrades, the plant will continue to operate as normal so will not result in any short-term effects. **Operational Effects** The option involves increased treatment capacity, resulting in an approximate yield of 6Ml/d of water for the Roadford region. This creates a more resilient and reliable water supply.	No notable impacts identified, therefore no mitigation required.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** This option is within Grade 3 Agricultural Land. It is within 200m of Marlands Authorised Landfill Site and within 200m of Little Hempston Reservoir Authorised Historic Landfill Site. Due to the limited construction anticipated, it is expected that there is likely to be no contamination effects. The option involves process upgrades within the existing WTW. It is assumed that the work undertaken to accomplish the process upgrades will not require any additional land take. There are expected to be no effect on soil and geology. **Operational Effects** Long-term operation is unlikely to have any significant effects on soil, due to there being no additional land take. A change in abstraction could potentially destabilise soils and cause subsidence. However, the likelihood of this effect is low and is not anticipated to affect the functionality or quality of soils.	Should any additional infrastructure be required as part of this option, it should be situated on existing hard-standing ground to reduce effects on soil as far as practicable.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located over 500m from any AQMAs. This option involves process upgrades within the existing WTW. It is anticipated that if any construction is required for the additional FBC capacity, it would be minor. There could be temporary impacts to air quality related to dust and exhaust emissions however this is expected to be very limited and with sufficient controls in place there is likely to be neutral effects. **Operational Effects** It is unlikely that the operation of the option will cause any effects on air quality. The option requires a small ongoing increase in energy consumption due to additional water treatment capacity. If sourced from fossil fuels, this could cause emissions to air, however effects as a result of the option are expected to be neutral.	If minor construction works are required, best practice construction methods should be implemented such as dust suppression to minimise the impact on air quality.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** Due to the minor upgrade works anticipated for this option it is likely that there will be some GHG emissions from plant and machinery and vehicles travelling to and from the site. New materials may be required for the additional FBC capacity which will increase the amount of embodied carbon of this option.	Investigate the use of substitute materials with lower embodied carbon and use of renewables. Decarbonisation of the National Grid is likely to help reduce future emissions.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects The process upgrades are anticipated to increase the capacity of the WTW. This will likely result in an overall increase in energy use at the plant.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to short-term effects of the option. **Operational Effects** Upgrades to the WTW could result in an increased resilience towards climate change effects through enabling the WTW to process more water in drier conditions, creating provision for those across the region. However increased abstraction in combination with draughts could lead to a reduction in water levels within the catchment which could impact water quality.	Best practice measures should be applied to prevent potential negative impacts on the environment.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** The option is located within 500m of three Listed Buildings. There are two Grade II Listed Buildings (Dartington Lodge and the bridge immediately north-east of Dartington Lodge) which are located 400m south west of the option. There is one Grade II* Listed Building (Hampstead Manor) located 100m south of the option. The option is over 500m from any Scheduled Monument, World Heritage Site, Registered Battlefields or Conservation Areas.	Recommendation for additional baseline collection and assessment to be undertaken at a more detailed stage to determine the additional potential effects on water-dependent heritage assets and water sensitive historic environments to be identified.	0	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The option is within 500m of Dartington Hall, a Grade II* Listed Garden. Construction activities could affect the setting of the Listed Garden. Process upgrades are expected to take place within the existing site, so there is low potential for undiscovered archaeology to be disturbed. **Operational Effects** Any additional infrastructure is likely to be minor. Due to the nature of the option, it is not anticipated for there to be any long-term permanent effects on the historic environment. It is therefore unlikely that there will be any enhancement or improvement on public access and/or enjoyment to heritage assets. If groundwater tables were to be altered due to a change in abstraction, there is potential for effects upon water-dependent heritage assets and water sensitive environments to occur. It is however currently unknown as to whether there are any of these assets present in proximity to the option, and as such effects remain assessed as neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** The option is located more than 200m from any AONBs or National Parks. Infrastructure changes may be required during process upgrades. It is assumed from the scale of the proposed works that the construction activities would be minor and contained within the existing site footprint. However, process upgrades could result in temporary effects on visual amenity from construction activities including deliveries and plant and equipment.	Best practice measures to reduce the construction impacts on landscape (measures from the CEMP should be followed). Visual impacts could be addressed through setting up visual screening. Some effects might still remain.	-	0

SEA Topic	SEA Objective	Effects ST		Effects LT	Commentary	Mitigation	Residual effects ST		Residual effects LT
					Operational Effects The option is unlikely to result in any effects on the surrounding landscape receptors during the operational phase as all works will be undertaken within the existing site footprint				
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	0	**Construction Effects** Process upgrades on the site could create employment opportunities in the short-term which could benefit the local economy. The option is within an IMD Decile rank of 8, meaning it is among the least deprived areas of England. There are no PROWs located within 500m of the construction works, therefore these areas will not be affected. There are a number of farms and other residential properties within 200m north, east and south of the option. As the works are going to be within the existing SWW site, there will be no direct impacts on these receptors. Although, they may experience disturbance from a minor increase in traffic (e.g., traffic noise and dust) passing along the A348 during the short-term. The WTW site is surrounded by tree lines to the east and south which will act as a partial noise buffer. **Operational Effects** No adverse effects on local communities are expected in the long-term, due to the scope and scale of the option with all upgrades occurring within the existing facility. The option does not promote a reduction in water consumption however does help to secure resilient	Best practice construction methods should be applied to minimise impacts on the health and wellbeing of the local community (measures from the CEMP should be followed). It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	-	+	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				water supplies for the health and wellbeing of customers.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** It is not anticipated for there to be disturbance to recreational land during construction. The site is located approximately 250m north of Totnes (Riverside) Station. Users of this station rather than the main Totnes station approximately 200m south may want to visit the River Dart. The railway runs between the WTW and the river therefore activities at the WTW are unlikely to affect any recreation or tourism associated with the River. Due to the nature of the option, it is anticipated that there will be no effect on tourism or recreation. **Operational Effects** Due to the WTW being located on non-recreational land and an existing site, it is expected that there will be no long-term effects on recreation or tourism.	No notable impacts have been identified; therefore, no mitigation is required. However, best practice measures and careful monitoring of abstraction to minimise the operational effects on tourism and recreation can still take place. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	0	0
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** It is assumed that there will be some minor infrastructure upgrades at the existing WTW. It is likely that new material will be used and there will be an increase in waste during the construction phase. Energy consumption is also likely to increase due to the use of machinery and vehicles in the short term. **Operational Effects** The extra treatment of 6Ml/d of water may require an increased consumption of chemicals as well as energy.	There is an opportunity to implement sustainable design measures, including the consideration of materials with less embodied carbon, and the reuse of excavated material. However, it is likely that some residual effects will remain.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** During the construction phase, there could be a minor increase in construction traffic in the local area, potentially disrupting the local road network temporarily. Process upgrades are expected to take place on the existing WTW site. Therefore, effects on built assets and infrastructure are considered minor. **Operational Effects** It is unlikely that there will be significant long-term impacts on built assets or infrastructure because of the option due to the assumption the upgrades will be contained within an existing WTW.	Best practice construction methods should be applied to minimise impacts on build assets and infrastructure (measures from the CEMP should be followed).	0	0

O. Wimbleball WRZ SEA Assessment

MOTT MACDONALD

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix O: Wimbleball Options Assessment

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessments (SEA) Environment Report		
Our reference:	100107117-MMD-RP-SEA-019-A	**Rev**	B
Prepared by:	Georgina Luck	**Date:**	08/02/23
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environment Report Appendix O: Wimbleball WRZ - SEA Options Assessments		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water Draft WRMP24 SEA Environmental Report (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, scoring criteria and definitions, and abbreviations for these assessments.

It is acknowledged that Wimbleball supply side options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported.

The following Options Assessments are for the Wimbleball Water Resources Zone (WRZ). Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS

++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

Wimbleball Water Resources Zone (WRZ)

The below Option Assessment Matrices cover the following draft WRMP24 options for Wimbleball WRZ:

- WIM1
- WIM2
- WIM4
- WIM5

- WIM6
- WIM7
- WIM8
- WIM9

O.1 WIM1

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM1				
Option:	Abstraction of Wimbleball Reservoir compensation flow when making supply releases.				
Scheme type:	Surface Water Enhancement				
Option description:	No infrastructure changes / construction works required. Abstracted water will have come from Wimbleball Reservoir. Downstream of abstraction point, the River Exe will have a reduced flow. It is assumed that there will be a small increase in energy due to increased water treatment and pumping.				
Approx. Yield (Ml/d):	9				
WRZ:	Wimbleball				
Date Completed:	16/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	E
Date Checked:	09/06/22, updated 09/02/23	***Checker:***	Katharine Mason, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is located over 5km from any SACs, SCIs, SPAs, and Ramsar Sites. The option has no direct encroachment on any NNRs or LNRs. The conservation status of these sites are not expected to be affected. The option is within 500m of Stoke Woods SSSI (14.83% favourable, 85.17% unfavourable – recovering) and Stokehill Field County Wildlife Site. The abstraction point is located within two SSSI Risk Zones, although this option is not expected to pose a risk to these areas as no construction is required. The option does not require any new infrastructure or construction works, so designated and non-designated	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				ecological sites are not expected to be impacted by the scheme in the short term. **Operational Effects** Further downstream, the River Exe closely passes Stoke Woods SSSI. However, as this site is not hydrologically connected to the option, it is not anticipated to experience any impacts. The Exe Estuary SPA and Ramsar are located approximately 9.5km downstream and are hydrologically connected to the option. During operation, borehole abstraction is not anticipated to have any impact on the sites due to the significant distance. Furthermore, the Exe Estuary is not a GWDTE as the habitats which support its qualifying features are intertidal. The option is located over 5km from any MCZs or MPAs, so these designations are unlikely to be affected by operation.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** Stoke Woods Ancient Woodland (also a SSSI), which supports over 40 species of breeding birds, is located within 500m of the abstraction point. The abstraction point near Northbridge is located within an area of coastal and floodplain grazing marsh priority habitat. Due to the nature of the option and the fact that it does not require any new infrastructure or construction works, these areas are not expected to experience any effects as a result of the implementation of this option. **Operational Effects** Abstraction of Wimbleball's compensation flow may reduce the natural river flow in the River Exe, which has the potential to affect water habitats and increase	Best practice mitigation to minimise impacts on biodiversity, vulnerable habitats, and habitat connectivity. Water quantity and quality downstream should be regularly monitored to reduce effects on habitats, species and biodiversity. Due to the nature of the works, there will be limited opportunity to enhance the existing biodiversity.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				sedimentation rates. This abstraction may also alter the flow dynamics of the river, which can negatively affect species sensitive to change, such as migrating fish further downstream. Areas of the River Exe downstream of the abstraction point pass through coastal and floodplain grazing marsh priority habitat and deciduous woodland priority habitat. These habitats and their associated species may experience some negative effects from reduced river flows. There are no Important Bird Areas or Shellfish Classification Zones within 5km of the option, so these sites are unlikely to experience any effects. Reduced flows could also have a negative effect on Salmon migration, as the River Exe is classified as a salmon river.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option involves the redevelopment of existing resources with increased yields. No additional infrastructure is needed in the short term. Therefore, there is no risk of transfer / movement of INNS with this option type **Operational Effects** There is a low risk that reduced water levels on the River Exe could change the habitat suitability for any INNS present which could facilitate further spread. This is because the receptor is hydrologically connected to other waterbodies. Therefore, operational effects are considered neutral.	No notable impacts have been identified, therefore no mitigation required.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	--	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 (total catchment) and outside of any Nitrate Vulnerable Zones. It is also located within a Drinking Water Protected Zone. The option requires no	Best practice measures implemented to mitigate effects on water quality and water resources.	0	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				additional infrastructure or construction therefore, effects on water quality and quantity are not expected during implementation. **Operational Effects** Direct river abstraction decreases the river's natural flow downstream. There is potential for reduced quantities of surface river flow further downstream as well as reduced water quality in the long-term. Increased surface water abstraction of 9Ml/d from the River Exe has potential to lead to a significant effect and permanent deterioration of WFD status downstream from the abstraction point (Culm to Creedy). There is potential for a high impact on preventing target WFD objectives from being achieved. Groundwater quality and quantity is unlikely to be affected in the long-term as a result of this option. The option will not alter the flow in upper catchments and will result in an increased water resource for the Wimbleball region.	Appropriate precaution measures should be taken when working in channels of watercourses, to appropriately manage the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures should be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water). The timing of river abstraction should be investigated to reduce impacts further.		
	Increase resilience and reduce flood risk	0	0	**Construction Effects** This option is located within both Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). However, due to the fact no construction is anticipated to take place, no short-term effects are expected. **Operational Effect** Although the option is located in Flood Zone 2 and Flood Zone 3, long-term operational impacts are likely to be neutral. This is because the option involves the abstraction of water from the river (decreasing its water	No notable effects have been identified and therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					volume by approximately 9Ml/d) and no infrastructure changes. Therefore, it is unlikely for there to be notable effects on flood risk. Additionally, the option is not located within close proximity to the coast, and so is unlikely to be adversely affected by future sea-level rise.				
	Deliver reliable and resilient water supplies	0	--	+	**Construction Effects** Until operation, the option is not anticipated to deliver any increased reliability or resilient water supplies, and so short-term effects are not anticipated. **Operational Effects** The option will provide an additional 9Ml/d of water for use within the Wimbleball region, with an increase in abstraction likely to result in positive long-term effects on the resilience of drinking water supplies. However, increased surface water abstraction of 9Ml/d from the River Exe has potential to lead to a significant effect and permanent deterioration of WFD status. There is potential for a high impact on preventing target WFD objectives from being achieved. This may deteriorate the quality of abstracted water further downstream, meaning that the resilience of water supplies for the Wimbleball region may decline. A mixed moderate negative and minor positive effect has therefore been identified during operation.	Appropriate precaution measures should be taken when working in channels of watercourses, to appropriately manage the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. All measures should be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).	0	--	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0		**Construction Effects** It is not anticipated that any additional land will be required for the option, as it will be using existing infrastructure to support the increase in abstraction. Therefore, impacts on the quality and quality of soils in the short-term are unlikely.	No notable impacts have been identified as a result of the option and therefore no mitigation has been identified.	0	0	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				The option does not encroach any geological SSSIs, so these sites should not be affected by implementation of the scheme. **Operational Effects** Long-term operation of the option is unlikely to have effects on soil, due to there being no additional land take or land required at the site of the option. An increase in abstraction from the river and possible decreases in water levels could potentially destabilise soils on the riverbanks, causing subsidence, however the likelihood of this issue is considered to be low.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located over 500m from any AQMAs. The option does not require any construction which means short-term effects on air quality are unlikely. **Operational Effects** It is unlikely that the operation of the option will cause any notable impact on air quality. The option requires a small ongoing increase in energy consumption due to additional pumping. If sourced from fossil fuels, this would cause emissions to air, however effects as a result of the option would be neutral.	Consider the use of renewables to power pumping facilities.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As the option does not require any new infrastructure, it is unlikely for there to be any embodied carbon or construction carbon emissions associated with the option. **Operational Effects** The implementation of this option will require the pumping and treatment of 9Ml/day of water. It is	Consider the use of renewables to power pumping facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					currently assumed that this will utilise fossil fuel sources of energy, which may increase operational carbon emissions in the long-term.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience issues or measures in place in the short-term, as there is no new infrastructure required. **Operation Effects** There will be an increased abstraction of the River Exe which has the potential to slightly alleviate effects on climate change related flooding. However, there is also potential that the river could be subject to climate related drought. Increased river abstraction could lead to depletion in water levels within the waterbody, especially further downstream. This has the risk of interrupting the natural river flow and any ecosystems dependent on this.	Assess the potential impacts of climate change within the area and implement best practice on order to mitigate against these. Water levels should be monitored during operation to ensure abstraction is not adversely affecting the water body.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** The option is located approximately 850m from Stoke Canon Bridge Scheduled Monument. The option is also located approximately 730m from Lake Bridge Cottage Grade II Listed Building. The option is located over 500m from any Conservation Areas, and over 5km from any Protected Wrecks. As there are no infrastructure changes required, implementing the option is not anticipated to affect these historic assets or their setting. Any previously undiscovered archaeology is unlikely to be disturbed. There are no other designated/non-designated assets near the option.	No impacts have been identified as a result of the option and therefore no mitigation has been identified. Due to the nature of works and the distance to heritage assets, no enhancement opportunities have been identified for incorporation into the option. Additional baseline collection and assessment to be undertaken to determine the additional	0	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option is located within a Historic Conservation Area, however long-term effects are likely to be low as the option does not directly encroach any significant historic assets and does not requires new infrastructure. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the increased abstraction of the River Exe, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.	potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** As the option will utilise existing infrastructure and pipelines, impacts to any landscape receptors due to implementation are unlikely. **Operational Effects** The option is located over 1km from any AONB and National Parks. The option is located within a Historic NLCA consisting of mainly open strip fields and amalgamated fields, however due to the lack of significant above ground infrastructure, it is not anticipated that this will be adversely affected. As the option will utilise the existing infrastructure, there are not expected to be any impacts on landscape receptors or designated sites. There is potential for a reduction in water levels as a result of abstraction, potentially exposing river banks in some areas and impacting visual amenity, although effects of this would be considered neutral.	No notable impacts have been identified as a result of the option and therefore no mitigation has been identified. Measures to enhance the surrounding landscape could be implemented.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+	0	**Construction Effects** There will be no construction activity, so the health and wellbeing of the local community is not expected to be affected. There is a section of PRoW located within 500m of the option, but this will not be affected as there will be no construction works or infrastructure changes. Upfront capex costs are anticipated to be very minimal over the two year period from 2025 to 2026. However, this still creates potential for job creation, which could improve the local economy. **Operational Effects** The option extends over areas which have a IMD decile of 4, which means the option is located in an area slightly more deprived than the median LSOA. Once the option is operational, it is anticipated to result in very minimal ongoing opex costs from 2027, resulting in neutral impacts on the economic and social wellbeing.	No notable impacts have been identified as a result of the option and therefore no mitigation has been identified.	+	0
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** The option does not require any construction activity or new infrastructure. Transport and recreational areas should not be affected, therefore, the impacts on tourism and recreation are considered neutral. **Operational Effects** There is the potential for long-term effects on tourism and recreation, due to the likely changes in water quality. Increased abstraction during summer periods, and potentially during periods of drought, may affect those using the River Exe for recreational purposes such as canoeing, paddle boarding, or fishing due to	Best practice mitigation measures to be implemented to minimise effects on tourism and recreation.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				reduced water quantity and quality, and the associated impacts on fish species.			
Material Assets	Minimise resource use and waste production	0	-	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, short-term effects on resource use and waste are not anticipated. **Operational Effects** The implementation of this option will require the pumping and treatment of 9Ml/day of water. This process is expected to result in an increase in waste production and resource use, including increased energy consumption. Energy is currently assumed to come from fossil fuel sources.	Best practice measures should be implemented to minimise the effect on resource use and waste production during operation. Consider the use of renewables to power pumping facilities.	0	-
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, short-term effects involving built assets and infrastructure are not anticipated. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there are no anticipated negative effects on built assets and infrastructure. There should however be considerations made as to whether the existing pipeline has the appropriate capacity to handle the additional water abstracted.	If construction of a new intake point is required, the location of this infrastructure should be carefully considered to minimise disruption to material assets.	0	0

O.2 WIM2

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM2				
Option:	Sidford borehole commissioning				
Scheme type:	New Groundwater				
Option description:	Equip and make existing borehole operational (pump, headworks, control and monitoring system, and connecting pipework). Also, the construction of a new groundwater source treatment system including chlorination, and iron and manganese removal plant within the existing site footprint. An increase in energy and resources are required to accommodate for the additional treatment and pumping.				
Approx. Yield (Ml/d):	1.5				
WRZ:	Wimbleball				
Date Completed:	16/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	04/07/22, updated 09/02/23	***Checker:***	Nicola Spofforth, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The Sidmouth to Westbay SAC is situated 2.7km – 2.8km south of the option, however no likely significant effects are expected on this during construction. The option does not encroach upon any NNRs or LNRs. There are also no County Wildlife Sites within 500m of the option. Due to the significant distance between these sites and the option location, construction	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				activities are not anticipated to negatively impact these areas. The Ladram Bay to Sidmouth SSSI (100% favourable) is located approximately 3.7km south-west from the option. The Sidmouth to Beer Coast SSSI (89.56% favourable, 4.27% unfavourable – recovering, 2.4% unfavourable – no change, 3.78% - declining) is located between 2.7km – 2.8km south from the option. Due to the significant distance between these sites and the option location, construction activities are not anticipated to negatively impact the SSSIs ecological status. The option is situated within a SSSI Risk Zone. Air pollution and noise arising from construction activities could pose a risk of disruption to this zone. However, due to the nature and small scale of the option, the effect of this is considered neutral. Due to the works taking place at an existing site and the distance from the SSSIs, there are unlikely to be any impacts on designated and non-designated sites during the construction of the option. **Operational Effects** Due to the nature of the works and the significant distance of the designated and non-designated sites, there are unlikely to be any impacts during the operational phase. The option is situated within a SSSI Risk Zone, however this is unlikely to be affected in the long-term. Operational activities are not expected to cause an increase in air pollutants or dust.			

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				The option is located over 5km from any MCZs or MPAs, so these designations are unlikely to be affected by operation.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The option is being constructed adjacent to an area of undesignated local woodland. The option is also located within 500m of multiple areas of Deciduous Woodland priority habitat. These habitats could potentially support legally protected species such as bats, breeding birds and dormice. Although the borehole and its associated infrastructure is located on an existing site, construction runoff, dust, noise, and vibrations have the potential to have an impact upon local wildlife and priority habitats. The new groundwater source treatment system will be constructed on the existing site. Depending on the exact location, the construction may take place on new grassland, which could potentially disturb wildlife resulting in the loss of habitat. The option is located over 2km away from any GWDTEs. However, there is potential for construction run off to contaminate nearby waterbodies, such as the River Sid. This could negatively impact habitats and species within that waterbody. **Operational Effects** As the borehole and its associated infrastructure will be located on an existing site, the development itself is unlikely to affect biodiversity in the long-term. However, abstracting groundwater from the borehole has potential to deplete the water table in the area.	Best practice construction methods to be implemented to minimise effects on nearby habitats and species. During operation, careful monitoring of the River Sid's base flows and abstractions should be implemented to minimise the impacts on local biodiversity. Due to the nature of the works, there will be limited opportunity to enhance the existing biodiversity.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				This could adversely impact ecology and biodiversity, especially further downstream on the River Sid. The existing site contains small areas of grassland. If the new groundwater source treatment system is constructed on this grassland, there will potentially be a permanent minor loss of habitat. If it is constructed on existing hardstanding ground, this effect is unlikely to occur. There are no Important Bird Areas or Shellfish Classification Zones within 5000m of the option, so these sites should not be affected by the scheme. The option is also not anticipated to have any effect on salmon rivers.			
	Reduce the spread or presence of INNS	-	0	**Construction Effects** Construction works have potential to introduce INNS through plant/equipment sharing and material movements. **Operational Effects** There is a very limited risk as the source of water to be abstracted is assumed to entirely free of INNS, therefore it will not permit any additional inputs of INNS.	Best practice and consultation of the INNS risk assessment in order to minimise spread of INNS. Construction sites to follow best practice biosecurity measures, Including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	-	0
Water	Protect and enhance the quality of the water environment and water resources	--	--	**Construction Effects** Although outside of a Nitrate Vulnerable Zone, the option is located within a Groundwater Source Protection Zone 3, which indicates there is a low potential for effects on groundwater sources.	Best practice measures implemented to mitigate effects on water quality and water resources (e.g., careful monitoring of groundwater quality and the	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				However, there is potential for construction activities to contaminate groundwaters. Pollutants from construction runoff may reach surface waters and temporarily deteriorate the WFD classification of the River Sid (GB 108045009160) and the Sidmouth – Honinton, Mercia Mudstone (GW) (GB40802G802800) in the short-term. This means there is a chance the water quality of local waterbodies may be negatively affected. The option is not, however, located within any Drinking Water Protected Areas. **Operational Effects** Increased groundwater abstraction could potentially result in long-term deterioration of groundwater quantity and quality. Increased groundwater abstraction has potential to lower existing groundwater levels and change the groundwater regime, which may alter the baseflow of nearby rivers, such as the River Sid. Increased groundwater abstraction has the potential to a widespread of prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.	following of measures outlined in the CEMP). Appropriate precaution measures will be taken when working in channels of watercourses to appropriately manage pollution within the water column. All measures should be in line with the requirements set out within the Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG5: Works and maintenance in or near water).		
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000-year risk of flooding from rivers or the sea), however the nature of construction activities is unlikely to result in surface water flooding given the scale and nature of the option	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects This option seeks to abstract via groundwater more regularly by 1.5Ml/d. Operational activities are not anticipated to reduce flood risk given that groundwater will be abstracted, lowering the groundwater table. The option is not expected to decrease flood risk in the long-term due to the relatively low abstraction yield.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** Until operation, the option will not deliver any increased reliability or resilient water supplies, and so short-term effects are not anticipated. **Operational Effects** The option will provide an additional 1.5Ml/day of water use within the Wimbleball region. An increase in groundwater abstraction and treatment will likely result in positive effects and more resilient water supplies. The option includes the implementation of a groundwater source treatment system, which is likely to reduce the presence of contaminants in the abstracted groundwater. The WFD assessment concludes that it is likely that water abstraction will be from the underlying Upper Greensand and the water levels in the overlying Sidmouth Mudstone are unlikely to be affected. However, on a precautionary basis, increased groundwater abstraction has the potential to result in a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. A decrease in groundwater	Groundwater quality should be carefully monitored to ensure that the impact on water resilience is minimised.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				quality could potentially reduce the resilience of water supplies within the region.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The option is located within Grade 3 Agricultural Land although the area within the existing site is not classed as Agricultural Land. It is assumed that construction works will take place on the existing site. However, there is potential for construction to disturb areas of grassland on this site. This could lead to the minor disturbance of soils due to construction works and installation of new infrastructure. Construction of the connecting pipework may also disturb the functionality and quality of soils. The option is located over 200m from any Authorised or Historic Landfill sites. **Operational Effects** The option is located on an existing site. Long-term impacts are likely to be limited given the small scale nature of the works and no ongoing requirement for land outside the site boundary.	Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc). During operation, careful monitoring of abstraction via the borehole should be implemented to avoid the impacts on soil subsidence.	-	0
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. Construction of additional infrastructure (pump, connecting pipework, groundwater source treatment system) may have a temporary impact on local air quality due to construction dust and emissions.	Best practice mitigation measures likely to be implemented during the construction phase, such as using water to suppress dust or turning off construction plant when not in use. However minor and temporary impacts on air quality are still likely to occur.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The operation of the borehole is not expected to generate air pollutants or dust during the operational phase. The option requires a small ongoing increase in energy consumption to operate the borehole. If sourced from fossil fuels, this would cause emissions to air, however effects as a result of the option would be neutral.			
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The commissioning of the borehole and additional infrastructure required will generate embodied carbon during installation, through the use of materials and construction activities. Short-term greenhouse gas emissions from construction activity are likely to occur. The embodied carbon emissions (total embodied carbon from construction) for this option will be 111tCO_2 equivalent. **Operational Effects** The implementation of this option will require increased energy consumption to accommodate for the operation of the borehole. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 96tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation.	Investigate the use of sustainable materials with lower embodied carbon and the use of renewables during construction. The use of renewables should also be considered to power the pumping facilities. Decarbonisation of the National Grid will help reduce future emissions.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** The construction effects would be short-term and will not have any notable impact upon climate change risks and hazards vulnerability. **Operational Effects** The option will result in an increase in water abstraction of 1.5Ml/d and will be vulnerable to drought during periods of reduced rainfall. This could result in negative effects on the environment if not properly monitored.	Water levels should be monitored during abstraction via the Sidford borehole. Best practice measures should be applied to prevent over abstraction and negative impacts on the environment.	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located within 500m of multiple Grade II Listed Buildings including Warren's Farmhouse, porch cottages and The Rising Sun Public House. The option is also located within 500m of the Scheduled Monument Sidford Packhouse Bridge. The option is located over 500m from any Conservation Areas, and over 5km from any Protected Wrecks. However, the option is not anticipated to directly affect any designated / non-designated sites. Views of construction works are likely to be screened via vegetation bordering the site. It is assumed that the development will be contained within an existing site, therefore the potential for damage on undiscovered assets is unlikely.	No impacts are anticipated because of the works and therefore no mitigation identified. Due to the nature of the works, no enhancement opportunities have been identified for incorporation into the option. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the option is operating, no additional activities are anticipated to affect the historic environment and designated / non-designated sites. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether any of these assets are present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within the East Devon AONB. It is assumed from the scale of the proposed works that the effect from construction activities would be neutral. There may be some temporary effects from increased construction plant movements and material stockpiles. However, views of construction activity are likely to be screened by surrounding vegetation, so the effect on landscape is considered neutral. **Operational Effects** Once the option is operational, no additional activities are anticipated to affect the surrounding landscape and visual settings. It is not anticipated that the option will create or improve green infrastructure. The option is located within a Historic NLCA consisting of mainly amalgamated fields, housing and unplanned fields, however due to the lack of significant above ground	Best practice measures to enhance the visual impacts of the surrounding landscape should be implemented to make the surrounding area more valued and recreational. Measures outlined in the CEMP should be followed to ensure best practice during construction.	0	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
					infrastructure, it is not anticipated that this will be adversely affected.				
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	+	**Construction Effects** The option extends over an area which has a IMD Decile of 9. The option is located on an existing brownfield site which has no public access. The option will not affect people with active lifestyles as no greenspace sites, PRoWs, roads or cycleways will be altered. There is potential for additional construction traffic on the A375 and through the nearby village. Within 500m of the option, there are two religious buildings which may experience negative effects from the noise and emissions of construction vehicles passing through the area. There is also potential for communities in Sidford village to experience minor disturbances from construction traffic, dust, and noise. However, the scale of the works would be minor and will therefore cause a minor effect on the health and wellbeing of the local community. During construction, the capital expenses for the works are anticipated to be very substantial over a three year period (2025 to 2027). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** Once the option is operational it is anticipated to result in high ongoing Opex costs from 2028.This is likely	Ensure best practice in terms of timings and volume of work is put in place during construction. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	-	+	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				due to the increase in energy requirements and additional treatment / pumping requirements.			
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The village of Sidford is in close proximity to Sidmouth (a tourist resort and a gateway to the Jurassic Coast World Heritage Site). Construction activities such as dust, traffic, and noise may negatively affect tourism in the village of Sidford and Sidmouth in the short term. **Operational Effects** The option is located on a small existing site and tourist/recreational areas should not experience any operational long-term impacts.	Ensure disruption is kept to a minimum and best practice measures are put in place to mitigate effects on tourism and recreation. Defined construction routes should be put in place and deliveries at peak times should be avoided. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	-	0
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** The option involves equipping and making an existing borehole operational. However additional resources will be needed to accommodate for the connecting pipework and new groundwater source treatment system, which will also result in more waste being generated. Energy consumption is also likely to increase during construction. **Operational Effects** Energy consumption is likely to increase in the operational phase to abstract more water. However, the additional amount to abstract is relatively small and therefore the effects are likely to be minor.	Best practice measures should be implemented to minimise the effect on resource use and waste production during operation. Sustainable design measures should be implemented into the scheme, including consideration of materials with less embodied carbon. The option should consider the use of renewables to power pumping facilities.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The construction of this option is not anticipated to affect built assets and infrastructure. The option is located on an existing brownfield site and most of the surrounding area consists of fields and Agricultural Land. **Operational Effects** There are no long-term operational impacts anticipated to affect built assets and infrastructure. The development will take place on an existing site and infrastructure to connect to SWW Water Mains already exists and therefore no major pipework would be required.	No impacts are anticipated because of the works and therefore no mitigation identified.	0	0

O.3 WIM4

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM4				
Option:	Wilmington springs annual abstraction increase				
Scheme type:	Groundwater Enhancement				
Option description:	No infrastructure changes required. A reduction in flow downstream in the Umborne Brook and a very small increase in energy required for the increased water treatment / distribution. The current intake is restricted by the current licence. The licence will be varied to allow a greater volume of water to be taken over the year.				
Approx. Yield (Ml/d):	0.2				
WRZ:	Wimbleball				
Date Completed:	23/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	D
Date Checked:	20/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is located over 5km from any Ramsar sites, SPAs, SACs, MCZs or MPAs so the conservation status of these sites is not expected to be affected during construction. The option is located within Reed's Farm Pit SSSI (100% Unfavourable – No change). Further downstream, the Umborne Brook also intersects multiple SSSI Risk Zones. It is unlikely that these sites will be affected in the short-term because no infrastructure changes or construction works are required.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				There are multiple County Wildlife Sites within 5km of the option, with the closest, Court Wood is situated approximately 1.8km north. The option is located over 5km from any LNRs or NNRs. However, this option does not require any construction or infrastructure changes, so these sites should not be disturbed in the short term. **Operational Effects** There is potential for reduced water flows further downstream in the Umborne Brook and lowering of the groundwater table. However, the designated and non-designated sites are either a significant distance away or are not hydrologically connected to the brook. SSSI Risk Zones are situated further downstream, however, due to the small increase in water abstraction, these are unlikely to experience impacts. As a result, the effect of operation on designated and non-designated sites is considered neutral.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	**Construction Effects** The option is located adjacent to deciduous woodland, lowland calcareous grassland, and unclassified Priority Habitat. Due to the nature of the option and the fact that it does not require any additional construction, these sites and their associated habitats and species are highly unlikely to experience any effects from the implementation of the option. The option is located over 500m from an Ancient Woodland. There are no Important Bird Areas or Shellfish Classification Zones within 5000m of the option.	Best practice mitigation measures to be implemented to minimise long-term impacts on biodiversity. During operation, levels/flows of the Umborne Brook should be carefully monitored to ensure habitats and species are not adversely affected downstream.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Due to this option not requiring any construction, the option is unlikely to result in BNG or create any opportunities for habitat creation/restoration. **Operational Effects** This option includes increased abstraction which could lead to lower water levels downstream in the Umborne Brook. Reduced water flows may negatively impact species which depend on the hydrological regime of the brook, as some organisms can only survive at certain flow rates. Fresh water aquatic species in these areas may become more vulnerable and habitat connectivity could decline. Lower flows could reduce the quantity of habitat for freshwater fish, invertebrates, and other species. It can also increase water temperatures, which can negatively affect freshwater species. As the abstraction will increase to equal that of the daily limit (1.7 – 2.1Ml/d), these effects are likely to be limited. The option is not anticipated to influence any salmon rivers.	Operation thresholds to be agreed with relevant stakeholders and abstraction volume will not exceed that of the daily limit.		
	Reduce the spread or presence of INNS	0	0	**Construction Effects** Due to the lack of any additional infrastructure works to accommodate the option, there are not likely to be any spread of INNS because of the construction phase. **Operational Effects** There is a very limited risk as the source of water to be abstracted is likely to be entirely free of INNS. It is assumed that groundwater is free of INNS, and that increasing abstraction will not permit any additional inputs of INNS.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	0	-	**Construction Effects** The option is located within both Groundwater Source Protection Zone 1 and Zone 2. The option is located outside of a Nitrate Vulnerable Zone. There are no Drinking Water Protected Zones within proximity of the option. However, due to the nature of the option requiring no additional infrastructure or construction, there are no effects on water quality or water resources in the short term. **Operational Effects** Increased groundwater abstraction to 2.1Ml/d has the potential to result in a reduction in flows downstream of the Umborne Brook, especially in periods of low rainfall / drought. The area is located within both Groundwater Source Protection Zone 1 and Zone 2, so there is potential for effects. The maintenance and use of abstraction infrastructure at Wilmington springs is not expected to affect the quality of the water environment or the ability for target WFD objectives to be achieved. However, the WFD Level 1 assessment concludes that increased groundwater abstraction could impact the flow of the Umborne Brook WFD waterbody (GB108045008880). This has potential to lead to a widespread or prolonged effect on the quality of the water, which may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.	No effects in the short-term have been identified and therefore no mitigation has been identified. During operation, the timing of river abstraction should be investigated and monitored to reduce impacts further.	0	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
	Increase resilience and reduce flood risk	0	0		**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000-year risk) and Flood Zone 3 (1 in 100-year risk). Due to the fact that no construction is anticipated to take place, there are no short-term effects on flood risk. **Operational Effects** The option is located within Flood Zone 2 and 3. Increased abstraction as a result of this option has the potential to alleviate the risk of flooding both at the site of the option and downstream in the Umborne Brook. Abstraction has been increased to equal that of the daily limit, so this is unlikely to have a notable impact, as small volumes of water are involved. Therefore, the implementation of this option will have a neutral effect on flood risk. The option is also located a sufficient distance away from the coast and so is not likely to be adversely affected by future sea-level rise.	No notable impacts have been identified, therefore no mitigation is required.	0	0	
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no short-term impacts are anticipated. **Operational Effects** The option is expected to provide an additional 0.2Ml/d of water for use in the Wimbleball region, with increases in abstraction likely to result in positive long	No effects in the short term have been identified and therefore no mitigation has been identified. During operation, the timing of river abstraction should be investigated and monitored to reduce impacts further.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				term effects on the resilience of water supplies within the area. However, the Level 1 WFD assessment concludes that increased groundwater abstraction has potential to lead to a widespread and prolonged effect on water quality and a temporary reduction in WFD status of the Umborne Brook. This may deteriorate the quality of water further downstream, meaning that the resilience of water supplies for the Wimbleball region may decline. A mixed minor negative and minor positive effect has therefore been identified for operation. It should also be considered as to whether the Umborne Brook has capacity to provide for this increased abstraction and provide a reliable source of water for the region, especially in periods of drought.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** It is not anticipated that any additional land will be required for the option, as it will be using existing infrastructure to support the increased abstraction. Therefore, there will be no impacts on quantity and quality of the soils surrounding the option. **Operational Effects** Long term operation of the option is unlikely to have any notable effects on soil, due to there being no additional land take or land required at the site. An increase in groundwater abstraction and possible decreased water levels downstream in the Umborne Brook could potentially destabilise soils on riverbanks causing subsidence. However, due to the limited amount of additional abstraction, water levels are not	No notable impacts have been identified, therefore no mitigation required	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				anticipated to decrease drastically and so the likelihood of this effect is considered to be low. The option does not intersect any Authorised Landfill Sites or any Historic Landfill Sites, so these should not be affected. The option is located within 500m of Wilmington Quarry Geological SSSI (100% Favourable). However, due to the scale of the activity and the distance away from the abstraction point, this is unlikely to be affected.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located over 500m from any AQMAs. There is no construction associated with the option, so short term effects on air quality are unlikely. **Operational Effects** It is unlikely that the operation of the option will cause any notable impacts on air quality. The option requires a small increase in energy consumption due to increased water treatment and distribution. If sourced from fossil fuels, this would cause emissions to air. However, effects as a result of the option would be neutral.	No notable impacts have been identified, therefore no mitigation required	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** As the option does not require any new infrastructure, there will be no short term effects associated with carbon emissions or embodied carbon in construction materials.	Consider the use of renewables to power pumping facilities. Decarbonisation of the National Grid is likely to help reduce any future carbon emissions.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Operational carbon emissions are likely to be limited, with potential for a small increase in energy consumption through the pumping of higher volumes of water, increased treatment, and distribution. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term.			
	Reduce vulnerability to climate change risks and hazards	0	-	**Construction Effects** Due to the option not requiring any additional infrastructure or construction, there are no climate resilience measures relating to this phase. **Operational Effects** There will be an increase in groundwater abstraction which could have the potential to slightly alleviate any effects of climate related flooding. However, as abstraction levels are being increased to equal that of the daily limit, abstraction volumes are considered low, and the effect on climate related flooding is therefore considered neutral. However, there is also potential that the downstream Umborne Brook could become subject to climate related drought, where an increase in abstraction could deplete water levels within the waterbody. This could have an effect on many factors downstream, such as biodiversity, water quality and habitats.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these. Monitoring of the effects on water levels within the Umborne Brook.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is located over 500m from any Scheduled Monuments, World Heritage Sites, Registered Parks and Gardens, Registered Battlefields and Conservation Areas. The option is also located over 5km from any Protected Wrecks. The option is located within 500m of several Grade II Listed Buildings and Structures, including Wellington Farmhouse and Rose Farmhouse. However, the option does not involve any construction activity, so these historical assets and sites will not experience any effects. **Operational Effects** The option is located within a Historic Conservation Area. However, long term effects are likely to be low as the option does not involve any additional infrastructure which will affect the assets or their setting. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets of paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.	No notable impacts have been identified, therefore no mitigation required Due to the nature of the works, no enhancement opportunities have been identified for incorporation into the option. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located within Blackdown Hills AONB. The option is located over 1km from any National Parks. As the option will utilise the existing infrastructure, there will be no impacts to any landscape receptors because of the implementation of the option. **Operational Effects** As the option will utilise the existing infrastructure, there are not likely to be any impacts to any landscape receptors as a result of the implementation of the option. The option is located within a Historic NLCA consisting of mainly unplanned and amalgamated fields and parks and gardens, however due to the lack of significant above-ground infrastructure, it is not anticipated that this will be adversely affected. There is a small potential for a reduction in water levels as a result of the abstraction. This could expose riverbanks in some areas, impacting on their visual amenity, although effects are considered neutral due to the small volumes of water planned to be abstracted.	No notable impacts have been identified, therefore no mitigation required. Measures to enhance the visual impacts of the surrounding landscape should be implemented (e.g tree planting to shield abstraction point).	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short term impacts on the health and well-being of the local community. PRoWs within 500m of the option will not be affected as no infrastructure changes are required. The upfront capex costs are very low over a two year period (2025 to 2026). This could still present the potential for job opportunities which could improve the	No notable impacts have been identified; therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				local economy. However, the impacts are expected to be neutral because this will be a temporary increase. **Operational Effects** The option extends over an area which has an IMD decile of 5. Once the option is operational it is anticipated to result in minimal ongoing Opex costs from 2027, and therefore overall neutral effects would be expected.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short term impacts on tourism and recreation. **Operational Effects** Whilst the option will not be utilising any additional recreational land, there is potential for reduced water levels within the Umborne Brook. However, this is unlikely to affect recreational activities and tourism because only a small volume of additional water is planned to be abstracted.	No notable impacts have been identified; therefore no mitigation required.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short term effects on resource use and waste.	No notable impacts have been identified; therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Due to the nature of the option utilising existing infrastructure, there is not expected to be any additional resource use or waste because of the operation of the option.			
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Due to the option not requiring any new infrastructure or construction works, there will not be any short term effects involving built assets and infrastructure. **Operational Effects** Due to the nature of the option utilising existing infrastructure, there are no anticipated negative effects on built assets and infrastructure. However, there should be consideration made as to whether the existing SWW main pipeline has appropriate capacity to accommodate the additional abstracted groundwater.	No notable impacts have been identified; therefore no mitigation is required	0	0

O.4 WIM5

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM5				
Option:	Indirect potable reuse – Stream support for Dotton WTW				
Scheme type:	Water Reuse				
Option description:	Pump treated effluent from Sidmouth WWTW directly to the River Otter using a new pipeline (5 km) and outfall to augment the river during low flow periods. High pumping power requirements due to a height variance in the pipeline route.				
Approx. Yield (Ml/d):	2				
WRZ:	Wimbleball				
Date Completed:	20/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	D
Date Checked:	20/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/09/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** East Devon Heaths SPA, East Devon Pebblebed Heaths SAC, and East Devon Pebblebed Heaths SSSI (27.76% Favourable, 66.39% Unfavourable – Recovering, 5.85% Unfavourable – No change) are	Best practice construction methods to be implemented (e.g. follow measures outlined in the CEMP, pollution control measures),	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				approximately 1.8km west from the option. There is a hydrological connection between these sites and the River Otter outfall, via a groundwater body. There is potential for significant effects during construction, with the possibility of disturbance to functional habitat outside of the SPA and SSSI used for feeding by qualifying features. This may have significant effects on the breeding success and/or adult survival and fitness of individuals of cited populations. Other designated and non-designated sites are located either a significant distance away from the option and construction activities are not expected to impact them. The option intersects multiple SSSI Risk Zones, which could experience some disturbance from air pollutants and noise arising from construction activities. The option is located over 500m from any LNRs or NNRs, so these sites should not be affected in the short-term. The option is not located within a MCZ or MPA, although there is a MCZ situated downstream however, it is not anticipated to experience any effects as a result of the option. **Operational Effects** It is unlikely that the operation of the option will cause any notable impact on designated sites. There is a MCZ situated downstream, surrounding the estuary of the River Otter. However, this is unlikely to be negatively affected because the pumped effluent will be treated, and the outfall will augment the river during low flow periods.	to ensure designated and non-designated sites are not affected in the short-term.		

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT
					There are no likely effects anticipated during operation as the outfall location of the new pipeline is downstream from the East Devon Heaths SPA, East Devon Pebblebed Heaths SAC, and the East Devon Pebblebed Heaths SSSI. Furthermore, the pipeline will be underground. The option is located within multiple SSSI Risk Zones, which may experience some disturbance from increased operational carbon emissions, however the effect of this is considered neutral.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	+	**Construction Effects** There are several priority habitats situated within 500m of the proposed 5km pipeline. These include deciduous woodland, traditional orchard, and unclassified priority habitat. There are also multiple woodlands and there is an area of Ancient Woodland located within 500m the pipeline. There is potential for these habitats and their associated species to be disturbed by the noise, dust and vibrations from construction works. The proposed 5km pipeline crosses multiple areas of green land and Agricultural Land. During construction, it is likely that habitats will experience disruption, which could negatively impact the species that use them. The option is expected to cause the loss of BNG due to habitat clearance associated with construction. The option is also likely to cause the temporary loss of Natural Capital stocks during construction. Best practice mitigation measures and reinstatement/compensation of habitat means most Natural Capital stocks post construction will have no to little change.	Areas of priority habitat and Ancient Woodland along the proposed pipeline should be avoided during construction to minimise disturbance. Best practice measures for the construction of the new pipeline should be implemented to minimise disturbance of local species, stocks, and habitats as far as practicable (e.g., follow measures outlined in the CEMP). The treatment of effluent should be carefully monitored throughout operation to ensure that the River Otter is not adversely affected.	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				There are no GWDTEs, or Important Bird Areas situated within 500m of the pipeline, so these areas should not experience any impacts. **Operational Effects** The pipeline crosses multiple areas of green land and Agricultural Land, and it will result in a permanent minor loss of habitat. Operational activities are not expected to negatively affect species, habitats, and biodiversity as the new pipeline will be situated underground. Treated water from Sidmouth WWTW will be piped to the River Otter during low flow periods. This could enhance biodiversity and wildlife in times of drought as the River Otter will be supplied with a sufficient water resource. There are no Important Bird Areas or Shellfish Classification Zones within 500m of the option or downstream of the River Otter, so these sites are unlikely to experience any benefits.	Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat.		
	Reduce the spread or presence of INNS	-	0	**Construction Effects** The connection of the Sidmouth WWTW directly to the River Otter may increase the chances of INNS spreading. The connecting of these sites by the shared use of equipment and personnel could result in INNS spreading from one site to the other during construction. **Operational Effects** During operation, water will be treated, so it is assumed no INNS will be within the treated water.	Best practice measures should be implemented to prevent the occurrence of INNS. Construction sites to follow best practice biosecurity measures, Including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Water will be transported within a closed pipeline system so no INNS should enter during water transport.			
Water	Protect and enhance the quality of the water environment and water resources	-	-	**Construction Effects** The option is located within Groundwater Source Protection Zone 2 and within the Mid-Devon Nitrate Vulnerable Zone. Construction of a new outfall structure has the potential to lead to a minor localised effect on the WFD status of the Lower River Otter Groundwater body. Water deterioration can result through contamination and waste arising from construction runoff and activity. The trenching and laying of pipes involving watercourse crossings also has potential to lead to a minor localised effect on the WFD status of the River Sid. However, these impacts would not result in the lowering of WFD status and are unlikely to prevent any target WFD objectives from being achieved. **Operational Effects** During operation, there will be an increase in treated effluent entering the River Otter. Treated effluent from the WWTW could be of a higher quality than the receiving River Otter. This has potential to lead to minor localised effects during operation. However, this would not result in the lowering of the WFD status of the Lower River Otter. The impacts would be very unlikely to prevent any target WFD objectives from being achieved. The seasonal cessation of the assumed existing effluent discharge into the River Sid at Sidmouth	Best practice mitigation measures should be implemented to ensure the effects on water quality are minimised (e.g. careful monitoring and the following of measures outlined in the CEMP). Appropriate precautions will be taken when working in channels or watercourses, to appropriately manage flood risk and the potential for deposition of silt or release of other forms of suspended material or pollution within the water column.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				WWTW could have potential to lead to a widespread or prolonged effect on the quality of water in the River Sid. This may result in a temporary reduction in WFD status and could prevent target WFD objectives being achieved. Maintenance works have potential to lead to minor localised short-term effect during operation. However, this would not result in the lowering of WFD status or prevent WFD objectives from being achieved. The option is located outside of Shellfish Classification Zones and Bathing Water Monitoring Zones, so these are unlikely to be affected in the long-term.			
	Increase resilience and reduce flood risk	--	0	**Construction Effects** The option directly encroaches areas within Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). This may have a negative effect on construction activity in periods of heavy rainfall and cause disruption. Construction runoff may also contribute to flooding during these times. **Operational Effects** Long-term operational impacts from flooding are likely to be low given that the 5km pipeline will be situated underground. The extra pumping of treated effluent into the River Otter may contribute to fluvial water flooding risk downstream of the outfall in periods of heavy rainfall. However, this is unlikely to occur as treated effluent will only be piped to the River Otter in low flow periods to ensure it has a sufficient water supply.	Measures to reduce the impacts of flooding during the construction phase may be required, especially in areas of Flood Zone 2 and 3. The pumping of treated effluent into the River Otter should be monitored regularly to ensure the risk of flooding does not increase.	-	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** Until operation, the option is unlikely to deliver any increased reliability or resilient water supplies, and so no construction effects are anticipated. It should be considered as to whether construction activities will be likely to disrupt any water supplies. **Operational Effects** The option will provide an additional 2Ml/day of water for use within the Wimbleball region. An increase of water pumped into the River Otter is likely to result in positive long-term effects on the resilience of water supplies. However, the WFD Level 1 assessment concludes that there is potential for a widespread or prolonged effect on the water quality of the River Sid. This may result in a temporary reduction in its WFD status and could prevent its target WFD objectives being achieved. Therefore, during operation, there may be short-term reductions in water resilience within the Wimbleball region.	Monitoring of the River Sid during construction and operation to minimise long-term effects on water reliability and resources.	0	-	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0		**Construction Effects** The option is located within Grade 3 Agricultural Land and close to Urban Land. The 5km pipeline will cross several areas of green undisturbed land. Excavation and drilling have potential to affect the functionality, quantity and quality of soils within 500m of the option. The option is located over 200m from an Authorised Landfill Site or any Historic Landfill Sites, so the soil in these areas is unlikely to change.	Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc).	-	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects During operation, the option is not expected to impact the functionality, quality, or quantity of soils. The pipeline will be situated within good to moderate quality land and ground is to be reinstated post-construction. The option is located over 200m from any Authorised Landfill Sites or Historic Landfill Sites, so there are no anticipated related effects.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMA's, however short-term construction may have an impact on air quality within the area. There is potential for construction dust during construction. The new pipeline will be located within 500m of the village of Sidford, so there is potential for increased traffic congestion during the construction phase. This will lead to additional traffic associated emissions in the area which could decrease local air quality. **Operational Effects** It is unlikely that the operation of the option will cause evident impacts on local air quality as the 5km pipeline will be situated underground. The option is likely to require high pumping power requirements due to the height variance in the pipeline route. It is assumed that this energy will be sourced from fossil fuels, this would cause emissions to air, however effects because of the option would be neutral.	Best practice mitigation measures likely to be implemented during the construction phase, such as dust suppression and pollution control. However minor and temporary impacts on air quality are still likely to occur.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The construction of the 5km pipeline will result in an increased use of machinery, vehicles, and construction materials. This construction activity will increase carbon emissions in the local area. Congestion caused by construction and associated road closures will also increase vehicle emissions, particularly in summer periods when the roads are busier due to tourism. This option requires new infrastructure which has potential to increase the embodied carbon within the asset. The combination of these emissions will result in negative effects relating to carbon emissions. **Operational Effects** The implementation of this option will require the pumping of treated effluent to the River Otter. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term. It is likely that there will be high pumping power requirements due to the height variance in the pipeline route.	Investigate the use of substitute materials with lower embodied carbon and renewables to power construction machinery and the new facilities. Decarbonisation of the National Grid is likely to help reduce operational carbon emissions.	-	-
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of this option. **Operational Effects** The pumping of treated effluent from Sidmouth WWTW directly to the River Otter could result in an increase in resilience towards climate change. The outfall of water	No notable impacts have been identified, therefore no mitigation required	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				is anticipated to augment the River Otter in periods of low flow. This could lead to more resilient and efficient river flows and supplies particularly in dry conditions and periods of drought.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** The option is predicted to intersect several Grade II Listed Buildings; including numbers 1-11 School Street; Leat Bridge, Cornerways; and British Legion Hall. There are also several Grade II and II* Listed Buildings, and a Scheduled Monument (Sidford Packhorse Bridge) within 500m of the option. Construction of the option will involve excavation works. This activity, as well as any associated road closures, construction machinery, or vibrations, has potential to disturb the Listed Buildings and Scheduled Monument, or reduce their visual amenity. Sections of the new pipeline will be installed in greenfield land. This means there is potential for undiscovered archaeology to be disturbed during construction. There are no World Heritage Sites, Registered Parks or Gardens, or Registered Battlefields within 500m of the option, so these designations should not be affected during construction. **Operational Effects** Long-term effects are likely to be negligible since the proposed pipeline will be underground, and land affected by construction should be returned to its previous condition. There is a minimal chance that the Grade II Listed Buildings could be subject to ongoing	Best practice mitigation measures should be implemented to minimise disruption to these sites. The route of the pipeline should be considered to potentially reduce effects on the historic environment.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				damages during the operational phase, however the overall effect is considered neutral. Water-dependant heritage assets are not anticipated to be experience effects from operation. This is because the option is not expected to lower the groundwater table, and therefore cause destabilisation.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	--	0	**Construction Effects** The option falls within the East Devon AONB. The option will require excavation to accommodate the 5km pipeline. During construction, there is potential for views to be interrupted by increased levels of construction activity and equipment. There is also potential for reduced access and views of designated historic features within the area. Construction works will be clearly visible from residential properties as there is limited screening. Landscape effects will be particularly prominent in summer periods where levels of tourism are high. There are no National Parks located within 1km of the option, so these sites should not be impacted. **Operational Effects** Operational effects are expected to be neutral in the long-term. It is anticipated that the disturbed ground would be reinstated post-construction. The pipeline will be situated underground, so long-term effects on visual amenity are not anticipated.	Ground to be reinstated post-construction to mitigate against any residual effects. Best practice measures to reduce the construction impacts on landscape (e.g follow measures outlined in the CEMP).	--	0

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST		LT			ST		LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	--	+	-	**Construction Effects** The option extends over areas which have an IMD decile of 8.2. During the construction phase of the option, there will likely be an increase in construction traffic on major roads in the local area. This could potentially cause delays and disturbance to local residents/tourists. There could also be an increase in noise and dust because of increased vehicle movements and construction activity, potentially affecting local residents and communities. There are multiple educational buildings, important retail buildings and important religious buildings located within 500m of the option. Accessibility to these facilities may be disrupted during the construction phase due to road closures, diversions and increased congestion. The pipeline will cross the A3052 Major Road. This access route may need to be closed in the short term to allow construction works to take place. This may lead to further delays and disruption. There are also several PRoWs located within 500m of the option which may be temporarily closed off during construction. This may create accessibility issues for the public. There are also multiple greenspace sites within 500m of the option. People who use these areas may be disrupted by nearby congestion, noise, and vibration associated with the construction works. These effects from construction are anticipated to be temporary. During construction, the upfront capex costs are anticipated to be £1,650,301 plus £2,475,451 over a two year period (2025 50 2026). This presents the potential for job creation as well as local material and	Best practice mitigation measures to be implemented to minimise effects on population and human health during construction. A CTMP should be implemented throughout construction. Diversion routes and road closures should be considered carefully to limit the effect on local residents, facilities and road infrastructure. It is recommended that the standards outlined in the Considerate Constructors Scheme are followed to ensure best practice. Regular monitoring of the quality of treated effluent should be implemented.	-	+	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** The pipeline will be situated underground, and any land affected by construction will be reinstated. However, the pumping of treated effluent into the River Otter may have negative reputational impacts in the local community. This may deter people away from using the river for recreational activities. Once the option is operational it is anticipated to result in ongoing opex costs from 2027 of approximately £94,097 per annum.			
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** Limited access and disturbance to recreational land may result from the construction phase due to road closures, diversions, and increased congestion. Increased traffic and construction activity has potential to disturb tourism in the area, particularly during the summer, where many people commute through Sidford Village to visit the Jurassic Coast. **Operational Effects** Due to the Sidmouth WWTW being located on non-recreational land and the associated pipeline being situated underground, it is expected that there will be limited long-term effects on recreational land. It is assumed that any land affected in the short term will be reinstated post-construction.	To mitigate the effects on tourism and recreation, construction of the option should be scheduled outside of summer periods, where tourism is at its peak. It is recommended that the standards outlined in the Considerate Constructors Scheme are followed to ensure best practice. Regular monitoring of the quality of treated effluent should be implemented.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				However, the pumping of treated effluent into the River Otter may have negative reputational impacts in the local community. This may deter people away from using the river for recreational activities.			
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** There is likely to be new material used for the 5km pipeline which will pump treated effluent to the River Otter. There will also be an increase in waste excavation material and construction waste. Energy consumption is likely to increase from machinery and construction vehicles in the short term. **Operational Effects** It is unlikely that there will be any evident resource use and waste production during the operation of the option, meaning the effects on resource and waste is considered neutral.	There is an opportunity for sustainable design measures to be implemented into the scheme, including consideration of materials with less embodied carbon, and the reuse of excavated material. However, it is likely that some minor residual effects will remain.	-	0
	Avoid negative effects on built assets and infrastructure	--	0	**Construction Effects** The proposed 5km pipeline will intersect minor roads and a major road, and the construction phase is likely to require excavation works. It is likely there will be a temporary increase in construction traffic in the local Sidford village, potentially causing delays. There may also be limited access to facilities and historic assets close to the proposed pipeline. **Operational Effects** It is unlikely that there will be any notable impacts on built assets and infrastructure as a result of the	Carefully plan road closures and diversions to minimise disruption and ensure any damaged infrastructure is reinstated post-construction. Ensure best practice measures are always implemented.	--	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				proposed option, due to the fact that the main extent will be located underground, and transport infrastructure will be reinstated.			

O.5 WIM6

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM6				
Option:	Increase Allers WTW capacity				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	Increase daily abstraction licence from 32Ml/d to 36Ml/d. Upgrade Bolham abstraction to pump an additional 4Ml/d (winter). Upgrade Allers WTW to treat an additional 4Ml/d, with distribution network improvements.				
Approx. Yield (Ml/d):	4				
WRZ:	Wimbleball				
Date Completed:	25/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	D
Date Checked:	20/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is located over 5km from any SACs, SPAs or Ramsar Sites. There are no NNRs or LNRs within 500m of the option. Therefore, construction works should not affect any of these sites due to their distance away from the option. Tidcombe Lane Fen SSSI (100% Unfavourable – Recovering) is located approximately 3.4km south-east from the option. Bickleigh Wood Quarry SSSI (100% Favourable) is located approximately 2.7km north of the option. Due to their distance from the option and the fact that construction works will be located on the	No notable impacts have been identified; therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				site footprint, these areas are unlikely to experience any impacts. The option intersects two SSSI Risk Zones. Construction works may cause some minor disturbance to these zones because of increased air pollutants and noise. However due to the nature of the works and the distance to any designated or non-designated sites, there are unlikely to be any effects during construction. The option is located over 5km from any MCZs or MPAs, so these designations are unlikely to be affected. **Operational Effects** Increased abstraction from the River Exe is likely to reduce the river flow, however, the impact of this is considered neutral. During operation, the increased abstraction from the River Exe is not anticipated to have effects on designated or non-designated sites or their qualifying features, due to their significant distance away from the option. Furthermore, the River Exe is not the only watercourse which feeds into the Exe Estuary, so sites located here should not experience impacts. The option is located within two SSSI Risk Zones. However, the SSSIs are located either upstream of the abstraction point or on a tributary of the River Exe so increased abstraction is unlikely to affect these sites.			
	Protect, conserve and enhance biodiversity, including priority	-	-	**Construction Effects** New infrastructure associated with the option has potential to extend onto small areas of coastal and	Construction on areas of coastal and grazing marsh priority habitat should be avoided to minimise	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	species, vulnerable habitats and habitat connectivity			grazing marsh priority habitat which are currently adjacent to the existing site. There is potential for these habitats and their associated species to be disturbed by construction dust, contamination noise and vibrations in the short term. With additional land-take, there is also potential for habitats to be permanently destroyed where there is new infrastructure put in place. Depending on the exact location, the construction of upgraded WTW infrastructure and the distribution network improvements may take place on new Greenfield land within the site. This could potentially disturb wildlife and existing habitats. There are no Ancient Woodlands within 500m of the option. Therefore, due to the distance and scale of the option, there are no anticipated affects during construction. **Operational Effects** River abstraction can reduce the natural river flow, which can reduce aquatic habitats and increase sedimentation rates. Increased abstraction licences at Bolham in the winter is likely to alter the flow dynamics of the River Exe. Changes to flow dynamics can negatively affect species sensitive to change, such as migrating fish. The River Exe is classified as a salmon river. There is also potential that through increased use of chemicals for water treatment at the site, there will be an increased risk of leakages and spillages resulting in contamination to surrounding habitats and waterbodies.	impacts on its associated species. Where unavoidable, land should be remediated as much as possible post-construction. It should also be considered as to whether there could be potential for new habitat creation. Best practice measures should be implemented to minimise disturbance of local species and habitats as far as practicable (measures outlined in the CEMP should be followed). The treatment of water should be carefully monitored throughout operation to ensure that nearby waterbodies are not affected by contamination.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				A reduction in the Dotton licence during the winter could improve habitat connectivity and species as the river will return to its more natural state which could benefit local ecology. However, this option would require that the Bolham licence is increased during the winter and therefore an overall neutral effect on biodiversity would likely be expected regarding this.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** There are no impacts on the transfer/movement of INNS during construction because no new waterbodies will be connected and there is a negligible risk that INNS will spread to adjacent priority habitats. **Operational Effects** During operation, there will be an increase in treatment and conventional use within the WTW. There is no risk of transfer/movement of INNS with this option type.	No notable effects identified, therefore no mitigation required.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	-	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 and outside of a Nitrate Vulnerable Zone, so there is a low potential for effects on groundwater. The modification of Bolham abstraction pump to support an additional 4Ml/d abstraction should result in no measurable change in the quality of the water environment within the River Exe. There could however be potential for contamination of the river through activities associated with the construction of the option. The impacts would not change the ability for target WFD objectives to be achieved. The option is	Best practice mitigation measures should be implemented to ensure the effects on water quality and water resources are minimised (measures outlined in the CEMP should be followed). The river channel should continue to be monitored throughout the operational phase to ensure increased	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				however, located within a Drinking Water Protected Zone, with potential to be adversely affected by any contamination/pollution arising from the construction phase, however through onsite mitigation and controls this risk has been identified as neutral. **Operational Effects** Increased river abstraction will decrease the river's natural flow downstream. There is potential for reduced quantities of surface water flow further downstream in the River Exe. Increased surface water abstraction from the River Exe has potential to lead to a minor localised, short-term and fully reversible effect, but would not result in the lowering of WFD status. This is due to the use of existing abstraction licences and the small increase in abstraction from 32Ml/d to 36Ml/d/. Impacts would be very unlikely to prevent any target WFD objectives from being achieved. The option will not alter the flow in upper catchments and will result in an increased water resource for the Wimbleball region.	abstraction does not adversely affect flows.		
	Increase resilience and reduce flood risk	--	--	**Construction Effects** The option is located within both Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). The option is also located directly next to the River Exe. There is a risk that this waterbody could flood and disrupt construction during periods of heavy rainfall. There is also potential that construction runoff could increase the risk of flooding in the short-term, particularly in periods of heavy rainfall.	Measures to reduce the impacts of flooding during construction and operation may be required, such as keeping electrical equipment and power sources above possible flood level.	--	--

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once operational, it is not anticipated for this option to increase flood risk, given that it involves an increase in the daily abstraction licence and the treatment of an additional 4Ml/d of water at Allers WTW. The option is also located a sufficient distance away from the coastline and so is not likely to be adversely affected by any flooding arising from sea-level rise. The option is however still located within Flood Zone 3, and so is rated moderate negative in both long and short term.			
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies. It should be considered as to whether any construction activities will be likely to interrupt any existing water treatment or water supplies. **Operational Effects** The option is expected to provide an additional 4Ml/d of water for use in the Wimbleball Region, with increased treatment likely to result in positive long-term effects on the resilience of water supplies within the area. The upgraded WTW is likely to ensure reliable water quality in the area.	No notable impacts have been identified; therefore no mitigation is required.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of	-	-	**Construction Effects** The option is located within Grade 3 and Grade 4 Agricultural Land. Depending on the exact location of the WTW upgrades and distribution network improvements, there is potential for impacts on the	Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	sites of geological importance			soil. Construction activity and machinery has the potential to disturb the functionality and quality of undisturbed soil in the site footprint. The option does not encroach any geological SSSIs, so these sites should not be affected by the development. **Operational Effects** An increase in abstraction at Bolham and possible decreased water levels could potentially destabilise soils on riverbanks causing subsidence. However, due to the limited amount of additional abstraction, water levels are not anticipated to decrease drastically and so the likelihood of this effect is low. Additional pipework may be needed to accommodate for the additional water abstraction and to connect this to the SWW Mains pipeline. This has potential to disturb soil functionality and quality in the long term.	subsoil etc). However, minor and temporary impacts on soils are still likely to occur. Additional design measures should be implemented to influence pipeline location so as to reduce any operational impacts of the option.		
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. The option will require some construction activity to accommodate for the new WTW infrastructure and pump upgrades. This could result in an increase in construction dust and emissions, which could lead to a reduction in air quality in the short term. **Operational Effects** The option requires a small ongoing increase in energy consumption due to additional abstraction, treatment, and pumping. If sourced from fossil fuels, this would	Best practice mitigation measures likely to be implemented during the construction phase, such as dust suppression and pollution control measures. However minor and temporary impacts on air quality are still likely to occur.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				cause emissions to air, however effects as a result of the option would be neutral.			
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The construction of the additional WTW infrastructure will result in an increased use of machinery, vehicles, and construction materials. This construction activity will increase carbon emissions in the local area. This option will require new infrastructure to accommodate for the abstraction increase, and distribution network improvements, which means there is potential for embodied carbon to increase. The combination of these emissions will result in negative effects in the short-term. The embodied carbon emissions (total embodied carbon from construction) for this option will be 649tCO_2 equivalent. **Operational Effects** The additional water abstraction, pumping, and treatment is likely to result in an increase in energy consumption. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term. If the option operated at 25% of maximum output for 9 months of the year, and full throughout for the remaining 3 months, operational carbon emissions will be 64tCO_2 equivalent per annum. This assessment considers the worst-case scenario of full operation. Operational carbon emissions under a maximum utilisation scenario will be 145tCO_2 equivalent per annum.	Investigate the use of substitute materials with lower embodied carbon and renewables to power the upgraded facilities during operation, and plant and machinery during construction. Decarbonisation of the National Grid is likely to help reduce operational carbon emissions.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** There will potentially be an increase in river water intake, which has potential to slightly alleviate any effects of climate change related flooding. However, there is potential that the river could be further subjected to climate related droughts, leading to risks of both interrupting ecosystems and efficiency of water resourcing/availability across the region.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** There are two Grade II Listed Buildings approximately 450m south-east of the option (Bolham Cottage and Ivy Cottage and attached Gate Piers). It is unlikely that these sites will be adversely affected by construction as they are located sufficiently distant from the option, meaning vibration and other effects will be minimal. The surrounding setting may be negatively impacted by the views of construction works and construction traffic. However, surrounding trees, vegetation and buildings are likely to screen the views and so the effect on the historic environment will be neutral. The option is in a Conservation Area and there may be construction on some grassland within the site footprint. However, as land within the site has been disturbed in the past, it is unlikely that archaeology will be discovered.	No notable impacts have been identified, therefore no mitigation required. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	0	0	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Long-term effects are likely to be low, since the WTW upgrades will be located on or close to the existing site. Historic assets within 500m of the option are not anticipated to be negatively affected during the operational phase. It is therefore also unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the increased abstraction of the River Exe, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** Whilst the option is located over 1km away from any AONBs or National Parks, there is potential for landscape effects during construction. There may be potential for views of nearby receptors to be interrupted from increased construction activity and equipment. Nearby trees and hedgerows are likely to provide some screening to construction activity, however it is likely that minor effects will remain. **Operational Effects** The option is located outside of any AONBs or National parks, so these sites are unlikely to be affected by the option. Additional minor infrastructure has potential to reduce the quality of views of nearby	Best practice construction measures to minimise any adverse effects on landscape such as through the use of hoarding or more natural shielding such as vegetation. Minor negative effects on landscape are still likely to remain throughout the construction phase. Measures to enhance the visual impacts of the surrounding landscape should be implemented to make the surrounding area	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				receptors (such as a nearby Bed and Breakfast and residential properties). However, it is likely that surrounding trees and vegetation will screen the views. The option is located within a Historic NCLA consisting of mainly amalgamated fields and woodland. However, as the new infrastructure will be located on an existing site, the long-term effects on landscape are considered neutral.	more valued and recreational.		
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	- +	+	**Construction Effects** The option extends over an area which has an IMD Decile of 7. During the short term, there is potential for increased construction traffic on the local roads. Nearby residents may be affected by congestion, dust, and vibrations during construction. There is a primary school and bed and breakfast within 500m of the option. These facilities may experience vibrations and noise from construction, but effects are not anticipated. There are areas of PRoW located within 500m of the option. However, they are located a sufficient distance away from the proposed works, therefore the accessibility to them should not be affected. During construction, the capital expenses for the works are anticipated to be very substantial over a period of two years (2025 to 2026). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy.	Best practice construction methods, such as dust suppression, should be implemented to minimise effects on the health and wellbeing of the local community. A CTMP should also be implemented for areas which will experience high volumes of construction traffic to minimise any potential effects during construction. It is recommended that the standards outlined in the Considerate Constructors Scheme are followed to ensure best practice.	- +	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the option is operational it is anticipated to result in moderate ongoing Opex costs from 2027.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The scope of works is not anticipated to encroach upon any recreational land, as the WTW upgrades will be located on the existing site. Construction is unlikely to affect tourism, however any construction traffic should be kept to a minimum where possible, especially during peak tourist season. **Operational Effects** Due to the upgrades taking place on the existing WTW site, it is expected there will be negligible long-term effects on recreational land and tourism. However, any additional intake from rivers as part of the development may result in more long-term effects on recreational use associated with rivers. The impact of this is likely to be neutral, due to the small volume of additional water being abstracted.	There are no impacts anticipated, however best practice mitigation measures should be implemented to minimise effects on tourism and recreation. It is recommended that standards outlined in the Considerate Constructors Scheme are followed to ensure best practice.	0	0
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** The upgraded WTW infrastructure and distribution networks may require the use of new resources and production of waste material. Energy consumption is expected to increase through construction vehicles and machinery; however, the effects will be minor.	There is an opportunity for sustainable design measures to be implemented into the scheme, such as the reuse of excavated material. However, it is likely that some minor residual effects will remain.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The additional treatment of 4Ml/d of water means there is potential for operational energy consumption to increase. Energy is currently assumed to come from fossil fuel sources. The additional treatment could also lead to a higher consumption of chemicals and waste.	Consider the use of renewables to power the WTW facilities.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** The construction of this option is not anticipated to affect any surrounding built assets. Additional WTW infrastructure will be located on the existing site, and the surrounding area mainly consists of fields and Agricultural Land. There is a major road situated directly east of the site, which may be affected by additional construction traffic and activity in the short term. **Operational Effects** There are no long-term operational impacts anticipated to affect built assets and infrastructure. The development will take place on or close to an existing site and surrounding built assets should not experience any changes.	Best practice construction measures should be in place to minimise effects on surrounding built infrastructure. A CTMP should also be implemented for areas which will experience high volumes of construction traffic to minimise any potential disruption effects to built assets and infrastructure during construction. Where feasible it is recommended that there is a minimal encroachment on built assets where the site is required to be extended. No effects during operation are anticipated and therefore no mitigation is required.	-	0

O.6 WIM7

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM7				
Option:	Increase Pynes to licence limit 66.46Ml/d				
Scheme type:	Water Treatment Works Capacity Increase				
Option description:	Upgrade WTW to treat an additional 6.5Ml/d. The final works could include new river intake streams, raw water main pipeline replacements, installation of additional water treatment equipment, and pump replacements. There will be no distribution network changes. During operation, there will be an increased energy consumption to accommodate for the additional water treatment and distribution. The WTW extracts untreated water from the River Exe. The natural river flows can be supplemented with releases from Wimbleball Reservoir in the River Haddeo, a tributary of the River Exe.				
Approx. Yield (Ml/d):	6.5				
WRZ:	Wimbleball				
Date Completed:	20/05/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	21/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The option is located over 5km from any SACs, SPAs, Ramsar Sites, MCZs or MPAs. The option is located approximately 500m from Stoke Woods SSSI (14.83% favorable, 85.17% unfavorable – recovering), which is also classified as Ancient Woodland. This SSSI/Ancient Woodland is situated adjacent to the River Exe. There are multiple SSSI Risk Zones located within or near to the WTW site. Therefore, there is	Best practice construction methods should be implemented (e.g., measures from the CEMP should be followed, pollution control measures) to minimise the impacts on designated and non-designated sites. CIRIA guidance should be	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				potential this designated site may be affected during construction as a result of construction activities. The option has no direct encroachment on any NNRs or LNRs. It is assumed that any construction works will be completed within the existing site footprint. The HRA AA concluded that the Exe Estuary SPA / Ramsar (approximately 8.3km downstream) although hydrologically connected downstream to the option, if mitigation is effectively implemented then no adverse impacts should affect the site. Stoke Woods SSSI/Ancient Woodland and multiple SSSI Risk Zones are located within or near to the WTW site. Risk activities associated with these zones include industrial development that could cause air pollution. Increased air pollutants and noise arising from construction may disturb these zones. **Operational Effects** The option is located within 500m of Stoke Woods SSSI and Ancient Woodland. However, this site is unlikely to experience any long-term effects as it is situated further upstream. Therefore, increased abstraction from the River Exe will not impact this site. There are multiple SSSI Risk Zones located within or near to the WTW site. Increased abstraction licences may reduce the natural flow of the River Exe within these zones. However, the natural river flow can be supplemented with releases from Wimbleball Reservoir, so the effect on these areas is considered neutral. The Exe Estuary SPA / Ramsar is not anticipated to experience effects on the site or its qualifying features.	followed to allow for effective pollution prevention measures to be implemented.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				This is due to its significant distance downstream and the fact that other watercourses will feed into the estuary and compensate for the water abstracted by the WTW. Due to the nature of the works and the distances from the option, there are unlikely to be any impacts on designated and non-designated sites during operation. The HRA AA assessment concluded that there will be no adverse impacts upon Exe Estuary SPA and Ramsar as long as mitigation measures set out are followed. Pollution of the water environment is the only potential impact pathway between the option and the designated site of the SPA and Ramsar.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The option is directly adjacent to areas of deciduous woodland priority habitat and coastal and floodplain grazing marsh priority habitat. There is potential for these habitats and their associated species to be disturbed by construction dust, noise and vibrations in the short term. Construction run off may deplete water quality in the nearby surface water bodies. There is potential for river wildlife and habitats to be adversely affected by this. The option could also include the construction of a new river intake, pipeline replacements, pump replacements and the installation of new water treatment equipment. This is likely to have a negative impact on existing aquatic/riparian habitats and species.	Areas of deciduous woodland priority habitat and coastal and floodplain grazing marsh priority habitat should be avoided during construction to minimise disturbance. Best practice measures should be implemented to minimise disturbance of local species and habitats as far as practicable (e.g., measures in the CEMP should be followed, pollution control measures). The treatment of water should be carefully monitored throughout operation to ensure that	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Extraction of water from the River Exe can reduce flows within the river channel. This will have a negative effect on salmon migration, as the River Exe is classified as a salmon river. The new river intake also has potential to negatively affect fish migration and on wider aquatic habitats and species.	nearby waterbodies are not affected by contamination. Fish and eel screening at the new intake should be implemented. It is likely that operational impacts will remain. The option is not anticipated to enhance ecology or biodiversity.		
	Reduce the spread or presence of INNS	-	0	**Construction Effects** Construction works have potential to introduce INNS through plant/equipment sharing and material movements. **Operational Effects** During operation, there will be an increase in water treatment and conventional use within the WTW. There is no risk of transfer/movement of INNS with this option type.	Best practice measures should be implemented to prevent the occurrence of INNS. Construction sites to follow best practice biosecurity measures, including equipment being thoroughly cleaned between locations to prevent INNS from spreading.	0	0
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is located within Groundwater Source Protection Zone 3 and outside of a Nitrate Vulnerable Zone, which indicates that there is a low potential for groundwater sources to be affected by construction. The construction and modification works are likely to result in minor localised, short-term effects on one or more of the quality elements of the Lower Creedy but would not result in the lowering of WFD status. This is likely due to construction runoff depleting nearby	Best practice mitigation measures should be implemented to ensure the effects on water quality and water resources are minimised (e.g., measures in the CEMP should be followed, pollution control measures).	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				surface waterbodies. The option is located on the edge of a Drinking Water Protected Area, with potential for adverse effects on this area arising from contamination/pollution during construction. **Operational Effects** Once operational, the risk of water contamination is likely to be low. Increased river abstraction will decrease the River Exe's natural flow. Therefore, there is potential for reduced quantities of surface water flow further downstream in the River Exe. Increased abstraction from the River Exe up to the licence limit of 66.46Ml/d has potential to lead to a widespread or prolonged effect on the quality of the Lower Creedy WFD waterbody. The WFD Level 1 assessment concluded moderate impacts on the Lower Creedy WFD waterbody due to the increase abstraction licence rates from the River Exe. Therefore, a WFD Level 2 assessment was undertaken which concluded possible deterioration between status classes, possible impediments to GES/GEP and possible compromises on waterbody objectives for the Lower Creedy. The option will not alter the flow in upper catchments and will result in an increased water resource for the Wimbleball region.	Supplementation of flow via Wilmbleball reservoir via River Haddeo if needed to maintain natural river flow.		

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
	Increase resilience and reduce flood risk	--	-		**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year risk) and Flood Zone 3 (1 in 100 year risk). The option is also located directly next to the River Exe and close to the River Creedy. There is a risk that these waterbodies could flood and disrupt construction during periods of heavy rainfall. There is also potential that construction runoff could increase the risk of flooding in the short term, particularly in periods of heavy rainfall. **Operational Effects** Once operational, it is not anticipated for this option to increase flood risk given that it involves the abstraction of water from surface waterbodies (decreasing its discharge and therefore reducing flood risk). The option is located within Flood Zone 2 and Flood Zone 3. There is a risk that the WTW and the new infrastructure upgrades could be at risk from flooding during periods of heavy rainfall. The option is also located a sufficient distance away from the coastline and so is not likely to be adversely affected by any flooding arising from sea-level rise.	Measures to reduce the impacts of flooding during construction may be required, such as keeping electrical equipment and power sources above possible flood level.	-	0	
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** Until operational, the option is unlikely to deliver any increased reliability or resilient water supplies. Construction effects are not anticipated. It should be considered as to whether any construction activities will be likely to interrupt any existing water treatment or water supplies.	Best practice mitigation measures (e.g., pollution control measures) to minimise the impacts on water reliability and supplies.	0	-	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option is expected to provide an additional 6.5Ml/d of water for use in the Wimbleball region, with increased treatment likely to result in positive long-term effects on the resilience of water supplies within the area. However, increased abstraction also has potential to lead to a widespread or prolonged effect on the quality of the existing water environment. This means there is also potential for decreased water resources and quality, meaning minor negative effects are possible.	Regular monitoring of nearby waterbodies to ensure the potential impacts on water resources and supplies are minimised. Supplementation of flow via Wilmbleball reservoir via River Haddeo if needed to maintain natural river flow.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** The option is located on an existing brownfield site, which is Grade 4 Agricultural Land. However, the option directly intersects Pynes Waste Treatment Works Historic Landfill Site. Construction of the upgraded WTW infrastructure could have an adverse effect on the functionality and quality of this land with increased machinery and vibrations. The construction of the new water intake and pipelines could result in a potential pathway for contamination between the landfill and rivers. **Operational Effects** It is anticipated that the upgrades will be located on existing hardstanding ground and no additional land take will be required. Therefore, the functionality and quality of soils should not be affected during the operational phase.	Best practice mitigation measures are likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc).	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMA's, however short-term construction may have an impact on air quality within the area. There is potential for construction dust and emissions during the upgrade of the WTW. This will result in a minor negative effect on air quality in the short-term. **Operational Effects** The upgrades to the WTW will result in an increase in energy use. If sourced from fossil fuels, this is likely to result in increased operational emissions, however effects on air quality are considered neutral.	Best practice mitigation measures likely to be implemented during the construction phase (e.g. dust suppression, pollution control measures), however minor and temporary impacts on air quality are still likely to occur.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	--	-	**Construction Effects** The construction of the additional WTW infrastructure will result in an increased use of machinery, vehicles, and construction materials. This construction activity will increase carbon emissions in the local area. This option will require new infrastructure for the WTW upgrades, which means there is potential for embodied carbon to increase. The combination of these emissions will result in negative effects in the short-term. The embodied carbon emissions (total embodied carbon from construction) for this option will be 1341tCO_2 equivalent. **Operational Effects** The implementation of this option will require additional water treatment, which will result in increased energy consumption. It is currently assumed that this will	Investigate the use of substitute materials with lower embodied carbon and renewables to power the upgraded facilities. Decarbonisation of the National Grid is likely to help reduce operational carbon emissions.	--	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term. If the option operated at 25% of maximum output for 9 months of the year, and full throughput for the remaining 3 months, operational carbon emissions will be 257tCO_2 equivalent per annum. Operational carbon under the maximum utilisation scenario is anticipated to be 587tCO_2. equivalent per annum. This assessment considers the worst-case scenario of full operation.				
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** There will potentially be an increase in river water intake, which has potential to slightly alleviate any effects of climate change related flooding. However, there is potential that the river could be further subjected to climate related droughts, leading to risks of both interrupting ecosystems and efficiency of water resourcing/availability across the region.	Continue to assess the impacts of climate change within the area and implement best practice in order to mitigate against these.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	-		**Construction Effects** There are several Grade II and II* Listed Buildings located within 500m of the option. The closest Listed Buildings are Mill Cott and associated outbuildings situated approximately 25m west of the option. Other Listed Buildings include Stables at Home Farm, The Lodge and adjoining gatepiers and railings, and Pynes, located to the north-east and north of the option	Best practice mitigation measures should be implemented to minimise disruption to these sites. Additional baseline collection and assessment to be undertaken to determine the additional	-	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				respectively. There are also several Scheduled Monuments located within 500m of the option, including Cowley Bridge situated 500m south-west and Pynes Cross approximately 480m north-east. It is unlikely that these sites will be adversely affected by the option, as construction works will be contained on the existing site. However the surrounding setting may be negatively impacted by the views of construction works and increased noise and vibrations. It is likely that surrounding trees and hedgerows will screen the construction views, however some visual impacts could still occur. The option is located over 500m from any Conservation Areas, and over 5km from any Protected Wrecks. As the development is contained within an existing site, the potential for damage on uncovered archaeological artefacts is unlikely. **Operational Effects** Long-term effects are likely to be low, since the WTW upgrades will be located on the existing site. There is a minimal chance that the infrastructure upgrades may disrupt views from historic assets in the long-term. As this infrastructure will be relatively small scale, the effect is considered neutral. It is not anticipated that there will be any significant enhancement or improvement on public access and/or the enjoyment to heritage assets. Due to increased abstraction of the River Exe, there is potential for the lowering of the groundwater table which could have potential minor adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is	potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				however currently unknown as to whether there are any of these assets present in proximity of the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** Whilst the option is located over 1km from any AONBs or National Parks, there is potential for landscape effects during construction. There may be potential for views to be interrupted from increased construction activity and equipment. The option is located on an existing site, so no additional Greenfield land is expected to be required. Nearby trees and hedgerows are likely to provide some screening to construction activity, however it is likely that minor effects will remain. **Operational Effects** Long-term effects are likely to be neutral, since the WTW upgrades will be located on the existing site. The option is located within a Historic NLCA consisting of mainly amalgamated field and woodland, however due to the lack of significant above-ground infrastructure, it is not anticipated that this will be adversely affected	Best practice construction measures to minimise any adverse effects on landscape (measures in the CEMP should be followed).	-	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	- +	+	**Construction Effects** The option is located over an area which has an IMD Decile of 6. During the short term, there is potential for increased construction traffic on the local roads. Nearby residents may be affected by congestion, dust, and vibrations during construction. There is a medical care facility and religious building within 500m of the option. These facilities may experience vibrations and noise from construction, but effects are not anticipated. There are also sections of PRoW located within 500m	Best practice construction methods, such as dust suppression, should be implemented to minimise effects on the health and wellbeing of the local community. It is recommended that the standards outlined in the Considerate Constructors	- +	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				of the option. However their accessibility should not be affected as construction will take place within the WTW site. The upfront capex costs during construction are anticipated to be very high over a period of three years (2025 to 2027). This presents the potential for job creation as well as local material and resource supply chain opportunities, all of which will improve the local economy. **Operational Effects** Once the option is operational it is anticipated to result in moderate ongoing opex costs from 2028.	Scheme are followed to ensure best practice.		
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** The scope of works is not anticipated to encroach upon any recreational land, as the WTW upgrades will be located on the existing site. Construction is unlikely to have an effect on tourism, however any construction traffic should be kept to a minimum where possible, especially during peak tourist season. **Operational Effects** Due to the upgrades taking place on an existing WTW site, significant long-term effects on recreational land and tourism are not anticipated. There is potential that reduced water flows as a result of increased abstraction could negatively affect the recreational use of the River Exe downstream of the abstraction point.	It is recommended that the standards followed in the Considerate Constructors Scheme are followed to ensure best practice. Regular and careful monitoring of the River Exe water flows should be implanted to minimise effects on recreation and tourism.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** The option is located on a brownfield existing site, so no additional land take is expected. The upgraded WTW infrastructure may require the use of new resources and production of waste material. Energy consumption is expected to increase through construction vehicles and machinery; however, the effects will be minor. **Operational Effects** The additional treatment of 6.5Ml/d of water means there is potential for operational energy consumption to increase. Energy is currently assumed to come from fossil fuel sources. The additional treatment could also lead to a higher consumption of chemicals and waste.	There is an opportunity for sustainable design measures to be implemented into the scheme, including consideration of materials with less embodied carbon, and the reuse of excavated material. However, it is likely that some minor residual effects will remain.	-	-
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The construction of this option is not anticipated to affect built assets and infrastructure. The option is located on an existing brownfield site and much of the surrounding area consists of fields. **Operational Effects** There are no long-term operational impacts anticipated to affect built assets and infrastructure. The development will take place on an existing site and infrastructure to connect to SWW Water Mains already exists and therefore no major pipework would be required.	No effects are anticipated and therefore no mitigation is required.	0	0

O.7 WIM8

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM8				
Option:	Brampford Speke borehole				
Scheme type:	New Groundwater				
Option description:	Agree licence changes with EA. Site Commissioning.				
Approx. Yield (Ml/d):	3.5				
WRZ:	Wimbleball				
Date Completed:	23/06/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	21/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is located over 5km from any SACs, SPAs, Ramsar Sites or County Wildlife Sites. The option is also located over 5km from any MCZs or MPAs. The option is located 2.6km from Stoke Woods SSSI (14.83% Favourable, 85.17% Unfavourable – Recovering). There are no LNRs or NNRs within the option site. In the short term, no infrastructure changes are needed as the borehole and washout are existing infrastructure. Therefore, there will be no short-term effects.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects The option involves increased groundwater abstraction. There are ecological SSSIs hydrologically connected to the option through groundwater. However, they are located over 5km away from the option, so they are unlikely to experience impacts. As the abstracted water will be discharged into the River Exe, there will be an increased flow in the River Exe downstream from this point. However, as the option does not encroach upon any designated or non-designated sites, these areas should not experience impacts. The Exe Estuary SPA and Exe Estuary Ramsar sites are located further downstream of the River Exe. The HRA assessment concludes that increased discharge into the River Exe is not anticipated to have significant effects on these sites as the habitats which support their qualifying features are intertidal.				
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	+	**Construction Effects** The option is directly adjacent to an area of deciduous woodland priority habitat and is within 500m of various areas of coastal and floodplain grazing marsh priority habitat. In the short term, no infrastructure changes are needed as the borehole and washout are existing infrastructure. Therefore, there will be no short-term effects on these habitats or species associated with them. The option is located over 2km from any Ancient Woodlands and over 5km from any Important Bird Areas, Shellfish Classification Zones, and GWDTEs. Therefore, these sites will not be affected.	During operation, careful monitoring of abstraction via the borehole should be implemented to minimise the negative impacts on local biodiversity. Best practice measures during operation should be implemented.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects Abstracting groundwater from the borehole has the potential to deplete the water table in the area. This could adversely impact ecology and biodiversity supported by the groundwater source. However, the River Exe will experience an increase in flow downstream from the discharge point. This could potentially enhance biodiversity and wildlife in times of low flow, so there is potential for positive effects. The River Exe is a salmon river, and so any changes in flows has the potential to adversely affect migrating Salmon.				
	Reduce the spread or presence of INNS	0	0		**Construction Effects** In the short term, no infrastructure changes are needed as the borehole and washout are existing infrastructure. Therefore, there will be no short-term effects on the presence or spread of INNS. **Operational Effects** There is a very limited risk of INNS as the source of water is likely to be entirely free of INNS. It is assumed that the groundwater is free of INNS, and that accessing it will not permit any additional inputs of INNS.	No notable impacts have been identified, therefore no mitigation required.	0	0	
Water	Protect and enhance the quality of the water environment and water resources	0	-	+	**Construction Effects** The option is located within a Nitrate Vulnerable Zone and within a Source Protection Zone (Zone I). It is also located within a Drinking Water Protected Area. In the short term, no infrastructure changes are needed as the borehole and washout are existing infrastructure.	Best practice mitigation measures should be applied to minimise negative effects (e.g., Operation thresholds to be agreed with relevant stakeholders and to not	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Therefore, there will be no short-term effects on water quality and water resources. **Operational Effects** The option is located within a Nitrate Vulnerable Zone and within a Source Protection Zone (Zone I). Increased groundwater abstraction has the potential to lead to a widespread or prolonged effect on the quality of the Permian Aquifers in Central Devon WFD Groundwater waterbody. This may result in a temporary reduction in WFD status and prevent target WFD objectives from being achieved. In the long term, there will also be an increase in flow in the River Exe, as the abstracted water will be discharged here. This has potential to lead to a minor localised or temporary improvement that does not affect the overall status of the Exe (Barle to Culm) WFD waterbody. The option is located over 5km from any Shellfish Classification Zones, so these areas should not be affected by the option.	exceed that of the daily limit, pollution control measures). Careful monitoring of groundwater levels and quality to ensure that long-term effects are kept to a minimum.		
	Increase resilience and reduce flood risk	0	--	**Construction Effects** The option is located within Flood Zone 2 (1 in 1000 year) and Flood Zone 3 (1 in 100 year). In the short term, no infrastructure changes are needed as the borehole and washout are existing infrastructure. Therefore, there will be no short-term impacts on flood risk or as a result of flood risk.	Careful monitoring and regulation of the river discharge during operation. Discharge could be stopped in periods of high flow. River abstraction downstream (presumably from Pynes WTW) could mitigate potential flooding if river flows exceed their limit.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects The borehole site is located adjacent to areas of Flood Zone 2 and Flood Zone 3. The River Exe, located adjacent to the borehole site, passes through areas of Flood Zone 2 and Flood Zone 3. During periods of heavy rainfall, the borehole site may be at risk of fluvial flooding, which could affect its ability to operate. This option seeks to increase groundwater abstraction. These activities are unlikely to increase flood risk as they are likely to decrease the groundwater table. Increased flow in the River Exe downstream from the discharge point may increase the risk of flooding in the surrounding area, particularly in periods of heavy rainfall. Downstream, the River Exe passes through areas of Flood Zone 2 and Flood Zone 3, so these areas may be particularly susceptible to fluvial flooding. The option is located a sufficient distance away from the coastline, so it is not anticipated to experience any effects from sea-level rise.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** In the short term, there is not expected to be an increase in the reliability or the resilience of water supplies. There are no infrastructure changes required, therefore existing water supplies should not be impacted. **Operational Effects** The option will provide an additional 3.5Ml/d of water available in the River Exe. An increase in groundwater abstraction will likely result in positive effects and more	Careful and regular monitoring of groundwater quality and levels to minimise potential impacts on water resilience in the long term.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				resilient water supplies, as more water will be discharged into the River Exe. However, increased groundwater abstraction has potential to lead to a widespread or prolonged effect on the quality of the groundwater sources. This means there is also potential for minor negative impacts on the resilience of water supplies within the Wimbleball region.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	-	**Construction Effects** The option is located within the Brampford Speke Geological SSSI (100% Favourable). The option is located 3.3km from Killerton Geological SSSI (1.65% Favourable, 98.35% Unfavourable – Declining). The option is located within Grade 1 and Grade 4 Agricultural Land. The option is located over 500m from any Authorised Landfill Sites and Historic Landfill Sites. The option involves the utilisation of an existing borehole site, and no infrastructure changes are required. Therefore, there will be no short-term impacts on soil. **Operational Effects** The option involves the utilisation of an existing borehole site. Groundwater abstraction via the borehole can potentially cause subsidence in areas close to the abstraction point, causing unstable ground. This could potentially cause subsidence in the Brampford Speke Geological SSSI. An increase in discharge into the River Exe will increase its water flows and the volume of sediment	During operation, careful monitoring of abstraction via the borehole should be implemented to avoid any impacts on soil subsidence.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				carried down the river. This has potential to increase soil erosion downstream, which may reduce the quality of soils. There are no Authorised or Historic Landfill Sites in close proximity to the option. Therefore, the soils in these sites should not be impacted.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is located over 500m from any AQMAs. There are no infrastructure changes required, therefore there will be no short-term impacts on air quality. **Operational Effects** It is unlikely that the operation of the option will cause any notable impact on air quality. The option requires a small increase in energy consumption due to additional abstraction from the borehole. If sourced from fossil fuels, this would cause emissions to air, however effects as a result of the option would be neutral.	No notable impacts have been identified, therefore no mitigation required.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	**Construction Effects** This option does not require any infrastructure changes, therefore no impacts on carbon emissions are expected in the short term. **Operational Effects** The increase in groundwater abstraction is likely to result in the ongoing release of operational carbon emissions due to the increase in pumping and potential water treatment.	Investigate the use of renewable energy to supply operational energy consumption. Decarbonisation of the National Grid will help reduce future emissions.	0	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** The option does not require any infrastructure changes. Therefore, there are currently no known climate resilience measures in place for the construction phase of the option. **Operational Effects** The option will result in an increase in groundwater abstraction and will be vulnerable to drought during periods of reduced rainfall. This could result in negative effects on the environment if not properly monitored. Alternatively, the increase in groundwater abstraction could alleviate effects from climate-related groundwater flooding. The increase in flow in the River Exe may alleviate effects of climate related droughts, as it will increase the volume of water within the waterbody. However, there is potential for increased river flows to contribute to climate-related riverine flooding within the area. The implementation of this option will require the increased abstraction via the borehole. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term.	Water levels should be monitored during groundwater abstraction via the borehole. Best practice measures should be applied to prevent over abstraction and negative impacts on the environment.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0		**Construction Effects** The option is located over 500m from any Listed Buildings and Structures. There are no Registered Parks or Gardens, Registered Battlefields, or World Heritage Sites within 500m of the option. The option is also located over 500m from any Conservation Areas, and over 5km from any Protected Wrecks.	No notable impacts have been identified, therefore no mitigation required. Additional baseline collection and assessment to be undertaken to determine the additional	0	0	

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Bowl Barrow Scheduled Monument is located within 500m of the option; however, this will not experience effects because no infrastructure changes are required. **Operational Effects** Once the option is operating, no additional activities are anticipated to affect the historic environment and designated / non-designated sites. It is also unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.	potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located over 1m from any AONBs and National Parks. This option does not require any infrastructure changes, therefore, no impacts on landscape are anticipated in the short term. **Operational Effects** As the option involves the utilisation of existing sources and existing river infrastructure, there is unlikely to be any operational effects on landscape in the long-term. The option is located within a Historic NLCA consisting of mainly amalgamated fields and woodland, however due to the lack of significant above ground	No notable impacts have been identified, therefore no mitigations required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				infrastructure, it is not anticipated that this will be adversely affected. The activities associated with the operation of the option are unlikely to affect the visual amenity of the surrounding area.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option is located within in an area which has an IMD Decile score of 6. There are no construction activities associated with this option, therefore functional sites, important buildings, and PRoW will not be affected in the short term. The upfront capex costs are anticipated to be very low over a two year period (2025 to 2026). The health and wellbeing of the local community will not be effected, and the overall impact is considered neutral. **Operational Effects** Long-term impacts can be considered minor positive related to water-based recreation, as there will be an increase in water discharge into the River Exe. Once the option is operational it is anticipated to result in low ongoing opex costs from 2027.	No notable impacts have been identified, therefore no mitigation required.	0	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** This option does not require any infrastructure changes or construction works. Therefore, tourism and recreation should not be impacted in the short term. **Operational Effects** The option involves the utilisation of existing sources and river infrastructure. Operational activities are	No notable impacts have been identified; therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				assumed to take place within the existing site footprint. Tourist/recreational areas are unlikely to experience any operational long-term impacts.			
Material Assets	Minimise resource use and waste production	0	-	**Construction Effects** This option does not require any infrastructure changes or construction works. Therefore, no impacts on resource use and waste production are anticipated in the short-term. **Operational Effects** The option involves the utilisation of existing sources and existing river infrastructure, so no additional resources are expected to be needed. The increase in groundwater abstraction will result in an increase in energy consumption in the long term. Energy is currently assumed to come from fossil fuel sources.	Investigate opportunities to utilise renewable energy sources during operation. Decarbonisation of the National Grid is likely to reduce operational emissions.	0	-
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** This option does not require any infrastructure changes or construction works. Therefore, no impacts on built assets or infrastructure are anticipated in the short term. **Operational Effects** There are no long-term operational impacts anticipated to affect built assets and infrastructure. The option involves the utilisation of existing sources and existing river infrastructure, so no additional material assets should be affected in the long term. Operational activities are assumed to take place within the existing site footprint.	No notable impacts have been identified, therefore no mitigation required.	0	0

O.8 WIM9

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	WIM9				
Option:	Stoke Canon borehole				
Scheme type:	New Groundwater				
Option description:	Agree licence changes with EA. Install new power supply. Site Commissioning.				
Approx. Yield (Ml/d):	4.5				
WRZ:	Wimbleball				
Date Completed:	27/06/22, updated 03/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	21/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** There are no SPAs, SACs, or Ramsar Sites within 5km of the option. Stoke Woods SSSI (14.83% Favourable, 85.17% Unfavourable – Recovering) is located approximately 2.86km away from the option. The option has no direct overlap with any NNRs or LNRs. The option is also located over 5km from any MCZs or MPAs. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					this is considered minor. Therefore, there will be no short-term effects. **Operational Effects** The option involves increased groundwater abstraction. There are ecological SSSIs hydrologically connected to the option through groundwater. However, they are located over 5km away from the option, so they are unlikely to experience impacts. As the abstracted water will be discharged into the River Exe, there will be an increased flow in the River Exe downstream from this point. However, as the option does not encroach upon any designated or non-designated sites, these areas should not experience any impacts. The Exe Estuary SPA and Exe Estuary Ramsar sites are located further downstream of the River Exe. The HRA assessment concludes that increased discharge into the River Exe is not anticipated to have significant effects on these sites as the habitats which support their qualifying features are intertidal.				
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	-	+	**Construction Effects** The option is located within 500m of the deciduous woodland priority habitat, traditional orchard priority habitat, and coastal and floodplain grazing marsh priority habitat. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this on priority habitats is considered neutral. This is due to the scale of the works and the fact that installation will occur on the site	During operation, careful monitoring of abstraction via the borehole should be implemented to minimise the impacts on local biodiversity. Best practice measures during operation should be implemented.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				footprint. Therefore, there will be no short-term effects on these habitats or species associated with them. The option is located over 500m from any Ancient Woodland, Important Bird Areas, Shellfish Classification Zones, and GWDTEs. Therefore, these sites are not anticipated to be affected during construction. **Operational Effects** Abstracting groundwater from the borehole has the potential to deplete the water table in the area. This could adversely impact ecology and biodiversity supported by the groundwater source. However, the River Exe will experience an increase in flow downstream from the discharge point. This could potentially enhance biodiversity and wildlife in times of low flow, so there is potential for positive effects. There is however potential that any alterations in flows could adversely impact salmon rivers and migration of Salmon.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this is considered neutral. This is due to the scale of the works and the fact that installation will occur on the site footprint. Therefore, there will be no short-term effects on the presence or spread of INNS.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Operational Effects There is a very limited risk of INNS as the source water is likely to be entirely free of INNS. It is assumed that groundwater is free of INNS, and that accessing it will not permit any additional inputs of INNS.				
Water	Protect and enhance the quality of the water environment and water resources	0	-	+	**Construction Effects** The option is located within a Nitrate Vulnerable Zone and within a Source Protection Zone (Zone I). The option is also located within a Drinking Water Protected Area. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this is considered neutral. This is due to the scale of the works and the fact that installation will occur on the site footprint. Therefore, there will be no short-term effects on water quality and water resources. **Operational Effects** The option is located within a Nitrate Vulnerable Zone and within a Source Protection Zone (Zone I). Increased groundwater abstraction has the potential to lead to a widespread or prolonged effect on the quality of the Permian Aquifers in Central Devon WFD Groundwater waterbody. This may result in a temporary reduction in WFD status and prevent target WFD objectives from being achieved. The option is likely to result in an increase in flow and water resource downstream of the River Exe, as the abstracted water will be discharged here. This has	Best practice mitigation measures should be applied to minimise negative effects (e.g., Operation thresholds to be agreed with relevant stakeholders and to not exceed that of the daily limit, pollution control measures). Careful monitoring of groundwater levels and quality to ensure that long-term effects are kept to a minimum.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				potential to lead to a minor localised or temporary improvement that does not affect the overall status of the Exe (Barle to Culm) WFD waterbody. The option is located over 5km from any Shellfish Classification Zones, so these areas should not be affected by the option.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is located within 500m of areas of Flood Zone 2 (1 in 1000) and Flood Zone 3 (1 in 100). In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this is considered neutral. This is due to the scale of the works and the fact that installation will occur on the site footprint. Therefore, there will be no short-term impacts on flood risk or as a result of flood risk. **Operational Effects** The option is located adjacent to areas of Flood Zone 2 and Flood Zone 3. The river washout and the River Exe is located to the southwest of the borehole, and these are within areas of Flood Zone 2 and Flood Zone 3. During periods of heavy rainfall, the river washout and the borehole site may be at risk of fluvial flooding, which could affect the operation of the washout and borehole. This option seeks to increase groundwater abstraction. These activities are unlikely to increase flood risk as they are likely to decrease the groundwater table.	Careful monitoring and regulation of the river discharge during operation. Discharge could be stopped in periods of high flow. River abstraction downstream (presumably from Pynes WTW) could mitigate potential flooding if river flows exceed their limit.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					Increased flow in the River Exe downstream from the discharge point may increase the risk of flooding in the surrounding area, particularly in periods of heavy rainfall. Downstream, the River Exe passes through areas of Flood Zone 2 and Flood Zone 3, so these areas may be particularly susceptible to fluvial flooding. The option is located a sufficient distance away from the coastline, so it is not anticipated to experience any effects from sea-level rise.				
	Deliver reliable and resilient water supplies	0	-	+	**Construction Effects** In the short-term, there is not expected to be an increase in the reliability or the resilience of water supplies. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this is considered neutral. This is due to the scale of the works and the fact that installation will occur on the site footprint. Therefore existing water supplies should not be impacted. **Operational Effects** The option will provide an additional 4.5Ml/d of water available in the River Exe. An increase in groundwater abstraction will likely result in positive effects and more resilient water supplies, as more water will be discharged into the River Exe. However, increased groundwater abstraction has potential to lead to a widespread or prolonged effect on the quality of groundwater sources. This means	Careful and regular monitoring of groundwater levels and quality to minimise potential impacts on water resilience in the long term.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				there is also potential for minor negative impacts on the resilience of water supplies within the Wimbleball region.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	-	**Construction Effects** The option is located approximately 730m to the east of Brampford Speke Geological SSSI (100% Favourable). The option is located approximately 2.2km to the west, away from the Killerton Geological SSSI (1.65% Favourable, 98.35% Unfavourable – Declining) and the Stoke Woods SSSI (14.83% Favourable, 85.17% Unfavourable – Recovering). The option is located within Grade 1 Agricultural Land and there are no Authorised Landfill Sites or Historic Landfill Sites within 500m. The option involves the utilisation of an existing source within a borehole site. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply, however the effect of this is considered neutral. This is due to the scale of the works and the fact that installation will occur on the existing site footprint. Therefore, there will be no short-term impacts on soil. **Operational Effects** The option involves the utilisation of an existing source within a borehole site. Groundwater abstraction via the borehole could potentially cause subsidence in areas close to the abstraction point, causing unstable ground.	During operation, careful monitoring of abstraction via the borehole should be implemented to avoid any impacts on soil subsidence.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				An increase in discharge into the River Exe will increase its water flows and the volume of sediment carried down the river. This has potential to increase soil erosion downstream, which may reduce the quality of soils. There are no Authorised or Historic Landfill Sites in close proximity to the option. Therefore, the soils in these sites should not be impacted.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from any AQMAs. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply. This may temporarily reduce air quality in the local area due to an increase in dust and vibrations. However, due to the small scale of the works, the effect of this is considered minor. **Operational Effects** It is unlikely that the operation of the option will cause any notable impact on air quality. The option requires a small increase in energy consumption due to additional abstraction from the borehole. If sourced from fossil fuels, this would cause emissions to air, however effects as a result of the option would be neutral.	Best practice construction methods should be applied (e.g., dust suppression, turning off machinery when not in use) to minimise the potential impacts on air quality.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply. The use of machinery and vehicles travelling to the site may	Investigate the use of renewable energy to supply construction machinery and operational energy consumption.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT	
					temporarily increase carbon emissions in the local area. However, due to the small scale of the works, the effect of this is considered minor. **Operational Effects** The increase in groundwater abstraction is likely to result in the ongoing release of operational carbon emissions due to the increase in pumping, potential water treatment and the operation of the new power supply.	Decarbonisation of the National Grid will help reduce future emissions.			
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply. However, due to the small scale of the works and the fact that installation will occur on the existing site, the effect of this is considered neutral. Therefore, there are currently no known climate resilience measures in place for the construction phase of the option. **Operational Effects** The option will result in an increase in groundwater abstraction and will be vulnerable to drought during periods of reduced rainfall. This could result in negative effects on the environment if not properly monitored. Alternatively, the increase in groundwater abstraction could alleviate effects from climate related groundwater flooding. The increase in flow in the River Exe may alleviate effects of climate related droughts, as it will increase the volume of water within the waterbody. However,	Water levels should be monitored during groundwater abstraction via the borehole. Best practice measures should be applied to prevent over abstraction and negative impacts on the environment.	0	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				there is potential for increased river slows to contribute to climate related riverine flooding within the area. The implementation of this option will require the increased abstraction via the borehole. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0	**Construction Effects** There are several Scheduled Monuments within 500m of the option, including Two Bowl Barrows and Burrow Cross. There are three Grade II Listed Buildings within 500m of the option. These are Heathfield Cottage, Hulford Cottage situated approximately 380m and 210m east of the option respectively, and Farmbuildings immediately to the south of Rew Barton situated approximately 490m south-east of option. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply. The historic assets within 500m of the site may experience some disturbance from temporary noise and vibrations. However, due the scale of the works and the fact that the installation will take place on an existing site, the effect of this is considered minor. There are no Registered Park or Gardens, Registered Battlefields, or World Heritage Sites within 500m of the option. The option is also located over 500m from any Conservation Areas, and over 5km from any Protected Wrecks.	Best practice construction methods should be applied during the installation of the new power supply (e.g. dust suppression, turning off machinery when not in use). Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the option is operating, no additional activities are anticipated to affect the historic environment and designated / non-designated sites. It is therefore unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to the increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is located over 10km from any AONBs and National Parks. In the short term, no changes to the borehole and washout infrastructure are needed as they are already existing. There may be some minor commissioning works on site to install the new power supply. However, due to the small scale of the works and the fact that installation will occur on an existing site, the effect of this is considered neutral. **Operational Effects** As the option involves the utilisation of existing sources and existing river infrastructure, there is unlikely to be any operational effects on landscape in the long term. The option is located within a Historic NLCA mainly consisting of amalgamated fields, however due to the lack of significant above ground infrastructure, it is not anticipated that this will be adversely affected. The	No notable impacts have been identified, therefore no mitigations required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				activities associated with the operation of the option are unlikely to affect the visual amenity of the surrounding area.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+	+	**Construction Effects** The option may involve minor commissioning works to install the new power supply. However, due to the scale of the works and the fact that installation will occur on an existing site, the effect of this is considered negligible. There are no PRoW located within 500m so these areas will not be affected. The upfront capex costs are anticipated to be low over a period of two years (2025 to 2026). This presents the potential for job creation which could benefit the local economy. **Operational Effects** Long term impacts can be considered positive, as there will be an increase in water discharge into the River Exe which could improve opportunities for recreation (e.g. watersports). Once the option is operational it is anticipated to result in low ongoing opex costs from 2027.	No notable impacts have been identified, therefore no mitigation required.	+	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option may involve minor commissioning works to install the new power supply. However, due to the scale of the works and the fact that installation will occur on an existing site, the effect of this is considered neutral. Therefore, tourism and recreation should not be impacted in the short-term.	No notable impacts have been identified therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The option involves the utilisation of existing sources and river infrastructure. Operational activities are assumed to take place within the existing site footprint. Tourists / recreational areas are unlikely to experience any operational long-term impacts.			
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** The option may involve minor commissioning works to install the new power supply. There may be a requirement for additional resources to accommodate for the installation. However, due to the scale of the works, the effect of this is considered minor. **Operational Effects** The option involves the utilisation of existing sources and existing river infrastructure, so there are opportunities for existing resources to be used. There may be a requirement for additional resources to accommodate for the installation of the new power supply. The increase in groundwater abstraction will result in an increase in energy consumption in the long term. Energy is currently assumed to come from fossil fuel sources.	Investigate the use of sustainable design methods and materials during installation. Investigate opportunities to utilise renewable energy sources during operation. Decarbonisation of the National Grid is likely to reduce operational emissions.	-	-
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option may involve minor commissioning works to install the new power supply. However, due to the small scale of the works and the fact that installation will occur on an existing site, effects are considered neutral. Therefore, no impacts on built assets or infrastructure are anticipated in the short-term.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There are no long-term operational impacts anticipated to affect built assets and infrastructure. The option involves the utilisation of existing sources and existing river infrastructure, so no additional material assets should be affected in the long-term.			

P. Isles of Scilly WRZ SEA Assessment

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix P: Isles of Scilly Options Assessment

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessments (SEA) Environmental Report		
Our reference:	100107117-MMD-RP-SEA-019-A	**Rev**	B
Prepared by:	Georgina Luck	**Date:**	08/02/23
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environmental Report Appendix P: Isles of Scilly WRZ - SEA Options Assessments		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water Draft WRMP24 SEA Environmental Report (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, scoring criteria and definitions, and abbreviations for these assessments.

It is acknowledged that Isles of Scilly supply side options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported.

The following Options Assessments are for the Isles of Scilly Water Resources Zone (WRZ). Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS

++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

Isles of Scilly Water Resources Zone (WRZ)

The below Option Assessment Matrices cover the following draft WRMP24 options for the Isles of Scilly WRZ:

- ISMY1
- ISMY2
- ISMY4
- ISB4
- IST1

P.1 ISMY1

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ISMY1				
Option:	St Mary's new borehole (location 1)				
Scheme type:	Undetermined				
Option description:	Drilling of new supply borehole at 30m depth – 150mm diameter borehole / c.1 kW pump. Associated infrastructure (headworks, kiosk, and pipework) wastewater piped via raw main (estimated 32mm diameter / 500m distance) to existing WTW. Assumes spare capacity at WTW. No additional requirement.				
Approx. Yield (Ml/d):	0.1 – 0.15				
WRZ:	Isles of Scilly				
Date Completed:	21/06/22, updated 02/02/23	***Completed By:***	Megan Townsend	***Version:***	E
Date Checked:	09/08/22, updated 08/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 08/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	0	**Construction Effects** The option is located within 500m (approximately 120m south-west) of the Isles of Scilly Complex SAC and Isles of Scilly MPA. The HRA concludes that this option has the potential for major significant effects on this designated site. The designated site is hydrologically connected to the option through a groundwater body. Any pollution events may be	Best practice construction and mitigation methods to be implemented to minimise disturbance effects (e.g. dust suppression and pollution control measures).	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				transferred via the groundwater catchment to the site and impact its qualifying features. Habitats may be damaged through pollution, which could degrade suitable habitat and foraging areas for grey seals. Noise and vibration from drilling activities and the laying of pipelines has potential to disturb the wildlife and habitats present within this site. It is deemed unlikely that The Isles of Scilly SPA and Ramsar (located approximately 1.8km north-east) would be significantly impacted by implementation of the option. The option is located approximately 530m west of Peninnis to Dry Ledge MCZ. The Isles of Scilly pSPA is located approximately 70m east of the option. Due to this identified proximity, the wildlife and habitats within these sites have potential to experience disturbance from resulting noise and vibration during construction. These sites are also hydrologically connected to the option; therefore, any pollution events could also impact their qualifying features. There are four biological SSSIs located on the island of St Mary's. The sites are hydrologically connected to the option via the Isles of Scilly groundwater body. Of these sites, four are located over 500m from the option footprint, however due to the sensitivity of these sites construction works and any potential pollution events have the potential to result in major significant impacts on these SSSIs. The island falls under several SSSI Impact Risk Zones. There is potential that these works will risk impacting SSSIs through construction activities regarding borehole installation.	Measures from the CEMP should be followed to ensure best practice.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The option is located over 500m from any NNRs, LNRs or Ancient Woodlands, therefore these sites are deemed unlikely to be affected by construction activities related to the option. **Operational Effects** It is anticipated that there would not likely be any significant impacts on designated and non-designated sites during operational activities related to the option. The abstraction yield from the proposed borehole is considered insignificant, therefore operation is not anticipated to have a likely significant impact on groundwater levels which could indirectly impact designated and non-designated sites. Once the borehole is installed, the infrastructure will be below ground. Disturbance is not expected during operational activities.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	---	-	**Construction Effects** The option directly encroaches areas of lowland heathland priority habitat and unclassified priority habitat. The option is also located within 500m of maritime cliff and slope, deciduous woodland and traditional orchard priority habitat. An Important Bird Area (located approximately 70m east of the option) and several areas of woodland are also located within 500m of the option. The option regards the construction of a new borehole which will involve drilling and excavation to install the borehole and the associated infrastructure. Construction runoff, dust, and vibrations has potential to disturb the wildlife and	Best practice construction methods are assumed to be implemented to minimise disturbance effects and habitat loss (e.g. dust suppression, pollution control measures). Trenchless techniques are to be implemented to reduce the level of disturbance to habitats within the close vicinity of the site.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				habitats within these areas, potentially impacting habitat connectivity. The route of the proposed 500m pipeline is currently uncertain, however it is likely that it will encroach upon areas of priority habitat, woodland, or grassland which may lead to major negative effects. The option is located over 500m from any Ancient Woodlands and Groundwater Dependent Terrestrial Ecosystems (GWDTEs) so there is a low potential for effects in these areas. **Operational Effects** Borehole groundwater abstraction has the potential to deplete the water table, potentially resulting in adverse impacts on local ecology and biodiversity in nearby water bodies and priority habitat. Although abstraction levels are likely to be low, the potential for minor negative effects regarding operational activities cannot be ruled out.	Measures from the CEMP should be followed to ensure best practice. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Ecology surveys will be required at future design stages to determine effects and mitigation required.		
	Reduce the spread or presence of INNS	-	0	**Construction Effects** Movement of excavated material and shared use of equipment may result in increased presence or spread of INNS from different areas. Colonising sediments left exposed post construction may also increase the spread of INNS. **Operational Effects** During operation, there is a very limited risk of INNS spread as the source water is likely to be entirely free of INNS. It is assumed that the groundwater is free of	Best practice and consultation of the INNS risk assessment in order to minimise spread of INNS. Construction sites to follow best practice biosecurity measures.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				INNS, and that accessing it will not permit any additional inputs of INNS.			
Water	Protect and enhance the quality of the water environment and water resources	-	---	**Construction Effects** The option is not located within an NVZ or a SPZ, therefore there is low potential for significant effects on groundwater quality. The closest SPZ is located 220m south and there are no NVZs on the St Mary's Island. Construction activities and excavation works could lead to the groundwater becoming contaminated, potentially causing minor effects on the SPZ located within 500m of the option. Pollutants from construction runoff could reach surface and ground waters and potentially impact Water Framework Directive (WFD) classifications of the Scilly Isles WFD waterbody and the Isles of Scilly (GW) WFD waterbody. However, the WFD Level 1 screening concluded no medium or high impacts as a result of this option. **Operational Effects** Increased groundwater abstraction could potentially result in long term deterioration of groundwater quality and quantity. The WFD Level 1 screening concluded high impacts on the Isles of Scilly (GW) WFD waterbody. This score was given due to the fact that there will be a new groundwater abstraction site with may lead to potential saline intrusion. These impacts, when taken on their own, have the potential to lead to a significant effect and permanent deterioration of WFD status.	Best practice construction methods are assumed to be implemented to minimise water deterioration (e.g., dust suppression, pollution control measures). Measures from the CEMP should be followed to ensure best practice. The groundwater levels and quality should be carefully monitored throughout operation and the monitoring criteria should be agreed with relevant authorities to minimise the long-term effects on water quality and water resources.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Abstracting groundwater from the borehole also has potential to deplete the water table in the area, which could decrease water resources in the long term. However, due to the small abstraction yield, the effect of this is considered minor.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The entirety of St Mary's island is located in Flood Zone 1. Therefore, construction is considered to have a neutral effect on flooding in the short term and construction of the option is not considered vulnerable to flood risk. **Operational Effects** The option seeks to abstract groundwater and transfer this to an existing WTW, via a new pipeline. This has the potential to reduce the risk of groundwater flooding, as activities will result in the lowering of the groundwater table. However, due to the small-scale abstraction yield, the effect is considered neutral. The option is located in Flood Zone 1, so it is not anticipated to be affected by flood risk during operation and therefore there is anticipated to be a neutral effect.	No notable impacts have been identified, therefore no mitigation required.	0	0
	Deliver reliable and resilient water supplies	0	- +	**Construction Effects** During the construction phase, the option is likely to have a neutral effect on the reliability or resilience of water supplies.	No notable impacts have been identified during construction, therefore no mitigation required. The groundwater quality should be carefully monitored throughout operation and the	0	- +

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The option will provide an additional 0.1 – 0.15Ml/d of water for use within the Isles of Scilly region. An increase in groundwater abstraction and treatment will likely result in minor positive effects and more resilient water supplies. However, increased groundwater abstraction could potentially result in long term deterioration of groundwater quality and quantity. Due to the small abstraction yield, a minor negative effect could be expected.	monitoring criteria should be agreed with relevant authorities to minimise the long-term effects on water quality and water resources		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	---	-	**Construction Effects** The option directly encroaches upon areas of Grade 2, Grade 4, and Grade 5 Agricultural Land. Construction of the new borehole and the associated infrastructure and pipelines is likely to require drilling and excavation works. This has potential to disturb the functionality, quality, and quantity of surrounding soils, especially as there is lots of undisturbed greenfield land surrounding the option footprint leading to a major negative effect. The option is not located within the footprint of any Authorised Landfill Sites and Historic Landfill Sites, therefore no impacts are anticipated. The option is located approximately 70m from Watermill Cove Geological SSSI (100% Favourable). There is potential for soils in this site to be negatively affected by construction runoff.	Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc). Construction on greenfield land should be avoided where possible, to reduce the impacts on undisturbed soils. Reinstatement of land excavated for the pipeline to minimise land take and disturbance. During operation, careful monitoring of abstraction via the borehole should be implemented to avoid any impacts on soil subsidence.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There is potential that groundwater abstraction via the borehole could cause subsidence in areas close to the groundwater source, causing unstable ground. Disturbed land is assumed to be re-instated post construction, potentially resulting in a minor negative effect.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** There are no AQMAs within 500m of the option. During construction, there is potential for temporary impacts on local air quality due to an increase in construction dust and emissions leading to minor negative effects on air quality. **Operational Effects** The operation of the option is not expected to generate air pollutants or dust. The option requires a small ongoing increase in energy consumption to operate the borehole. If sourced from fossil fuels, this would cause air emissions, however arising effects are deemed to be neutral.	Best practice mitigation measures are to be implemented (e.g., dust suppression, pollution control measures), however short-term air quality effects are likely to remain.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The construction of the borehole, associated infrastructure, and 500m pipeline will generate embodied carbon during installation, through use of materials and construction activities. Short term greenhouse gas emissions from construction activity and vehicular movements are likely to occur, potentially leading to a minor negative effect.	Investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the national grid is likely to help reduce future carbon emissions.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects	
		ST	LT				ST	LT
					Operational Effects The implementation of this option will require increased energy consumption to accommodate for the operation of the borehole and water transfer. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term leading to a minor negative effect.			
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place for the construction phase of the option. **Operational Effects** The additional abstraction and water transfer could result in increased resilience towards climate change effects through enabling increased water treatment and supply. However, the option will result in an increase in groundwater abstraction and may be vulnerable to drought during periods of reduced rainfall. This could result in minor negative effects on the environment if not properly monitored.	Water levels should be carefully monitored during operation to ensure they remain at an appropriate level. Best practice measures should be applied to prevent over abstraction and negative impacts on the environment.	0	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	0		**Construction Effects** The option is located within 500m of four Listed Buildings, including Grade II Listed Buildings Borough Farmhouse (200m south-west), Barn at Trenworth Farm (310m north-west) and Trenworth Farmhouse and Cottage and attached garden wall (270m north-west) and Watermill Cottage (200m south-west). The	The location of the borehole, associated infrastructure, and the pipeline should be carefully considered to minimise the effects on the historic environment.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				option is located within 500m of seven Scheduled Monuments, including Round cairn 137m east of Helvear Farm, St Mary's (45m north), and Kerbed platform cairn on Helvear Hill 210m ENE of Helvear Farm, St Mary's (130m north-east). Constructing the borehole, associated infrastructure, and pipeline, including drilling and excavation works, has the potential to cause effects through vibrations and dust emissions. The setting of these historic assets has potential to be negatively impacted. There are no World Heritage Sites, Registered Parks and Gardens and Registered Battlefields within 500m of the options. Therefore, there are no impacts on these sites. The option (and the entirety of St Mary's Island) is located within the Isles of Scilly Conservation Area. Construction plant and equipment as well as the generation of dust and vibrations have the potential to cause disturbance on this conservation area, leading to short-term minor negative effects. There are also several protected wrecks within 5km of the option location including Wheel Wreck, HMS Colosseus and Bartholomew Ledges. These assets are unlikely to be affected by construction. The exact location of the proposed 500m pipeline is currently unknown, so the severity of effects on individual historic assets cannot be wholly determined. There is potential for undiscovered archaeology to be disturbed if the infrastructure or pipeline is constructed on greenfield / undisturbed land.	If the historic environment is likely to be detrimentally affected, re-routing the pipeline should be considered. If this is not possible then careful consideration and reinstatement to its original condition should take place, with no detrimental effect on the character or area. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational, the option is not anticipated to have any effect upon the historic environment. Any land disturbed is assumed to be reinstated post construction. It is unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is currently unknown as to whether there are any of these assets present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	---	-	**Construction Effects** The option (and the entire St Mary's Island) is contained within the Isles of Scilly Area of Outstanding Natural Beauty (AONB) and 158 Isles of Scilly NCLA. Due to the nature of the Island, construction activities including drilling and excavation works have the potential to result in major negative impacts on the visual amenity of these areas. Construction dust, emissions, machinery, and vehicle movement are also likely to negatively impact the landscape temporarily. Existing trees and hedgerows are likely to provide some screening and therefore reduce the overall effect on the local landscape. There are no National Parks within 200m from the option.	Best practice construction methods to be implemented to minimise any effects on landscape and visual amenity (measures from the CEMP should be followed). If possible, locate the new infrastructure close to existing above ground-built assets, as this could lower the long term impacts on visual amenity.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option involves new infrastructure, so there are likely to be long term impacts on landscape and visual amenity. It is likely that this option will result in permanent loss of some greenfield land, leading to a minor negative effect on landscape.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	---	0	**Construction Effects** The area within the vicinity of this option is located within IMD Decile 7. During construction of the pipeline, major and minor roads may be affected (depending on pipeline route). Due to the size and sensitivity of the island this may increase congestion on the island and exacerbate deprivation and accessibility issues locally, to some extent, resulting in a major negative effect. There are no functional sites, important buildings or greenspace sites situated within 500m of the option and are therefore unlikely to be impacted. There are no PRoWs on the island of St Mary's. The option may contribute to employment opportunities during the construction phase. The exact location of the proposed 500m pipeline is currently unknown, so the severity on individual sites and assets cannot be determined. **Operational Effects** No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.	Best practice construction methods to be implemented to minimise the impacts on the health and well-being of the local community. Route realignment to be amended or trenchless techniques to be used to avoid direct impacts on property and community assets. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice. However, temporary effects are likely to still occur during construction.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	-	**Construction Effects** The option is located over 500m from any Greenspace site. Impacts on tourism and recreation are not expected during the construction phase. **Operational Effects** Operational activities are expected to be contained within the proposed site and proposed pipeline. Any disturbed or damaged land is to be reinstated post construction. However, due to the sensitivity of the island regarding changes to landscape and recreational impact, a precautionary minor negative effect could be expected.	It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	0	0
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** Construction of the borehole, associated infrastructure and the new pipeline will require materials and generate waste leading to minor negative effects on waste production. Energy consumption is also likely to increase during construction due to machinery and vehicle movement. It is assumed that these energy requirements would be met using fossil fuel sources. **Operational Effects** Energy consumption is likely to increase during the operational phase to abstract and transfer more water leading to minor negative effects. It is currently assumed that these energy requirements will be met using fossil fuel sources.	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain.	-	-
	Avoid negative effects on built	-	0	**Construction Effects**	Best practice construction and mitigation measures to	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	assets and infrastructure			There is likely to be some disruption to local traffic networks during the construction phase due to increased volume of construction vehicles and potential road closures and diversions. There is one major road (the A3110) and various minor roads within 500m of the option, which may lead to minor negative effects for users of surrounding roads. There are no National Trails, National Cycle Networks, or rail lines on St Mary's island, therefore these will likely not be affected in the short term. **Operational Effects** During the operational phase it is unlikely that there will be any disturbance on transport networks or built infrastructure.	be implemented, including a Traffic Management Plan to minimise disturbance during construction. However, temporary effects are likely to remain.		

P.2 ISMY2

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ISMY2				
Option:	St Mary's new borehole (location 2)				
Scheme type:	Undetermined				
Option description:	Drilling of new supply borehole 30m depth at 150mm diameter borehole / c.1 kW pump. Associated infrastructure (headworks, kiosk and pipework) and requiring standalone treatment, with water piped directly into supply network (estimated 32mm diameter / 500m distance). Note – Price for new WTW stream				
Approx. Yield (Ml/d):	0.1 – 0.15				
WRZ:	Isles of Scilly				
Date Completed:	27/06/22, updated 02/02/23	***Completed By:***	Megan Townsend	***Version:***	D
Date Checked:	22/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	0	**Construction Effects** The option is located within 500m of the Isles of Scilly Complex SAC (120m south-west) and MPA. During construction, the HRA concludes that this site has potential for significant effects on this designated site. The designated site is hydrologically connected to the option through a groundwater body. Any pollution events may be transferred via the groundwater catchment to the site and impact its qualifying features. Habitats may be damaged through pollution, which could degrade suitable habitat and foraging areas for grey seals. Noise and vibrations from construction	Best practice construction and mitigation methods to be implemented to minimise disturbance effects (e.g., dust suppression and pollution control measures). Measures from the CEMP should be followed to ensure best practice.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				operations has the potential to disturb the wildlife and habitats present within this site. The option is located approximately 530m west of Peninnis to Dry Ledge MCZ. The Isles of Scilly pSPA is located approximately 70m east of the option. The wildlife and habitats within these sites have potential to experience disturbance from noise and vibration produced during construction. These sites are also hydrologically connected to the option, so any pollution events could also impact their qualifying features. There are four biological SSSIs located on the island of St Mary's. The sites are hydrologically connected to the option via the Isles of Scilly groundwater body. These SSSIs are located over 500m away from the site footprint and therefore construction activities and any potential pollution events associated with the option are unlikely to have significant impacts on these sites. The island falls under several SSSI Impact Risk Zones. There is potential that these works will risk impacting SSSIs through construction activities. The option is over 500m from any NNRs, LNRs or Ancient Woodlands and therefore is likely to have negligible impacts on these sites. **Operational Effects** It is anticipated that there are likely to be no significant impacts on designated and non-designated sites during operational activities. The abstraction yield from the proposed borehole is considered very small, therefore operation is not anticipated to have a			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				significant impact on groundwater levels which would otherwise result in indirect impacts on designated and non-designated sites. Once the borehole is installed, the infrastructure will be below ground, resulting in minimal disturbance during operational activities.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	---	-	**Construction Effects** The borehole location encroaches areas of lowland heathland priority habitat and unclassified priority habitat. The borehole and standalone treatment plant are located within 500m of maritime cliff and slope, deciduous woodland, and traditional orchard priority habitat. An Important Bird Area (70m east from the option location), and several areas of woodland are located within 500m of the option. The option involves the construction of a new borehole which will involve drilling and excavation to install the borehole and associated infrastructure. This option also requires a new standalone treatment plant at the borehole location. Construction runoff, dust, and vibrations has potential to disturb the wildlife and habitats within these areas, potentially affecting habitat connectivity. The route of the proposed 500m pipeline is uncertain at present, however it is likely that it will encroach upon areas of priority habitat, woodland, or grassland. The option is located over 500m from any Ancient Woodlands and GWDTEs. Therefore, an insignificant impact on these biodiversity assets would be expected. **Operational Effects**	Best practice construction methods are assumed to be implemented to minimise disturbance effects and habitat loss (e.g. dust suppression, pollution control measures). Trenchless techniques are to be implemented to reduce the level of disturbance to habitats within the close vicinity of the site. Measures from the CEMP should be followed to ensure best practice. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Ecology surveys will be required at future design stages to determine effects and mitigation required	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Abstracting groundwater from the borehole has potential to deplete the water table in the area. This could adversely impact ecology and biodiversity in local waterbodies and priority habitat. However, abstraction levels are assumed to be low, therefore operational effects are considered minor.			
	Reduce the spread or presence of INNS	-	0	**Construction Effects** Movement of excavated material and shared use of equipment may result in increased presence or spread of INNS from different areas. Colonising sediments left exposed post construction may also increase the spread of INNS. **Operational Effects** During operation, there is a very limited risk of INNS spread as the source water is likely to be entirely free of INNS. It is assumed that the groundwater is free of INNS, and that accessing it will not permit any additional inputs of INNS.	Best practice and consultation of the INNS risk assessment to minimise spread of INNS. Construction sites to follow best practice biosecurity measures.	-	0
Water	Protect and enhance the quality of the water environment and water resources	-	--	**Construction Effects** The option is not located within a NVZ or a SPZ, therefore insignificant effects on groundwater quality are likely. The closest SPZ is located 220m south of the option location and there are no NVZs located on St Mary's Island. Construction activities and excavation works could lead to groundwater contamination, potentially causing minor negative effects on the SPZ located within 500m of the option. Pollutants from construction runoff could reach surface and ground waters and potentially	Best practice construction methods are assumed to be implemented to minimise water deterioration (e.g., dust suppression, pollution control measures). Measures from the CEMP should be followed to ensure best practice. The groundwater levels and quality should be carefully	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				impact Water Framework Directive (WFD) classifications of the Scilly Isles WFD waterbody and the Isles of Scilly (GW) WFD waterbody. However, the WFD Level 1 screening concluded that there would likely not result in medium or high impacts from this option. **Operational Effects** Increased groundwater abstraction could potentially result in long term deterioration of groundwater quality and quantity. The WFD Level 1 screening identified potential for high impacts on the Isles of Scilly (GW) WFD waterbody. This score was given as there will be a new groundwater abstraction site with may lead to potential saline intrusion. These impacts, when taken on their own, have the potential to lead to a significant effect and permanent deterioration of WFD status. This score does not consider the low abstraction yield, which is likely to reduce these potential effects on the WFD groundwater body to an overall moderate negative effect. Abstracting groundwater from the borehole also has potential to deplete the groundwater table in the area, which could decrease water resources in the long term. However, due to the small abstraction yield, the effect of this is considered neutral. It is assumed that the new standalone treatment plant will require below ground structures. During operation, this may have potential to lead to a minor localised effect on the Scilly Isles and Isles of Scilly (GW) WFD	monitored throughout operation and the monitoring criteria should be agreed with relevant authorities to minimise the long-term effects on water quality and water resources.		

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				waterbodies. However, these impacts are not anticipated to lower WFD status.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The entirety of the island of St Mary's is located within Flood Zone 1. Therefore, construction is considered to have a neutral effect on flooding in the short term and construction of the option is not considered vulnerable to flood risk. **Operational Effects** The option seeks to abstract groundwater and treat this within a standalone treatment plant on site. This has potential to reduce the risk of groundwater flooding, as the activities will result in the lowering of the groundwater table. However, due to the small-scale abstraction yield, the effect is considered neutral. The option is located within Flood Zone 1, therefore it is not anticipated to be affected by flood risk during operation.	No notable impacts have been identified, therefore no mitigation required.	0	0
	Deliver reliable and resilient water supplies	0	- / +	**Construction Effects** During the construction phase the option is unlikely to have any effect on the reliability or resilience of water supplies. **Operational Effects** The option will provide an additional 0.1 – 0.15Ml/d of water for use within the Isles of Scilly region. An increase in groundwater abstraction and treatment will likely result in minor positive effects and more resilient	No notable impacts have been identified, therefore no mitigation required. The groundwater quality should be carefully monitored throughout operation and the monitoring criteria should be agreed with relevant authorities to minimise the	0	- / +

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				water supplies. However, increased groundwater abstraction could potentially result in long term deterioration of groundwater quality and quantity. Due to the small abstraction yield, the impact is considered minor.	long-term effects on water quality and water resources		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** The option location directly encroaches upon areas of Grade 2, Grade 4, and Grade 5 Agricultural Land. Construction of the new borehole, the standalone treatment plant and 500m pipeline is likely to require drilling and excavation works. This has potential to disturb the functionality, quality, and quantity of surrounding soils, especially as there is a large quantity of undisturbed greenfield land surrounding the option footprint. The option is not located within the footprint of any Authorised Landfill Sites and Historic Landfill Sites, therefore no impacts are anticipated. The option is located within 500m of Watermill Cove Geological SSSI (100% Favourable). There is potential for soils in this site to be negatively affected by construction runoff. **Operational Effects** There is potential that groundwater abstraction (via borehole) could potentially cause subsidence in areas close to the groundwater source, causing unstable ground. Disturbed land is assumed to be re-instated post construction.	Best practice mitigation measures likely to be implemented during the construction phase (stripping, stockpiling, the conservation of topsoil and subsoil etc). Construction on greenfield land should be avoided where possible, to reduce the impacts on undisturbed soils. Reinstatement of land excavated for the pipeline to minimise land take and disturbance. During operation, careful monitoring of abstraction via the borehole should be implemented to avoid any impacts on soil subsidence.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Air	Reduce and minimise air emissions	-	0	**Construction Effects** There are no AQMAs within 500m of the option. During construction there is potential for temporary impacts on local air quality due to an increase in construction dust and emissions, potentially resulting in a minor negative effect. **Operational Effects** The operation of the option is not expected to generate air pollutants or dust. The option requires a small increase in energy consumption to operate the borehole and treatment plant. If sourced from fossil fuels, this would cause emissions to air, however effects because of the option would be neutral.	Best practice mitigation measures are to be implemented; however short-term air quality effects are likely to remain.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** The construction of the borehole, associated infrastructure and 500m pipeline will generate embodied carbon during installation, through using materials and construction activities. Short term greenhouse gas emissions from construction activity and vehicular movements are likely to occur leading to a minor negative effect. **Operational Effects** The implementation of this option will require increased energy consumption to accommodate for the operation of the borehole, treatment plant, and water transfer. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term.	Investigate the use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of the national grid is likely to help reduce future carbon emissions.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
		ST	LT				ST	LT	
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place for the construction phase of the option. **Operational Effects** The additional abstraction and water treatment could result in increased resilience towards climate change effects through enabling increased water availability. However, the option will result in an increase in groundwater abstraction and may be vulnerable to drought during periods of reduced rainfall. This could result in negative effects on the environment if not properly monitored.	Water levels should be carefully monitored during operation to ensure they remain at an appropriate level. Best practice measures should be applied to prevent over abstraction and negative impacts on the environment.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	-		**Construction Effects** The option is located within 500m of four Listed Buildings, including Grade II Listed Buildings Borough Farmhouse (200m south-west), Barn at Trenoweth Farm (310m north-west), Trenworth Farmhouse and Cottage and attached garden wall (270m north-west) and Watermill Cottage (200m south west). The option is located within 500m of seven Scheduled Monuments, including a including Round cairn 137m east of Helvear Farm, St Mary's (45m north), and Kerbed platform cairn on Helvear Hill 210m ENE of Helvear Farm, St Mary's (130m north-east). Constructing the borehole, associated infrastructure, and pipeline, including drilling and excavation works, have the potential to cause effects through vibrations	The location of the borehole treatment plant, and the pipeline should be carefully considered to minimise the effect on the historic environment. If the historic environment is likely to be detrimentally affected, re-routing the pipeline should be considered. If this is not possible then careful consideration and reinstatement to its original condition should take place,	-	-	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and dust emissions. The setting of these historic assets could therefore be negatively impacted. There are no World Heritage Sites, Registered Parks and Gardens and Registered Battlefields located within 500m of the options. Therefore, there would likely be no significant impacts on these sites. The option (and the entirety of St Mary's Island) is located within the Isles of Scilly Conservation Area. Construction dust and vibrations have the potential to cause disturbance on this conservation area, leading to short-term minor negative effects. There are also several protected wrecks within 5km – Wheel Wreck, HMS Colosseus and Bartholomew Ledges. These assets are unlikely to be affected by construction. The exact location of the proposed 500m pipeline is currently unknown, so the severity of effects on individual historic assets cannot be determined. There is potential for undiscovered archaeology to be disturbed if the infrastructure or pipeline is constructed on greenfield / undisturbed land. **Operational Effects** Once operational, the option is not anticipated to have any significant effect upon the historic environment. Any disturbed land is assumed to be reinstated post construction. The new standalone treatment plant has potential to disturb the views, setting and visual amenity of historic assets within 500m of the option. However, the effect of this is considered minor.	with no detrimental effect on the character or area. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				It is unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is currently unknown as to whether there are any of these assets present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option (and the entire St Mary's Island) is contained within the Isles of Scilly AONB and 158 Isles of Scilly NCA. Construction, drilling, and excavation works are likely to negatively impact the visual amenity of these areas. Construction dust, emissions, machinery, and vehicle movement are likely to negatively impact the landscape temporarily. Trees and hedgerows are likely to provide some screening and reduce the overall effect on the landscape. There are no National Parks within 200m from the option. **Operational Effects** The option involves new infrastructure, therefore long term impacts on landscape and visual amenity could be expected. It is likely that this option will require the permanent loss of some greenfield land.	Best practice construction methods to be implemented to minimise any effects on landscape and visual amenity (measures from the CEMP should be followed). If possible, locate the new infrastructure close to existing above ground-built assets, as this could lower the long term impacts on visual amenity.	-	-
	Maintain and enhance the health	-	0	**Construction Effects**	Best practice construction methods to be implemented	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	and wellbeing of the local community, including economic and social wellbeing			The area within the vicinity of this option is located within IMD Decile 7. During construction of the pipeline, major and minor roads may be affected (depending on pipeline route). This may increase congestion on the island and exacerbate deprivation and accessibility issues locally, to some extent, resulting in a minor negative effect. There are no functional sites, important buildings, and greenspace sites situated within 500m of the borehole and treatment plant location, therefore significant impacts would not be expected. There are no PRoWs located on the island of St Mary's, therefore the settings of these footpaths would not likely be affected by the option. The option may contribute to employment opportunities during the construction phase and have a positive impact on economic wellbeing. The exact location of the proposed 500m pipeline is currently unknown and therefore the severity on individual sites and assets cannot be determined. **Operational Effects** No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.	to minimise the impacts on the health and well-being of the local community. Route realignment to be amended or trenchless techniques to be used to avoid direct impacts on property and community assets. It is recommended that standards from the Considerate Constructors Scheme should be followed to ensure best practice. However, temporary effects are likely to still occur during construction.		
	Maintain and enhance tourism and recreation	0	0	**Construction Effects**	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The option is located over 500m from any areas of Greenspace. Impacts on tourism and recreation are not expected during the construction phase. **Operational Effects** Operational activities are expected to be contained within the proposed sites and proposed pipeline. Any disturbed or damaged land is to be reinstated post construction. Therefore, impacts on tourism and recreation are not expected in the long term.	However, it is recommended that standards from the Considerate Constructors Scheme should be followed to ensure best practice.		
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** Construction of a new borehole, standalone treatment plant, and the new pipeline will require materials and generate waste leading to potential minor negative effects. Energy consumption is also likely to increase during construction due to machinery and vehicle movement. It is assumed that these energy requirements would be met using fossil fuel sources. **Operational Effects** Energy consumption is likely to increase in the operational phase to abstract, treat, and transfer more water leading to minor negative effects. It is currently assumed that these energy requirements would be met using fossil fuel sources.	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that negative effects will remain.	-	-
	Avoid negative effects on built	-	0	**Construction Effects**	Best practice construction and mitigation measures to be implemented, including a	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	assets and infrastructure			There is likely to be some disruption to local traffic networks during the construction phase due to increased volume of construction vehicles and potential road closures and diversions. There are several major and minor roads within 500m which may experience these impacts. There are no National Trails, National Cycle Networks, or rail lines on the island, so these will not be affected in the short term. **Operational Effects** During the operational phase it is unlikely that there will be any disturbance on transport networks or built infrastructure.	Traffic Management Plan to minimise disturbance during construction. However, temporary effects are likely to remain.		

P.3 ISMY4

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ISMY4				
Option:	St. Mary's – Increase Existing Desalination Plant Capacity				
Scheme type:	Undetermined				
Option description:	Additional process stream at existing RO plant. New building required.				
Approx. Yield (Ml/d):	0.1 – 0.25				
WRZ:	Isles of Scilly				
Date Completed:	04/07/22, updated 02/02/23	***Completed By:***	Megan Townsend	***Version:***	C
Date Checked:	25/07/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	?	?	**Construction Effects** The new RO desalination plant and the existing seawater intake has no direct encroachment upon any SACs, SPAs, Ramsar Sites, SSSIs, NNRs, or LNRs. The option is located within 500m of the Isles of Scilly Complex SAC (170m east), Isles of Scilly MPA (130m east), the Isles of Scilly pSPA (130m east) and Isles of Scilly Sites – Peninnis to Dry Ledge MCZ (130m east). There is potential for these sites to be negatively impacted in the short term. It is assumed that this option involves the construction of a new building and equipment at the existing RO desalination plant, with no new pipelines needed. The HRA concludes that there is potential for significant effects on the Isles of	Best practice construction and mitigation methods should be implemented to minimise effects on designated and non-designated sites. Measures from the CEMP should be followed to ensure best practice. Careful consideration of the borehole location should be given to avoid effects on designated and non-designated ecological sites.	?	?

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Scilly Complex SAC during the construction phase. This is because it is hydrologically connected to the option through a groundwater body. Any pollution events may be transferred via the groundwater catchment to the site and impact their qualifying features. Habitats may be damaged through pollution, which could degrade the suitable habitat and foraging areas for grey seals. There are three ecological SSSIs on the island: Peninnis Head (St. Mary's) SSSI (2.3km south-west) (100% Unfavourable – Recovering), Lower Moors (St. Mary's) SSSI (1.6km south-west) (100% Unfavourable – Recovering), and Higher Moors & Porth Hellick Pool (St. Mary's) SSSI (570m south-west) (100% Favourable). However, these are located over 500m away from the existing site, so they should not experience disturbance effects from construction. This option involves the possibility for a new borehole to be installed, however the location on St Mary's is currently unknown. The MCZ of Peninnis to Dry Ledge is 130m east of the option, and the sea surrounding the island of St Mary's is classified as the Isles of Scilly Complex SAC and Isles of Scilly MPA (130m east). There are three ecological SSSIs on the island, additionally the island falls under several SSSI Impact Risk Zones. If a new borehole is required, construction would involve drilling and excavation to install the borehole and its associated infrastructure. Construction runoff, dust and vibrations has potential to disturb the species and habitats within these sites.			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				The location of possible new boreholes is currently uncertain. Therefore, the severity of effects on individual ecological sites cannot be determined at this stage. There are no Ramsar Sites, LNRs, or NNRs directly on the island of St Mary's, therefore no impact on these sites are expected. **Operational Effects** This option involves a new building and equipment at an existing site to increase the output of the existing RO desalination plant. This will also involve either increasing the yield of existing boreholes or drilling new boreholes (which could be located anywhere on St Mary's). The HRA concludes that no impacts during operation are anticipated on the Isles of Scilly Complex SAC and Isles of Scilly MPA, the Isles of Scilly pSPA, and Isles of Scilly Site – Peninnis to Dry Ledge MCZ. This is because there are no impact pathways present during operation. It is unlikely that SSSIs will be impacted during operation. If the yield of the boreholes (located anywhere on St Mary's) is increased, saline water abstraction will increase. SSSIs should not be impacted as they are likely to be freshwater dependent. However, there is a risk of saltwater intrusion from the increased abstraction of saine water. It is currently uncertain how the remaining brine water will be disposed of. If the brine water is released back into the sea, it may accumulate and decrease the			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				quality of seawater. This poses a potential threat to marine life within the designated sites. This topic area has been assessed as requiring further information to identify impacts regarding these criteria and at this stage will the impacts are unknown.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	?	?	**Construction Effects** It is assumed that this option involves the construction of a new building and equipment at the existing RO desalination plant, with no new pipelines needed. Areas of lowland heath and priority habitat are located within the site footprint. This site is also located within 500m of traditional orchard and unclassified priority habitat. The option is expected to cause the loss of BNG units due to habitat clearance associated with construction. The option is also likely to generate the loss of natural capital stocks during construction. Dwarf shrub heath stocks are expected to be temporarily lost during construction, but reinstated/compensated reducing long term impacts on ecosystem services. Construction runoff has potential to pollute nearby coastal and surface waters, which could affect habitats and species within them. Construction dust, noise and vibrations also have potential to disturb wildlife within the surrounding priority habitat. The option is expected to cause a minor loss of habitat during construction, which could negatively affect biodiversity and habitat connectivity. However, as the new infrastructure will be located on an existing site, the effect is considered minor.	Best practice construction methods to be implemented to minimise disturbance effects and habitat loss (e.g., dust suppression, pollution control measures). Measures from the CEMP should be followed to ensure best practice. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Ecology surveys will be required at future design stages to determine effects and mitigation required	?	?

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
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				This option involves the possibility for a new borehole to be installed, however the location on the island of St Mary's is currently unknown. The island has multiple Important Bird Areas and priority habitats including lowland heathlands, pockets of deciduous woodland, and coastal vegetated shingle. Construction will involve drilling and excavation to install the borehole and associated infrastructure. Construction runoff, dust, and vibrations has potential to disturb these areas. The exact location of this possible borehole is currently unknown, so the severity of effects on each priority habitat cannot be determined. There are no Ancient Woodlands or GWDTEs located on the island, so these areas and their associated species will not experience impacts. **Operational Effects** This option involves a new building and equipment at an existing site to increase the output of the existing RO desalination plant. This will also involve either increasing the yield of existing boreholes (same location as the existing direct sea intake) or new boreholes (which could be located anywhere on St Mary's). Increased abstraction has potential to deplete the water table in the area. This could adversely impact close by waterbodies and priority habitat, depending on the location. Increased abstraction could also threaten marine wildlife within the coastal waters surrounding the Isles of Scilly. This is because mature fish and other marine life can be significantly injured or			

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				killed when they become trapped or sucked into open water intake pipes. It is currently uncertain how the remaining brine water will be disposed of. Brine waste also poses a potential threat to marine life and water quality, as it contains dangerously high concentrations of salts and other minerals. This could significantly alter coastal ecosystems in the surrounding area therefore at this stage the option has been assessed as having its potential impacts as unknown until further information is made available.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** It is assumed that this option involves the construction of a new building and equipment at the existing RO desalination plant, with no new pipelines needed. The option will also involve either increasing yield of existing boreholes or construction of new boreholes. Construction may result in increased spread or presence of INNS from different areas, due to the shared use of equipment and movement of material around the construction site. **Operational Effects** It is assumed water transfer will occur throughout regular operation of the option and assumed raw water will be transferred from possible new borehole. There is potential for the spread of INNS during operation. If a pipe bursts, this will cause water to be released back into the environment, which will create a pathway for the transfer of INNS.	Consultation of the INNS risk assessment in order to minimise spread of INNS. Construction sites to follow best practice biosecurity measures.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
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Water	Protect and enhance the quality of the water environment and water resources	-	---	**Construction Effects** The island is located outside of an NVZ, so there is low potential for significant effects on water quality. The existing site is located within 500m of a Groundwater Source Protection Zone II (Outer protection Zone) (110m west) and Zone I (Inner Protection Zone) (600m west). It is assumed that this option involves the construction of a new building and equipment at the existing RO desalination plant, with no new pipelines needed. There is also a possibility that new boreholes may need to be constructed, but the location on St Mary's is currently uncertain. Pollutants from construction runoff could reach surface water and groundwaters and potentially impact WFD classifications of the Scilly Isles and Isles of Scilly (GW) WFD waterbodies. The WFD Level 1 screening concluded that no medium or high impacts would result from this option. **Operational Effects** This option involves increased abstraction from the existing or new borehole. The WFD Level 1 screening concluded medium impacts on the Isles of Scilly (GW) WFD waterbody. This is due to the change in abstraction licence needed for the new or existing boreholes. The WFD Level 1 screening also concluded moderate impacts on the Scilly Isles WFD waterbody. This is due to the increase of the coastal waterbody abstraction licence. These medium impacts have potential to lead to a widespread or prolonged effect on the quality of the water	Best practice construction methods are assumed to be implemented to minimise disturbance and pollution (e.g. dust suppression, pollution control measures). Measures from the CEMP should be followed to ensure best practice. The quality of the Isles of Scilly seawater should be carefully monitored throughout operation to minimise long term effects on water quality and water resources. Location of new borehole to take into consideration Groundwater Protection Zone locations. The quality of the Scilly Isles and Isles of Scilly (GW) waterbodies should be carefully monitored throughout operation to minimise long term effects on water quality and water resources. Further investigation into the potential effects of brine	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
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				environment and it may result in a temporary reduction in WFD status of these two waterbodies. The operation of the desalination plant itself is not anticipated to affect terrestrial water quality or resources. This is because operational activities will take place on the existing site. It is currently uncertain as to how the remaining brine water will be disposed of. Brine poses a potential effect on water quality, as it contains dangerously high concentrations of salts and other minerals. This could potentially lead to the long-term deterioration of water quality within the coastal waters of the Isles of Scilly overall, the effects are moderate negative.	water disposal should be undertaken.		
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The entire St Mary's Island is located in Flood Zone 1. Therefore, construction is considered to have a neutral effect on flooding in the short term and construction of the option is not considered vulnerable to flood risk. **Operational Effects** The option seeks to increase borehole yield or construct a new borehole. Either option will transfer abstracted groundwater to the existing RO desalination plant. However, due to the small-scale abstraction, the effect is considered neutral. The operation of the option is not expected to be impacted by flood risk because the option is located in Flood Zone 1.	No notable impacts have been identified, therefore no mitigation required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
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	Deliver reliable and resilient water supplies	0	+	**Construction Effects** During the construction phase, the option is unlikely to have any effect on the reliability or resilience of water supplies. **Operational Effects** The option will provide an additional 0.1 – 0.25 Ml/d of water for use within the Isles of Scilly region. An increase in treatment of the RO desalination plant and increased water abstraction is likely to result in minor positive effects and more resilient water supplies.	No notable impacts have been identified, therefore no mitigation required.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	?	0	**Construction Effects** It is assumed that this option involves the construction of a new building and equipment at the existing RO desalination plant, with no new pipelines needed. There are areas of Grade 4 Agricultural Land within the existing desalination site. Additionally, construction is likely to cause the permanent loss of farmland pastures stock, which will negatively impact soils in this area. There is also a possibility that new boreholes may need to be constructed, but the location on St Mary's is currently uncertain. There are areas of Grade 2, Grade 4 and Grade 5 Agricultural Land on St Mary's, with areas of urban and non-agricultural land. Construction of the new borehole and the associated infrastructure is likely to require drilling and excavation works. This has potential to disturb the functionality, quality, and quantity of soils on the island of St Mary's. There is one historic landfill site and two geological SSSIs on	Best practice construction and mitigation measures to be implemented (stripping, stockpiling, the conservation of topsoil and subsoil etc).	?	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				the island: Porthloo SSSI located 2.4km northwest (100% Favourable), and Watermill Cove SSSI located 800m northwest (100% Favourable). If boreholes are constructed close to these SSSIs, the soil within them may be affected. The severity of these effects on these sites cannot be determined until details on the borehole location are confirmed. **Operational Effects** This option is not expected to affect soil functionality, quality, or quantity in the long term. Operational activities will take place on the existing site and no new pipelines are needed. Activities associated with increased treatment at the desalination plant are not anticipated to affect soils.			
Air	Reduce and minimise air emissions	-	-	**Construction Effects** The existing RO desalination plant is located over 500m away from any AQMAs. Construction of a new building and equipment within this site may have a temporary impact on local air quality due to an increase in construction dust and emissions. Additionally, there is a possibility that a new borehole will need to be constructed on the island of St Mary's, so this is likely to temporarily reduce local air quality. **Operational Effects** During operation, there will be an increase in output of the existing RO desalination plant. Desalination is an energy-intensive process. If the energy is sourced from fossil fuels, greenhouse gas emissions will increase as	Best practice construction methods to be implemented (e.g. dust suppression). Investigate the use of renewables to power the new facilities. Decarbonisation of the national grid is likely to reduce long term effects on air quality. However, it is likely that some impacts on air quality will remain.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				well as the reliance on fossil fuels. This has potential to negatively impact air quality in the long term.			
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** Construction of the new building and equipment within the existing RO site will generate embodied carbon during installation, through using materials and construction activities. Short term greenhouse gas emissions from construction activities and vehicle movements are likely to occur. The NCA concludes that construction impacts will include the loss of carbon storage. This is likely due to the loss of priority habitat and farm pastures stock, which would have stored carbon prior to construction. This option may require the construction of new boreholes (which could be located anywhere on St Mary's). Construction of new boreholes will also generate embodied carbon through using materials and construction activities. **Operational Effects** The implementation of this option will require increased energy consumption to accommodate for the operation of the boreholes and the increased output at the existing RO desalination plant. It is currently assumed that this will utilise fossil fuel sources of energy, which will increase operational carbon emissions in the long term.	Investigate the use of materials with less embodied carbon and less energy intensive construction methods. Investigate the use of renewables to power the new facilities. Decarbonisation of the national grid is likely to reduce long term effects on carbon emissions. However, it is likely that some impacts on carbon emissions will remain.	-	-

SEA Topic	SEA Objective	Effects			Commentary	Mitigation	Residual effects		
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	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place for the construction phase of the option. **Operational Effects** This option could result in increased resilience towards climate change through enabling increased water abstraction, treatment and supply. This option involves the increased output of the existing RO desalination plant. Desalination is an energy intensive process. It is assumed that the energy supplied will come from fossil fuel sources and will result in increased carbon emissions in the long term. This could alternatively decrease climate resilience and result in negative effects. There is also a chance that the existing/new boreholes may be susceptible to future sea-level rise and changes to seawater temperature.	Investigate the use of renewables to power the new facilities. Decarbonisation of the national grid is likely to reduce long term effects on climate resilience.	0	-	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	?	0		**Construction Effects** The existing RO desalination plant is located within 500m of 11 Scheduled Monuments. These include Civil War breastwork and battery on the north coast of Normandy Down, Kerbed platform cairn 80m northeast of Mount Todden Farm, Platform cairn 100m NNW of Water Rocks, Normandy Down, and Prehistoric entrance grave and regular field system on north-western Porth Hellick Down. Constructing the new building and equipment has potential to cause effects through increased dust, vibrations, and vehicular	If new boreholes are required, the location should be carefully considered to minimise construction impacts on the historic environment. Best practice construction methods should be applied (e.g. dust suppression).	?	0	

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				activity. The visual amenity of these historic assets has potential to be negatively impacted in the short term. There are no Listed Buildings within 500m of the option, with the closest being Grade II Listed Building Borough Farmhouse 1.05km north-west of the option. The option may involve the construction of new boreholes (which could be located anywhere on the island of St Mary's). St Mary's has several Listed Buildings and Scheduled Monuments situated across the island. Constructing the boreholes has potential to cause effects through vibrations and dust, along with drilling and excavation works. The accessibility and visual amenity of historic assets has potential to be negatively impacted. There is also potential for effects on undiscovered buried archaeology. The exact location of possible new boreholes is currently uncertain, so the severity of construction effects on individual historic assets cannot be determined at this stage. The island is located over 500m from any World Heritage Sites, Registered Parks and Gardens and Registered Battlefields, so these areas are unlikely to be impacted. The option is located within the Isles of Scilly Conservation Area. Construction dust and vibrations has potential to cause minor disturbance effects to this Conservation Area. There are also several protected wrecks within 5km – Wheel Wreck located 1.95km north-east, HMS Colosseus located 4.05km west and Bartholomew			

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				Ledges located 3.95km south-west. These assets are unlikely to be affected by construction. **Operational Effects** Once operational, the new building and equipment is not anticipated to have effects upon the historic environment. This is because it will be located on an existing site and any land disturbed is assumed to be reinstated post construction. Any new boreholes are not anticipated to have any effect upon the historic environment. Any land disturbed is assumed to be reinstated post construction. It is unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located within the Isles of Scilly AONB and Isles of Scilly NCLA. Construction works could negatively impact the visual amenity of these areas. Construction dust, emissions, machinery, and vehicular movement is likely to negatively impact the landscape temporarily. **Operational Effects** The option involves new infrastructure, so there may be some long-term impacts on landscape and visual amenity. The new building and equipment will be located on an existing site, so these will have a minor impact on landscape. The option may involve the construction of new boreholes (which could be located	Best practice construction methods to be implemented to minimise the effects on landscape and visual amenity. Measures from the CEMP should be implemented to ensure best practice. If possible, locate the new infrastructure close to existing above-ground built assets, as this could lower the long-term impacts on visual amenity.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				anywhere on St Mary's). This new infrastructure could potentially lead to minor negative long-term visual effects. As the location of possible new boreholes is currently uncertain, the severity of impacts on individual visual receptors cannot be determined at this stage and a precautionary minor negative impact is identified.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	0	**Construction Effects** The new building and equipment will be constructed in an area with an IMD Decile of 7. There is one greenspace site (Normandy Pool) within 500m of the existing RO desalination plant, where users may experience negative impacts from increased construction dust and emissions. The option may involve the construction of new boreholes (which could be located anywhere on the island of St Mary's). There are several functional sites, important buildings and greenspace sites located on the island. There is a possibility that construction dust, noise, and vibrations may temporarily disturb these sites. Major roads or transport infrastructure is not anticipated to experience any negative effects. The location of the new borehole is currently uncertain, so the severity of effects on individual assets cannot be determined. There are no PRoWs located on the island of St Mary's, so these areas will not be affected by the option. At this stage, the overall minor negative effect of construction on health and wellbeing could be expected.	Best practice construction methods to be implemented to minimise the impacts on the health and wellbeing of the local community. Borehole location should be carefully considered to avoid direct impacts on property and community assets. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.			
	Maintain and enhance tourism and recreation	-	--	**Construction Effects** There is a greenspace site situated within 500m of the existing RO desalination plant (Normandy Pool). Users of this greenspace may be negatively affected during construction from dust, noise, and vibrations. The option may involve the construction of new boreholes (which could be located anywhere on St Mary's). There are several greenspace sites located on the island. There is a possibility that construction dust, noise, and vibrations may temporarily disturb these sites. Therefore, there may be a temporary impact on recreational activities during the construction phase, however this is considered minor. The severity of effects on individual greenspace sites cannot be determined at this stage, as the location of possible new boreholes is uncertain. **Operational Effects** Once operational, the new infrastructure is not anticipated to have any effect upon tourism and recreation. Any land disturbed is assumed to be reinstated post construction. However, it is currently uncertain how the remaining brine water will be disposed of. Brine poses a potential effect on water quality, as it contains dangerously high	Best practice construction and mitigation methods to minimise the impacts on tourism and recreation. Any land disturbed during construction should be reinstated. Borehole location should be carefully considered to minimise impacts on tourism and recreation. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice. Further investigation into the effects of brine water disposal should be undertaken.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				concentrations of salts and other minerals. This could potentially lead to the long-term deterioration of water quality within the coastal waters of the Isles of Scilly. Decreases in water quality have potential to reduce the recreational use of the coastal waters of the Isles of Scilly (e.g. for recreational purposes and fishing). A precautionary moderate negative effect has been identified.			
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** Construction of the new building and equipment (and possible boreholes) will require materials and generate waste. Energy consumption is also likely to increase during construction due to machinery and vehicular movement. It is assumed that these energy requirements will be met using fossil fuel sources leading to a minor negative effect on resource use. **Operational Effects** Energy consumption is likely to increase in the operational phase to power the increased abstraction and water treatment. Desalination is an energy-intensive process, and it is currently assumed that these energy requirements will be met using fossil fuel sources leading to a minor negative effect on resource use.	Seek opportunities to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse any waste material if possible. However, it is likely that negative impacts will remain. Investigate the use of renewables to power new facilities. Decarbonisation of the national grid is likely to reduce the effects in the long term.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	?	0	**Construction Effects** The new building and equipment will be located on an existing RO desalination plant. Construction of these assets will not affect the built environment. This option may involve the possible construction of new boreholes (which can be located anywhere on the island of St Mary's). As the location of these possible new boreholes is currently uncertain, the short-term impacts on built assets and infrastructure cannot be determined. **Operational Effects** During the operational phase, there is unlikely to be any disturbance on transport networks or built infrastructures.	Borehole location should be carefully considered to minimise any possible impacts on the built environment during construction.	?	0

P.4 ISB4

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	ISB4				
Option:	Bryher – Increasing Existing Desalination Plant Capacity				
Scheme type:	Undetermined				
Option description:	Additional process stream at existing RO plant plus increased borehole yield &/or new borehole source. New building required.				
Approx. Yield (Ml/d):	0.1-0.2				
WRZ:	Isles of Scilly				
Date Completed:	24/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	04/08/22, updated 09/02/23	***Checker:***	Alice Rudd, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	-	**Construction Effects** The HRA concluded that there is potential for significant effects for the Isles of Scilly Complex SAC (80m west) and Isles of Scilly SPA and Ramsar (120m north) regardless of the specific location of the option, as it will be connected to the site through the WFD groundwater waterbody Isles of Scilly. Any pollution events may be transferred via the groundwater catchment to the site and impact qualifying features. Habitats may be damaged through pollution, subsequently degrading habitat and foraging areas for grey seals. If the option is within 200m of the sites, then there is potential for effects from reductions in air	Consideration to drilling of new borehole should one be required needs to take into account the proximity to designated ecological sites, if possible, select a location with minimal impact upon these.	--	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				quality and nitrogen deposition from construction activities. Construction related visual and noise disturbance may have significant effects on breeding birds associated with the Isles of Scilly SPA. Construction also has the potential to destroy suitable bird nesting sites. The option is within 500m of Shipman Head and Shipman Down (Bryher) SSSI (88% Favourable, 12% Unfavourable - recovering) (120m north of the option site) and Pool of Bryher & Popplestone Bank (Bryher) SSSI (100% Favourable) (20m south-east of the option site at the nearest point) with potential for effects from construction, including noise, vibration and dust emissions. There is also potential for effects from reductions in air quality and nitrogen deposition from construction traffic. The island falls under several SSSI Risk Impact Zones. Dependent on the location of a new borehole, if one is required, the surrounding ecological sites may be impacted in the short term by vibrations caused through drilling, with further effects of dust and noise pollution. **Operational Effects** Once operational, the option should not have an impact upon designated ecological sites, as the extension of the desalination plant to have capacity for increased reverse osmosis is unlikely to directly impact upon these sites. If the yield of the boreholes is increased, saline water abstraction will increase. Any designated sites should not be impacted as they are likely to be freshwater dependent. The HRA concluded			

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		ST	LT			ST	LT
				there were no impact pathways present during the operational phase. It is currently uncertain how the remaining brine water will be disposed of. If the brine water is released back into the sea, it may accumulate and decrease the quality of seawater. This poses a potential threat to marine life within the designated sites.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	-	**Construction Effects** The option is located over 500m from any Ancient Woodland and therefore has low potential for effects from construction related dust emissions and vibrations due to the distance from the option. There are also no LNR or NNRs within 500m of the option. The option is within 500m of lowland heathland, good quality semi-improved grassland additional habitats, saline lagoons, maritime cliff and slope and coastal vegetated shingle. These priority habitat range from as close as 20m to the option site and are scattered within the 500m buffer zone. these and the associated species they support are susceptible to effects from construction works such as dust required, noise and vibration. There is also potential for pollution from construction run-off. Due to the nature of the option being the replacement of existing infrastructure the impact upon these sites should be lessened as no further landtake should be required. If a new borehole is required, the location of this may impact upon priority habitat with potential for effects from this including potential habitat loss or disturbance effects during drilling of the new borehole. **Operational Effects**	Best practice mitigation measures should be implemented to minimise potential disruption to priority habitat and species within the local area. Location of the new borehole, should one be required, should be located to avoid priority habitat.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Once operational, the option should not have an impact upon the biodiversity or habitat connectivity of the surrounding area as the overall footprint of the site is not likely to be expanded. The function of the site is also expected to be the same as the original desalination plant and therefore should not create new issues for biodiversity within the area. It is however currently uncertain how much water will be abstracted during operation. Increased abstraction could threaten marine wildlife within the coastal waters surrounding the Isles of Scilly as mature fish and other marine life can be significantly injured or killed when they become trapped or sucked into open water intake pipes. It is also uncertain as to how brine water will be disposed of which could have additional impacts on species and habitats.			
	Reduce the spread or presence of INNS	-	--	**Construction Effects** The option is only expected to require excavation of soils through the drilling of a new borehole, if one is required. There is risk of the spread of INNS during construction through increased movement of materials and sharing of equipment which may result in increased presence of INNS from different areas. **Operational Effects** Once operational the requirement for a new stream for the desalination could lead to a minor increase in INNS spread but the water will be treated and therefore, the risk of INNS spread is low. It is assumed water transfer will occur throughout regular operation of the options and assumed raw water will be transported to the	Best practice and consultation of the INNS risk assessment in order to minimise spread of INNS. Construction sites to follow best practice biosecurity measures which should mitigate risk of INNS.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				updated desalination plant from possible new borehole.			
Water	Protect and enhance the quality of the water environment and water resources	--	--	**Construction Effects** The option is located in SPZ 2 with potential for direct pollution impacts from construction run-off and is also located in the WFD groundwater waterbody the Isles of Scilly. The impacts upon this designation will occur through the drilling of a new borehole if one is required, as contamination may occur. The Level 1 WFD assessment concluded that there is a low risk of potential effects during the construction phase from new below ground structures and modifications. There are two surface water features within 500m to the west of the option, which could be impacted by surface run off from construction activities There are no Shellfish Classification Zones or bathing waters within 500m of the option. **Operational Effects** Once operational, the option is not anticipated to have any long-term effects on the quality of the water resources within the local environment, as the increased capacity for reverse osmosis is unlikely to generate large-scale changes. The WFD Level 1 assessment highlighted that during the operational phase there is a potential for low effects from the new below ground structures. If a new borehole is drilled, then the potential for effects on the Isles of Scilly WFD groundwater waterbody is moderate. The new capacity upgrades at the desalination plant will have moderate	Best practice mitigation measures to be implemented to minimise potential impacts arising from construction activities.	-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				effects on the Isles of Scilly WFD groundwater waterbody with an increased licence needed. it is currently uncertain how the remaining brine water will be disposed of. Brine waste also poses a potential threat to marine life and water quality if released into the sea, as it contains dangerously high concentrations of salts and other minerals. There is also potential for pipeline bursts to cause water to be released into the environment, creating a pathway for the transfer of saline water into freshwater sources. The overall risk of the option is moderate due to the regular frequency of water transfer throughout regular operation of the option.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is in Flood Zone 1. Therefore, construction is considered to have a neutral effect on flooding in the short term. **Operational Effects** The option is unlikely to contribute to flood risk as the option is being redeveloped on a brownfield site within Flood Zone 1 and there should be no additional landtake or above ground hard infrastructure that was not already present. There is potential for a reduction in risk of groundwater flooding, as increased abstraction activities will result in the lowering of the groundwater table. However, due to the low anticipated additional yield, the effect is considered neutral.	No notable impacts have been identified, therefore no mitigation is required.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	-	+	**Construction Effects** During the construction phase due to the small nature of the island the reliability of water supplies may be influenced when connecting the new treatment stream to the existing desalination plant. The impacts of this are likely to be minor. **Operational Effects** Once operational the option is likely to improve water availability through increased rates of reverse osmosis and increase resilience to drought scenarios through increased water provisions.	Best practice mitigation measures are to be implemented to reduce impact upon water reliability for local resources. Utilise other water facilities on the island in preparation for potential reduction of water supplies from this site during construction.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	--	**Construction Effects** The option is located in Grades 4 and 5 Agricultural Land, however due to the small nature of the island and scarcity of land, moderate impacts on local soil resources could be expected. The construction of a new building for the reverse osmosis is unlikely to have impacts upon soils, as this would likely be in the form of an extension at the desalination plant. The increased landtake of the extension would likely be minimal and soil within that area is unlikely to be used for agricultural purposes due to its close proximity to the desalination plant. There are no authorised landfill sites or historic landfills sites within 200m of the option therefore there is low potential for contamination from infiltration. If a new borehole is required, surrounding excavated land should be reinstated where possible to minimise impacts, although due to the scale of the borehole proposed, the impacts would likely be neutral.	Reinstatement of any soils that may be excavated during the potential drilling of a new borehole if more land is excavated than needed. If subsidence of land surrounding borehole occurs, then reinstatement will be necessary to mitigate effects.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Excavations could cause the destabilisation of soils with potential for subsidence as a result. **Operational Effects** Once the option is operational it is not anticipated to have any impacts upon soil resources within the area due to the nature of the works			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is located over 500m from an AQMA and therefore construction effects on air quality are unlikely to impact these areas. However, the construction phase of the option has the potential to cause temporary negative effects on air quality due to increased dust emissions and vehicle movement to create the new building for increased reverse osmosis and install the new borehole. **Operational Effects** Once operational the option is not expected to result in any negative long-term impacts upon air quality, as it is not expected to require further upgrades requiring vehicular movement. The increased reverse osmosis that will be taking place at the plant will likely require additional operational emissions but as the approximate yield is expected to be small scale in size the impact upon air quality because of this is likely to be neutral.	Best practice mitigation measures are to be implemented to mitigate potential air quality effects arising from construction works and increased vehicular movement.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Climatic Factors	Reduce embodied and operational carbon emissions	-	0	**Construction Effects** During the construction phase there will be an increase in embodied carbon and carbon emissions due to the removal of the old desalination plant, construction of the new desalination plant and borehole installation which will require new materials and the use of machinery. **Operational Effects** The increased reverse osmosis that will be taking place at the plant will likely require additional operational emissions but as the approximate yield is expected to be small scale in size the impact upon air quality because of this is likely to be neutral. As well as this, the new stream will require increase operational carbon for the pumping of the water.	Investigate use of substitute materials with lower embodied carbon and the use of renewables to power construction machinery and new facilities. Decarbonisation of National Grid is likely to help to reduce any future carbon emissions.	-	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are currently no climate resilience measures in place for the construction phase of the option. **Operational Effects** The option is likely to increase the abstraction taking place from groundwater, either through existing sources or a new borehole. With this there may be an increased vulnerability to climate change risks such as drought and increased saline intrusion during periods of low rainfall. However, this is unlikely to cause anything more than neutral effects due to the small abstraction yields anticipated with the option. There may be an increase in water availability from the option	Monitoring of groundwater levels should take place to assess the impact of increased abstraction, and ensure they remain at an appropriate level. Best practice mitigation measures should be implemented to prevent over abstraction and negative impacts on the environment.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				but due to the small yields anticipated this is unlikely to yield more than neutral impacts upon resilience to drought scenarios.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	?	**Construction Effects** There are eight Scheduled Monuments within 500m of the option. The closest Scheduled Monument is 150m north of the option site, and the other Scheduled Monuments are located sporadically across the 500m buffer zone. There are four Grade II Listed Buildings located to the south of the option. The option is also located in the Isles of Scilly Conservation Area. The construction of the option involves increased vehicle movements and has the potential for effects on these historic assets, including dust and vibration pollution and impacts on visual amenity and historic setting. Drilling of a new borehole, if one is required, will result in vibrations and dust emissions, as well as potential for damage to buried archaeology. However as the location of the borehole is currently unknown, the effects on specific archaeology receptors as a result of drilling are unknown at this stage The option is not within 500m of any Registered Battlefields, Registered Parks and Gardens or World Heritage Sites and therefore would not impact any of these designations. There is a Protected Wreck located within 5km – HMS Colossus, with potential for destabilisation from increased abstraction. however, negative impacts related to construction are unlikely. **Operational Effects**	Best practice measures to be implemented to minimise setting effects for heritage assets during construction. Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology. Residual effects may remain due to potential loss of archaeological remains. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic environments to be identified	-	?

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Once operational, the option would not impact the setting or access to historic monuments or areas as the overall footprint of the site is not likely to be extended beyond the current proposed boundary. Due to the increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	0	**Construction Effects** The option is located within the Isles of Scilly AONB and the Isles of Scilly NLCA. Construction works are likely to have a temporary impact upon the visual amenity of these areas due to increased vehicular movement, dust and noise emissions. **Operational Effects** Once operational the option is unlikely to impact the local landscape to any significant extent.	Best practice mitigation measures to be implemented to reduce potential short-term impacts of construction on landscape.	-	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	0	**Construction Effects** There are no Noise Action Plan areas within 500m of the option. The option is located in IMD Decile 7. There are three Important Buildings within 500m of the option with potential for effects on access from increased vehicle movement and traffic disruption during the construction phase. There are no PRoWs on the island and therefore access to these footpaths would not be affected by the option. The option may contribute to the local economy during the construction phase.	Consideration should be given to access routes and timings of deliveries to minimise the potential traffic disruption on local residents and the access to important buildings.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.			
	Maintain and enhance tourism and recreation	-	--	**Construction Effects** There is one greenspace around 440m east of the option but the impacts upon the greenspace are unlikely due to the nature of the works being captured within the vicinity of the desalination works. This greenspace, and user access to the space, is unlikely to be affected by any construction vehicle movements. If a new borehole is required and a location is allocated on the existing site, there will likely be additional construction effects as a result of excavation works. Increased vehicular movement associated with the construction phase may have short term minor negative impacts on access to recreational activities within the local area, such as walking and other activities. **Operational Effects** Once operational the option is unlikely to have any effect upon recreation and tourism as the new plant will be contained within the site of the existing desalination works. However, it is currently uncertain how the remaining brine water will be disposed of. Brine poses a potential effect on water quality, as it contains dangerously high concentrations of salts and other	Avoidance of the greenspace for drilling of a new borehole to mitigate any potential impacts upon this site. Best practice mitigation measures to be implemented to minimise potential impacts upon traffic disruption.	0	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				minerals. This could potentially lead to the long-term deterioration of water quality within the coastal waters of the Isles of Scilly. Decreases in water quality have potential to reduce the recreational use of the coastal waters of the Isles of Scilly (e.g., for swimming purposes and fishing), potentially resulting in moderate negative impacts.			
Material Assets	Minimise resource use and waste production	-	-	**Construction Effects** Construction of the new building to support the increased reverse osmosis process will require new materials. This is additional to the drilling and installation of the new borehole which will create waste and likely result in minor negative effects on material assets. **Operational Effects** Once the option is complete and fully operational it is likely to produce more waste as a result of the increased reverse osmosis process that will be taking place. The option is not expected to require further new resources long-term. Additional resources are also likely to be required to power the facility.	There is opportunity for the implementation of sustainable design measures to be put in place, such as through the selection and reuse of materials. There could also be potential to use renewables to power construction machinery and the new facility to reduce the impacts of energy requirements. Decarbonisation of the national grid is likely to help to reduce any future carbon emissions.	-	-
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** There are no National Trails, National Cycle Networks or major roads within 500m of the option site. There is likely to be an increased construction vehicle presence on access roads around the island during the construction phase which are likely to lead to minor	Best practice mitigation measures to be implemented including a Traffic Management Plan to minimise disturbance during construction. However,	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				negative effects on built assets, although these effects are likely to be temporary. **Operational Effects** Once complete and operational, the option is not expected to require further works and therefore is unlikely to impact in the long term on built assets and infrastructure.	temporary effects are likely to remain.		

P.5 IST1

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	IST1				
Option:	Tresco new borehole				
Scheme type:	Undetermined				
Option description:	Drilling of new supply borehole to south or east of island. Assumed 30m depth, 0.75kW pump, 100mm diameter borehole pipework. with associated infrastructure (headworks, kiosk and pipework) and on-site treatment (assume UV disinfection) wastewater piped via new raw main (est. 40mm dia. / 500 m distance) to existing WTW. Cost for new WTW with UV.				
Approx. Yield (Ml/d):	0.03				
WRZ:	Isles of Scilly				
Date Completed:	28/06/22, updated 02/02/23	***Completed By:***	George Britton	***Version:***	C
Date Checked:	03/08/22, updated 09/02/23	***Checker:***	Nicola Spofforth, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	---	--	**Construction Effects** The option is located within 500m of multiple designated sites. These include the Isles of Scilly Complex SAC and Isles of Scilly SPA. The option is also located within 500m of Pentle Bay, Merrick and Round Islands SSSI (10.76% favourable, 89.24% unfavourable – recovering) (50m northwest) and Great Pool (Tresco) SSSI (100% favourable) (310m southwest). There will be significant new infrastructure associated with the option, with required construction activities including excavations and additional areas of	All recommendations made within the HRA should be followed to ensure appropriate mitigation measures relating to habitats and species are put in place. Best practice construction measures to minimise dust and pollution should also be put in place to protect any	--	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				hardstanding. These sites have the potential to be adversely affected during construction through an increase in vehicle movements and other construction activities. It is unlikely, however, that the footprint of the option will directly encroach upon any of the designated sites. The HRA concluded that there is potential for significant effects on the Isles of Scilly Complex SAC (220m north-east) and the Isles of Scilly SPA and Ramsar (40m north-east). Regardless of the specific location of the option it will be connected to both sites through the WFD groundwater waterbody of the Isles of Scilly. Any pollution events may be transferred via groundwater to the sites and impact qualifying features. For the Isles of Scilly Complex SAC habitats may be damaged through pollution, which could subsequently degrade suitable habitat and foraging areas for grey seal. If the option is within 200m of the Isles of Scilly SPA, reductions in air quality and nitrogen deposition may affect foraging areas. Habitats may be damaged through water/air pollution which could affect seabird survival. Additionally, depending upon the location of the option construction related disturbance may have significant effects on visual and noise and in turn effect breeding birds. **Operational Effects** It is likely that there will be permanent land-take as part of the option, however this is not anticipated to encroach directly upon designated sites given the distance they are from the option site. This would, however, depend on the precise location of the option	habitats where there will be additional land take. Undertaking of a HRA AA to provide further information on habitat sites.		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				and the amount of infrastructure associated with it. The option will involve increased groundwater abstraction, which may lower the groundwater table. However, this is unlikely to affect designated sites within 500m of the option as the abstraction yield is very low, so the impact is considered neutral. The HRA also concluded that there are no impact pathways present during operation for all three of the designated sites discussed above, Isles of Scilly SAC and the Isles of Scilly SPA and Ramsar.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	--	--	**Construction Effects** There are multiple priority habitats located within 500m of the option, including areas of coastal sand dunes, maritime cliff and slope, deciduous woodland and reedbeds. Due to the fact the option is likely to require additional land-take and excavations for the new pipeline, there is potential for these sites to be affected, although the majority of sites are located a distance away from the option. These impacts include visual and noise disturbances. It is not anticipated that any Shellfish Classification Zones or fisheries will be affected by the option as these are located over 500m from the option location. **Operational Effects** There may be some permanent land-take from these priority habitats as a result of the implementation of the option, potentially impacting long-term habitat connectivity. The option is however located a distance away from the majority of these sites though so impact should be minimal. The option involves groundwater	Trenchless techniques are to be implemented to reduce the level of disturbance to habitats within the close vicinity of the site. Measures from CEMP should be followed to ensure best practice. Habitats to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Ecology surveys will be required at future design stages to determine effects and mitigation required.	0-	--

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				abstraction, which may lower the groundwater table and negatively affect species and habitats. However, as the abstraction yield is considered low, the impacts of this will likely be minor.			
	Reduce the spread or presence of INNS	-	-	**Construction Effects** Movement of excavated material during the construction phase may result in increased spread of INNS from different areas. There is also a small risk of construction workers introducing INNS during works on the new boreholes and pipeline, however this risk is expected to be minimal and likely to be mitigated with the following of site biosecurity practices. **Operational Effects** The INNS assessment concluded there is very limited risk as the source water is likely to be entirely free of INNS. It is assumed that groundwater is free of INNS, and that accessing it will not permit any additional input of INNS.	Best practice measures and consultation of an INNS risk assessment in order to minimise any potential spread of INNS, which would form part of the CEMP. Construction site and contractors should follow the best practice biosecurity measures.	0	0
Water	Protect and enhance the quality of the water environment and water resources	-	---	**Construction Effects** Whilst construction of the option is unlikely to directly impact upon any watercourses or sources, there is a potential for ground and surface water contamination from runoff and other pollution from construction materials and plant. There are no Nitrate Vulnerable Zones located within the area. The WFD Level 1 screening concluded no moderate or high impacts as a result of this option. **Operational Effects**	Best practice mitigation methods should be used here to ensure residual effects will be minimised. Pipeline alignment and trenchless techniques to be used to mitigate effects on Groundwater Protection Zones. Location of new borehole to take into consideration Groundwater	-	---

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Increased water abstraction through the borehole has a potential to lead to a deterioration in groundwater levels and quality, having ongoing effects on groundwater-dependent ecosystems. The WFD Level 1 screening concluded high impacts on Isles of Scilly (GW) due to new groundwater abstraction.	Protection Zone locations. Risk assessments will be undertaken for excavation works and dewatering to ensure no adverse effects on watercourses. Measures identified within the CEMP to manage surface run off should be implemented to reduce risk.		
	Increase resilience and reduce flood risk	0	-	**Construction Effects** The option is in Flood Zone 1. Therefore, construction is considered to have a neutral effect on flooding in the short term. **Operational Effects** The option is likely to result in an increase in hard standing, which could increase surface water run-off, but this is unlikely to have an overall effect on flood risk. Climate related sea-level rise in the long-term operation of the option should also be considered as a risk, despite the option site currently being at low risk of flooding. The abstracted water may be unusable due to the salinity of that being extracted due to its close proximity to the coast.	Ensure flood risk continues to be monitored and implement appropriate mitigation measures if there are changes which could adversely affect the option. Minimising use of impermeable surfaces where possible. If abstracted water is saline, it is recommended that construction of a desalination plant may be required to allow the water resource at this option to be usable.	0	0
	Deliver reliable and resilient water supplies	-	- +	**Construction Effects** During construction, the option will not deliver any increased reliability or resilient water supplies, and so no construction effects are anticipated. It should however be considered as to whether construction	No adverse impacts have been identified and therefore no mitigation measures will be required.	0	- +

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				activities will be likely to interrupt any existing water supplies. The impacts of this are likely to be temporary with mitigatory measures as there are two WTWs on the island and mitigation should prevent any potential impacts upon water supplies. **Operational Effects** The option is expected to provide an additional 0.03Ml/d of water for use within the SWW region, which is likely to have a positive long-term effect in the resilience of water supplies. However, the abstracted water may have issues regarding salinity due to the close proximity to the coast which may have minor negative effects in the long term.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	-	**Construction Effects** The option is located over 200m from any Authorised or Historic Landfill Sites. It is likely that there will be additional greenfield land-take to accommodate the new borehole and associated facilities. There will also be excavations for approximately 500m of new pipeline connecting the borehole to a nearby WTW and onwards towards the existing supply pipelines. A large proportion of the option is located upon Grade 4 Agricultural Land, with surrounding areas of Non-Agricultural Land' and an insignificant proportion of Grade 2 Agricultural Land. Overall, impacts to soil resources are likely to be minimal due to the nature of works proposed. Land reinstatement works should be undertaken post-construction to minimise these effects.	Reinstatement of land excavated for 1km extent of pipeline to minimise disturbance to soils. If subsidence of land surrounding borehole occurs the reinstatement will be necessary to mitigate effects. Best practice mitigation measures are to be implemented, including conservation of topsoil to minimise effects of excavation.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects It is unlikely that operation of the option would lead to long-term effects on soil resources.			
Air	Reduce and minimise air emissions	-	0	**Construction Effects** The option is not located within any AQMAs, however, short-term construction may have a minor and temporary impact on air quality within the local area due to dust and exhaust fumes from construction equipment. **Operational Effects** It is not expected that there will be an impact on air quality as a result of the option, however, increased abstraction will require increased pumping. This will require increased energy demand which if sourced by fossil fuels would release air emissions. However, the long-term effect is expected to be neutral.	Best practice mitigation measures should be implemented during construction to supress any potential air quality effects arising during the construction phase.	-	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	-	**Construction Effects** Borehole installation, associated infrastructure, and new pipeline will generate embodied carbon during installation by using raw materials and throughout construction activities. Short term greenhouse gas emissions from construction activity and vehicular movements are likely to occur. **Operational Effects** Increased borehole abstraction is expected to result in an increase in operational carbon emissions due to the increased energy requirements associated with the operation of the new treatment plant and borehole.	Investigate use of substitute materials with lower embodied carbon and use of renewables to power new facilities. Decarbonisation of national grid is likely to help to reduce any future carbon emissions.	-	-

SEA Topic	SEA Objective	Effects ST	Effects LT		Commentary	Mitigation	Residual effects ST	Residual effects LT
					The inclusion of any renewable energy supplies is not yet known.			
	Reduce vulnerability to climate change risks and hazards	0	-	+	**Construction Effects** There are currently no known climate resilience measures in place relating to the construction phase of the option. **Operational Effects** The option will involve increased abstraction of the groundwater body. This could lead to increased resilience in the long term towards climate change effects through enabling increased water treatment and supply. However, the option will also result in an increase in groundwater abstraction and may be vulnerable to drought and saline intrusion during periods of reduced rainfall. This could result in negative effects on the environment if not properly monitored. Considering these effects, impacts are likely to be neutral after mitigation.	Continue to assess the impacts of climate change on the option and implement mitigation measures where appropriate. Water levels should be carefully monitored during operation to ensure they remain at an appropriate level.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	-	-		**Construction Effects** There are eight Grade II Listed Buildings and Structures located within 500m of the option, with a further seven scheduled monuments within 500m of the option. Due to the location of the option it is unlikely that these assets will be directly affected by construction. They may however be subjected to minor negative vibration or noise effects associated with construction activities for the new borehole and associated infrastructure. There could also be a risk of encountering previously undiscovered archaeology in	Implement best practice mitigation measures to minimise any disruption to these sites and assets. Additional baseline collection and assessment to be undertaken to determine the additional potential effects on water-dependant heritage assets and water sensitive historic	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				areas of construction on undeveloped land. The option is located within the Isles of Scilly Conservation Area, the setting of which could be temporarily impacted by construction works. There are two Protected Wrecks within 5km of the location – HMS Colossus and Wheel Wreck. It is unlikely these wrecks would be impacted by construction related to the option. **Operational Effects** Direct long-term effects on the local historic environment are not expected. It is unlikely that there will be any significant enhancement or improvement on public access and/or enjoyment to heritage assets. Due to increased groundwater abstraction, there is potential for the lowering of the groundwater table which could have adverse effects on water-dependant heritage assets or paleoenvironmental remains. It is however currently unknown as to whether there are any of these assets present in proximity to the option.	environments to be identified. Desk based studies should take place to find any records of historic environment. Watching briefs and intrusive investigations during the construction phase may be required.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	-	-	**Construction Effects** The option is located within the Isles of Scilly AONB and the Isles of Scilly NLCA. Construction works are anticipated to have an impact upon the visual amenity of these areas. Construction dust, emissions, machinery, and vehicular movement is likely to negatively impact the landscape temporarily. Trees and hedgerows are likely to provide some screening and reduce the overall effect. **Operational Effects**	Best practice construction methods to be implemented to minimise any effects on landscape and visual amenity (measures from the CEMP should be followed). Trenchless techniques to be used for construction of new pipeline where possible. If possible, locate the new infrastructure close to existing above ground-built	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Long-term operational effects could be experienced due to the presence of new above ground infrastructure.	assets, as this could lower risk of long-term impacts on visual amenity		
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	0	**Construction Effects** There is a potential for an increase in noise and dust effects on local receptors during the construction of the options, thus potentially impacting residents and the local community. The local receptors include Important Buildings of a school 170m north-west and a church 200m north-west. The site is located in IMD rank 7. There are no Noise Action Planning Important Areas within 500m of the option therefore there would be no potential for effects in these areas. There are no PRoWs located on the island and therefore there would be no risk to access for these footpaths. **Operational Effects** No adverse effects on local communities are expected in the long term. There are also no local economic or social enhancements anticipated. Operational effects have been identified as neutral.	Trenchless techniques or route realignment to be used to avoid direct impact upon properties, Agricultural Land and minor roads on the island. Best practice mitigation measures are to be used to minimise effects, including the reinstatement of excavated land. All to be detailed within the CEMP. It is recommended that standards from the Considerate Constructors Scheme are followed to ensure best practice. However, temporary effects are likely to still occur during construction.	0	0
	Maintain and enhance tourism and recreation	-	-	**Construction Effects** There is potential for the land on which the new borehole and infrastructure is being constructed will encroach directly upon footpaths, such as bridleways and the coastal footpath, especially where areas of greenfield land are excavated for the new pipeline. As a result, there may be requirement for certain areas to be temporarily closed to the public for the duration of the construction phase. This could negatively impact	Ensure any disruption is kept to a minimum and all land used during construction is reinstated where possible. Monitoring of flow rates should take place to assess the impact of a new abstraction point.	-	-

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				upon local tourist facilities, including shops and activities. **Operational Effects** Once operational, the option will be located within privately owned land and so is unlikely to impact upon any recreational activity on an ongoing basis. There may however be a permanent land take of recreational areas, resulting in a negative impact on the health and wellbeing of locals. The new abstraction may have an impact upon river flows which could in turn impact angling and other water based recreational activities. The overall impact of this may be negative but at this stage would require further assessment.			
Material Assets	Minimise resource use and waste production	--	--	**Construction Effects** Due to the fact there will be new infrastructure associated with boreholes and associated pipelines, there is a high likelihood that there will be an increase in resource use, excavated material and construction waste arising from the construction phase. **Operational Effects** It is likely that through increase borehole abstraction and water treatment, there will be an increase in energy consumption once the option is operational.	There is opportunity for sustainable design measures to be implemented, considering materials with less embodied carbon and the reuse of excavated material. Utilise renewable energy sources to avoid consumption of fossil fuels.	-	-
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** Due to the location of the option, it is unlikely that there will be any impact on built assets and infrastructure during construction. There could, however, be potential	Ensure any disruption during the construction phase of the option is kept to a minimum. A CEMP will	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				for the temporary blocking of tracks and pathways by construction vehicles and equipment. The increase in construction traffic may lead to congestion and negatively impact road users leading to minor negative and temporary effects. **Operational Effects** With new sites required for the new borehole and associated pipeline, there is potential for additional land take. However, this is not expected to encroach upon any built assets and infrastructure.	be produced within which a Traffic Management Plan should be outlined and followed to minimise impacts upon local users.		

Q. Demand Options SEA Assessment

MOTT MACDONALD

South West Water Draft WRMP24 Strategic Environmental Assessment (SEA)

Appendix Q: SWW Demand Options Assessments

Project:	South West Water: Draft Water Resources Management Plan 2024 (WRMP24) Strategic Environmental Assessments (SEA) Environmental Report		
Our reference:	100107117-MMD-RP-SEA-019-A	**Rev**	B
Prepared by:	Georgina Luck	**Date:**	08/02/23
Approved by:	Melanie Reid	**Checked by:**	Katharine Mason
Subject:	Environmental Report Appendix Q: SWW Demand Options – SEA Options Assessment		

1 Overview

This document supports the South West Water (SWW) Strategic Environmental Assessment (SEA) of the Water Resources Management Plan 2024 (WRMP24). Please refer to the SEA Environmental Report (South West Water WRMP24 SEA Environmental Report DRAFT (100107117-MMD-RP-SEA-006-F), Mott MacDonald, February 2023) regarding methodology, scoring criteria and definitions, and abbreviations for these assessments.

It is acknowledged that SWW Demand options have undergone continuous development through the production of the draft WRMP24, which has the potential to result in minor inconsistencies in option descriptions. The options outlined within are the options assessed as a result of the information available at the time of writing. Should any options be developed further, future reassessment would be undertaken and reported. The following Options Assessments are for the SWW Demand options. Table 1.1 below provides a summary of the scoring key and example scoring definitions for the 'Biodiversity, flora and fauna' SEA objective. Please refer to the full scoring definitions and guide questions in the SEA Environmental Report for all objectives.

Table 1.1: SEA Scoring Key

Effect	Description	Example Scoring Definitions – Biodiversity Objective
+++	Major Positive	The option would result in a major enhancement of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability The option would result in a major increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amount of creation or enhancement of habitat, promoting a major increase in ecosystem structure, function or connectivity The option would result in a major reduction or management of INNS

++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a moderate increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure, function or connectivity The option would result in a moderate reduction or management of INNS
+	Minor Positive	The option would result in a minor enhancement on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures The option would result in a minor increase in the population of a priority species Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure, function or connectivity The option would result in a minor reduction or management of INNS
0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS
-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a minor decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a minor loss of ecosystem structure, function or connectivity The option would result in a minor increase or spread of INNS
--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a moderate decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality or small losses or degradation of habitat leading to a moderate loss of ecosystem structure, function or connectivity The option would result in a moderate increase or spread of INNS.
---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation The option would result in a major decrease in the population of a priority species Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function The option would result in a major increase or spread of INNS
?	Uncertain	From the level of information available, the effect that the option would have on this objective is uncertain.

2 Options Assessment

SWW Demand Resource Options

The below Option Assessment Matrices cover the following draft WRMP24 demand options for SWW:

- NHH_A_001
- NHH_A_003
- NHH_A_004
- NHH_A_005
- NHH_A_007
- NHH_E_001
- NHH_N_001
- NHH_N_006
- HH_A_002
- HH_A_003
- HH_E_009
- HH_E_013
- HH_E_0017
- HH_M_009
- Water Labelling Scenario

Q.1 NHH_A_001

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_A_001				
Option:	Business Efficiency Visits (BEV)				
Scheme type:	Water Efficiency Audit				
Option description:	Visits to businesses including undertaking a water audit, advice and tailored retrofit of free water efficient devices to bathrooms and kitchens only (not wider process water). Business sectors are targeted based on high potential for water savings. BEV's are undertaken following liaison with Water Retailers. Specific BEVs to target individual customers through detailed analysis of MOSL data.				
Approx. Yield (Ml/d):	0.49				
WRZ:	SWW				
Date Completed:	06/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	03/08/22, updated 09/02/23	***Checker:***	Nicola Spofforth, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is not expected to have any significant impact upon ecological sites or their conservation status due to the nature of the works involving audits and retrofitting existing infrastructure. **Operational Effects** In the long term there are not anticipated to be negative impacts upon sites of ecological importance including habitats and biodiversity.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** The option is not anticipated to have any significant negative effects upon biodiversity or priority habitats with the works taking place on existing buildings and infrastructure. Potential retrofitting could take place in close proximity to priority species and vulnerable habitats; however effects are considered to be neutral given the nature of the option and the use of existing infrastructure. **Operational Effects** In the long term there are not expected to be any negative impacts associated with water audits and retrofitting regarding biodiversity and habitat protection.	Best practice mitigation measures should be implemented to manage potential negative impacts arising from the retrofitting works. Surveys and consultation with regulators should take where necessary to avoid potential negative effects arising from retrofitting works.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The works are not expected to involve the excavation of materials to complete retrofitting, but this could be possible depending upon the location of any issues that arise at individual sites, for example works to underground services. Any effects are considered likely to be minor, with low potential for INNS spread. **Operational Effects** The option is not anticipated to have an impact upon INNS spread due to no water transfer taking place.	Best practice measures should be implemented to ensure transfer of species on footwear, vehicles, equipment etc does not occur.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option is expected to involve auditing and retrofitting of existing infrastructure and therefore should have no effect on the quality of water resources within the area.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term it is not anticipated the option will negatively impact the water environment. The option should have minor positive impacts on water resourcing by reducing water losses within individual businesses.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is unlikely to have an impact upon flood risk during the construction phase or impact the resilience of the local areas. **Operational Effects** In the long term, this option may identify opportunities for improved water management and reductions in water leakages. However, the effects on resilience and flood risk are considered neutral. This is because there will only be a small volume of water saved, and this is not considered enough to impact flood risk.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
	Deliver reliable and resilient water supplies	-	+	**Construction Effects** There is the potential for water usage within the individual business to be negatively affected during the construction phase if retrofitting is required. During this water supply through the section being retrofitted is likely to be halted for works to be carried out. **Operational Effects** The option is expected to have minor positive effects on reducing water losses and increasing water efficiency within businesses. Therefore, providing minor positive outcomes for water supply resilience over the long term.	Best practice mitigation measures should be implemented to reduce the impact of potential water shut off during retrofitting. This should involve liaison with the client with prior notice and alternative water supplies secured through the duration of the works. Retrofitting works should be completed in the most	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
					efficient way to minimise disruption to water supplies.		
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option will involve retrofitting within existing buildings and working on previously developed land. Therefore, anticipated effects on soils resulting from this option are anticipated to be neutral. **Operational Effects** In the long term, the option is not expected to have any effect upon soils given the nature of the works to be completed.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** During the construction phase there will be increased vehicular movement with engineers and works vehicles commuting to businesses across the region and works associated with retrofitting activities. This is likely to have a neutral effect on local air quality due to the small scale of works that would be expected. **Operational Effects** Once the option is operational the is not anticipated to be any impact upon air quality in the long term due to the nature of the option.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	0	**Construction Effects** During the construction phase there is anticipated to be an increase in vehicle movements across the region to carry out the works along with an increased requirement for retrofitting materials which would have	Sustainable modes of transport should be considered where possible to carry out works, for example use of an electric vehicle fleet.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				associated embodied carbon. A minor negative effect could be expected. This could lead to an increased carbon footprint, although this is likely to be negligible given the small scale nature of the works. **Operational Effects** In the long term the option is not expected to lead to an increase in carbon emissions. The option is expected to reduce water losses and therefore reduce water usage. This may result in lower carbon emissions being produced. However, due to the scale of the option, the effect is considered neutral.	The use of sustainable materials with less embodied carbon should be considered during retrofitting.		
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option is unlikely to have an influence on climate change risks and hazards within the local area due to the small scale water efficiency changes that are likely to arise from the option. **Operational Effects** The option has the potential for slight increases in catchment resilience to drought by reducing water demand, and in turn increasing water resources, however this is not certain, and effects are likely to be neutral.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is not anticipated to have any negative effects on the historic environment with water efficiency audits and retrofitting likely to take place on existing infrastructure.	While no significant impacts have been identified. Any retrofitting works to listed/otherwise protected buildings/structures would require appropriate	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option is not expected to produce any significant negative long-term impacts that will affect the historic environment.	consultation with the local planning authority and Historic England where necessary.		
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is not expected to involve any construction on designated sites or to negatively impact on surrounding landscapes with works expected to be contained within business boundaries. All temporary construction works would potentially be taking place on previously developed land and within existing buildings. **Operational Effects** There are no long-term negative impacts anticipated to be associated with the option that would influence the local landscape.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	**Construction Effects** There may be levels of nuisance due to increased vehicular movements and activities which may require water supplies to be temporarily turned off for short periods of time. **Operational Effects** In the long term the option is likely to promote water efficiency within local businesses in the area and encourage a reduction in water consumption. A reduction in water consumption could lead to economic benefits throughout the local area.	Works should be scheduled so as to avoid/minimise disruption to the local community, including good communication regarding timescales for work and minimising time water supply may need to be switched off.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The option is likely to have a neutral effect on wider tourism and recreation in general during the construction phase due to the nature of works. If retrofitting works specifically involve businesses that revolve around tourism or recreation, then there is the potential for these to be negatively impacted while the works take place. **Operational Effects** Once operational the option is not expected to have an effects tourism and recreation.	Best practice mitigation measures should be implemented to minimise impact on businesses. These should include liaison with business to discuss most appropriate date and times for works to commence if they are required.	0	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** Minor works may be required with use of materials likely to be necessary. Energy usage is also likely to be required during this process although these works are likely to be minor. **Operational Effects** Once operational the option should not require long-term resource use or creation of waste.	Sustainable design measures should be considered when undertaking retrofit works including minimising use of new materials and maximising re-use and recycling where possible.	-	0
	Avoid negative effects on built assets and infrastructure	0	+	**Construction Effects** Retrofitting works are likely to require minor increases in vehicular movement, but this is expected to be a negligible amount with little effect on built assets such as transport links. **Operational Effects** In the long term, the option could have minor positive effects on built assets by reducing their need for	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				maintenance and by improving their operational efficiency.			

Q.2 NHH_A_003

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_A_003				
Option:	Business Efficiency Visits (HEV) – Targeted Business Leakage				
Scheme type:	Leak Detection				
Option description:	BEV particularly targeted at leakage detection and fix. Targeted where high-water usage would indicate that leakage might be occurring. BEV are undertaken following liaison with Water Retailers. Specific BEVs to be target individual customers through detailed analysis of MOSL data.				
Approx. Yield (Ml/d):	0.16				
WRZ:	SWW				
Date Completed:	06/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	04/08/22, updated 09/02/23	***Checker:***	Nicola Spofforth, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The option has the potential for construction works if leaks are found from detection works. Depending upon the site location there could be minor short-term effects on biodiversity or ecological sites within the local area. **Operational Effects** The option has the potential to identify potential losses from pipework, this could lead to a minor positive impact upon the local biodiversity if water demand is lowered leading to reduced abstraction and associated reduced impacts on water-dependent ecosystems.	Best practice mitigation measures should be implemented to manage any potential adverse impacts associated with the potential works. Surveys and consultation with regulators should take where necessary to avoid potential negative effects arising from retrofitting works.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Although as savings are currently unknown the value of this effect is currently uncertain.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	0	**Construction Effects** The option is not anticipated to have any significant negative effects but could have short-term minor effects on biodiversity or habitat diversity within the local area depending on the location of the site. This is due to repair of leaking pipes requiring potential construction works within proximity to areas with priority species and vulnerable habitats. **Operational Effects** In the long term there are not expected to be negative impacts associated with this option with regards to biodiversity and habitat protection.	Best practice mitigation measures should be implemented to manage any potential adverse impacts associated with the potential works. Surveys and consultation with regulators should take where necessary to avoid potential negative effects arising from retrofitting works.	-	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The works have the potential to involve the excavation of materials depending upon the location of any repair works that may be needed. Any effects are considered likely to be minor, with low potential for INNS spread. **Operational Effects** The option is not expected to increase the risk of INNS spread as the process only involves the repair of leaks and reinstatement of materials in-situ.	Best practice measures should be implemented to ensure transfer of INNS on footwear, vehicles, equipment etc. does not occur.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The nature of the work is unlikely to cause any negative effects on the quality and quantity of water resources during the construction phase as this is	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				likely to only include leakage repair at specific pipeline locations. **Operational Effects** In the long term it is not anticipated the option will negatively impact the water environment. The option should have minor positive impacts on water resourcing by reducing water losses.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option may require short-term works if leaks are detected, but these are unlikely to be affected by flood risk. **Operational Effects** The option is unlikely to have any effect on flood risk in the long term as leakage repair is not associated with flood risk management, and so will have a neutral effect.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
	Deliver reliable and resilient water supplies	+	+	**Construction Effects** The option does not require substantial construction works or new infrastructure development, and the fixing of leakages has the potential to increase the resilience of water supplies in the short term, and so has the potential to result in minor positive effects. **Operational Effects** The option is likely to have a minor positive impact upon water resilience by decreasing water losses within businesses, likely leading to decreases in water consumption.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	+	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option may require construction works if leaks are detected with excavating of materials to repair leaks a possibility. This is unlikely to have a significant effect on soils as all works would be taking place on existing SWW pipelines. **Operational Effects** There are not anticipated to be any long-term negative effects of the option regarding soils, with the works only including leak detection and repair.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** During the construction phase there will be the vehicular movement of engineers to and from business sites to identify and repair leaks. This is likely to have a neutral effect on local air quality due to the small scale of works that would be expected. **Operational Effects** In the long term the option is not anticipated to have any impact on local air quality.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** During the construction phase there is anticipated to be an increase in vehicle movements across the region to carry out the works along with an increased requirement for repair materials which would have associated embodied carbon. This could lead to an increased carbon footprint, although this is likely to be negligible given the small-scale nature of the works.	Sustainable modes of transport should be considered where possible to carry out works, for example use of an electric vehicle fleet. The use of sustainable materials with less embodied carbon should be	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term the option is not expected to lead to an increase in carbon emissions. The option is expected to reduce water losses and therefore reduce water usage. This may result in lower carbon emissions being produced. However, due to the scale of the option, the effect is considered neutral.	considered during retrofitting.		
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are not anticipated to be any effects during the construction phase due to the nature of the works not requiring any new infrastructure. **Operational Effects** Long term the option is unlikely to have any effect on climate change vulnerability and risk to the local area. Reduction in water losses is a positive impact of the option but is not expected to yield significant amounts of water saving.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is not anticipated to have any negative effects on the historic environment with leak repair likely to take place on existing infrastructure. **Operational Effects** The option is not expected to produce any significant negative long-term impacts that will affect the historic environment.	While no significant impacts have been identified. Any retrofitting works to listed/otherwise protected buildings/structures would require appropriate consultation with the local planning authority and Historic England where necessary.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is not expected to involve any construction on designated sites or to negatively impact on surrounding landscapes with works expected to be contained within business boundaries. All temporary construction works would potentially be taking place on previously developed land and within existing buildings. **Operational Effects** There are no long-term negative impacts anticipated to be associated with the option that would influence the local landscape.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	-	+	**Construction Effects** There may below levels of nuisance resulting from increased vehicular movements and activities which may require water supplies to be temporarily turned off for short periods of time. **Operational Effects** In the long term the option is likely to promote water efficiency within local businesses in the area and encourage a reduction in water consumption. A reduction in water consumption could lead to economic benefits throughout the local area.	Works should be scheduled so as to avoid/minimise disruption, including good communication regarding timescales for work and minimising time water supply may need to be switched off.	0	+
	Maintain and enhance tourism and recreation	-	0	**Construction Effects** The option is likely to have a neutral effect on wider tourism and recreation in general during the construction phase due to the nature of works. If repair works specifically involve businesses that revolve around tourism or recreation, then there is the potential	Best practice mitigation measures should be implemented to minimise impact on businesses. These should include liaison with business to	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				for these to be negatively impacted while the works take place. **Operational Effects** Once operational the option is not expected to have an effect on tourism and recreation.	discuss most appropriate date and times for works to commence if they are required.		
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** Minor repair works may be required with use of materials likely to be necessary. Energy usage is also likely to be required during this process although these works are likely to be minor. **Operational Effects** Once operational the option should not require long-term resource use or creation of waste.	Sustainable design measures should be considered when undertaking retrofit works including minimising use of new materials and maximising re-use and recycling where possible.	-	0
	Avoid negative effects on built assets and infrastructure	0	+	**Construction Effects** Repair works are likely to require minor increases in vehicular movements, but this is expected to be a neutral amount with little effect on built assets such as transport links. **Operational Effects** In the long term, the option could have minor positive effects on built assets by reducing their need for maintenance and by improving their operational efficiency.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

Q.3 NHH_A_004

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_A_004				
Option:	Business Efficiency Visits (HEV) – Agriculture Leakage				
Scheme type:	Water Efficiency Audit				
Option description:	This option specifically targets the agricultural sector and is delivered in partnership with a third party (e.g., FWAG South West, AHDB, NFU). Expert water audit is provided on farms including advice, improvements, and fixes (target of dairy sector).				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	06/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	-	0	**Construction Effects** The option has the potential for construction works if leaks are found from detection works. Depending upon the site location there could be minor short-term effects on biodiversity or ecological sites within the local area. **Operational Effects** The option has the potential for losses from pipework, this could lead to a minor positive impact upon the local biodiversity if water demand is lowered leading to reduced abstraction. Although this is likely to have a neutral impact due to the low-level yield savings anticipated. As such, the effects are neutral.	Best practice mitigation measures should be implemented to supress any potential negative impacts arising from potential works.	-	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	-	0	**Construction Effects** The option is not anticipated to have any significant negative effects but could have short-term minor impact on biodiversity or habitat diversity within the local area depending on the location of the site. This is due to repair of leaking pipes could require construction works within proximity to areas with priority species and vulnerable habitats. **Operational Effects** During the operational phase of the option there is not anticipated to be any effect on the local environment including biodiversity and habitats due to the option regarding leak detection and repair. As such, the effects are neutral.	Best practice mitigation measures should be implemented to supress any potential negative impacts arising from potential works.	-	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The works could include the excavating of materials to access and repair pipeline leaks, however this will be dependent on the location of any issues that arise at individual sites. If underground pipes require retrofitting excavating of material may be possible. However, due to the scale of the option, the effects on INNS spread are considered neutral. **Operational Effects** The option is not expected to increase the risk of INNS spread as the process only involves the repair of leaks and reinstatement of materials in-situ. As such the effects are neutral.	Best practice mitigation measures should be implemented to minimise the potential spread of INNS if excavating of materials is required to undertake leakage repair works.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The nature of the work is unlikely to cause any negative impacts on the quality and quantity of water during the construction phase as this is likely to only include leakage repair in specific pipeline locations. As such the effects are neutral. **Operational Effects** The option is likely to contribute to the achievement of WFD objectives by identifying leaks within sectors and businesses that can help reduce water losses. As such the effects are determined as minor positive in the long-term.	There are no significant negative effects expected with the option and therefore no mitigation measures are identified.	0	+
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option may require short-term works if leaks are detected, but these are unlikely to impact flood risk. As such, the effects are neutral. **Operational Effects** The option is unlikely to have any effect on flood risk in the long term as leak detection is not associated with flood risk management, and so will have a neutral effect.	There are no significant impacts identified with this option and therefore no mitigation measures are identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** The option does not require substantial construction works or new infrastructure development so will have a neutral effect on water supplies in the short term.	There are no significant negative effects identified with the option so therefore no mitigation measures were identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The option is likely to have a minor positive impact upon water resilience by decreasing water losses within the agricultural sector, likely leading to minor decreases in water consumption.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	-	0	**Construction Effects** Access to process water pipes within the agricultural sector may be located within areas that require movement over agricultural soils. This may have a minor negative impact on soils if excavation works are required to fix leaks. **Operational Effects** In the long term there is not expected to be any impacts upon soils from process water auditing and leakage detection. As such the effects are neutral.	Best practice mitigation measures to be implemented to minimise any potential impacts associated with accessing process water sites for audit.	-	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** During the construction phase there will be the vehicular movement of engineers to and from business sites to identify and repair leaks. This is likely to have a neutral impact on overall air quality due to the low volume of construction expected. **Operational Effects** Once the option is operational the is not anticipated to be any impact upon air quality in the long term due to the nature of the option. As such the effects are neutral.	Sustainable modes of transport should be considered where possible to carry out works.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** The option will involve the increased vehicular movement to and from agricultural sites to identify leaks, although this is likely to have neutral impact on the release of embodied carbon. **Operational Effects** In the long term the option is not expected to lead to increases in the release of embodied or operational carbon, due to the nature of the works. As such the effects are neutral.	Sustainable modes of transport should be considered where possible to carry out works.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are not anticipated to be any changes to vulnerability to climate change during the construction phase due to the nature of the works not requiring any new infrastructure. As such the effects are neutral. **Operational Effects** Long term the option is unlikely to have any changes to climate change vulnerability and risk to the local area. Reduction in water losses is a positive impact of the option but is not expected to yield significant amounts of water saving. As such the effects are neutral.	There is not expected to be any significant negative impacts of the option and therefore no mitigation measures are identified.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is not anticipated to have any impacts on the historic environment with process water audits likely to take place on existing infrastructure. As such the effects are neutral.	There are no significant negative impacts identified with the option so there are no mitigation measures identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects There are no long-term impacts anticipated from the option regarding the historic environment due to the nature of the works. As such the effects are neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option does not involve any new infrastructure development but may include some minor impacts on landscape due to improvements and fixes. As such the construction effects are expected to be neutral. **Operational Effects** In the long term the option should not have any impact upon the landscape with all works expected to take place on brownfield sections of land or within agricultural sector land. As such the effects are neutral.	There are no significant negative effects expected with the	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The auditing and leakage detection will require increase vehicular movement through engineers accessing agricultural sites may lead to increases in traffic but is likely to have neutral impacts upon local communities. **Operational Effects** In the long-term, water efficiency is likely to be promoted within the agricultural sector from the option, with minor decreases in water losses and encouragement of a reduction in water consumption. As such a minor positive effect has been identified.	Consideration of local traffic congestion should be considered to minimise impact upon local communities where possible.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option does not require any infrastructure development but does require increased vehicular movement to undertake works, although this is likely to have neutral impacts upon tourism and recreation activities. **Operational Effects** In the long term the option is not expected to have any impacts on tourism and recreation within the region as no further works are expected. As such the effects are neutral.	There are no significant negative impacts expected with the option and therefore no mitigation measures are identified.	0	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** If minor upgrades are required to fix leaks, then new materials may be required during the construction phase, along with energy use to complete works. But these are expected to only involve minor amounts of works. **Operational Effects** In the long term there are not anticipated to be any negative impacts on material assets for the option. As such the effects are neutral.	Sustainable design measures to be implemented where possible to minimise use of resources and waste creation.	-	0
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** The option is likely to require increased vehicular movement across the region, but this is unlikely to result in increased pressures on built assets including transports links. If minor works are required to fix leaks under road networks, there may be short-term negative impacts on transport routes.	Consideration to traffic congestion and transport routes should be considered where possible to minimise potential impacts on local communities.	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects In the long term there are not anticipated to be any negative impacts of the option as leak identification is unlikely to cause issues to built infrastructure and assets. As such the effects are neutral.			

Q.4 NHH_A_005

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_A_005				
Option:	Business Efficiency Visit (BEV) – Targeted Large Business Leakage				
Scheme type:	Water Efficiency Audit and Leak Detection				
Option description:	This option provides targeted visits by process engineers to large scale businesses to look at how water use can be reduced on site. The output will be recommendations with indicative cost and efficiencies that could be achieved (solutions could include zero liquid discharge (ZLD), water reuse). This option would also consider any potential for the use of non PWS supplies. Target visits based on MOSL data to a limited number of large-scale water users.				
Approx. Yield (Ml/d):	0.04				
WRZ:	SWW				
Date Completed:	07/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not require any construction or potential for impacts to occur upon designated or non-designated sites in the short term. As such, effects are neutral. **Operational Effects** The option has the potential to identify potential losses from pipework, this could lead to a minor positive impact upon the local biodiversity if water demand is lowered leading to reduced abstraction. Although this	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				is likely to have a neutral impact due to the low level yield savings anticipated.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** The option does not require any construction or potential for impacts to occur upon biodiversity or habitats in the short term. As such, effects are neutral. **Operational Effects** During the operational phase of the option there is not anticipated to be any effect on the local environment including biodiversity and habitats due to the option being leak detection. As such, the effect is neutral.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not require any construction or potential for impacts to occur upon the spread or presence of INNS. Therefore, effects are considered neutral. **Operational Effects** The option is not expected to increase the risk of INNS spread as the process only involves the detection of leaks. As such the effects are neutral.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The nature of the works are unlikely to cause any negative effects on the quality and quantity of water as no construction is required. The water efficiency audit will not have an impact on water resources.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects The option is likely to contribute to the achievement of WFD objectives by identifying leaks within sectors and businesses that can help reduce water losses. As such the effects are minor positive long-term effects.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option does not require any new infrastructure development or construction works so is not expected to be impacted during the construction phase. As such the effect is neutral. **Operational Effects** The option is unlikely to have any effect on flood risk in the long term as leak detection is not associated with flood risk management, and so will have a neutral effect.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** The option does not require any construction works or new development infrastructure so will have a neutral effect on water supplies in the short term. **Operational Effects** The option is likely to have a minor positive impact upon water resilience by decreasing water losses from large-scale water users, likely leading to minor decreases in water consumption.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality	0	0	**Construction Effects** The option does not require any construction works, so the short-term effects on soil are considered neutral.	There are no notable impacts identified with this option and therefore no	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	of soils, including the protection of sites of geological importance			**Operational Effects** There are not anticipated to be any long-term impacts of the option regarding soils. As such, the effects are neutral.	mitigation measures are identified.		
Air	Reduce and minimise air emissions	0	0	**Construction Effects** During the short term, there will be an increase in the vehicular movement of engineers to and from business sites to carry out water efficiency audits. However, this is likely to have a neutral effect on overall air quality. **Operational Effects** In the long term the option is not anticipated to have any impact on local air quality.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** The option will involve increased vehicular movement to and from business sites to carry out the water efficiency audits, although this is not likely to have a notable impact, and so a neutral effect on the release of carbon emissions has been identified. **Operational Effects** In the long term the option is not expected to lead to increases in the release of embodied or operational carbon. As such, the effects are neutral.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are not anticipated to be any effects during the short term as this option does not require construction works.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Long term the option is unlikely to have any effect on climate change vulnerability and risk to the local area. Reduction in water losses is a positive impact of the option but is not expected to yield significant amounts of water saving.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** No infrastructure development or construction works are required for the option. Therefore, the short-term effects on the historic environment are considered neutral. **Operational Effects** The option will involve works that take place within the vicinity of individual businesses and sectors and so in the long term is not anticipated to have any effects on the historic environment.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option does not involve any new infrastructure development or construction works and so no impacts upon landscape are expected. **Operational Effects** In the long term the option should not have any impact upon landscape with all works expected to take place within the vicinity of the business boundaries. As such, the effects are neutral.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the	0	+	**Construction Effects** The option does not involve the development of new infrastructure or construction works and is therefore	There are no notable impacts identified with this option and therefore no	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	local community, including economic and social wellbeing			unlikely to have any effect on local communities during the short term. **Operational Effects** In the long term the option is likely to promote water efficiency and reduce water consumption within the businesses and sectors.	mitigation measures are identified.		
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option does not require any new infrastructure development but does require increased vehicular movement to undertake the water efficiency audit. However, this is likely to have neutral impacts upon tourism and recreation activities. **Operational Effects** In the long term the option is not expected to have any effect on tourism and recreation within the region as no further works are expected.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not require any new infrastructure development, or any construction works. As such, short-term effects on material assets are considered neutral. **Operational Effects** In the long term there are not anticipated to be any negative effects on material assets for the option.	There are no notable impacts identified with this option and therefore no mitigation measures are identified.	0	0
	Avoid negative effects on built	0	0	**Construction Effects** The option is likely to require increased vehicular movement across the region, but this is unlikely to	There are no notable impacts identified with this option and therefore no	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	assets and infrastructure			result in increased pressures on built assets including transports links. The option does not require any new infrastructure development or construction works, therefore effects on built assets and infrastructure are considered neutral. **Operational Effects** In the long term there are not anticipated to be any negative impacts of the option as leak identification is unlikely to cause issues to built infrastructure and assets. As such, the effects are neutral.	mitigation measures are identified.		

Q.5 NHH_A_007

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_A_007				
Option:	Virtual Business Efficiency Visit (VBEV) - Water Audits and Devices				
Scheme type:	Water efficiency audit				
Option description:	Virtual business use assessment undertaken online with an online efficiency representative. The assessment provides advice, recommendations, and actions, and could include sending free water efficiency devices for self-install or a professional plumber visit (e.g., for leaky loo fix).				
Approx. Yield (Ml/d):	0.07				
WRZ:	SWW				
Date Completed:	07/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not require any construction or potential for impacts to occur upon designated or non-designated ecological sites in the short term. As such, the effects are neutral. **Operational Effects** In the long term the option will not have impacts upon biodiversity. As such, the effects are neutral.	There are no negative effects identified with the option, and so no mitigation is identified.	0	0
	Protect, conserve and enhance biodiversity,	0	0	**Construction Effects** The option will not have impacts upon biodiversity such as priority species or habitats in the short term as the	There are no negative effects identified with the	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	including priority species, vulnerable habitats and habitat connectivity			option involves virtual auditing. As such, the effects are neutral. **Operational Effects** Once the virtual audit has been completed and any water efficient devices have been supplied to clients there is not expected to be any effect on biodiversity. As such, the effects are neutral.	option and therefore no mitigation is identified.		
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not require any excavating of materials and therefore presents no risk in the short term to increasing the spread of INNS. As such, the effects are neutral. **Operational Effects** In the long term due to the nature of the option the risk of INNS spread is neutral.	There are no negative effects identified with the option and therefore no mitigation has been identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option does not require any construction works and therefore will not have impacts on the quality of water resources within the environment. As such, the effects are neutral. **Operational Effects** Once the virtual auditing is complete and water efficient devices have been supplied to clients then minor savings of water may be made within the local area. With this option there is likely to be a small increase in demand savings which will contribute to WFD objectives.	There are no negative effects identified with the option and therefore no mitigation has been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Increase resilience and reduce flood risk	0	0	**Construction Effects** Due to the nature of the option, there will be no impacts on flood risk on option as audits will be completed virtually and water efficiency devices supplied to individual clients. With this no construction works will take place that could impact the option through flood risk. As such, the effects are neutral. **Operational Effects** In the long term due to the minor yield savings that are anticipated with the option, the effect on flood risk and resilience is likely to be positive but overall have neutral impacts.	There are no negative effects identified with the option and therefore no mitigation has been identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** No construction works are required with the option so there should be no impact in the short term on the delivering of reliable and resilient water supplies. As such, the effects are neutral. **Operational Effects** Once the virtual audits have been completed and water efficiency devices have been distributed the option should have a minor positive impact on demand management within the area. This is because the audit should provide water saving improvements for individual businesses.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including	0	0	**Construction Effects** The option does not require construction works and therefore is not expected to have any impact upon soils in the short term. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	the protection of sites of geological importance			**Operational Effects** Due to the nature of the works being virtual auditing and distribution of water efficiency devices there is not expected to be any long-term impact on soils. As such, the effects are neutral.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option is not anticipated to have any impact upon air quality as the nature of the works does not involve construction requirements. The option does require the distribution of water efficiency devices which will require transport, but in the short term the impacts upon air quality are likely to be neutral. **Operational Effects** Over the long term the option is not expected to have any impact upon air quality due to the low scale associated with the option. As such, the effects are neutral.	Sustainable transport methods should be considered when distributing water efficiency devices.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** The option does not require any construction works and therefore has no negative impacts on embodied carbon emissions. As such, the effects are neutral. **Operational Effects** The use of water efficiency devices may require the use of energy to be operational, but these are not likely to produce discernible impacts. As such, the effects are neutral.	Use of sustainable energy sources should be used where possible to power water efficiency devices if they require an energy input.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option will not require any construction works and so will not be impacted by climate change risk. As such, the effects are neutral. **Operational Effects** In the long term the option will achieve small yield savings of water supplies and so will only have a neutral impact on increasing resilience.	There are no negative effects identified with the option and so no mitigation is identified.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option will have no impact on the historic environment as no construction works are required for the option due to the nature of the works. As such, the effects are neutral. **Operational Effects** In the long term the option will not have any negative impacts upon the historic environment. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** With the option including virtual auditing and distribution of water efficiency devices there will be no impact on the landscape in the short term. As such, the effects are neutral. **Operational Effects** In the long term the option will have no negative effects on the landscape due to the nature of the works.	There are no negative effects identified with the option and so no mitigation has been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** There are no construction works associated with the option therefore no negative impacts are expected in the short term to effect local communities. As such, the effects are neutral. **Operational Effects** Once the option has been completed there is not expected to be any negative impacts associated in the long term that would impact the local populations. There is likely to be a minor positive impact of the option regarding water efficiency and an encouragement in reduction of water usage within the local population.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No construction works are to be undertaken with the option and therefore no impacts are expected upon tourism and recreation. As such, the effects are neutral. **Operational Effects** Once virtual auditing and distribution of water efficiency devices has taken place there is not expected to be any long-term impacts upon tourism and recreation. As such, the effects are neutral.	There are no negative effects identified with the option and so no mitigation is identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not involve any construction works and so will not have any impact on material assets in the short term. The option does also not produce any waste. As such, the effects are neutral.	There are no negative impacts identified with the option and so no mitigation is identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term the option is not anticipated to produce any waste or require any resources due to the nature of the option. As such, the effects are neutral.			
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option does not require any infrastructure works and therefore will not have a negative impact upon built assets such as vehicular movement to site. The option will require the distribution of water efficiency devices to client sites, but this will have a neutral impact upon built assets. **Operational Effects** Once the virtual audits have been completed and the water efficiency devices have been distributed there is not anticipated to be any negative impact upon material assets. As such, the effects are neutral.	There are no negative issues identified with the option and therefore no mitigation is identified.	0	0

Q.6 NHH_E_001

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH-E-001				
Option:	Sector Specific Water Efficiency Advice				
Scheme type:	Water efficiency advice				
Option description:	The development of a central website/customer engagement dashboard website to provide information on water efficiency campaigns and online tools for customers to engage with that provide water efficiency advice (e.g., water calculators - effectively acting as a self-audit) and wider resources. This could be extended to allow customers to login to their accounts to look at real time water use from Smart meters: advice would then be more tailored.				
Approx. Yield (Ml/d):	0.6				
WRZ:	SWW				
Date Completed:	07/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** Due to the nature of the option involving online engagement with customers, there is not anticipated to be any construction works associated with the option. As such, the effects are neutral. **Operational Effects** There is not expected to be any long-term negative effects on biodiversity. As such, the effects are neutral.	There are no negative issues identified with the option and therefore no mitigation identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** No negative impacts upon biodiversity, priority species or vulnerable habitats are expected as no construction works are associated with the option. As such, the effects are neutral. **Operational Effects** In the long term the option should have no impact upon biodiversity due to the nature of the option. As such, the effects are neutral.	There are no negative issues identified with the option and therefore no mitigation identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not involve any construction works therefore there is no risk of spread of INNS. As such, the effects are neutral. **Operational Effects** Due to the nature of the option there will be no long-term impact on INNS spread. As such, the effects are neutral.	There are no issues associated with the option and therefore no mitigation identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option does not require any construction works and therefore will not have a negative impact upon water resources. As such, the effects are neutral. **Operational Effects** The option is relaying advice to clients regarding water efficiency and therefore should lead to minor water savings that contribute to WFD objectives.	There are no negative effects identified with the option and therefore no mitigation identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option does not require any construction works and therefore will not impact flood risk in this phase. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to produce neutral impacts upon flood risk due to the low volume of yields that will be saved through the option.	There are no negative effects identified with the option and therefore no mitigation identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** No construction works are required with the option so there will be no impact in the short term on the delivering of reliable and resilient water supplies. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to provide advice that leads to minor savings in water resourcing from clients within the region.	There are no negative effects associated with the option and so no mitigation identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is not expected to involve any construction works or excavation of materials, therefore no impacts upon soils are anticipated in the short term. As such, the effects are neutral. **Operational Effects** Once the advice has been given to individual clients there will be no impacts upon soils within the region in the long term. As such, the effects are neutral.	There are no negative issues associated with the issues and so no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
Air	Reduce and minimise air emissions	0	0	**Construction Effects** No construction works are planned with the option and so no vehicular movement is anticipated, therefore in the short term no impact on air quality is expected. As such, the effects are neutral. **Operational Effects** In the long term the option is not likely to produce any impacts upon air quality as the works only include advice regarding water efficiency. As such, the effects are neutral.	If option includes visiting clients, then sustainable transport methods should be implemented where possible.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** The option does not require any construction works and therefore has no carbon emissions. As such, the effects are neutral. **Operational Effects** In the long term the option is not anticipated to lead to any increases in releases of embodied or operational carbon due to the nature of the works only involving online advice. As such, the effects are neutral.	There are no negative issues associated with the issues and so no mitigation measures are identified.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option will not require any construction works and will not change climate change risk. As such, the effects are neutral. **Operational Effects** In the long term the option will achieve small yield savings of water supplies and so will only have a neutral effect on increasing resilience.	There are no negative effects identified with the option and so no mitigation is identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option will have no impact on the historic environment as no construction works are required for the option due to the nature of the works. As such, the effects are neutral. **Operational Effects** In the long term the option will not have any impacts upon the historic environment. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is not expected to have any impact upon the landscape with the option being advice to clients regarding water efficiency. As such, the effects are neutral. **Operational Effects** In the long term the landscape should not be impacted by the option due to the nature of the works. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** There are no construction works associated with the option and so no impacts to the local communities are expected in the short-term. As such, the effects are neutral. **Operational Effects** Once the option has been completed there is not expected to be any negative impacts associated in the long term that would impact the local populations.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				There is likely to be a minor positive impact of the option regarding water efficiency and an encouragement in reduction of water usage within the local population.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No construction works are to be undertaken with the option and therefore no impacts are expected upon tourism and recreation. As such, the effects are neutral. **Operational Effects** In the long term the option is not expected to have any impact upon tourism and recreation as the option involves providing advice to clients regarding water efficiency. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not involve any construction works and so will not have any impact on material assets in the short term. The option does also not produce any waste. As such, the effects are neutral. **Operational Effects** In the long term the option is not anticipated to produce any waste or require any resources due to the nature of the option. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option is not expected to require construction works and therefore will not have any negative impacts on built assets or infrastructure. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Over the long term the option is not anticipated to have a negative impact upon infrastructure as the option evolves around advice to clients regarding water efficiency. As such, the effects are neutral.			

Q.7 NHH_N_001

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_N_001				
Option:	Rainwater Harvesting				
Scheme type:	Rainwater harvesting				
Option description:	This option would work with developers to provide rainwater harvesting systems to provide a non-potable supply for use within the new commercial properties. Water is collected from roof runoff and a sustainable drainage system is created. The collected water goes through a basic level of treatment. Rainwater harvesting is included in the development to meet planning conditions.				
Approx. Yield (Ml/d):	1.21				
WRZ:	SWW				
Date Completed:	07/06/22, updated 02/02/23	***Completed By:***	Megan Townsend	***Version:***	B
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Rhiannon Izzard, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Georgia Luck, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** To implement rainwater harvesting in new commercial developments, there may be a requirement for rainwater harvesting systems ranging from simple water butts to pump feed systems. The systems will be implemented on the construction sites of the new developments. Therefore, the technologies alone will not impact designated and non-designated sites and an overall neutral impact on this objective is expected.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational, the rainwater harvesting technologies outlined are expected to have a neutral impact on designated and non-designated ecological sites. Operational activities will take place within commercial and public developments, and any impacts are not anticipated to extend beyond the site footprint.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	+	**Construction Effects** Implementing rainwater harvesting systems within new developments may require some additional minor infrastructure. Any potential impacts on biodiversity and habitats are likely to be neutral. **Operational Effects** Once operational, the rainwater harvesting technologies are not expected to negatively impact biodiversity, habitats, or species. Operational activities will take place within the commercial and public developments. Rainwater harvesting is likely to reduce the use of the mains water supply, which means less water will be artificially drawn from the environment. This may contribute to improved water levels and potentially enhance biodiversity and habitat connectivity in associated waterbodies.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
	Reduce the spread or presence of INNS	0	0	**Construction Effects** Implementing rainwater harvesting technologies may require very minor additional construction works and possibly excavation, depending on the scale of the technology used. However, any effects on the spread of INNS are likely to be neutral compared to the effects	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				resulting from construction of the new commercial developments. **Operational Effects** During operation, there will be no water transferred between different sources. Rainwater will be collected within the site boundary, therefore the introduction or spread of INNS is not anticipated and a neutral impact on biodiversity is expected.			
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** Implementing rainwater harvesting may require some additional minor infrastructure. However, the option is deemed unlikely to have significant effects on water quality and quantity during construction, therefore a neutral effect is expected. **Operational Effects** In the long term, the option is likely to reduce reliance on the mains water supply. Therefore, less water will need to be artificially drawn from the environment which could potentially improve water quality and flow within existing water bodies. Rainwater harvesting will also increase the amount of water available to the commercial / public developments using nature-based solutions and/or sustainable drainage systems.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
	Increase resilience and reduce flood risk	0	+	**Construction Effects** Implementing rainwater harvesting technologies may require some minor additional construction works and infrastructure. It is unlikely that the construction phase	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				regarding these systems would have an immediate impact on flood risk. **Operational Effects** Once operational, rainwater harvesting systems could potentially lessen the quantity of water entering drainage systems, reducing the effects of flooding by channelling the run-off water into tanks for recycling and having a minor positive impact on long-term flood risk.			
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Before operation, the option is not expected to deliver any additional resilient water supplies to the SWW region. **Operational Effects** This option is expected to deliver an additional 1.21Ml/d of water for use in the SWW region, potentially reducing reliance on mains resources and subsequently the artificial draw of water from the environment, resulting in minor positive effects on water supplies within the SWW region.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is not expected to alter the functionality, quality, or quantity of surrounding soils. The rainwater harvesting infrastructure will be implemented on the construction sites of the new commercial / public developments and they are not anticipated to extend beyond the existing site.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Operational activities are expected to take place on the commercial / public site and will not alter any surrounding soils or disturb any sites of geological importance.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The implementation of the rainwater harvesting technology may require some additional minor construction works. However, any air quality impacts are likely to be neutral. **Operational Effects** The operational phase will not result in any air pollution. Due to the nature of the option, the effect on air quality is likely to be neutral.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	-	+	**Construction Effects** Implementing rainwater harvesting technologies is likely to require some new infrastructure. This could range from simple water butts to larger pump feed systems. Development of additional infrastructure is likely to increase the volume of embodied carbon within developments, including an increase in vehicular movements on-site, leading to potential minor negative impacts on this objective. **Operational Effects** Once operational, the rainwater harvesting systems are unlikely to increase operational carbon emissions. The option involves on-site water recycling facilities which will reduce the volume of water being pumped and treated from SWW supplies, such as reservoirs.	Investigate the use of sustainable construction methods during the implementation of new infrastructure (e.g turn machinery off when not in use). Investigate the use of materials with less embodied carbon when implementing the new infrastructure.	-	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				This could have a positive impact through reducing operational carbon emissions in the long term.			
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** During the short term, the option is unlikely to impact the vulnerability to climate change risks and hazards. **Operational Effects** Rainwater harvesting may help to manage increased water run-off from storm events (which are likely to increase in frequency due to climate change), reducing the impacts of surface water flooding. During periods of heavy rainfall, harvesting technologies will be able to collect rainwater which may be able to provide a water supply in dry periods, to an extent. Rainwater harvesting will likely decrease the commercial / public water consumption from SWW mains, leading to less water being abstracted, pumped, and treated from existing sources. Rainwater can be used instead of potable water for uses such as toilet flushing and gardening. This could potentially reduce operational carbon emissions in the long term and decrease the vulnerability to climate change within the SWW region.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option may require some additional infrastructure however this will be implemented on the existing commercial / public development site. A neutral impact on heritage assets would be expected.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects No effects on the historic environment and archaeology are anticipated in the long term.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option may require some additional infrastructure and construction works however this will be implemented on the existing commercial / public development site. Any effects on the landscape are going to be neutral compared to the effects arising from the new developments overall. **Operational Effects** A neutral impact on landscape and townscape would be expected during operation of rainwater harvesting systems.	Careful consideration of the placement and positioning of any rainwater harvesting infrastructure to minimise the visual impacts on nearby receptors.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option may require some additional construction works however this will be completed on existing commercial / public development sites. A neutral impact on this objective would be expected during the construction phase. **Operational Effects** Through improving water supplies, through the potential provision of an additional 1.21Ml/d to the region, a minor positive impact on wellbeing within communities could be expected.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option is likely to require minor infrastructure development and increased vehicular movement. However, overall neutral impacts upon tourism and recreation activities are anticipated to be neutral. **Operational Effects** Operational activities will take place on the existing development site. There may be a small requirement for maintenance works and subsequent short-term pedestrian use impacts, however, long-term impacts on tourism and recreation are not anticipated.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0
Material Assets	Minimise resource use and waste production	-	+	**Construction Effects** The option is likely to require minor infrastructure development and increased vehicular movement, which is likely to increase energy consumption to an extent. There may be some waste materials and small excavation works related to these activities, depending on the scale of the development of rainwater harvesting infrastructure. **Operational Effects** Implementing rainwater harvesting technology will encourage the recycling and re-use of rainwater. This could decrease commercial and public reliance on the mains water supply and have a minor positive impact on potable water resources in the long term.	Investigate the use of reusing waste materials and implementing recycled materials into the design. Implement sustainable construction methods to reduce the energy consumption in the short term (e.g. turn off machinery when not in use).	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** Any new infrastructure associated with the option will be implemented an existing commercial and public construction site. Neutral impacts on built assets and infrastructure would be expected. **Operational Effects** Operational activities will take place on an existing site and will not extend beyond this. Built infrastructure in the surrounding area is not anticipated to be impacted by the operation of rainwater harvesting systems.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

Q.8 NHH_N_006

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	NHH_N_006				
Option:	Reuse Treated Wastewater Effluent				
Scheme type:	Reuse of Treated Wastewater Effluent				
Option description:	Reuse treated wastewater effluent from industrial customers is used for supply to industrial customers. This reclaimed water could be used for industrial/commercial use rather than potable water.				
Approx. Yield (Ml/d):	0.62				
WRZ:	SWW				
Date Completed:	07/06/22, updated 02/02/23	***Completed By:***	MT	***Version:***	B
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** To introduce this option, there may be a requirement for some additional minor infrastructure. This is likely to be implemented on existing WWTW sites and make use of existing SWW pipelines. Therefore, this option is not expected to affect designated and non-designated ecological sites in the short term. As such, the effect is neutral. **Operational Effects** Once operational, this option is not expected to impact designated and non-designated ecological sites. Operational activities will take place within existing WWTW sites, and any impacts are not anticipated to	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				extend beyond the site footprint. As such, the effect is neutral.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	+	**Construction Effects** Implementing this option may require some additional minor infrastructure. However, any effects on biodiversity are likely to be neutral because this infrastructure is likely to be located on an existing WWTW site. The impact on biodiversity, habitats and species can be considered neutral in the short term. As such, the effect is neutral. **Operational Effects** Operational activities will take place within existing WWTW sites and it is currently unknown whether new or existing pipework would be required. The operational phase is unlikely to have a negative impact on biodiversity, species, and habitats. Reusing treated wastewater effluent as an alternative supply for commercial and industrial activities is likely to reduce the use of the SWW mains supply. This means less water will be artificially drawn from the environment. A reduction in water abstraction may enhance biodiversity and habitat connectivity in associated waterbodies.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified	0	+
	Reduce the spread or presence of INNS	0	0	**Construction Effects** Implementing this option may require very minor construction works, depending on the requirement and scale of additional infrastructure. However, there is low potential for effects on INNS spread, as construction would be minor and temporary.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term, there are not expected to be any impacts associated with INNS spread as operational activities are likely to take place on existing sites and there will be no water transfer between sources. Therefore, negative impacts on INNS are not anticipated as the level of abstraction from waterbodies is likely to decrease. As such, the effect is neutral.			
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** Implementing this option may require some minor construction works and additional minor infrastructure. It is assumed that this will take place on an existing WWTW site. The quantity and quality of surface and ground waterbodies in the surrounding environment should not be affected in the short term. As such, the effect is neutral. **Operational Effects** The recycling of treated wastewater is not expected to negatively affect water quality or water resources. In the long term, this option is likely to reduce the use of the mains water supply, which means that less water will need to be artificially drawn from the environment. This could potentially reduce the risk of water pollution. This option will increase the amount of water available to the SWW region and will be used for commercial and industrial purposes.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Increase resilience and reduce flood risk	0	0	**Construction Effects** Implementing this option may require some minor additional infrastructure and construction works. However, these activities will be small scale and any impacts on flood risk are going to be neutral. **Operational Effects** The nature of this option involves the recycling of treated wastewater effluent for commercial and industrial purposes. This is not anticipated to alter flood risk as operational activities will take place on site and the rate of water abstraction is expected to slightly decrease. As such, the effect is neutral.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** Prior to operation, the option is not expected to deliver any additional resilient water supplies to the SWW region. As such, the effect is neutral. **Operational Effects** This option is expected to deliver an additional 0.62Ml/d of water for use in the SWW region, reducing the artificial draw of water from the environment and the use of the SWW Mains resource.	This option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is not expected to alter the functionality, quality, or quantity of surrounding soils. If any new infrastructure or construction works are required, they will be implemented on an existing WWTW site and are not anticipated to extend beyond the existing site. As such, the effect is neutral.	This option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Operational activities are assumed to take place on an existing WWTW site and will not alter any surrounding soils or disturb any sites of geological importance. As such, the effect is neutral.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The implementation of this option may require some additional minor construction works. However, compared to the existing works completed by the developers, the effect of this option on air quality is considered neutral. **Operational Effects** The operational phase will not result in any additional air pollutants or air pollution. Due to the nature of the option, the effect on air quality can be considered neutral.	This option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	?	+	**Construction Effects** Implementing this option may require some minor new infrastructure and construction works. Additional infrastructure is likely to increase the volume of embodied carbon within the WWTW sites. Construction activity may increase carbon emissions in the short term through increased vehicular and machinery use. At this stage, it is uncertain whether construction works will be required, therefore the effect on carbon emissions is uncertain in the short term.	If construction is required, investigate the use of sustainable construction methods during the implementation of new infrastructure (e.g., turn machinery off when not in use). Investigate the use of materials with less embodied carbon when implementing any new infrastructure.	?	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term, the option is unlikely to increase operational carbon emissions. The option involves recycling treated wastewater. This is likely to reduce the volume of water being pumped and treated from SWW supplies such as reservoirs. This could reduce operational carbon emissions in the long term.			
	Reduce vulnerability to climate change risks and hazards	0	+	**Construction Effects** During the short term, the option is unlikely to impact the vulnerability to climate change risks and hazards. As such, the effect is neutral. **Operational Effects** The option will decrease the commercial/industrial consumption of potable water, meaning less water will be abstracted, pumped, and treated from existing water sources. Treated wastewater effluent can be used instead of potable water for commercial and industrial processes. This could reduce operational carbon emissions in the long term which could therefore decrease the vulnerability to climate change.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	+
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option may require some additional infrastructure however it is assumed that this will be implemented on existing WWTW sites. Therefore, effects on the historic environment are considered neutral.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Operational activities will take place on existing sites, therefore no impacts on the historic environment and archaeology are anticipated in the long term. As such, the effect is neutral.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	?	0	**Construction Effects** The option may require some additional infrastructure and construction works however this is uncertain. If construction works are required, it is assumed they will take place within an existing WWTW site. At this stage, the effects on landscape and visual amenity are unknown. **Operational Effects** The option may require some additional infrastructure although this is uncertain. If additional infrastructure is required, it will be minor, and it is assumed it would be located on the existing WWTW sites. Therefore, long-term negative effects on landscape and visual amenity are not anticipated. As such, the effect is neutral.	If additional construction and infrastructure is required, the placement and positioning of this should be carefully considered to minimise visual impacts on nearby receptors.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option may require some additional construction works however it is assumed that this will be completed on existing WWTW sites. Nearby important buildings and community facilities should not be affected by the scheme. There is a possibility that local air quality may temporarily deteriorate during construction. However, as the scale of works would likely be small, the effect of this on health and well-being is anticipated to remain neutral.	If construction works are required, best practice mitigation is expected, to minimise the effects on the health and well-being of the local community.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Effects on health and wellbeing of the local community can be considered positive as this option will provide an additional 0.62Ml/d of water to the SWW region.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The implementation of this option may require minor infrastructure development and minor increased vehicular movement. However, this is likely to have a neutral impact on tourism and recreational activities. **Operational Effects** Operational activities will take place on an existing site. There may be a small requirement for maintenance works, however, impacts on tourism and recreation are not anticipated. As such, the effect is neutral.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0
Material Assets	Minimise resource use and waste production	?	+	**Construction Effects** The option may require some additional infrastructure to be implemented, however this is currently uncertain. If this is required, there will be a small increase in vehicular movement and use of machinery. This is likely to increase energy consumption and potentially generate some waste. The effect of this option on resource use and waste production is currently unknown. **Operational Effects** Implementing this option will increase the amount of recycled water. This will decrease the commercial and industrial reliance on potable water for associated processes. This will lead to an increased volume of potable water available to the SWW region.	If additional infrastructure / construction is required, investigate the use of reusing waste materials and implementing recycled materials into the design. Implement sustainable construction methods to reduce energy consumption in the short term (e.g., turn off machinery when not in use).	?	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Energy consumption is also expected to decrease due to the reduction in abstraction, pumping, and treatment of water artificially drawn from the environment.			
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** If new infrastructure is required, it is assumed that this will be located on existing WWTW sites. Any impacts on the surrounding built assets are likely to be neutral. **Operational Effects** Operational activities will take place on an existing site and will not extend beyond this. Built infrastructure in the surrounding environment is not anticipated to be impacted in the long term. As such, the effect is neutral.	The option is not expected to result in any negative impacts; therefore, no mitigation measures have been identified.	0	0

Q.9 HH_A_002

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_A_002				
Option:	Home Efficiency Visits (HEV) – Audit with Device - Metered				
Scheme type:	Efficiency visits and audits				
Option description:	Visits include undertaking a water audit, advice and tailored retrofits of free water-efficient devices where required (e.g. leaky loo fix) to households with a meter already installed.				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	10/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not require any significant levels of construction works as leakage detection is expected to occur within the vicinity of the individual location. Therefore, option is not expected to impact upon SPAs, SACs, Ramsar Sites, SSSIs, MCZ or MPAs are anticipated. As such, the effects are neutral. **Operational Effects** In the long term due to the nature of the option there are not anticipated to be any impacts upon designated and non-designated ecological sites. Through water conservation, the option could allow for further retention of water within the local environment to some	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				extent. However overall, the effects are likely to be neutral.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** Due to the nature of the option not requiring large scale construction works there is not anticipated to be any impacts on biodiversity, including priority species and vulnerable habitats. As such, the effects are neutral. **Operational Effects** Once the option has been completed there is not expected to be any long-term impact upon species or habitats, with no effects on Biodiversity Net Gain. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option is not expected to be require the excavation of any materials and therefore will not in the short term have any impact upon INNS spread. As such, the effects are neutral. **Operational Effects** The option is not expected to have any long-term impact upon INNS spread due to the nature of the option. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The nature of the option will not require any large-scale construction works and therefore will not impact upon the quality and or quantity of surface and groundwater. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the option is operational there is likely to be minor positive contributions to WFD objectives through water savings measures including leakage reductions.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option does not require any large-scale construction works and therefore will not be impacted by flood risk in the short term. As such, the effects are neutral. **Operational Effects** In the long term the option will not be impacted upon by flood risk as the option includes leakage detection and repair within individual business sectors. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** The option will not have a short-term impact upon the reliability and resilience of water supplies in the short term due to the option not requiring any large-scale construction works. As such, the effects are neutral. **Operational Effects** In the long term the option could lead to minor positive impacts upon water resilience due to decreases in losses through leakage in the water system.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including	0	0	**Construction Effects** The option will not require any construction works and therefore will not have an impact upon soils within the SWW region. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	the protection of sites of geological importance			**Operational Effects** Long term no negative impacts are anticipated on soils due to the nature of the option evolving around leakage detection in businesses. As such, the effects are neutral.			
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option does not plan to use large scale construction works and so will not have an effect short term on air quality management areas of local air quality. As such, the effects are neutral. **Operational Effects** Once the option is operational no impacts upon air quality are anticipated due to the nature of the option. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** Due to the option not requiring any large-scale construction works there are not anticipated to be any negative impacts associated with embodied carbon emissions. Some carbon emissions could be produced during the manufacturing of these devices, with the embodied carbon emissions (total embodied carbon from construction) for this option being 249tCO2 equivalent. The overall effects of the option are likely to be neutral. **Operational Effects** Long term the option is expected to have a negligible levels of operational carbon emissions as the option is detailed around leakage detection and repair. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option will not require any large-scale construction works and so will not change climate change risk. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to achieve small yield savings that could contribute positively to the reduction in vulnerability to climate change hazards such as drought, but this is likely to be of negligible amounts. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option will not have impacts on the historic environment as no large-scale construction works are required for the option due to the nature of the works. As such, the effects are neutral. **Operational Effects** In the long term the option will not have any negative impacts upon the historic environment. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option is not anticipated to have any impacts upon landscape due to the nature of the option permitting leakage detection and repair. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects In the long term the option is not anticipated to have any impact upon landscape. As such, the effects are neutral.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option is not expected to require any large-scale construction works and therefore no negative short-term impacts on the local population are anticipated. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to increase water efficiency through the detection and repair of leaks. As well as this there should be a level of encouragement for a reduction in water usage. As such, there would be a minor positive effect.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No large-scale construction works are to be undertaken with the option and therefore no impacts are expected upon tourism and recreation. As such, the effects are neutral. **Operational Effects** Once operational the option is anticipated to have no impact upon tourism and recreation with the SWW region. As such, the effects are neutral.	There are no significant impacts identified with the option and therefore no mitigation measures have been identified.	0	0
Material Assets	Minimise resource use and waste production	-	0	**Construction Effects** The option may require the use of machinery and tools to fix leakage issues, this may require energy usage	Sustainable design measures to be implemented where possible to minimise use of	-	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				for completion although this is only expected to be minor. **Operational Effects** Once operational the option is not anticipated to have any negative impact on resource use and will not produce any waste. As such, the effects are neutral.	resources and waste creation.		
	Avoid negative effects on built assets and infrastructure	-	0	**Construction Effects** The option is not expected to require large scale construction works but may require vehicular movement to individual sites across SWW region to detect and fix leakages. However, this is likely to be minor and have a neutral effect upon built assets and infrastructure **Operational Effects** In the long term the option is not expected to have any negative impacts upon built assets including transport infrastructure. As such, the effects are neutral.	Sustainable transport methods should be implemented where possible to minimise impacts upon built infrastructure.	-	0

Q.10 HH_A_003

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_A_003				
Option:	Home Efficiency Visits (HEV) – Audit with Device - Metered				
Scheme type:	Efficiency and Audit				
Option description:	Visits include undertaking a water audit, advice and tailored retrofits of free water efficient devices where required (e.g. leaky loo fix). HEV's are provided alongside the company's ongoing smart meter rollout.				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	08/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not require construction works due to the option including home efficiency visits (HEVs), small-scale fixes and meter rollout only. There will be no negative effects on designated and non-designated ecological sites in the short term. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to improve water resourcing within the region. This is due to minor increases in water efficiency use by households. However, this is not expected to impact designated and non-designated ecological sites.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** There are no construction works anticipated with the option and so no negative impacts are expected to occur upon biodiversity, priority species or vulnerable habitats. The option does use HEVs and therefore may have minimal impact in the short term on biodiversity factors within the local environment however these are unlikely to cause significant impact. As such, the effects are neutral. **Operational Effects** In the long term there is not expected to be any negative impacts associated with the option due to the nature of the works, as this involves HEVs and the distribution of water efficiency devices to households.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not involve any construction works therefore does not involve the excavating of materials. Therefore, the risk of INNS spread during this phase is very low. As such, the effects are neutral. **Operational Effects** Once the auditing of households has been completed and water efficiency devices have been distributed there should still be no effect on the risk of INNS in the long term, due to the nature of the works. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option will not impact upon the quality or quantity of surface or groundwater during the construction phase. Shellfish and bathing waters are also highly unlikely to be affected negatively due to the nature of the works and so will not be impacted. As such, the effects are neutral. **Operational Effects** Once auditing has been completed and water efficiency devices have been distributed there is the potential for minor positive long-term effects on water resources. This is due to minor savings being made regarding reduction in waste water within households. This is likely to lead to minor positive impacts on WFD objectives including the achievement of WFD objectives.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is not vulnerable to the effects of flood risk, with any works involving minimal changes. Distribution of water efficiency devices will not impact flood risk. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to produce minor improvements in catchment demand management as wastewater levels could be lowered. However, due to the low-level yields that are expected to be saved it is likely to result in neutral impacts upon resilience and flood risk.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** In the short term the option will have no impact on the reliability and resilience of water supplies. The nature of the option results in no impact upon water resources. As such, the effects are neutral. **Operational Effects** Once the audits have been completed and water efficiency devices have been distributed the option should have a minor positive effect on demand management within the area. This is because the audit should provide water saving improvements for individual households.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** Due to the nature of the option there will be no impact upon soil, this includes high grade agricultural land and greenfield land. As such, the effects are neutral. **Operational Effects** Once the option is operational there will be no negative impacts upon soils across the SWW region. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option involves the use of HEVs which may have negligible impact upon air quality including air quality management areas. There also may be the requirement for vehicular movement to distribute water efficiency devices, although this is likely to be minor and have neutral impacts upon local air quality. As such, the effects are neutral.	Sustainable modes of transport should be considered where possible to distribute water efficiency devices and mitigate any potential air quality emissions.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Upon completion of auditing and distribution of water efficiency devices there is not anticipated to be any impact upon air quality within the local area or wider SWW region. As such, the effects are neutral.			
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** Due to the nature of the option there are no construction works expected to complete the audits and distribute water efficiency devices. The distribution and manufacture of water efficiency devices would require transport through vehicular movement which may result in minor releases of embodied carbon, with the embodied carbon emissions (total embodied carbon from construction) for this option being 390tCO2 equivalent spread across the design life of the option. This is however likely to result in neutral impacts due to the small-scale nature of the option. **Operational Effects** In the long term the option is not expected to have any impacts. As such, the effects are neutral.	Sustainable modes of transport should be considered where possible to distribute water efficiency devices and mitigate any potential releases of embodied carbon. Use of renewable energy sources to power water efficiency devices where possible.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option does not involve any construction works and therefore impact the vulnerability to climate change. As such, the effects are neutral. **Operational Effects** In the long term the option will provide minor positive impacts upon water demand management by decreasing wastewater. This could positively impact resilience to the effects of climate change on water	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				resources but due to the small yield savings expected the overall impact is likely to be neutral.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option will have no impact upon the historic environment as no construction works are required to undertake virtual audits. As such, the effects are neutral. **Operational Effects** Over the long term no negative impacts upon the historic environment are associated with the option due to the option not involving any new infrastructure development. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** With the option including HEVs and distribution of water efficiency devices there is not expected to be any impact on the landscape in the short term. As such, the effects are neutral. **Operational Effects** In the long term the option will have no impact on the landscape due to the nature of the works. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** There are no construction works associated with the option and so no negative impacts are expected in the short term to effect local communities. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term the option is likely to produce minor positives impacts upon water management for the SWW region. There is also likely to be an encouragement within local populations to reduce water usage with overall minor positive effect.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No construction works are to be undertaken with the option and therefore no impacts are expected upon tourism and recreation. As such, the effects are neutral. **Operational Effects** Once HEVs and distribution of water efficiency devices has taken place there is not expected to be any long-term impacts upon tourism and recreation. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not involve any construction works and so will not have any impact on material assets in the short term. The option does also not produce any waste. As such, the effects are neutral. **Operational Effects** In the long term the option is not anticipated to produce any waste or require any resources due to the nature of the option. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option does not require any infrastructure works and therefore will not have a negative effect upon built assets such as vehicular movement to properties. The option will require the distribution of water efficiency devices to client sites, but this will have a neutral impact upon built assets. **Operational Effects** Once the virtual audits have been completed and the water efficiency devices have been distributed there is not anticipated to be any impact upon material assets. As such, the effects are neutral.	There are no negative issues identified with the option and therefore no mitigation is identified.	0	0

Q.11 HH_E_009

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_E_009				
Option:	Home Efficiency Visits (HEVs) – Local Authorities etc.				
Scheme type:	Efficiency visits and audits				
Option description:	Visits include undertaking a water audit, advice and tailored retrofits of free water efficient devices where required. Targeted at specific housing stock of local authorities or housing associations. The visits are selected based on high potential for water savings.				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	08/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option is expected to only cover works that take place within the vicinity of individual households and therefore will not impact upon designated or non-designated ecological sites. As such, the effects are neutral. **Operational Effects** In the long term the option is not anticipated to have any impacts upon ecological sites as no works are planned.	There are no negative effects identified with the option and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** Due to the option including auditing and fitting of water efficient devices in individual households there is not expected to be any construction works that would negatively impact biodiversity. As such, the effects are neutral. **Operational Effects** Over the long term, biodiversity including priority species and habitat connectivity will not be impacted once auditing of households and water device installation has been completed. As such, the effects are neutral.	There are no negative effects identified with the option and so no mitigation measures are identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** There are no construction works planned with the option therefore there will not be any excavating of materials. This means there is no risk of INNS spread. As such, the effects are neutral. **Operational Effects** Due to the nature of the option in the long term no effects should take place regarding INNS spread. As such, the effects are neutral.	There are no negative impacts identified with the option and so no mitigation is identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option should only include auditing households and the installation of water efficiency meters. Therefore, no construction works should be taking place that would negatively impact the quality of water resources within the environment. As such, the effects are neutral.	There are no negative impacts identified with the option and therefore no mitigation is identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The installation of water efficiency devices and auditing of households is likely to contribute minor water savings with minor decreases in demand. This is likely to lead to minor positive effects on achieving WFD objectives.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** There are no construction works planned with the option and so flood risk should not impact upon the option in the short term. As such, the effects are neutral. **Operational Effects** The auditing of households and installation of water efficiency devices is likely to result in less water consumption. However, this is likely to have a neutral effect on the resilience and reduction of flood risk.	There are no negative effects identified with the option and therefore no mitigation is identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** The option does not require any new infrastructure development or construction works, and therefore will not have impacts upon the deliverability and reliability of water supplies within the region. Auditing of households and installing of water efficiency devices is not anticipated to have any wider impact on regional water supplies. As such, the effects are neutral. **Operational Effects** In the long term the option is likely to produce minor positive impacts upon water supplies through minor decreases in wastewater. Increases in water efficiency will lead to minor increases in water supply resilience.	There are no negative effects of the option identified and therefore no mitigation is identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option is not anticipated to require any construction works and therefore should have no negative impacts upon soils. Works are expected to take place within the properties of the household. As such, the effects are neutral. **Operational Effects** Over the long term the option is not expected to have any negative impacts upon soils as no construction works are to be carried out to audit and install water efficiency devices within households. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** Due to the nature of the option not requiring any construction works no construction vehicular movement is expected. Auditing and installation of water efficiency devices may require personnel to attend individual households through vehicular movement, however this is anticipated to have neutral effects on air quality. **Operational Effects** In the long term the option is not expected to require any vehicular movement that could potentially lead to air emissions. Therefore, the effect on air quality in the operational phase is neutral.	Sustainable modes of transport should be used where possible to carry out works.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** In the construction phase there may be the requirement for personnel to attend individual households for auditing and installation of water efficiency devices. This may require vehicular movement and the potential use of machinery however the overall release of carbon emissions from this, and the manufacture of these devices, is likely to be insignificant due to the small-scale nature of the option, with the embodied carbon emissions (total embodied carbon from construction) for this option being 32tCO2 equivalent over five years. Therefore, neutral effects are likely. **Operational Effects** The installation of water efficiency devices may require the use of energy to operate, however this is not anticipated to yield any long-term negative impacts on carbon emissions. As such, the effects are neutral.	Sustainable modes of transport should be used where possible to minimise potential carbon emissions.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** Due to the nature of the option, there is not anticipated to be any impacts on climate change vulnerability as no construction is required (with the exception of installation of water efficiency meters). As such, the effects are neutral. **Operational Effects** The option is likely to have minor positive effects on the reduction of wastewater which will in turn increase water resourcing within the region. However, although this will reduce vulnerability to climate change risks	There are no negative impacts identified with the option and so no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				such as droughts the impact is likely to be neutral on the overall water system.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option is not expected to require construction works except within individual households, therefore would not have negative impacts upon the historic environment. Auditing and water efficiency installation may take place within Listed Buildings, but this is likely to be inputted into pre-existing infrastructure within buildings such as under sinks. As such, the effects are neutral. **Operational Effects** Over the long term the option is not expected to have any negative impacts on the historic environment. All works including installation of water efficiency devices will have taken place on pre-existing infrastructures within the household or outside the household in water systems. As such, the effects are neutral.	There are no negative impacts identified with the issue and therefore no mitigation measures are identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** There are no construction works anticipated with the option. Installation of water efficiency devices are expected to take place within the vicinity of the household. These are minor works with no negative impact on the landscape expected either through noise or dust pollution. As such, the effects are neutral. **Operational Effects** Upon completion of individual household audits and installation of water efficiency devices there are no negative impacts anticipated upon the landscape. All	There are no negative impacts identified with the option and so no mitigation is outlined.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				works will be completed within households and pose no risk to landscape character. As such, the effects are neutral.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option does not require any new infrastructure. There will be the requirement for household owners/occupiers to present during the auditing and installation of water efficiency devices. However, this is likely to have neutral impacts upon the economic or social wellbeing of individuals or the wider population. **Operational Effects** In the long term the option is not expected to have any negative impacts upon the population or individual human health due to the nature of the option. The option is expected to have minor positive impacts upon reductions in wastewater which will positively contribute to minor resilience improvements within the region.	Consideration should be given to individual household requirements regarding arranging auditing and installation of water efficiency devices, in respect of day and time convenience to ensure best practice.	0	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option is likely to require minor increases in vehicular movement for auditing and water efficiency devices to be installed. However, this is likely to have a neutral impact upon tourism and recreation due to the low volume of vehicles that will be required. **Operational Effects** The option is not expected to produce any negative long-term impacts upon tourism and recreation due to the nature of the works being completed. As such, the effects are neutral.	There are no negative impacts identified with the option and so no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option is unlikely to require the use of major machinery to install water efficiency devices. The option is likely to be installed using manual tools within the vicinity of the household. As such, effects are neutral. **Operational Effects** The option may require energy to function in regard of water efficiency devices, but this is likely to have neutral levels of resource use.	There are no negative impacts identified with the option and so no mitigation measures are identified	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** In the short term the option is likely to require minor increases in vehicular movement along transport links to access households. This is likely to produce neutral negative impacts on built infrastructure due to the low scale operation of the option. **Operational Effects** The option is not expected to have any negative long-term impacts on built assets or infrastructures due to the nature of the works. As such, the effects are neutral.	Sustainable transport methods should be implemented where possible to minimise any potential impact on built assets.	0	0

Q.12 HH_E_013

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_E_013				
Option:	Efficiency visits and audits				
Scheme type:	Efficiency visits and education				
Option description:	This option involves working in partnership with schools across the WCWR region to promote water efficiency. The aim is that education regarding water efficiency starts at an early age and therefore will result in long-term demand savings. This would be tailored for children for the different key stages. It would provide lesson plans and material to allow teachers to deliver water efficiency lessons, this would be provided to all schools. This would also be accompanied by a set number of school visits each year (targeted to areas of high water use or demography).				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	09/06/22, updated 02/02/23	***Completed By:***	MT	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** This option does not require construction works as it evolves around educating school pupils about water efficiency. There will be no effects on designated and non-designated ecological sites in the short term. As such, the effects are neutral. **Operational Effects** In the long term, the option may have neutral to minor positive impacts upon water resourcing within the region. Educating school pupils anticipated to improve water efficiency. Although, resultant impacts on	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				designated and non-designated ecological sites are most likely going to be neutral.			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** There are no construction works associated with this option so impacts on biodiversity, priority species, and vulnerable habitats are not expected in the short term. As such, the effects are neutral. **Operational Effects** In the long term, there is not expected to be any negative impacts associated with the option as it involves educating school pupils about water efficiency. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not involve construction works therefore it does not involve the excavation of materials. Therefore, there is no risk of INNS spread. As such, the effects are neutral. **Operational Effects** Once the school visits have taken place, there is not expected to be any effect on the risk of INNS spread in the long term. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option will not have an impact on the quality or quantity of surface or groundwater as no construction is required. There will be no impacts on shellfish or bathing waters. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once the school visits have taken place, there may be a small improvement of water resources. Students will be educated about the importance of saving water and using water efficiently. This could lead to minor savings of water across local communities which could have a minor positive effect on WFD objectives and water quality. However, it should be noted that this depends on the level of school pupil engagement and participation in the long term.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** This option is not vulnerable to the effects of flood risk, as no construction works are involved. As such, the effects are neutral. **Operational Effects** In the long term, the option may result in minor reductions of water demand, as school pupils and teachers will be educated on water efficiency. However, due to the low water yield that is expected to be saved, this option is likely to produce neutral impacts upon flood risk resilience.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** In the short term, the option will have no impact on the reliability and resilience of water supplies, as construction works are not required. As such, the effects are neutral. **Operational Effects** Once the school visits have been completed, the option could have a minor positive impact on water	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				demand in the area. This is because the school pupils will be educated about water efficiency and will be encouraged to participate in water efficient practices. However, it should be noted that this depends on the level of engagement and participation of the school pupils. As such, the effects are neutral.			
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option does not involve any construction works, therefore effects on soil functionality, quantity, and quality will be neutral. High grade agricultural land, sites of geological importance, and greenfield land will not be impacted by the option. **Operational Effects** Once the school visits have been completed, no negative impacts on soil should arise within the SWW region. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option does not involve construction works, so there will be no additional pollutants and noise arising from machinery or plant. There may be the requirement for vehicular movement for travel purposes, although this is likely to be minor and have a neutral effect upon air quality. **Operational Effects** Once the water efficiency programmes have been delivered, no negative impacts on local air quality are anticipated in the long term. As such, the effects are neutral.	Sustainable modes of transport should be considered where possible during travel to minimise any potential air pollutants.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** Due to the nature of the option, there are no construction works involved. Vehicular movement may be required for travel purposes, which may slightly increase carbon emissions in the short term, with the embodied carbon emissions (total embodied carbon from construction) for this option being 88tCO2 equivalent. However, this is likely to result in neutral impacts due to the small-scale nature of the option. **Operational Effects** In the long term, the option is not expected to have any negative effects. The aim of this option is to educate school pupils in the hope of achieving long-term demand savings. There may be a small reduction in operational carbon emissions, as water demand may decline in the local area. However, the impacts from this are likely to be neutral due to the small scale of the option.	Sustainable modes of transport should be considered where possible during travel to minimise any potential carbon emissions.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option does not involve any construction works and therefore will not be changes to vulnerability to climate change. As such, the effects are neutral. **Operational Effects** In the long term, the option may provide minor positive impacts by reducing water demand within the region. This could positively impact resilience to climate change, however, due to the small yield savings expected, the overall effect is likely to be neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option should have no impact upon the historic environment as no construction works are required to undertake the school visits. As such, the effects are neutral. **Operational Effects** In the long term, no negative impacts upon the historic environment are associated with the option due to the nature of the works involving school visits and education about water efficiency. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option should have no impact on landscape or visual amenity due to the nature of the option not involving any construction works. As such, the effects are neutral. **Operational Effects** In the long term, no negative impacts upon landscape or visual amenity are associated with the option due to the nature of the works involving school visits education around water efficiency. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** There are no construction works associated with the option and so no negative impacts are expected in the short term to affect local communities. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects The aim of this option is to educate school pupils in the hope of achieving long-term demand savings. In the long term, the option is likely to produce minor positive impacts on water demand within the SWW region. There is likely to be an encouragement to reduce water usage, however the effect of this is dependent on the engagement and participation of the school pupils. A reduction of water demand will increase water resources.			
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No construction works are to be undertaken and therefore no impacts are expected to disrupt tourism and recreation. As such, the effects are neutral. **Operational Effects** Once the school visits have been completed, there is not expected to be any long-term impacts upon tourism and recreation. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not involve any construction works and so will not have any impact on material assets or waste in the short term. As such, the effects are neutral. **Operational Effects** In the long term, the option is not anticipated to produce any waste or require any resources due to the nature of the option. As such, the effects are assessed as neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option does not require any infrastructure works and therefore will not have a negative impact upon built assets in the surrounding area. As such, the effects are neutral. **Operational Effects** Once the school visits and education about water efficiency has been completed, there is not expected to be any negative impact upon material assets in the long term. As such, the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

Q.13 HH_E_017

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_E_017				
Option:	Targeted Water Efficiency Programmes				
Scheme type:	Education				
Option description:	A focused water efficiency programme at targeted locations across the WCWR area including advertising, education, and other outreach work.				
Approx. Yield (Ml/d):	Undetermined				
WRZ:	SWW				
Date Completed:	09/06/2022, updated 02/02/23	***Completed By:***	MT	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** This option does not require construction works and is anticipated to deliver water efficiency training programmes, educating specific groups and communities through these targeted programmes. There will be no effects on designated and non-designated ecological sites in the short term. As such the effects are neutral. **Operational Effects** In the long term, the option may have neutral to minor positive impacts upon water resourcing within the region. Educating targeted groups is anticipated to improve their water efficiency and, as well as retaining	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				water within the local environment, could potentially be positive on designated and non-designated ecological sites, although this is likely to be minimal. As such the effects are neutral			
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** There are no construction works associated with this option so impacts on biodiversity, priority species, and vulnerable habitats are not expected in the short term. As such the effects are neutral. **Operational Effects** In the long term, there is not expected to be any negative impacts associated with the option as it involves educating specific groups and communities in the region about water efficiency. As such the effects are neutral	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** The option does not involve construction works therefore it does not involve excavation of materials. Therefore, the risk of INNS spread in the short term is low. As such the effects are neutral. **Operational Effects** Once the water efficiency programmes have been delivered, there is not expected to be any effect on the risk of INNS spread in the long term. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** The option should not have a negative effect on the quality or quantity of surface or groundwater as no construction is required. No effects on shellfish or bathing waters are anticipated. **Operational Effects** Once the water efficiency programmes have been delivered, there is potential for a minor positive long-term effect on water resources. This is due to minor savings being made, such as reducing wastewater and reducing the reliance on the mains water supply. This could have a minor positive effect on WFD objectives and water quality.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option is not vulnerable to the effects of flood risk, as no construction works are involved, as such the effects are neutral. **Operational Effects** In the long term, the option may result in minor reductions to water demand, as the targeted audience will be educated on water efficiency. However, due to the low water yield that is expected to be saved, this option is likely to produce neutral impacts upon flood risk resilience.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** In the short term, the option should have no effect on the reliability and resilience of water supplies, as construction works are not required As such the effects are neutral. **Operational Effects** Once the water efficiency programmes have been delivered, the option could have a minor positive effect on water demand within the area. This is because the targeted groups will be educated about water efficiency and will be encouraged to participate in water efficient practices. However, it should be noted that this depends on the level of engagement and participation from the targeted audience.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	+
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option does not involve any construction works therefore effects on soil functionality, quantity, and quality will be neutral. High grade agricultural land, sites of geological importance, and greenfield land will not be impacted by the option. **Operational Effects** Once the water efficiency programmes have been delivered, no impacts on soil will arise as part of the programme. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** The option does not involve construction works, so there will be no additional pollutants and noise arising from machinery or plant. There may be the requirement for vehicular movement for SWW staff /	Sustainable modes of transport should be considered where possible during travel to minimise any potential air pollutants.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				specific groups to travel to the location of the programme delivery, although this is likely to be minor and have a neutral effect upon air quality. **Operational Effects** Once the water efficiency programmes have been delivered, no negative impacts on local air quality are anticipated in the long term.			
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** There are no construction works involved with this option. Vehicular movement may be required for travel purposes, which may slightly increase carbon emissions in the short term, with the embodied carbon emissions (total embodied carbon from construction) for this option being 8tCO2 equivalent. However, neutral effects are anticipated with this option. **Operational Effects** In the long term, the option is not expected to have any negative effects. If communities and specific groups become more water efficient, there may be a small reduction in operational carbon emissions, as water demand may decline in the local area. However, the impacts from this are likely to be neutral due to the small scale of the option.	Sustainable modes of transport should be considered where possible during travel to minimise any potential carbon emissions.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** The option does not involve any construction works and therefore will not be vulnerable to climate change effects. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects In the long term, the option may provide minor positive impacts by reducing water demand within the region. This could positively impact resilience to climate change, however, due to the small yield savings expected, the impacts are likely to be neutral.			
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** The option should have no effect upon the historic environment as no construction works are required to undertake the water efficiency programmes. **Operational Effects** In the long term, no negative impacts upon the historic environment are associated with the option due to the nature of the works involving education about water efficiency. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** The option should have no impact on landscape or visual amenity due to the nature of the option not involving any construction works (as such the effects are neutral). As such the effects are neutral. **Operational Effects** In the long term, no negative impacts upon landscape or visual amenity are associated with the option due to the nature of the works involving education around water efficiency. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** There are no construction works associated with the option and so no negative impacts are expected in the short term to effect local communities. As such the effects are neutral. **Operational Effects** In the long term, the option is likely to produce minor positive impacts on water demand within the SWW region. There is likely to be an encouragement to reduce water usage. A reduction of water demand will increase water resources and have minor positive effects on the health and wellbeing within the region. However, overall, this option is likely to have a neutral impact due to the small yield savings, and therefore the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** No construction works are to be undertaken and therefore no impacts are expected to disrupt tourism and recreation. As such the effects are neutral. **Operational Effects** Once the water efficiency programmes have been delivered, there is not expected to be any long-term impacts upon tourism and recreation. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** The option does not involve any construction works and so will have minimal impact on material assets or waste in the short term. There may be the requirement for vehicular movement for SWW staff / specific groups	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				to travel to the location of the programme delivery, although this is likely to be minor. As such the effects are neutral. **Operational Effects** In the long term, the option is not anticipated to produce any waste or require any resources due to the nature of the option. As such the effects are neutral.			
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option does not require any infrastructure works and therefore will not have a negative effect upon built assets in the surrounding area. As such the effects are neutral. **Operational Effects** Once the education surrounding water efficiency programmes has been delivered, there is not anticipated to be any negative effect upon material assets in the long term. As such the effects are neutral.	There are no negative effects identified with the option and therefore no mitigation measures are identified.	0	0

Q.14 HH_M_009

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	HH_M_009				
Option:	Watersmart				
Scheme type:	Data analysis and behaviour change				
Option description:	This option makes use of customer meter and other data to provide personalised bills and behavioural nudges (e.g. comparisons against local averages).				
Approx. Yield (Ml/d):	0				
WRZ:	SWW				
Date Completed:	06/06/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	03/08/22, updated 09/02/23	***Checker:***	Nicola Spofforth, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not involve any construction and so is unlikely to impact upon any ecological sites. This is expected to have neutral effects on biodiversity. **Operational Effects** During operation the option is highly unlikely to have any impact upon sites of ecological importance due to the nature of the works. Retaining water within the local environment could have potential benefits to biodiversity, however, the overall effect is likely to be neutral.	No notable impacts have been identified and as a result, mitigation measures are not considered to be necessary.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Protect, conserve and enhance biodiversity, including priority species, vulnerable habitats and habitat connectivity	0	0	**Construction Effects** No new infrastructure developments or construction is required for this option and so negative impacts on biodiversity, habitats or species not are anticipated. **Operational Effects** The option could reduce business demand and abstraction levels required within the region, which has the potential to reduce pressures on biodiversity and water dependant habitats in the area. However, the extent and locations of demand reductions and benefits to ecology are not yet confirmed. Effects have been assessed as neutral.	No significant impacts have been identified and so as a result no mitigation measures are suggested. There could be potential for additional habitat creation resulting from any retained water levels following implementation of the option.	0	0
	Reduce the spread or presence of INNS	0	0	**Construction Effects** There is not anticipated to be any construction related to this option, therefore no construction stage effects associated with INNS are anticipated. **Operational Effects** The option is not anticipated to have an impact upon INNS spread due to no water transfer taking place.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	+	**Construction Effects** Due to the option not requiring any additional infrastructure or development there is not anticipated to be any impact upon water resources during the construction phase.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects Once operational the option is likely to reduce water consumption within the region, and so is anticipated to have a minor positive effect on water resources.			
	Increase resilience and reduce flood risk	0	0	**Construction Effects** No new infrastructure development is required so there is no effect upon resilience or flood risk expected during the new meter installations. **Operational Effects** The option may have a small increase on resilience against drought in the area due to decreases in water demand, although this is likely to be minimal. There is not anticipated to be any impact on flood risk from the operation of the option.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
	Deliver reliable and resilient water supplies	0	+	**Construction Effects** There are no impacts anticipated during meter installations due the nature of the works, with no impact upon water supplies in the short term. **Operational Effects** The option is likely to reduce water demand which should have small but positive impacts upon water supplies, although the scale of this is uncertain. This is likely to contribute to increasing the SWW region's reliability and sustainability regarding water resourcing in the long term.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** There is not anticipated to be any impact upon land or soils due to the option, as no construction is expected to take place. **Operational Effects** Once operational the option will not have any ongoing impacts on soils or geology.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** As the option involves data analysis, it is unlikely that any emissions will be produced, however some vehicular movements may be required for engineers to check some meter readings. This is likely to have a neutral effect on local air quality. **Operational Effects** Once the option is operational there is not anticipated to be any impact upon air quality in the long term due to the nature of the option.	Sustainable modes of transport should be considered where possible to carry out works, for example use of an electric vehicle fleet.	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** As the option involves data analysis, it is unlikely that any emissions will be produced, however some vehicular movements may be required for engineers to check some meter readings. This could lead to minor releases of greenhouse gases through burning of fuels for transport purposes, although this is likely to be a negligible amount.	Sustainable modes of transport should be considered where possible to carry out works, for example use of an electric vehicle fleet.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
				Operational Effects As the option involves data analysis and changes to bills, no operational carbon is anticipated. The option has the potential to reduce water losses and therefore reduce water usage. This may result in lower carbon emissions being produced. However, due to the scale of the option, the effect is considered neutral.			
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are not anticipated to be any effects during the construction phase due to the nature of the option. **Operational Effects** The option has the potential for slight increases in catchment resilience to drought by reducing water usage, and in turn increasing water resources, however this is not certain, and effects are likely to be neutral.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** No infrastructure development or construction is required for the option. Effects on the historic environment within the region are not anticipated. **Operational Effects** Once operational, the option will not have any effects on the historic environment.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary	0	0
Landscape	Conserve, protect and enhance landscape, townscape and	0	0	**Construction Effects** The option does not involve any infrastructure development or construction activity and so no impacts on landscape receptors are anticipated.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	seascape character and visual amenity			**Operational Effects** No long-term landscape effects are anticipated from the option.			
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	+	**Construction Effects** The option does not any require infrastructure development and so is unlikely to have a negative impact upon local communities. Therefore a neutral impact has been identified. **Operational Effects** Once operational the option should promote increased water efficiency and reduce water consumption within the region. This is because greater sight of usage data may adjust behaviours towards water usage. The option is likely to have a small positive effect on resilience as water resource use could be reduced. A reduction in water consumption could also lead to economic benefits throughout the local area.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	+
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option does not require any infrastructure development but may require increased vehicular movement to undertake readings, although this is likely to have neutral impacts upon tourism and recreation activities. **Operational Effects** Once operational the option will not have any impact upon tourism and recreation in the long term.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** As the options does not involve any construction or removal of assets and therefore will not produce any waste, a neutral impact has been identified. **Operational Effects** Once operational the option will not have any impact upon material assets.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** The option will not require any construction works, and so a neutral impact has been identified. **Operational Effects** Once operational the option is not anticipated to have any impact on built infrastructure and assets.	No significant impacts have been identified and as a result mitigation measures are not considered to be necessary.	0	0

Q.15 Water Labelling Scenario

South West Water WRMP24 SEA: Option Assessment Matrix

Option Ref:	Water Labelling Scenario				
Option:	Water Labelling Scenario				
Scheme type:	Standards				
Option description:	Water labelling – with minimum standards				
Approx. Yield (Ml/d):	<1Ml/d				
WRZ:	SWW				
Date Completed:	19/07/22, updated 02/02/23	***Completed By:***	Luke Owen	***Version:***	C
Date Checked:	11/08/22, updated 09/02/23	***Checker:***	Gary Chan, Georgina Luck		
Date Approved:	31/08/22, updated 09/02/23	***Approver:***	Jacqueline Fookes, Katharine Mason		

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
Biodiversity, flora and fauna	Protect and enhance designated and non-designated ecological sites	0	0	**Construction Effects** The option does not require any construction works and therefore in the short term will be neutral effects on ecological or non-ecological sites. **Operational Effects** In the long term the option will not have any impact upon designated or non-designated ecological sites. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
	Protect, conserve and enhance biodiversity, including priority species, vulnerable	0	0	**Construction Effects** No construction works are involved with the option and therefore no impacts upon biodiversity will occur. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	habitats and habitat connectivity			**Operational Effects** Once operational the option is not anticipated to have any impact upon biodiversity long term as the option involves changes to policy minimum standards. As such the effects are neutral.			
	Reduce the spread or presence of INNS	0	0	**Construction Effects** No construction works will take place therefore there is no risk to INNS spread. As such the effects are neutral. **Operational Effects** In the long term there will be no effect on the risk of INNS spread. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
Water	Protect and enhance the quality of the water environment and water resources	0	0	**Construction Effects** No construction activities will take place with this option and therefore no impacts are associated with the construction phase. As such the effects are neutral. **Operational Effects** Once operational the policy changes will have no effect upon the quality of water resources within the water environment. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
	Increase resilience and reduce flood risk	0	0	**Construction Effects** The option does not involve any construction works and therefore will have no effect during this phase. As such the effects are neutral. **Operational Effects** The option will have no effect on resilience and will not impact flood risk due to the option involving policy change. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects		Commentary	Mitigation	Residual effects	
		ST	LT			ST	LT
	Deliver reliable and resilient water supplies	0	0	**Construction Effects** No construction activities will take place with this option and therefore no impacts are associated with the construction phase. As such the effects are neutral. **Operational Effects** In the long term, once the option is operational, there is expected to be minor positive impacts of the policy changes. However, as the option is expected to have yield savings of <1Ml/d and so will have a neutral effect overall.	No effects have been identified and therefore no mitigation is suggested.	0	0
Soil	Protect and enhance the functionality, quantity and quality of soils, including the protection of sites of geological importance	0	0	**Construction Effects** The option does not involve any construction works and so will have no effect upon the quality or quantity of soils. As such the effects are neutral. **Operational Effects** Once operational the option will have no effect upon soils as the raising of minimum water labelling standards will not impact soils. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
Air	Reduce and minimise air emissions	0	0	**Construction Effects** No construction works will take place with the option and therefore will result in no effect upon air quality. As such the effects are neutral. **Operational Effects** Once operational the changes to policy and legislation will have no overall effect upon air quality. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	**Construction Effects** The option does not involve any construction works and so has no embodied carbon releases. As such the effects are neutral. **Operational Effects** Once operational the option will not lead to increases in production of operational carbon emissions. The increasing of water labelling minimum standards may increase the performance of products and in turn decrease operational carbon needs. However, the overall impact of this is likely to be neutral due to the small-scale yield savings expected.	No effects have been identified and therefore no mitigation is suggested.	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	**Construction Effects** There are no construction works associated with the option and therefore will have no effect climate change vulnerability. As such the effects are neutral. **Operational Effects** In the long term the option will have no effect on vulnerability to climate change risks or hazards due to the nature of the option involving policy change. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	**Construction Effects** No construction works will be carried out for the completion of the option and therefore neutral effects upon any historical settings by the option.	No effects have been identified and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects In the long term there will be neutral effects upon the historic environment as the option involves increasing of policy standards.			
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	**Construction Effects** There will be no short-term impacts upon the landscape by the option as no construction works will take place. As such the effects are neutral. **Operational Effects** In the long term there will be no impacts upon the landscape due to the nature of the option. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	**Construction Effects** No short-term impacts will be experienced by the population during the construction phase as no works will be taking place. As such the effects are neutral. **Operational Effects** In the long term the increasing in policy standards may lead to improvements in water usage which may in turn positively impact water availability for local communities. However, the overall impact of this will be neutral due to the small, expected yield savings.	No effects have been identified and therefore no mitigation is suggested.	0	0
	Maintain and enhance tourism and recreation	0	0	**Construction Effects** The option will have no short-term impacts upon tourism and recreation as no construction works will take place. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0

SEA Topic	SEA Objective	Effects ST	Effects LT	Commentary	Mitigation	Residual effects ST	Residual effects LT
				Operational Effects Once operational the policy changes will have no long-term effects upon tourism and recreation as the option is relating to product performance. As such, the effects are assessed as neutral.			
Material Assets	Minimise resource use and waste production	0	0	**Construction Effects** No construction works will take place with the option, and therefore there will be neutral effects on material assets in the form of resource use or waste production. **Operational Effects** In the long term, once the option is operational, there may be decreases in waste production such as water usage from the increase in policy regarding products minimum standards. However, this will have neutral effects overall due to the small yield savings that will take place.	No effects have been identified and therefore no mitigation is suggested.	0	0
	Avoid negative effects on built assets and infrastructure	0	0	**Construction Effects** No construction works will take place with the option and so no construction traffic will be involved, therefore the effects are neutral. **Operational Effects** Once operational the option will have no effect on built assets as the raising of water labelling minimum standards will not involve vehicular movement. As such the effects are neutral.	No effects have been identified and therefore no mitigation is suggested.	0	0