

A large circular diagram composed of various white line-art icons on a teal background. The icons include a person with a headset, a cloud with circuit lines, a "net zero" circle with a leaf, a checkmark in a circle, a target, a microscope, a person at a presentation board, a hand holding a water drop, a globe with a thermometer, a group of people with an upward arrow, a leaf, a person silhouette, a water drop with a gear, and a glass of water. The central text is surrounded by these icons, which are connected by a dashed circular line.

**APPENDIX
SES010
ENHANCEMENT
CASE:
ENVIRONMENTAL
IMPROVEMENT**

Contents

Appendix SES010: Environmental improvement	2
A. Introduction	2
B. Description of our proposed environmental improvement enhancements	4
C. The need for our proposed enhancements	7
D. Why our proposals are the best option for customers	19
E. Cost efficiency	29
F. Customer protection	33



APPENDIX SES010: ENVIRONMENTAL IMPROVEMENT

A. Introduction

This enhancement case sets out the actions we propose to undertake to ensure we continue to be effective stewards of the environment in our water supply area.

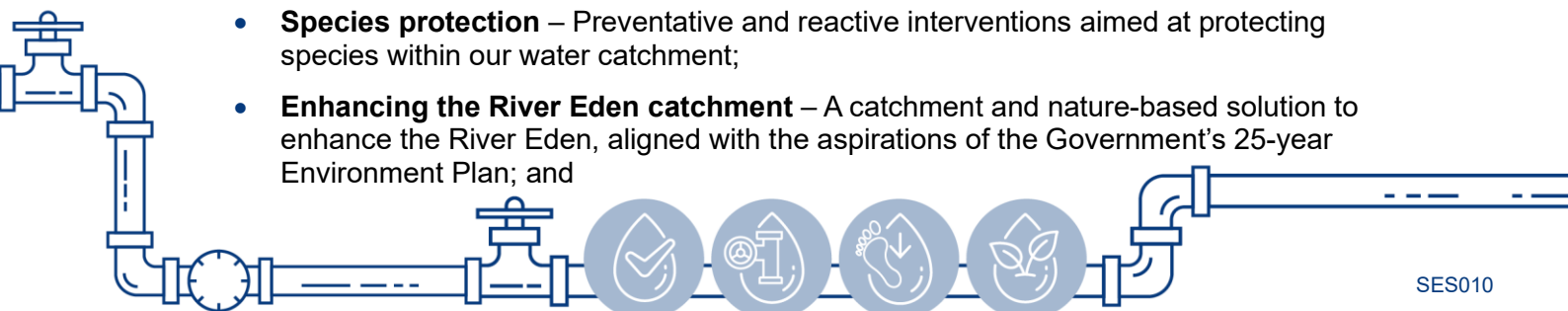
Through the WINEP (Water Industry National Environment Programme) framework, we have identified several actions to implement during AMP8 as part of our longer-term plan to secure water resources in an environmentally sustainable way. These actions will deliver reduced abstraction, improvements to water quality, and enhance the landscape within our water supply area.

As 72% of customers specifically support environmental improvements beyond our statutory requirements – with support the strongest for the greatest level of investment – our proposals consist of both statutory and non-statutory interventions.

1. This enhancement case is structured in line with Ofwat's assessment criteria:
 - In Section B, we provide a detailed description of the environmental enhancements we propose;
 - In Section C, we describe the need for these enhancements;
 - In Section D, we demonstrate why we consider the chosen actions are the best options for customers;
 - In Section E, we set out our consideration of cost efficiency of our proposals; and
 - In Section F, we explain how our proposals are in the consumer interest, and how our customers will be protected in the event the enhancements are not delivered.

Summary of our environmental improvement enhancement case themes

2. Throughout this enhancement case, we have categorised our proposed interventions into the following five themes:
 - **Ensuring sustainable abstraction** – Investigations into the sensitive catchments and landscapes we operate in to define actions we can undertake to mitigate the impact of our abstractions on the environment. Delivery of river restoration work with Thames Water following a joint investigation in AMP7;
 - **High quality water supplies** – Investigations into ground water quality and actions aimed at either preventing the deterioration of water quality or improving it;
 - **Species protection** – Preventative and reactive interventions aimed at protecting species within our water catchment;
 - **Enhancing the River Eden catchment** – A catchment and nature-based solution to enhance the River Eden, aligned with the aspirations of the Government's 25-year Environment Plan; and



- **Enhancing biodiversity** – Delivery of improved land management practices with partners to improve biodiversity over the next 25 years across the majority of our land holding and beyond.



B. Description of our proposed environmental improvement enhancements

3. As highlighted in our Long-Term Delivery Strategy (LTDS) and the 25 Year Environment Plan, our ambition is to only abstract water from sources where we can do so without harming the environment. By 2050, we also aim to significantly improve biodiversity across the land we own and areas we work, following the success of being the only water company to achieve Biodiversity Benchmark status across a number of our sites.
4. To deliver our ambition, we intend to:
 - (a) Only abstract water from sources where it is sustainable to do so over the long-term and enhance the management of water within catchments so remaining abstractions are resilient and do not impact the health of those catchments and our rivers;
 - (b) Work with the agricultural sector and other stakeholders, to improve and prevent the deterioration of the quality of our local rivers and streams;
 - (c) Take proactive steps to make sure our activities do not harm vulnerable species and protect our sites from invasive non-native species;
 - (d) Collaborate with our regulators, the agricultural sector, local planning authorities and wastewater service providers in our area, to improve the management of the water system across the River Eden catchment; reducing the impacts of flooding across the catchment whilst making our supplies more resilient, improving the quality at source and working to mitigate the need for embedded carbon and capital expenditure to increase our storage capacity; and
 - (e) Improve the biodiversity of the water bodies and land under our management.
5. We are taking a catchment-based approach to delivering this ambition. We are making sure to have effective monitoring in place to identify concerns or potential future issues, investigating concerns when they arise, delivering targeted improvements, and making early interventions to avoid larger challenges in future.
6. By the end of AMP7, we will have:
 - (a) Delivered a five-year programme of collaborative working across key source protection zones for the non-deterioration of water quality;
 - (b) Made improvements to the River Wandle to improve the passage of fish, and supported the restoration and stabilisation of a section of the River Darent along an upper reach requiring protection which falls outside our operational area;
 - (c) Completed an investigation with Thames Water into the flow of the Hogsmill River, a chalk-fed stream, where we both abstract from the catchment;
 - (d) Begun the journey of biodiversity net gain across 260 hectares of the land we own (equating to 80%), increasing the area we are managing biodiversity improvement on by 500% that we achieved under the Wildlife Trust's Biodiversity Benchmark across three of our operational sites; and
 - (e) Developed our catchment and sustainability teams to provide a greater breadth of expertise in the business and drive a greater level of environmental ambition across our undertaking.
7. Our plan for AMP8 builds on these components. We will deliver targeted improvements where we have identified a need for action, undertake investigations where we have identified potential issues or committed to changes.
8. We are proposing 18 interventions, summarised in Table 1 below.

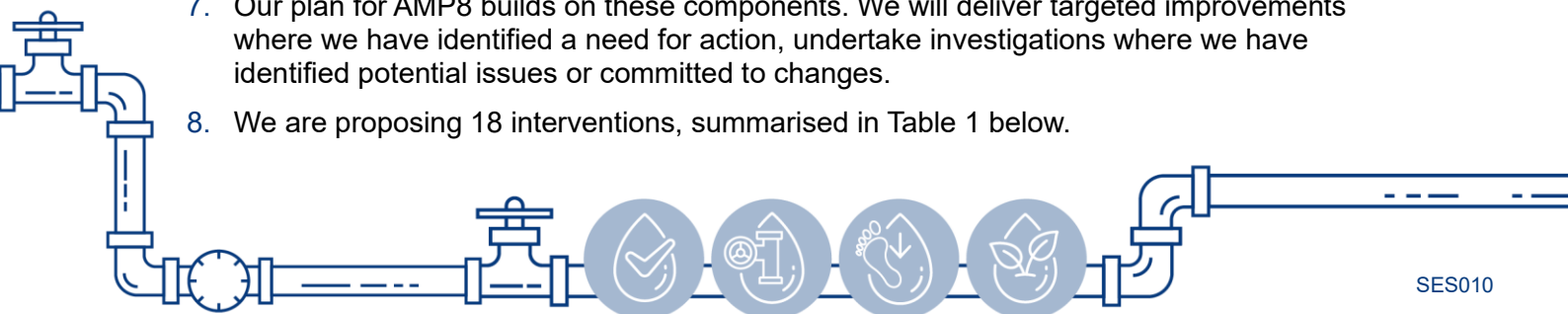
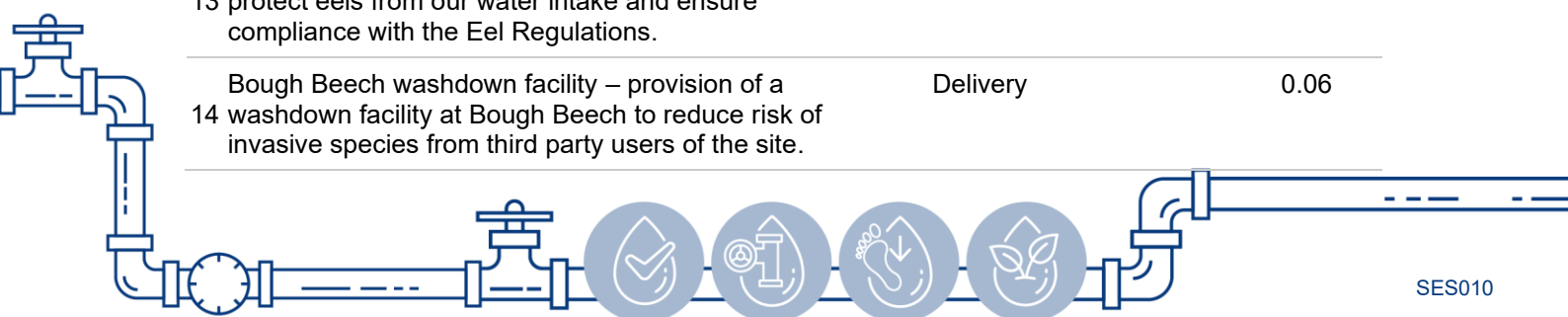


Table 1: List of interventions captured within this enhancement case

Intervention	Type of intervention	Total cost (£m, 2022/23)	AMP8 cost (£m, 2022/23)
Ensuring sustainable abstractions			
1 Environmental destination investigation to define a profile of abstraction reductions from 2030 to 2050 in the Hogsmill catchment.	Investigation		0.17
2 Environmental destination investigation to define a profile of abstraction reductions from 2030 to 2050 in the Eden (groundwater) catchment.	Investigation		0.28
3 Environmental destination investigation to define a profile of abstraction reductions from 2030 to 2050 in the Wandle catchment.	Investigation		0.21
4 Environmental destination investigation to define a profile of abstraction reductions from 2030 to 2050 in the Upper Darent catchment.	Investigation		0.21
5 Regional environmental destination investigation to align company investigations, support further catchment reviews and develop alternative supply options.	Investigation		0.27
6 A WFD investigation to confirm local understanding of the relationship between surface and groundwater in the Beverley Brook catchment.	Investigation		0.04
7 A SSSI (Site of Special Scientific Interest) investigation to explore whether our Cliftons Lane site could impact the Reigate Heath protected landscape.	Investigation		0.16
8 Hogsmill river restoration – Restoration of 1.5km of the Hogsmill River.	Delivery		0.22
High quality water supplies			
9 Eden flufenacet – Series of targeted interventions aimed at preventing deterioration with respect to flufenacet concentrations within the Eden catchment.	Delivery	0.75	0.35
10 Brewer street nitrate – Series of targeted interventions aimed at preventing deterioration of nitrate concentrations levels in groundwater.	Delivery	0.20	0.10
11 Epsom North Downs Chalk groundwater body water quality nitrate investigation.	Investigation		0.06
12 Leatherhead groundwater/River Mole water quality nitrate investigation.	Investigation		0.06
Species protection			
13 Chiddingstone eel screens – installation of screens to protect eels from our water intake and ensure compliance with the Eel Regulations.	Improvement		2.00
14 Bough Beech washdown facility – provision of a washdown facility at Bough Beech to reduce risk of invasive species from third party users of the site.	Delivery		0.06



15	Site monitoring – ongoing monitoring of our sites for invasive species.	Monitoring		0.15
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Enhancing the River Eden catchment

16	25 Year Environment Plan investigation across the Eden catchment to define nature-based solutions that mitigate impacts of river flashiness.	Investigation		0.23
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17	Working with partners to implement highlighted interventions from our 25 Year Environment Plan investigation.	Delivery	0.66	0.13
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Enhancing biodiversity

18	Delivering biodiversity net gain across the majority of our landholding with stakeholders and partners.	Delivery	0.40	0.28
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Source: SES Water

9. It can be seen from the Table 1 that the largest, single area of expenditure is the installation of compliant eel screens at our Chiddingstone intake. This will protect eels from our pumping station equipment and provide a safe outlet beyond the intake lagoon. The remaining actions include investigating water quality issues we have identified, investigating where and how we may reduce our water abstractions or mitigate the effects, delivering a programme of improvements in partnership with local residents and farmers to improve water quality, and protecting our sites from invasive non-native species.

10. In line with our LTDS, the proposed interventions will ultimately deliver:

- A defined profile of environmental destination at source level and an assessment of the network enhancements we may need to achieve our abstraction reductions.
- The material understanding of where we need to develop alternative supply options to ensure our future WRMPs (Water Resource Management Plan) continue to have a good proportion of feasible supply options that do not have a negative impact on the catchments we operate in.
- A prevention in the deterioration in water quality within safeguard zones and an understanding of the sources and pathways of nitrate to additional sources and how we can manage water quality risks from these findings.
- A series of interventions we can undertake across the Eden catchment, together with partners and stakeholders, to manage the flow of water through the catchment and improve the quality at source.
- An improvement to the biodiversity of key areas of our own land, situated in close proximity or adjacent to other areas of key designations including AONBs (National Association for Areas of Outstanding Beauty), SSSIs, SACs (Special Areas of Conservation) and SNClS (Sites of Nature Conservation Interest). We aim to deliver sustained improvements of up to 50% in biodiversity units on some sites, and an average improvement of 25%.

11. We consider the interventions proposed within this case to be enhancement spend and not implicit in our base funding allowance. They relate to new activities that we propose to undertake to deliver environmental benefit, building on the activities we are expecting to undertake as part of AMP7. Whilst there have been similar activities funded as part of AMP7, they have been funded through enhancement allowances and, therefore, are not captured within base.



C. The need for our proposed enhancements

Ambition: We want to progressively enhance the water bodies and catchments in the area we serve to protect water quality, maintain sustainable resource availability and increase biodiversity

12. In our LTDS , we set out our 2050 ambition to:

- Only abstract water where it is sustainable to do so, while maintaining the resilience of our water supplies. The activities we have identified within this enhancement case are the first step in achieving this ambition. In this AMP, we will investigate where the biggest impact of our abstractions are, define a source specific profile of feasible abstraction reductions and otherwise identify improvements we can deliver to mitigate the impact of our abstractions where there are challenges to delivering reduced abstraction. In subsequent AMPs, we will implement these improvements so that by 2050, we are not abstracting unsustainably from any water source;
- Continue providing high-quality water supplies. In this AMP, we will undertake preventative measures to stop the deterioration of the quality of our water sources, which will reduce the need for more intensive treatment to maintain the quality of our water supplies. This will help us cost-effectively maintain high-quality water supplies, despite increased pressures; and
- Nominate 80% of our land into the biodiversity performance commitment (PC). During AMP8 we will deliver a series of improvements to our land holding to improve habitats, to protect against invasive species, and to protect specific species from any harmful effects from our activities. We intend to nominate further land across catchments into our biodiversity (PC) over coming AMPs, working with our stakeholders and partners to deliver continued benefit.

13. The following items set out the need for our proposed environmental enhancements across the areas we operate.

Ensuring sustainable abstraction

14. Across our region, we hold 19 licences to abstract water, some of which are located close to chalk aquifer-fed streams which form a vital and endangered ecosystem. Abstraction from four of these sources is thought to influence flows in the adjacent chalk streams, namely the River Darent, River Wandle and Hogsmill River. In the Wandle and the Hogsmill we have provided augmentation flows to help support these streams since the 1960s.

15. Our 2050 ambition is to only use sources where we can take water without harming the environment. Between 2025 and 2050 we will reduce our abstraction from sources where it is not sustainable to continue taking water at the rate we do now and leave more water in the environment. The appropriate profile of abstraction reductions will be determined by the WINEP investigations in the first five years of our LTDS, while our WRMP will identify the best value solutions to replace any existing abstractions.

High quality water supplies

16. A key part of our long-term strategy to supply high quality water is to address the risk of our water sources being contaminated by non-point source pollution. Where possible we will work with farmers and landowners on catchment-based schemes to stop pollution and deliver wider environmental benefits.



Enhancing the River Eden catchment

17. We have developed our first non-statutory piece of work under the 25 Year Environment Plan focusing on the Eden catchment and our Bough Beech reservoir.
18. Our 25 Year Environment Plan WINEP is a catchment-based investigation aiming to quantify catchment pressures and appropriate mitigation/partnerships¹ across the catchment. Pressures include:
 - (a) an increasingly “flashy”² river with limited sustained flow during our permitted abstraction;
 - (b) river water quality issues surrounding chemicals and dissolved oxygen;
 - (c) local flooding across the catchment during heavy rainfall, resulting in reduced agricultural productivity, soil erosion, and road contaminants entering land and water;
 - (d) built environment planning for projected population growth and housing/service needs and
 - (e) the need to support neighbouring water companies, coupled with a potential raising option of the Bough Beech reservoir (and the associated expenditure and embodied carbon).
19. Our ambition for the Eden catchment is to define a series of nature-based solutions and interventions we can undertake with various partners to alleviate these pressures. For us, we are aiming to achieve a more sustained river flow, as part of an improved water system³ – with the potential to develop our abstraction protocol – and better water quality at source.
20. The outcomes of this investigation, and subsequent work across the catchment, will feed into our future WRMP cycles. This is with a view to developing source options that have a balance across nature-based solutions and, where required, built infrastructure; and ultimately work towards reducing our reliance on new water storage and embedded carbon.
21. Customer engagement throughout our PR24 development has set out our customers’ strong support for us to enhance local environments. This research is covered in Appendix SES018 – Customer Research Reports.

Species protection

22. Our WINEP requires investment to protect habitats in water sources from which we abstract water and to reduce the risk and spread of invasive non-native species, both of which are statutory requirements. This forms part of our land management improvements to enhance biodiversity and support the provision of amenity and education across our key strategic sites.

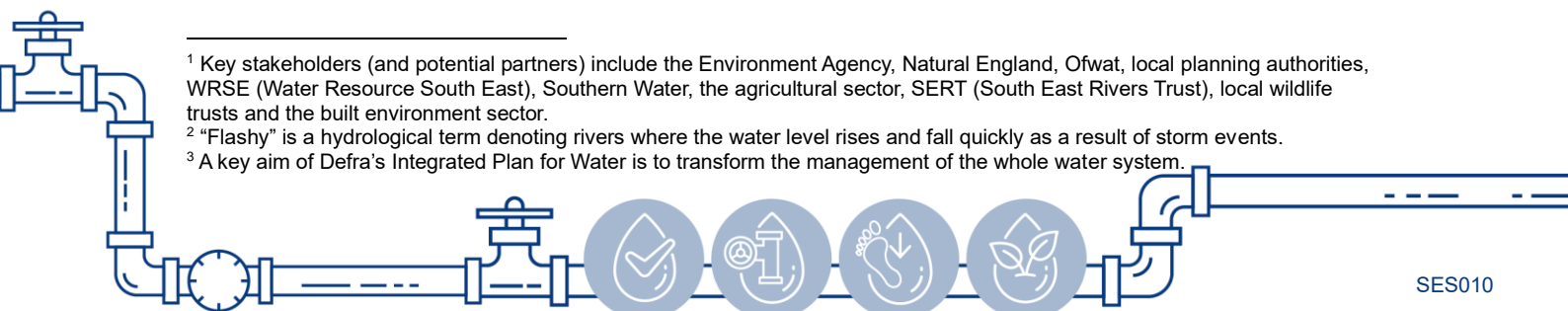
Enhancing biodiversity

23. Our operational sites are based across a mix of locations: generally urban or sub-urban in the north of our area and sub-urban or rural in the central and southern reaches. We believe the opportunity to deliver material and long-lasting biodiversity net gain on a number of these sites should be an integral part of our plan, and we welcome the inclusion of biodiversity enhancement as a common PC.

¹ Key stakeholders (and potential partners) include the Environment Agency, Natural England, Ofwat, local planning authorities, WRSE (Water Resource South East), Southern Water, the agricultural sector, SERT (South East Rivers Trust), local wildlife trusts and the built environment sector.

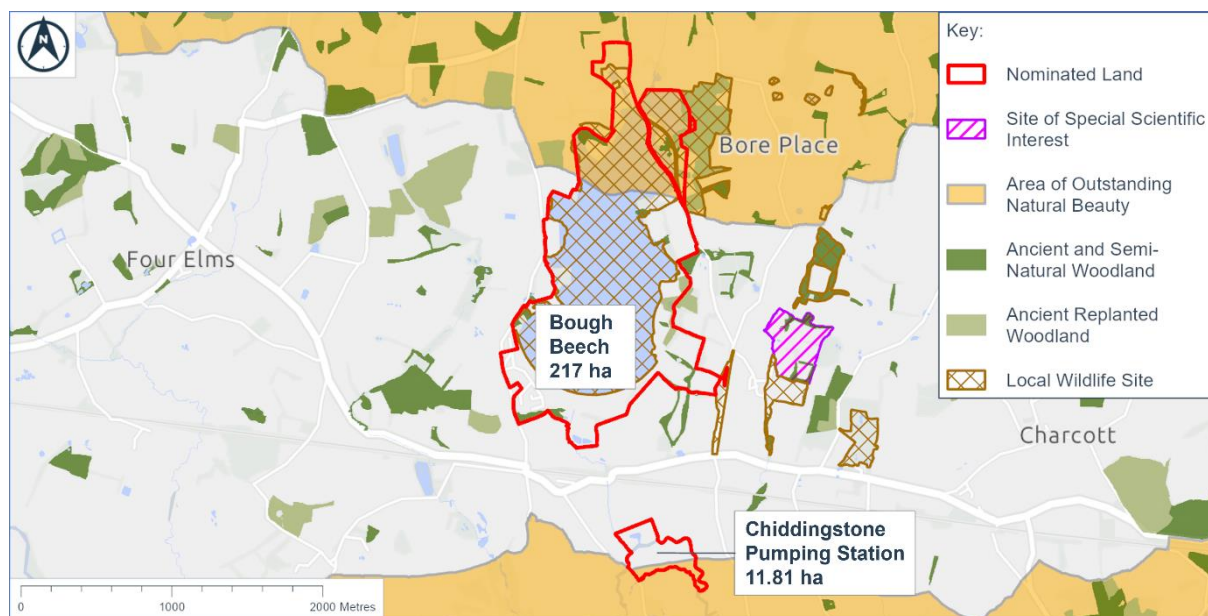
² “Flashy” is a hydrological term denoting rivers where the water level rises and fall quickly as a result of storm events.

³ A key aim of Defra’s Integrated Plan for Water is to transform the management of the whole water system.



- 24. Our region covers six river catchments: the Eden, Mole, Darent (in largely rural surroundings), Wandle, Beverley Brook and Hogsmill (in largely urban or sub-urban surroundings). These ecosystems will provide the second area of focus for our biodiversity enhancement work.
- 25. Over the last five years we have improved the way we manage the land we own. This has led us to become the first water company to receive the Wildlife Trust's Biodiversity Benchmark, which positions us well for the future.
- 26. Our plan aims to expand on this work – and our learnings to date – such that our biodiversity common PC covers almost 80% of the land we own. This will encompass four operational sites – comprising over 260 hectares – set in proximity to potential local nature recovery areas, SSSIs, AONBs, SNICs and local wildlife sites, to support the enhancement and connectivity of our landscapes. Figures 1 and 2 below present the nominated locations and their proximity to local designations. (Additional plans are provided towards the end of this document.)

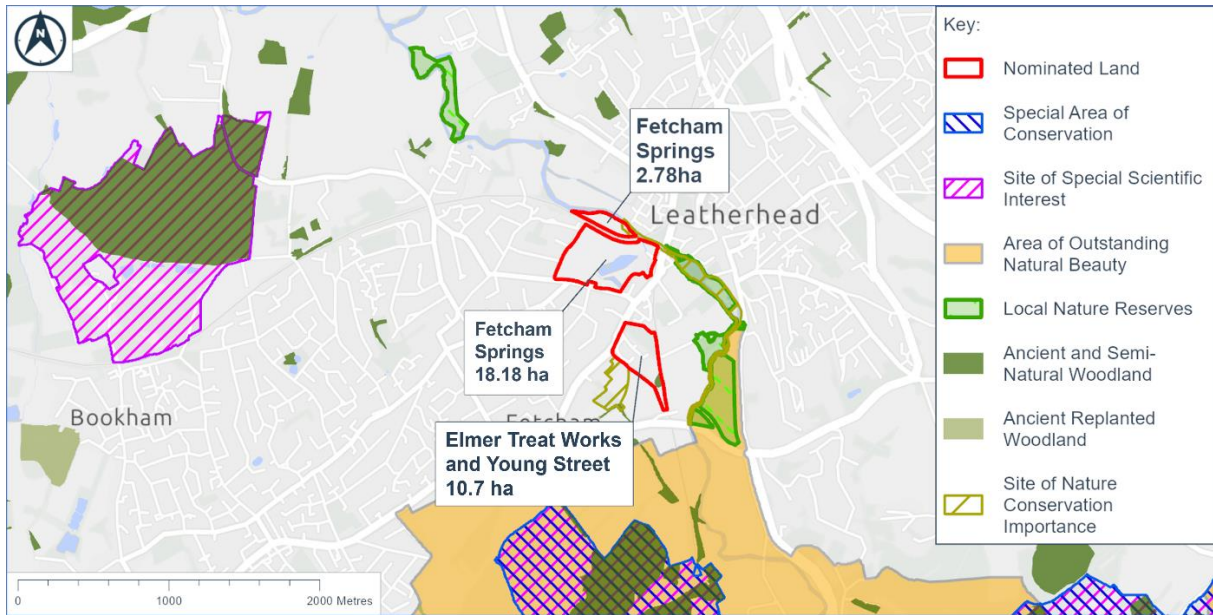
Figure 1: Our nominated land at Bough Beech and Chiddingstone and their proximity to significant landscapes



Source: SES Water, Dalcour Maclaren



Figure 2: Our nominated land at Elmer WTW and Fetcham Springs and their proximity to significant landscapes

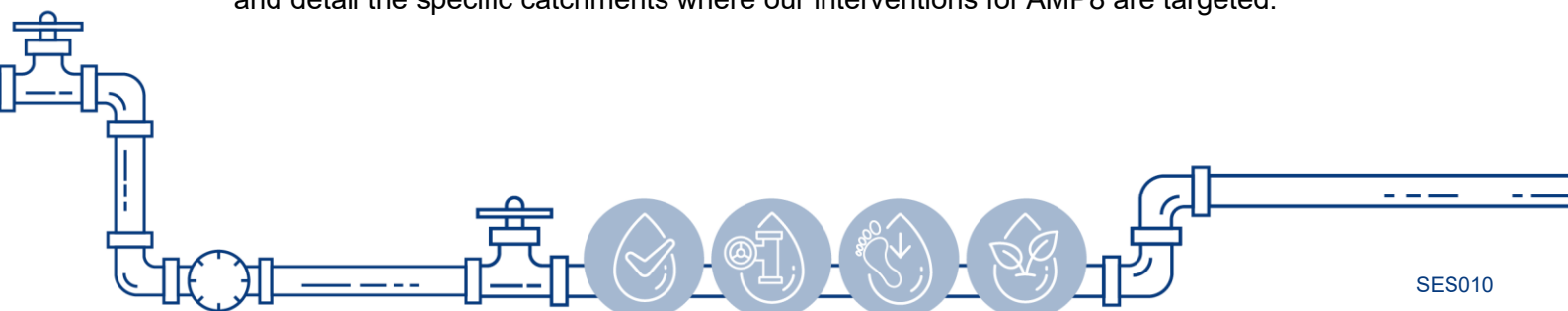


Source: SES Water, Dalcour Maclaren

- 27. Both Kent and Surrey County Council are developing their respective local nature recovery strategies. The positioning of the Bough Beech and Chiddingstone holdings have significance to the Eden catchment strategy we are developing (25 Year Environment Plan work) and ties in with the evolving Eden farm cluster to align future land management with water quality, flood management (water resource) and landscape recovery.
- 28. Our ambition is to increase the number of biodiversity units created by 25% by 2050 on our land. From AMP9 onwards we propose to nominate additional land into the PC across the catchments noted above, where we will be supporting further WINEP work, identified catchment partnership schemes or operational remediation opportunities.
- 29. These sites also provide strategic importance in relation to our ability and proposals to improve amenity, support local and small businesses, and develop educational opportunities as part of work to deliver ecosystem services and a circular economy.

Investment driver: We need to make sure our water environment can withstand the pressures that arise from our activities and the activities of others in the area

- 30. We have a strong track record of delivering high quality water to our customers, despite pressures to water quality from other activities in the area we serve. However, these activities, and our own abstractions, do impose pressures on the water environment. We need to make sure that we continue to deliver high quality and resilient water supplies, while doing so sustainably and while maintaining healthy water bodies and habitats.
- 31. Below, we present the main statutory and strategic drivers for our proposed investments and detail the specific catchments where our interventions for AMP8 are targeted.



25 Year Environment Plan

32. Our overarching plan for the environment can be considered the key strategic driver for our WINEP actions. Our WINEP actions touch on all aspects within the 25 Year Environment Plan, such as:
- Clean and plentiful water;
 - Thriving plants and wildlife;
 - Reduced risk of harm from environmental hazards such as flooding and drought;
 - Using resources from nature more sustainably and efficiently;
 - Mitigating and adapting to climate change;
 - Managing exposure to chemicals; and
 - Enhancing biosecurity
33. While many of our actions target specific issues to align with certain WINEP drivers, we will review our climate change adaption report to make sure that we collate and integrate the various elements of works, and our actions remain consistent with the 25 Year Environment Plan.

Defra's Integrated Plan for Water

34. Defra's Integrated Plan for Water sets clear expectations and strategy to drive a localised, catchment-based, approach to the water system. This requires improved connectivity between water infrastructure (natural or built), resource use, environment needs and climate adaptation, biosecurity and pollution risk, and biodiversity.
35. Our ambition and strategies for delivery – by bringing together our WINEP, proactive estate management and planned biodiversity enhancements – ensures we are contributing to our role in improving a catchment-based water system. Our 25 Year Environment Plan investigation for the River Eden catchment aims to mitigate the requirement for future hard infrastructure, primarily the development of our storage capacity at Bough Beech⁴. We will invest in the catchment with stakeholders and develop a balance of green and grey solutions that secure our water resource whilst aiming to protect customers from the significant capital and carbon costs of a hard engineered only solution.

Drinking Water Protected Areas (DrWPAs)

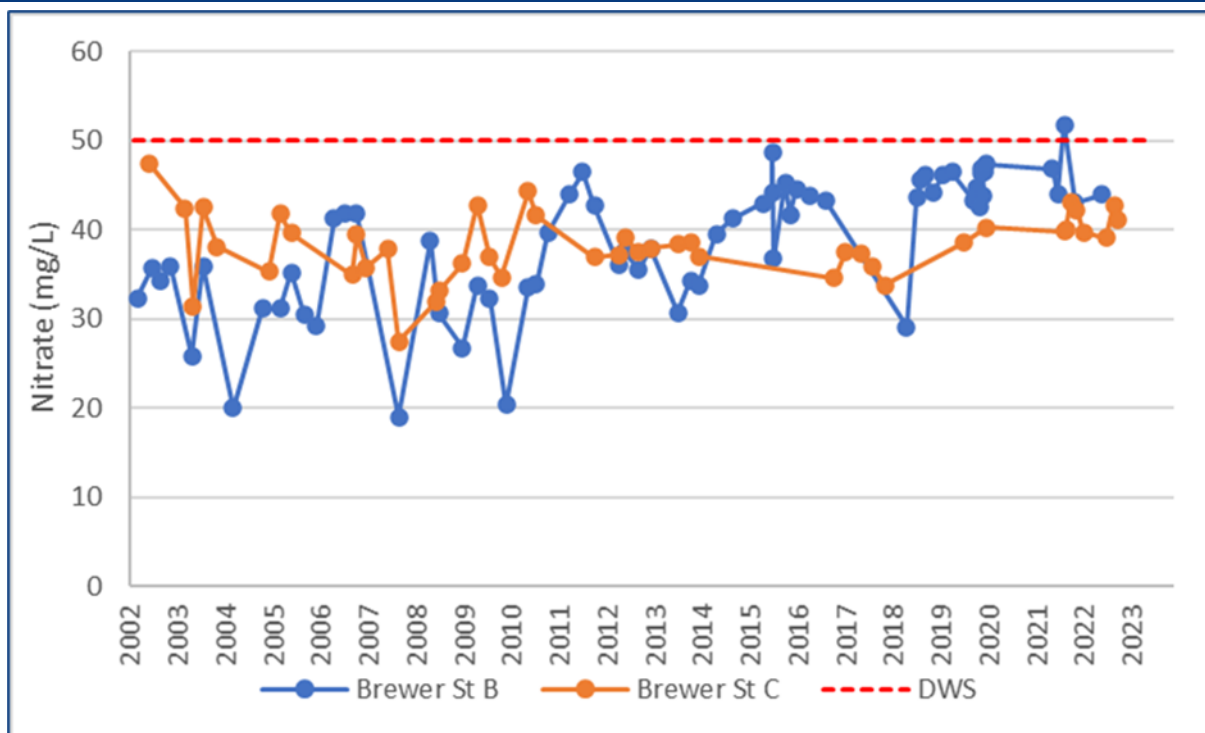
36. In our surface water catchment pesticides present a challenge to compliance, with a number of actives exceeding the drinking water standard in both the river and reservoir. In particular, water quality monitoring suggests flufenacet (a herbicide commonly used on wheat) poses an emerging risk which we need to address.
37. In our groundwater catchments our challenge relates to nitrate. A number of the groundwater sources we abstract from have elevated nitrate concentrations either close to, or in excess of, the drinking water standards, with some of these showing deteriorating trends and requiring further investigation and intervention.
38. Our treatment processes are currently sufficient to ensure that concentrations of flufenacet in our treated water are well below the drinking water standard limits. Similarly, the blending of water from our elevated nitrate boreholes with water from sources containing lower nitrate is sufficient to ensure our treated water remains well below the drinking water standard.

⁴ Increased storage capacity at Bough Beech reservoir required in a WRMP high population/demand scenario.



- 39. Nonetheless, the trends we observe mean that action is required to ensure we avoid the need to install additional treatment in future to maintain our compliance with drinking water standards. Installing additional treatment is likely to be more costly and less sustainable than our proposed early intervention.
- 40. In Figures 3 and 4 below, we present baseline concentrations of nitrate and flufenacet for the water sources where we have AMP8 schemes proposed to address the deterioration in water quality.

Figure 3: Nitrate concentrations in our two Brewer Street Boreholes since 2002

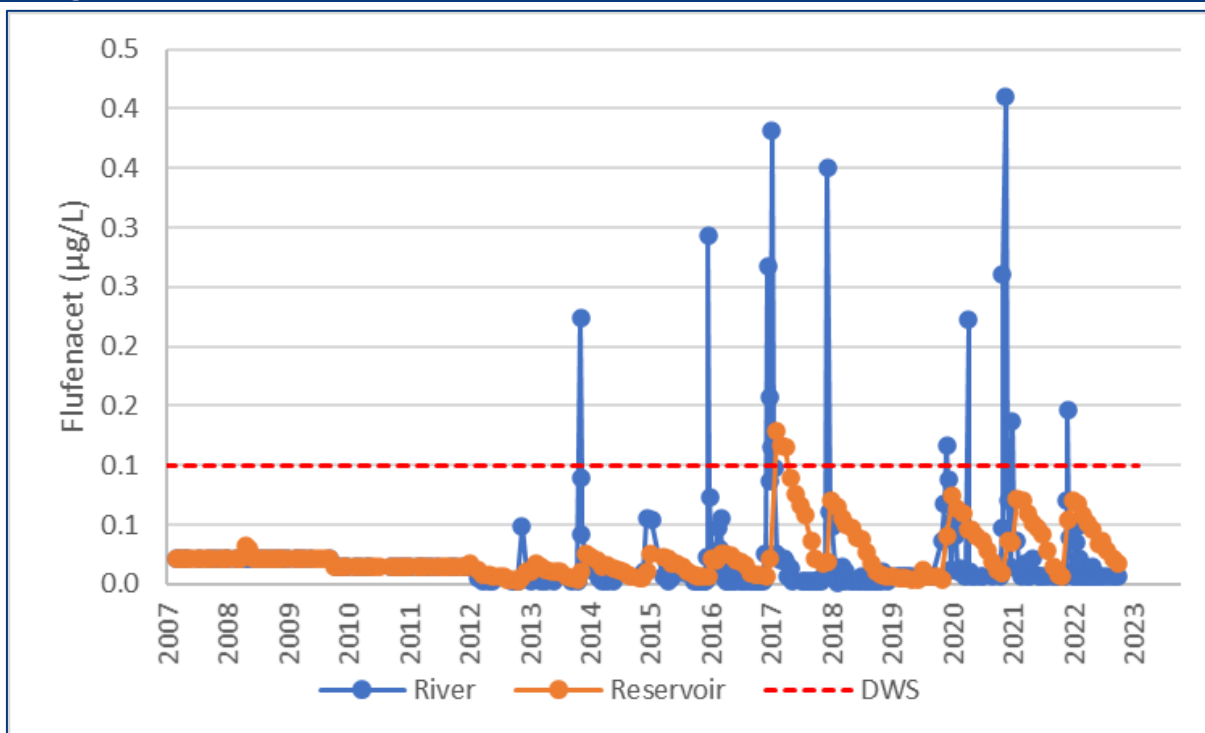


Source: SES Water

- 41. Water quality data (Figure 3) suggests a deteriorating nitrate trend at our Brewer Steet source, in particular for Borehole B which has already exceeded the drinking water standard on one occasion. The drinking water standard (DWS) for nitrate of 50 mg/l is shown for reference. If this trend continues it is likely that without further action frequent exceedances of the drinking water standard may occur in Borehole B within the next three years.
- 42. Two groundwater nitrate investigations are proposed for AMP8. The Leatherhead groundwater/River Mole investigation builds on a current AMP7 scheme we are undertaking in the Leatherhead area and will look at the influence the wider Mole surface water catchment could be having on groundwater nitrate. The Epsom and North Downs chalk waterbody investigation will investigate the sources and pathways of nitrate impacting on water quality in three groundwater safeguard zones (comprising 14 separate boreholes), all of which abstract from the Epsom North Downs Chalk groundwater body. These will be used to inform the need for further work in subsequent AMPs.



Figure 4: Flufenacet concentrations in the River Eden (at point of abstraction) and our Bough Beech Reservoir, since 2007

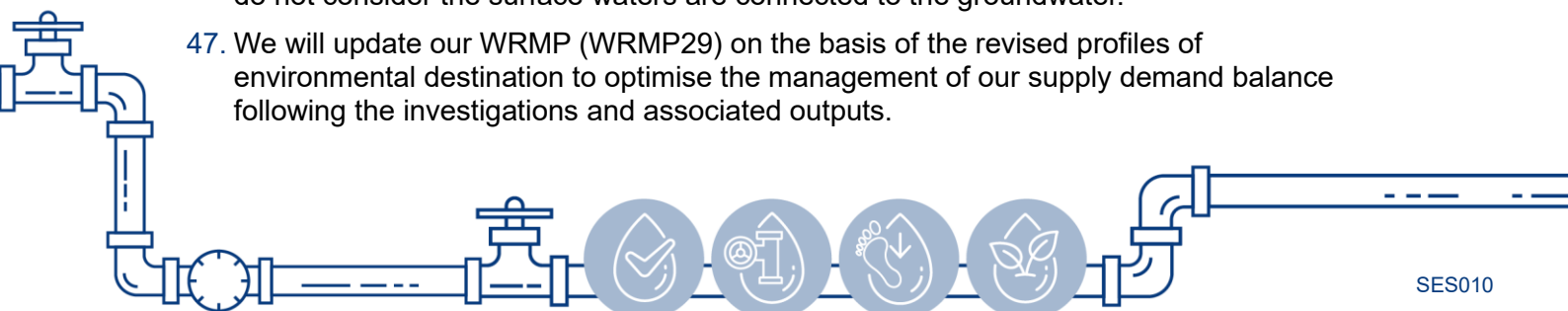


Source: SES Water

43. Concentrations above the drinking water standard have been detected in the River Eden (Figure 4) during the autumn/winter months of most years and a general upward trend in peak concentrations has been observed. Bough Beech Reservoir concentrations exceeded the drinking water standard in 2018 and mirror the general upward trend observed in the river. The drinking water standard (DWS) for flufenacet of 0.1 µg/L is shown for reference.

Water Resources Management Plan (Environmental Destination)

- 44. The current approach to providing water to customers is not sufficient to tackle the issues we face – particularly supporting growth and increased demand whilst enhancing the environment.
- 45. We have worked with our local Environment Agency officers to refine as far as we can profiles of environmental destination between 2030 and 2050, and we have committed to reducing the amount we abstract from sensitive catchments. Our WRMP captures these profiles. We aim to investigate these to define the particular sources we ideally need to reduce our abstractions from and set out how we can deliver these abstraction reductions, while maintaining resilience of our water supplies.
- 46. We will undertake investigations across our sources in the Wandle, Hogsmill, Darent and Eden (groundwater) catchments to define a profile of environmental destination (abstraction reductions) appropriate for each source. We will also undertake a desk-based study of the Beverley Brook catchment where, together with local knowledge, we do not consider the surface waters are connected to the groundwater.
- 47. We will update our WRMP (WRMP29) on the basis of the revised profiles of environmental destination to optimise the management of our supply demand balance following the investigations and associated outputs.



48. Where we are unable to commit to the profile of reductions those sources need, owing to water availability or operational constraints, or needing a series of investment over future AMPs to reconfigure our network, we will seek catchment solutions to support the sensitive environments. This may take the form of river restoration works so that we can support the health of our rivers. This is the case for our restoration work of the Hogsmill River.
49. Our joint investigation with Thames Water has indicated that one of our sources is having an impact on the flow of the Hogsmill River. We have committed in our WRMP to a profile of environmental destination from 2030, and we will use the outputs of our next AMP8 investigation to update that profile based on the specific source and needs of the catchment. This will be in balance of the neighbouring catchments, where environmental destination is planned, so that we can define a cost-effective way to deliver reduced abstraction.
50. In the meantime, we propose to contribute to the WINEP wider environmental outcomes and prevent further deterioration by improving the channel morphology and biodiversity.

Invasive Non-Native Species and eel regulations

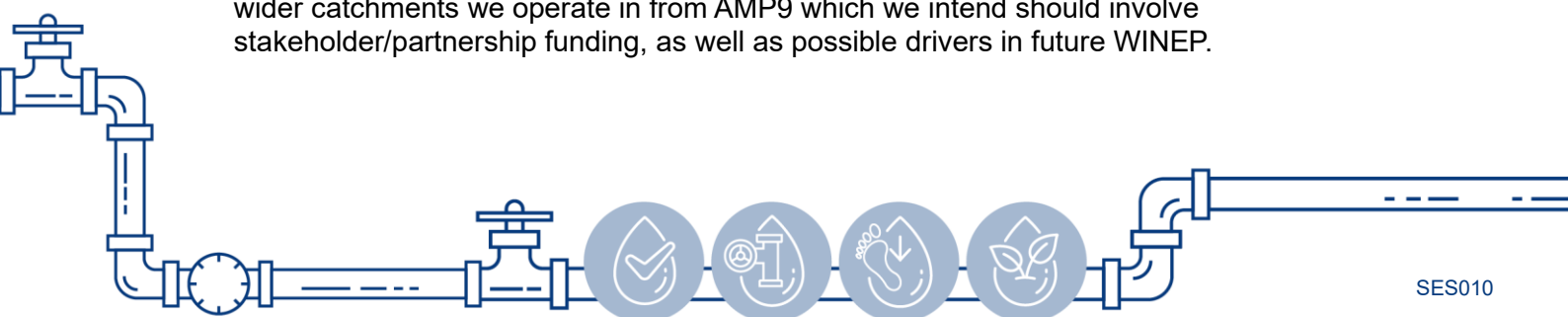
51. The final set of drivers for our WINEP actions relate to developing and protecting our habitats to improve biodiversity. We intend to protect the sites we operate from invasive species and make sure that key species are protected from our abstraction activities.
52. Beyond investigations into specific issues, there are some specific interventions we have identified to be delivered within this AMP. For these, we detail the specific drivers that underpin our proposed investment.
- (a) Installation of eel screens at Chiddingstone intake. Our raw water intake near Chiddingstone is not currently compliant with the Eels Regulations 2009 or proposed Coarse Fish Regulations with regard to screening and reducing impingement of fish and eels. It is recognised that the abstraction site is low risk to eels and other fish for two reasons:
- (i) Abstraction from the river is limited to September to April which is outside of the migration period of vulnerable small fry and juvenile eels. In practice abstraction does not normally take place until late October/ early November due to the minimum residual flow requirement, which reduces impacts even further.
- (ii) The intake is located a considerable distance from the tidal Thames, therefore the screening requirement only applies to low numbers of yellow and silver adult eel that migrate as far as that point.

Nevertheless, we intend to install screening compliant with the regulations.

- (b) Installation of washdown facilities at our Bough Beech reservoir site. Following the identification of Crassula, and more recently Zebra Mussel, at our Bough Beech site, we intend to improve our facilities to manage the risk surrounding invasive non-native species.

Biodiversity net gain

53. Biodiversity net gain will be primarily delivered through our wider operational works, that aligns with work relating to invasive non-native species, ongoing biodiversity management and ongoing site transformation. We will seek opportunities across the wider catchments we operate in from AMP9 which we intend should involve stakeholder/partnership funding, as well as possible drivers in future WINEP.



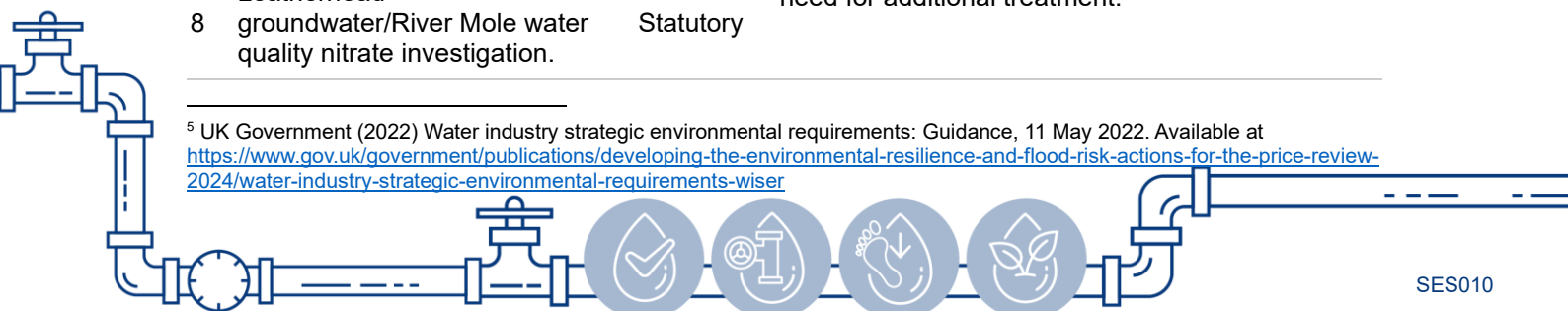
Summary

54. In Table 2 below, we summarise the key drivers underpinning each of the proposed WINEP interventions, as per the water industry strategic environmental requirements (WISER).⁵

Table 2: Summary of drivers underpinning the WINEP interventions

Intervention	Type of intervention	Driver
1 Chiddingstone eel screens – installation of screens to protect eels from water intake and ensure compliance with the Eel Regulations.	Statutory Plus	Eel Regulations – scheme to prevent entrainment of eels and provide eel pass, following statutory screening requirement. This driver enables water companies to comply with the Eels Regulations and is considered Statutory Plus at the stage of delivering required improvement.
2 Eden flufenacet – series of targeted interventions aiming to prevent deterioration with respect to flufenacet concentrations within the Eden catchment.	Statutory	DrWPAs – catchment actions to prevent deterioration in water quality and to reduce the need for additional treatment.
3 Brewer Street nitrate – series of targeted interventions aiming to prevent deterioration of nitrate concentrations levels in groundwater.	Statutory	
4 Hogsmill river restoration – restoration of 1.5km of the Hogsmill River.	Statutory Plus	Action to improve ecological status (surface water). This is considered a statutory plus driver based on our proposal to make an improvement now that we have completed a statutory investigation with Thames Water to determine the impact of abstractions.
5 Bough Beech washdown facility – washdown facility at Bough Beech to reduce risk of invasive species.	Statutory	Invasive Alien Species Regulations – reduce pathways for the introduction and spread of INNS (invasive and non-invasive species).
6 Site monitoring – monitoring of SES sites for invasive species.	Statutory Plus	Invasive Alien Species Regulations – reduce pathways for the introduction and spread of INNS. Introduction of surveillance is defined as a statutory plus driver, and we consider this is necessary for the effective management of our sites and our obligations to protect the environment from INNS.
7 Epsom North Downs Chalk groundwater body water quality nitrate investigation.	Statutory	DrWPAs – catchment actions to prevent deterioration in water quality and to reduce the need for additional treatment.
8 Leatherhead groundwater/River Mole water quality nitrate investigation.	Statutory	

⁵ UK Government (2022) Water industry strategic environmental requirements: Guidance, 11 May 2022. Available at <https://www.gov.uk/government/publications/developing-the-environmental-resilience-and-flood-risk-actions-for-the-price-review-2024/water-industry-strategic-environmental-requirements-wiser>

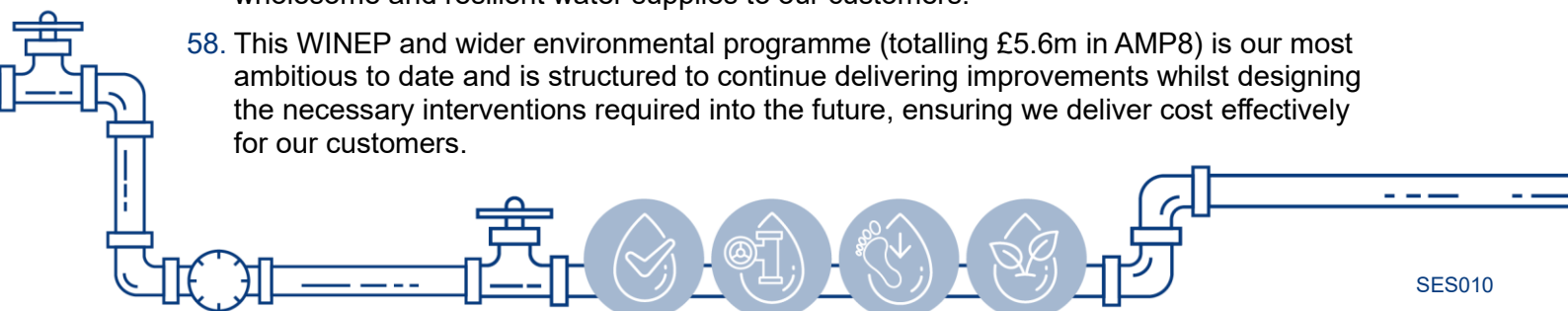


9	Environmental Destination – Hogsmill.	Statutory	
10	Environmental Destination – Eden.	Statutory	
11	Environmental Destination – Wandle.	Statutory	WRMP Regulations 2007 and National Framework for Water Resources – abstractions and operations must meet regional planning requirements to support the achievement of environmental objectives.
12	Environmental Destination – Upper Darent.	Statutory	
13	Regional Environmental Destination.	Statutory	
14	Beverley Brook investigation.	Statutory	
15	25 Year Environment Plan – Eden investigation.	Non-Statutory	
16	Cliftons Lane SSSI investigation.	Statutory Plus	Wildlife and Countryside Act 1981, Water Industry Act 1991 and Biodiversity 2020 Nature Strategy – contributing to meeting or maintaining favourable condition targets for SSSI. All drivers are considered Statutory Plus.

Source: SES Water

Why action is needed now: adaptive planning and justifying the scale and timing of the proposed enhancement

- 55. There is some way to go for us to deliver our 2050 ambitions. We are taking a considered approach to delivering this ambition, making sure our interventions are appropriately targeted and evidence driven. We have also designed our LTDS to learn from the outcomes from previous interventions.
- 56. However, to meet this ambition, we need to begin our investigations now into the issues identified. Whilst these have been identified through relevant environmental legislation and regulation, we have considered the timings of the various investigations to configure an approach that aligns with our continued development of business planning and implementation of future activities.
- 57. Where we have identified specific improvements, we need to deliver them as soon as is practicable. Many of the actions we have identified are designed to identify and implement preventive measures to potential issues on a timely basis; to avoid the need for larger, hard engineering solutions later. Without this investment, it is highly likely that the engineering solutions will become necessary to ensure we continue to provide wholesome and resilient water supplies to our customers.
- 58. This WINEP and wider environmental programme (totalling £5.6m in AMP8) is our most ambitious to date and is structured to continue delivering improvements whilst designing the necessary interventions required into the future, ensuring we deliver cost effectively for our customers.



Ensuring sustainable abstraction

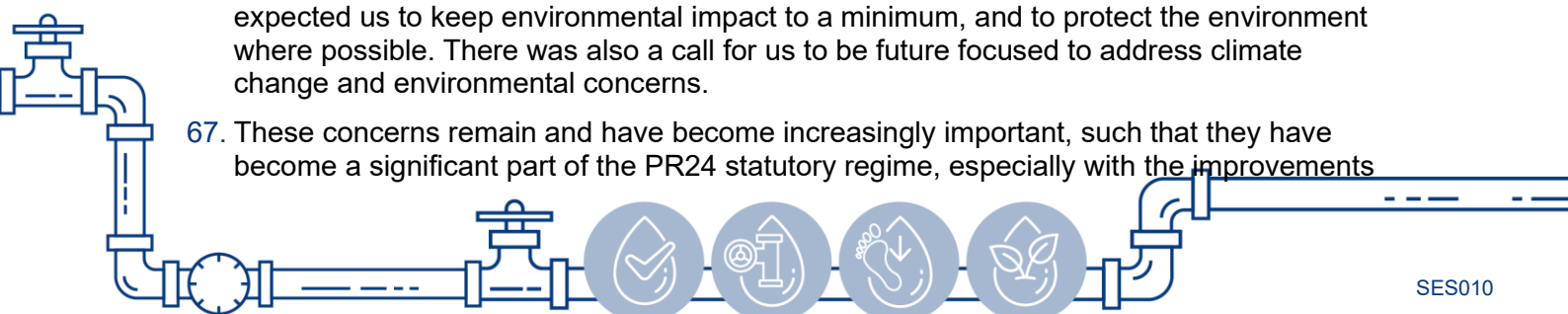
59. The interventions we have proposed for this AMP are all investigations into the impact of our abstractions on key waterbodies. As our WRMP has suggested several abstraction reductions aimed at putting them on a more sustainable footing, it is necessary to investigate these issues further before deciding on an appropriate course of action.
60. We consider the actions we are proposing to undertake are the minimum we can reasonably proceed with during AMP8 whilst being consistent with our longer-term ambition. If we were to reduce the number of investigations, we risk developing network and supply solutions that do not also address how we can maintain supply and resilience in other neighbouring catchments. This could risk a disjointed and overall cost inefficient programme. It would also limit our climate change adaptation update which must consider catchment pressures and reduced abstraction in the round.
61. We considered more ambitious proposals, such as initiating works in catchments where we have included environmental destination in our WRMP. However, we determined these would be inappropriate without understanding the scale of feasible abstraction reactions and the complementary suite of the catchment measures that may be required (and therefore objectively justified) to support a recovering environment.

High quality water supplies

62. Our AMP8 no-deterioration interventions will build on our ongoing work and engagement in the catchment, providing continued presence and support to the agricultural enterprises or household and businesses operating in the areas, and addressing product trends as they emerge. Reducing our work will risk slower awareness and engagement of emerging chemicals and require operational water quality treatment solutions, at higher capital, operational and carbon costs than our catchment work.
63. Our investigations will define the best value solutions where issues or risks are identified so that we can effectively prepare the necessary case for further interventions, and the wider benefits they may deliver.

Customer support

64. While the key driver for the activities identified within this submission are statutory, we have identified several areas where we can cost-effectively deliver more ambitious improvements to the environment. Appendices SES015 – Customer Insight Synthesis and Triangulation and SES018 – Customer Research Reports set out our customer engagement and research – outlining strong support for environmental enhancement. We have provided an outline of the research below for ease of reference.
65. Delivering environmental enhancements emerged as a key priority from our Bespoke 2 research. Customers were presented with 11 key service areas that we consider important when making long term investment plans. Improving the environment and having a positive impact on our local area was of medium importance behind high quality water, leakage, ensuring affordability for all, ensuring there is enough water in the event of a drought and maintaining the infrastructure to avoid burst pipes. This aligns with the positioning of the environment in the collaborative priorities research.
66. These findings build on the customer insight we undertook at PR19, which though somewhat limited, showed that serious pollution is unacceptable, that customers expected us to keep environmental impact to a minimum, and to protect the environment where possible. There was also a call for us to be future focused to address climate change and environmental concerns.
67. These concerns remain and have become increasingly important, such that they have become a significant part of the PR24 statutory regime, especially with the improvements



required under WINEP and the addition of a biodiversity common PC. Our early priorities research showed that as a minimum, customers expect us to protect the environment, but there is increasing evidence that many customers want us to go further. The same research showed that we could show our ambition by delivering a business plan that was industry leading in terms of the breadth of sustainability concerns (e.g. carbon, water scarcity, electric vehicles) and prioritising the natural environment e.g. elevating biodiversity benchmarking. Some customers found it difficult to understand the scale of some environmental enhancement and preferred the focus to be on more localised improvements.

68. The long-term plan to secure water supplies and improve resilience of the water system to drought and unexpected events should not at the expense of the environment. Indeed, supply options that have a net positive environmental impact and deliver wider public value (e.g. recreation and amenity) will be preferred. Use of chemicals, high energy use, and other unmitigated impacts are key reasons why some options are less favoured. Our WRMP plans to leave more water in the environment, with abstraction levels projected to decrease at several sensitive sources including chalk streams.
69. This point shows further traction in our Bespoke 2 research where almost half of customers, 46%, were aware of the link between water abstraction and chalk streams i.e. that continuing to abstract water from these catchments could have a lasting environmental impact. Awareness increases significantly with age, rising to 62% for those over the age of 65.
70. Indeed, our early priorities research shows that while there was little awareness about how water abstraction is affected by changing the nature of demand, customers were impressed with our ability to take the necessary steps to avoid negative environmental impacts.
71. To understand how ambitious customers expect us to be in delivering environmental enhancements, we provided choices to customers about vary levels of improvement. Of the five areas that we tested, environmental enhancements were ranked second most important to invest in, with almost three quarters (71%) rating this as important or very important. Support is strongest amongst both age groups over 35 years but lower for the 18- 34 age group.
72. When customers were presented with three differing options for the scale and pace of environmental improvements, along with their associated bill impacts, 72% supported further investment over and above the statutory requirements. Two out of three customers who supported additional investment opted for the highest level of environmental enhancement.
73. By triangulating the various customer engagement studies, we consider that there is support from customers to go beyond statutory requirements, and an appetite for bill increases to pay for this enhanced investment. As a result, our preferred business plan includes additional investment that will enable us to deliver further environmental improvements between 2025 and 2030 and sets us towards making further improvements on the rivers Eden and Mole initially. 72% of customers specifically support environmental improvements beyond statutory requirements, with support strongest for the greatest level of investment.



D. Why our proposals are the best option for customers

74. In this section, we detail the options we have considered for each of the interventions we have proposed as part of this enhancement, and how we have selected the preferred option. We do this separately for each category of intervention.
75. In general, the range of options we have considered for each WINEP action or proposal has depended on the nature of our issue and our stage of consideration for those issues.
76. We have selected our preferred options based on an assessment of the relative merits of the different options we have considered. The precise approach taken has varied from project to project, but has involved considering scheme costs, expected benefits and alignment with our ambition, stakeholder views, and practicability and deliverability considerations. From this assessment, we have selected the best value option.
77. We have therefore structured this section to align with the components of our ambition as follows:
- Options considered and selected to ensure sustainable abstraction;
 - Options considered and selected to manage issues present in the Eden catchment;
 - Options considered and selected to deliver high quality water supplies;
 - Options considered and selected to protect species, and our sites from INNS; and
 - Options considered and selected to enhance biodiversity.

Ensuring sustainable abstraction

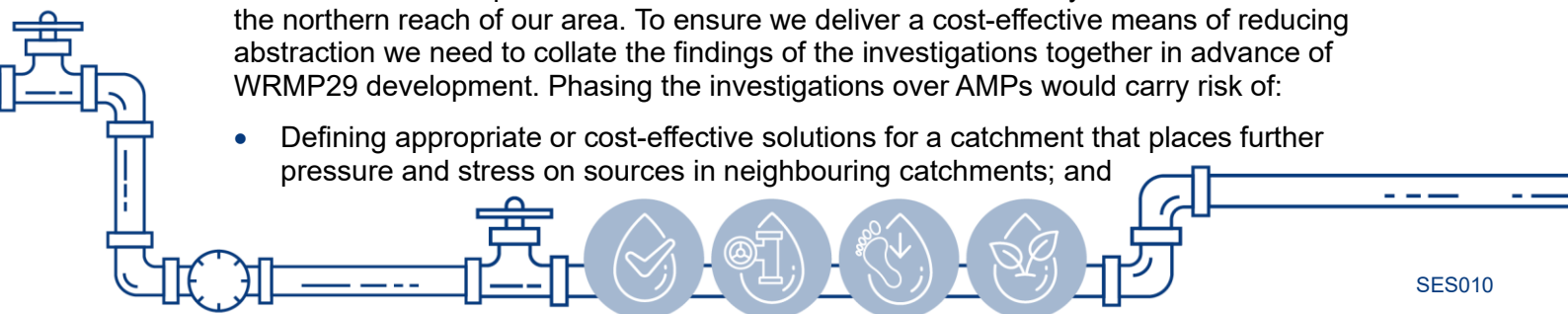
78. We are proposing eight actions to ensure we remain on the path to deliver on our commitment to only abstract water where we can do so without harming the environment:
- (a) Environmental destination investigation into the Hogsmill catchment;
 - (b) Environmental destination investigation into the Eden (groundwater) catchment;
 - (c) Environmental destination investigation into the Wandle catchment;
 - (d) Environmental destination investigation into the Upper Darent catchment;
 - (e) WFD (Water Framework Directive) investigation into Beverley Brook catchment;
 - (f) Catchment-wide Regional Environmental Destination investigation;
 - (g) SSSI investigation into the Reigate Heath SSSI and our Clifton's Lane site; and
 - (h) Improvements to the Hogsmill River.

Options considered

79. **Environmental destination, WFD and SSSI investigations:** For these investigations, we have considered one option only – to undertake the investigation. We have prioritised investigations based on the prioritisation of catchments and landscapes – notably the chalk (fed) streams and SSSI landscape that form vital and, in some cases, endangered ecosystems.

80. The Hogsmill, Eden (groundwater), Wandle, Upper Darent and Beverley Brook catchments all form part of our environmental destination and they are all located within the northern reach of our area. To ensure we deliver a cost-effective means of reducing abstraction we need to collate the findings of the investigations together in advance of WRMP29 development. Phasing the investigations over AMPs would carry risk of:

- Defining appropriate or cost-effective solutions for a catchment that places further pressure and stress on sources in neighbouring catchments; and



- Setting out network enhancements to facilitate environmental destination in a catchment that could otherwise also serve network requirements to support abstraction reductions in neighbouring catchments.
81. The Environment Agency (EA) had considered two further investigations which, with discussion, we did not include within our WINEP owing to ongoing actions relating to our licences and operations⁶.
82. On the advice of the EA to the regional group, WRSE, we have proposed a collaborative investigation that will bring together the findings of individual investigations and support the development of alternative supply options from more sustainable catchments.
83. **The Hogsmill River Restoration Scheme:** this scheme is being jointly funded and delivered by us and Thames Water. When preparing submissions to the EA we were awaiting the results of our site-specific investigation with Thames Water. This was completed in May 2023 and from this investigation we understand that, in modelled scenarios, one of our sources influences the flow of the Hogsmill River.
84. We have developed a suite of options with Thames Water that include reduced abstractions, river improvements and augmentation⁷. However, Thames Water's abstractions from the catchment support an 'island zone' and alternative supply options are currently cost prohibitive. We are therefore seeking to undertake catchment work in AMP8 that will support other environmental indicators of the river, and mitigate the impact of abstractions, whilst defining a permanent means to reduce abstractions that can feed into future iterations of our WRMP.
85. Following the investigation, we are now collaborating with Thames Water and the Hogsmill Catchment Partnership to develop and refine the initial options presented to the EA and determine the appropriate restoration solution. An overview of the options considered in the Options Assessment Report is provided in Table 3 below:

⁶ We prepared a method document to support our WINEP submissions to the Environment Agency which may be provided on request.

⁷ We currently support the Hogsmill River with an augmented flow.

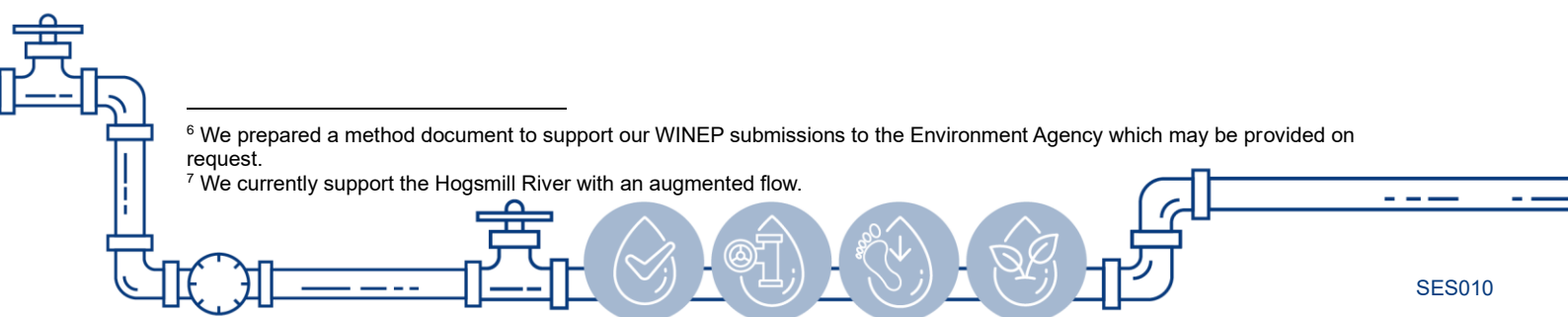


Table 3: Extract of feasible options from Options Assessment Report (River Hogsmill)

	Option	Description	Direct environmental benefit	Direct environmental benefit score*	Wider benefit (monetary value £M)	Biodiversity net gain (% change)	Cost (CAPEX £M)
Abstraction reduction	B	Total closure of Epsom and Langley Vale PWS	Additional flow would meet R-HEFT guideline thresholds for fish but ecological communities would likely to still be restricted by the limited habitat provision through the majority of the study area.	4	1.79	12%	89.41
	E	Reduce combined abstraction from Epsom and Langley Vale PWS to 5 MI/d	Significantly improves the frequency flows meet R-HEFT guideline thresholds for fish but ecological communities would likely to still be restricted by the limited habitat provision through the majority of the study area.	4	1.30	12%	76.47
	F	Reduce combined abstraction from Epsom and Langley Vale PWS to 10 MI/d	Some improvement to frequency flows meet R-HEFT guideline thresholds for fish but mainly limited to upstream of Green Lanes Stream.	2	0.30	12%	93.50
	G	Reduce abstraction at Epsom to 2 MI/d to retain as an emergency source. Close Langley Vale	Additional flow would meet R-HEFT guideline thresholds for fish in most reaches but ecological communities would likely to still be restricted by the limited habitat provision through the majority of the study area.	4	1.30	12%	84.23
	H	Close Epsom PWS and retain Langley Vale PWS at 5 MI/d by re-siting Langley Vale	Significantly improves the frequency flows meet R-HEFT guideline thresholds for fish but ecological communities would likely to still be restricted by the limited habitat provision through the majority of the study area.	3	1.30	12%	96.45
	I	Close Epsom PWS and retain 10 MI/d at Langley Vale by re-siting Langley Vale PWS	Benefit to reach upstream of Green Lanes Stream greater than for other reaches.	2	1.30	12%	103.49
	J	Closure of Nonsuch PWS	No flow gain simulated	0	-	-	-
	K	Reduction at Nonsuch Park PWS	Improvement relative to baseline and increase in lowest flows but frequency of sub-optimal flow is greater than for other options.	2	0.20	12%	45.03
	L	Closure of Nonsuch Park PWS	Benefit to reach upstream of Green Lanes Stream greater than for other reaches.	3	0.90	12%	51.50
	M	Redistribution of abstraction within the Cheam Group licence	No flow gain simulated	0	-	-	-
Augmentation	R	Review thresholds and timing of augmentation	Additional flow would meet R-HEFT guideline thresholds for fish upstream of Green Lanes Stream but little change further downstream.	3	0.39	12%	0.00
	T	Change augmentation discharge locations	Could provide additional flow in the upstream of Green Lanes Stream but would be unlikely to meet guideline thresholds for fish and no benefit further downstream.	2	0.20	12%	0.59
Habitat enhancement	Y	Localised, in-channel river restoration measures	Potential to provide greater variation of in-channel and marginal habitat including increased vegetation. Provides habitat for fish and macroinvertebrates but may be limited by low flows.	3	2.45	129%	0.90
	Z	Improve fish passage	Some improvement to the upper section for fish and wider ecology but may be limited by low flows.	2	0.33	11%	0.27
	AA	Large scale river restoration	New channel designed to maximise habitat variability and benefit wider ecology. Improve resilience to low flow conditions but may still be limited by available flow.	3	3.60	126%	12.36
Combined options	Y + E	Localised, in-channel river restoration measures and abstraction reduction	Potential to provide greater variation of in-channel and marginal habitat including increased vegetation. Additional flow maintains habitat for fish and macroinvertebrates and improves resilience to extreme low flows.	5	2.89	129%	77.37
	AA + E	Large scale river restoration and abstraction reduction	New channel designed to maximise habitat variability and benefit wider ecology with sufficient flow to maintain communities. Improves resilience to extreme low flow conditions.	5	4.19	126%	88.83

*Direct environmental benefit scoring

5	Fully meets flow requirements for fish and habitat requirements for wider ecology throughout the river
4	Largely meets flow requirements for fish throughout, habitat provision still limited; or major improvement to habitat provision, but flow still limited
3	Meets flow requirements for some reaches and/or improvement to habitat provision in some reaches
2	Improvement to flow, but does not fully meet requirements and/or minor improvement to habitat provision
1	Minor improvement to flow or habitat over a short reach
0	No change

Source: SES Water, Thames Water, Atkins Realis



High quality water supplies

Options considered

86. For investigations, we have used our expertise to develop our approach for the risks identified across the catchments.
87. For our water quality interventions, we have proposed catchment management schemes focused on agricultural sources of herbicides and both agricultural and non-agricultural sources of nitrate. As these are catchment management schemes, the exact nature of our interventions will be dependent on our engagement with local land users.
88. As an alternative, with regards to nitrates, we have considered relying on traditional methods of blending sources with lower nitrate sources. However, we screened this approach out as we believe we need to take a proactive approach to the issues presenting at our sources.
89. Operational options for chemicals associated with agricultural centre around upgrading and recharging water quality treatment processes at our water treatment works. This would be relatively costly and our treatment processes are currently sufficient for ensuring the levels of flufenacet are below drinking water limits.

Assessment of options

90. We propose undertaking catchment management schemes for our nitrate and flufenacet interventions. We have selected this as our preferred (and only) option based on the successful delivery of similar schemes during AMP7. This includes ongoing actions in the Eden centring around mecoprop, metaldehyde, propyzamide, carbetamide and phosphate. We have several ongoing AMP7 nitrate schemes, including across the Elmer, Leatherhead and Fetcham sources.
91. As catchment management schemes in this context are relatively low cost when compared with the alternative of more treatment, we consider them a compelling 'low regrets' intervention to mitigate the risk of future costs. The catchment management schemes will aim to secure the non-deterioration of our raw water quality and support wider environmental and social benefits associated with catchment management.

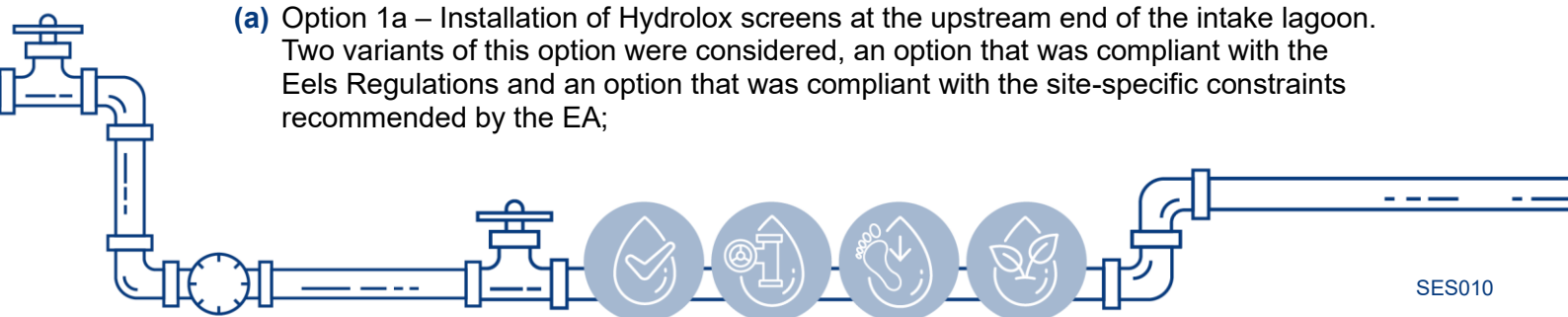
Species protection

92. Work throughout the current and previous AMP has highlighted the key species and risks present on our land and sites that we need to improve or manage. This includes:
 - Work to comply with the Eel Regulations 2009, of which we have one outstanding site to upgrade;
 - A full site review to identify and treat INNS, and rollout effective staff training; and
 - Identify sites where ongoing risks of INNS are present.

Options considered

93. **Compliance with Eel Regulations at Chiddingstone intake:** For this scheme, we conducted high-level screening of five different options, all of which involved the replacement of the existing non-compliant screens:

- (a) Option 1a – Installation of Hydrolox screens at the upstream end of the intake lagoon. Two variants of this option were considered, an option that was compliant with the Eels Regulations and an option that was compliant with the site-specific constraints recommended by the EA;



- (b) Option 1b – Installation of Hydrolox screens at the location of the existing coarse bar screen. As above, two variants were considered;
 - (c) Option 2 – Installation of Passive Wedge Wire Cylinder screens at the upstream end of the intake lagoon;
 - (d) Option 3 – Replacement of the existing band screens and inclusion of a fish recovery and return system; and
 - (e) Option 4 – Replacement of the existing band screens with Geiger MultiDisc screens and inclusion of a fish recovery and return system.
94. We also considered but discounted behavioural deterrents and the KLAWA eel pass system as they were less effective at preventing eel passage, and we discounted sub-gravel intakes as implementing a system at the Chiddingstone intake would have required significant capex.
95. **Bough Beech washdown facility:** Our Bough Beech holding provides facilities for our tenants (also referred to as our joint users) – notably sailing and angling clubs, that have members visiting the site for recreational and sporting pursuits. The clubs manage proactive biosecurity practices on-site, however, following the identification of non-native species a washdown facility is required on-site to manage the risks associated with biosecurity and public use of the site. We considered the following options:
- (a) Option 1 – install one hot water washdown area (least cost);
 - (b) Option 2 – install two cold water washdown areas (preferred); and
 - (c) Option 3 – install two hot water washdown areas (alternative).
96. **Monitoring of invasive species:** From our work this AMP we have identified INNS at several sites and have undertaken a treatment plan, where able, to manage the species. We intend to monitor these during AMP8 and considered the following approaches:
- (a) Option 1 – monitoring all sites with identified INNS annually using an ecologist;
 - (b) Option 2 - monitoring all sites with identified INNS annually using our grounds maintenance team and not utilising the services of an ecologist; and
 - (c) Option 3 - monitoring all sites with identified INNS annually using our grounds maintenance team and arrange for an ecologist to visit the sites once during the AMP.



Assessment of options

97. **Compliance with Eel Regulations at Chiddingstone intake:** Table 4, extracted from our Options Assessment report, presents a summary of the feasibility assessment of the four best practice screening options considered. The summary table offers only a relative comparison between the options considered where green is most favourable, passing through yellow to red as least favourable.

Table 4 Extract from Options Assessment Report, options feasibility summary

Screen Option		Buildability	Total Intake Hydraulic performance	Level of maintenance	CAPEX	OPEX	Overall
Option 1a	Eel Regulations compliant	Red	Red	Green	Red	Green	Red
	Site-specific compliance	Red	Red	Green	Red	Green	Red
Option 1b	Eel Regulations compliant	Yellow	Green	Green	Green	Green	Yellow
	Site-specific compliance	Green	Green	Green	Yellow	Green	Green
Option 2	Site-specific compliance	Red	Yellow	Red	Green	Green	Yellow
Option 3	Site-specific compliance	Yellow	Green	Yellow	Yellow	Yellow	Green
Option 4	Site-specific compliance	Green	Green	Yellow	Yellow	Yellow	Green

Source: SES Water, Atkins Realis

98. The Options Assessment also provided a cost benefit analysis, as presented in Table 5:

Table 5 Extract from Options Assessment Report, cost-benefit analysis

Screen Option		Screen Costs (£ million)	CAPEX Estimate (£ million)	BCR	Cost Beneficial?
Option 1a	Eel Regulations compliant	0.66	3.96	2.39	Yes
	Site-specific compliance	0.88	5.28	2.10	
Option 1b	Eel Regulations compliant	0.22	1.10	8.08	
	Site-specific compliance	0.33	1.65	6.43	
Option 2	Site-specific compliance	0.16	1.45	7.74	
Option 3	Site-specific compliance	0.25	1.50	6.30	
Option 4	Site-specific compliance	0.47	2.34	4.19	

Source: SES Water, Atkins Realis

99. We have selected Option 1b (site-specific compliance) as our preferred option. Although it is not the lowest cost option, we discounted the lower cost options for the following reasons:



- Option 2 will potentially reduce the hydraulic performance of the intake and has an onerous construction scope; and
- Option 1b (Eel Regulations compliant) does not offer the level of compliance preferred by the EA as the approach velocities exceed 0.3m/s.

100. **Bough Beech washdown facility:** Table 6 is extracted from our Options Assessment Report to the EA, and sets out the costs of the options considered:

Table 6: Extract from our WINEP Options Assessment Report (washdown facility)

Option	OAR classification	Monetised information – cost (£m)
Install one hot water washdown area	Least cost	£0.03
Install two cold water washdown areas	Preferred	£0.06
Install two hot water washdown areas	Alternative	£0.14

Source: SES Water

101. We have included in our WINEP our preferred option to install two cold water washdown areas, providing greater provision of facilities at the site – managing biosecurity for the entry/exit to the site and avoiding bottle necking when our joint users hold events at the reservoir. We believe this is a key means of supporting the transformation of our site.

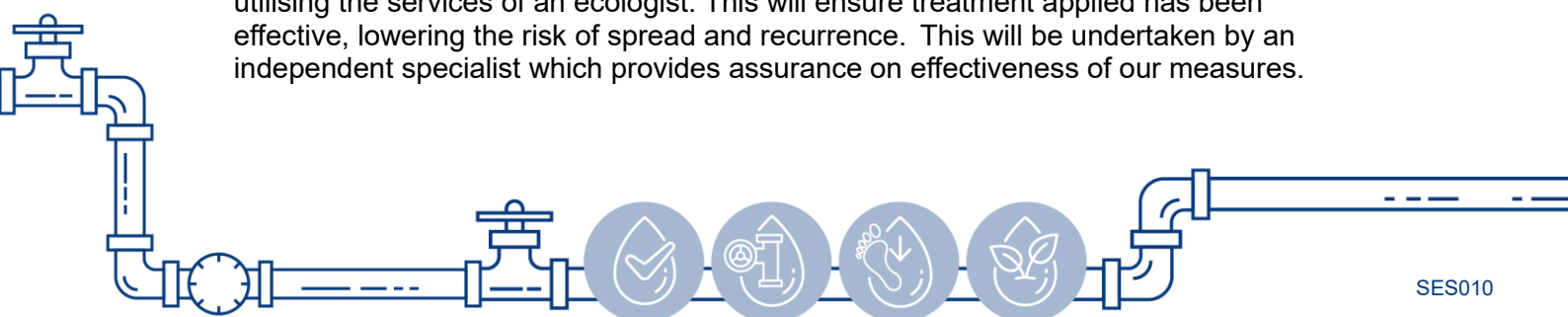
102. **Monitoring of invasive species:** Table 7 below is extracted from our Options Assessment Report to the EA, and sets out the costs of the options considered:

Table 7: Extract from our WINEP Options Assessment Report (INNS monitoring)

Option	OAR classification	Monetised information – cost (£m)
Monitoring all INNS sites annually with our grounds maintenance team.	Least cost	£0.01
Monitoring all INNS sites annually with an ecologist.	Preferred	£0.15
Monitoring all INNS sites annually with our grounds maintenance team, and once in AMP by an ecologist.	Alternative	£0.03

Source: SES Water

103. We have included in our WINEP our preferred option to undertake annual checks utilising the services of an ecologist. This will ensure treatment applied has been effective, lowering the risk of spread and recurrence. This will be undertaken by an independent specialist which provides assurance on effectiveness of our measures.



Enhancing the River Eden catchment

Options considered

104. To enhance the River Eden catchment, we have prioritised the need to undertake the investigation. To continue with a ‘symptom’ approach across this catchment would result in lost opportunity to consider:

- Flood management, together with surface/foul water systems and river health;
- Environment health and land/soil management;
- Effective/long term climate change adaptation;
- Engagement with the natural environment and social value;
- Chemical use and ongoing pollution;
- Local development needs and built environment policy; and
- Efficient use of customer investment.

105. The 25 Year Environment Plan driver has been selected over drinking water and flow drivers as the ambition of the investigation proposed is to address wider catchment pressures and meet objectives of the 25 Year Environment Plan. We consider this will allow the best value options and wider environmental benefits to be addressed.

106. During AMP7 we have and will continue to build relationships with landowners and stakeholders within the catchment to support the delivery of the investigation in AMP8. It is proposed the investigation would be structured as follows:

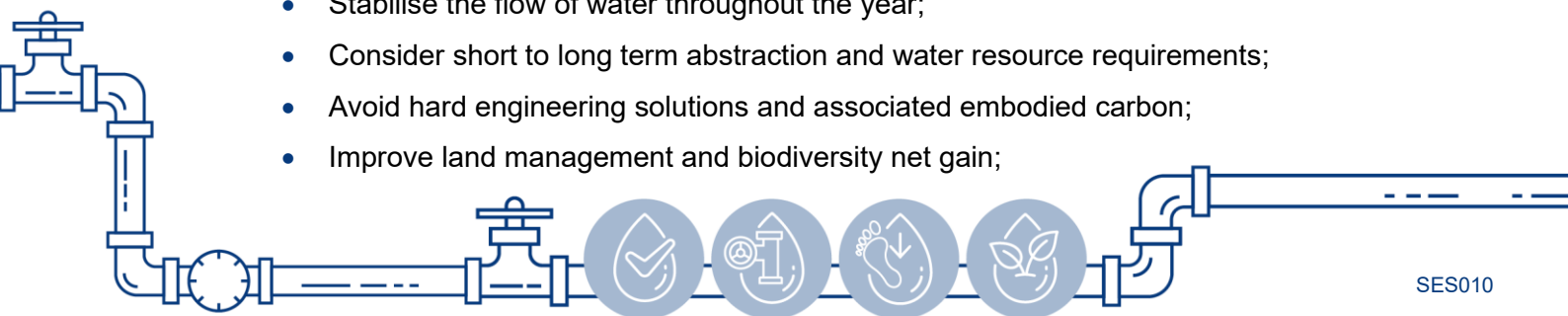
(a) Phase 1: Desk based study of key catchment pressures and issues (including stakeholder engagement). The study will utilise previous published studies and reports and include data sources such as:

- soil health metrics to indicate areas of relatively poor organic matter, poor moisture retention and poor water quality;
- flood mapping and poor stretches of the river channels (affecting movement of water/flash flooding);
- the extent of current and proposed built environment, and related drainage issues; and
- asset resilience considerations (across our own asset base and others).

(b) Phase 2: Ground truthing the catchment pressures via stakeholder events and walkovers. This will be informed by the desk study to define the priority catchment pressures and identified areas of intervention.

(c) Phase 3: Based on the key catchment pressures the final stage of the investigation will focus on identifying catchment and nature-based options – with wider stakeholders for co-funding and delivery to maximise wider benefits. The options appraisal will consider the 25 Year Environment Plan objectives. The proposed options and benefits will need to be evidence based and allow for the assessment of quantified benefits to be assessed. The options appraisal will consider options to:

- Stabilise the flow of water throughout the year;
- Consider short to long term abstraction and water resource requirements;
- Avoid hard engineering solutions and associated embodied carbon;
- Improve land management and biodiversity net gain;



- Deliver water sector public interest commitments where relevant; and
- Enable us to identify and develop opportunities for effective partnership, confirming co-funding proposals where appropriate.

(d) Phase 4: Phase 4, being the initial phases of delivery, is expected to commence in AMP9 but depending on specific business case (low/no regrets implementation) and co-funding opportunities some phases may start in AMP8.

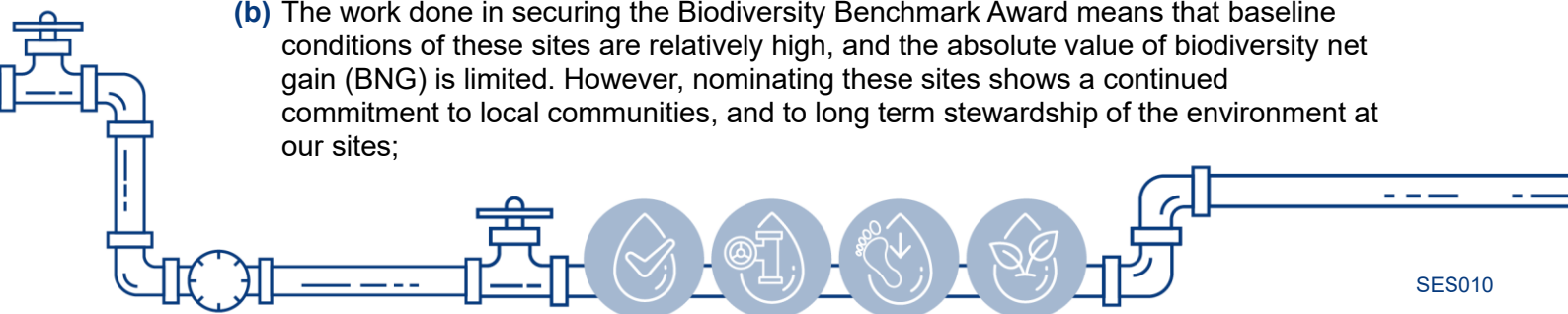
Enhancing biodiversity

Options considered

107. In the previous AMP, SES Water committed to a bespoke PC to achieve the Wildlife Trust's Biodiversity Benchmark award at three sites - Fetcham, Elmer and Bough Beech.
108. We have taken our learnings from AMP7 and are proposing to apply them to an ambitious trajectory for biodiversity in AMP8. Of our 322-ha landholding, we will nominate over 80% of this to the PC, including Bough Beech, Fetcham and Elmer, with the addition of Chiddingstone River Intake.
109. In AMP8, we will be undertaking WINEP and environmental investigations and schemes across our six river catchments. In tandem with these schemes, we are committed to investigating the sites involved for potential biodiversity improvements that we can facilitate alongside existing project work.
110. **Improvement of biodiversity across SES Water's owned land:** In AMP8, we propose to exclusively nominate land owned by SES Water.
- (a)** When nominating land for the PC, we considered a variety of sites, both operational and non-operational. These sites included areas that were both open and closed to the public, sites that have undergone previous biodiversity management, and those that have been left relatively unmanaged; and
- (b)** We also considered the best approach to biodiversity improvements: whether to better manage existing habitats or introduce new ones with higher value to the environment.
111. **Improvement of biodiversity across additional land within SES Water's area that is not owned by the company**
- (a)** In future AMPs, we will nominate additional land outside of our holdings based on investigations undertaken in AMP8. For example, we expect that there can be significant improvement to biodiversity through AMP9 interventions in the Eden catchment.

Assessment of options

112. **Improvement of biodiversity across SES Water's owned land**
- (a)** At the time of submission, two of our sites, Fetcham Springs and Elmer Treatment Works, have apportioned land that has achieved the Wildlife Trust's Biodiversity Benchmark. We are currently undertaking our site management plan for the third site, at Bough Beech, with a view to the Wildlife Trust considering the Benchmark status this year;
- (b)** The work done in securing the Biodiversity Benchmark Award means that baseline conditions of these sites are relatively high, and the absolute value of biodiversity net gain (BNG) is limited. However, nominating these sites shows a continued commitment to local communities, and to long term stewardship of the environment at our sites;



- (c) Both Fetcham Springs and Bough Beech are accessible in part to the public. Fetcham has footpath access and is well-enjoyed by many. Bough Beech is similar, with the addition of several tenants and groups of land users that make the site their home. These include Bore Place, the angling club and the sailing club;
 - (d) Elmer and Chiddingstone conversely, do not have public access. Their selection into the PC can be attributed to a connectivity piece (see Figure 1 and Figure 2 for context). Elmer is situated a kilometre south of Fetcham, and Chiddingstone of Bough Beech;
 - (e) Between the four sites, there is connectivity across them to AONBs, local nature reserves, local wildlife sites, SSSIs, and further non-statutory land designations where biodiversity is pivotal;
 - (f) Connectivity is key in the safeguarding and enhancement of biodiversity, and so the context of the site in its local environment is a key consideration; and
 - (g) When drafting management plans and trajectories for the nominated sites, we took the approach of maintaining and improving existing habitats, as opposed to disrupting the local environment through the creation of new habitats.
113. **Improvement of biodiversity across land within SES Water’s catchment area, but not owned by the company**
- (a) In AMP8, we do not have sufficient information, or understanding of the impact of our WINEP schemes on biodiversity in specific locations. Therefore, before proposing works that may not be best placed, we have committed to undertaking investigations of potential options.

Direct Procurement for Customers (DPC)

114. We consider these actions to be unsuited to DPC as they all fall below the investment threshold.



E. Cost efficiency

115. We have presented our approach to costs across the various activities below.

Overview of proposed costs

Environmental destination, WFD, SSSI and 25 Year Environment Plan

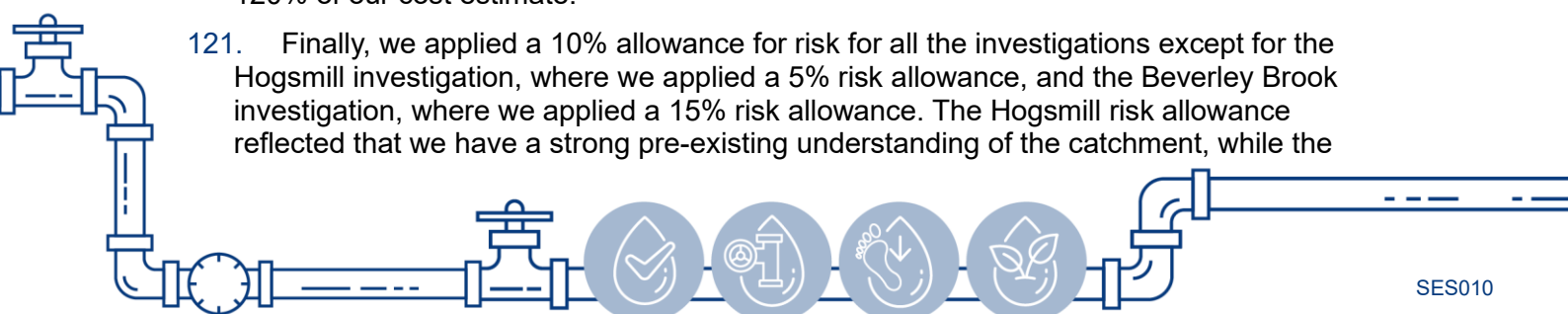
116. The costs above have been estimated on a bottom-up basis and validated using outturn costs from previous investigations. The expected cost of each investigation varies by the complexity of the issues needing investigation, whether we have readily available access to monitoring data, and the depth of the required investigation.

Table 8: Overview of proposed investigation costs (ED, WFD, SSSI and 25YEP)

Intervention	Total cost (£m)	AMP8 cost (£m)
Environmental Destination – Hogsmill	0.17	0.17
Environmental Destination – Eden	0.23	0.23
Environmental Destination – Wandle	0.21	0.21
Environmental Destination – Upper Darent	0.21	0.21
Regional Environmental Destination	0.27	0.27
Beverley Brook investigation	0.04	0.04
25 Year Environment Plan – Eden investigation	0.23	0.23
Cliftons Lane SSSI investigation	0.16	0.16

Source: SES Water, Atkins Realis

117. We began by taking the outturn cost from a previous investigation (at £360k) and removing any exceptional elements from that outturn cost (£70k), resulting in a net estimate of £290k.
118. We then detailed the full list of steps involved in undertaking an investigation, split into three broad phases. Phase 1 is a desk-based study, Phase 2 is a detailed impact assessment, and Phase 3 is an options appraisal. We allocated the net project cost estimate of £290k to each of these steps, using a mixture of assumptions and outturn data from previous projects.
119. For each investigation, we assessed whether a step was necessary and if so, the level of complexity involved with the task. For example, where we readily had access to data, we assumed there would be lower complexity involved. We also considered whether there were opportunities to combine steps across investigations, to benefit from economies of scale.
120. We then aggregated the cost for each investigation, assuming that low complexity tasks would cost 80% of our central cost estimate, and high complexity tasks would cost 120% of our cost estimate.
121. Finally, we applied a 10% allowance for risk for all the investigations except for the Hogsmill investigation, where we applied a 5% risk allowance, and the Beverley Brook investigation, where we applied a 15% risk allowance. The Hogsmill risk allowance reflected that we have a strong pre-existing understanding of the catchment, while the



Beverley Brook risk allowance reflected the small-scale of the study giving greater scope for cost uncertainty.

Table 9: Overview of proposed river restoration costs

Intervention	Total cost (£m)	AMP8 cost (£m)
Hogsmill river restoration – Restoration of 1.5km of the Hogsmill River.		0.22

Source: SES Water, Thames Water

122. The outline restoration was initially costed by Thames Water for their WINEP submission, and we presented a 40% contribution (£463k). However, the costs of the scheme are expected to reduce, and we presented a refined proposal (£217k) to the EA.

123. Our ongoing engagement with the EA and the Catchment Partnership will enable us to refine the catchment options and present an updated cost and benefits assessment.

Water quality

124. These costs have been estimated through an analysis of the costs of previous investigations and catchment work and verified through initial market engagement. We only include third-party contracting costs within these cost estimates, and do not include any internal project management or engagement costs.

Table 10: Overview of proposed investigation costs

Intervention	Total cost (£m)	AMP8 cost (£m)
Epsom North Downs Chalk groundwater body water quality nitrate investigation.	0.06	0.06
River Mole water quality nitrate investigation.	0.06	0.06

Source: SES Water

Table 11: Overview of proposed non-deterioration scheme costs

Intervention	Total cost (£m)	AMP8 cost (£m)
Eden flufenacet – targeted interventions aiming to prevent deterioration of flufenacet concentrations within the Eden catchment.	0.75	0.35
Brewer Street nitrate – targeted interventions aiming to prevent deterioration of nitrate concentrations levels in groundwater.	0.20	0.10

Source: SES Water

Species protection

125. Costs relating to the management of INNS have been estimated through analysis of costs for other water company deliverables and consultant costs, and verified through



initial market engagement. We only include third-party contracting costs within these cost estimates, and do not include any internal project management or engagement costs.

Table 12: Overview of costs to manage invasive non-native species

Intervention	Total cost (£m)	AMP8 cost (£m)
Bough Beech washdown facility – provision of a washdown facility at Bough Beech to reduce risk of invasive species from third party users of the site.		0.06
Site monitoring – ongoing monitoring of our sites for invasive species.		0.15

Source: SES Water

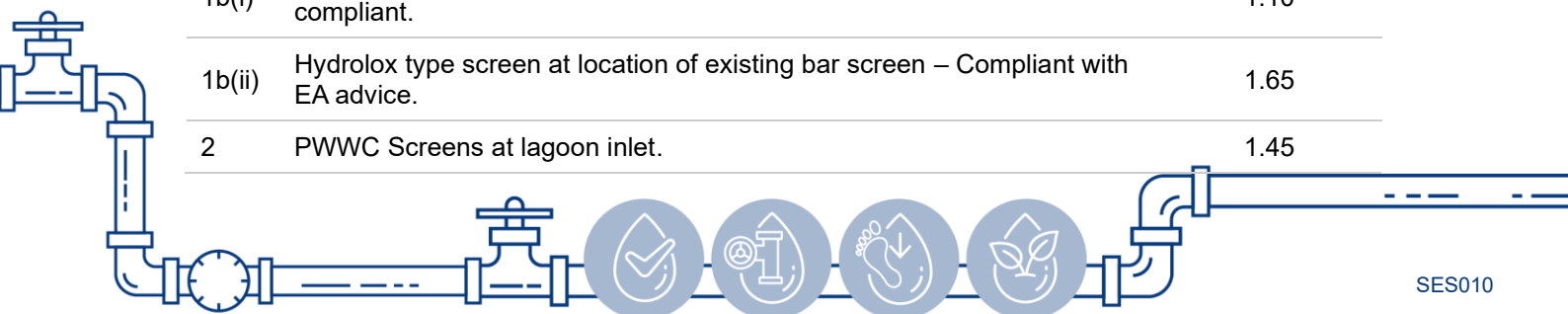
126. To comply with the Eel Regulations at Chiddingstone intake, the capex cost estimated for the eel screen installation have been estimated by Atkins on behalf of SES Water. The costs for each option have been estimated on a top-down basis, using quotes from suppliers, estimates of the number of screens required by option, and benchmarked cost multipliers. The detailed calculation steps are as follows:

- (i) For each option, Atkins has used quotes from suppliers and their own experience of designing previous schemes to estimate the unit cost for each screen. For Option 1b, the unit cost for each screen was estimated at £110k.
- (ii) They have then estimated the number of screens required under each option and multiplied it by the unit cost to obtain a total screen cost. For Option 1b, Atkins estimated that 3 screens would be needed, resulting in a total screen cost of £330k.
- (iii) Finally, the total screen costs were then multiplied by a cost multiplier to convert the screen costs to a total capex estimate. The multipliers were based on estimates from 10 other schemes, which resulted in a benchmark multiplier estimate of 5. This multiplier was then varied by each option, based on a grading of complexity, scope of civils works, and client overhead requirements. By comparison, a scheme designed by Atkins for Thames Water resulted in a cost multiplier of 8. For Option 1b, Atkins used a cost multiplier of 5, resulting in a total capex cost of £1.65 million.

127. In Table 13 below we show the cost estimates for each option considered, and the preferred solution in Table 14.

Table 13: Overview of costs for options to comply with Eel Regulations at Chiddingstone

Option	Total cost (£m)
1a(i) Hydrolox type screen at lagoon inlet – Eel regulations compliant.	3.96
1a(ii) Hydrolox type screen at lagoon inlet – Compliant with EA advice.	5.28
1b(i) Hydrolox type screen at location of existing bar screen – Eel regulations compliant.	1.10
1b(ii) Hydrolox type screen at location of existing bar screen – Compliant with EA advice.	1.65
2 PWWC Screens at lagoon inlet.	1.45



3	Replace existing band screens.	1.50
4	Replace existing band screens with MultiDisc screens.	2.34

Source: SES Water, Atkins Realis

Table 14: Overview of cost proposal for preferred solution to comply with Eel Regulations at Chiddingstone

Intervention	Total cost (£m)	AMP8 cost (£m)
Chiddingstone eel screens – installation of screens to protect eels from water intake and ensure compliance with the Eel Regulations (Option 1b).	2.00	2.00

Source: SES Water, Atkins Realis

128. Further detail of the calculations and underlying assumptions can be provided on request from our submissions to the EA.

Cost efficiency assessment

129. We are confident in the cost efficiency of our proposals as most of the costs are a combination of using our own people (naturally benchmarked based on the local jobs market) together with select support from Atkins Realis – an engineering and environmental consultancy contract that was awarded in the last five years which we believe still represents value for money.

130. The largest element of our WINEP – Chiddingstone eel screens – was estimated by Atkins using pricing mechanisms/curves that have been built from significant volumes of actual industry data and is therefore benchmarked.

Third-party assurance

131. By nature of the WINEP and evolution of our proposals in consultation with the EA, we consider the proposals contained in our WINEP reflect required packages of work. The requirements of the submissions present cost analysis and wider environmental outcomes where required. The EA have reviewed our proposals and marked our WINEP as proceed.



F. Customer protection

132. We have assessed the degree of customer protection that is afforded by the various mechanisms in place across the regulatory frameworks applying to this scope of works and conclude the following as providing requisite customer protection required for these programmes of works.
133. Regarding the biodiversity element of our work, we believe the new BNG common PC, applicable from the commencement of AMP8, and its associated and eventual ODI mechanism (when set by Ofwat) will provide adequate protection for customers in the event of any under-delivery of this element of our work.
134. We have not proposed a bespoke PC for these enhancement works as we do not deem this scope of works would meet the criteria for a bespoke PC.
135. We have not proposed a Price Control Deliverable (PCD) for the WINEP elements of these works for the reasons set out in Appendix SES063 – Price Control Deliverables and Additional Reporting Metrics. As over 95% of the proposed programme in AMP8 is categorised as statutory, we assess that the EA's ability to take enforcement action in the event of any under-delivery provides adequate protection for our customers based on the materiality of the programme in question. With regards to the non-statutory element – comprising the remaining 5% of the WINEP programme, we assess the materiality of this work to not meet the threshold required to qualify for a PCD.
136. Where actions are joint funded, the EA has introduced the requirement to record the division of joint responsibility in the relevant Action Specification Form (ASF). We completed a retrospective confirmation for the recently completed River Hogsmill investigation following the introduction of this approach. This provides certainty of responsibilities in the event actions are not delivered and remedial actions arising from that.
137. We believe that the above arrangements provide adequate protection for our customers in the event of late or non-delivery of these schemes.

