

PR24

NORTHUMBRIAN
WATER *living water*

ESSEX&SUFFOLK
WATER *living water*

SUPPLEMENT TO ENHANCEMENT CASE A3-14

WINEP PROTECTED AREAS – LONG SEA OUTFALL

1.	INTRODUCTION	3
2.	NEED FOR ENHANCEMENT INVESTMENT	4
2.1.	CHANGES SINCE OUR BUSINESS PLAN	4
2.2.	CUSTOMER SUPPORT FOR THE NEED	5
2.3.	STEPS TAKEN TO CONTROL COSTS	6
3.	BEST OPTION FOR CUSTOMERS	7
4.	COST EFFICIENCY	9
5.	CUSTOMER PROTECTION	11

1. INTRODUCTION

In our enhancement case for [WINEP protected areas and bathing waters](#) (NES28), we set out how we will deliver on our commitments to maintain bathing water quality, maintain and improve our natural habitats, and restore our marine conversation zones. These plans were aligned to WINEP statutory guidelines.

This included the need to reduce nitrogen at Seal Sands (under WINEP driver HD_IMP) and achieve nutrient neutrality requirements in the Teesmouth & Cleveland Coast SPA (under WINEP drive HD_IMP_NN). In 2022, Natural England issued advice that 31 habitat sites are in unfavourable condition due to excess nutrient pollution. Because of this, the advice says that development plans or projects in these areas can only go ahead if the additional wastewater produced by the development will not add to nutrient pollution – that is, they must be “nutrient neutral”.

Following this advice from Natural England, the EA issued guidance in December 2022 to say that water companies should upgrade all STWs in these areas that serve a population equivalent (PE) of more than 2,000 people. The objective of this was to remove nitrogen from final effluent to meet the “technically achievable limit” (TAL), which is currently 10mg/l of total nitrogen. In our region, this only applies for nitrogen limits for Teesmouth and Cleveland Coast SPA and Lindesfarne SPA together with the river catchments that drain to these areas. As all STWs discharging to Lindisfarne SPA have less than 2,000 population, only the Teesmouth and Cleveland Coast SPA is subject to TAL requirements.

Following this guidance, the Levelling Up and Regeneration Act provided a greater level of flexibility than expected in how we could reduce nutrient pollution across the affected catchment, with the aim of “maximising benefits for the environment while minimising costs on water bill payers”¹.

As we described in our business plan ([NES28](#)), we challenged the EA to provide advocacy and evidence to support our WINEP proposals, and we put forward a flexible approach which would use nature based and catchment solutions to reduce nutrient pollution, at a cost of **£47.7m**. We discussed these proposals with the Water Forum throughout the process, and they asked us to continue to push for this. We made some modifications as agreed with the EA as we developed our business plan further, and so the proposal in our business plan in October 2023 included these.

These alternative solutions require agreement from the Secretary of State. Since October 2023, we have worked with the Environment Agency and Natural England to provide further details about our modelling and how we would expect to meet the requirements through nature-based solutions. In Table 20 of NES28, we set out three possible options to address this need, explaining the total costs and benefits for each solution. Our preferred solution was both the least cost and (significantly) best value option.

In June 2024, Defra confirmed that we are required to take forward our option for nature-based solutions and a long sea outfall (the second column in Table 20 of NES28).

¹ See Appendix A of [NES28](#)

This supplement to our enhancement case NES28 explains the costs of the long sea outfall and other changes to our enhancement case. We have not changed the costs or benefits or the original nature-based solutions, which are still included as well as the new long sea outfall, and we assessed the benefits of the long sea outfall option in our original business case. We have updated our business plan tables to include the costs and benefits for this new option.

We have also carried out additional customer research since June 2024, and we explain this in section 2 in the context of our previous customer research on this topic. We have considered further customer protection, risk sharing and potential for third party income in future and we discuss this in section 5.

In this document, we have set out the evidence under Ofwat’s enhancement assessment criteria set out in its final methodology². We do not repeat information that we already included in enhancement case NES28, but refer to this where applicable. We have used a simpler structure than our business plan enhancement cases to reflect this.

2. NEED FOR ENHANCEMENT INVESTMENT

In our business case NES28, we provided evidence that there is a need for enhancement investment to meet new statutory requirements under WINEP and under the Levelling Up and Regeneration Act. We explained that our wastewater WINEP for AMP7 included 626 schemes, and we were on track to deliver all of these on time or early.

We explained the detailed requirements at Seal Sands, including modelling for nitrogen loads and the impact on macroalgae, in NES28. This showed the need to reduce nitrogen loads to restore Seal Sands SSSI to favourable status in AMP8. We explained that this was a statutory requirement, validated in WINEP. This also showed that this was new investment, not previously funded at previous price reviews or in base expenditure.

2.1. CHANGES SINCE OUR BUSINESS PLAN

We are now required under WINEP to switch to our “nature based solutions and long sea outfall” option³. Our legal obligation is to reduce the nitrogen load to the equivalent of the “technically achievable limit” of 10mg/l – this would mean a load reduction of 5,376 kg/D:

TABLE 1 - LOAD REDUCTIONS REQUIRED UNDER NTAL (KG/D)

STW	Load reduction, kg/D
Aycliffe	-186
Barnard Castle	-104
Chilton Lane	-21
Fishburn	-30
Great Ayton	-35
Stokesley	-29

² Ofwat methodology [Appendix 9](#), p154

³ See NES28, Table 20

STW	Load reduction, kg/D
Stressholme	-721
Trimdon	-29
Windlestone	-58
Carlton and Redmarshall	-12
Sedgefield	-42
Bran Sands Municipal	-4,108
TOTAL	-5,376

Table 1 shows the load reductions that would be required under NTAL in Teesmouth.

Our current “at permit” load from Bran Sands Municipal (6,340 kg/D) and our Industrial (3,002 kg/D) permits mean a total of 9,432 kg/Day. This means that removing this load entirely through a long sea outfall would meet the requirements under NTAL.

We plan to use this headroom to offset any load produced by the 11 STWs which are upstream of the Tees Estuary area. In total, these 11 STWs have a combined “at permit” discharge of 2,100 kg/D. This means that we have been able to demonstrate in WINEP that no upgrades are required at these treatment works, and that the load targets from the Levelling Up and Regeneration Act should be met by a reduction of 9,432 kg/D at Bran Sands, and the load at the remaining STWs to be set at 4,056kg/D. This will satisfy the legal requirements.

We have included our nature-based solutions under the HD_IMP WINEP driver. We will deliver and trial these while undertaking the same monitoring that would be required for a catchment and nature-based permit. Where the trials are successful, we will use these for any further tightening of the Levelling Up and Regeneration Act obligation in AMP9 and beyond, as well as using any additional unused capacity from the long sea outfall.

We provided this evidence and calculations to the EA under WINEP.

2.2. CUSTOMER SUPPORT FOR THE NEED

In NES28, we described our customer support for our WINEP programme.

In our People Panels research, we discussed our options for tackling nutrient neutrality across Lindisfarne and Teesmouth (at the time, Lindisfarne was within scope of these). Customers do not support an engineering-based approach to removing nitrogen from wastewater, because of the high cost for a relatively low impact. Customers indicated that they would support a less expensive, nature-based approach. Customers did consider this important ([enhancements and other service area summaries](#), NES43).

In our pre-acceptability research, most customers preferred to invest now to remove nitrogen using nature-based approaches. There was substantial support for nature-based solutions rather than engineering solutions. Customers noted

the benefits of the cheaper option and preferred to take the risk of a later bill increase if nature-based solutions were not successful, rather than an immediate large increase ([enhancements and other service area summaries](#), NES43).

Our WINEP plan for nitrogen and phosphorus provided better value at a lower cost than traditional solutions and is strongly supported by customers and stakeholders. Our Board decided that they wanted to change the conversation about WINEP, and so we had challenged the EA by providing advocacy and evidence to support our WINEP proposals – which were included in our business plan. We discussed these proposals with the Water Forum throughout the process, and they asked us to continue to push for this.

Our business plan included our WINEP, with some modifications as agreed with the EA as we developed these plans further. This was supported by our customer research and by our stakeholders.

Our customers did not originally support a long sea outfall when we asked them about this during the business plan process, as this is more expensive and does not have more benefits than the nature-based solutions alone. However, customers asked us to seek alternative nature-based solutions alongside challenging Defra on an NTAL solution (at the time of our first research, we estimated the costs at £292m or £390m at Teesmouth, depending on the requirements). In our pre-acceptability Part B research⁴, customers said they supported nature-based solutions but understood the risk of a later bill increase if these were not effective – and preferred this to an immediate larger increase.

We asked our customers in July 2024 what they now thought about changing our plan to include the building of a long-sea outfall. Customers were generally surprised that this was needed but were mostly willing to trust regulators that this was needed (and did not feel able to say if this was important or not). The majority of our small group of customers thought this was acceptable (an average score of 6.64 out of 10, where 10 was very acceptable and 1 was very unacceptable).

2.3. STEPS TAKEN TO CONTROL COSTS

We engaged with the Environment Agency and Defra through the WINEP process, including proposing solutions through WINEP, providing evidence and advocacy for our nature-based solutions on behalf of our customers. We have continued to push for this until June 2024.

We have been (partly) successful in reducing the costs of this programme for customers. Firstly, we worked with the Government on the proposed Levelling Up Bill to suggest increasing the threshold for small sewage treatment works which had very little impact on the levels of nitrogen in the catchment – which our cost estimates at the time suggested could save up to £300m. And secondly, we continued to push for the use of nature-based solutions in the catchment to reduce nitrogen more effectively – which we have been able to retain in our WINEP as trials.

⁴ [NES43](#), p27

In sections 3 and 4, we explain the options we considered for customers in more detail – and how we have made sure that our cost estimates for the additional long sea outfall are efficient and robust. We have already provided the evidence for our nature-based solutions in NES28.

3. BEST OPTION FOR CUSTOMERS

In [NES28](#), we explained our process for considering options for tackling this need (3.3.1 onwards) – and Ofwat has already assessed this. We used a structured approach to consider a wide range of unconstrained options⁵, which included changing the outfall location at any given location. In Table 17 of NES28, we show that changing the outfall location at Bran Sands was one of the constrained options, and that the programme we have now included in our business plan was considered as one of three “high level options”⁶. These options included a range of intervention types, from innovative nature-based solutions to “end of pipe” traditional solutions.

In NES28, we also explained our robust cost benefit appraisal, which includes a wide range of benefits including improved water environments, biodiversity net gain, amenity, habitat water purification, climate regulation, water quality, education, and recreation. This also considered operational and embedded carbon emissions.

Our original preferred option – comprising nature-based solutions and an upgrade to Bran Sands STW – was assessed as both the least cost and best value solution⁷. This included wider benefits (such as to water quality, air quality, carbon, and food) which we could not quantify in monetary terms⁸.

Our new programme still delivers these benefits, but rather than relying on nature-based solutions unproven at this location the EA and Defra have asked us to deliver the long-sea outfall option which provides certainty about how much nitrogen loads will be reduced. A long sea outfall from Bran Sands is sufficient to meet the nitrogen reduction need on its own, and so our nature-based solutions have now been classified as trials (so the outcome of nitrogen reduction is not reliant on these delivering the benefits we have estimated). Instead, these nature-based solutions will provide further benefits to nitrogen reduction in the catchment and – as our original assessment of benefits shows – these are strongly cost beneficial (a net cost benefit of **£161m**⁹) with many wider benefits. This will provide resilience for future pressures from nitrogen in the catchment, as well as providing a solution to reducing nitrogen limits further in the future.

If we want to use nature-based and catchment solutions to tackle nitrogen loads in the future, it is critical that these trials go ahead in AMP8. This is because if we cannot be confident now – with extensive modelling and investigations – that catchment solutions will deliver nitrogen load reductions, then we will also not be confident enough for PR29 or any future price review that these will deliver what is needed. This would mean that we would never be able to use nature-based solutions. We remain confident in the modelling and investigations that we have carried, and while we understand why

⁵ [NES28](#), Figure 9 and Table 16

⁶ [NES28](#), p52

⁷ [NES28](#), Table 20

⁸ [NES28](#), 3.3.6

⁹ [NES28](#), Table 20

others have a lower risk appetite, we welcome the opportunity to demonstrate through trials that this can be effective. We hope that these trials will enable a much more efficient solution with many more benefits – for our customers and the environment in our areas, but also to support similar schemes across the UK.

We described our work to understand customer views in [NES28](#)¹⁰. Our customers strongly supported our preferred plan, with substantial support for nature-based solutions rather than engineering solutions. Customers noted the benefits of our preferred plan, and preferred to take the risk of a later bill increase if nature-based solutions were not successful, rather than an immediate large increase.

We also had strong stakeholder support for our balanced approach to delivering WFD and UWWTD requirements. The Rivers Trust (our partners in the North East Catchments Hub) say that they are *“proud to be working in partnership with Northumbrian Water to co-develop catchment and nature-based schemes... this is an industry leading approach following the Ofwat guidance... allowing water companies to meet their regulatory obligations and customers’ needs, while restoring and increasing natural assets to realise environmental net gains. It has our full support and we believe it could provide a step-change for water quality improvements and wider environment recovery in the North East.”* (Letter in support of our WINEP programme).

Although we can no longer continue with our preferred option (nature based solutions and upgrade to Bran Sands STW), our customers and stakeholders supported our approach and still support the inclusion of nature-based trials in Teesmouth.

3.1. COST AND BENEFIT SUMMARY

We have updated the costs and benefits in our business plan tables (as submitted on 28 August 2024). This updates Table 32 from [NES28](#), and we have marked in red text where there are changes from our January 2024 business plan tables (as Ofwat has used for their Draft Determination).

TABLE 2 - EXTRACT FROM TABLE CWW3 - ENHANCEMENT EXPENDITURE WASTEWATER NETWORK+ TOTEX £M (2022/23 PRICES)

PR24 BP reference	EA/NRW environmental programme	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	AMP8
CWW3.21	Increase storm system attenuation / treatment on a STW - green solution; (WINEP/NEP) wastewater	0.748	0.748	0.003	0.003	0.003	0.003	0.003	1.512
CWW3.57	Treatment for total nitrogen removal (chemical) (WINEP/NEP) wastewater	0.200	4.148	48.200	48.200	48.200	48.200	48.200	241.000

¹⁰ [NES28](#), section 7 – for full references to our customer research summaries

PR24 BP reference	EA/NRW environmental programme	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	AMP8
CWW3.72	Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution (WINEP/NEP) wastewater	0.948	1.548	1.708	1.708	1.708	0.445	0.445	6.014
CWW3.87	Catchment management - habitat restoration; (WINEP/NEP) wastewater	0.179	0.179	1.376	0.563	0.563	0.563	0.563	3.985
CWW3.90	Microbiological treatment - bathing waters, coastal and inland (WINEP/NEP) wastewater	0.000	0.000	0.321	1.281	0.184	0.030	0.030	1.847
CWW3.111	Investigations, other (WINEP/NEP) - multiple surveys, and/or monitoring locations, and/or complex modelling wastewater	0.371	0.742	14.486	14.486	0.000	0.000	0.000	28.972
CWW3.123	Restoration management (marine conservation zones etc) (WINEP/NEP) wastewater	1.043	1.043	0.979	0.979	0.979	0.979	0.979	6.982

The benefits (as provided in Table CWW15 in our business plan tables) are unchanged, except for a change in the operational and embedded carbon emissions.

4. COST EFFICIENCY

We explained our costing methodology in full in [NES28](#)¹¹, which also referred to our costs appendix ([NES04](#)). This includes Level 2 costs for all options except for treatment at Bran Sands which were at Level 3. We explained how we had arrived at these option costs, and how we had identified delivery efficiencies.

We developed our costs for the long sea outfall using a combination of our iMOD system and more detailed costing approaches. This was because using historic and industry costs from iMOD alone to develop robust level 2 costings would be very challenging – for this scope and scale, there is limited information and cost data points to construct a robust cost estimate in iMOD alone. Our engineering contracts developed a scope for the project which considered the optimal combination of pumping capacity, onshore and offshore pipeline. We then looked at each of these items in more detail.

For our pumping station and onshore pipeline, we were able to compare these to actual costs for a similar scheme at Howdon. This showed that the pumping station cost from our iMOD system was far too low – because this pumping station (at 2,588kW) is much larger than any other historic data held in iMOD, and so there are not enough data points for a robust estimate. Similarly, we found that the iMOD onshore pipeline costs seemed to be too high as there were not enough comparable cost data points for this size of pipework. We used the comparable costs from the Howdon schemes,

¹¹ [NES28](#), section 83

rather than our iMOD estimates, because these were more robust. This reduced the cost by around **£3m** compared to our original iMOD estimate.

We also undertook a thorough benchmarking exercise for the long sea outfall, which in NES28 was described as an alternative option. In NES28, we explain that “we saw this as essential, due to the uncertainty around the agreement and delivery of our preferred option, and the high cost of the alternative”¹². In Table 37 of NES28, we set out the results of our benchmarking, which involved a separate third-party assessment using four comparators:

TABLE 3 - LONG SEA OUTFALL BENCHMARKING £M (COPY FROM TABLE 37 OF NES28)

Items	Northumbrian Bran Sands LSO	Low	Medium	High
Scope	109.222	100.312	114.182	122.024
Pumping station	10.485	5.094	8.156	9.865
Onshore pipeline	28.724	26.335	34.423	39.323
Offshore pipeline	67.193	65.688	67.193	68.196
Other (power upgrade etc)	2.819	3.196	4.409	4.639
Contract overhead	29.772	30.539	33.986	42.911
Project overhead	36.256	23.758	28.940	30.533
Capex excluding risk	175.250	154.609	177.108	195.467
Risk	70.100	21.232	23.705	25.073
Capex including risk	245.350	175.841	200.813	220.540
Annual opex	1.564	1.910	1.910	1.910

The most difficult part of this to cost was the offshore pipeline. There is not much relevant UK industry data, and our initial benchmarking did not provide many comparators (one international comparison from the USA). We asked our separate third-party benchmarking contractors to create a more detailed bottom-up build-up for the offshore pipeline costs, supported by engagement with several marine pipelaying contractors and specialist plant supply companies. They recommended that a dredger plant would likely be required for the given depth, which further increased the estimated cost. We used the bottom-up build-up of costs for our offshore pipeline costs, as these are more robust than any benchmarked values.

We considered the capex costs for risk in more detail. The third-party assessment used their own risk assessment tool, but this did not match the approach to estimating risk that we had set out in our PR24 methodology¹³ - which was based on industry (and Government) best practice and benchmarked against comparable water companies. This means that although our capex estimate excluding risk is slightly lower than the “medium” benchmarking capex, our estimate of risk is higher. We considered that our approach to risk was more robust as it met independent advice and industry best practice.

¹² NES28, p75

¹³ See our cost assurance report, [NES68](#)

We asked a specialist (Gardiner & Theobald) to review and provide cost assurance for our proposed long sea outfall as part of their PR24 cost assurance PMO activities. They produced a report highlighting their findings and recommendations. Overall, their assessment was that the estimate of £245m was a robust figure for the proposed scope of works. They also stated that the cost per metre rate of the onshore and offshore pipelines benchmarked favourably against other more recent schemes in the North East and North West¹⁴.

This report also noted that the initial design phase of the project could show different costs, as the costs presented are based on benchmarking – but this is an unusual project which is likely to require a more detailed cost engineering exercise which should include a phase to consider if alternative approaches could reduce programme costs. This would focus on the pipeline route and developing a more detailed scope to allow an engineering bottom-up estimate to be conducted.

We asked Gardiner and Theobald to update their report to review the offshore benchmark produced by Aqua Consultants and the onshore pricing of the project based on Howdon PEPS, which we attach as NES28A1 to our representations as third party cost assurance. In particular, we asked them to look at the issue with the costs of risk identified by the Aqua report to test if this was a sensible alternative that should be used. G&T determines that:

“The revised iMOD estimate [of £245.35m] is a robust figure that can be utilised to progress the scheme forward based upon the scop set out within the Stantec pre-feasibility work.”

Subsequently, Aqua Consultants noted to us by e-mail that “we were not aware of the protocol or justification approach associated with estimating uncertainty for the purposes of the submission. From a first principles perspective, we would observe that, given the status of the project in question and the timing of the estimate, we would include estimating uncertainty and assumed that this would have been applied to the overall programme.... This would also explain the difference of opinion between ourselves and G&T.”

So, this provides us with confidence that our costs are efficient (under the benchmarking in Table 3) and that our third party cost assurance shows that our costs are robust.

An offshore pipeline would also require specialist contractors, which will not be available in our Living Water Enterprise (as we would not have otherwise needed these skills). We are already engaging with specialist contractors to understand how these more detailed costs might be developed.

5. CUSTOMER PROTECTION

The inclusion of a long sea outfall instead of treatment at Bran Sands STW does not make much difference to the benefits for customers through Ofwat’s common performance commitments – we do not expect any change.

¹⁴ We included these paragraphs in [NES28](#), p76.

In NES28, we explained that customers would be protected by a PCD for all WINEP schemes¹⁵ if the investment is cancelled or reduced in scope – and this will now include the long sea outfall too. This PCD is set according to individual project costs and is flexible enough to allow costs to be returned to customers for projects where the EA has decided that these are no longer required (which should not lead to a penalty). The EA has flexibility to change WINEP, including the delivery dates, and our proposed PCD means that projects must be delivered to the specification agreed under WINEP, with the EA confirming that WINEP actions have been delivered to the agreed timeframe and that environmental obligations have been met.

This PCD will work for the long sea outfall too. There is still a risk that this might not be required – with the potential for a future Government to conclude that a new approach is needed to catchment planning (and this is particularly the case for nutrient neutrality, where secondary legislation can be made to change the requirements). A flexible PCD means that any unspent costs can be returned to customers if the project were to be cancelled while it is being delivered (that is, removed from WINEP).

In our business plan, we proposed a notified item as an uncertainty mechanism for nutrient neutrality¹⁶. We said then that we hoped that the decision over what option must be pursued can be resolved with the PR24 process – and it has been, so this mechanism is not required.

However, with the inclusion of the long sea outfall there is risk to both customers and company due to uncertain costs. This scheme is different in scope and scale to what we – and the rest of the sector – has delivered before, and the delay (to June 2024) in making a decision to include this scheme has meant that we have not yet been able to start a more detailed design phase (for example, as we have done with our water supplies schemes in Suffolk). There remains a risk that our cost estimates will prove to be either too high or too low. Without any changes, any underspend or overspend would be shared 50:50 between customers and company through cost sharing.

If this rate were lower – such as 25:25 – then customers would be better protected if costs proved to be much lower than expected. If costs were higher than expected, customers would contribute a larger share of any higher costs (using a symmetric mechanism). This could be a good approach to reflecting the cost uncertainty created by an unusual project with an (unavoidably) squeezed timetable before final determinations, while still retaining an appropriate incentive to minimise costs and drive efficiency.

It may be possible to derive additional income from our programme of nature-based solutions and long sea outfall. Firstly, we may be able to sell “nutrient credits” to developers as our nature-based solutions are now aiming to go beyond the standards set under TAL. Customers are already protected here, as developer contributions would be included within the price control. We are not asking Ofwat for a licence modification¹⁷ to do this as a non-price control activity, as we think this

¹⁵ See Table 39 of [NES28](#)

¹⁶ [NES04](#), section 6.3.2

¹⁷ As Ofwat sets out on p127 of [Appendix 9 – setting expenditure allowances](#).

income should be used to reduce bills for customers. We have made no forecast of potential income from this within our business plan tables, as no plans are currently in place (due the timing of the decision from Defra).

Secondly, we may be able to agree third party contributions to our long sea outfall if others want to use this capacity from Teesside for industrial wastewater. We have no plans to do so, due to the timing of the decision, but could explore this option as part of our detailed planning stages. In this case, we would treat these as capital contributions to reduce the cost of the LSO, and so sharing these benefits with customers. If the cost sharing rate were set at 25:25, this would return 75% of any savings to customers.