PRT07.05 WINEP & PROTECTING THE ENVIRONMENT

CONTENTS

1. SUMMARY

This document describes the drivers, activities and costs of the work Portsmouth Water will undertake in AMP8 to deliver our obligations under the Water Industry National Environment Programme (WINEP) and to develop a targeted groundwater quality monitoring network.

Portsmouth Water's WINEP commitments for PR24 (AMP 8) fall into two types of obligation:

- The continuation of catchment management activity – directly seeking to influence land use practices to protect groundwater quality at source.
- The investigation of the majority of our source catchments to assess our abstraction activities possible impact on the Water Framework Directive classification on waterbody status within those catchments currently and in the future.

To provide confidence in the assessments and to integrate with Portsmouth Water's catchment management strategy, this investment proposal also includes the development of a targeted groundwater monitoring network in AMP9 which will provide critical data on water quality and groundwater levels. This data will be used to corroborate the conclusions from the investigation programme of AMP8 and will contribute to the accuracy of future groundwater models which will underlie any future investigations, whilst also enabling the impact of our catchment management activity to be monitored directly.

The majority of the investigations will take place during AMP8 with a small residual carry over to AMP9. This profile was agreed with the Environment Agency after significant challenge, which initially saw us wanting to deliver the investigation programme more evenly across the 2 AMP periods. The WINEP element of this case complies with our statutory requirements.

The investigation programme covers nearly all our abstraction sites. Where the investigation concludes our abstraction activity may cause risk to the environment, that investigation will incorporate an options appraisal process to identify the most appropriate course of action to mitigate or remove that risk.

We propose these initial options appraisals to be undertaken between 2026 and 2028 for the first set of investigations, with a second phase in 2030 to 2033. This is to reflect the phased approach to the investigations between the AMP8 (2025-2030) and AMP9 (2030-2035) planning periods.

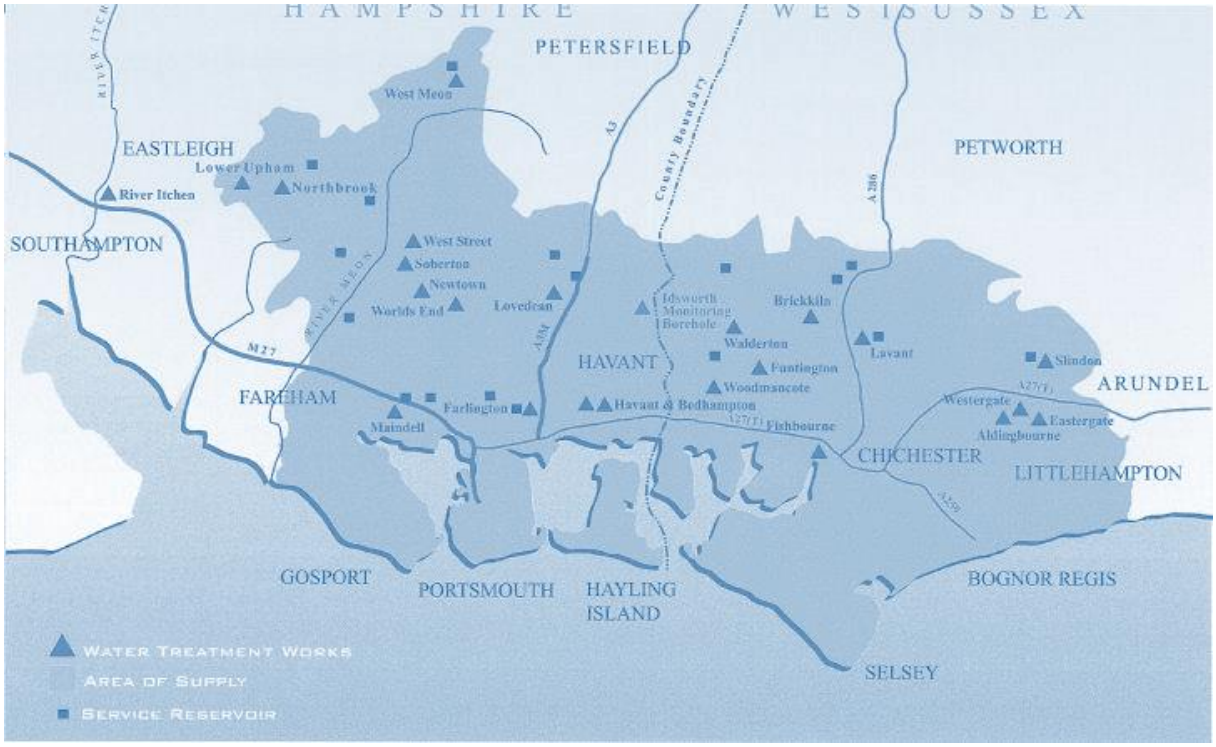
The total costs of WINEP across AMP8 and AMP 9, including catchment management activity, will be £10.43m, with £7.03m being required for AMP8. Of this, £2.505m is for the continuation of previously funded catchment management activity and would be considered base activity. Therefore this business case for enhancement funding for the increased specification and need for WINEP activities is for £4.525 in AMP8 and £0.850m in AMP9

This investment provides the following benefits, that are in line with the Portsmouth Water vision:

- The investigation and quantification of the possible impact our abstraction activities may be having on the environment.
- The identification of sustainable means of abstraction for the future.
- Tackling high nitrate concentrations at their source, resulting in a long-term customer benefit by reducing treatment costs, increasing sustainability of treatment processes as well as enhancing the environment and biodiversity of the catchments.
- Ensuring the most effective and cost-efficient outcomes are available for future planning decisions in WRMP29 and PR29, allowing us to achieve the right level of protection for the environment, securing high quality water supplies for our customers and proactively seeking to minimise the consequences for customers' bills.

The figure below represents Portsmouth Water area of supply. Portsmouth Water operates 21 abstraction sources across 10 geographic catchments. 20 of these abstractions are from wells or boreholes and take water from the ground (groundwater). Only a single site takes water directly from a river (surface water).

Figure 1: Portsmouth Water groundwater abstraction distribution



The average daily amount of water we put into supply across our network is in the region of 180 Ml/d – ranging from nearly 240Ml/d summer when demand is highest, to 150Ml/d in winter when demand is lowest. Taking this amount of water from the environment could impact on the underlying chalk aquifer and its dependent water bodies. With concerns being expressed by Regulators, Environmental Groups and customers over the acceptability of current and future levels of abstraction, a programme of investigation and options appraisals has been agreed with the Environment Agency, after a period of challenge.

For planning purposes and to inform our Water Resource Management Plan 2024 (WRMP24) and our long-term delivery strategy (LTDS), we worked with the Environment Agency to model a range of possible future abstraction levels we might reasonably anticipate for the future. These scenarios anticipate future abstraction reductions which could result in a reduction of between approximately 30 and 130Ml/d to our current deployable output (DO). This represents a material amount of water to our company and challenges our current operating model.

The investigation element of WINEP will allow us to move from an assumed range of values to a quantified level of anticipated abstraction reduction and will be incorporated into the future planning rounds for WRMP29, PR29 and the LTDS, significantly increasing the levels of certainty in our long-term planning.

Given the potential significance of the AMP 8 and AMP 9 WINEP investigation programme and our current reliance on groundwater sources of for water, the provision of high-quality groundwater monitoring data is considered important. Therefore we have included for the provision of an expanded groundwater monitoring network in this plan, to be installed in AMP 9 in order to corroborate the conclusions of our investigations.

Not only will this ensure abstraction impacts were properly identified but will provide key data on water quality trends. These are needed to determine the benefits of previous catchment management activities as well as direct the best use of resources in future initiatives.

This document supports the investment case summarised below:

Activity	AMP 8		AMP 9	
	Base	Enhancement	Base	Enhancement
WINEP Investigations programme	£0	9 x catchment investigations £4.480	£0	1 x catchment investigations £0.425
WINEP Catchment Management activity.	Continuation of current catchment work £2.505	Expansion into equine catchment work £0.045	£2.975	£0
Groundwater monitoring network	£0	£0	£0	Installation of 19 groundwater monitoring boreholes. £0.425
Totals	£2.505	£4.525	£2.975	£0.850

2. NEEDS

A. WINEP Overview

The Water Industry National Environment Programme (WINEP) represents a set of actions that the Environment Agency requires all water companies operating in England to complete, in order to contribute towards meeting our environmental obligations. The final list of actions comes from a prescribed regulatory process administered by the Environment Agency and involving Natural England and Ofwat. Previously, the WINEP focused on developing a 5-year funding programme, but in this round of planning has increasingly moved to developing a longer-term view and approach.

In going through the prescribed WINEP process, we fully understand the current level of concern over the stress chalk catchments are under and wholeheartedly agree a programme of investigations is required. These investigations need to both identify any specific impacts or risk of impacts our abstractions might represent, whilst also seeking to understand approaches we might take to protect flows and water quality - all whilst maintaining access to sufficient water for an efficient public supply.

These investigations are vital to informing our longer term “Environmental Destination” which will offset forecast environmental consequences of climate change in our long-term planning processes (WRMP24, LTDS). These investigations will include:

- Water Framework Directive (WFD) ‘No deterioration’ studies to review possible impacts of possible future abstraction patterns that might go beyond recent actual levels of abstraction to date.
- The possible positive and negative impacts of abstraction licence capping, where certain abstraction sources are capped at recent actual abstraction rates to understand if this action might be considered appropriate as part of a best value environmental solution.
- The impacts of historic catchment management to manage raw water quality to assess the long-term viability / treatment needs of our sites as well as to meet our Drinking Water Safety Plan (DWSP) obligations. For this, we aim to improve our groundwater data gathering strategy by implementing a new monitoring plan. To achieve the maximum value from the WINEP and DWSP, new monitoring boreholes are proposed across the catchment areas. This development would take place in AMP9.

Our Water Sources

The water we currently supply comes from three main sources[1]:

- 62% from boreholes and wells (groundwater).
- 27% from springs (groundwater).
- 11% from the River Itchen (surface water).

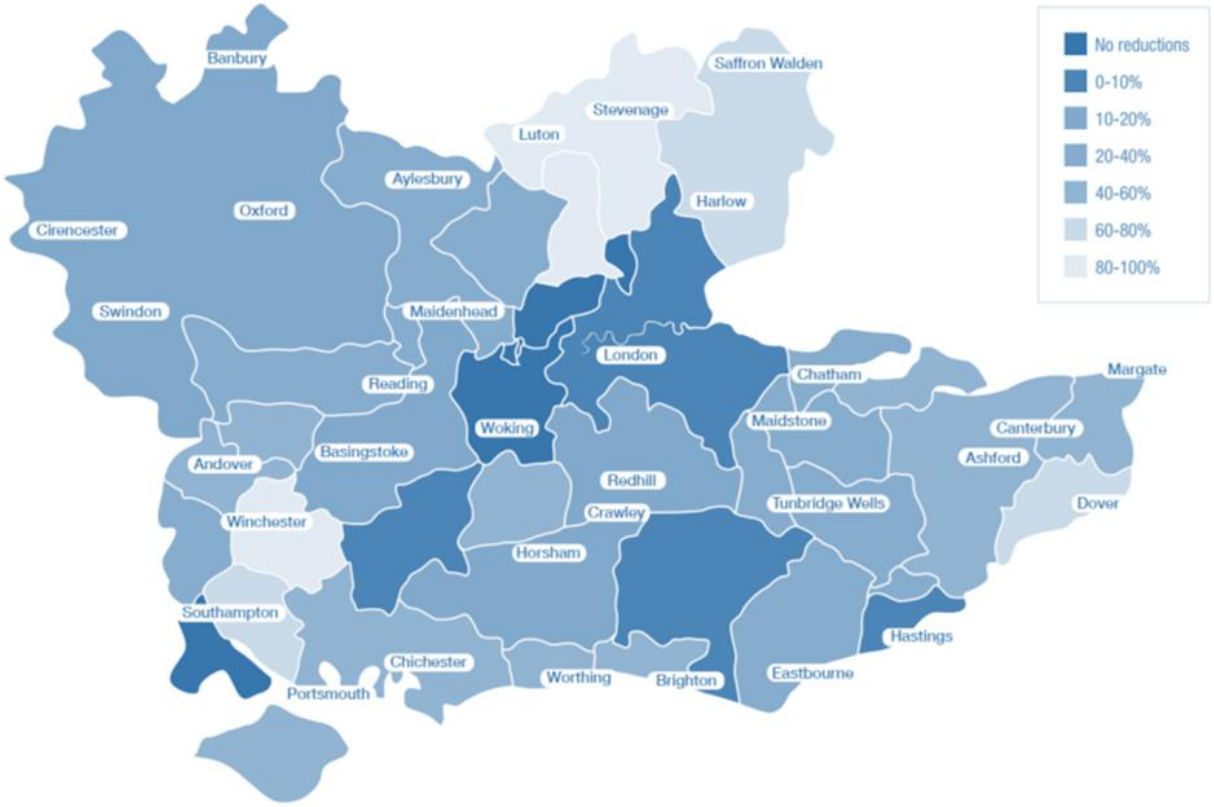
Portsmouth Water's supply region encompasses Five Special Protection Areas, Four Special Areas of Conservation, 32 Sites of Special Scientific Interest, Five National Nature Reserves, and 26 Local Nature Reserves as well as being partially covered by the South Downs National Park. All of our water comes from a chalk aquifer or the water bodies they support. Should it be identified that reduced abstraction is needed to protect the environment, such sustainability reductions are likely to have a significant influence on our supply capability. It is therefore vital that the WINEP produces robust assessments of impact and provides confidence over the identification of the ecological consequence of current or future levels of abstraction.

[1] Figures from Water Resources Management Plan Summary document (2023) - PRT17 Water Resources Management Plan

Through WRMP24 Regional planning process, we worked with the Environment Agency to model feasible scenarios of abstraction reduction to use as planning scenarios, in the absence of the quantified data that will be provided by these planned investigations. This exercise was undertaken by all the companies in the Southeast and Water Resources South East (WRSE) produced figure 2 below which highlights the scale of expected sustainability reductions to abstraction levels across the whole Southeast region.

In the absence of a quantified view which will come from these investigations, our supply region has been identified as likely requiring a 40-60% licence reduction to meet the sustainability needs. This comparison impact assessment by WRSE indicates that all the catchments in our supply area are considered 'high priority' for meeting the Environment Agency's proposed 'environmental destination' and therefore the significant sustainability reductions, mentioned previously, are modelled within the supply demand balance. As a result, a range of both supply-side and demand-side schemes are needed to meet a supply demand balance deficit. Given the financial and operational consequence that such large-scale reductions in abstraction would bring, it is necessary for the investigations element of the WINEP to be delivered in order to refine the assumed impact assessments though detailed investigations and options appraisals.

Figure 2: Expected sustainability reductions over the Water Resources Southeast Region.



Our inclusion of this business case is driven by the imperative need to quantify the level of abstraction adjustment necessary to deliver environmental improvements to give confidence in our future long-term planning and investment needs.

Other than the continuation of our catchment management activity, the WINEP schemes proposed are investigation-based, rather than implementation schemes. The outcome of these investigations and the information they will provide will inform the adaptive pathways for WRMP29 and PR29 and other interventions needed to meet the relevant environmental drivers.

This investment will consist of investigations for 9 catchment in AMP 8 and 1 catchment in AMP 9.

The non-investigatory element of our WINEP programme is for a continuation of the catchment management activity we currently undertake.

The main water quality concern seen within abstracted groundwater quality is high nitrate concentrations. Nitrate trend assessments undertaken during AMP 6 and AMP 7 show 11 abstractions have rising nitrate levels and, in some cases, seasonal “spikes” that go above the drinking water standard of 50mg/l. These abstractions have been designated to be Safe Guard Zones by the Environment Agency (AMP 6). Measure Specification Forms were produced for the 11 abstractions. These forms provide detailed actions and measures to reduce nitrate levels in groundwater with short and long-term actions and deliverable timescales which have been agreed with the Environment Agency. Specific actions that will continue will include farmer engagement, funding to reduce nitrate impacts in our catchment through Payment for Ecosystem Services (PES) and Capital Grant Scheme for nitrate reduction equipment. In AMP 8, these Measure Specification Forms will be amended to Action Specification Forms (ASFs) and are likely to have similar measures to reduce nitrate impacts. The ASFs will be developed and agreed with the Environment Agency prior to April 2025.

B. Monitoring Network Overview

Currently, our groundwater quality monitoring network is supported by three Environment Agency boreholes, which are those in our supply area that make up the national Groundwater Quality Monitoring Network (GQWMN).

Historically this has been a sufficient level of monitoring to identify risks and understand hydrogeomorphology affecting our sources.

However, recent work with the Drinking water Inspectorate on our Drinking Water Safety Plans and the emergence of Environmental drivers requiring detailed investigations into all our sources requires has changed this view. In order to ensure possible future investments in treatment or sustainable new sources of water represent good value for customers and accurately inform our long-term planning vehicles, we now require significantly more granular data on both groundwater quantity and quality.

Therefore, we are planning a more robust groundwater quality monitoring network which, for our own confidence, we own and operate.

C. Supporting Our ‘Vision’

The Portsmouth Water vision ‘Excellence in Water. Always.’ [2] sets out our ambitious vision for the next 25 years, operating against the backdrop of climate change, population growth and a changing world. It outlines a commitment to provide an affordable, reliable, and sustainable supply of high-quality water for our customers. By being smart in our approach, we will work with local communities to meet our core water supply activities while protecting and enhancing the environment for future generations.

[2] PRT16 Our 25 Year Vision (consultation version)

This investment case supports our vision to:

1. **Ensure the long-term resilience and security of water supplies through proactive planning and risk management**, by ensuring we can demonstrate a move to environmentally sustainable levels of water abstraction in all our catchments.
2. **Provide high-quality water to customers now and in the future by investing in innovative and sustainable solutions** by obtaining more accurate data from a wider evidence base to improve our solution choice-making.
3. **We'll invest in catchments before we invest in concrete, putting the environment at the heart of our decision making and securing sustainable water supplies** by understanding the opportunity and benefit available from nature and catchment-based solutions in our catchments to support the environments we abstract water from.
4. **We won't need to implement restrictions during even the most severe droughts – and our services will remain reliable through the biggest environmental shocks** because this work will help us to ensure our sources are sustainable, even in extreme weather.

The investigation element of our WINEP programme involves studying water availability, quality, and demand to identify opportunities for sustainable management of water resources. By investing in these investigations, we can improve our understanding of the water resources available to us, assess the risks associated with future water demands and supply, and develop effective strategies to ensure that water supplies are resilient and secure in the long term and articulated in our future WRMPs and LTDS.

We feel that given the significance and potential scale of future impact of this work over the next 10 years, there should be an emphasis on obtaining high quality data over a prolonged timescale to accurately inform how abstractions are influencing both water quality and quantity.

We are therefore including in our proposals the implementation of a groundwater monitoring strategy to signal the risk from drought and contamination and the risk to the environment.

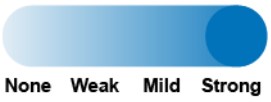
With such a strategy, it will be beneficial to incorporate our on-going Catchment Management programme to reveal the scale of the challenge to water quality and the potential improvements produced by the better management of nitrate application. Investment in catchment management over more traditional concrete solutions not only prevents deterioration of the environment, but also reduces the embedded and operational carbon that would otherwise be expended in the treatment of drinking water.

This work will continue to involve engagement with local farmers and land owners, guiding them to limit practices which might inadvertently pollute local catchments with nitrate, as well as collaborating with other stakeholders to promote water quality objectives. The inclusion of our catchment management programme within our WINEP has been endorsed by our local Environment Agency office.

D. Supporting Performance Commitments

The table below summarises the linkages the proposals in this investment case have to the common performance commitments:

Table 1. Links between this investment case and the common ODIs

Performance commitment	Relationship	Justification
Total / Serious Pollution incidents		Whilst this proposal aims to minimise the number of pollutants that get into the groundwater, it will not impact the number of pollution incidents that come from our business.
CMex, DMex, BR-Mex		Customer Service is dependent on our ability to provide a plentiful of drinking water under challenging dry weather conditions. This proposal is a key step to ensuring the sustainability of our raw water sources in the future.
Compliance Risk Index (CRI)		Whilst this proposal aims to safeguard groundwater quality of our raw water it will not impact this measure that is a product of water post-treatment.
Water Supply Interruptions		Whilst this proposal will seek to secure sustainable sources f raw water into the future, it will not directly impact on this service measure.
Operational Greenhouse Gas emissions		This proposal will allow us to understand the opportunity presented to us for catchment and nature-based solutions - minimising embedded and operational carbon that could come from more traditional solutions.
Biodiversity		The proposal aims to allow us to increase the use of nature-based solutions and catchment management approaches.
Leakage		This proposal will not impact on our leakage performance.

Performance commitment	Relationship	Justification
Per capita consumption & Business demand		This proposal will allow us to speak confidently about the relationship between the source of our raw water and the environment and will provide data, knowledge and compelling narrative to engage people in water saving initiatives.
Discharge permit compliance		This proposal will not impact on our compliance performance.

E. Historical Perspective

Our AMP7 WINEP programme comprised of 18 schemes, detailed in the table below;

Table 2 AMP7 schemes delivered by Portsmouth Water

Scheme ID	Scheme Name/Name of Investigation/Site Name/Licence name	Driver Code (Primary)	Links to PR24
7PW200001	Gaters Mill Eel Screens	EE_IMP	Implementation scheme complete.
7PW200002	Gaters Mill Brook Lamprey Screens	HD_IMP	Implementation scheme complete
7PW200003	SOBERTON	WFD_NDINV_WRFlow	Wider sources in the Meon will be investigated in PR24 to allow cumulative effects to be understood to quantify risk of no deterioration. Moen now has a HD driver and requires further assessment.
7PW200007	Investigation to determine the costs, impacts and technical feasibility of reaching or maintaining revised CSMG flow targets for the River Itchen SAC. Suggest this is a joint investigation with Southern Water and South East Water.	HD_INV	Scheme progresses into AMP8 for joint options appraisal with Southern Water and South East Water

Scheme ID	Scheme Name/Name of Investigation/Site Name/Licence name	Driver Code (Primary)	Links to PR24
7PW200011	Investigation for biosecurity of "other" pathways (including all water company operations, recreation activities and assets) incorporating options appraisal, mitigation measures assessment and delivery of operational changes/small cost interventions as pilot projects/further investigation.	INNS_INV	Investigation and implementation to continue as Business as Usual.
7PW200015	Investigation with options appraisal into increasing catchment natural capital/ecosystem services in delivering groundwater DrWPA catchment measures.	NERC_INV1	Investigation complete and catchment management continues as Business as Usual (BAU)
7PW200019	Clanfield Springs Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200021	Catherington South Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200023	Fareham Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200025	Fontwell Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200026	Bosham East Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200028	West Ashling Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200030	Slindon Common Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200031	Oving Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200032	Norton Safeguard Zone - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW200033	North Warnford - catchment measures	DrWPA_ND	Remains as a BAU activity

Scheme ID	Scheme Name/Name of Investigation/Site Name/Licence name	Driver Code (Primary)	Links to PR24
7PW200034	Bishops Waltham - catchment measures	DrWPA_ND	Remains as a BAU activity
7PW300001	Gaters Mill - Investigation to determine the costs, impacts and technical feasibility of reaching ASB3 in principle salmon rivers (as per Salmon 5 Point Action Plan). Suggest linked to rCSMG investigation.	NERC_INV2	Linked to 7PW200007. Scheme will continue into AMP8 for Options Appraisal.

A number of investigations related to ground water quality were conducted in the AMP 6 National Environment Programme. These investigations concluded that the agricultural application of nitrogen is the main source of nitrate in the predominantly rural catchments to Portsmouth Water's groundwater sources.

As a result, AMP 7 included the requirement for us to undertake 'Catchment Scheme Actions'. The aim of these actions was to prevent the water quality deterioration (in relation to nitrate) and to avoid the need and eventually reduce the amount of existing and potential future treatment at our abstractions.

Groundwater is generally slow moving through the environment and as a result background quality (rather than point source pollution) exhibits a slow-moving trend. However, the chalk also exhibits fast moving groundwater flow through fractures and other karstic features in our landscape. It is therefore widely recognised that a 5-year window to set up catchment schemes and deliver mechanisms to reduce water quality improvement is very limited. All our catchments have complex groundwater travel times and pathway risks. Actions to prevent pollution on a seasonal (agricultural) basis is needed and actions to influence or reverse long term background quality trends will also be required.

We therefore intend to continue our catchment management campaign to improve water quality both for our customers and the environment for the foreseeable future. An identified weakness of the current approach has been the difficultly to measure the changes in groundwater quality and assess the impact of the catchment management work. A limited number monitoring of monitoring sites are available today, which provide useful data but do not cover our supply area in sufficient granularity. Hence, we are proposing to develop a groundwater monitoring programme with an expanded monitoring network in AMP9, to fill the data void. With the establishment of effective monitoring, this will not only provide crucial evidence on water quality trends, but also generate key groundwater level datasets to corroborate the findings of our WINEP investigations.

F. Regulatory and Statutory Compliance

Following the guidance issued by the Environment Agency and working with Natural England and Ofwat, we have created a WINEP programme that is legally compliant and that provides overall benefit from our investments to customers, society, and the environment.

All the elements of our WINEP programme are as a result of applying statutory drivers to our situation.

Our initial view of our WINEP programme was submitted to the Environment Agency in November 2022. Following that submission there has been an ongoing dialogue and challenge to the phasing of our proposal with National and Local colleagues in the Environment Agency which concluded in September 2023.

Table 3 below maps our final proposed WINEP programme with the statutory drivers from the WINEP guidance.

Our need for the groundwater monitoring boreholes comes from a need to provide detailed data on groundwater quality and levels to better inform the production of the statutory Drinking Water Safety Plan (DWSP) and to corroborate the conclusions of the statutory investigations prescribed through WINEP.

Table 3: Elements of our final WINEP programme mapped against the statutory driver codes.

Action ID	Drivers	Investigation Name	Main River catchment
08PW100009a & 08PW100009b & 08PW100009c & 08PW100009d	WFD_NDINV_ WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Eastergate, Westergate, Aldingbourne and Slindon	Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife
08PW100001a & 08PW100001b	NERC_INV 25YEP_INV WFD_NDINV_WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Walderton, Brickiln and Woodmancote.	River Ems
08PW100002a & 08PW100002b & 08PW100002c	NERC_INV 25YEP_INV HD_INV WFD_NDINV_WRFlow	Catchment based Water Resources investigation into the Soberton, West Street and West Meon.	River Meon
08PW100003 & 08PW100003b & 08PW100003c	EDWRMP_INV WFD_NDINV_WRFlow WFD_INV_WRHMWB	Catchment based Water Resources investigation into Maindell, Worlds End and Newtown	River Wallington
08PW100004a & 08PW100004b	WFD_NDINV_WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Northbrook and Lower Upham	River Hamble
08PW100005	HD_IMP SSSI_IMP WFD_NDINV_WRFlow EDWRMP_INV	Water Resources investigation into the River Itchen (including Portsmouth Water's Gators Mill)	River Itchen
08PW100006	NERC_INV 25YEP_INV HD_INV WFD_NDINV_WRFlow	Water Resources investigation into the Drought Order (Slindon) and Southern Water Drought Order scheme.	Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife
08PW100007	EDWRMP_INV	Regional Environmental Destination Options Appraisal	Regional
07PW200019, 21, 23, 25, 26, 28, 30, 31, 32, 33 & 34 schemes	DrWPA	Drinking Water Protected Area schemes – 11 schemes for nitrate (continuation of AMP7 schemes. Aldingbourne Eastergate Westergate Slindon	Regional

Action ID	Drivers	Investigation Name	Main River catchment
		Fishbourne Behampton & Havant Springs Lovedean Maindell Northbrook West Meon	
08PW100008	Invasive None Native Species Implementation - Continuation of INNS_INV 7PW200011 as an improvement into AMP8.	All catchments	Regional

G. Customer Support

We implemented our new insight strategy in 2020, making sure it met our current and future needs and the changing relationship we want to create with our customers and communities.

The focus has been on expanding our insight gathering and providing an embedded approach to drive not just our business planning processes and strategies but also collaborating on our day-to-day service delivery, putting customer and community views at the heart of our plans and approaches.

Our conversations spanned five themes: the core service; affordability; resilience; environment; and social purpose. The figure below shows how our conversations covered each of these themes.

Full details of our engagement process, findings and how those findings have influenced our plan can be found in the supporting document PRT03 Engaging and Understanding Our Customers and Communities.

A very high-level summary of what customers told us from the concerns and priorities big conversation is:

Environment: preserving the local environment is important but seen as a medium priority; long-term plans should not be at the expense of the environment; go faster where cost effective to improve biodiversity.

Reliable service: ensuring efficiency means minimal leakage, preference for 2040 target to halve leakage; continuing to avoid long term interruptions and long-term security of supply are critical.

Water quality: high levels of acceptability to improve performance at no additional cost on the bill.

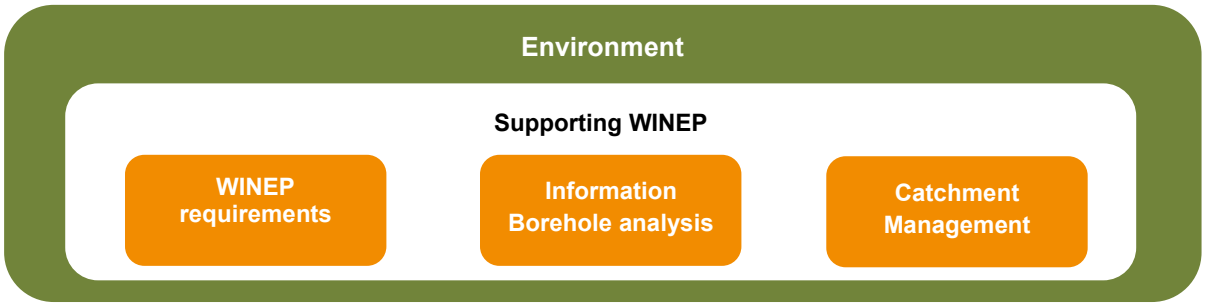
Customer service: satisfaction is strong, but service touchpoints need updating; vulnerable customers value easy customer journeys and good communication.

Affordability: is becoming more of a concern; customers want stable bills with intergenerational funding even investment profiles, with support for the vulnerable.

The WINEP programme, together with the associated groundwater monitoring boreholes, are critical to us informing the sustainable development of our medium and long-term plans. This is a demonstrable priority for our customers.

Whilst our engagement has covered significant elements of our environmental improvement work, our activity falls into our WINEP requirements with a smaller element of environment work which is required to be done adding to that investment case.

The three key areas of environment within our business plan are:

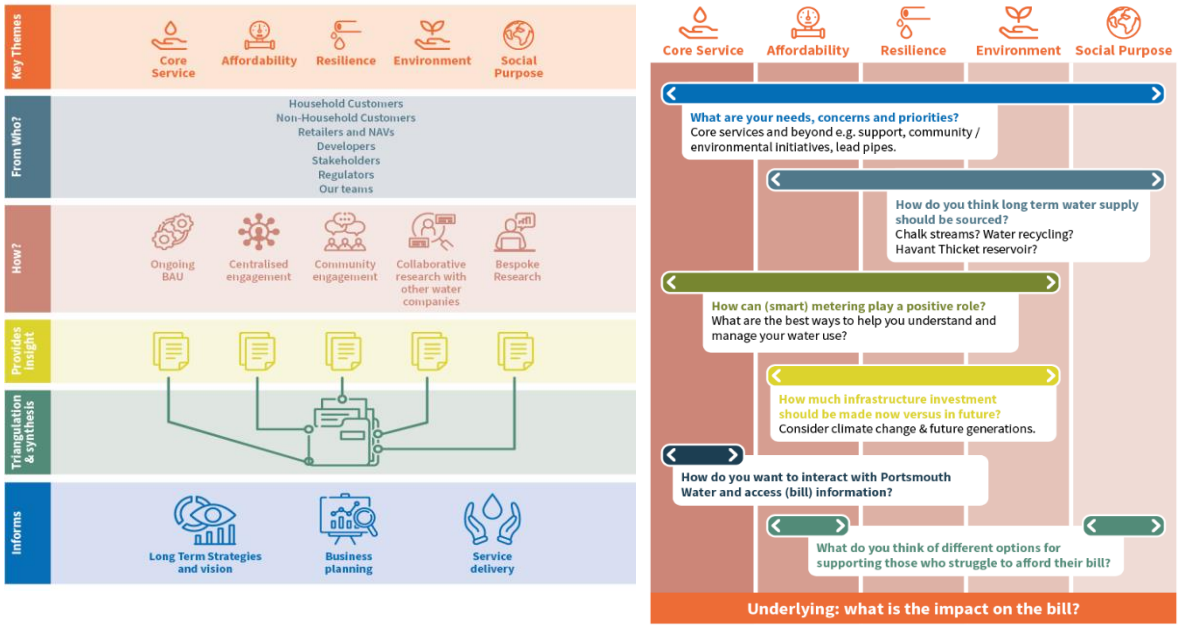


Our research with customers has focused on:

- The overall support for making the environment a priority
- Additional investment relating to catchment management

Our strategy alongside our BIG conversation framework has provided ongoing research insight as well as identifying gaps to drive bespoke research when necessary.

Figure 3: Engagement Strategy and Big Conversation Framework



Whilst not all research is summarised below, we have included key research that has informed the insight around the environment significantly. The full view for all our research is laid out in PRT03 Engaging and Understanding our customers and communities.

Consumer Advisory Panel – Report 4 – April 2023

This engagement focused on the following objectives:

- Exploring customer views on a series of ideas relating to social value and how it could be funded

- Assess which ideas had customer support
- Understand how each could impact on the perceptions of Portsmouth Water

As part of this research we specifically explored environmental improvement by sharing with customers the outcomes of previous consultation that showed support not only for us to continue with our catchment management grants, but also extending. This was up to £200,000 per year at a cost to the average annual bill of 8p per year.

We explored the options of spending the additional grants with:

- Further grants to farmers
- Supporting other local initiatives through a bid process

Insight obtained told us:

> Providing additional support to improve the environment is seen as an intuitive and appropriate area for Portsmouth Water to focus on, due to it's direct link to the environment as a business. Diversifying support to ensure it's inclusive of farmers and other relevant stakeholders is seen as the preferred next step.

Customers also told us that in relation to additional grants to farmers:

- The idea to give more grants to farmers is positively accepted
- The cost is seen as low
- Customers are likely to be supportive
- Its key to ensure that we monitor for positive outcomes from the grant
- Some questions did wonder if that would be sufficient funding to bring about change

In regard to funding additional initiatives, customers told us:

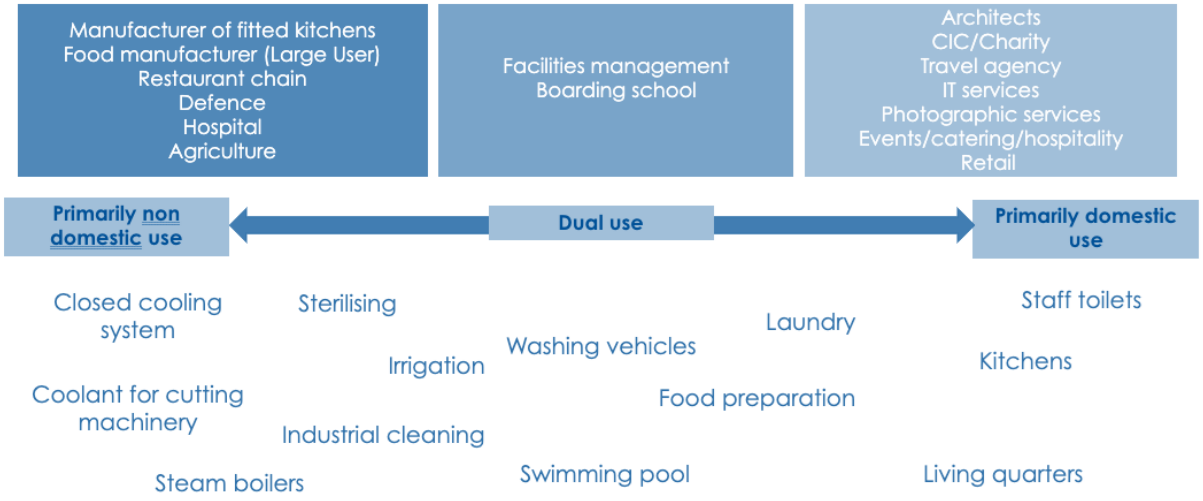
- This was the best option for social value being delivered in the area
- View that lots of local organisations could benefit
- Hard to visualise without a sense of the scale of projects

Non-Household Plan Choices qualitative Research – April 2023

This research was 17 online interviews made up of:

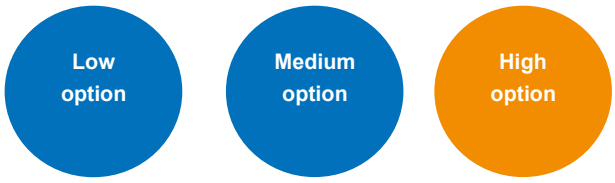
- 12 SMEs
- 3 Business large users
- 1 developer
- 1 stakeholder

This research covered the following water usage types:



Customers were presented the 3 options used in this stage of engagement.

Customers preferred plan choice was:



We talked more as part of this research to help us better understand customer drivers which identified:

- Many customers felt the options had a very minimal cost (even the highest)
- There was a clear climate change driver based on the customers geographical location (with those closest to the coast having higher impact awareness

"To be honest the figure is only 36p - whether for the environment or not they should just go to the higher level. It's hardly worth mentioning. No one will notice it on the bill. We are all in this together, we will soon moan when things aren't being done. For a minimal amount it is a no brainer"

(SME, primarily domestic use)

"Wildflower meadows sounds all well and good, but is that really what we need? We need to be prioritising spending due to how constrained budgets are for water companies"

(NAV, primarily non- domestic use)

- The overall customer view chose the high investment option across all research (this is potentially due to the low cost on bills of delivering).
- Future customers are particularly likely to choose the high option as they exhibit a high level of concern for the environment.

Customers see this as an important activity to enhance and protect the environment in an effort to counter any negative impacts we have on it.

Plan Acceptability

Improving the environment was rated the most important by a third of participants (33%) in the Acceptability and Affordability testing.

In the qualitative element of our Acceptability and Affordability customers were supportive of environmental targets that we had set and the impacts on bills were seen to be very small, although some customers wondered whether customers should fund or whether it should be funded through CSR and grants.

Balanced view:

- there is support for the plan detail to double grants and improve key sites.
- While not seen as urgent investment customers are willing and able to pay

3. OPTIONS

A. WINEP Overview

Our WINEP programme has been developed following the process outlined in the WINEP guidelines and in consultation with the Environment Agency, Natural England and Ofwat. Inclusion of a scheme on the final WINEP spreadsheet indicates that regulators support the inclusion of investigations where they reduce uncertainty and see quicker or better delivery of Environmental Destination

The following section describes at a high level the process we followed to arrive at our final WINEP programme, including the options assessed through that process. A detailed explanation and record of the process we followed is captured in Appendix C of this document.

B. WINEP option process

Description

The key stages of the development and delivery of the WINEP process are outlined in Table 1. A high-level overview of WINEP steps stage 1 to 3 are shown in Figure 4.

Table 1: Key Stages within the WINEP process for Portsmouth Water.

WINEP State	Portsmouth Water Activity	Status
Stage 1	Regulatory guidance.	Completed
Stage 2	Workshop with regulators. Identifying the long list of WINEP Schemes	Completed
Stage 3	Creation of short list and production of Option Assessment Reports.	Completed
Stage 4	Refining costs and approach with ongoing stakeholder discussions. Production of Action Specification Forms	On track
Stage 5	Final determination from Ofwat (Price Review completed)	Yet to be started
Stage 6	Investigations and outputs completed	Yet to be started

WINEP Stage 1 and 2 have been completed which involved the Environment Agency setting the WINEP framework and a collaborative stage to identify the environmental risks and issues to be addressed through the WINEP.

In **Stage 2**, working with our local offices of the Environment Agency and Natural England, we identified a long list of possible schemes for consideration. These potential schemes were grouped into 10 hydrological catchments to ensure in-combination factors and synergies were identified.

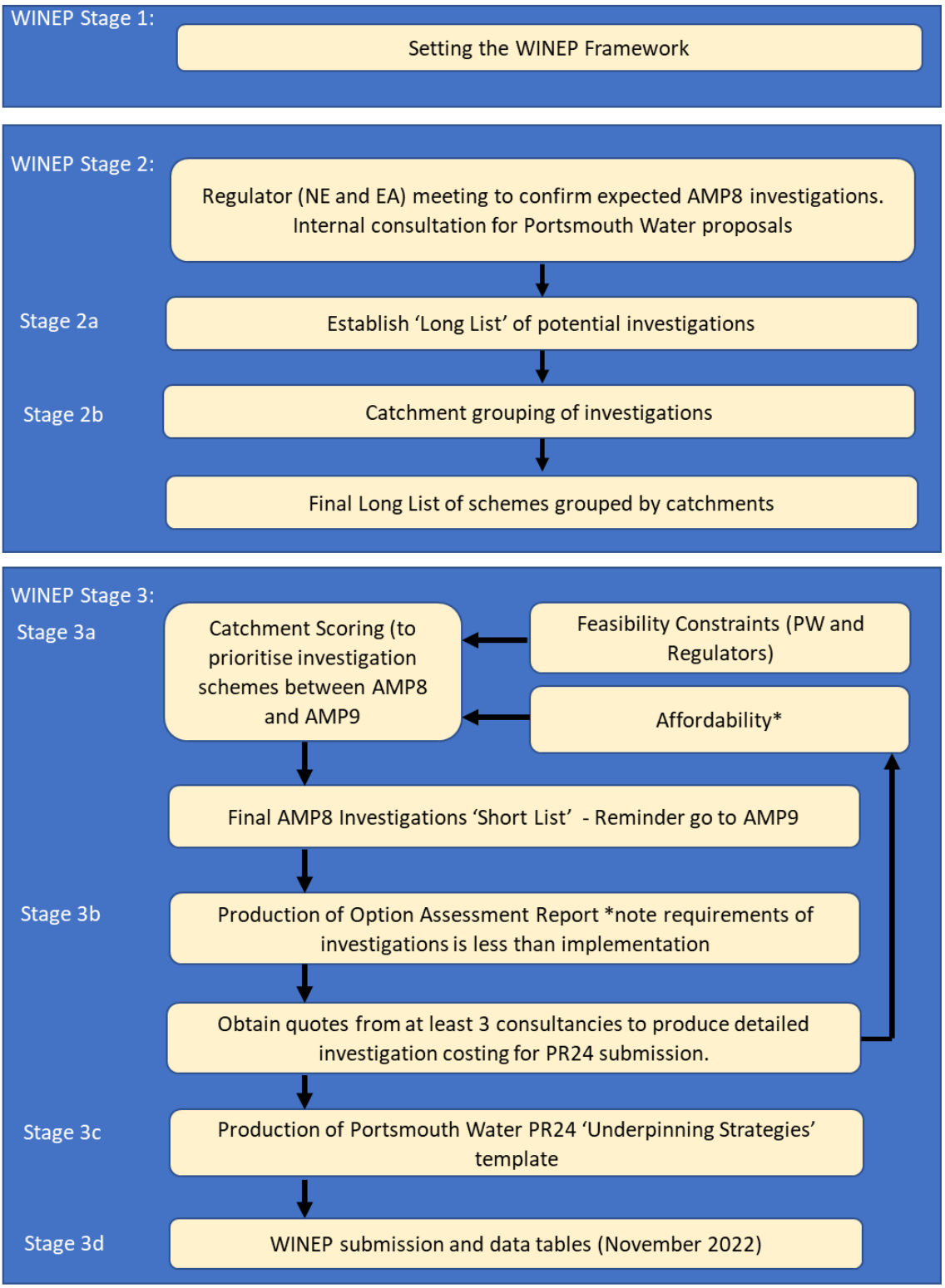
As we worked through **Stage 3**, we initially considered it was not viable that all 10 catchments – covering 19/21 of our abstraction points, could be investigated in AMP8, due to affordability and practicality considerations. Therefore the schemes were prioritised over AMP8 and AMP9.

In order to come to this initial prioritisation we followed a risk assessment and scheme scoring process with supporting reviews of feasibility and initial high-level costing. The detail of this process and the engagement with the Environment Agency through this process is described in detail in Appendix E

Whilst not part of the WINEP programme directly, in this investment case we are also including the need and costs to install a network of groundwater monitoring boreholes. This network, consisting of monitoring boreholes sited at key locations within each catchment, will work to corroborate the conclusions of the WINEP investigations. This is important because 20 of our 21 abstraction sites are groundwater sources and will rely on this data going forward. The network will provide high quality data on quality and groundwater level response to abstraction vital to both determining environmental impact and the consequences of our catchment management work.

The first milestone for the completion of Stage 3 was the submission of our initial WINEP programme proposal to the Environment Agency on 31 November 2022.

Figure 4: High level overview of WINEP Steps Stage 1 to 3.



*affordability is a key constraint in the prioritisation of catchment investigations. This will need to be reviewed alongside other investment needs for PR24 and alongside the detailed costing.

Following this milestone we entered an iterative cycle. The phasing of, but not the overall scale of, our initial proposal has been subject to ongoing discussions between ourselves and the Environment Agency, both locally and nationally, right up to September this year. The issue of concern was the phasing of the investigation programme between AMP 8 and 9. The inclusion of the catchment management elements of the WINEP programme for AMP 8 were never disputed.

With the submission of this business case we have settled on the phasing of our investigation programme within the WINEP programme, and we are continuing to develop the Option Assessment Reports (OARs), in line with the WINEP options development guidance. The OARs aim to resolve the environmental risk and issues identified in Stage 2 assessments.

The proposed investigations would be classified as detailed investigations into specific schemes which could significantly increase ambition. This would be reviewed case by case. For catchments with known lower environmental pressures (or small expected DO losses) or those with greater level of assessment or data, the investigation will focus primarily on the options appraisal element of the investigation. This is expected to be the case for the collaborative investigation with Southern Water and South East Water on the River Itchen where all parties are jointly seeking to identify the best outcomes via a detailed Options Appraisal (Action ID: 08PW10005). Desk based studies would be used to inform the required detail of the investigation.

When considering WINEP, we consider it necessary to implement a new strategy of groundwater monitoring, requiring catchment monitoring boreholes to identify potential contamination prior to reaching the water supply abstraction boreholes. This will guide the need for the catchment management and will inform the DWSP (Drinking Water Safety Plan) activity.

We are proposing enhancing our groundwater data gathering strategy by implementing a new monitoring plan. The monitoring plan includes the implementation of 19 monitoring boreholes, one at each active abstraction point across the 10 catchments. This plan will inform us on a much more granular level of the groundwater quality and level of our area, which will help mitigate the risk of drought and provide early warning of potential water contamination.

Currently, our groundwater quality monitoring network consists of the three Environment Agency boreholes constituting the element of the National Groundwater Quality Monitoring Network (GQWMN) in our supply area and Water Quality (WQ) sampling made directly in the water supply abstraction boreholes.

Stage 4 of the WINEP process, which is still ongoing, is where the full detailed scope of the investigations will be developed and agreed with Regulators ahead of AMP8 via the Action Specification Form (ASF) and will be based on the following key themes:

- Investigations will be catchment based to ensure cumulative effects and mitigations are considered at the right scale.
- Investigations will include a review of any barriers to fish passage in the catchment which may hinder ecological status. This element has been added to the investigations to cover a concern raised by the Environment Agency.
- Investigations will quantify the extent of Deployable Output losses to provide greater certainty on any required investment.
- Investigations will include a detailed options appraisal to identify the most suitable range of options and measures which provide the best overall value (this will follow the latest WINEP guidance at the time).
- Investigations will review wider catchment pressures to ensure a full range of catchment and nature-based solutions (C&NBS) can be considered within the options appraisal. Options appraisal will also consider customers priorities, Natural Capital and Environmental Net Gain in option development and assessment.

- Options Appraisal will consider wider social and environmental benefits (as per the EA's WEO Metric spread or the latest assessment method) and Portsmouth Water's Vision Statement and WRMP requirements. Once produced for PR24, the outputs of Portsmouth Waters Long Term Delivery Strategy will inform the options appraisal.
- The options appraisal will also need to ensure and demonstrate how the options will continue to the WINEP wider environmental outcomes.
- For each catchment investigation there will be a collaborative working group with regulatory and non-regulatory stakeholders. This will be detailed via the Action Specification Form, but Portsmouth Water would seek to engage at an early stage with all relevant stakeholders.

Investigations will consider the range of drivers to ensure all requirements are met. This will be detailed in the Action Specification Forms developed prior to the start of AMP8.

C. Investigation outcomes

The outcome of the investigations will indicate any effects of abstraction on the wider environment, characterised through the classification of waterbodies under the Water Framework Directive. If significant effects are identified, then a mitigation options appraisal would be undertaken. It is anticipated that the outcomes of such appraisals would likely fall into one of five core categories:

- An abstraction source is subject to a licence reduction.
- A nature-based solution(s) is implemented to bring wider environmental benefits, whilst retaining abstraction.
- An abstraction source is subject to a smaller licence reduction with potential impacts being offset / mitigated by nature-based solution(s).
- An alternative supply option is considered (which may include relocating the source further downstream or a whole new source of water)
- A combination of all the above.

This outcome would be identified via a detailed options appraisal.

The options appraisal element of the WINEP investigations are planned to take place between 2025 and 2028 for the first set of investigations, with a second phase in 2030 to 2033. This is to ensure that the information from these investigations can be taken into consideration for WRMP29, PR29 and our monitoring plan for our Long-Term Delivery Strategy. As the outcomes of these investigations are a significant driver for investment decisions in future AMPs these are time critical investigations.

Whilst the catchments are separate investigations the options appraisal would consider wider strategic options to meet the requirements of Environmental Destination and other environmental drivers. The options appraisal will also utilise existing data from WRMP24 options appraisal for supply side schemes and the outputs of the WRSE Environmental Destination WINEP investigation. The key themes of the options appraisal include:

- The appraisal of options for delivery will focus on the review of wider social and environmental benefits and consider the effects on resilience and affordability. The detailed scope of the options appraisal will be confirmed via the Action Specification Forms in due course.
- Use of Pywr water resources model to investigate the impact of potential sustainability reductions on the integrity of our WRZ and the potential need for local network improvements to overcome any restrictions. It is anticipated these improvements will be introduced as options within WRMP29 and WRMP34 and Portsmouth Water associated business plans.
- A full range of catchment and nature-based solutions (C&NBS) will be considered. This includes catchment management and river restoration to bring wider benefits, such as reduction in flood risk, pollution, improved biodiversity and supporting catchment to adapt to climate change.

- Co-funding to bring wider benefits and increased speed of delivery.
- Customers priorities to ensure options align with customer preferences.
- Natural Capital and Environmental Net Gain in option development and assessment.
- Consideration of the wider social and environmental benefits (as per the EA's WEO Metric spreadsheet or the latest assessment method) and Portsmouth Water's Vision Statement and WRMP requirements.

The output of the options appraisal will result in potential options which will be included for WRMP29 and WRMP34 as potential options for consideration. The solutions are expected to have a quantified Ml/d volumetric benefit. We may consider catchment trials where we need to generate evidence on the suitability of catchment and nature-based solutions.

We will seek to implement options as soon as possible to reduce the timescales of meeting our environmental obligations. Within options appraisal between 2025 to 2028, consideration of the residual uncertainty within the AMP9 investigations (2030-2035) will need to be considered to reduce the risk of sub optimal investment. For example, we will want to avoid a proposal of a network transfer scheme to offset abstraction without knowing the full extent of deployable output losses at alternative / donor sources. We would however seek to implement 'no regret' options in AMP8 and AMP9, subject to funding. Options which may be considered no regret could include staged licence reductions or Catchment and nature-based solutions or in stream habitat improvement works. If this is the case, then during AMP8 we will seek co-funding and co-delivery opportunities to ensure a prompt delivery of options and schemes.

Other WINEP schemes

Aligning with the WINEP investigations, the majority of the non-investigatory elements of the WINEP programme is the continuation of existing catchment management works within the bronze PES option. This will include 'meaningful engagement' with additional farmers as well as the continued cooperation with stakeholders to monitor and manage local catchments. 'Meaningful engagement' actions include a collaboration and education type engagement which involves advice and knowledge transfer. Farmers that have been 'meaningfully engaged' will aim to reduce their pollution impact on the local catchments and subsequently reduce the amount of nitrate in the groundwater of the catchments.

The bronze PES option also includes the continued monitoring and management of catchments in close collaboration with stakeholders. Nitrate trend modelling will be produced annually to get an indication of the performance of existing catchment management, as well as determine which catchments require more attention from Portsmouth Water and their stakeholders.

However, following the delivery of this catchment programme we have concluded that we need to expand our catchment activities to include the equine community, who have a stronger presence in some of our catchments than we initially understood. Equine establishments are not covered by existing agricultural regulations and therefore need a bespoke programme to engage and incentivise the reduction of water quality risks. We have expanded this element of our programme to include equine establishments going forward.

D. Groundwater Monitoring Network Overview

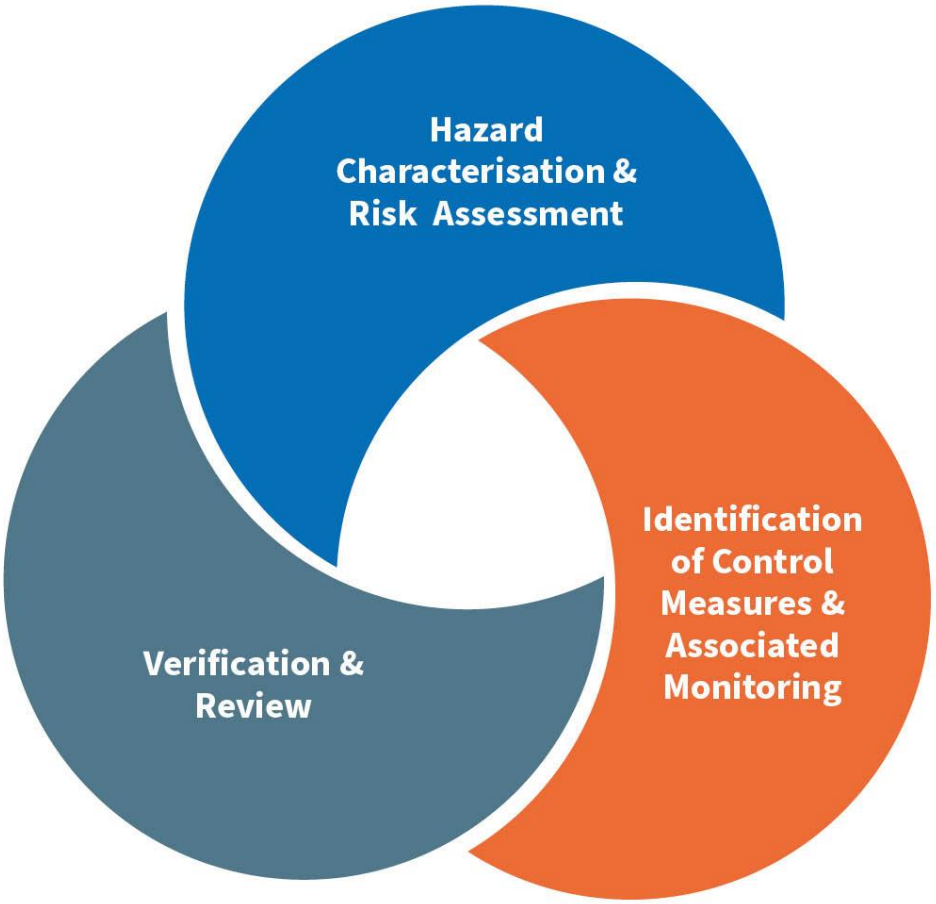
Our current methodology for monitoring groundwater quality and level is delivered through:

- Three EA GQWMN boreholes.
- Raw water sampling is undertaken at the abstraction stage, and.
- The nitrate risk is directly managed by working with the agricultural sector at the catchment scale and providing grants to homeowners to reduce the risk of pollution incidents arising from poor domestic heating oil storage.

Portsmouth Water follows the guidance of the Drinking Water Safety Plan (DWSP), in terms of quality for its water supply. Ensuring the quality of the drinking water is crucial to the service we provide to customers. The Drinking Water Inspectorate announced the use of the Drinking Water Safety Plan (DWSP) concept (originally developed by the World Health Organisation) to the regulation of drinking water quality during 2004. This is a source to tap risk management approach that identifies and proactively manages risks to drinking water quality. This approach is central to the way in which Portsmouth Water ensures a continuous supply of safe drinking water now and in the future.

A Drinking Water Safety Plan consists of three key elements:

Figure 5: Three elements of the DWSP



When assessing the risks to drinking water quality we identify hazards and hazardous events and score the likelihood and consequence of these occurring to determine the level of risk. We then put

control measures in place to manage any risk to reduce the likelihood of these hazardous events happening.

The risk management approach is an integral part of our Periodic Review and business planning process which helps to direct investment into the most important areas. An example of this process is the significant risk that the trihalomethane (THM) standard might be breached in the future; a solution was identified and put forward in our final business plan to OFWAT and accepted.

More recently, greater effort has been focused on determining risks to raw water quality within the catchments. We are building upon the existing Downs & Harbours Clean Water Partnership and has created a Catchment Management programme to upscale approaches to tackle diffuse water pollution. The elaboration of a robust groundwater quality and level monitoring strategy is part of this programme.

E. Groundwater Monitoring borehole process

As stated previously, the existing groundwater quality monitoring network is limited across our catchments. A sufficient level of monitoring to identify risks and understand hydro-geomorphology affecting our sources is required.

We are intending to design, drill and install 19 monitoring boreholes, collecting data from within every Source Protection Zone abstraction used for public water supply during AMP9. After the installation of each borehole, a groundwater quality sampling and monitoring strategy will be initiated. The frequency of groundwater collection will be based on our Drinking Water Safety Plan risks and trends within abstraction boreholes. Once groundwater quality data has been collected this will be used to support the Drinking Water Safety Plan risk assessment work and help inform better targeting of our catchment work to support the reduction contaminants of concern that are identified by working with landowners, farmers, industrial sites etc.

For the majority of our catchments, the only water quality data we receive is from our abstraction boreholes. Water quality impacts, say from pollution incident(s) or rising trends from agricultural activities would therefore be too late to make any investigations into the cause of the impacts and undertake proactive interventions such as Catchment and Nature Based Solutions to reduce future impacts.

Strategic monitoring is employed to obtain background water quality information, which can be used to determine broad groundwater quality, diffuse pollution trends, problems and long-term changes in groundwater quality[3]. By having boreholes with the catchment area of an abstraction, the data will provide “early warning” of potential future rises or improvements of contaminants of concern and help with locating the origin of potential impacts better. Ideally more than 1 borehole per Source Protection Zone would be preferred. This is because some of the catchment areas are very large and would need a wider coverage. We decided that a basic groundwater quality network would be sufficient to begin with and when additional water quality data is obtained and several years of trend assessments is gathered, justification could then be put forward for additional funding for additional boreholes in later AMP periods if required.

[3] Ref; Guidance on the design and installation of groundwater quality monitoring points Environment Agency Science Report SC020093.

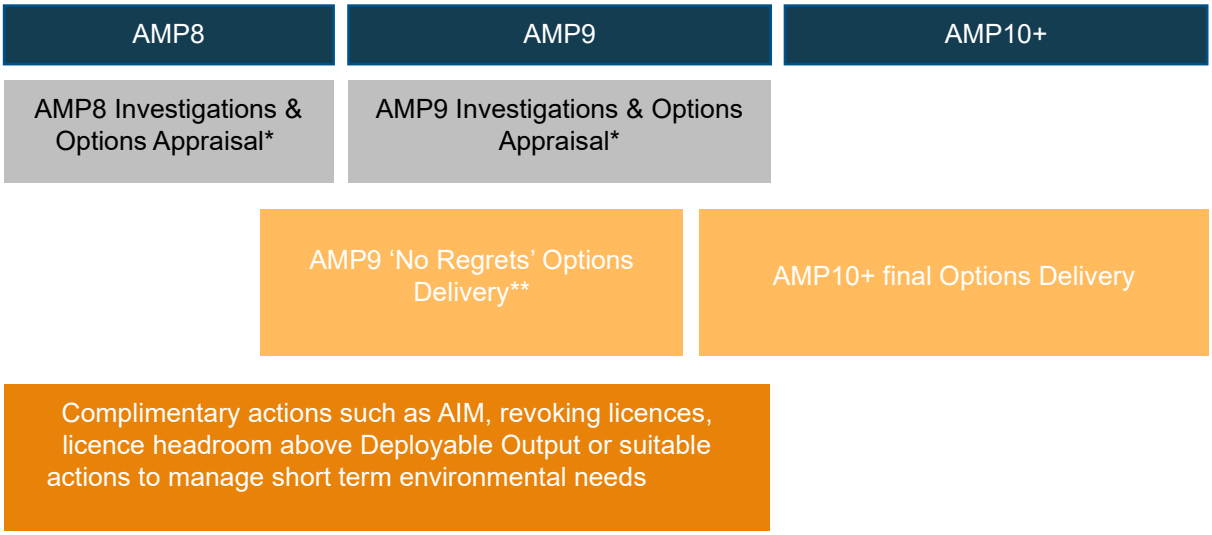
F. Long-term Delivery

Approach to WINEP

For the investigation schemes in WINEP the Options Appraisals will follow the investigations. Within options appraisal for AMP8 investigations, consideration of the residual uncertainty within the AMP9 investigations will need to be considered to reduce the risk of sub-optimal investment. For example, to avoid a proposal of a network transfer scheme to offset abstraction without knowing the full extent of DO losses at alternative / donor sources. Options which are considered 'No Regrets' should be put forward for AMP9 delivery. This approach would inform the monitoring plan for the Long-Term Delivery Strategy as well as inform the WRMP29 and PR29 processes.

This approach is summarised in Figure 6. Whilst the catchments are separate investigations the options appraisal would consider wider strategic options to meet the requirements of Environmental Destination. The options appraisal will utilise existing data from WRMP24 options appraisal for supply side schemes. The appraisal of options for delivery will focus on the review of wider social and environmental benefits and consider the effects on resilience and affordability. The scope of the Options Appraisal will be confirmed via the Action Specification Forms produced prior to the start of AMP8.

Figure 6: Approach to options appraisal with investigation staging.



**Options Appraisal will consider a range of interventions needed to meet the outcome of the investigation but also any large strategic options needed to meet the required outcomes of Environmental Destination. Where relevant this will run in parallel to the investigation to ensure effective options are identified as soon as possible.*

***AMP9 options delivery is expected to focus on 'No Regrets' options which won't be influenced by the remaining AMP9 investigations. Options which are influenced by AMP9 investigations would be expected to be delivered in AMP10 onwards to ensure investment is optimal i.e. building a transfer to move water from one area to the other, but the donor area faces a sustainability reduction in later planning periods is not considered optimal). This Options Delivery / assessment may consider options identified in the Ofwat Core Pathway for dWRMP24 and WRSE as part of regional schemes.*

The catchment management schemes include the continued monitoring and management of local catchments and the addition of equine engagement activities. Nitrate trend modelling will be produced to get an indication of the performance of existing catchment management, as well as to determine which catchments require more attention from our activities and those of our stakeholders. The use of better data available from the proposed groundwater monitoring sites will allow corroboration of the accuracy of modelling used in the investigations.

We set out to engage with 50 out of 75 local farmers by the end of AMP 7, and our goal is to have full engagement with all 75 local farmers by the end of AMP 8. Our equine ambition is to reach out to all equine groups in each catchment, run workshops with establishment owners and promote manure handling best practice to protect water quality.

The farmers will take part in an education and collaboration programme in which they will be incentivised to adopt practices that decrease the amount of nitrate in the catchment, and subsequently, in the groundwater. The investment will occur wholly within AMP 8, however, investment in catchment management would be required in subsequent AMPs to achieve the long-term benefits of the proposal.

Approach to the groundwater monitoring network

The establishment of a greatly enhanced groundwater monitoring network has long term benefits, not just to corroborate the conclusions of the investigations into the sustainability of our current abstractions, but also to better inform the groundwater model covering our area. As a groundwater dominated company the model will be critical in establishing sustainable levels of abstraction in the first instance and then form a critical element of environmental monitoring into the future to ensure new options deliver on their assumed benefits and therefore is a key insight into the choices of our long-term delivery strategy. In addition to this, groundwater quality monitoring from these boreholes will also help inform our catchment risks, feed in to Drinking Water Safety Plans, support the modelling of our long-term trends of nitrate and used as early warning to address any potential pollution incident and help better prioritise our engagement with landowners and farmer to reduce water quality pressures.

We have assessed the priority of location to install the monitoring network, with the areas of highest priority detailed in Table 5.

Table 2: Monitoring Borehole prioritisation and phasing (gold is AMP 8 programme)

Borehole location example	Environmental risk level and driver
Northbrook	Very High – Nitrate & Water Resources
Walderton	High – Water Resources
Eastergate, Westergate & Lovedean, Funtington	High – Nitrate

Borehole location example	Environmental risk level and driver
Maindell, Fishbourne, Havant & Bedhampton	High Nitrate & Water Resources
Soberton, West Street World's End, Brickkiln, Lavant,	Medium nitrate & Water Resources
Aldingbourne, Slindon, Newtown, Lower Upham	Low nitrate

G. Costs

WINEP

Full details of the process we went through to produce cost estimates for the investigation elements of the WINEP programme are detailed in Appendix E, and summarised below, together with the processes followed to identify the estimated costs of the Catchment management work and the monitoring borehole network.

Investigation scheme costs.

To provide costs for the investigations, six external consultants were approached to provide indicative costings for the investigations. A proforma was provided for each consultant to populate and return. The proforma broke down investigations into components and the indicative costs for a Low, Central and High estimate per component. This is to reflect how the costs could vary between catchments of varying complexity (i.e. a small catchment with two abstraction sources would have a lower cost than a larger catchment with more abstraction sources).

The returned costs from consultants were averaged for each investigation component. During this process a review of outliers was undertaken, and some numbers were adjusted or removed to ensure values were in the same units where possible. Given the limited scope of the investigations at present, some expert judgment had to be applied to the costing.

Each catchment-based investigation was then assessed from Low to High based on expert judgment of the expected scale of the investigation. A detailed breakdown presented in Appendix A.

The following additional costs were also accounted for:

- Expected monitoring costs (i.e. flow monitoring and ecology surveys).
- Overhead costs of a Project Manager and a Technical Support Officer which are new roles needed to support the investigations as there is no role present in Portsmouth Water at present.
- An allowance for Detailed Design and Costing in AMP8 to ensure an efficient transition into AMP9. This is post-Outline Design.
- 20% risk allowance to account for uncertainty in scope at present.

Costing for joint investigations with Southern Water and Southeast Water are accounted for within the costings. For Arundel Park SSSI, £100k has been put forward as negotiated with Southern Water. The

River Itchen Scheme has an agreed split of 65% Southern Water, 20% Portsmouth Water and 15% South East Water based on AMP7 Study.

The cost profile for AMP8 and AMP9 is summarised in Table 3. A more detailed cost breakdown can be found in the Appendix.

Table 3: Total AMP8 and AMP9 WINEP Investigation costs.

	Costs for AMP8 (£m)	Costs for AMP9 (£m)
WINEP INVESITGATIONS (9 x AMP8 & 1x AMP9 Schemes)	£5.271	£0.500

Catchment Management scheme costs

Portsmouth Water has decided to invest in the Bronze Payments for Ecosystem Services (PES) scheme, which entails Portsmouth Water contributing 50% of the schemes funding. The total cost for this scheme in AMP 7 was £2.5 million, being increased to £3 million for AMP 8 and £3.5 million for AMP9. The investment includes a farmer capital grant scheme, which grants each farmer who has been engaged by Portsmouth Water £10,000. The increased investment is caused by further engagement with farmers, from 50 to 75, subsequently increasing the farmer capital grant scheme from £500,000 to £750,000, with inflation being believed to cause the rest of the cost increase. The investment in catchment management works will occur wholly within AMP 8, however, continued investment will be required through subsequent AMPs in order to achieve the long-term benefit.

These costs include the new and additional equine work we have identified as necessary for AMP8.

The investment cost breakdown for the bronze catchment management PES option for AMP 7 can be found in Appendix C. As mentioned above, the costs will be similar to those in AMP 8, however, it is unclear how inflation has affected the individual costings.

Table 4: Total AMP8 and AMP9 WINEP Catchment Scheme costs.

	Costs for AMP8 (£m)	Costs for AMP9 (£m)
CATCHMENT MANAGEMENT	£3.000	£3.500

Groundwater monitoring costs

An initial cost for delivering 19 new groundwater monitoring wells, installation of monitoring equipment and associated Hydrogeological Consultancy along with one year of quarterly sampling visits, summary reports and one annual report, has been produced by H2Ogeo for Portsmouth Water in a letter dated November 2024. This cost is subject to adjustment as it was produced nearly two years ago, and it is as well stated that Laboratory and drilling costs are indicative at this stage and will be refined once the detailed scope has been determined.

The scope used to generate the costs identified to date can be found in Appendix D.

Additionally, this proposal does not account for any maintenance of the network or replacement equipment. Any maintenance requirements will be reported to Portsmouth Water and dealt with on a time and expense basis under a separate scope where requested.

Table 5: Total AMP8 and AMP9 Monitoring network costs.

Activity	AMP 8 (£m) (0 Boreholes)	AMP 9 (£m) (19 Boreholes)
Drilling, installing boreholes	0	0.380
Monitoring boreholes	0	0.120
Totals	**0**	**0.500**

Investment case totals

Table 6 below summarises the total costs for the activities described in this investment case.

Table 6: Total AMP8 and AMP9 WINEP and Environment costs.

Activity	AMP 8 (£m)	AMP 9 (£m)
WINEP Investigations programme	£5.271	£0.500
WINEP Catchment Management activity.	£3.000	£3.500

[4] PRT07.05.01 H_2Ogeo, 2021, "Proposal for design and delivery of a groundwater quality monitoring network for Portsmouth Water's groundwater sources".

Activity	AMP 8 (£m)	AMP 9 (£m)
Groundwater monitoring network	£0	£0.500
Totals	£8.271	£4.500

Efficiency Challenge

Recognising our customers' concerns about affordability, we've challenged ourselves hard to make sure all expenditure is essential and efficient. We went through a structured process to challenge our own bottom-up plans, removing expenditure which could be deferred on a risk-based assessment and absorbing new requirements (such as cyber risks) within base costs. We've removed the two draft Cost Adjustment Claims submitted to Ofwat in June 2023, in relation to our new Head Office and cyclical asset maintenance requirements.

To account for the greater opportunity for leveraging efficiencies from a larger plan, we included a 15 per cent programme-level efficiency across all our enhancement and maintenance expenditure, with a larger 20 per cent stretch applied to our largest enhancement programmes. In addition, we've allowed for ongoing (frontier) efficiency of 1.0 per cent per annum across all of wholesale costs, amounting to a further cost saving of almost 5 per cent by 2029-30.

Table 7: Summary of internal efficiency challenges applied to costs.

Activity	Saving applied	Justification
WINEP Investigations programme	15%	Competitive procurement process to contract with a single, multi-discipline partner will lower management overheads. This assumption is predicated on entering the market and procuring services this AMP and we are expecting to bring forward some AMP8 spend to do this.
WINEP Catchment Management activity.	15%	Completely in-sourcing resource to undertake this activity rather than using some contractors – savings between salary and day rate
Groundwater monitoring network	15%	Competitive tender to contract for the programme of 19 boreholes for the AMP expected to lower management, planning and administrative overheads

Base Enhancement split

In this document we have described the entirety of the effort required to deliver our WINEP obligations and wider catchment monitoring ambition.

Not all this activity is new and enhanced from the activities we have been undertaking in AMP7 and therefore we are not requiring the full amounts as 'enhancement' funding.

The table below lays out the elements of this investment case that are covered by base expenditure and where we are requiring new enhancement funding to deliver new duties and activities not previously funded.

Table 8: Split of costs between Base and Enhancement following efficiency challenge.

Activity	AMP 8		AMP 9	
	Base	Enhancement	Base	Enhancement
WINEP Investigations programme	£0	£4.480	£0	£0.425
WINEP Catchment Management activity.	£2.505	£0.045	£2.975	£0
Groundwater monitoring network	£0	£0	£0	£0.425
Totals	£2.505	£4.525	£2.975	£0.850

Final Enhancement costs

Therefore the final enhancement costs that have been taken forward into our LTDS and requested in this investment case are outlined in the table below.

Table 9: Final Enhancement costs for AMP8 and AMP9.

Activity	AMP 8	AMP 9
WINEP Investigations programme	£4.480	£0.425

Activity	AMP 8	AMP 9
WINEP Catchment Management activity.	£0.045	0
Groundwater monitoring network	£0	£0.425
Totals	£4.525	£0.850

Source: Table CW3, Row 40

Impact on customer bills

The impact of this investment case on customer bills has been calculated as being less than £1.

4. ASSURANCE AND BOARD APPROVAL

A. Assurance

Production of this supporting document has been undertaken in accordance with internal governance and assurance procedures and processes. Third party assurance has also been provided by Jacobs Global Consultancy.

This comprised initial drafting by an internal Lead Author, supported by external consultants (Arcadis) as appropriate, under the direction of an Executive Owner who retains Executive responsibility for the document content including robustness and accuracy.

The document has undergone three stages of internal review and third-party assurance before being signed off by the Board. Internally this has included:

i. Executive Owner,
ii. Nominated Executive,
iii. Internal Executive Review Team including the CEO and CFO.

Details of the third-party assurance, including findings/opinion, can be found in PRT15.04

The Board has been engaged in the development of the business plan and its content through subject specific discussions at monthly PR24 Steering Committee meetings that have taken place since late 2021. Minutes of relevant meetings are included in PRT15 Board Assurance, Appendix PRT15.01

5. CONCLUSION

Climate change, population pressure, land use intensification and environmental protection considerations are all affecting the way we have historically abstracted, treated and supplied water to our customers over the course of our history.

We have accommodated these pressures in our long-term WRMP24 and LTDS using several plausible scenarios and ranges of impact. That is sufficient for us to be confident in the identified investment required in the initial period of our plans but leaves investment in the medium to long term timeframes less certain.

Working with Regulators we have developed a Water Resource and Water Quality WINEP programme, with associated groundwater monitoring network, that will allow us to move from modelled scenarios to quantified impacts and to therefore bring much greater certainty to our long- term planning. This move to reduce uncertainty in our plans is essential to demonstrate that our future investment choices represent the best value for customers, our communities, and the environment.

We have challenged the phasing of this programme with Regulators and the proposal we make now satisfies statutory requirements.

We have internally challenged the costing of this programme and we are confident the vales we have put in this investment case represents our best view of efficient costs, prior to the insight that the undertaking of formal procurement activity will bring and represents good value for money for our customers and stakeholders.

Protecting the Environment and securing a long-term supply of water for the future are seen as important by our customers and the activities outlined in this business case will make a significant contribution to achieving that outcome for customers.

PRT07.05 APPENDIX

PRT07.05 APPENDIX

Detailed record of the WINEP process: Link to documents below:

Appendix PRT07.05.01 Portsmouth Water Investigation Costing (SDS-JN)

Appendix PRT07.05.02 Portsmouth Water WINEP PR24 Development

Appendix PRT07.05.03 Supplemental WINEP Methodology and driver codes

Detailed breakdown of the estimates for activity costs for the investigatory schemes of the WINEP programme.

Overview:
In AMP8, Portsmouth Water are due to undertake a number of Water Resources investigations to quantify the impact of various abstractions on the environment and confirm the extent of any Deployable Output (DO) losses which have been assumed in the dWRMP24. The outcome of the investigations will inform the adaptive plan of WRMP24 and what measures are needed, which may include catchment based measures (such as in-channel modifications) or capital schemes (such as network transfers) in order to allow the sustainability reductions to occur.

The investigations include three key stages:
- Stage 1: A desk based study to establish the catchment background, review existing data and develop a monitoring plan based on gap analysis of available data.
- Stage 2: The main investigation (monitoring, analysis and reporting). This will include hydrological and ecological monitoring. The investigation will also include catchment walkovers to review aspects such as channel morphology and other catchment pressures. The investigation will need to assess current status and the risk of future deterioration within the impact assessment.
- Stage 3: Options Appraisal and assessment. This includes developing possible options based on the outcome of the investigation. This may include aspects such as catchment or in channel measures. The options appraisal will need to include all stages from option development to outline design, costing and cost benefit analysis of the wider social and environmental benefits. These outputs would feed into the WINEP for PR29.

The key drivers of the investigations include Environmental Destination, WFD No Deterioration and Habitats Directive. There will be 8 catchment based investigations in total covering the Portsmouth Water supply area. All catchments are within chalk groundwater. These investigations will be phased over AMP8 and AMP9 and would be 2 years long. The investigations are summarised in the following table.

Investigation ID	Core waterbody within catchment	Number of abstraction sources
PW_CInv_01	Arundel SSSI, Swanbourne Lake, Aldingbourne Rife	4
PW_CInv_02	River Lavant	2
PW_CInv_03	Chichester Harbour	2
PW_CInv_04	River Ems	2
PW_CInv_05	Hermitage Stream	3
PW_CInv_06	River Meon	3
PW_CInv_07	River Wallington	2
PW_CInv_08	River Hamble	2

Consultant Support:
The detailed scope of the investigations will be developed between 2022 to April 2025, when the AMP8 investigations will commence. Ahead of November 2022 WINEP submission and for PR24 submission we need to generate ***indicative*** costs for each investigation to ensure the costs are included within the Business Plan for AMP8. We are asking a number of consultants to provide indicative costs for various components of investigations which will then be compiled and averaged for each catchment to provide a robust audit trail. Please note:
- ***The individual costs provided by each company will not be published or used beyond this purpose*** .
- No company will be held to the costs. The purpose is to generate costs to include for PR24 Business Plan.
- Any questions asked to Portsmouth Water for further clarity will be responded to via email. The responses will be shared anonymously to all companies to form a working Frequently Asked Questions.
- Where it may not be possible to accurately break components of analysis and reporting apart, please use expert judgement and provide any comments.
- Given the limited scope of the investigations provided at this stage, **the costs are considered indicative and therefore we are not expecting any company to provide detailed costing**. The indicative costs should reflect the costs of similar investigation you may have delivered for other clients.
- In terms of the PR24 WINEP guidance, these investigations would be considered Detailed Investigations rather than desk based studies only.
- Costs should be in 2022/23 prices.

The following tables provide a breakdown of the key activities, alongside fields to populate a Low, Central and High estimate. The range reflects the uncertainty in these indicative costs, in particular how the costs can vary between catchments of varying size and complexity (please see example catchments below). Please add any comment or assumptions into the 'Consultant Comments' field.

Reporting / Analysis Costs:			Low £	Central £	High £	Consultant Comments
Desk Based Study	Desk based study	*Desk based study should present an overview of the catchment, its influences and include a review of all existing data to inform gap analysis and a monitoring plan. Low to High reflects the range based on available data and/or catchment size/ complexity which may increase the work required for a desk based study. Exclude costs of data and licence fees.*	25000	35000	45000	Low: relatively simple investigation, characterising waterbodies with good data availability, previous studies and a common understanding of issues Central: EFI review with some quantitative analysis, more contentious issues High: Complex investigation (e.g. multiple abstractors, mix of wetland types with different hydroecological sensitivities)
Main Investigation	Undertake model runs of the Environment Agency East Hants and Chichester groundwater model runs	*There is a groundwater model which includes the Portsmouth Water region. The costs should include running and reviewing the model outputs. Analysis should be undertaken at average and full licence to quantify the risk of growth and at least three future climate change scenarios. Please assume the model is calibrated and requires no further modifications.*	7000	10000	13000	At Impact assessment stage we would likely want to use the GW model to understand impacts of each abstraction with a series of runs with each abstraction switched off to compare to the RA baseline run. Nat and FL scenarios already exist so no need to do those. For No Det investigations, Future predicted will need to be investigated (vs RA and possibly FL). Allowance of 4 runs per source. Plus an extra 3 runs per investigation for in combination runs. (10 for low, 12 for central and 14 high). Includes preparation of model output (e.g. contour plots, time series, flow duration curves) to inform the more detailed assessment of the potential effects of groundwater abstraction on surface flows.
Main Investigation	Water Resources modelling (Deployable Output)	*Use of Portsmouth Water Pywr water resources model to investigate the impact of potential sustainability reductions on the integrity of the water resources zone (and the need for local network improvements to overcome any restrictions as part of the options appraisal). Assume Portsmouth Water will run the model based on defined model run criteria. Assume 3 model runs based on a range of possible variables.*	700	1050	1400	Assume costs per source (£350) to define model runs and to interpret results. Modelling costs sit within Portsmouth Water.
Main Investigation	Catchment Walkovers	*Walkover to review of river morphology and pressures (includes fish barriers and catchment pressures to establish a strong understanding of factors influencing the waterbody. It is assumed that not all catchments reaches would be assessed / walked (assume 20% of catchment walked). GIS mapping used to support the assessment.*	1600	2400	3200	Assume that based on RHS/MoRPH walkover surveys, with teams of two. 4 reaches per day, with 2 days for a low, 3 for a central and 4 for a high. Difficult to estimate for the specific studies owing to a lack of knowledge of the catchments.
Main Investigation	Biodiversity Net Gain and Natural Capital assessments	*May be completed as part of walkovers. Low to High estimates reflect a range of catchment size. It is assumed that not all catchments reaches would be assessed / walked. GIS mapping used to support the assessment (please assume 20% of the catchment is walked). Hydrological area mapping only.*	7500	13000	20000	Informed by scope items above (i.e. using MoRPH). Assumes a centralised method (and supporting spreadsheet) is developed for the WINEP and not within these costs. Difficult to estimate as the area isn't clear, challenges/need for stakeholder engagement not established.
Main Investigation	Impact assessment (standard assessments)	*Based on the desk and field monitoring, undertake analysis and reporting to complete the core assessment. The outcome of the assessment should confirm the scale of impact. This needs to take into account the current status and aim to quantify the risk of deterioration. This could include hydro ecological analysis based on the field monitoring. Please specify what tools you would utilise for the analysis.*	6500	15000	25000	Based on macroinvert regression models and RHEFT (physical habitat suitability), supporting the interpretation of groundwater modelling outputs and a review of the EFI (and current/future compliance with it). A DRUWID model (a multivariate regression model developed by the EA and applied by Atkins and others) could be developed across all sites for approx. £35k-£50k.
Main Investigation	Impact Assessment (Common Standards Monitoring Guidance (CSMG)	*Depending on the WINEP driver(s) of the catchment based investigation, there may be a need to do impact assessment against the Common Standards Monitoring Guidance.*	3000	4500	6000	ADDITIONAL to the line above. Approach as per above but with a different (and additional) suite of targets for SSSI rivers (costs are additional). A different suite of analysis would be required for GWDTE (wetlands), lakes and estuaries. For SPA and SAC, the output of the recent judicial review on abstraction licensing and the Norfolk Broads may change the burden of evidence necesary to conclude that there is no LSE or that an adverse effect on site integrity can be discounted. See: https://www.freeths.co.uk/wp-content/uploads/2022/09/Harris-Judgment-6-Sep-22.pdf
Main Investigation	Write up (draft and final)	*Include the main write up of the report which will incorporate all aspects of the investigation. There would be the need to produce a draft, incorporate Portsmouth and Regulator comments ahead of the final report.*	14500	20000	21000	Assumes draft, meeting with PW, update, meeting with EA, final update
Options Appraisal	Options Appraisal (initial optioneering)	*Appraisal of options to identify an environmental and asset solutions per catchment. We expect that a catchment solution will involve a combination of staged licence reductions in parallel with improvement works (e.g. removal of barriers to fish passage) and supply network improvements to provide best value for the environment and society. This should be in consultation with the Water Resources team at Portsmouth Water and regulators. Assume each catchment may have 3 feasible options post initial optioneering. This stage excludes costing and design.*				See comments below
Options Appraisal	Options Appraisal (Outline Design)	*Following on from the initial optioneering, this includes outline design and costing of the options and assessment of benefits (cost benefit analysis). A catchment may include multiple options in order to achieve the required outcome. This would form part of the EA WINEP submission for PR29 and therefore assumed the requirements of the WINEP as per the May 2022 guidance would be applicable for PR29. Therefore costs should reflect this scope of work. Assume each catchment has three possible options / solutions.*	6000	12000	22000	Costs would cover the initial optioneering (it's difficult to unpack from the information that I have readily to hand). Strongly recommended that you develop a common assessment methodology and objectives so that you (a) gain efficiency in the programme and (b) can demonstrate that the outcomes are coherent when you're planning for PR29/AMP9
Project Management	Project Management and Stakeholder Engagement	*Fortnightly meetings with Portsmouth Water and quarterly meetings with the EA. Investigations and Options Appraisal will require strong liaison with our Water Resources team. Assume a 2 year window.*	12000	24000	30000	Some stakeholder engagement is embedded in many of the tasks above and difficult to unpack. Recommend adding a specific task for stakeholder engagement on contentious schemes as it can be significant

Field Monitoring Costs: costs are per site and sample. Costs will be aggregated over sample frequency and the number of monitoring points. All sampling is ditch, stream and river monitoring, not lakes or ponds.			Low £	Central £	High £	Consultant Comments
Monitoring	Hydrology Surveys (flow gauging)	*Cost per survey / site for flow gauging. Low to High range based on river size. Assume all in channel monitoring hand held flow meter.*	166	266	366	Based on a doing 10 sites (conducted in a day), with monthly visits over a year.
Monitoring	Borehole dipping	*Cost per survey / site for a borehole dip*				This doesn't really make sense. Would never just do one borehole and would also need include data processing.
Monitoring	Ecology (macroinvertebrates)	*Cost per survey / site. Assume all samples are the standard kick samples. Include costs of sampling and analysis.*	N/A	616.67	N/A	Scaled for a project with 3 samples per year (spring, summer, autumn) for 6 sites, including analysis and data collation. Cost is sensitive to the number of sites sampled in a day.
Monitoring	Ecology (fish)	*Cost per survey / site. Assume standard three pass runs are completed. Low and High range reflects river size.*		1500		Based on four sites (at £4800), which would have included preparation of RAMS and expenses were spread across the four sites.
Monitoring	Ecology (macrophytes)	*Cost per survey / site. RIVPACS assessment of macrophytes.*	N/A	462.5	N/A	Based on conducting four surveys per day, including expenses
Monitoring	Ecology (diatoms)	*Cost per survey / site. Including analysis costs.*	N/A	616.67	N/A	Similar burden for field sampling and lab analysis as macroinvertebrates. Lab analysis could be cheaper but would be sensitive to the availability/capacity of a suitable supplier.
Monitoring	Water Quality (spot samples, limited suite of analysis)	*Cost per survey / site. Including analysis (general suit of analysis i.e. nutrients, suspended solids, pH etc.)*	N/A		N/A	Costs are very sensitive to the specific suite of determinands.
Monitoring	Standard day rate for monitoring	*Include standard day rate for monitoring (assume Graduate to Senior Consultant in the range). Include travel and any subsistence*		800		Based on current rates and noting uncertainty owing to inflationary pressures. Also very sensitive to the individuals involved (could be £700)

A detailed cost breakdown of the phasing for the investigatory schemes of the WINEP programme.

AMP8 Profiling, Phasing and costing.

Action ID	Drivers	Investigation Name	Main River catchment	WINEP Profiling year	Estimated Cost
09PW100001a & 09PW100001b & 09PW100001c & 09PW100001d	WFD_NDINV_ WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Eastergate, Westergate, Aldingbourne and Slindon	Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife	AMP8	£603k
08PW100001a & 08PW100001b	NERC_INV 25YEP_INV WFD_NDINV_WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Walderton, Brickkiln and Woodmancote.	River Ems	AMP8	£653k
08PW100002a & 08PW100002b & 08PW100002c	NERC_INV 25YEP_INV HD_INV WFD_NDINV_WRFlow	Catchment based Water Resources investigation into the Soberton, West Street and West Meon.	River Meon	AMP8	£697k

Action ID	Drivers	Investigation Name	Main River catchment	WINEP Profiling year	Estimated Cost
08PW100003 & 08PW100003 b & 08PW100003 c	EDWRMP_INV WFD_NDINV_WRFlow WFD_INV_WRHMWB	Catchment based Water Resources investigation into Maindell, Worlds End and Newtown	River Wallington	AMP8	£582k
08PW100004 a & 08PW100004 b	WFD_NDINV_WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Northbrook and Lower Upham	River Hamble	AMP8	£682k
08PW100005	HD_IMP SSSI_IMP WFD_NDINV_WRFlow EDWRMP_INV	Water Resources investigation into the River Itchen (including Portsmouth Water's Gators Mill)	River Itchen	AMP8	£79k
08PW100006	NERC_INV 25YEP_INV HD_INV WFD_NDINV_WRFlow	Water Resources investigation into the Drought Order (Slindon) and Southern Water Drought Order scheme.	Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife	AMP8	£450k
08PW10007	EDWRMP_INV	Regional Environmental Destination Options Appraisal	Regional	AMP8	£50k
09PW100002a & 09PW100002 b	NERC_INV 25YEP_INV WFD_NDINV_ WRFlow	Catchment based Water Resources investigation into Lavant and Brickkiln.	River Lavant	AMP8	£697k
09PW100003 a & 09PW100003 b	WFD_NDINV_ WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Fishbourne and Funtington.	Chichester Harbour, Bosham Stream	AMP8	£697k

Action ID	Drivers	Investigation Name	Main River catchment	WINEP Profiling year	Estimated Cost
			Total for AMP8		£5,271k

Table 4: AMP9 Profiling and Phasing

Action ID	Drivers	Investigation Name	Main River catchment	WINEP Profiling year	Cost
09PW100004a & 09PW10000b	NERC_INV 25YEP_INV WFD_NDINV_WRFlow EDWRMP_INV	Catchment based Water Resources investigation into Havant & Bedhampton and Lovedean.	Hermitage Stream	AMP9	£500k

Breakdown of costs for the catchment management elements of the WINEP programme

Table 5: Bronze Catchment Management PES Option for AMP 7

Item	Total cost for AMP period	Capex/ Opex	Comments
FTE			
Catchment Officer	£175,500	Opex	Assume £30k plus 17% on costs (£35,100)
Evidence			
Annual update of online GIS portal	£192,500	Capex	Quote £38,500/a (£46,200/a inc VAT)
Update nitrate trend modelling	£15,000	Capex	Based on Amec Foster Wheeler 2017 costs
Update source apportionment modelling	£20,000	Capex	Based on Amec Foster Wheeler 2017 costs
Update nitrate risk/prioritisation map	£2,000	Capex	Based on 2017 cost
Intervention monitoring	£120,000	Opex	Soil testing - average cost £1200/farm, therefore £1200 x 100 priority farms
PR24 economic analysis/business case	£30,000	Capex	Based on Amec Foster Wheeler 2017 costs
Aldingbourne investigation - to confirm the degree of aquifer confinement and investigate source of nitrate peaks and trend.	£25,000	Capex	Recommended in Amec Foster Wheeler Catchment Management Strategy 2013
Lovedean investigation - to understand high nitrate and thick unsaturated zone.	£25,000	Capex	Recommended in Amec Foster Wheeler Catchment Management Strategy 2013
Eastergate and Westergate investigation - to understand cause of seasonal peaks.	£50,000	Capex	Recommended in Amec Foster Wheeler Catchment Management Strategy 2013
Establishment of potential land purchases for AMP 8 - landowner engagement, legal advice etc.	£75,000	Opex	Inclusion dependent on Board's view as to whether land purchase is an option.
Continued contribution to BGS PhD research	£75,000	Capex	Continued from AMP6. £50k for 20/21 and £25k for 0.5 of 21/22. NB, worst case scenario; if funding bid successful zero cost.
On the ground action			
Farmer Capital Grant Scheme	£500,000	Opex	100 high priority farm x £5,000 per farm
Interventions/Payment for Ecosystem Services (PES) Scheme - 'one off' costs	£143,695	Opex	Amec Foster Wheeler report 2017
Interventions/Payment for Ecosystem Services (PES) Scheme - annual costs (total)	£366,825	Opex	Amec Foster Wheeler report 2017
Oil Tank Replacement Campaign	£500,000	Opex	400 properties in SPZ 1, assume 50% have old tanks, therefore 200 x £2500 contribution
Natural England Catchment Sensitive Farming Officer match funding	£100,000	Opex	Continue of funding from AMP 6 - funding 0.6 FTE ~£20,000, £50,000 is total cost for 1 FTE (source: Charlie Chantler, Natural England). Therefore £20,000 x 5 years

Influencing local planning - call off contract for additional support	£125,000	Opex	£25k/yr based on current costs
Totals			
Total	**£2,540,520**		
Total CAPEX	£434,500		
Total OPEX	£2,106,020		

PRT07.05.04 Scoping assumptions made for the monitoring borehole network for costings.

This option would include the design, drilling, installation and monitoring of 10 boreholes during AMP8 and 9 boreholes during AMP9. The scope of work would be delivered in two phases. Firstly, establishing the monitoring network (Phase 1) and secondly, monitoring and reporting (Phase 2).

Phase 1

1- A desk-based review of all 19 catchments will be undertaken consisting of the following:

- Data request sent to the Client and key stakeholders.
- Assessment of water quality, based on any existing catchment data and the source water quality data.
- Identification of potential sources of contamination/pollution (Catchment-scale)
- Preparation of Hydrogeological Conceptual Site Model.
- Preliminary selection of sites.

2- On agreement with landowners site walkovers will occur with the proposed drilling contractor to check access, environmental and health and safety as well as the suitability for borehole drilling and installation. Portsmouth Water would need to negotiate with landowners relating to purchase, lease and or compensation.

3- Borehole design will include the construction of all 19 boreholes as well as the monitoring equipment and kit to be installed.

Monitoring kit is anticipated to include:

- One level data logger per borehole (19 in total) with a range of up to 25m.
- Two barometric loggers, one to be held at Portsmouth Water HQ and one to be located at one of the two easterly sources – Eastergate/Westergate.
- Sampling tube.

4- Drilling supervision along with project management of the Drilling Contractor would be necessary. To reduce the potential for pollution during drilling, the boreholes will be drilled using a reduced diameter technique and potable water.

On completion of drilling, installation, and development, 19x data loggers with a 25m range and two barometric loggers would be installed. Dedicated sample tubing will be installed down each borehole.

The boreholes will be finished with a cement/concrete plinth with secure headworks. Where required, a stock fence shall surround the casing. For the purposes of developing this proposal the following items have been costed:

- Site Walkovers.
- Site clearance using Digi-Cat.
- 50m of reduced diameter drilling (3 to 5m bentonite cement plug) to allow for 100mm uPVC plain casing install with up to 20m slotted.
- The borehole installation consisting of washed gravels and finished with a concrete plinth.
- Secure/anti tampering headworks and protective animal fencing (post and rail type).
- Well development – purging/air lifting.
- Remote logging of Chalk using the CIRIA Chalk Description and Classification Scheme.

Phase 2

1- It is proposed to carry out Water Quality Monitoring on a quarterly basis at all 19 monitoring points. Eight days have been assigned to groundwater monitoring, recovery of elevation data and manual dipping on site.

Groundwater samples will be collected using the low flow technique. Low flow conditions will be achieved using the designated sampling tubing down-hole and purging at a low flow rate comparable to the natural flow through the screen, avoiding significant drawdown of the water level in the well.

During sampling regular monitoring, field samples will be analysed with a YSI PRO Series (or similar) multi parameter probe for electrical conductivity, dissolved oxygen, pH, Redox and Temperature.

Low flow monitoring is recommended due to the potentially large volumes of purge water generated that may prove challenging to manage in more remote locations. It has been assumed that samples will be sent to Southeast Water's Scientific Services and therefore the detailed scope of analysis has not been determined as part of this proposal.

A comprehensive laboratory analyses suite would consist of the following analytes: pH, EC, TOC, Sulphate, Sulphide, Monohydric Phenols, Total Cyanide, Free Cyanide, Complex Cyanide, Ammonium, Chloride, Boron, Sb, As, Ba, Cr, Hexavalent Chromium, Cu, Pb, Se, Sn, V, Zn, Co, Mn, Mo, Cd, Hg, Ni, Be, Fe, Ca, K, Na, Mg, P, Speciated PAH, TPH2, TPH1, Mineral Oil, DRO, TPH CWG, VOC & SVOC, Major Ions and a Pesticide Screen.

Data from each elevation logger will be downloaded at the same time as visiting the sites to collect samples. It is proposed that the data loggers will be set to capture one reading per day at midday and can be used to reflect the long-term trends within the catchment groundwater levels.

2- Quarterly summary reports will be provided within two weeks of receiving the confirmed laboratory results. These reports will describe the site visits, site conditions encountered and any issues with the appearance of the infrastructure and/or groundwater samples. A summary of the laboratory analysis will be provided with a qualitative assessment of the data. An annual summary will be presented every twelve months. The annual summary will include a comparison of the whole data record, long-term trends and groundwater elevation profiles plotted against rainfall data for the year versus long-term trends, once established. Key analytes will be plotted with their concentration trends assessed where possible and a Major Ions mass balance will be presented.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