



Dŵr Cymru
Welsh Water

Enhanced Investment
Case:
WSH73-PE08 –
Reducing Levels of Odour
in the Environment

Contents

Executive Summary	3
1. Introduction.....	4
1.1 Structure of this Document.....	5
2. Need for Enhancement Investment	6
2.1 Evidence that Enhancement is Needed	6
2.2 Overlap with Activities to be Delivered through Base.....	8
2.3 Overlap with Funding from Previous Price Reviews.....	8
2.4 Alignment with the Long Term Delivery Strategy	9
2.5 Management Control of Costs.....	9
3. Best Option for Customer	10
3.1 Identification of Solution Options.....	10
3.2 Quantification of Benefits	12
3.3 Uncertainties relating to cost and benefit delivery	12
4. Costing Efficiency	14
4.1 Developing a cost for Odour reduction.....	14
4.2 Benchmarking our approach	15
5. Providing Customer Protection	16
5.1 Proposed Price Control Deliverable (PCD)	16
6. Appendix A.....	18

Executive Summary

The primary objective of this investment is to deliver a step-change improvement in odour performance around Swansea Wastewater Treatment Works (WwTW). Swansea Council have issued an Environmental Management Plan (EMP) which dictates the requirement to significantly reduce odour emissions from the WwTW. The reduction required by the EMP is beyond the level that the existing odour control unit can achieve.

This investment is therefore required to achieve compliance with Swansea Councils EMP to reducing odour emissions around the WwTW.

We have structured this document using the enhancement assessment criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1. The enhancement assessment criteria are divided into four areas in this document:

- need for enhancement investment (5 sections);
- best option for customers (3 sections);
- cost efficiency (2 sections); and
- customer protection.

Need: The existing odour control unit was installed as part of the original WwTW construction in 1997. Since that time there has been an increase in residential developments, a new university campus adjacent to the WwTW, and other potential developments including recreation amenities on the boundary. As a result, the number of customer complaints relating to odour from the WwTW have increased significantly. The existing odour control asset has had numerous refurbishments and upgrades but is no longer a sustainable solution as it is physically undersized to be able to achieve what is now required of it. Furthermore, advancements in odour treatment technology, enables new systems to remove odour causing vectors older systems could not. Lastly, the existing system is housed underground with the other assets, severely limiting access.

Options: We have assessed multiple scenarios using the approach described in WSH50-IP00 Our Approach to Investment Planning (Section 4.3) to consider how best to scale and target our response. The existing asset is incapable of achieving what is required of it, so the options considered have focussed on the installation of new odour control units with varying ratios of existing ducting reuse.

The chosen option is a full replacement of the odour control unit and ducting, which will fully address the need.

What We Will Deliver: A new above ground, increased capacity, odour control unit including extraction ducting and fans, odour neutralisation tower, monitoring equipment, and required appurtenant works at the Swansea Bay WwTW. The investment will triple the size of the odour processing plant and extraction system and provide enhanced access for future maintenance.

Efficient Costing: We will invest £22M of TotEx (post efficiency, 22/23 price base) in the odour control unit and ducting. The costing was developed as part of the preliminary design and planning completed by an external consultant.

Customer Protection: There is oversight from Swansea Council who have issued the EMP for the site. A joint steering group between Welsh Water and Swansea Council is meeting regularly to manage the issue. A bespoke PCD has also been proposed.

Benefits: This investment will create a step change improvement in odour from this site, significantly benefit our customers and achieve regulatory compliance with the EMP.

Our approach has been independently assessed by Jacobs (for Engineering and Costs) and Economic Insight (for CBA).

1. Introduction

The need for change primarily centres around compliance with the EMP for Swansea WwTW and reducing odour complaints from customers located in the vicinity of the site. Furthermore, the Enhancement Case includes also includes odour impact assessments at other identified sites to inform our planning for future AMPs.

Collectively this enhancement investment will create a step change improvement in the air quality surrounding our wastewater infrastructure by reducing the amount of odour contributing vectors within the atmosphere. It will also improve levels of protection for operators within the building to low levels of odour by increasing both the frequency of air changes within the building and treatment of a wider number of organic compounds generated which lead to odours.

The AMP8 Enhancement CapEx cost is £22M and OpEx £0.4M (post efficiency, 2022/23 price base). The work is split into 2 workstreams.

Table 1: Enhancement Case spend breakdown

Enhancement Case Spend Areas	Value
Swansea Bay WwTW odour mitigation	£21.632M
Odour assessments	£0.387 M
Total	£22.009M

Due to the non-material value of odour assessments above, this document case will solely focus on the odour mitigation required at Swansea Bay WwTW.

1.1 Structure of this Document

We have structured this investment case using the enhancement assessment criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1.1:

ID from Appendix 9	Abbreviated Assessment Criterion	Addressed in
A1.1.1 Need for enhancement investment	a Is there evidence that the proposed investment is required?	Section 2.1
	b Is the scale and timing of the investment fully justified?	Section 2.1
	c Does the proposed investment overlap with base activities?	Section 2.2
	d Does the need and/or proposed investment overlap/duplicate with previously funded activities or service levels?	Section 2.3
	e Does the need clearly align to a robust long term delivery strategy within a defined core adaptive pathway?	Section 2.4
	f Do customers support the need for investment?	Section 2.1
	g Have steps been taken to control costs, including potential cost savings?	Section 2.5
A1.1.2 Best option for customers	a Have a variety of options with a range of intervention types been explored?	Section 3.1
	b Has a robust cost-benefit appraisal been undertaken to select the proposed option?	Section 3.1
	c Has the carbon impact, natural capital and other benefits that the options can deliver been assessed?	Section 3.2
	d Has the impact of the proposed option on the identified need been quantified?	Section 3.2
	e Have the uncertainties relating to costs and benefit delivery been explored and mitigated?	Section 3.3
	f Where required, has any forecast third party funding been shown to be reliable and appropriate?	Not applicable for this case
	g Has Direct Procurement for Customers (DPC) delivery been considered?	Please refer to WSH50-IP00 Our Approach to Investment Planning (Section 3.4.1)
	h Have customer views informed the selection of the proposed solution?	Please refer to Stepping up to the Challenge: Business Plan 2025-30 (Section 2.2)
A1.1.3 Cost efficiency	a Is it clear how the company has arrived at its option costs?	Section 4.1
	b Is there evidence that the cost estimates are efficient?	Section 4.2
	c Does the company provide third party assurance for the robustness of the cost estimates?	Section 4.1
A1.1.4 Customer protection	a Are customers protected if the investment is cancelled, delayed or reduced in scope?	Section 5.1
	b Does the protection cover all the benefits proposed to be delivered and funded?	Section 5.1
	c Does the company provide an explanation for how third-party funding or delivery arrangements will work for relevant investments?	Not applicable for this case

2. Need for Enhancement Investment

This section will set out the drivers behind the Enhanced Investment Case and describe the context within which it has arisen.

The Case covers improvements into odour compliance across our asset base, but particularly at Swansea WwTW.

The proposed investment aligns with our long-term delivery strategy by responding to the need for long term stewardship and improvement of the service that Welsh Water provides.

2.1 Evidence that Enhancement is Needed

***Is there evidence that the proposed enhancement investment is required?
Where appropriate, is there evidence that customers support the need for investment?***

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1a and A1.1.1f

This investment is included as enhancement in line with OFWAT’s table guidance where it is stated: ‘expenditure on schemes where the primary objective is to deliver a step-change improvement above base standard. This could include odour’ (CWW3b.165-167).

Swansea Bay WwTW is an MBBR (moving bed biofilm reactor) treatment process located in the docks area to the east of Swansea. The treatment works, constructed in 1997, discharges to Swansea Bay through a long sea outfall pipeline and serves a Population Equivalent (PE) of 185,372 (2022/23 Resident and Non-Resident, excluding tankered). Uniquely, this site is largely underground and relies on air extraction and filtration systems to supply fresh air into the enclosed areas, extract, and treat the odorous air and harmful gases produced by the WwTW processes. The existing odour unit was designed to remove H₂S (Hydrogen Sulphide), however there are numerous other odour causing vectors that modern units now remove. The underground nature of the site makes odour extraction and treatment extremely important, but also very difficult.

The site’s odour control no longer meets required standards and so has been largely non-compliant with the Environmental Management Plan (EMP) since 2013. This plan was imposed on the site through a planning condition submitted via a Section 106 agreement (legal agreements between local authorities and developers). The development of new residential accommodation, and a new university campus around the site has increased complaints and the drive for change. Premises within the dock area also adjacent to the works have changed from industrial use to more office and domestic, again changing the customer acceptability to odours from the site. We are working closely with the Council to manage the issue ahead of investment – with a regular joint steering group.

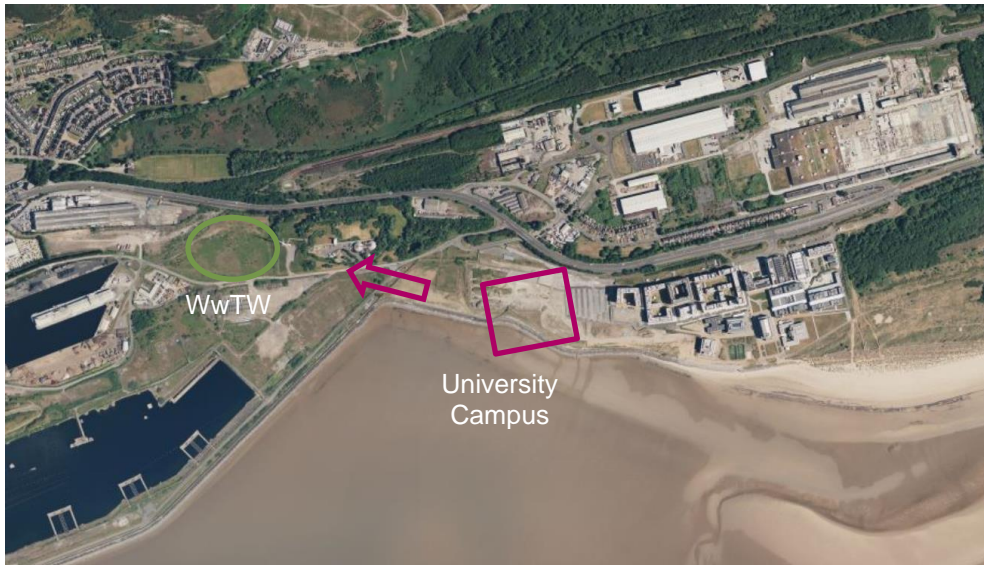


Figure 1: 2023 Google Earth Image of WwTW, new university campus and future development direction, providing example of actual encroachment.

The site has a history of odour complaints. In the last calendar year alone there have been 100 complaints, the majority of which occurred in the warmer period of the year, with August 2023 recording 40 complaints alone.

The extent of odour risk is demonstrated in Figure 2 below. It indicates that odour exposure levels will exceed maximum allowable for more than 2% of hours in a year. Comparison of these exposure levels to odour impact criteria (sensitive receptors typically applied to assess impact risk), indicate that several sensitive receptors such as residential properties and businesses, are within the range at which odour annoyance would be expected to occur under current operational conditions.

A review of actual complaints received validates the modelling work which has been undertaken. Figure 2 shows complaints within the modelled odour areas. In accordance with the model, odour annoyance has developed in areas where odour exposure levels are predicted to exceed 2% of hours in a year.

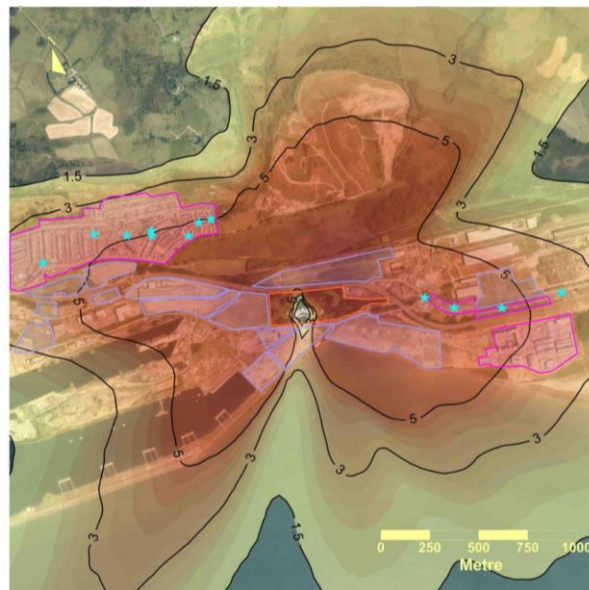


Figure 2: Baseline (existing assets) dispersion mode. Blue stars indicate complaints and contours represent odour units per cubic meter.

In conclusion, the site has two clear drivers for investment following development around the site:

- The site is attracting elevated numbers of odour complaints, exacerbated by the encroachment of residential and university developments with more planned.
- The sites odour control units are undersized and do not remove all odour causing vectors expected of modern standards. As such the site cannot satisfactorily meet its EMP.

2.1.1 Scale and Timing of Investment

Is the scale and timing of the investment justified?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1b

Since the initial EMP non-compliance in 2013 we have continued to maintain, refurbish and have undertaken interventions of the ventilation and air scrubber process (2015). While these measures satisfied the immediate needs of the City and County of Swansea Environmental Health group (CCSEH), for Welsh Water to achieve full compliance an upsized odour control unit is required.

This is the only long-term sustainable solution to enable a step change of improvement in odour performance at Swansea WwTW.

2.2 Overlap with Activities to be Delivered through Base

Does the proposed enhancement investment overlap with activities to be delivered through base?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1c

For all Enhancement Cases we have undertaken an exercise to ensure that base and enhancement spend is clearly segregated. This methodology is covered in WSH50-IP00 Our Approach to Investment Planning.

All Base Maintenance activities, refurbishment, and interventions have been exhausted to try and achieve the requirements of the EMP.

For this specific case the recommended option is a full replacement of the existing infrastructure with an increased air ventilation capacity. The proposed works would increase fresh air ventilation by a factor of 3 times (from 35,200m³/hr to 110,100m³/hr), and reduce Hydrogen Sulphide (H₂S), emissions and concentrations accordingly. Once installed, this equipment will be managed using Base Allowance.

Linked to this and to help increase the odour capture from within the process units, it is also proposed to install sludge cake silos in a concurrent scheme that will be funded from Base Allowance.

The investment in the odour control process will result in a significant step change in service above that which is achievable by Base Maintenance activity with the existing assets.

2.3 Overlap with Funding from Previous Price Reviews

Does the need and/or proposed enhancement investment overlap with activities or service levels already funded at previous price reviews?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1d

The existing asset has been maintained, refurbished, and modified to meet short term needs within existing base allowances. There has been no previous enhancement investment for odour control at the site.

2.4 Alignment with the Long Term Delivery Strategy

Is the need clearly identified in the context of a robust long term delivery strategy within a defined core adaptive pathway?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1e

Works associated with odour form part of Welsh Water’s Long Term Delivery Strategy. Scenario testing has been undertaken on several long-term outputs and where appropriate alternative pathways have been identified.

Further details can be seen in Welsh Water’s WSH01 Long Term Delivery Strategy.

Our approach to addressing the significant odour concerns at Swansea WwTW is an example of our adaptive planning strategy. We have continued to manage the asset by both maintaining and making improvements while the University was in the early planning stages. Simultaneously we have been exploring and understanding the advancements in modern odour control systems. With trials we have established the efficacy and TotEx costs of several process units. We are now at a stage (with the current phase of university building complete, and process evaluation complete) to implement an efficient treatment solution which is also cost effective, delivering a better value solution to our customers through adaptive planning.

2.5 Management Control of Costs

Is the investment driven by factors outside of management control? Is it clear that steps been taken to control costs and have potential cost savings been accounted for?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1g

The factor that is driving this Enhanced Investment Case that is outside of management control is our obligation to achieve sustainable compliance with the EMP. The improvement in the level of odour performance required results from changes in the land use around the site from industrial to residential. This change in land use has led to a significant increase in odour complaints.

We have taken steps to respond to this challenge including odour suppressing chemical dosing installed at incoming assets at Langdon SPS, Fabian Way SPS and the new University SPS. Further mitigation has been taken at the WwTW, including increased maintenance of ventilation pipework and air handling units, additional temporary ventilation, and odour suppressing chemical dosing into sludge lines. A specialist real-time odour monitoring and predictive modelling software pack, Envirosuite, has been installed to identify sources of odour and provide early warning of likely odour issues to support proactive intervention.

3. Best Option for Customer

In this section, we describe how we have developed options for addressing the need identified above. We can assess costs and benefits (including private and societal costs) through time including performances impacts to inform the best investment choice.

We identify the requirement for a significant uprating of the existing odour control system on the site and explored options to make use of existing equipment to reduces costs. The site is constructed underground which creates constraints and add complexity when developing any viable solutions.

The site is the subject of many odour complaints which are underpinned by an EMP. All Base Maintenance options to manage this have been exhausted. It is therefore in the best interests of our customers that an appropriately sized and effective means of odour control is installed. The installation of such an odour control system will address the complaints of our customers and is therefore fully within their interest.

3.1 Identification of Solution Options

Has the company considered an appropriate number of options over a range of intervention types to meet the identified need?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2a

Our approach to optioneering is set out in WSH50-IP00 Our Approach to Investment Planning (Section 4.3).

For this Enhancement Case we identified comprehensive longlist of options, these options were workshopped with all relevant stakeholders based on best available information.

1. Do Nothing: Current issues continue with our customers negatively affected and non-compliance with the EMP (progressed to shortlisting only for base assessment).
2. Operational solution: Manage airflow on the site through operational mitigation (e.g., hire of extra fans, increased chemical dosing), and regularly review numbers of odour complaints. This has been discounted at longlisting due to failures to achieve compliance using these techniques in AMP7.
3. Extract and treat options: Four extract and treat options were considered. The options varied by the amount of existing infrastructure that would be re-used as part of the replacement. Due to the unsuitability of the existing asset the following two options were taken to shortlisting.
 - a. Full replacement of existing OCU asset (100%).
 - b. Partial replacement of existing OCU asset (90%), reuse of existing ductwork (10%).

The selected options were costed and progressed to our cost benefit analysis.

Table 2: Shortlisted options

Eliminate, reduce or delay the need for change. Conventional Solution	End of AMP7 Position with no further actions
Maintain the effective risk controls already in place. Option S1	End of AMP7 Position with ongoing temporary measures
Enhance existing resources or add new resources. Option S2	Upsizing of odour control unit (OCU) and 100% of associated ducts
Enhance existing resources or add new resources. Option S3	Upsizing of odour control unit (OCU) and partial replacement of existing ducts.

It is also important to note that we have taken an adaptive approach, by not delivering this scheme when planning for the university was first discussed but have explored different odour treatment options (including the exploration of several innovative solutions) and by adopting a series of mitigation steps over the last few years have avoided unnecessary investment.

3.1.1 Assessment and Selection of Solution Options

Is there evidence that the proposed solution represents best value for customers, communities, and the environment over the long term?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2b

Our approach to cost benefit appraisal and its role in decision making is set out in WSH50-IP00 Our Approach to Investment Planning (Section 4.3).

The table below shows our analysis for the shortlisted options.

Table 3: Cost Benefit Analysis of Options Considered

Solution Option	Option Name	CapEx	Present Value Whole Life Costs (WLC)	Present Value Whole Life Benefits (WLB)	Benefit/Cost Ratio	Net Present Value (=WLB - WLC)
Option S1	Do nothing (with ongoing temporary measures)	£0.000M	£3.061M	-£0.388M	-0.127	-£3.449M
Option S2	100% full replacement	£23.627M	£26.331M	£8.735M	0.332	-£17.596M
Option S3	New OCU with partial reuse of existing ductwork	£23.255M	£25.544M	£8.692M	0.340	-£16.852M

Values in 2022/23 prices, pre-efficiency

Based on our CBA analysis Option S2 was recommended for implementation. It is noted Option S2 has a nominally lower cost benefit values compared to Option S3. There are only very marginal differences between the two options and Option S2 is judged to have lower delivery risks and provides better protection against future investment requirements.

Our CBA does not fully capture all the benefits of the options being assessed – specifically the legal compliance which underpins this intervention. This benefit is absent from both options so the two options are still comparable for selection purposes. As such, whilst it is calculated to be non-cost beneficial there remains a key driver for delivery.

In scaling the proposed new unit for Option S2 we have worked with our specialist suppliers to calculate the scale of unit required to address the standards set out in the EMP, in summary the design includes:

- Above ground installation of new carbon filter and ventilation stack (4m diameter x 15 m high), to achieve 1000 OU/m³ @ average and maximum odour conditions (meeting EMP requirement).
- Air handling unit with associated ducting and stack fans. Supply 47854 l/s, exhaust to stack 38817l/s, exhaust to atmosphere 9648 l/s.
- 4 new kiosks to house all motor control units, LV distribution boards and transfer equipment.

- Civil works to ensure ease of access for maintenance.
- Landscaping.

3.2 Quantification of Benefits

Has the company fully considered the carbon impact, natural capital and other benefits that the options can deliver?

Has the impact (incremental improvement) of the proposed option on the identified need been quantified, including the impact on performance commitments where applicable?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2c and A1.1.2d

To demonstrate how we have considered the carbon impact, natural capital and other benefits for this particular case we have included an excerpt from our Service Measures Framework (SMF) analysis which maps benefits to Ofwat drivers for inclusion within data tables.

For the preferred option in this Enhancement Case the scheme delivers benefits across categories in our SMF with the reduction in odour providing 82% of the overall total.

Table 4: Profile of Benefits from our Preferred Option

Scenario	Benefits from AMP8 Spend relative to baseline						
	Legal Compliance	Final Effluent Quality	Avoidable Costs	Staff Productivity	Health & Safety	Nuisance - Odour	Total
Preferred	1.6%	2.3%	6.4%	7.6%	0.5%	81.7%	100%

There is no longer a common performance commitment for odour reporting (customer contacts).

3.3 Uncertainties relating to cost and benefit delivery

Have the uncertainties relating to costs and benefit delivery been explored and mitigated? Have flexible, lower risk and modular solutions been assessed – including where forecast option utilisation will be low?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2e

Our methodology is set out in WSH50-IP00 Our Approach to Investment Planning (Sections 4.10 and 4.3). This includes commentary on our approach to optioneering, costing and cost benefit analysis.

For this Enhancement Case we have evaluated a range of options in line with our TotEx hierarchy approach. We balance efficient costing and delivery with innovation and managing risk.

We have highlighted areas in which the calculation of costs or benefits are unusual or uncertain and how we have mitigated for this in our evaluation. Our identified three options have been included in the table below.

Table 5 : Options considered for Odour mitigation at Swansea Bay WwTW

Option	Description	Risks associated with costing this option or valuing its benefits	Mitigation [of the Risk associated with costing]
Conventional Solution	End of AMP7 Position with no further actions	Low (do nothing approach)	NA
Option S1	End of AMP7 Position with ongoing temporary measures	Low, we are familiar with the maintenance requirements of the ageing infrastructure.	NA
Option S2	100% full replacement of OCU	Odour control units are typically propriety equipment that requires specialist design.	We approached specialist suppliers for preliminary design and costing based on our requirements (current and future).
Option S3	Partial (90%) OCU replacement with use of existing ducts	Odour control units are typically propriety equipment that requires specialist design. Furthermore, the integration of existing ducting requires condition assessment. This creates uncertainty in the cost estimate	We approached specialist suppliers for preliminary design and costing based on our requirements (current and future).

4. Costing Efficiency

In this section we give specific details on our approach to costing and benchmarking. Our overarching approach to developing efficient costs is set out in WSH50-IP00 Our Approach to Investment Planning (Section 7).

The two sub sections below correspond to the three criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A.1.1.3. There is no third-party funding associated with this investment case.

4.1 Developing a cost for Odour reduction

Is it clear how the company has arrived at its option costs? Is there supporting evidence on the calculations and key assumptions used and why these are appropriate?

– Ofwat's final methodology for PR24, Appendix 9, A1.1.3a and A1.1.3c

The Swansea WwTW Odour Mitigation scheme was costed using the Unit Cost Database (UCD) Cost & Carbon Estimating Tool (C&CET) as described in 'Overview: How we have developed our investment plan Section 5 Costing Methodology.

This programme utilises like-for-like (top down) costing approach of process assets and construction related costs to forecast and estimate future project and programme costs.

The scope contains items of work which have been constructed throughout previous AMPs, and therefore we have a rich source of historical cost data. For these items of work, we have developed cost models based on the dominant cost drivers, e.g., the most influential drivers to cost for pipework is length and diameter. This costing approach forms the direct works and site-specific costs. We apply construction indirect costs and project oncosts based on the work stream, in this instance this is Wastewater Non-Infrastructure, which applies modelled percentages to the cost of the direct works and site specifics.

The scope is aligned to our Work Breakdown Structure (WBS), which was developed to support our data capture process of historical project cost against delivered assets, into a scope input sheet. Within this, sizing of the assets based on the relevant yardstick, which is dictated by the WBS, is provided following calculation in the previous engineering stages. Our costs models are developed in line with our WBS and this allows us to input this information into the C&CET and generate a project estimate. WBS details the inclusions and exclusions of works under each cost model and the limitations of the model, so we can ensure all project costs are captured and there is also no over costing.

The estimate for Swansea WwTW lists out the scope items such as pipework, with their location, diameter and length, cabling with the length, transformers and the and the power in kVA, air handling units and motor control centres in kW etc. With the relevant quantities against these, the C&CET calculates the costs for each item using the cost models. With the workstream selected the C&CET applies the correct models to the Direct Works and Site-Specific costs, to cost the contractor indirect and project oncosts, associated with delivering the project.

The costing assumptions are that the scheme is based on the average case, in providing assets which we construct on regular basis. The scope follows the assumptions and calculations provided by the supplier following the ERG Air Pollution Control FEED Study and the conclusion that wet scrubbing and carbon polishing as the method of treatment. As part of this scope, associated power upgrades with new substation, HV cabling and new transformer, will be required.

Along with our overall costing strategy being reviewed and assured by Jacobs, we have also employed third party consultants to review single Enhancement Cases to provide confidence that the estimates within them are robust, efficient, and deliverable. Please refer to WSH50-IP00 Our Approach to Investment Planning (Section 6) for more information regarding the review and assurance undertaken.

4.2 Benchmarking our approach

Is there evidence that the cost estimates are efficient (for example using similar scheme outturn data, industry and/or external cost benchmarking)?

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.3b

We engaged independent consultants to carry out an industry benchmark of our preferred solution for Swansea Odour Compliance.

This benchmark forms most of the Enhancement Case expenditure. The benchmarking output showed that our pre-efficiency costs were within the benchmark range and suggests that our cost efficiency is within the upper quartile.

The findings of this benchmarking are shown in the following table.

Table 6: Financial Benchmarking (values in pre-efficiency 21/22 prices)

Scheme	Welsh Water Costing	Upper Quartile	Average	Lower Quartile
Swansea Bay - Odour Compliance	£21.721M	£22.904M	£24.179M	£25.275M

5. Providing Customer Protection

Delivery of this work has been committed to Swansea Council through the EMP and they are providing oversight for the required change. Given the scale of the proposed work it is also appropriate to recommend a Price Control Deliverable (PCD) to protect customers, this is set out below.

The material below corresponds to the three criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A.1.1.4. There is no third-party funding for this Enhancement Case.

5.1 Proposed Price Control Deliverable (PCD)

Are customers protected (via a price control deliverable or performance commitment) if the investment is cancelled, delayed or reduced in scope?

– Ofwat's final methodology for PR24, Appendix 9, A1.1.4a

Investment will have oversight from Swansea Council. However, as the planned work is just below the materiality threshold, we feel it is appropriate for a PCD to be put in place.

Customer Facing Description of Enhancement Case	Reducing Levels of Odour in the Environment
Short Description of Enhancement Case / PCD Area	Delivery of new odour control unit at Swansea WwTW
PCD Number	PCD 09
Summary of deliverable Description	Installation of Odour Control Measures
	<p>The company's wastewater treatment works (WwTW) at Swansea is subject to an Environmental Management Plan (EMP), imposed on the site through a planning condition submitted via a Section 106 agreement (legal agreements between local authorities and developers).</p> <p>The expansion of residential development (including student accommodation) around the site has led to increased complaints and an increased expectation from Swansea Council (specifically the City and County of Swansea Environmental Health group - CCSEH) to improve odour compliance.</p> <p>The site has a history of odour complaints. In the last calendar year there have been 100 complaints, the majority of which occurred during the warmer period of the year. In August 2023 alone, there were 40 recorded complaints.</p> <p>The site has unique characteristics having been built underground to reduce visual intrusion. This increases the complexity of managing gasses within the WwTW. Design work has been progressed to identify the need to triple the size of the existing odour control system.</p>
Measurement and Reporting	<p>We will measure this investment in two ways.</p> <ol style="list-style-type: none"> 1) Delivery against the EMP requirements. This will be agreed with Swansea Council through our joint steering group. 2) Delivery of the proposed works. This will be through an annual update to Ofwat as part of the Annual Performance Report (APR) process.

Conditions on scheme	NA
Assurance	The company will agree appropriate assurances with Ofwat as part of Final Determination.
Price control deliverable payment rate	<p>We will specify the details of the activity to be delivered within this Enhancement Case and return funding to customers on a proportionate basis for non-delivery.</p> <p>By the end of AMP8 we will deliver:</p> <ul style="list-style-type: none"> • Above ground installation of new carbon filter and ventilation stack (4m diameter x 15 m high), to achieve 1,000 OU/m³ @ average and maximum odour conditions (meeting EMP requirement). • Air handling unit with associated ducting and stack fans. Supply 47,854 l/s, exhaust to stack 38,817l/s, exhaust to atmosphere 9,648 l/s. • 4 new kiosks to house all motor control units, LV distribution boards and transfer equipment. • Civil works to ensure ease of access for maintenance. • Landscaping. <p>Up to £21.632M will be returned for non-delivery.</p>
Impact performance in relation to performance commitments	There is not a common performance commitment specifically for odour contacts.

The proposed protection covers the full value of the Swansea scheme.

It does not include the investigative works at other locations, but these are immaterial at £387K.

6. Appendix A

The table below shows the total CapEx enhancement costs in Amp 8 for this Enhancement Case. The Ofwat driver this Enhancement Case maps to is:

- Odour and other nuisance; enhancement CapEx – CWW3b.165
- Odour and other nuisance; enhancement CapEx – CWW3b.166

No other Enhancement Cases contribute to this driver.

Table 7: Allocation of Costs in the Data Tables

Driver Ref	Year in AMP8					Grand Total
	1	2	3	4	5	
CWW3b.165 - CapEx	£0.077M	£2.301M	£10.778M	£8.474M	£0.079M	£21.709M
CWW3b.166 - OpEx	£0.000M	£0.000M	£0.100M	£0.100M	£0.100M	£0.300M
TotEx	£0.077M	£2.301M	£10.878M	£8.574M	£0.179M	£22.009M
Total CapEx in AMP8 Plan in 2022/23 prices						

What We Will Deliver: This Enhancement Case will deliver a new, increased capacity, odour control unit including extraction ducting and fans, odour neutralisation tower, monitoring equipment, and required appurtenant works at the Swansea Bay wastewater treatment plant. The investment will triple the size of the odour processing plant and extraction system.