

# Enhancement Business Cases

## Cost Assurance Note

Northumbrian Water

---

<b>Project:</b>	PR24 Enhancement Business Cases		
<b>Prepared by:</b>	Steve Dobson	<b>Date:</b>	10 August 2023
<b>Approved by:</b>	Adam Symonds	<b>Checked by:</b>	Michael Harper
<b>Subject:</b>	Cost Assurance Note rev1		

---

## 1 Introduction

This cost assurance note gives an overview of the process that has been carried out in the preparation and development of the costing for the enhancement elements of the PR24 business plan, support Northumbrian Water in confirming to OFWAT that:-

- We are confident that the overall strategy for data assurance and governance processes delivers high quality data across all aspects of the plan and long-term delivery strategy.
- We have challenged and satisfied ourselves that we considered the full implications of the 2025-30 business plan, and that the plan achieves value for money.
- The expenditure forecasts included in the plan are robust and efficient.

The description within this note outlines the work undertaken in the preparation of the the enhancement costing element of the PR24 business plan submission, from the adoption of industry best practice estimating methodology to the enhanced cost assurance and benchmarking activities, to give Northumbrian Water's leaders confidence that robust, auditable, and appropriate processes have been followed.

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

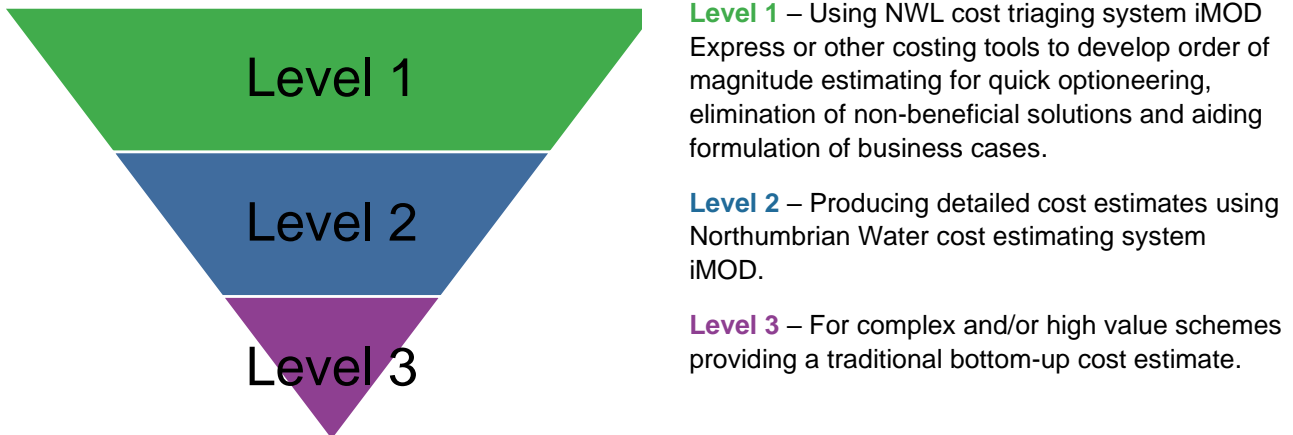
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

## 2 Cost Estimation

### 2.1 Approach to Costing

To maximise the benefit and efficiency of the costing effort, a three-level estimating approach has been utilised for developing PR24 costs.



**Figure 1: Estimating Level**

Where NWL have robust cost models that have sufficient data and scope coverage, level 2 estimates have been utilised as the preferred final estimate. However, if options are not subject to robust level 2 coverage, or schemes are complex and high value in nature, then level 3 estimates have been carried out.

### 2.2 Estimating Scope

The scope used as the basis for estimating has been provided by the PR24 needs and engineering teams, as well as from NWL asset planning, operational & delivery teams.

The level of scope detail provided throughout the business plan development has been appropriate to the level of estimating being carried out. High level scopes developed from desktop studies which identify basic assets and sizing provided the basis for level 1 estimates. For level 2 & 3 estimates, detailed asset lists, sizing descriptions and site-specific considerations have been provided together with outline drawings.

### 2.3 Estimating Method

#### 2.3.1 iMOD

Northumbrian Water's capital and operational estimating system has been the primary method of estimating for PR24 enhancement schemes.

The iMOD estimation package comprises a suite of 50 engineering scoping models and a large and detailed cost database containing many thousands of costing data-points on a range of components and assets. The iMOD system uses a Process and Component costing hierarchy. The relevant processes are selected for each estimate, with the engineering scoping model run for each process. This produces a quantified Work Breakdown Structure (WBS), with detailed attribute tags, with costs applied via the iMOD cost database. The process models are then supplemented with individual components and/or unit rates to complete the estimate as appropriate. Contract and Client overheads are then added from a library of up to 40 workstream specific, overhead cost models.

The iMOD engineering scoping models produce detailed OPEX calculations for Power, Operational labour, Chemicals & Materials and Waste disposal. E.g. when running a Pumping Station model the kW pump rating and daily/monthly/annual run time are all automatically calculated and costed via the OPEX unit cost table.

### 2.3.2 Other Costing Methods

For repetitive costing activities that either do not have costing information in iMOD or where the scale of the costing exercise is too large to be efficiently costed individually through iMOD, then alternative approaches have been adopted. The primary costing tools and models used are as follows:-

- Nature-based costing tool
- DWMP cost model
- WRMP costing

### 2.3.3 Traditional Estimating

Traditional unit cost build-up has been carried out for enhancement areas where either the iMOD system does not have model coverage or cost data. In this approach traditional bills of quantities have been produced and costed using unit cost rates. Unit cost rates have been sourced from the following:-

- Actual historical costs from NWL delivery
- Framework rates from agreed competitively tendered delivery frameworks
- Industry Data – published cost information and sector databases
- Market testing – supplier quotations

## 2.4 Risk and Uncertainty

### 2.4.1 Industry Best Practice

The inclusion of estimating uncertainty and risk allowance, appropriate to the stage in a project, is recognised as industry best practice as outlined in the following guidance: -

- Infrastructure and Projects Authority – Cost Estimating Guidance
- APM/Association of Cost Engineers – Estimating Guide
- Association for the Advancement of Cost Engineering (AACE) – Recommended Practices

### 2.4.2 Northumbrian Water Risk and Uncertainty Allowances

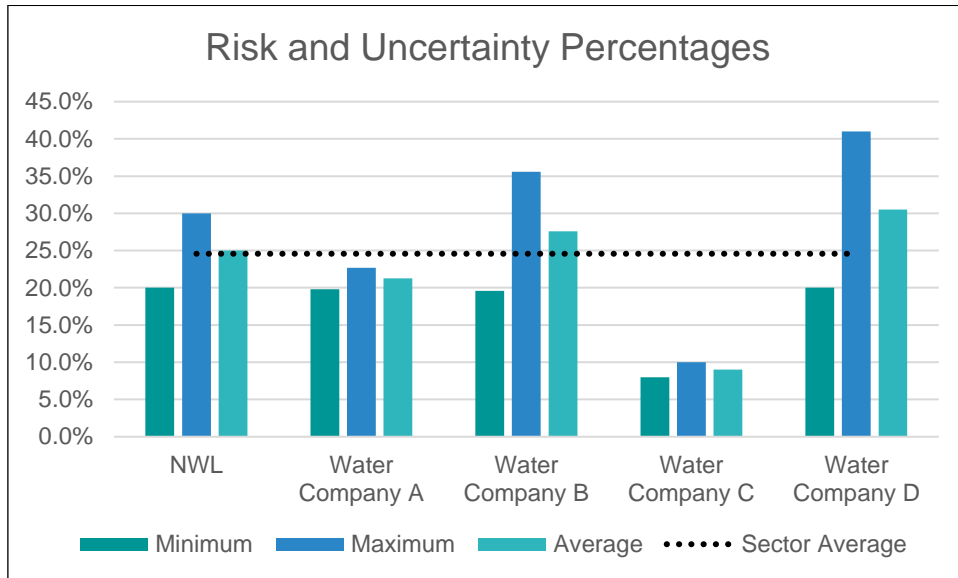
Northumbrian Water have utilised iMOD estimating system since PR14 and have analysed budget performance throughout project gateways for AMP6 and the first two years of AMP7. The table below outlines the percentage change between project gateways for each of the main work areas.

Delivery Area	Business Planning to Close	Business Planning to Award	Award to Close
Wastewater Infrastructure	31.6%	19.1%	10.5%
Wastewater Non-Infrastructure	13.6%	23.6%	-8.1%
Water Infrastructure	72.6%	33.6%	29.2%
Water Non-Infrastructure	43.6%	14.4%	25.5%
<b>All Areas</b>	<b>30.2%</b>	<b>20.5%</b>	<b>8.1%</b>

**Table 1: Actual project change for AMP6 & AMP7**

Northumbrian Water have used this analysis to develop a process for accounting for risk and uncertainty within their business as usual estimating and budget planning. The cost estimates prepared as part of NWL

PR24 business plan submission have therefore included allowances for risk and estimating uncertainty in accordance with business-as-usual processes and are in line with comparative companies as shown in the chart below.



**Chart 1: Sector Risk and Uncertainty**

**2.4.3 Checking and Approval Procedure**

All estimates produced have been checked and approved by a suitably qualified estimating professional as part of peer review and quality procedure. Checking process includes the following activities:-

- Calculation review
- Verify that all scope elements have been priced
- Confirm appropriate cost data and models used
- Correct contract and client overheads applied
- Risk and estimating uncertainty suitably applied

All solution estimates have been subject to a ‘Check’ from a peer level estimator or higher under a delegation matrix. All estimates carried out by the estimating team have been checked internally to identify any issues or necessary amendments before distribution.

Stage	Level 1	Level 2	Level 3
Do	Estimator	Estimator	Estimator
Check	Peer-Review	Peer-Review	Peer-Review
Approve	Senior Estimator	Senior Estimator	Work Package Lead

**Table 2: Delegation Matrix**

## 3 Benchmarking

### 3.1 Benchmarking Approach

Throughout the development of enhancement costs for PR24, NWL have incorporated benchmarking centrally into the iterative process to ensure that the costs submitted to OFWAT are robust, efficient, and appropriate.

Benchmarking activities have included the following: -

- Pre-Benchmarking of NWL cost models
- Business case project benchmarking
- Econometric benchmarking
- Peer/Supplier Benchmarking

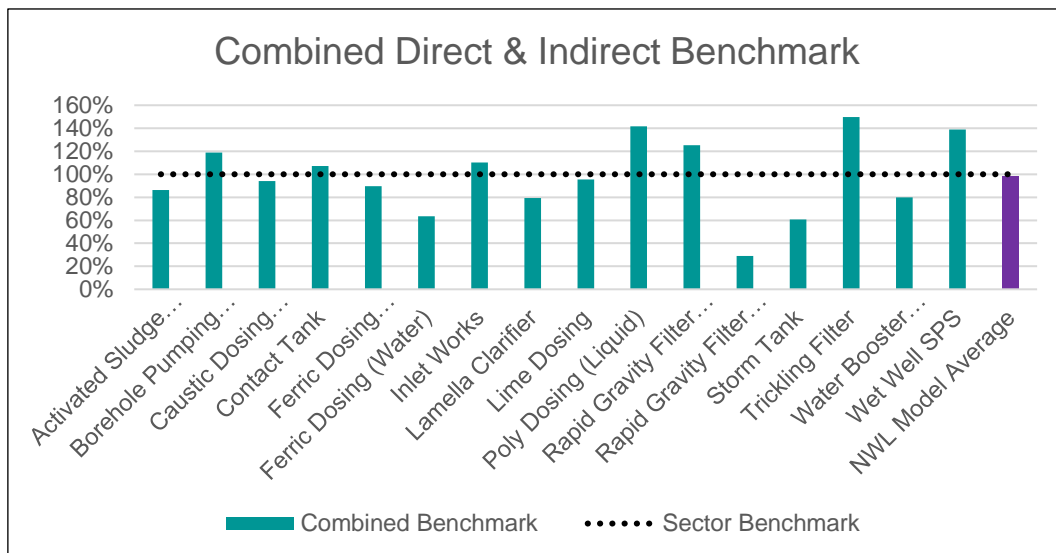
The benchmarking approach for NWL has been guided by the IPA – Best Practice in Benchmarking.

### 3.2 Pre-Benchmarking

Prior to commencing the cost estimation process for PR24 enhancement cases, Mott MacDonald carried out a pre-benchmarking exercise to ensure that NWL's cost models within iMOD were in line with sector costs. Benchmarking focused on the following areas: -

- Indirect Costs
- Direct Costs

The benchmarking indicates that NWL indirect costs are in line with or under the sector averages, whilst the direct costs are over sector averages. However, when both indirect and direct costs are combined to give a holistic view, NWL costs are at 98% average or 2% under the expected costs as show in the chart below.



**Chart 2: Combined Benchmarking**

The conclusion from the pre-benchmarking exercise was that overall, the cost estimates generated from the cost models within iMOD should be in line with sector cost and that the use of iMOD would be appropriate.

### 3.3 Business Case Project Benchmarking

Representative projects were sampled from selected business cases and benchmarking estimates produced from Mott MacDonald's sector database, as outlined in the table below.

Case	Sample Size	Benchmarking Outcome
DWF	6 Projects	-11%
WINEP - Storm Overflows	12 Projects	-10%
DWMP Marske	Programme	1%
DWMP Berwick	Programme	-12%
WINEP - WFD	6 Projects	-5%
WINEP - Sludge	Sludge Storage Shed	16%
WINEP - Monitoring	5 Monitor Installations	-14%
WINEP - Septic Tanks	6 Projects	-22%
Raw Water (Nitrates, Geosmin)	6 Projects	-4%
<b>Overall Benchmarking</b>		<b>-6%</b>

**Table 3: Business Cases**

The project benchmarking indicates that NWL's cost are generally in line with or under the sector benchmarking costs.

### 3.4 Econometric Benchmarking

Econometric benchmarking has been carried out on several business case areas where applicable. The OFWAT PR19 economic models and principles have been updated by Mott MacDonald with AMP7 reported data and PR24 data where available. Econometric models benchmarked were: -

- Spills
- P-Removal

For both Spills and P-Removal costs from traditional grey solutions can be assessed and Northumbrian Water's costs appear to be efficient and deliverable when compared to Mott MacDonald's econometric models. However, for green interventions, the industry reported data in its current state is of insufficient quality to build appropriate econometric models.

### 3.5 Peer/Supplier Benchmarking

For high value schemes, further peer and supplier independent benchmarking has been carried out.

For the Berwick and Marske DWMP schemes, NWL delivery partners MMB and Esh carried out independent cost estimates, with DWMP cost estimates broadly in line with supplier estimates as shown in table below.

Scheme	NWL PR24	Esh	MMB
Berwick	£165m	£174m	£200m
Marske	£330m	£295m	£358m

**Table 4: DWMP Supplier Benchmarking**

For the Bran Sands long sea outfall, Aqua Consultants have carried out an independent peer estimate, concluding that the PR24 estimate is in the correct order of magnitude.

### 3.6 Benchmarking Outcomes & Actions

The benchmarking process has been invaluable to understand how Northumbrian Water's position is likely to be compared to the sector, showing that NWL costs in the main will be seen as either in line or efficient.

However, the process has been iterative, with outcomes of the benchmarking work being used to inform further actions to develop the best possible enhancement cost submission. Where NWL costs have been substantially higher than the sector position, such as the sludge storage barns, the PR24 team considered and reduced scope inclusions and re-estimated to develop in line costs.

For other areas, such as wastewater filtration, with pre-benchmarking and project benchmarking indicating under-estimating for these assets, benchmarking averages have been used to increase costs to be in line with sector costs whilst still being seen as efficient.

## 4 Cost Assurance

Cost assurance processes have formed a central part of the estimating work for PR24. In addition to the checking and approval procedures carried out, each iteration of an estimate as it has been developed through the estimating methodology, has been tracked and assessed against the following pillars: -

- Level of Scope Definition
- Quality of Cost Data
- Estimation Method

This assessment has been used to ensure that an estimate is at a sufficient level appropriate to the decision gateway and that schemes going forward into the business plan have met the correct confidence level.

Where costs have not been produced by the PR24 costing team, but have been developed by Northumbrian Water, the PR24 costing team have carried out assurance reviews to ensure costs are correct and have followed a consistent and auditable process.

In a final cost assurance exercise, Northumbrian Water's own cost estimating team are carrying out a review of all the cost estimating carried out for PR24 enhancements to ensure process, accuracy and auditability.