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NWG Climate Change Benchmark Report

PR24 Assurance

**Benchmark Report
Northumbrian Water Group**

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1 Executive Summary

Turner and Townsend have been commissioned to provide Benchmarking assurance to NWG as part of their PR24 Draft Determination submission. We received 112 individual estimates completed by the NWG delivery team.

Cost Category	NWG iMOD	T&T Benchmark	Variance
Scope (iMOD Component Models)	£162,933,646	£188,490,587	£25,556,940
Scope (Estimator Assessments)	£72,310,410	£72,310,410	£0
Contract Overheads	£64,002,253	£110,512,500	£46,510,246
Risk	£133,505,284	£85,622,309	-£47,882,974
Project Overheads	£53,757,437	£41,425,963	-£12,331,474
Total	£486,509,030	£498,361,768	£11,852,738

We have noted the following key items throughout our review:

- Cost estimated using NWG iMOD estimating system appear generally below current market prices based on our wider market intelligence.
- Due to Draft Determination time constraints, we have excluded a detailed review of scope, measurement and engineering assumptions, but note several instances which appear to drive a significant proportion of the cost.
- As is standard practice with this level of estimate maturity, Contract Overheads, Risk and Projects overheads are calculated as percentage on cost to measurable scope items. As such a significant increase in scope cost, drives a number of other associated costs.

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2 Introduction

Turner & Townsend (T&T) have been commissioned to complete a benchmark report for Northumbrian Water Group (NWG). The report aims to provide NWG with cost assurance on their Amp 8 budget, reviewing the proposed projects costs and benchmarking these against T&T internal benchmark data.

2.1 Scope

- Consolidate all 112 estimates into single report/ workbook
- Identify materially significant process/ components
- Produce benchmark models for key components
- Run benchmark models in place of iMOD models
- Summarise outputs at project level
- Identify percentage of individual projects benchmarked vs total programme
- Benchmark Indirect Cost assumptions/ uplifts
- Provide three point estimate overall
- Short form Report on findings, identifying areas of key concern and recommendations

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3 Methodology/Approach

In order to complete the benchmarking activity, NWG provided 112 individual projects and their associated costs. It is noted that some projects appeared with multiple optioneering possibilities which have been included in the benchmark analysis.

The 112 individual projects were consolidated into a single working master copy in order to identify materially significant cost items across the entire batch of estimates, rather than taking a statistical sample of projects to benchmark.

Within this exercise, iMOD costs were broken down into scope costs, contract overhead costs, risk costs, project overhead costs and Capex total costs. Overall, the total Capex costs for the projects as detailed by NWG totalled to £486,509,030. Below is a table showing the values of each cost item required for the benchmarking report.

Cost Category	NWG iMOD
Scope (iMOD Component Models)	£162,933,646
Scope (Estimator Assessments)	£72,310,410
Contract Overheads	£64,002,253
Risk	£133,505,284
Project Overheads	£53,757,437
Total	£486,509,030

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3.1 Scope Costs

Within the master document, each project was further broken down into the individual components of work that collectively formed the scope costs. An example of this can be seen below. Thus, the collective group of projects comprised of **4289** individual components of work that potentially could be benchmarked. Of these components of work, only those that had a component code assigned to them were benchmarked as these related to physical assets such as chemical tanks, pipework, reinforced concrete base slabs etc. We were unable to benchmark any manually inputted lump sump items, as we lacked the scope of information to validate the initial estimating assumptions. This meant that **1337** component of work line items were benchmarked for the report.

Therefore, for the 112 projects provided by NWG, **£168,226,807** (68%) of scope costs were benchmarked against the overall scope costs, using T&T internal data.

3.1.1 Cost models

For each of the components of work that had a component code, a cost model was created using internal T&T data, resulting in the creation of **43** individual cost models. Due to NWG's tagging system for the components of work, some cost models required multiple editions to consider the variations in asset type costs. As a result, **67** cost models were created to benchmark the scope costs. An example of a cost model can be seen below.

3.2 Contract Overheads

We have developed **14** individual benchmark cost models for each of the identified NWG iMOD contract overhead components. These costs are calculated as a percentage of the total scope cost and are benchmarked using historical projects of a similar nature.

3.3 Risk

Risk allowances, including estimating uncertainty have been calculated using a fixed 20% allowance applied to the cumulative cost of Scope, Contract Overheads and Project Overheads.

3.4 Project Overheads

Project overheads including client, consultant and project development costs are benchmarked as a 15% uplift to the total Scope costs.

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4 Analysis

4.1 Scope Costs

As stated, NWG's scope costs that could be benchmarked against component codes was **£168,226,807**. When compared to T&T's benchmark exercise using the cost model data, the cost scope value was **£242,613,329**, which represented a 44% increase on NWG's costs.

Cost Category	NWG iMOD	T&T Benchmark	Variance
Scope (iMOD Component Models)	£162,933,646	£188,490,587	£25,556,940
Scope (Estimator Assessments)	£72,310,410	£72,310,410	£0
Total	£235,244,056	£260,800,996	£25,556,940

The main cost drivers within the cost components were CC0002 (in-trench pipework) and CC0005 (kiosks and buildings). These have been further explained below.

4.1.1 CC0002 – In Trench Pipework

The total NWG iMOD scope costs for CC0002 came to **£17,550,560** and when compared to T&T's benchmark costs, these were **£60,464,151**. A significant driver of the cost variance is the Sedgefield STW WFD Transfer, a c20 kilometre in trench pipeline with an iMOD scope cost of c£4m, compared to a benchmark of c£51m.

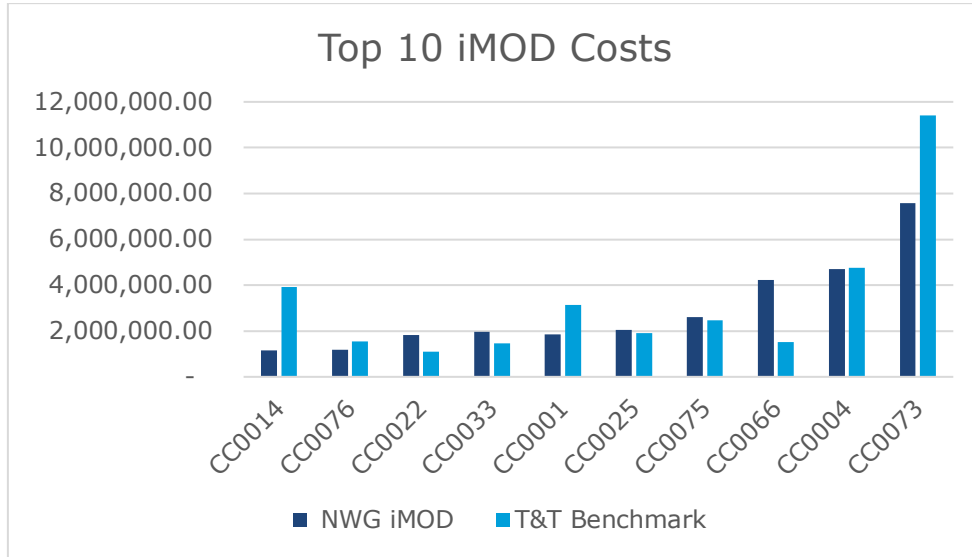
4.1.2 CC0005 – Kiosks and Buildings

Another component that increased costs throughout the projects were kiosks and buildings. For the NWG iMOD scope costs these came to **£115,367,985**. For T&T's benchmark these costs were **£137,003,103**. Again, the costs were driven by a few assets which had kiosk/building quantities ranging from 16,000 – 55,000m². Typically, we would expect kiosks to be no bigger than 25m². After reviewing the components, it is understood that these are structural steel covers for other assets, therefore it would be advised that using a kiosk/building cost model would not be the most appropriate cost model for these assets. Instead it may be more appropriate to build a bespoke bottom up cost models with more appropriate scope assumptions.

4.1.3 NWG iMOD Highest Scope Costs

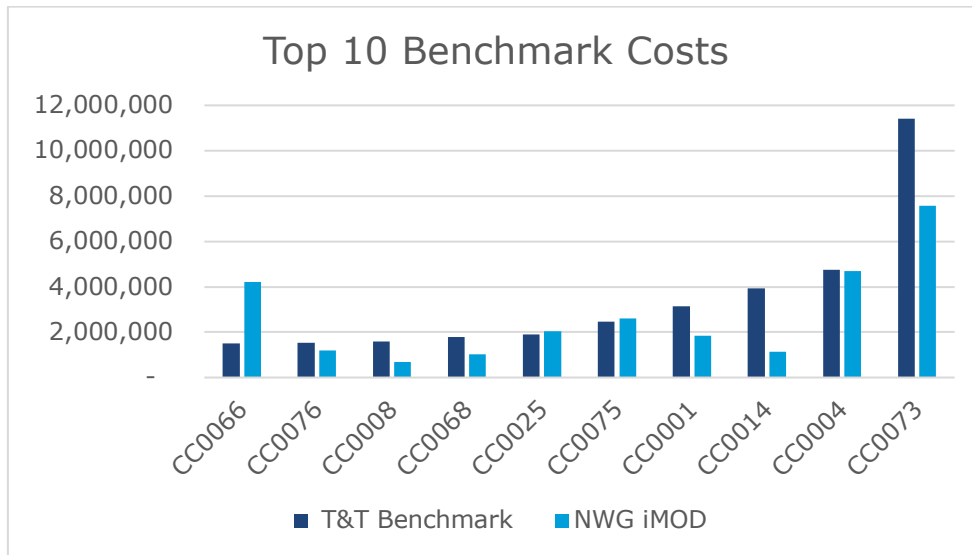
Below is a graph that shows the top 10 NWG iMOD costs when compared to T&T's benchmark. CC0002 and CC0005 have not been included in these costs.

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4.1.4 T&T Highest Scope Costs

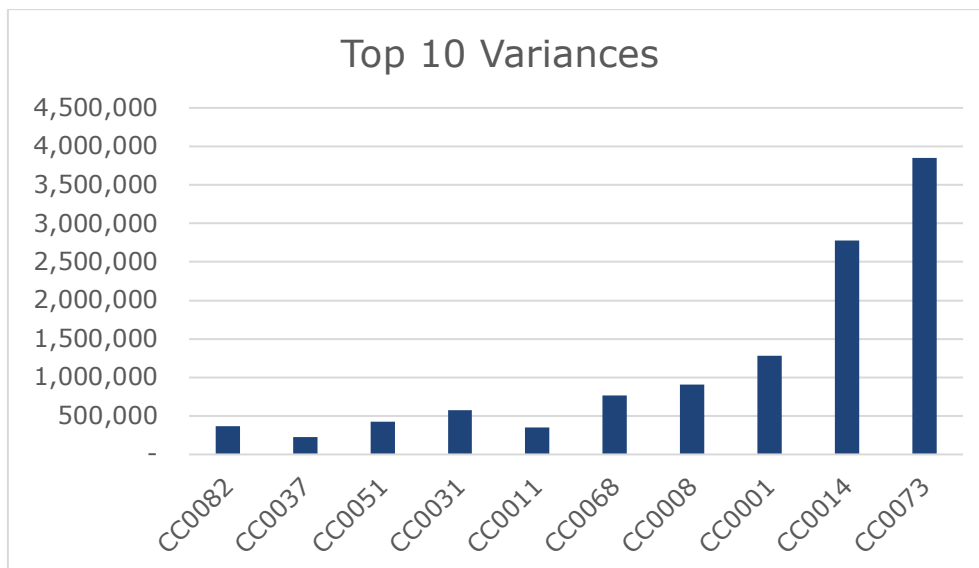
Below is a graph that shows the top 10 T&T benchmark costs when compared to T&T's benchmark. CC0002 and CC0005 have not been included in these costs.



4.1.5 Largest Cost Variances Between NWG iMOD Costs and T&T Benchmark Costs

Below is a graph that shows the top 10 cost variances between NWG iMOD costs and T&T benchmark costs. CC0002 and CC0005 have not been included in these costs.

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4.1.6 Variance by project

It can be observed that large variances exist when comparing the Benchmarkable NWG iMOD scope costs and T&T costs. The top 10 projects with variances are shown in the table below:

Project Option	NWG iMOD	T&T	Variance
Layer Building	£40,863,727	£47,919,700	£7,055,974
Run to waste - Hanningfield	£8,815,158	£2,188,151	-£6,627,006
Chigwell Building	£38,248,828	£44,852,840	£6,604,012
Run to waste - Honey Hill WTW option 1	£2,522,345	£8,174,444	£5,652,099
Langham Building	£15,695,324	£18,401,165	£2,705,841
Ormesby Building	£12,140,695	£14,232,151	£2,091,456
Langham GAC option	£2,617,747	£4,335,725	£1,717,978
Mosswood gas option	£714,400	£1,776,895	£1,062,495
Horsley Magnese gas option	£713,249	£1,772,021	£1,058,771

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4.2 Contract Overheads

Individual contract overheads are benchmarking using cost curves against the total scope cost for each project. A significant proportion of the variance is driven by an increased scope cost driving an associated impact to contract overheads. There are however some areas such as supervision/ Prof Labour where our historic benchmark data

Contract Overhead	NWG iMOD	T&T Benchmark	Variance
Compound	£1,348,045	£4,315,339	£2,967,294
Generators	£237,063	£290,330	£53,267
Other	£5,200	£47,569	£42,369
Plant	£4,430,348	£4,942,473	£512,125
Pumping	£243,081	£242,151	(£930)
Security	£1,227,734	£8,622,492	£7,394,758
Supervision/Prof. Labour	£38,905,481	£62,890,724	£23,985,243
Traffic	£0	£0	£0
Testing and Commissioning	£2,314,892	£1,992,124	(£322,768)
Design	£5,388,738	£20,386,126	£14,997,388
Site Investigation	£1,011,647	£5,122,196	£4,110,548
Access Road	£532,956	£48,686	(£484,270)
Accommodation/Buildings/Services	£4,571,928	£979,676	(£3,592,252)
Fencing and Lighting	£1,670,764	£283,740	(£1,387,024)
Temporary Works Other	£2,114,377	£348,874	(£1,765,502)
Total	£64,002,253	£110,512,500	£46,510,246

4.3 Project Overheads

Project overheads have been calculated as a 15% uplift to the project scope costs. Despite this being against a higher baseline scope cost, the resulting benchmark project overhead cost is lower than that of iMOD.

Project Overheads	NWG iMOD	T&T Benchmark	Variance
Project Overheads	£53,757,437	£41,425,963	(£12,331,474)

4.4 Risk

Risk has been benchmarked as a 20% allowance to Scope, Project overheads and Contracts overheads. This results in a significantly lower value than that produced by iMOD. A primary driver of this may be the point at which cost uncertainty is included, our benchmark data is from historical projects and so as a results contains an element of realised risk.

Risk	NWG iMOD	T&T Benchmark	Variance
Risk	£133,505,284	£85,622,309	(£47,882,974)

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4.6 Estimate Uncertainty

Estimating uncertainty has been calculated to provide typical optimistic and pessimistic total projects costs.

Cost Item	Optimistic	Benchmark	Pessimistic
Scope	221,779,544	260,917,110	313,100,532
Contract Overhead	93,935,625	110,512,500	132,614,999
Risk	72,778,963	85,622,309	102,746,771
Project Overhead	35,212,068	41,425,963	49,711,155
Capex Total	423,706,199	498,477,881	598,173,458

Tolerance assessment percentages are based on the level of maturity of the estimate in line with accepted industry practices which can be found under the AACE International recommended practices. This Class 4 estimate is based on the project of project definition to be expected at this stage. Our tolerance calculations allow fluctuations dependent upon the confidence in the information to prepare the estimate which is broken down into various key elements - scope, quantity, oncosts and rates.

Estimate Class	Maturity level of project definition deliverables	End Use	Methodology	Expected Accuracy Range
Class 5	0% - 2%	Concept screening	Capacity factored, parametric Models, judgement or analogy.	L: -20% to -50% H: +30% to +100%
Class 4	1% - 15%	Study or feasibility	Equipment Factored or Parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% - 40%	Budget authorisation	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%
Class 2	30% - 75%	Control or Bid/ Tender	Detailed Unit cost with forced Detailed Take-Off	L: -5% to -15% H: +5% to +15%
Class 1	65% - 100%	Check Estimate or bid/ tender	Detailed Unit Cost with Detailed Take Off	L: -3% to -10% H: +3% to +15%

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5 Recommendations

- We would recommend a scope validation/ assurance of a sample of the key cost driving components. A Review of the top 100 components alone would improve overall confidence
- Further validation/ supporting evidence of the £77.6m of lump sum/ estimator allowances would significantly increase the overall confidence in the benchmark price.
- Options which include covering assets with a building should be reviewed separately, and a bespoke bottom up estimate for an appropriate shelter would provide greater certainty for these options. The current cost models (CC005 Kiosks and Buildings), likely include significant cost items that would potentially not be representative of the type of asset intended.
- A bespoke review of the WFD transfer schemes would improve confidence, as it does not appear that iMOD has relevant data for long length pipelines.

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6 Appendix A – Individual Project Summary