

Assessment of Real Price Effects (RPE)

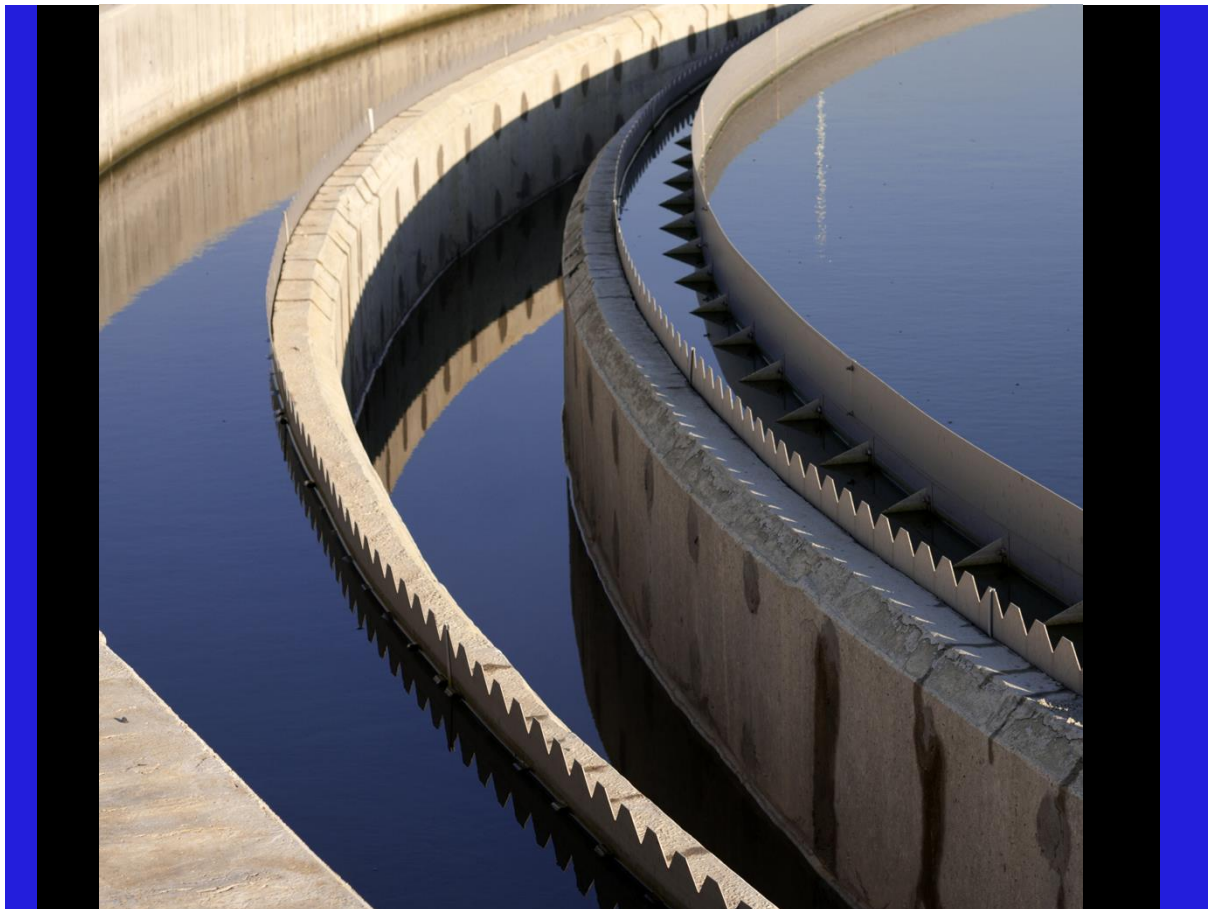
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Northern Ireland Water

NI Water

Assessment of RPE



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Acronyms and abbreviations

MTR	Mid Term Review
PMO	NI Water Project Management Office
IPAC	Investment Planning and Costing – tool used by NI Water to capture scopes and generate costs for schemes
RPI	Retail Price Index
UR	Utility Regulator
RPE	Real Price Effects
PC21	Price Control 2021
BCIS	Building Cost Information Service
PAVI	Price Adjustment Formulae Indices

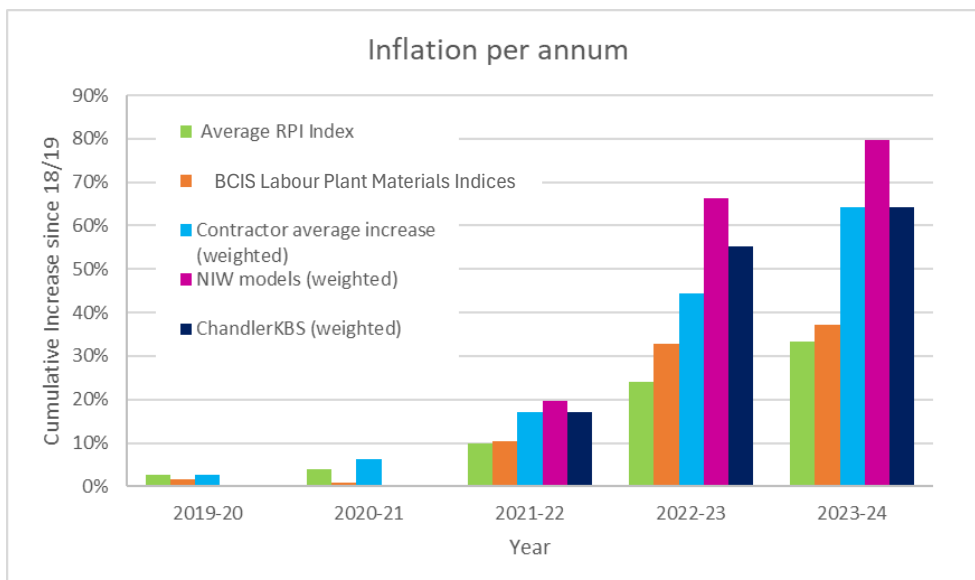
Executive Summary

Jacobs, in conjunction with ChandlerKBS, has been requested to provide support to the response to the Reporter’s RPE challenge, and to provide external independent analysis and contrast with other UK industry price indices.

Our methodology supports a triangulated set of results rather than a single figure for RPE. We have carried out a review of labour, plant and material cost increases using published data and requested data from NI Water’s main contractors who delivered circa 90% of the total spend for the first 3 years of the programme.

Prior to re-costing PC21 projects to determine cost increases, we benchmarked a sample of current projects to obtain confidence in the cost models and the process. Previous benchmarking undertaken during PC21 has been repeated to determine typical cost increases since 2018/19, which was the base date for the PC21 submission.

The analysis supports the principal that costs have increased by more than RPI. The cumulative inflation increase since 2018/19 is shown below. Data from NI Water’s main contractors and ChandlerKBS data shows an increase above 60% in year 3, whilst NI Water cost model data suggests an increase of circa 80% on 2018/19 costs [this includes some model corrections for previous under-pricing due to lack of data].



Our assessment of annual inflation from all data sources supports the use of an RPE adjustment over and above RPI as summarised below.

	2018-19	2019-20	2020-21	Y1 2021-22	Y2 2022-23	Y3 2023-24
RPI Annual Change		2.6%	1.2%	5.8%	12.9%	7.5%
ChandlerKBS				12.2%	10.2%	5.7%
NI Water Cost Models				14.9%	14.9%	9.0%
Main Contractors		0.1%	2.3%	4.3%	10.6%	6.1%
BCIS Labour Plant Material Indices		-0.7%	-1.2%	2.6%	7.8%	-5.6%
RPE Low				2.6%	7.8%	-5.6%
RPE High				14.9%	14.9%	9.0%
RPE Average				8.5%	10.9%	3.8%
RPE Average (excl BCIS)				10.5%	11.9%	6.9%
NI Water Original Submission				7.2%	10.5%	0.0%

1. Introduction

Price Control (PC) is the regulatory process which determines the levels of customer bills, capital investment and company performance during the control period. The PC21 Business Plan covers a 6-year price control period from 1 April 2021 to 31 March 2027, with a mid-term review.

The PC21 Mid Term Review (MTR) submission was issued to the Utility Regulator (UR) by NI Water in September 2023 and the Reporter's draft Report was received in February 2024.

NI Water had included an additional inflation adjustment (referred to as Real Price Effects or RPE) in the MTR submission, in addition to Retail Price Index (RPI). There has been a challenge by the Reporter to the robustness of the RPE assessment and the representativeness of the sample projects and data utilised.

Jacobs, in conjunction with ChandlerKBS, has been requested to provide support to the response to the Reporter's RPE challenge, and to provide external independent analysis and contrast with other UK industry price indices.

The scope as defined by NI Water is:

1. Examine the findings of the Reporter.
2. Gain a full understanding of the original RPE analysis.
3. Present additional published industry data to support the use of RPE – UK and Ireland if available.
4. The work must complement the existing IPAC / unit costs system used in PC21 (2018/19 Version 5.35). RPI is also to be applied.

Jacobs are performing the role of lead author on the findings, supported by ChandlerKBS.

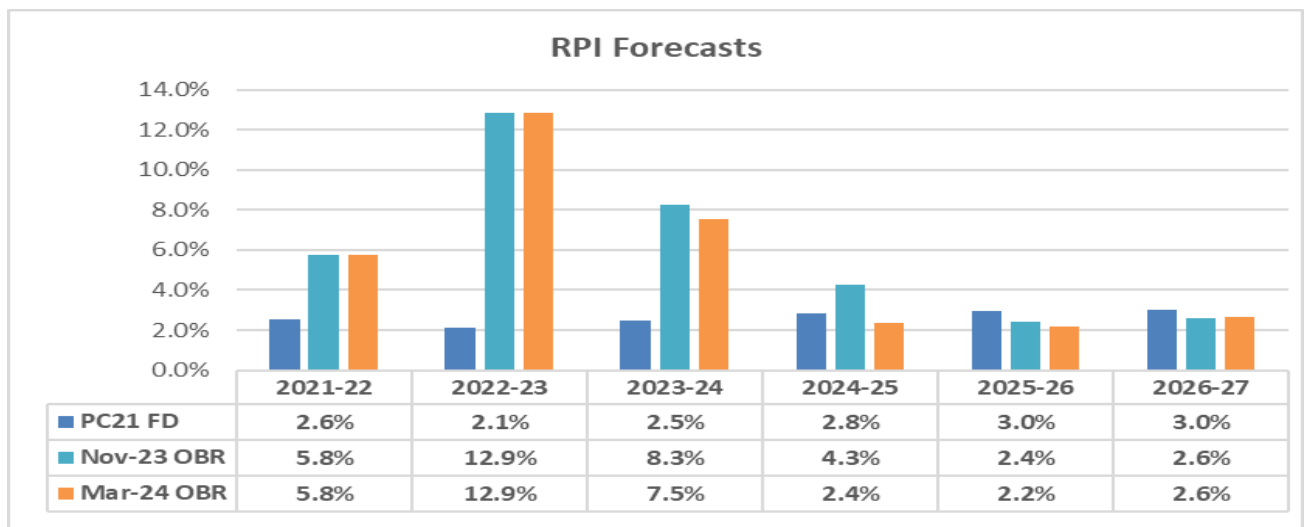
2. Background

The published RPI figures have been proposed by the Regulator and Reporter as a suitable reflection of cost increases across construction undertaken by NI Water. The RPI figures that shall be used throughout our analysis are outlined in Table 2.1 below and are based on March 24 published figures. These figures are also illustrated in Figure 2.1 below and include the published actual indices to 23/24 and forecasts for the years 24/25 to 26/27.

Table 2.1 RPI (March 24 data)

	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Average RPI Index	283.31	290.64	294.17	311.16	351.22	377.72	386.63	395.14	405.53
<i>increase</i>		2.6%	1.2%	5.8%	12.9%	7.5%	2.4%	2.2%	2.6%

Figure 2.1 RPI actuals and forecast compared to PC21FD (Mar 24)



NI Water has proposed an additional factor be added to RPI to reflect cost increases incurred across projects in Northern Ireland. Some work was undertaken by NI Water's CPMO team, where increases to materials were presented to support an alternative inflation figure (referred to as Measured Capital Price Inflation or MCPI) of 13% in 2021-22 and 23.4% in 2022-23. The methodology to derive these figures has been reviewed by the Reporter and deemed to be unsuitable as it is based on too small a sample (approx. 10 schemes) to support extrapolation across the MTR. The inflation figures proposed by NI Water in the MTR are shown below in Table 2.2. NI Water proposed the use of RPI for 19/20 and 20/21, MCPI for 21/22 and 22/23 and returning to RPI from 23/24.

Table 2.2 MTR proposed inflation indices

Inflation Index	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
RPI %	2.6	1.2	-	-	6.4	1.2	1.0	2.0
NIW Measured Capital Price inflation (MCPI) %	-	-	13.0	23.4	-	-	-	-
Hybrid Capital inflation measure used for MTR	RPI	RPI	MCPI	MCPI	RPI	RPI	RPI	RPI

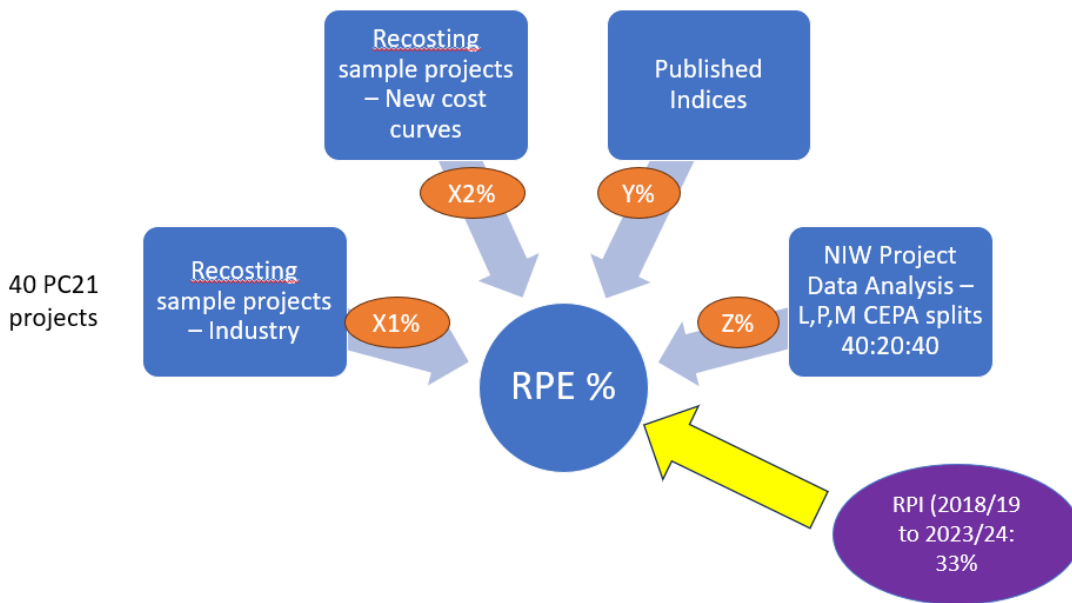
3. Approach

Our approach for the independent assessment of a suitable RPE for the MTR has considered 3 different aspects that will inform the overall adjustment including:

- Published Indices i.e. BCIS
- Labour, Plant and Material assessments (published data and market engagement)
- Benchmarking (repricing sample of projects using latest cost models compared to PC21 costs at 18/19 prices). This will also include the projects being used by CPMO for costs of materials analysis as a calibration exercise.

This approach, commonly referred to as data triangulation, is further illustrated in Figure 3.1 below.

Figure 3.1 Approach for triangulated set of results



Our approach included a review of the data analysis undertaken by NI Water to derive the RPE figure submitted as part of the MTR, as well as undertaking our independent assessment of cost increases to determine if an adjustment is applicable.

We note that NI Water has not considered any additional cost increases for the period 2019-20 or 2020-21. PC21 used a 2018/19 base date and there may be drivers which affect costs above RPI since this date, notably COVID lockdowns during 2020.

4. Review of Reporter’s Report and NI Water Submission

NI Water had undertaken an assessment of materials commonly used in construction projects and had assessed cost increases during the 2-year period (2021/22 and 2022/23) as outlined in Figure 4.1 below as part of their initial submission. We have reviewed the analysis undertaken, as well as the commentary provided by the Reporter.

Figure 4.1 Cost components and increases as derived by NI Water

Construction Element	Y1	Y2
Gas Oil (Diesel in Construction)	53%	113%
Cast and Spun Iron Products (including pipes)	7%	39%
Bricks and Clay Products	6%	30%
Aggregates including Levy	2%	28%
Precast Concrete Structural Components (including pipes)	25%	28%
DERV Fuel	25%	25%
Ready Mixed Concrete	6%	22%
Precast Concrete Non-Structural Components	7%	22%
Asphalt for Paving	6%	21%
Aggregates excluding Levy	4%	20%
Steel Pipes	24%	19%
Cements	5%	18%
Metal Structures	16%	15%
Site Accommodation	16%	15%
Electrical Engineering Materials	16%	26%
Mechanical Engineering Materials	11%	21%
PE Pipe	76%	18%

The main findings presented by the Reporter¹ following their review of NI Water’s RPE claim in February 24 were:

- *The fundamental principles behind the regulatory decision about the application of RPI are sound, and the definitions used for the various components of this such as frontier shift are in accordance with those used by OFWAT in England & Wales, albeit with a different choice of household inflation metric.*
- *The approach taken by NI Water to assess RPE is based on reasonable logic. Flaws are visible in the implementation, and it could not be described as best practice. The Reporter however acknowledges that many of the staff involved have ‘inherited’ the documents from predecessors.*
- *On the fundamental question of whether an RPE allowance is due to NI Water, the Reporter’s finding is that objectively, given the information available, there is insufficient evidence to suggest that RPE is present. The use of RPI as an allowance is sufficiently generous, because although construction inflation is more volatile and has peaked above RPI at times, the cumulative effect over the period being scrutinised is that RPI inflation remains higher.*

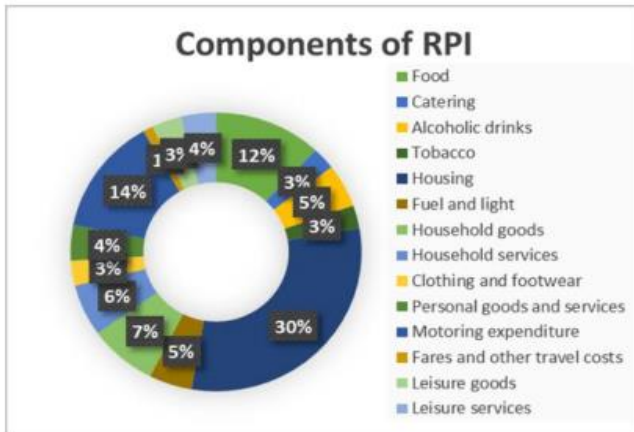
Our assessment of Inflation has been done independently from any additional work undertaken by NI Water since the original MTR submission. We have followed a different methodology in our assessment of cost increases for Northern Ireland from that adopted by NI Water.

¹ Assessment of Justifications for NI Water’s RPE Claim, February 2024

5. Published Indices

The Regulator has proposed an inflationary uplift to PC21 Final Determination using the Retail Price Index (RPI). RPI consists of a basket of goods, however some of these are not considered relevant to the construction industry, for example, alcoholic drinks, household goods, food and clothing etc. A summary of all items included as well as their weighting is shown below in Figure 5.1.

Figure 5.1 Components of RPI



A review of published indices has been undertaken, focusing on those indices with most relevance to the type of work undertaken by NI Water.

5.1 Price Adjustment Formulae Indices (PAFI)

The BCIS Price Adjustment Formulae Indices (PAFI) are a set of construction component cost indices commonly used in reimbursement mechanisms for price fluctuation clauses in construction contracts. PAFI, sometimes referred to as NEDO, Baxter or Osborne, is used in various sectors in the construction industry including civil engineering contracts and facility management. PAFI indices comprises over 200 cost series and include the following categories of construction components:

- Labour indices
- Plant indices
- Material indices
- Specialist labour indices
- Specialist material indices

5.2 BCIS Civil Engineering

The BCIS Civil Engineering input cost indices are produced and published by the Building Cost Information Service (BCIS) and include the following:

- BCIS Rail Cost Index
- BCIS Water and Sewerage Cost Index (WSCl)
- BCIS Road Cost Index

The BCIS Civil Engineering input cost indices measure changes in costs of labour, materials and plant, i.e. input cost to contractor. The indices are based on cost models produced by BCIS which represent typical expenditure profiles for the sectors. The resultant series are therefore base weighted indices.

The inputs to the indices are predominately selected Work Category Indices from the Price Adjustment Formulae Indices (PAFI) Civil Engineering 1990 series. Other inputs include ONS Producer Price Indices and

earnings statistics. The indices allow for changes in the costs of nationally agreed labour rates, factory gate material prices and plant costs, although they do not necessarily reflect changes in contractors' actual site costs.

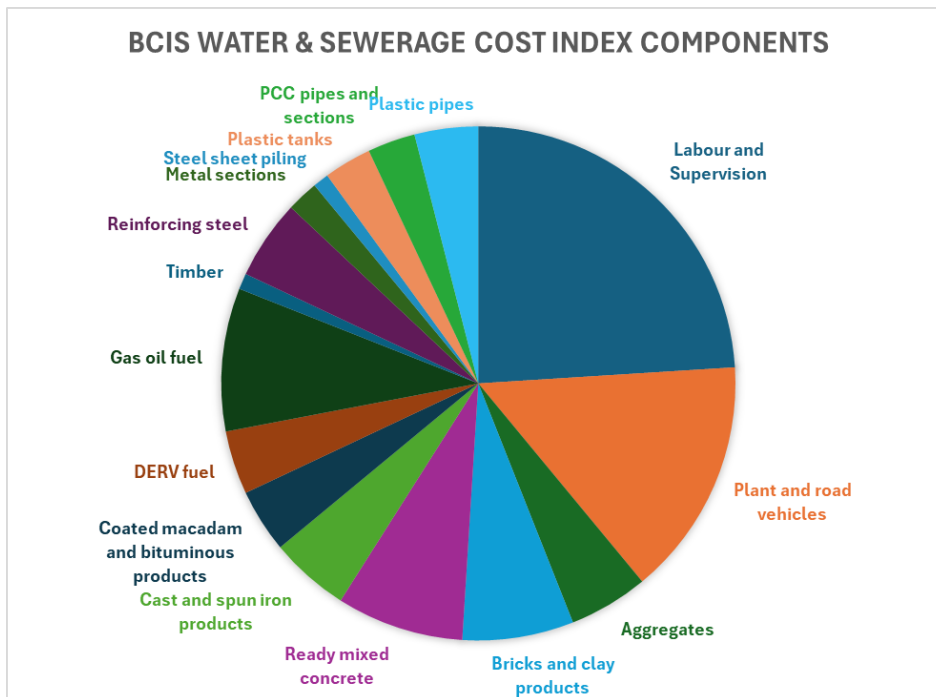
The BCIS General Civil Engineering Cost Index (CECI) was first published in December 2008 and the model was revised in November 2013. The model is based on an analysis of sub-sector infrastructure output and is compiled from the sub-sector Civil Engineering input cost indices.

5.3 BCIS Water & Sewerage

The index model for water and sewerage is based on an analysis of water industry projects, the expertise of a specialist practitioner, and the input cost indices selected to measure the movements of the resources.

The models used to calculate the Water and Sewerage input cost indices have been compiled by BCIS from a variety of sources and the components are shown in Figure 5.2. The inputs are, in the main, Price Adjustment Formulae Indices (PAFI). The monthly indices are calculated from the equivalent month of the PAFI. Labour resource is the average price ruling of the month to which the index refers. Materials and plant resource is the price ruling in the month to which the index refers. Other inputs to the Water and Sewerage input cost indices include ONS Producer Price Indices and earnings statistics.

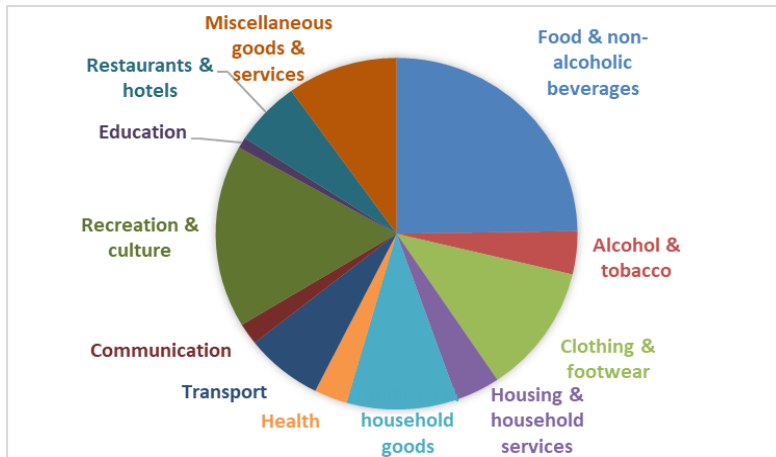
Figure 5.2 Components of BCIS Water and Sewerage



5.4 Consumer Prices Index

Consumer Prices Index including owner occupiers' housing costs (CPIH) is commonly used by OFWAT for inflation of prices. The basket of goods includes a significant number of elements that are not relevant to construction including food and household goods as shown below in Figure 5.3.

Figure 5.3 Components of CPIH



5.5 Construction Output Price Indices

The ONS Construction Output Price Indices (OPIs) provide an estimate of inflation within the UK construction industry. The OPIs are compiled using existing ONS data sources. The ONS approach involves input costs, which are materials, labour and plant hire, weighted together for a selection of types of construction projects, with a mark-up being applied to account for profit by the construction firm. The result is considered a proxy for output prices known as COPI.

5.6 BCIS Mechanical and Electrical Engineering

The BCIS Mechanical and Electrical Engineering Cost Index measures changes in costs of labour, materials and plant, i.e. input cost to contractor for mechanical, electrical and lift installations. The indices are based on cost models produced by BCIS which represent average buildings. The resultant series are therefore base weighted indices. The inputs to the indices are the Work Category Indices from Series 2 of the Price Adjustment Formulae Indices (PAFI). The indices allow for changes in the costs of nationally agreed labour rates, material prices and plant costs, but they do not necessarily reflect changes in contractors' actual site costs.

5.7 BCIS Tender Price Indices

BCIS Tender Price Indices (TPIs) measure the trend of contractors' pricing levels in accepted tenders, i.e. cost to client, for schemes let on a lump sum basis, built up from rates and quantities, usually a Bill of Materials, at commit-to-build stage.

Since the BCIS TPIs are constructed using projects based on traditional procurement routes, projects based on contractor-led procurement methods, such as design and build and partnering, are only included when the required pricing documents are available.

5.8 Summary

The Regulator has selected RPI as the measure for inflation for construction costs in Northern Ireland. NI Water consider construction costs have increased above this Index as evidenced through the higher prices the company is experiencing during procurement and delivery.

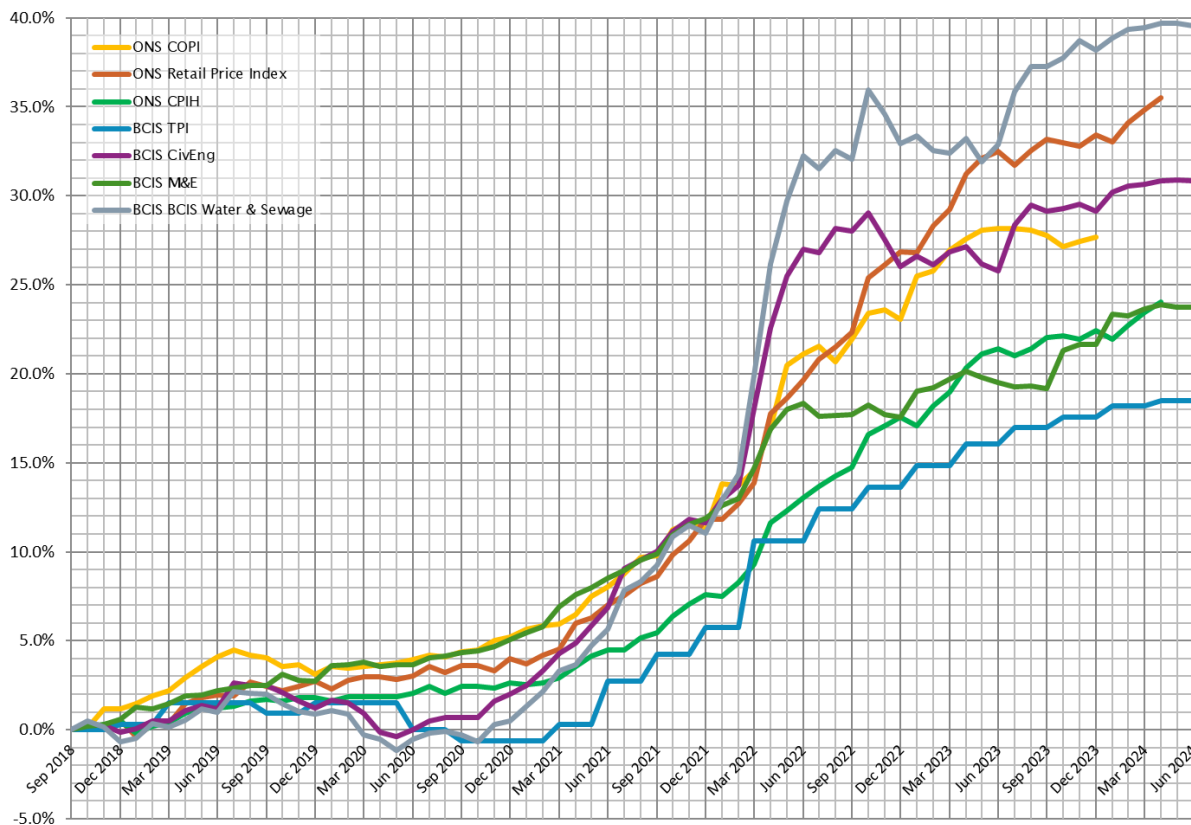
Table 5.1 below shows the various indices in comparison to RPI.

Table 5.1 RPI compared to other Indices

	2018	2019	2020	2021	2022	2023
RPI	0%	2.6%	3.8%	9.8%	24.0%	33.2%
BCIS CIV ENG	0%	2.1%	1.7%	10.9%	27.2%	29.3%
BCIS WATER SEWERAGE	0%	1.6%	0.8%	10.5%	32.8%	37.3%
CPIH	0%	1.7%	2.5%	6.3%	15.6%	22.0%
COPI	0.0%	3.1%	4.1%	9.9%	21.9%	27.0%
BCIS MECH & ELEC ENG	0.0%	2.4%	4.2%	10.2%	17.7%	20.5%
BCIS TENDER PRICES	0.0%	1.6%	0.2%	4.4%	13.1%	17.5%

We have illustrated in figure 5.4 below the trends in the above indices since 2018.

Figure 5.4 Comparison of all Indices



The comparison of published indices presents their inflation between 18/19 and 23/24, ranging from the lowest increase of 17.5% for BCIS Tender Prices index to the highest increase of 37.3% for BCIS Water and Sewerage Index. The ONS RPI increase in the period is half-way between the BCIS civil engineering indices of Civ Eng and Water & Sewerage. However, the previous 2 years showed lower RPI increases than either civil engineering index. The BCIS Water and Sewerage Index now presents a moderate increase in costs above RPI, but none of the Indices reflect the level of cost increase experienced across the industry.

6. Labour, Plant and Material cost increases

As part of their RPE submission, NI Water had undertaken an assessment of cost increases across several elements for a 2-year period for materials costs. We are aware this analysis is being expanded and supported by additional information from actual tendered projects by the NI Water team independently from this assessment.

We have carried out review of labour, plant and material cost increases using published data.

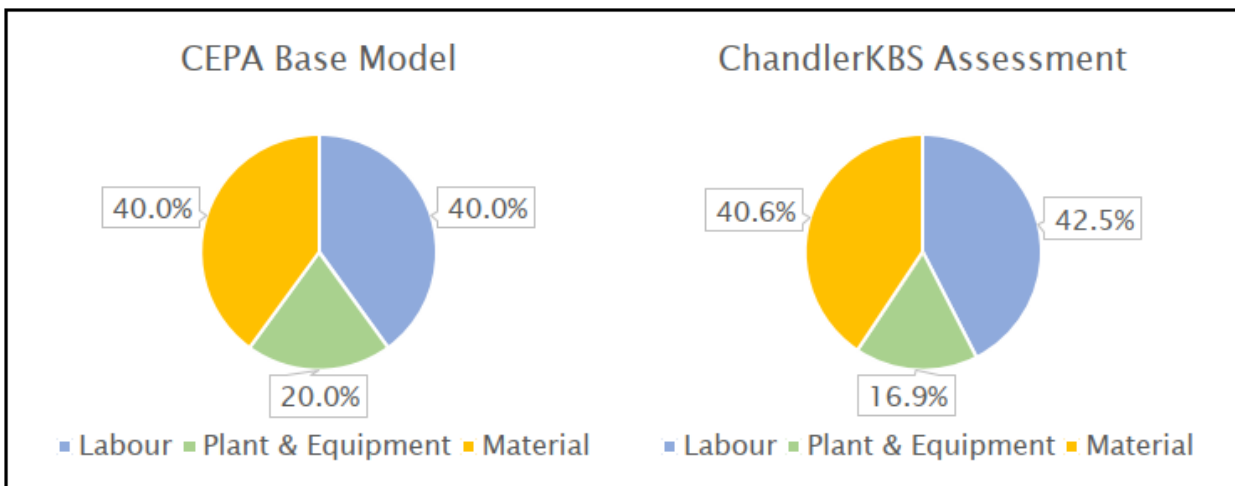
We have also requested data from NI Water’s main suppliers for average annual increases across various criteria including labour, plant and materials cost increases. A copy is included in Appendix B. These suppliers all undertake work via NI Water’s Capital Delivery Frameworks and represent circa 90% of work delivered in the first 3 years of PC21 (£450m). The suppliers approached include:

- AG Wilson
- Deane Public Works
- Murphy/Dawson Wam JV
- Farrans-Glanua JV
- Lowry Building & Civil Engineering
- Geda Construction
- John Graham Construction Ltd
- BSG Civil Engineering Ltd
- Civco

Responses were received from all 9 suppliers for labour costs, and these are anonymised in the data presented. Suppliers provided information on most of the materials whilst only 50% of suppliers provided the plant cost increases.

We have utilised the same Labour, Plant and Materials (LPM) splits as previously used by CEPA Economics for the assessment of Regional Price Adjustments (RPA)². CEPA had proposed a split at that time and ChandlerKBS had undertaken project analysis and confirmed the splits proposed were reasonable. The figures proposed by CEPA and derived by ChandlerKBS are shown below in Figure 6.1. For the purposes of this assessment, we have used the CEPA splits of 40% Labour, 20% Plant and 40% Materials.

Figure 6.1 Labour Plant and Material splits (based on 2021 information)



² <https://www.uregni.gov.uk/files/uregni/media-files/UR%20PC21%20DD%20Annex%20J%20-%20Regional%20Price%20Adjustments%20PC21%20%28CEPA%29%2001.00%20Published.pdf>

6.1 Labour

6.1.1 Indices

Labour cost increases since 2018-19 (which is the base date for the PC21 submission) have been derived using BCIS data for several labour types including Civil Engineering, Mechanical and Electrical Engineering. Annual increase factors for the various labour types are summarised below in Table 6.1

Table 6.1 BCIS labour increases (Annual Salary)

	Labour PAFI	Factor From Mid 2018/2019					
		2018	2019	2020	2021	2022	2023
12601	Civil Engineering Labour	1.00	1.04	1.04	1.06	1.12	1.20
12643	Electrical Engineering Labour	1.00	1.04	1.06	1.07	1.11	1.14
12648	Mechanical Engineering Labour	1.00	1.03	1.04	1.05	1.09	1.14
12401	Electrical - Labour	1.00	1.01	1.03	1.23	1.75	1.81
12411	Mechanical - Labour	1.00	1.03	1.04	1.05	1.09	1.14
12421	Mechanical Engineering Labour	1.00	1.03	1.04	1.06	1.09	1.14
12424	Electrical Engineering Labour	1.00	1.04	1.06	1.07	1.11	1.14
4441	Labour and Supervision	1.00	1.04	1.04	1.06	1.12	1.20
12461	Structural Steelwork - Labour	1.00	1.03	1.04	1.06	1.09	1.14

The latest 2023 Annual Survey of Hours and Earnings (ASHE) data release for UK³ and NI⁴ has also been reviewed to assess labour cost increases. There are many different tables within the dataset and we have used the same dataset as was used in the RPA assessment -

- Median
- 2 digit
- Excluding Overtime
- All employees
- Hourly

The 2018 rates have been compared to the annual and latest figures, using the same staff weightings used in the RPA assessment, and the results are shown in Table 6.2 below.

³<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation2digitsocashetable2>

⁴ <https://www.nisra.gov.uk/publications/ashe-tables-ods>

Table 6.2 Northern Ireland ASHE data Labour increases 2018 to 2023 with RPA weightings

Codes	Description	Proportion of Labour	Factor From Mid 2018/2019					
			2018	2019	2020	2021	2022	2023
11	Corporate managers and directors	4%	1.00	1.01	1.08	1.05	1.12	1.28
21	Science, research, engineering and technology professionals	10%	1.00	1.00	1.06	1.02	1.14	1.21
31	Science, engineering and technology associate professionals	4%	1.00	1.04	0.99	1.00	1.00	1.07
41	Administrative occupations	2%	1.00	1.03	1.06	1.10	1.17	1.22
53	Skilled construction and building trades	56%	1.00	0.96	1.01	1.01	1.11	1.06
81	Process, plant and machine operatives	16%	1.00	1.03	1.13	1.11	1.17	1.30
91	Elementary trades and related occupations	8%	1.00	1.06	0.98	1.08	1.22	1.25
	WEIGHTED AVERAGE		1.00	0.99	1.03	1.04	1.13	1.14
	ANNUAL CHANGE			-1.0%	4.4%	0.4%	8.9%	1.2%
	CHANGE FROM 2018			-1.0%	3.4%	3.8%	13.0%	14.4%

Our analysis has included data for UK staff as not all staff engaged on NI projects are from Northern Ireland. We advised in the RPA report that 70% of staff on NI Water construction projects are Northern Ireland based and 30% are UK based. A review of cost increases for UK staff shows a similar trend and this is therefore not deemed to be material for this assessment.

We note that the ASHE data suggests skilled construction and building trade hourly costs have increased by 6%. This figure has a significant impact on the derived increase for labour however we consider this figure does not represent labour cost increases experienced in Northern Ireland as shown in section 6.1.2 Framework Supplier Data – Labour Rates.

6.1.2 Framework Supplier Data – Labour Rates

We engaged with NI Water Framework suppliers for evidence of annual labour cost increases. Table 6.3 summarises the average responses received, weighted by their delivered value of work in years 1 to 3.

Table 6.3 Labour cost increases 2018 to 2023 – NI Water Framework Suppliers

Codes	Description	Proportion of Labour	Factor From Mid 2018/2019					
			2018	2019	2020	2021	2022	2023
11	Corporate managers and directors	4%	1.00	1.04	1.10	1.15	1.26	1.35
21	Science, research, engineering and technology professionals	10%	1.00	1.04	1.11	1.16	1.26	1.35
31	Science, engineering and technology associate professionals	4%	1.00	1.04	1.10	1.16	1.26	1.35
41	Administrative occupations	2%	1.00	1.03	1.09	1.14	1.24	1.34
53	Skilled construction and building trades	56%	1.00	1.04	1.11	1.17	1.30	1.41
81	Process, plant and machine operatives	16%	1.00	1.04	1.10	1.22	1.33	1.43
91	Elementary trades and related occupations	8%	1.00	1.03	1.09	1.17	1.27	1.39
	WEIGHTED AVERAGE		1.00	1.04	1.10	1.17	1.29	1.39
	ANNUAL CHANGE			4.0%	6.3%	7.2%	11.8%	10.4%
	CHANGE FROM 2018			4.0%	10.3%	17.5%	29.3%	39.7%

6.2 Plant

We are aware NI Water has tendered rates for the provision of plant within their current frameworks and that inflationary rises have been applied to these. These increases may or may not reflect actual costs paid by Contractors and have therefore not been used in this assessment.

6.2.1 Indices

Plant cost increases since 2018-19 (which is the base date for the PC21 submission) have been derived using BCIS data for construction plant including purchased plant, hired plant and plant fuel. Annual increases for plant, based on estimated cost proportions of 10% purchased plant, 50% hired plant and 40% fuel, are summarised below in Table 6.4.

Table 6.4 Plant cost increases (BCIS)

BCIS Code	BCIS Index	Proportions of Plant	Factor From Mid 2018/2019					
			2018	2019	2020	2021	2022	2023
12604	Purchased Plant	10%	1.00	1.02	1.02	1.06	1.15	1.19
12605	Hired Plant	50%	1.00	1.00	1.01	1.03	1.06	1.07
90/11	Gas Oil Fuel (Red Diesel)	40%	1.00	0.95	0.74	1.13	2.41	2.11
	Weighted Average		1.00	0.98	0.90	1.07	1.61	1.50
			0.0%	-1.6%	-9.8%	7.1%	61.0%	50.2%

6.2.2 Framework Supplier Data – Plant

We engaged with NI Water Framework suppliers for Plant cost increases. Table 6.5 summarises the responses received.

Table 6.5 Plant cost increases 2018 to 2023 – NI Water Framework Suppliers

BCIS Index	Proportions of Plant	Factor From Mid 2018/2019					
		2018	2019	2020	2021	2022	2023
Equipment (incl Gas Oil Fuel)	100%	1.00	1.00	0.97	1.13	1.94	2.24
Weighted Average		1.00	1.00	0.97	1.13	1.94	2.24
		0.0%	0.0%	-3.2%	12.9%	94.2%	124.1%

6.3 Materials

Material cost increases for key components were assessed as part of this review. We used the materials listed in the CEPA analysis for RPA for consistency of approach. This list is comparable to NI Water's material list included as part of the RPE assessment.

The weightings by sub-category are shown below in Table 6.6. We note that there is no allocation of MEICA equipment under the materials listed but we have used the split as presented.

Table 6.6 Material cost increases 2018 to 2023 – NI Water Framework Suppliers

Factor From Mid 2018/2019	

Description	CEPA % of Materials	2018	2019	2020	2021	2022	2023
Concrete	15.00%	1.00	1.04	1.08	1.19	1.48	1.82
Rebar	5.00%	1.00	1.03	1.08	1.37	1.95	2.19
Pipes Concrete	11.67%*	1.00	1.02	1.06	1.11	1.37	2.00
Pipes DI	11.67%	1.00	1.03	1.15	1.33	1.43	1.73
Pipes Plastic	11.67%	1.00	1.02	1.08	1.21	1.46	1.71
Other materials	32.50%**	1.00	1.06	1.13	1.38	1.61	1.96
Disposal	12.50%	1.00	1.06	1.12	1.24	1.36	1.65
WEIGHTED AVERAGE		1	1.042	1.106	1.275	1.509	1.861
ANNUAL CHANGE			4.2%	6.1%	15.3%	18.4%	23.3%
CHANGE FROM 2018/19			1.042	1.106	1.275	1.509	1.861

* Pipes allocated as 35% of materials and allocated equally across Plastic, Ductile and Concrete (11.67% each)

** Other materials allocated as 32.5% of materials to include MEICA (meters)

6.3.1 Indices

BCIS presents annual rate increases for several key materials which can be aligned with the sub-category weightings. Table 6.7 below presents a summary of the items with annual increases.

Table 6.7 Annual material costs increase using CEPA Sub Category model

Description	CEPA % of Materials	Factor From Mid 2018/2019					
		2018	2019	2020	2021	2022	2023
Concrete	15.00%	1.00	1.01	0.99	1.05	1.29	1.48
Rebar	5.00%	1.00	0.97	1.03	1.71	1.89	1.42
Pipes Plastic	11.67%*	1.00	1.02	1.02	1.15	1.27	1.21
Pipes DI	11.67%	1.00	1.02	1.02	1.09	1.52	1.92
Pipes Concrete	11.67%	1.00	1.05	1.09	1.36	1.75	1.87
MEICA (meters)	2.50%	1.00	1.02	1.05	1.21	1.28	1.25
Other materials	30.00%	1.00	1.01	1.09	1.11	1.42	1.34
Disposal	12.50%	1.00	1.03	1.06	1.09	1.11	1.15
WEIGHTED AVERAGE		1.000	1.018	1.051	1.163	1.413	1.454
ANNUAL CHANGE			1.8%	3.2%	10.7%	21.5%	2.9%
CHANGE FROM 2018/19			1.8%	5.1%	16.3%	41.3%	45.4%

* Pipes allocated as 35% of materials and allocated equally across Plastic, Ductile and Concrete (11.67% each)

6.3.2 Framework Supplier Data – Materials

We engaged with NI Water Framework suppliers for evidence of Materials cost increases. Table 6.8 below summarises the responses received. Increases have been weighted using the CEPA sub-category splits and have also been weighted based on NI Water data for annual spend, to derive a range for cost of materials increases.

Table 6.8 Material cost increases 2018 to 2023 – NI Water Framework Suppliers

Description	CEPA % of Materials	Contractor Low	Contractor Average	Contractor High
Concrete	15.0%	1.57	1.83	2.15
Rebar	5.0%	1.37	2.20	2.91
Pipes Concrete	11.7%	1.27	2.00	3.69
Pipes DI	11.7%	1.39	1.73	2.16
Pipes Plastic	11.7%	1.16	1.71	2.28
Other materials	32.5%	1.48	1.97	2.33
Disposal	12.5%	1.25	1.65	3.06
WEIGHTED AVERAGE		1.387	1.864	2.555

6.4 Summary Labour Plant and Material reviews

Labour, plant and materials have been combined using the weightings proposed by CEPA – 40%, 20% and 40% to generate an overall cost increase. Cost increases derived using the BCIS indices show a similar result to RPI at 36%, as shown below in Table 6.9.

Table 6.9 Summary Cumulative Cost Increase Based on BCIS Indices

	Proportion	2018	2019	2020	2021	2022	2023
Labour: Civil Engineering Labour	40%	1.00	1.04	1.04	1.06	1.12	1.20
Plant: Purchased & Hired Plant & Gas Oil Fuel	20%	1.00	0.98	0.90	1.07	1.61	1.50
Materials: PAFI	40%	1.00	1.02	1.05	1.16	1.41	1.45
Combined	100%	1.00	1.02	1.02	1.10	1.33	1.36
CHANGE FROM 2018/19		0.0%	1.9%	1.9%	10.5%	33.4%	36.0%

Increases generated from the Contractor returns are shown in Table 6.10. This shows an average cost increase since 2018/19 of 50.9% up to 2022.

Table 6.10 Summary cumulative cost increase based on Contractor Submissions

	Proportion	2019	2020	2021	2022	Low	Weighted Average	High
Labour	40%	1.04	1.10	1.17	1.29	1.22	1.40	1.71
Plant	20%	1.00	0.97	1.13	1.94	1.62	2.24	3.08
Materials	40%	1.04	1.11	1.27	1.51	1.39	1.86	2.56
Combined	100%	1.03	1.08	1.21	1.51	1.37	1.75	2.32
CHANGE FROM 2018/19		3.3%	7.7%	20.6%	50.9%	36.6%	75.1%	132.2%

We have tested the sensitivity of the analysis by removing the highest and lowest returns from each dataset. This reduced the spread of results as expected but has not significantly changed the weighted average of the results (reduced from 75.1% to 72.5%). The revised summary is presented in Table 6.11 below.

Table 6.11 Summary cumulative cost increase based on Contractor Submissions with outliers removed

	Proportion	2019	2020	2021	2022		Low	Weighted Average 2023	High
Labour	40%	1.04	1.11	1.17	1.27		1.24	1.39	1.62
Plant	20%	1.00	0.97	1.13	1.94		1.62	2.24	3.08
Materials	40%	1.03	1.10	1.25	1.52		1.52	1.80	2.11
Combined	100%	1.03	1.08	1.20	1.51		1.43	1.73	2.11
Change from 2018/19		2.9%	7.7%	19.5%	50.6%		42.9%	72.5%	110.7%

7. Benchmarking

Our methodology supports a triangulated set of results rather than a single figure. We have initially benchmarked several current projects to obtain confidence in the cost models and the process. Previous benchmarking undertaken during PC21 has been repeated to determine typical cost increases since 2018/19, which was the base date of the PC21 submission.

ChandlerKBS provided Industry Data Cost Models for the external benchmarking during PC21 and for this current assessment. They have undertaken several benchmarking projects for Jacobs over the past few years for clients including Ofwat, United Utilities and Thames Water, which are two of the UK's largest water and sewerage companies.

7.1 PC21 tendered Projects – 11 projects

A sample of projects is being used by NI Water in the current data analysis and these same projects have also been analysed as part of the data extraction process to generate data points for updating NI Water's cost models. We have included the re-costing of these scopes to demonstrate that the cost models used in the benchmarking are reflective of costs experienced in Northern Ireland.

The projects included in the benchmark are summarised below in Table 7.1. These projects only represent £36m from the PC21 programme. However, we note that we have a larger benchmark/calibration summary which contains 30 projects and covers all types of projects (WI, WNI, WWI, WWNI). This summary has a total value of £87m and is refreshed with every update of the NIW cost models.

Table 7.1 Sample construction Projects - Contractor pricing

IPAC	Project Names	Date of Contractor pricing	inflation to 23/24	Contractor Pricing £	ECI costs £	Total £	Contractor Pricing (23/24) £
1186	Altnahinch Treatability Improvements	22/23	1.08	£483,997	£80,939	£564,936	£607,569
1066	Neillsbrook WwPS Upgrade Appraisal	23/24	1.00	£845,026	£89,000	£934,026	£934,026
1358	Ballyronan WwTW	22/23	1.08	£4,109,833	£157,000	£4,266,833	£4,588,825
1038	Grange WwTW	23/24	1.00	£3,923,692	£84,000	£4,007,692	£4,007,692
2739	Clonmore Road Sewerage	22/23	1.08	£598,281	£63,000	£661,281	£711,184
2496	Portadown Drainage Area Network Improvements Meadow Lane and Bann Street	23/24	1.00	£7,833,116	£51,000	£7,884,116	£7,884,116
2599	Ballymagorry Wwps	23/24	1.00	£1,870,180	£136,000	£2,006,180	£2,006,180
1338	Pomeroy WwTW	22/23	1.08	£1,755,446	£109,000	£1,864,446	£2,005,144
1395	Loughries WwTW	22/23	1.08	£564,556	£91,000	£655,556	£705,027
1775	Fofanny to Alt trunk Main	22/23	1.08	£5,657,885	£181,000	£5,838,885	£6,279,510
	Ravenhill Avenue, Belfast - Sewer Upgrades	22/23	1.08	£5,827,752	£103,600	£5,931,352	£6,378,955
	Total						£36,108,228

7.1.1 Benchmark/Calibration using latest NIW Cost Models

The actual project scope (as derived by Jacobs from the contractor activity schedule) has been re-costed using the new NIW cost models and a summary of the results is shown below in Table 7.2.

Table 7.2 Re-costing tendered projects – NIW Cost Models

IPAC	CPMR		Project Names	Re-costed MCCL v7.26 (23_24) £	Contractor Pricing (23/24) £	Difference
1186	JA330	112	Altnahinch Treatability Improvements	£682,486	£607,569	12.3%
1066	KA270	111	Neillsbrook WwPS Upgrade Appraisal	£824,874	£934,026	-11.7%
1358	KB552	112	Ballyronan WwTW	£4,777,146	£4,588,825	4.1%
1038	KB556	111	Grange WwTW	£3,778,571	£4,007,692	-5.7%
2739	KF378	111	Clonmore Road Sewerage	£815,457	£711,184	14.7%
2496	KG183	111	Portadown Drainage Area Network Improvements Meadow Lane and Bann Street	£7,886,093	£7,884,116	0.0%
2599	KL542	111	Ballymagorry Wwps	£1,975,343	£2,006,180	-1.5%
1338	KN681	111	Pomeroy WwTW	£2,021,096	£2,005,144	0.8%
1395	KR730	112	Loughries WwTW	£737,079	£705,027	4.5%
1775	JV901	113	Fofanny to Alt trunk Main	£6,089,639	£6,279,510	-3.0%
	KR588	113	Ravenhill Avenue, Belfast - Sewer Upgrades	£6,351,902	£6,378,955	-0.4%
Total				£35,939,686	£36,108,228	

7.1.2 ChandlerKBS benchmark using latest Industry Cost Models

The scope, as derived by Jacobs, of the 11 projects was also re-costed using ChandlerKBS' Cost Intelligence Database (CID). The CID is a system of integrated cost databases and costing tools that allows users to review and compare multiple cost models, project data and indices to normalise and derive industry average costs for a range of asset drivers.

The CID comprises data from thousands of capital projects delivered by UK water companies over the past 20 years, including Wessex Water, South West Water, Bristol Water, Thames Water, Welsh Water and Scottish Water. Due to involvement on several long-term cost management and capital allowances frameworks and commissions with water companies, contractors and regulators, ChandlerKBS can capture the cost, design and specification data on all types of assets, processes, projects, programmes and technologies used within the industry.

Direct costs consist of aggregated labour, plant and material costs to reflect the scope. Indirect costs, relevant to the asset type, are added as an uplift factor to account for contractor management, design, tender-to-outturn and client overheads. Land acquisition and power supply costs have been estimated with provisional sum allowances, based on the NIW PC21 estimates, inflated to 2023/2024 using the same methodology described below.

Expert estimator's judgement has been applied to interpret the scope to be costed and align cost data and derive an overall cost. ChandlerKBS' CID comprises data and models that utilise various cost structures and

definitions. Cost data sources were carefully aligned to derive costs that meet the scope requirements. The base estimate was built up from a suite of high confidence cost data derived from sources that have well defined cost models and Work Breakdown Structures (WBS). Where a scope exceeds the coverage of a single data source, multiple data sources were combined to fulfil the scope requirements. Similarly, where a scope requires a partial cost of a data source or sub process, CID projects are examined for similar scopes to determine an appropriate adjustment to apply to the data source. ChandlerKBS has a comprehensive list of engineering cost factors specific to water industry assets that were utilised to derive proportional costs for civil, mechanical, electrical and ICA elements.

The estimates went through several stages of refinement to derive robust costs. At each stage, assurance was provided by senior and peer estimators. A review of the estimates was undertaken to identify the scope that had significant impact on cost, required further cost assurance and a more robust price. Similar asset costs in CID projects, estimates and other industry cost models were compared with the estimate to provide additional confidence.

To adjust cost data to account for its age, a factor has been applied that represents the industry's variance in construction costs from the cost data's base date to the estimate base date of 2023/2024. The adjustment factor used is determined by a construction cost index. The index that has been used to adjust capex costs is the Civil Engineering cost index (reference 1191) published by Building Cost Information Services (BCIS). This index has cost components that align specifically with the UK water industry. Over a period of circa ten years, cost data reliability gradually reduces and cannot be improved by applying base date adjustments. Therefore, to produce a relevant cost estimate, cost data from the most recent decade is prioritised and where possible, cost data older than 10 years is excluded.

To adjust cost data for UK regional differences, a factor has been applied to adjust the cost data's base region to reflect the NIW region. The regional adjustment factor is determined by the Regional Price Adjustment of 91% set by CEPA for PC21.

Table 7.3 below presents the comparison for each project. There is variation across each project which is to be expected as cost models are based on an average cost across a dataset. Overall, the costs are 9% higher than the actual tendered costs. Figures within 10% are deemed acceptable for a benchmark.

Table 7.3 Re-costing tendered projects – ChandlerKBS

Project Code	Project Name	Contractor Tender Cost	ChandlerKBS Contract Cost	Variance £	Variance %
1186	Altnahinch WTW	£607,569	£644,137	£36,568	6.0%
1358	Ballyronan WWTW	£4,588,825	£4,962,043	£373,218	8.1%
2739	Clonmore Road WwPS	£711,184	£1,066,506	£355,322	50.0%
1038	Grange WwTW	£4,007,692	£4,017,422	£9,731	0.2%
1395	Loughries WwTW	£705,027	£746,095	£41,068	5.8%
2496	Portadown WwPS	£7,884,116	£8,849,992	£965,876	12.3%
1066	Neillsbrook WwPS	£934,026	£974,210	£40,184	4.3%
1338	Pomeroy WwTW v2	£2,005,144	£2,021,925	£16,781	0.8%
	Ravenhill Sewer upgrades	£6,378,955	£7,698,937	£1,319,982	20.7%
2599	Ballymagorry WwPS	£2,006,180	£2,097,679	£91,498	4.6%
1775	Fofanny to Alt Trunk Main	£6,279,510	£6,273,919	-£5,591	-0.1%
	Total	£36,108,228	£39,352,864	£3,244,636	9.0%

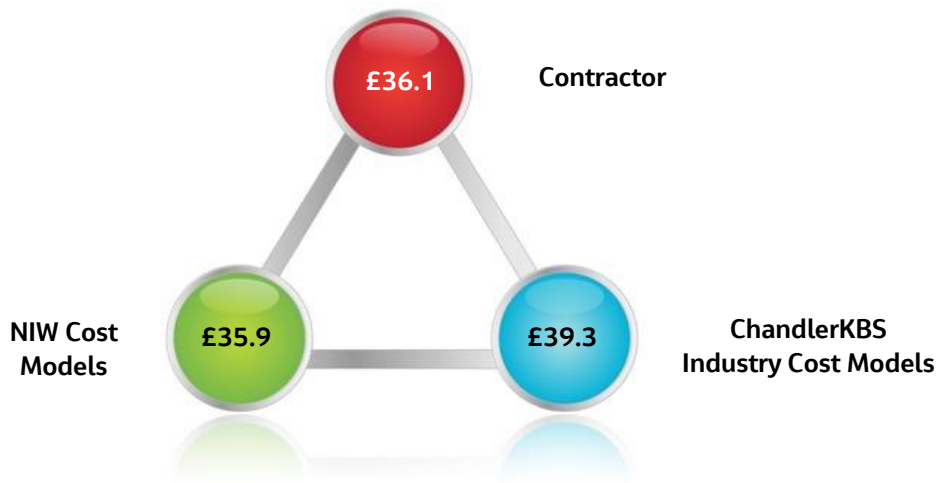
7.1.3 Summary – Benchmarking current projects

The analysis shows that the current NI Water cost models and ChandlerKBS Industry Cost Models align reasonably well with the total contractor tender costs across the sample of projects reviewed, as summarised

below in Figure 7.1. The provides confidence in the use of the cost models for the assessment of cost increases from 18/19 to 23/24 which is summarised in the following sections.

The NI Water cost models and ChandlerKBS Industry Cost Models are within 10% of the contractor actual costs which is deemed acceptable. The main differences have been investigated and the sewer infrastructure models are the main driver for the higher results from the ChandlerKBS Industry Cost Models.

Figure 7.1 Benchmarking Industry (ChandlerKBS), NIW cost models compared to Contractor Tender Costs



The costs presented exclude risk and indirect costs that get added to make a complete project cost (wayleaves, power supplies, consultant PM costs as Capitalised Salaries etc). Note: Any changes experienced during the delivery phase (A3 to A5) will be captured by the NI Water finance teams and will be used in the assessment of Tender to Outturn Ratio (TOR) which will be applied to IPAC for costing of the PC27 submission.

7.2 Original PC21 sample of projects – 40 projects

During development of the cost models for PC21 pricing, we benchmarked a sample of project scopes to determine if the NI Water cost models were reflective of market costs at that time. A total of 40 schemes were selected to reflect the types of projects where most expenditure was expected.

The number of projects in each investment category were as follows:

- 4 projects in water infrastructure (WI).
- 7 projects in water non-infrastructure (WNI).
- 19 projects in sewage infrastructure (WWI).
- 10 projects in sewage non-infrastructure (WWNI).

These same projects have been used to compare original IPAC 18/19 cost estimates to the latest 23/24 cost estimates for the same scope. This should inform any cost increase above RPI allowances. The approach we adopted was:

- ChandlerKBS have re-costed these same projects/scope using their latest cost models (23/24 base date).
- Jacobs have undertaken the same re-costing exercise, using the latest MCCL which has been updated using actual NIW data from recent tenders (also 23/24 base date).

7.2.1 Industry Benchmark – 40 PC21 projects

The 40 projects and the original benchmark results are presented in Appendix A. This was a total cost benchmark which included construction, land, power supplies, project management (consultant costs and NI Water overheads).

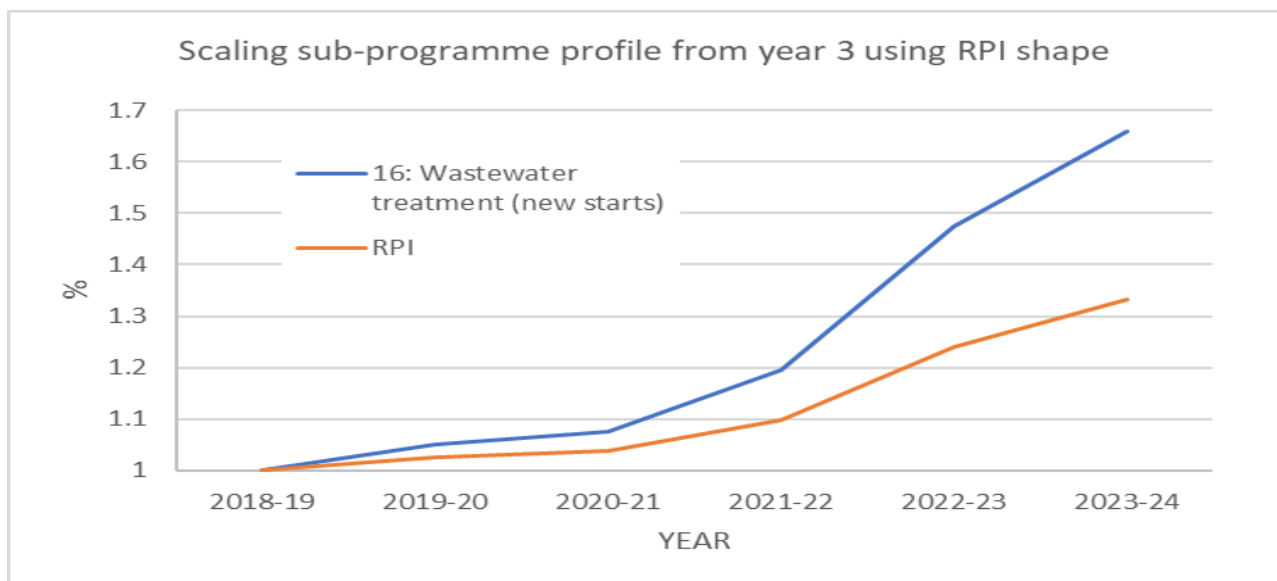
We have repeated this benchmark using the original scope [to ensure the benchmark is like for like] with the latest ChandlerKBS cost models to determine the cost increase. The data analysis is summarised by sub-programme below in Table 7.4 and more detail is presented in Appendix C. There is variation at an individual project level which is to be expected as the models are based on averages across many projects. All costs are shown with 2023-24 base date.

Table 7.4 Project costs by Sub-programme (ChandlerKBS Cost Models)

Sub Programme Number	CHANDLERKBS PREVIOUS	CHANDLERKBS CURRENT COST	Variance
16a	£ 52,847,250	£ 91,472,609	73%
12b	£ 96,960,993	£ 165,129,866	70%
12c	£ 2,702,856	£ 4,968,056	84%
05a	£ 23,500,532	£ 40,738,279	73%
05b	£ 2,154,729	£ 4,879,579	126%
06z	£ 10,327,628	£ 19,769,214	91%
16b	£ 8,720,968	£ 10,305,067	18%
04a	£ 8,961,404	£ 18,094,429	102%
23c	£ 14,824,226	£ 24,068,862	62%
05c	£ 2,951,378	£ 5,095,314	73%
12d	£ 5,973,272	£ 10,699,140	79%
Total	£ 229,925,236	£ 395,220,415	72%

We have also used the RPI annual increments to estimate a typical inflation figure for the other 2 years of the programme. Figure 7.2 presents the RPI cumulative profile together with a typical sub-programme where the derived percentage increase for year 3 was 66%. Years 1 and 2 have been derived using the RPI percentage increases and the resulting profile reflects a reasonable annual increase to achieve 66% in year 3.

Figure 7.2 Example of scaling from year 3 figures to generate year 1 and 2 inflation



Not all sub-programmes are covered by the sample of projects used in the analysis and therefore to generate a typical weighted average across the whole programme, we have made some assumptions regarding which sub-programmes would have a similar uplift. The actual spend by sub-programme for the first 3 years of the PC21 programme was provided by NI Water.

Where a sub-programme is not included in the data analysis, we have assumed a figure based on similar types of work. This has enabled a typical inflation figure to be generated for all sub-programmes which is then weighted by append to generate an uplift for the year.

The inflation percentage applied and typical spend per sub-programme, for each year are presented in Table 7.5 below.

Table 7.5 Assessment of RPE across the programme for years 1 to 3 (ChandlerKBS cost models)

	Year 3 analysis assumption	2021/22			2022/23			2023/24		
		actual spend	year 1 increase	year 1 inflated (23/24)	actual spend	year 2 increase	inflated (23/24)	actual spend	year 3 increase	inflated (23/24)
16: Wastewater treatment (new starts)	from analysis	£ 33,009	19%	£ 39,422	£ 41,554	47%	£ 61,240	£ 61,933	66%	£ 102,724.8
02: Base maintenance (sewerage)	assume same as SP12	£ 27,766	21%	£ 33,593	£ 36,408	51%	£ 55,040	£ 38,620	71%	£ 66,097.8
12: Sewerage programme	from analysis	£ 27,243	21%	£ 32,961	£ 34,613	51%	£ 52,326	£ 47,111	71%	£ 80,630.1
20: Management & General	assumed RPI	£ 29,457	10%	£ 32,353	£ 32,277	24%	£ 40,014	£ 29,939	33%	£ 39,916.3
04: Water treatment works	from analysis	£ 14,067	30%	£ 18,296	£ 19,006	73%	£ 32,938	£ 21,634	102%	£ 43,682.3
00: Capitalised salaries and on-costs	assumed RPI	£ 1,595	10%	£ 1,752	£ 1,838	24%	£ 2,279	£ 2,037	33%	£ 2,715.8
08: Water mains rehabilitation	assume same as SP23	£ 14,000	10%	£ 15,376	£ 17,879	24%	£ 22,165	£ 18,044	33%	£ 24,057.2
01: Base maintenance (water)	average assumed	£ 12,002	21%	£ 14,552	£ 15,755	52%	£ 23,919	£ 11,717	72%	£ 20,157.9
05: Water trunk mains	from analysis	£ 5,375	23%	£ 6,600	£ 11,560	56%	£ 17,985	£ 16,609	77%	£ 29,444.0
09: Leakage	assumed RPI	£ 4,862	10%	£ 5,340	£ 4,487	24%	£ 5,563	£ 5,038	33%	£ 6,716.9
10: Ops capital (water)	assumed RPI	£ 9,891	10%	£ 10,863	£ 12,109	24%	£ 15,012	£ 13,102	33%	£ 17,468.3
03: Water resources	average assumed	£ 4,502	21%	£ 5,459	£ 5,036	52%	£ 7,645	£ 5,157	72%	£ 8,872.1
06: Service reservoirs and clear water tanks	from analysis	£ 1,871	27%	£ 2,376	£ 6,387	66%	£ 10,587	£ 11,033	91%	£ 21,119.4
23: Water mains new and renew	assumed RPI	£ 2,524	21%	£ 3,054	£ 5,266	51%	£ 7,961	£ 7,799	71%	£ 13,347.9
24: Sewerage new and renew	assume same as SP12	£ 2,201	21%	£ 2,663	£ 5,322	51%	£ 8,046	£ 3,595	71%	£ 6,152.8
18: Ops capital (sewerage)	assume same as SP12	£ 10,989	21%	£ 13,295	£ 11,860	51%	£ 17,929	£ 13,913	71%	£ 23,812.0
19: Metering	assumed RPI	£ 1,329	10%	£ 1,460	£ 1,529	24%	£ 1,896	£ 2,025	33%	£ 2,699.8
07: Service reservoir rehab	assumed RPI	£ 2,516	10%	£ 2,763	£ 4,033	24%	£ 5,000	£ 5,035	33%	£ 6,712.9
17: Small wastewater treatment works	Assume same as SP16	£ 884	19%	£ 1,056	£ 2,065	47%	£ 3,043	£ 2,135	66%	£ 3,541.2
15: Wastewater treatment (carry over projects)	assumed RPI	£ 26	10%	£ 29	£ -	24%	£ -	£ -	33%	£ -
		£ 206,109		£ 243,262	£ 268,984		£ 390,587	£ 316,476		£ 519,869.6
			18/19 to 21/22	18.0%		18/19 to 22/23	45.2%		18/19 to 23/24	64.3%

7.2.2 Benchmark – 40 projects using latest NI Water Cost Models

We have re-costed the original 40 project scopes using the latest version of the NI Water cost models. Jacobs has been undertaking data analysis over the past 2 years of tendered A3 projects, to derive data points which are then used as the basis for the latest cost models. Batch 1-3 were completed in 2023 and Batch 4 is currently progressing (and includes projects awarded since June 23) and data extraction is almost complete.

Cost models are currently presented at 2023-24 price date but will be updated to 2024-25 for pricing PC27. Most of the cost models are showing significant increases above RPI as shown in the examples in Figure 7.2 and 7.3 below. These illustrate the new data points (derived from project A3 cost buildups) compared to the PC21 algorithm (inflated using RPI).

Figure 7.2 NIW100 PC21 cost model (+RPI) V 23_24 cost model and data points

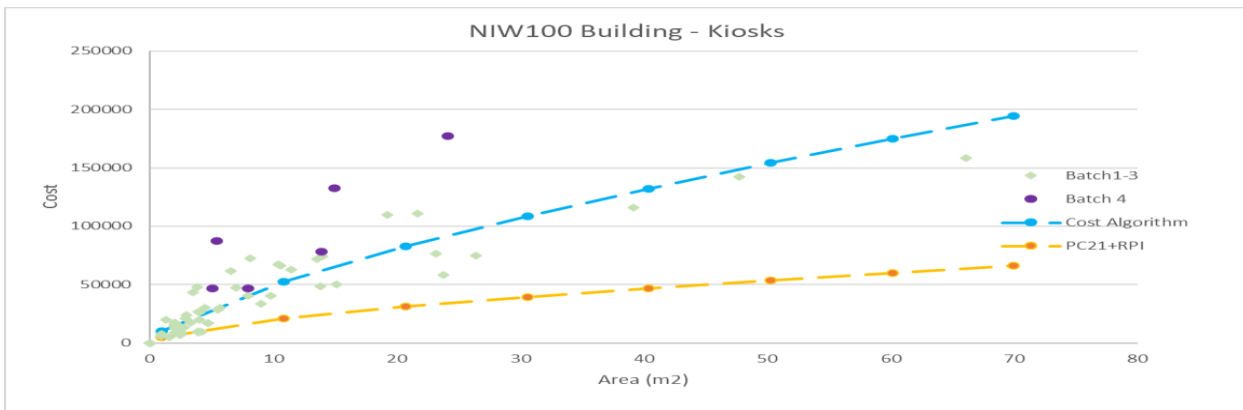
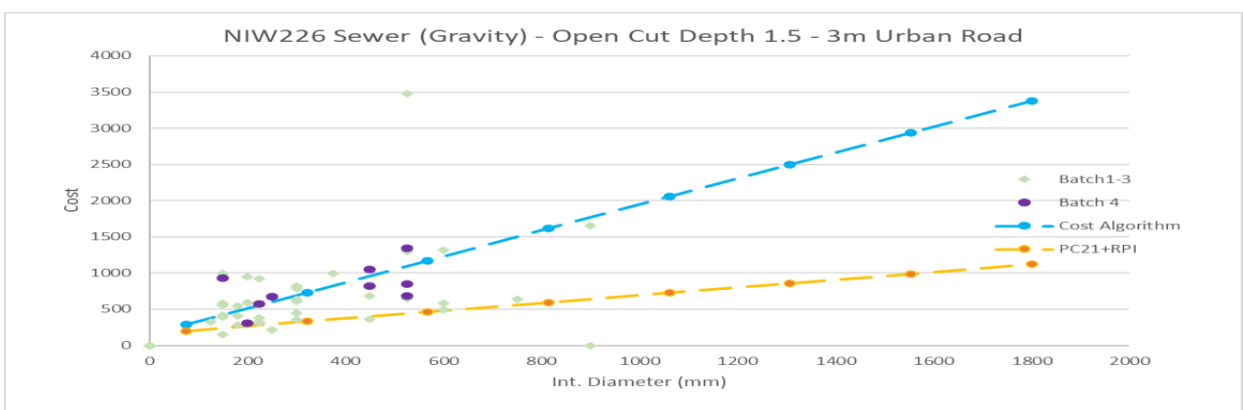


Figure 7.3 NIW226 PC21 cost model (+RPI) V 23_24 cost model and data points



The original scope was extracted from IPAC and the new cost models applied offline (IPAC still uses 18/19 costs curves). The full list of projects and the results are shown in Appendix C.

The variation by project type (WI, WNI, WWNI, WWI) is shown below in Table 7.6. This confirmed our understanding that the biggest increases were being experienced in the delivery of watermains and the services reservoir programmes. Our watermains costs were based on limited data for the PC21 submission and the benchmark undertaken for the PC21 submission had confirmed that our cost models were low. Our SR models were based on historical data but costs for this type of work seems to have increased significantly and this seems to be related to the high costs for concrete, steel reinforcement and the pipe fittings.

Table 7.6 Re-costing 40 Benchmark projects – Jacobs

Project Type	% increase
Water Non-Infra	170%
Water Infra	164%
Waste Water Infra	66%
Waste Water Non-Infra	76%
Weighted Average	95%

The projects were also tagged with subprogrammes codes, and we have been able to generate increases by sub programme also. This resulted in figures as shown below in Table 7.7.

Table 7.7 Project cost increases grouped by Sub-programme (NIW Cost Models)

Sub Programme Number	Prog Number	Tender Construction Sub-Total (v5.35 18_19)	Tender Construction Sub-Total (v5.35 23_24 using RPI)	Tender Construction Cost (v7.26 23_24)	% increase from 18/19
16a	16	£ 32,681,367	£ 43,564,262	£ 65,360,927	100%
12b	12	£ 66,583,710	£ 88,756,085	£ 103,001,041	55%
12c	12	£ 1,274,726	£ 1,699,210	£ 2,458,372	93%
05a	05	£ 12,789,537	£ 17,048,453	£ 32,456,531	154%
05b	05	£ 1,721,497	£ 2,294,756	£ 3,287,499	91%
06z	06	£ 6,383,698	£ 8,509,469	£ 22,216,582	248%
16b	16	£ 6,567,350	£ 8,754,278	£ 12,871,484	96%
04a	04	£ 6,211,746	£ 8,280,257	£ 14,643,538	136%
23c	23	£ 7,198,708	£ 9,595,878	£ 19,212,522	167%
05c	05	£ 1,357,152	£ 1,809,084	£ 3,881,301	186%
12d	12	£ 3,953,972	£ 5,270,645	£ 6,365,758	61%
Sub-Total		£ 146,723,463	£ 195,582,376	£ 285,755,553	

The derived percentages are only applicable to year 3 and the same approach was adopted as outlined in section 7.2.1 for the derivation of typical inflation uplifts for years 1 and 2 of the PC21 programme. The percentages applied and resulting weighted annual inflation figures are shown below in Table 7.8.

Table 7.8 Assessment of RPE across the programme for years 1 to 3 (NIW models)

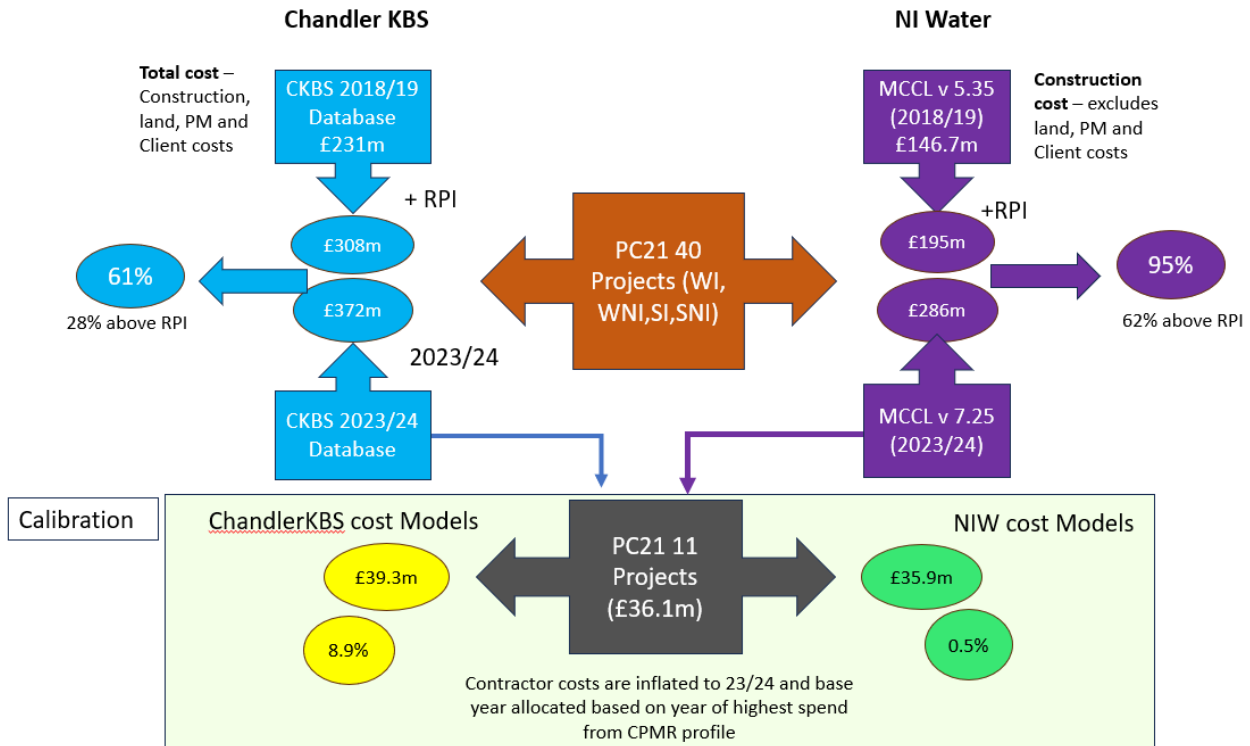
	Year 3 analysis assumption	2021/22			2022/23			2023/24		
		actual spend	year 1 increase	year 1 inflated (23/24)	actual spend	year 2 increase	inflated (23/24)	actual spend	year 3 increase	inflated (23/24)
16: Wastewater treatment (new starts)	from analysis	£ 33,009	29%	£ 42,680	£ 41,554	71%	£ 71,241	£ 61,933	99%	£ 123,447.8
02: Base maintenance (sewerage)	assume same as SP12	£ 27,766	16%	£ 32,330	£ 36,408	40%	£ 50,999	£ 38,620	56%	£ 60,138.5
12: Sewerage programme	from analysis	£ 27,243	16%	£ 31,721	£ 34,613	40%	£ 48,485	£ 47,111	56%	£ 73,360.5
20: Management & General	assumed RPI	£ 29,457	10%	£ 32,353	£ 32,277	24%	£ 40,014	£ 29,939	33%	£ 39,916.3
04: Water treatment works	from analysis	£ 14,067	40%	£ 19,699	£ 19,006	98%	£ 37,562	£ 21,634	136%	£ 50,999.9
00: Capitalised salaries and on-costs	assumed RPI	£ 1,595	10%	£ 1,752	£ 1,838	24%	£ 2,278	£ 2,037	33%	£ 2,715.3
08: Water mains rehabilitation	assume same as SP23	£ 14,000	16%	£ 16,301	£ 17,879	40%	£ 25,044	£ 18,044	56%	£ 28,097.8
01: Base maintenance (water)	average assumed	£ 12,002	28%	£ 15,357	£ 15,755	68%	£ 26,493	£ 11,717	95%	£ 22,819.8
05: Water trunk mains	from analysis	£ 5,375	44%	£ 7,749	£ 11,560	108%	£ 24,009	£ 16,609	150%	£ 41,475.3
09: Leakage	assumed RPI	£ 4,862	10%	£ 5,340	£ 4,487	24%	£ 5,563	£ 5,038	33%	£ 6,716.9
10: Ops capital (water)	assumed RPI	£ 9,891	10%	£ 10,863	£ 12,109	24%	£ 15,012	£ 13,102	33%	£ 17,468.3
03: Water resources	average assumed	£ 4,502	28%	£ 5,760	£ 5,036	68%	£ 8,468	£ 5,157	95%	£ 10,043.7
06: Service reservoirs and clear water tanks	from analysis	£ 1,871	73%	£ 3,240	£ 6,387	178%	£ 17,781	£ 11,033	248%	£ 38,397.1
23: Water mains new and renew	Same as Sewers	£ 2,524	16%	£ 2,939	£ 5,266	40%	£ 7,376	£ 7,799	56%	£ 12,144.5
24: Sewerage new and renew	assume same as SP12	£ 2,201	16%	£ 2,563	£ 5,322	40%	£ 7,455	£ 3,595	56%	£ 5,598.1
18: Ops capital (sewerage)	assume same as SP12	£ 10,989	16%	£ 12,795	£ 11,860	40%	£ 16,613	£ 13,913	56%	£ 21,665.1
19: Metering	assumed RPI	£ 1,329	10%	£ 1,460	£ 1,529	24%	£ 1,896	£ 2,025	33%	£ 2,699.8
07: Service reservoir rehab	assumed RPI	£ 2,516	10%	£ 2,763	£ 4,033	24%	£ 5,000	£ 5,035	33%	£ 6,712.9
17: Small wastewater treatment works	Assume same as SP16	£ 884	29%	£ 1,143	£ 2,065	71%	£ 3,540	£ 2,135	99%	£ 4,255.6
15: Wastewater treatment (carry over projec	assumed RPI	£ 26	10%	£ 29	£ -	24%	£ -	£ -	33%	£ -
		£ 206,109		£ 248,836	£ 268,984		£ 414,829	£ 316,476		£ 568,673.1
			18/19 to 21/22	20.7%		18/19 to 22/23	54.2%		18/19 to 23/24	79.7%

7.3 Benchmarking Summary

The benchmarking has included a triangulated approach, with the aim to provide evidence for actual construction cost increases experienced in Northern Ireland since submission of the Business Plan and Final Determination. A sample of PC21 tendered projects have been re-costed to test the validity of the cost models and the results of this are within 10% of the actual contractor pricing which is acceptable.

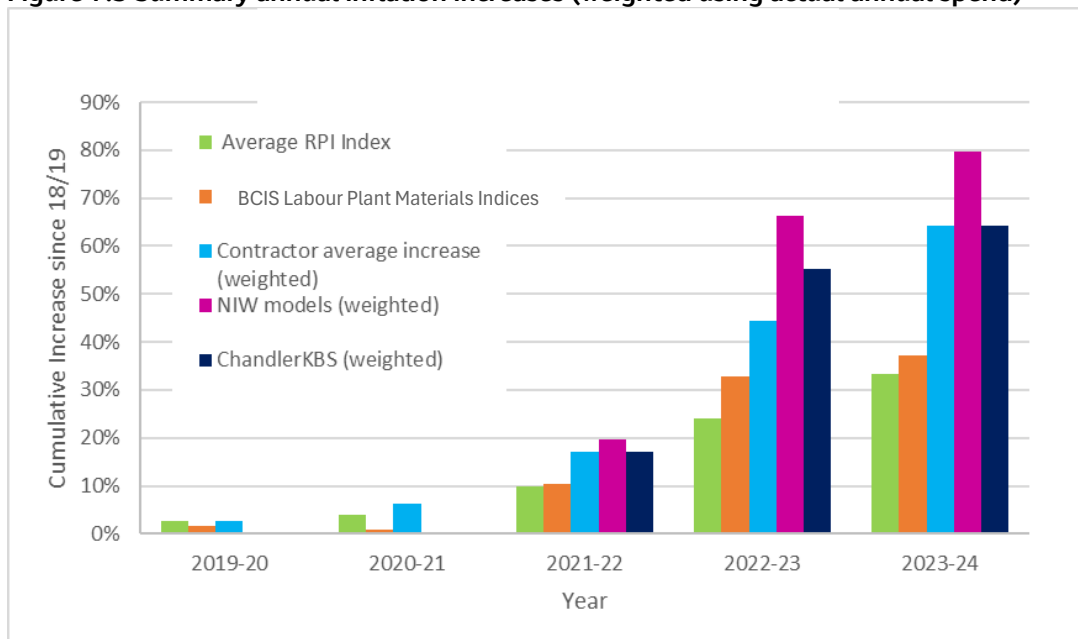
The re-costing of the original 40 PC21 projects has shown that costs have increased by significantly more than the RPI in the period from 2018/19 to 2023/24. This is a mix of local inflation, and in the case of water infrastructure the costs of pipe supply have increased significantly. There is also more data for the larger pipe diameters available to generate a NI Water cost model. The results of the various aspects of benchmarking for the sample of projects is summarised in Figure 7.4.

Figure 7.4 Benchmark Summary NI Water models and Industry Data



Our assessment of annual increases using the analysis above as the base for Year 3 inflation is presented below in Figure 7.5. The benchmarking results have been weighted based on sub-programme spend per annum to derive inflation figures for the first 3 years of the programme. We have also included the figures generated using the Contractor data (also weighted against the sub-programmes) for comparison.

Figure 7.5 Summary annual inflation increases (weighted using actual annual spend)

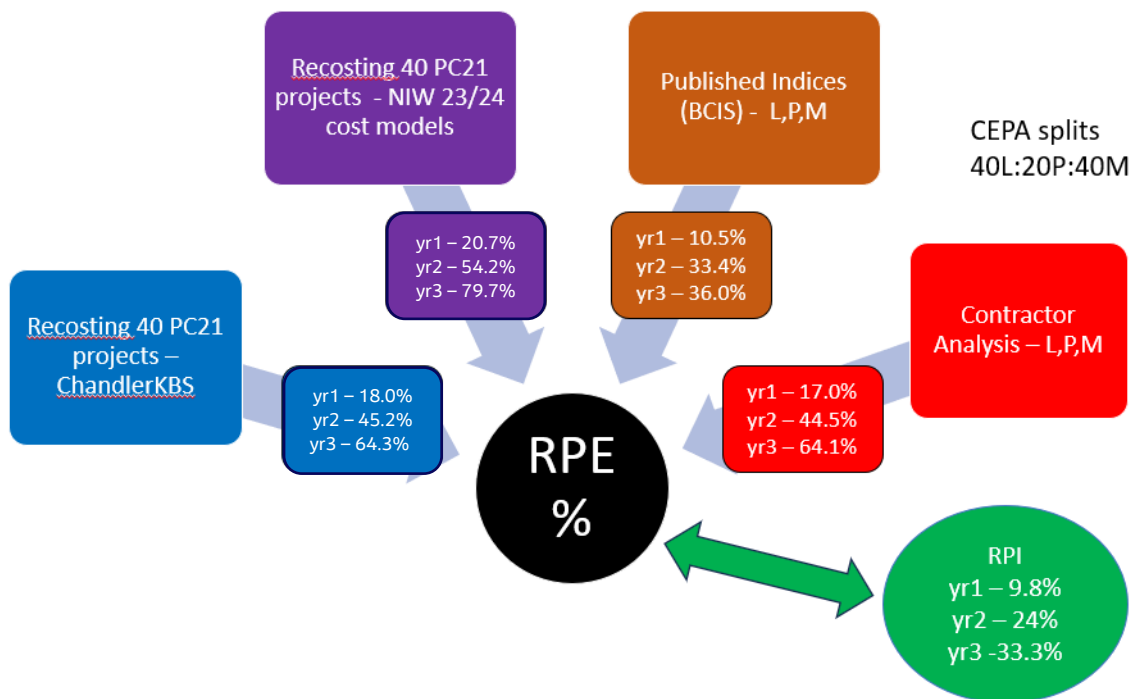


8. Summary

Our methodology has adopted a triangulated approach to assess typical cost increases for Northern Ireland and confirm how these compare to RPI. ChandlerKBS Industry Cost Data has been used to benchmark a sample of projects and we have also re-costed these projects using the latest NIW cost models, noting that these are still in development as we extract more data from current projects in preparation for costing PC27.

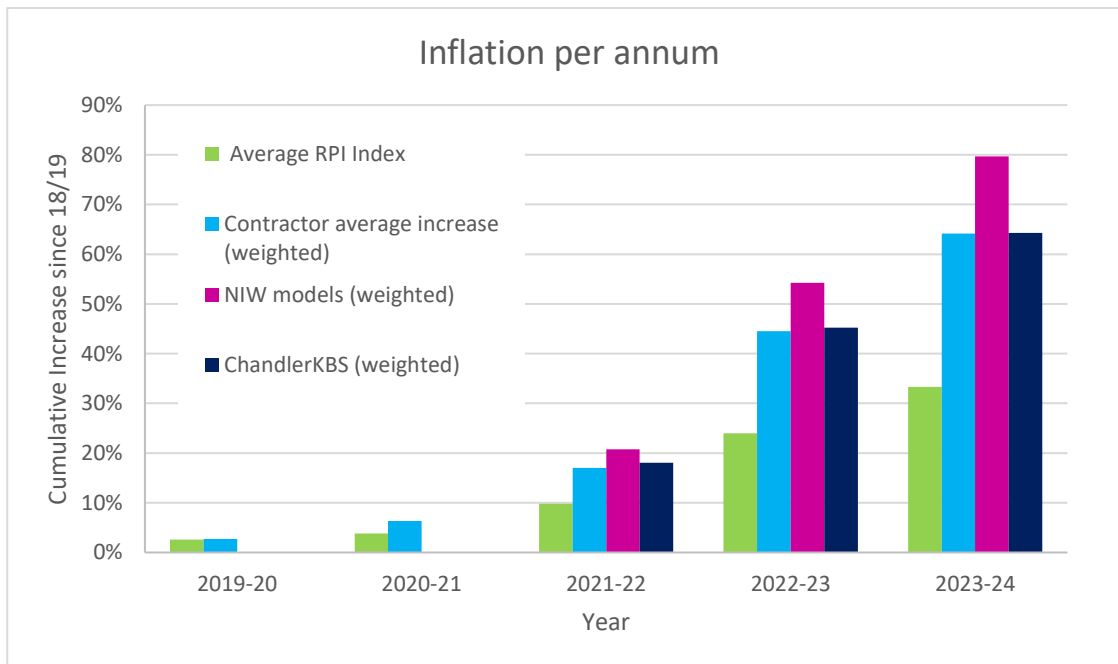
The cost models have also been used in the re-costing of 11 sample projects to demonstrate that the cost models reflect actual costs experience by NIW. The projects selected have been used by NI Water in the assessment of materials costs and have not been selected by Jacobs/ChandlerKBS. The results of our assessment of cumulative inflation are summarised below in Figure 8.1.

Figure 8.1 Cumulative Inflation Since 2018/19



The annual inflation increases are also summarised in Figure 8.2

Figure 8.2 Summary Annual Inflation Increases (weighted using actual annual spend)



RPE identified from data sources in this analysis is presented as the variance between the RPE and RPI percentages. The percentages for RPE Low and RPE High represent the lowest and highest variance to RPI, where $Adjusted_Cost = Base_Cost * (1 + RPI_% + RPE_%)$.

Table 8.1 Cumulative Inflation for all data sources compared to RPI

	2018-19	2019-20	2020-21	Y1 2021-22	Y2 2022-23	Y3 2023-24
RPI Adjustment	0.0%	2.6%	3.8%	9.8%	24.0%	33.3%
ChandlerKBS				18.0%	45.2%	64.3%
NIW Models				20.7%	54.2%	79.7%
Contractors		2.7%	6.3%	17.0%	44.5%	64.1%
BCIS Labour Plant Material Indices		1.9%	1.9%	10.5%	33.4%	36.0%
RPE Low				0.7%	9.4%	2.7%
RPE High				10.9%	30.2%	46.4%

The annual inflation as calculated for each data source is summarised in Table 8.2 below. There are a range of figures across the various sources, and we have presented the lowest and highest figures for potential RPE.

Table 8.2 Annual Inflation for all data sources compared to RPI

	2018-19	2019-20	2020-21	Y1 2021-22	Y2 2022-23	Y3 2023-24
RPI Annual Change		2.6%	1.2%	5.8%	12.9%	7.5%
ChandlerKBS				18.0%	23.1%	13.2%
NIW Models				20.7%	27.8%	16.5%
Contractors		2.7%	3.5%	10.1%	23.5%	13.6%
BCIS Labour Plant Material Indices		1.9%	0.0%	8.4%	20.7%	1.9%
RPE Low				2.6%	7.8%	-5.6%
RPE High				14.9%	14.9%	9.0%

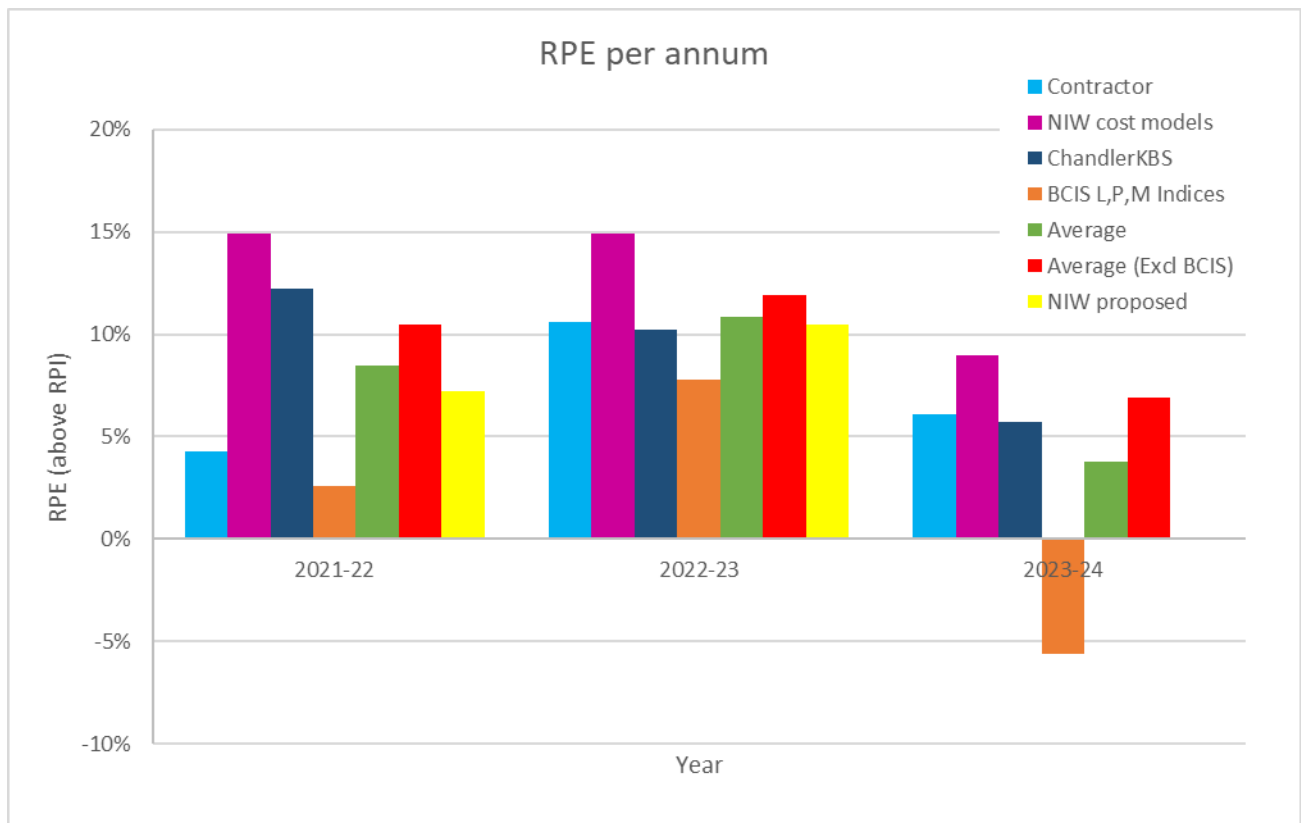
Table 8.3 presents the derived RPE figures from the data presented above.

Table 8.3 Derived RPE figures per annum

	2018-19	2019-20	2020-21	Y1 2021-22	Y2 2022-23	Y3 2023-24
RPI Annual Change		2.6%	1.2%	5.8%	12.9%	7.5%
ChandlerKBS				12.2%	10.2%	5.7%
NIW Models				14.9%	14.9%	9.0%
Contractors		0.1%	2.3%	4.3%	10.6%	6.1%
BCIS Labour Plant Material Indices		-0.7%	-1.2%	2.6%	7.8%	-5.6%
RPE Low				2.6%	7.8%	-5.6%
RPE High				14.9%	14.9%	9.0%
RPE Average				8.5%	10.9%	3.8%
RPE Average (excl BCIS)				10.5%	11.9%	6.9%
NI Water Original Submission				7.2%	10.5%	0.0%

The derived figures are presented in Figure 8.3 for comparison. The NI Water generated figures from the original submission appear to align with the RPE average across the sources although we note that there is no uplift proposed for year 3 and this may result in a shortfall for delivery of schemes.

Figure 8.3 RPE by data source



In summary, the analysis supports the principal that costs have increased by more than RPI as shown in Table 8.1. Data from NI Water's main contractors and ChandlerKBS data shows an increase above 60% in year 3, whilst NI Water cost model data suggests an increase of circa 80% on 2018/19 costs [this includes some model corrections for previous under-pricing due to lack of data].

Appendix A. PC21 Benchmark ChandlerKBS

Project No	Project Name	Option	Project Type_IPAC	Scope definition Grade (1-5)	Count of Cost Curve_lines	Count of Cost Curve_used	NIW Total Factored CAPEX	NIW Total Cost	ChandlerKBS Total Cost	Total Cost Variance	Total Variance
1038	Grange (Taylorstown) WwTW	5	Waste Water Non-Infra	3 - Intermediate	60	52	£ 2,215,954.00	£ 3,144,709.61	£ 3,650,738.63	£ 506,029.03	16%
1048	Antrim DA Glenavy Road Crumlin WwPS	1	Waste Water Infra	3 - Intermediate	34	23	£ 449,847.00	£ 693,162.25	£ 1,016,782.44	£ 323,620.19	47%
1054	Ballyrickard DA Upper Crescent Comber WwPS	1	Waste Water Infra	3 - Intermediate	32	27	£ 2,465,824.00	£ 3,642,520.09	£ 4,382,086.15	£ 739,566.06	20%
1055	Ballyrickard DA Scrabo Road WwPS	1	Waste Water Infra	3 - Intermediate	31	23	£ 2,332,757.00	£ 3,449,371.73	£ 4,830,736.45	£ 1,381,364.73	40%
1064	Tamnamore DA Clonmore Road Clontyclay WwPS	1	Waste Water Infra	3 - Intermediate	22	21	£ 469,571.00	£ 723,322.41	£ 908,047.06	£ 184,724.65	26%
1065	Donnybrewer DA Eglinton Cottage Way WwPS	1	Waste Water Infra	3 - Intermediate	22	21	£ 828,531.00	£ 1,252,696.62	£ 1,794,808.82	£ 542,112.20	43%
1096	Moy WwTW	2	Waste Water Non-Infra	1 - Concept	59	55	£ 4,199,647.00	£ 5,897,732.38	£ 6,014,479.14	£ 116,746.76	2%
1129	Mountfield PC21	3	Waste Water Non-Infra	4 - Detailed	64	52	£ 1,615,039.00	£ 2,300,140.95	£ 2,727,607.29	£ 427,466.34	19%
1140	Caugh Hill/Carmoney to Strabane Link Main	1	Water Non-Infra	3 - Intermediate	52	21	£ 11,918,707.00	£ 18,287,200.39	£ 21,695,211.68	£ 3,408,011.29	19%
1191	Newry WwTW	1	Waste Water Non-Infra	2 - Preliminary	87	61	£ 18,092,584.00	£ 25,031,218.29	£ 27,753,476.47	£ 2,722,258.17	11%
1226	Killinchy WwTW	5	Waste Water Non-Infra	3 - Preliminary	78	50	£ 4,570,892.00	£ 6,424,703.81	£ 6,969,445.41	£ 544,741.61	8%
1245	Western Resource Zone - Resilience	1	Water Non-Infra	3 - Intermediate	26	13	£ 1,721,499.00	£ 2,725,784.06	£ 2,154,729.29	£ 571,054.76	-21%
1306	Robinsonstown WwTW	1	Waste Water Non-Infra	3 - Intermediate	54	50	£ 1,950,886.00	£ 2,773,963.77	£ 3,416,073.55	£ 642,109.78	23%
1323	Event Duration Monitors WwPS/CSOs	5	Waste Water Infra	3 - Intermediate	19	14	£ 16,122,012.00	£ 23,163,429.77	£ 22,708,055.25	£ 455,374.52	-2%
1328	Belfast DA - Shankill Road Lanark CSO WwPS	1	Waste Water Infra	1 - Concept	23	21	£ 1,839,691.00	£ 2,761,434.16	£ 2,714,172.56	£ 47,261.61	-2%
1338	Pomeroy WwTW	3	Waste Water Non-Infra	3 - Intermediate	45	42	£ 1,663,834.00	£ 2,372,168.47	£ 2,315,429.38	£ 56,739.09	-2%
1366	Belfast DA River Terrace CSO DO51	1	Waste Water Infra	1 - Concept	24	21	£ 11,510,360.00	£ 16,711,624.61	£ 15,666,575.97	£ 1,045,048.64	-6%
1517	Kinnegar DA - Castlehill Road Sewerage	1	Waste Water Infra	1 - Concept	10	9	£ 178,449.00	£ 288,794.39	£ 371,796.88	£ 83,002.49	29%
1546	SR - Loughmacrory Hill	1	Water Non-Infra	3 - Intermediate	16	15	£ 2,092,081.00	£ 2,962,842.80	£ 3,751,346.29	£ 788,503.49	27%
1640	CWT - Fofanny	1	Water Non-Infra	3 - Intermediate	14	14	£ 2,419,690.00	£ 3,414,787.36	£ 3,561,729.13	£ 146,941.77	4%
1642	CWT - Seagahan	1	Water Non-Infra	3 - Intermediate	15	14	£ 1,968,354.00	£ 2,790,647.59	£ 3,014,552.62	£ 223,905.03	8%
1653	Belfast WwTW - Phase 2 Upgrade	1	Waste Water Non-Infra	3 - Intermediate	19	18	£ 2,456,683.00	£ 3,478,454.87	£ 3,579,743.88	£ 101,289.02	3%
1655	Belfast WwTW - UV Treatment	1	Waste Water Non-Infra	4 - Detailed	18	17	£ 4,110,668.00	£ 5,765,853.86	£ 5,141,224.49	£ 624,629.37	-11%
1668	NIW Alpha WTWs Treatability Improvements	2	Water Non-Infra	2 - Preliminary	44	14	£ 5,896,914.00	£ 7,763,509.92	£ 8,322,140.30	£ 558,630.37	7%
1673	Ballymena DAP - Albert Place CSO	1	Waste Water Infra	1 - Concept	23	21	£ 1,227,373.00	£ 1,852,360.08	£ 2,039,724.66	£ 187,364.58	10%
1695	Killyhevin DWW Tank	1	Water Non-Infra	4 - Detailed	8	7	£ 314,836.00	£ 445,294.13	£ 639,263.79	£ 193,969.66	44%
1716	Kinnegar DA - Marine Parade Hollywood CSO	1	Waste Water Infra	2 - Preliminary	3	3	£ 138,770.00	£ 227,191.62	£ 288,409.00	£ 61,217.38	27%
1723	Omagh DA - Rodgers Villas CSO Sewerage	1	Waste Water Infra	2 - Preliminary	21	21	£ 486,944.00	£ 751,312.41	£ 741,466.93	£ 9,845.48	-1%
1727	Trunkmain - Whitespots	1	Water Infra	3 - Intermediate	1	1	£ 3,218,342.00	£ 4,626,329.24	£ 7,000,511.19	£ 2,374,181.95	51%
1729	Trunkmain - Crescent Link	1	Water Infra	4 - Detailed	5	3	£ 1,357,152.00	£ 1,847,403.56	£ 2,951,377.51	£ 1,103,973.95	60%
1738	Glenmachan Project Phase 2 €" Fane Street	1	Waste Water Infra	3 - Intermediate	5	5	£ 1,872,406.00	£ 2,800,208.15	£ 2,690,305.34	£ 109,902.81	-4%
1775	Trunkmain - Fofanny to Alt	1	Water Infra	3 - Intermediate	6	6	£ 3,980,367.00	£ 5,700,927.12	£ 7,823,714.68	£ 2,122,787.56	37%
1932	Glenmachan Project Phase 2 €" Sicily Park	2	Waste Water Infra	1 - Concept	73	22	£ 4,625,675.00	£ 6,762,737.32	£ 6,892,521.92	£ 129,784.60	2%
1978	Kinnegar DA - Cluster 1 DO61	1	Waste Water Infra	1 - Concept	16	15	£ 4,443,364.00	£ 6,540,783.07	£ 5,886,014.47	£ 654,768.60	-10%
1990	Kinnegar DA - 28 & 30 Onslow Parade, 103, 105 & 107 Ladas Drive DG	1	Waste Water Infra	2 - Preliminary	24	21	£ 3,953,972.00	£ 5,816,112.88	£ 5,973,272.00	£ 157,159.12	3%
2008	Belfast DA - Distillery Street CSO WwPS	1	Waste Water Infra	1 - Concept	28	26	£ 14,104,650.00	£ 20,415,089.34	£ 18,169,957.76	£ 2,245,131.58	-11%
2047	Edenasop to Killeter SR	1	Water Infra	4 - Detailed	4	4	£ 870,829.00	£ 1,409,855.17	£ 1,805,320.63	£ 395,465.46	28%
2211	Newtownbreda DA - Storm Tanks	4	Waste Water Infra	3 - Intermediate	17	15	£ 2,387,863.00	£ 3,529,695.51	£ 4,175,185.74	£ 645,490.23	18%
2239	Cookstown DA - Orritor Road CSO	1	Waste Water Infra	1 - Concept	25	23	£ 1,410,024.00	£ 2,121,304.82	£ 2,802,066.18	£ 680,761.35	32%
2242	Cookstown DA - Burn Bank CSO	1	Waste Water Infra	1 - Concept	25	23	£ 1,417,438.00	£ 2,132,212.06	£ 2,838,473.69	£ 706,261.62	33%
SUBTOTAL							£ 148,900,479.00	£ 214,798,890.66	£ 231,178,574.64	£ 16,379,683.98	7.6%

Appendix B. Letter to Contractors



6 June 2024



Dear Sirs

Ref: Northern Ireland Water's Assessment of Real Price Effects (RPE)

I am writing to you in relation to the above subject and your company's input into Northern Ireland Water's (NI Water) PC21 Mid-Term Review.

The Northern Ireland Authority for Utility Regulation (NIAUR) set NI Water a revenue allowance for PC21 covering the period from April 2021 to March 2027 and included the provision for a PC21 Mid-Term Review. Part of NI Water's Mid-Term Review submission includes an additional inflation adjustment for inflation greater than the Retail Price Index. NI Water must provide evidence to support this inflation adjustment and is therefore seeking information from the supply chain to validate the claim.

We would kindly request your support in providing information that shows the annual increase in costs your company has experienced across Labour, Equipment (plant used to provide the works) and Materials during the period 2018 – 2023. This information is critical for NI Water to provide robust evidence to NIAUR that underpins the inflation adjustment and allows a suitable determination to be made.

We include a table on the following page that sets out the information we would like to you to provide.

We have an extremely tight timeline for NI Water's submission to NIAUR and therefore need to collate this information by no later than 11 June 2024.

Whilst I appreciate this is onerous, I am sure you will appreciate how important this information is and the impact it will have on NI Water's capital programme if we cannot provide compelling evidence, hence your company's help will be much appreciated.

If you have any questions or queries in completing this information, please contact john.gavigan@chandlerkbs.com or william.heap@chandlerkbs.com.

Yours sincerely



John Gavigan
Partner
ChandlerKBS

Confidential Information for NI Water Real Price Effects Adjustment Submission to NIAUR

 Company:

 Information provided by:

 Position:

 Date:

Instructions for completion

1. Insert the percentage increase you have experienced in each year over and above the previous year.
2. Please state any assumptions in the lines below the table.

Element		2018/19	2019/20	2020/21	2021/22	2022/23	Assumptions
Labour	Management & Directors						
	Engineering Professionals						
	Administration						
	Skilled Labour						
	Non-Skilled Labour						
	Plant Operators						
Equipment							
Materials	Concrete						
	Rebar						
	Pipes - concrete						
	Pipes - steel						
	Pipes - pe						
	Aggregates						
	Disposal						

Appendix C. 40 projects Re-costed – ChandlerKBS

Project No	Project Name	Option	Project Type_IPAC	Project Type_amended	CKBS PREVIOUS	CKBS CURRENT COST	Increase on Previous Estimate
1038	Grange (Taylorstown) WwTW	5	Waste Water Non-Infra	Waste Water Non-Infra	£ 3,650,739	£ 5,752,304	58%
1048	Antrim DA Glenavy Road Crumlin WwPS	1	Waste Water Infra	Waste Water Infra	£ 1,016,782	£ 1,653,353	63%
1054	Ballyrickard DA Upper Crescent Comber WwPS	1	Waste Water Infra	Waste Water Infra	£ 4,331,737	£ 7,131,661	65%
1055	Ballyrickard DA Scrabo Road WwPS	1	Waste Water Infra	Waste Water Infra	£ 4,830,736	£ 7,667,543	59%
1064	Tamnamore DA Clonmore Road Clontyclay WwPS	1	Waste Water Infra	Waste Water Infra	£ 908,047	£ 1,453,637	60%
1065	Donnybrewer DA Eglinton Cottage Way WwPS	1	Waste Water Infra	Waste Water Infra	£ 1,794,809	£ 3,514,419	96%
1096	Moy WwTW	2	Waste Water Non-Infra	Waste Water Non-Infra	£ 6,014,479	£ 11,105,458	85%
1129	Mountfield PC21	3	Waste Water Non-Infra	Waste Water Non-Infra	£ 2,727,607	£ 5,681,530	108%
1140	Caugh Hill/Carmoney to Strabane Link Main	1	Water Non-Infra	Water Non-Infra	£ 21,695,212	£ 37,585,382	73%
1191	Newry WwTW	1	Waste Water Non-Infra	Waste Water Non-Infra	£ 27,753,476	£ 46,580,507	68%
1226	Killinchy WwTW	5	Waste Water Non-Infra	Waste Water Non-Infra	£ 6,969,445	£ 10,872,002	56%
1245	Western Resource Zone - Resilience	1	Water Non-Infra	Water Non-Infra	£ 2,154,729	£ 4,879,579	126%
1306	Robinsonstown WwTW	1	Waste Water Non-Infra	Waste Water Non-Infra	£ 3,416,074	£ 6,030,736	77%
1323	Event Duration Monitors WwPS/CSOs	5	Waste Water Infra	Waste Water Non-Infra	£ 22,708,055	£ 39,137,681	72%
1328	Belfast DA- Shankill Road Lanark CSO WwPS	1	Waste Water Infra	Waste Water Infra	£ 2,714,173	£ 4,083,357	50%
1338	Pomeroy WwTW	3	Waste Water Non-Infra	Waste Water Non-Infra	£ 2,315,429	£ 4,812,386	108%
1366	Belfast DA River Terrace CSO D051	1	Waste Water Infra	Waste Water Infra	£ 15,666,576	£ 24,959,976	59%
1517	Kinnegar DA- Castlehill Road Sewerage	1	Waste Water Infra	Waste Water Infra	£ 371,797	£ 590,922	59%
1546	SR - Loughmacrory Hill	1	Water Non-Infra	Water Non-Infra	£ 3,751,346	£ 7,096,006	89%
1640	CWT - Fofanny	1	Water Non-Infra	Water Non-Infra	£ 3,561,729	£ 6,859,944	93%
1642	CWT - Seagahan	1	Water Non-Infra	Water Non-Infra	£ 3,014,553	£ 5,813,264	93%
1653	Belfast WwTW - Phase 2 Upgrade	1	Waste Water Non-Infra	Waste Water Non-Infra	£ 3,579,744	£ 5,216,375	46%
1655	Belfast WwTW - UV Treatment	1	Waste Water Non-Infra	Waste Water Non-Infra	£ 5,141,224	£ 6,068,416	18%
1668	NIW Alpha WTWs Treatability Improvements	2	Water Non-Infra	Water Non-Infra	£ 8,322,140	£ 16,919,832	103%
1673	Ballymena DAP- Albert Place CSO	1	Waste Water Infra	Waste Water Infra	£ 2,039,725	£ 3,586,778	76%
1695	Killyhevlin DWW Tank	1	Water Non-Infra	Water Non-Infra	£ 639,264	£ 1,174,597	84%
1716	Kinnegar DA - Marine Parade Holywood CSO	1	Waste Water Infra	Waste Water Infra	£ 288,409	£ 535,026	86%
1723	Omagh DA- Rodgers Villas CSO Sewerage	1	Waste Water Infra	Waste Water Infra	£ 741,467	£ 1,235,986	67%
1727	Trunkmain - Whitespots	1	Water Infra	Water Infra	£ 7,000,511	£ 11,715,204	67%
1729	Trunkmain - Crescent Link	1	Water Infra	Water Infra	£ 2,951,378	£ 5,095,314	73%
1738	Glenmachan Project Phase 2 €" Fane Street	1	Waste Water Infra	Waste Water Infra	£ 2,675,350	£ 4,093,951	53%
1775	Trunkmain - Fofanny to Alt	1	Water Infra	Water Infra	£ 7,823,715	£ 12,353,658	58%
1932	Glenmachan Project Phase 2 €" Sicily Park	2	Waste Water Infra	Waste Water Infra	£ 5,704,487	£ 14,288,290	150%
1978	Kinnegar DA - Cluster 1 D061	1	Waste Water Infra	Waste Water Infra	£ 5,886,014	£ 10,052,752	71%
1990	Kinnegar DA- 28 & 30 Onslow Parade, 103, 105 & 107 Ladas Drive DGS	1	Waste Water Infra	Waste Water Infra	£ 5,973,272	£ 10,699,140	79%
2008	Belfast DA- Distillery Street CSO WwPS	1	Waste Water Infra	Waste Water Infra	£ 18,169,958	£ 29,804,699	64%
2047	Edenasop to Killeter SR	1	Water Infra	Water Infra	£ 1,805,321	£ 3,152,898	75%
2211	Newtownbreda DA - Storm Tanks	4	Waste Water Infra	Waste Water Infra	£ 4,175,186	£ 6,813,888	63%
2239	Cookstown DA - Orritor Road CSO	1	Waste Water Infra	Waste Water Infra	£ 2,802,066	£ 4,736,547	69%
2242	Cookstown DA - Burn Bank CSO	1	Waste Water Infra	Waste Water Infra	£ 2,838,474	£ 4,757,454	68%
					£ 229,925,236	£ 395,562,454	72%

Appendix D. 40 projects Re-costed - Jacobs

Project No	Project Name	Option	Project Type_amended	Scope definition Gra	Sub Programme Nur	Tender Construction Sub-Total (v5.35 18_1 ^{NA})	Tender Construction Cost (v7.26 23_24)
1038	Grange (Taylorstown) WwTW	5	Waste Water Non-Infra	3 - Intermediate	16a	£ 2,187,081	£ 4,816,273
1048	Antrim DA Glenavy Road Crumlin WwPS	1	Waste Water Infra	3 - Intermediate	12b	£ 439,256	£ 883,074
1054	Ballyrickard DA Upper Crescent Comber WwPS	1	Waste Water Infra	3 - Intermediate	12b	£ 2,465,824	£ 4,695,426
1055	Ballyrickard DA Scrabo Road WwPS	1	Waste Water Infra	3 - Intermediate	12b	£ 2,332,755	£ 4,638,721
1064	Tamnamore DA Clonmore Road Clontyclay WwPS	1	Waste Water Infra	3 - Intermediate	12c	£ 446,195	£ 770,186
1065	Donnybrewer DA Eglinton Cottage Way WwPS	1	Waste Water Infra	3 - Intermediate	12c	£ 828,531	£ 1,688,186
1096	Moy WwTW	2	Waste Water Non-Infra	1 - Concept	16a	£ 4,176,149	£ 8,193,638
1129	Mountfield PC21	3	Waste Water Non-Infra	4 - Detailed	16a	£ 1,615,039	£ 3,524,060
1140	Caugh Hill/Carmoney to Strabane Link Main	1	Water Non-Infra	3 - Intermediate	05a	£ 11,918,709	£ 30,631,098
1191	Newry WwTW	1	Waste Water Non-Infra	2 - Preliminary	16a	£ 16,533,820	£ 32,594,537
1226	Killinchy WwTW	5	Waste Water Non-Infra	1 - Concept	16a	£ 4,560,668	£ 8,296,318
1245	Western Resource Zone - Resilience	1	Water Non-Infra	3 - Intermediate	05b	£ 1,721,497	£ 3,287,499
1306	Robinsonstown WwTW	1	Waste Water Non-Infra	3 - Intermediate	16a	£ 1,944,774	£ 4,178,420
1323	Event Duration Monitors WwPS/CSOs	5	Waste Water Non-Infra	3 - Intermediate	12b	£ 16,122,013	£ 19,175,557
1328	Belfast DA- Shankill Road Lanark CSO WwPS	1	Waste Water Infra	1 - Concept	12b	£ 1,630,121	£ 2,478,353
1338	Pomeroy WwTW	3	Waste Water Non-Infra	3 - Intermediate	16a	£ 1,663,836	£ 3,757,682
1366	Belfast DA River Terrace CSO DO51	1	Waste Water Infra	1 - Concept	12b	£ 11,300,789	£ 17,219,384
1517	Kinnegar DA- Castlehill Road Sewerage	1	Waste Water Infra	1 - Concept	12b	£ 178,449	£ 256,174
1546	SR - Loughmacrory Hill	1	Water Non-Infra	3 - Intermediate	06z	£ 2,048,979	£ 7,036,833
1640	CWT - Fofanny	1	Water Non-Infra	3 - Intermediate	06z	£ 2,384,807	£ 8,123,842
1642	CWT - Seagahan	1	Water Non-Infra	3 - Intermediate	06z	£ 1,949,912	£ 7,055,907
1653	Belfast WwTW - Phase 2 Upgrade	1	Waste Water Non-Infra	3 - Intermediate	16b	£ 2,456,682	£ 7,057,702
1655	Belfast WwTW - UV Treatment	1	Waste Water Non-Infra	4 - Detailed	16b	£ 4,110,668	£ 5,813,781
1668	NIW Alpha WTWs Treatability Improvements	2	Water Non-Infra	2 - Preliminary	04a	£ 5,896,912	£ 13,533,795
1673	Ballymena DAP- Albert Place CSO	1	Waste Water Infra	1 - Concept	12b	£ 1,227,373	£ 1,873,399
1695	Killyhevlín DWW Tank	1	Water Non-Infra	4 - Detailed	04a	£ 314,834	£ 1,109,743
1716	Kinnegar DA - Marine Parade Holywood CSO	1	Waste Water Infra	2 - Preliminary	12b	£ 138,770	£ 242,754
1723	Omagh DA- Rodgers Villas CSO Sewerage	1	Waste Water Infra	2 - Preliminary	12b	£ 486,945	£ 707,818
1727	Trunkmain - Whitespots	1	Water Infra	3 - Intermediate	23c	£ 3,218,342	£ 9,225,866
1729	Trunkmain - Crescent Link	1	Water Infra	4 - Detailed	05c	£ 1,357,152	£ 3,881,301
1738	Glenmachan Project Phase 2 €" Fane Street	1	Waste Water Infra	1 - Concept	12b	£ 1,872,406	£ 4,334,343
1775	Trunkmain - Fofanny to Alt	1	Water Infra	3 - Intermediate	23c	£ 3,980,366	£ 9,986,655
1932	Glenmachan Project Phase 2 €" Sicily Park	2	Waste Water Infra	1 - Concept	12b	£ 4,625,675	£ 8,598,997
1978	Kinnegar DA - Cluster 1 DO61	1	Waste Water Infra	1 - Concept	12b	£ 4,443,364	£ 6,841,929
1990	Kinnegar DA- 28 & 30 Onslow Parade, 103, 105 & 107 L	1	Waste Water Infra	2 - Preliminary	12d	£ 3,953,972	£ 6,365,758
2008	Belfast DA- Distillery Street CSO WwPS	1	Waste Water Infra	1 - Concept	12b	£ 14,104,648	£ 22,297,263
2047	Edenasop to Killeter SR	1	Water Infra	4 - Detailed	05a	£ 870,828	£ 1,825,432
2211	Newtownbreda DA - Storm Tanks	4	Waste Water Infra	3 - Intermediate	12b	£ 2,387,862	£ 3,299,339
2239	Cookstown DA - Orritor Road CSO	1	Waste Water Infra	1 - Concept	12b	£ 1,410,023	£ 2,722,015
2242	Cookstown DA - Burn Bank CSO	1	Waste Water Infra	1 - Concept	12b	£ 1,417,437	£ 2,736,494
						£ 146,723,463	£ 285,755,553

Appendix E. Jacobs re-costing actual projects using latest cost models

IPAC	CPMR		Project Names	Data Analysis Batch	Recosted PCT (23_24) v7.26	Date of Contractor pricing	inflation to 23/24	Contractor Pricing	ECI costs	Total	Contractor Pricing (23/24)	difference	comments
1186	JA330	112	Altnahinch Treatability Improvements	2	£ 682,486	22/23	1.08	£ 483,997	£ 80,939	£ 564,936	£ 607,569	12.3%	0
1066	KA270	111	Neillsbrook WwPS Upgrade Appraisal	3	£ 824,874	23/24	1.00	£ 845,026	£ 89,000	£ 934,026	£ 934,026	-11.7%	raising existing wet well walls - many special activities not covered by cost curves - £1 cost curve used 50% of project
1358	KB552	112	Ballyronan WwTW	2	£ 4,777,146	22/23	1.08	£ 4,109,833	£ 157,000	£ 4,266,833	£ 4,588,825	4.1%	0
1038	KB556	111	Grange WwTW	4	£ 3,778,571	23/24	1.00	£ 3,923,692	£ 84,000	£ 4,007,692	£ 4,007,692	-5.7%	some double counting of metalwork has been removed in cost curve buildup
2739	KF378	111	Clonmore Road Sewerage	2	£ 815,457	22/23	1.08	£ 598,281	£ 63,000	£ 661,281	£ 711,184	14.7%	2 shafts together with concrete plug between so cheaper than 2 separate shafts
2496	KG183	111	Portadown Drainage Area Network Improvements Meadow Lane and Bann Street	3	£ 7,886,093	23/24	1.00	£ 7,833,116	£ 51,000	£ 7,884,116	£ 7,884,116	0.0%	OK - Cost curve analysis used
2599	KL542	111	Ballymagorry Wwps	3	£ 1,975,343	23/24	1.00	£ 1,870,180	£ 136,000	£ 2,006,180	£ 2,006,180	-1.5%	OK - Large concrete plug - 2m deep and concrete collar on shaft
1338	KN681	111	Pomeroy WwTW	4	£ 2,021,096	22/23	1.08	£ 1,755,446	£ 109,000	£ 1,864,446	£ 2,005,144	0.8%	0
1395	KR730	112	Loughries WwTW	2	£ 737,079	22/23	1.08	£ 564,556	£ 91,000	£ 655,556	£ 705,027	4.5%	0
1775	JV901	113	Fofanny to Alt trunk Main	3	£ 6,089,639	22/23	1.08	£ 5,657,885	£ 181,000	£ 5,838,885	£ 6,279,510	-3.0%	OK - Cost curve analysis used
1	KR588	113	Ravenhill Avenue, Belfast - Sewer Upgrades	2	£ 6,351,902	22/23	1.08	£ 5,827,752	£ 103,600	£ 5,931,352	£ 6,378,955	-0.4%	Scope from detailed analysis
					£ 35,939,686						£ 36,108,228	0.3%	

Appendix F. ChandlerKBS re-costing projects - Industry cost models

Project Code	Project Name	NIW	CKBS Contract Cost	Variance	
1186	Altnahinch WTW	£ 607,569	£ 644,137	£ 36,568	6.0%
1358	Ballyronan WWTW	£ 4,588,825	£ 4,962,043	£ 373,218	8.1%
1064	Clonmore Road WwPS	£ 711,184	£ 1,066,506	£ 355,322	50.0%
1038	Grange WwTW	£ 4,007,692	£ 4,017,422	£ 9,731	0.2%
1395	Loughries WwTW	£ 705,027	£ 746,095	£ 41,068	5.8%
2496	Portadown WwPS	£ 7,884,116	£ 8,849,992	£ 965,876	12.3%
1066	Neillsbrook WwPS	£ 934,026	£ 974,210	£ 40,184	4.3%
1338	Pomeroy WwTW v2	£ 2,005,144	£ 2,021,925	£ 16,781	0.8%
	Ravenhil Sewer upgrades	£ 6,378,955	£ 7,698,937	£ 1,319,982	20.7%
2599	Ballymagorry WwPS	£ 2,006,180	£ 2,097,679	£ 91,498	4.6%
1775	Fofanny to Alt Trunk Main	£ 6,279,510	£ 6,273,919	-£ 5,591	-0.1%
		£ 36,108,228	£ 39,352,864	£ 3,244,636	9.0%