Water & Sewerage Services Price Control 2021-27

Draft Determination – Annex I
Capital Investment
September 2020

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1. Introduction

1.1 This Annex to the PC21 draft determination sets out the Utility Regulator's assessment of the capital investment proposed by NI Water for the PC21 period.

1.2 The provision of water and sewerage services is a capital-intensive business. The network of water mains and sewers extends to 27,000 km and 16,200 km respectively. Water resources, water treatment works, pumping plant and wastewater treatment works require substantial structures, mechanical and electrical plant and instrumentation.

1.3 The company must invest to maintain these assets to ensure improvements in service, support development as well as meet the requirements for drinking water quality and environmental compliance.

1.4 In PC15 the programme of work proposed by the company was constrained by the indicative public expenditure budget stated in the Social and Environmental Guidance issued by DfI to the Utility Regulator under Article 7 of the Water and Sewerage Services (Northern Ireland) Order 2006.

1.5 For PC21 the guidance did not state an indicative budget. Instead it asked the company to "formulate a deliverable investment plan which meets established needs and is affordable from a tariff perspective". NI Water prepared and submitted its Business Plan on this basis. The company's plan envisages capital investment of £1,907m in 2018-19 prices compared to £967m in PC15. It also assumes that the £455m associated with the LWWP will be grant funded and will not impact on tariffs. The company's plan results in real price limits of zero.

1.6 The key challenge of this Business Plan is the increased level of capital investment to address a lack of capacity in the sewerage network which is a cause of development constraints. The need to address these issues is recognised by the quality regulators, the Consumer Council and DfI.

1.7 The plan does not meet all the identified needs as this would not be achievable within a target of zero price limits and taking account of the deliverability of capital spend. The company therefore expects that high levels of investment will be required in at least two subsequent price controls to address issues with the capacity of the sewerage network.

1.8 Notwithstanding the guidance provided by the Department through the Social and Environmental Guidance, it remains the case that NI Water is subject to public expenditure constraints. There is therefore no guarantee that the full capital budget necessary to deliver the plan will be made available in current financial circumstances and in light of other significant demands on the

public purse.

1.9 The company's Business Plan presented a detailed list of sub-programmes and projects including costings, service and purpose allocation and key project milestones. Supporting information in varying degrees of detail were provided in outline Business Cases.

1.10 We have used a range of top down and bottom up approaches to challenge the Business Plan including:

a) A top down econometric assessment of capital maintenance investment using data from comparator companies in England & Wales. A further allowance was included for consequential capital maintenance due to the increased size of the capital programme.

b) A comparison between historical unit costs of delivery and run rates of expenditure for items of work which continue from PC15 into PC21. We expect costs to remain the same or reduce for similar work unless a robust explanation for the increase is provided.

c) A review and challenge of the scope of works or the quantity of activities included in the costings.

d) Applying a general reduction in bottom up cost estimates of 6.7% based on the Reporter's comments on the application of scope and tender to out-turn risk.

e) We have also made some adjustments to the company's allocation of investment by purpose (enhancement / base) and by service. This included a systematic reallocation from infrastructure investment to non-infrastructure investment for service reservoir rehabilitation, metering and ICT.

1.11 The outcome of our analysis is summarised in the table below. NI Water's capital programme was £1,907m before the deduction of grants and contributions. Our draft determination reduces this to £1,681m (-11.9%).

	Investment £m 2018-19 prices		
	NI Water Submission	UR draft determination	Difference
Capital maintenance	763	683	-80
Enhancement expenditure	1144	998	-147
Grants and contributions (excluding LWWP)	-72	-72	0
LWWP grant funding	-455	0	455
Total investment net of contributions	1380	1609	229

Table 1.1: PC21 capex determination summary

1.12 Our assessment of the capital programme is presented in the following sections. These sections follow the key steps in our analysis. We have analysed and reported investment in real terms (adjusted for inflation) using a common price base of 2018-19 prices.

Section 2 Capital Budget

Section 3 Capital Inflation

Section 4 Capital Efficiency

Section 5 Capital Maintenance Investment

Section 6 Individual Sub-programmes of Work

2. Capital Budget

Public expenditure capital budget

2.1 The draft determination includes a gross capital budget of £1,681m in 2018-19 prices. This is equivalent to £1991m in nominal terms.

2.2 Public expenditure capital budget is stated in nominal terms and includes the following adjustments from the gross capital budget to account for:

- Accounting allocations in respect of the Public Private Partnership (PPP) schemes which treat water and wastewater and dispose of sewage sludge under concession arrangements with NI Water; and,
- The capital grants and contributions which NI Water receives in respect of infrastructure charges for new connections.

PPP and IFRS adjustments

2.3 We have accepted the adjustments set out by NI Water for Alpha PPP maintenance, the residual interest in off balance-sheet PPP and the IFRS infrastructure renewals charge adjustment.

Capital grants and contributions

2.4 The company receives capital grants and contributions in respect of new connections including: infrastructure connection charges; connection costs, reasonable cost contributions for requisition and sewer adoption income. These grants and contributions provide a source of income to part fund the associated capital works.

2.5 We have reviewed the company's estimates of capital grants and contributions for PC21 and concluded that they were reasonable. Where appropriate these estimates:

- Were based on the level of development and new connections which were used by the company to estimate the capital costs of new development and connections.
- Reflected recent run rates of grants and contributions amended for estimated rates of future development.

2.6 The capital grants and contributions included in the Business Plan and the draft determination are summarised in Table 2.1.

Source of grants and contributions	£m in PC21
Capital grants and contributions (EU Interreg fund)	0.5
Infrastructure charges	28.1
Other contributions.	43.6
Total	72.2

Table 2.1: Projected grants and contributions in PC21 (2018-19 prices).

2.7 In addition to the capital grants and contributions shown above, the company's Business Plan submission assumed that the capital expenditure linked to Living with Water Programme investment of £455m would be funded by a grant from government. We have determined that the LWWP investment in PC21 can be delivered within a weighted average charge increase of zero. As a result we concluded that it is not necessary to assume that this investment would be off-set by grant funding. It is possible that future investment in subsequent price controls cannot be delivered within stable prices and it may be necessary to make a case for grant funding to off-set part of the capital programme in the future.

Equivalent public expenditure budget for PC21

2.8 The equivalent public expenditure capital budget for the draft determination is set out in Table 2.2.

	21-22	22-23	23-24	24-25	25-26	26-27	PC21
PE capital budget used	214.4	260.7	307.2	384.9	412.9	372.2	1952.3
Alpha PPP maintenance	-2.9	-3.0	-1.1	-1.2	-1.2	-1.6	-11.1
Residual interest in off balance-sheet PPP	-4.1	-4.2	-4.3	-4.3	-4.2	-4.3	-25.5
Capital grants and contributions	13.5	13.7	13.8	14.3	14.5	15.0	84.8
Capital grants and contributions transferred to deferred credits	-1.6	-1.6	-1.6	-1.7	-1.7	-1.7	-9.9
NI Water gross capital budget	219.3	265.6	313.9	392.0	420.4	379.4	1990.6

Table 2.2: Public expenditure budget reconciliation (£m nominal).

3. Capital Inflation

Introduction

3.1 NI Water's capital investment is predominantly funded through public expenditure budgets which are set in nominal terms. The outputs which can be delivered will be affected by inflation which will reduce the real purchasing power of the budget.

3.2 In our PC15 determination process we considered a range of options for projecting capital inflation in the medium term and for monitoring delivery of the capital programme. Following a consultation exercise we concluded that we should adopt RPI as the basis for estimating and adjusting for capital inflation over PC15. We believe that RPI remains the most suitable inflation indicator for projecting capital expenditure and so have continued to use it for PC21.

3.3 In our information requirements for PC21 we asked NI Water to submit the estimates of annual inflation that it had used to convert capital investment between nominal prices and real prices at the 2018-19 baseline. The indices submitted by the company are shown in the table below and these have been used to model capital inflation in our draft determination.

	Base Year 18-19	21-22	22-23	23-24	24-25	25-26	26-27
RPI (year average)	283.308	308.892	318.159	327.703	337.534	347.661	358.090

Table 3.1: RPI indices used to model capital inflation in the determination.

3.4 We will monitor delivery in PC21 using RPI to deflate nominal capital costs. We will adjust the RCV at the end of PC21 using RPI to create an opening balance for PC27.

4. Capital Efficiency

Reporter capex challenge

4.1 Following an audit of the capital programme the independent Reporter prepared a 'Capex balance sheet' which summarised

4.2 The Reporter's summarised the impact of the issues identified in audit by providing impact and confidence level as follows:

- Low potential, high confidence £45m.
- High potential, low confidence £246m.

4.3 Much of the low potential, high confidence adjustments identified by the Reporter relates to two specific capital maintenance (mature compliance and DRRM outputs). We have been able to make specific adjustments to the capital programme to reflect these items.

4.4 The range between the low and high potential adjustments is dominated by the Tender Outturn Risk. The Reporter has concluded that that *the ToR effectively double counts the coverage of risk in the Company's PC21 Capex costing and that there is insufficient justification for including it.* Taking account of the Reporter's comments on Tender Outturn Risk and the confidence, we have reduced the company's cost estimates by 60% of range between the low and high potential adjustments identified by the Reporter. We have applied this reduction across all individual projects in the programme with the exception of capitalised salaries and on-costs. This is the equivalent of a 6.7% reduction to pre-efficiency costs.

4.5 This adjustment has not been applied to items of work which have been determined using historical run-rates and unit rates because the historical costs already account for scope risk and tender to out-turn risk. Nor has it been applied to our determination of capital maintenance expenditure based on econometric benchmarking which already reflects efficient costs.

Capital efficiency

4.6 NI Water's Business Plan included an assessment of capital efficiency for PC21 which considered a range of process and procurement opportunities. The aggregate outcome was an efficiency challenge rising from 1.8% in 2021-22 to 10.1% in 2026-27.

4.7 We have accepted the company's assessment of capital efficiency. We have applied these efficiency adjustments to our profiled pre-efficiency profiled at a project level.

5. Capital Maintenance Investment

NI Water's estimate of capital maintenance investment

5.1 Capital maintenance expenditure is the investment necessary to maintain the serviceability of the existing assets and the level of service the company delivers to consumers. It is an on-going expense which is included in the determined revenue and paid for by today's consumers through charges including subsidy in lieu of domestic charges.

5.2 NI Water's Business Plan included £763.1m of capital maintenance investment in 2018-19 prices. This represents 40% of the total investment of £1,907.6m proposed by the company.

5.3 In our approach to asset maintenance planning for PC21, we identified a range of techniques which are typically used to assess medium to long term asset maintenance needs:

Top down expenditure analysis

a) The projection of historical expenditure;

b) Econometric analysis of expenditure by other companies; and

c) Depreciation approach based on modern equivalent asset valuation.

Asset maintenance outcomes

d) Assessment of historical serviceability trends; and

e) Historical assessment of condition and performance.

Asset maintenance plans

f) Specific asset maintenance plans identifying outputs and expenditure; and

g) Forward looking risk based approach which takes account of how asset serviceability deteriorates over time and analyses the cost of running or replacing the asset to drive a cost effective or cost beneficial asset management plan.

5.4 In its business plan submission the company has made use of:

a) Bottom up cost assessments.

b) Run rate of historical expenditure for activities which will continue in PC21 at or about the same level of investment.

c) A bottom up assessment of asset management need using modelling of deterioration, risk and reliability to develop a risk based assessment of capital maintenance needs and investment.

5.5 While we welcome the development of bottom up risk based methodologies to assess capital maintenance we have concluded that further work is required to have confidence in the outcome of this approach which continues to be subject to management adjustments. As a result, we have continued to use top down techniques to determine capital maintenance investment.

Utility Regulator's assessment of capital maintenance investment

5.6 We have adopted the following approach to determining capital maintenance investment in the absence of a strong case to support the level of increased investment identified by the company:

a) We have reviewed recent trends in serviceability;

b) We have reviewed recent trends in capital maintenance investment;

c) We have completed an econometric assessment of capital maintenance investment, expanding the range of techniques employed to allow us to triangulate to a reasonable determination;

d) We have determined an allowance for consequential base maintenance in light of the increase in the overall capital programme. This will ensure that investment in maintenance which is driven by enhancement expenditure does not distract from general maintenance of the assets driven by need.

e) We have applied an allowance for growth of the asset base and an on-going efficiency adjustment over the PC21 period.

f) Finally we used the detailed challenge to individual sub-programmes to prepare a bottom up estimate of base maintenance and compared this with our top-down assessment.

Serviceability trends

5.7 Serviceability is the capability of an asset to provide a service. It is a broad measure based on a mix of service indicators, asset performance indicators and sub-threshold indicators which balance consumer experience and the underlying performance of the assets. Focusing asset maintenance planning on serviceability, rather than the condition or performance of the assets, will ensure that investment targets consumer outcomes in the short term and the

right level of capital maintenance investment is maintained in the medium and long term.

5.8 Annex F describes our approach to serviceability and provides our assessment of serviceability for PC15. We have concluded that the current trend in serviceability is stable following improvements driven by investment over the last decade (see Figure 1).

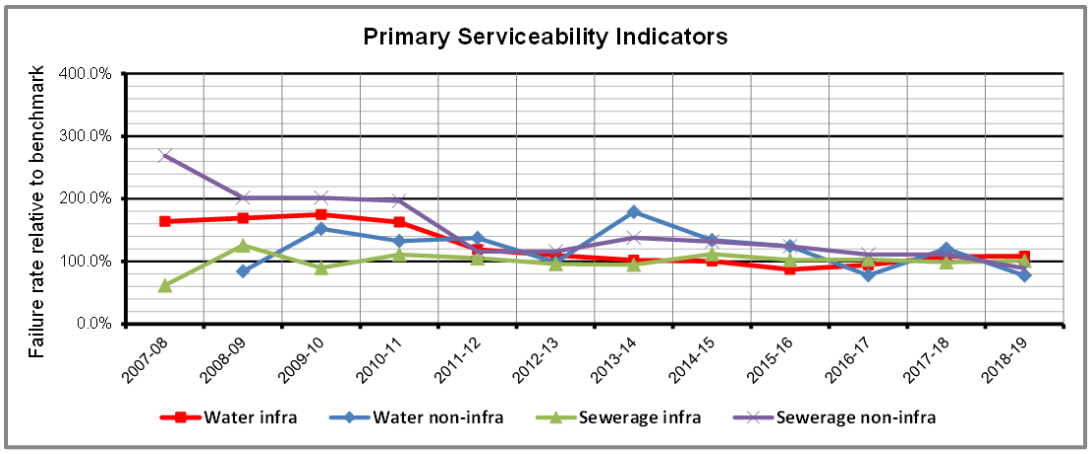

Figure 1: Primary serviceability indicators.

5.9 Because serviceability is stable at present, it is reasonable to assume that capital maintenance investment in the recent past has been adequate for the current asset base. That is not to say that an increase in investment will not be necessary in the future. But it does indicate that a significant stepped increase in investment to maintain the company's existing assets is not warranted.

Assessment of historical spend

Historical capital maintenance investment from 2007-08 is shown in Figure 2. The data has been updated to 2018-19 prices using RPI with a notional adjustment of -0.6% to reflect the long term frontier shift of real price effects and on-going productivity over the long term.

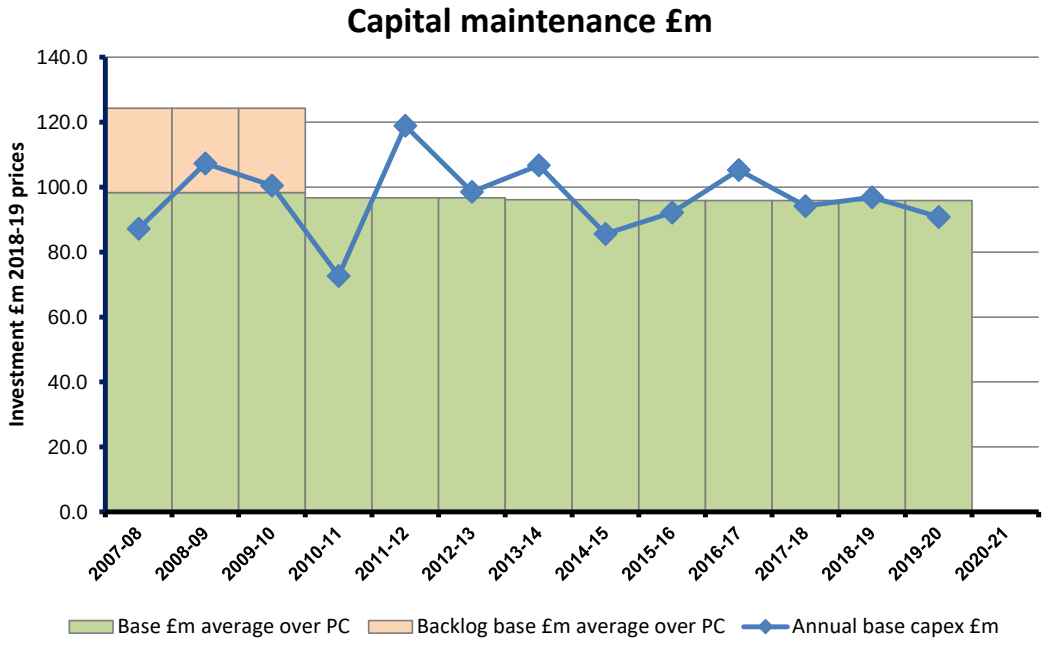

Figure 2: Capital maintenance investment trends (£m 2012-13 prices).

5.10 During the three year Strategic Business Plan period 2007-10, the company allocated some investment to enhancement as 'backlog base maintenance' to improve the assets and catch up on under-investment in previous years. Average investment in real terms over various periods is set out in Table 5.1.

Price Control	Duration		£m
SBP	3 years	2007-10	98.4
PC10	3 years	2011-13	96.7
PC13	2 years	2013-15	96.2
PC15	5 years to date	2015-20	95.9
Long term average 2007-20			96.7
Note: average costs in 2018-19 prices excluding backlog base maintenance in the SBP period			

Table 5.1: Average capital maintenance investment (£m 2018-19 prices).

5.11 We do not draw any strong conclusion from the fluctuation in investment between years or between price control periods. The fluctuation between years is driven by investment decisions within annual budget limits.

5.12 The average rate of capital maintenance has remained broadly consistent in real terms over the medium term. Our broad conclusion is that serviceability has been maintained at an average level of investment of £96.7m per

annum.

Econometric assessment of capital maintenance

5.13 Our determination of capital maintenance expenditure is underpinned by econometric comparison with water and sewerage companies in England and Wales. This work is described in Annex L. We have used the average of the various model costs to establish a benchmark costs for water and sewerage services.

5.14 The detailed econometric assessment set out in Annex L reflects the division of water industry costs by Ofwat into wholesale and retail and the analysis covers wholesale assets only. NI Water remains an integrated provider and includes retail assets. We have used a simple regression of cost from comparator companies in England & Wales using average billed customer numbers as a driver to establish a capital maintenance allowance for retail costs.

5.15 The central estimate and upper quartile cost for NI Water produced by this analysis is summarised in Table 5.2.

Service	Central estimate £m	UQ £m
Wholesale sewerage	51.5	48.7
Wholesale water	46.8	40.3
Retail	2.4	2.4
Total	100.7	91.4

Table 5.2: Econometric benchmark capital maintenance costs (2018-19 prices)

5.16 In the first five years of PC15, NI Water has invested an average of £96.5m in capital maintenance, operating between our central and upper quartile estimate. At the same time, serviceability has been maintained.

5.17 Our draft determination for PC21 asks NI Water to close 80% of the gap to the upper quartile estimate by improving the efficiency of its capital maintenance activities. This requires the company to reduce its costs by £4.0m by the end of PC21.

Consequential capital maintenance

5.18 The concept of “consequential capital maintenance” refers to additional maintenance expenditure which might result from enhancement investment. For example where the improvements to deliver a new standard make it necessary to replace an asset with some residual life, or it is considered

economic to bring forward asset replacement within a single contract to reduce the number of contracts carried out on a site.

5.19 In the past, when we have used econometric comparison to determine capital maintenance expenditure we have not taken account of consequential capital maintenance. The comparator companies we use in our analysis also incur consequential capital maintenance which is included in the benchmark costs. Therefore there should be no reason to adjust for consequential capital maintenance for any specific company.

5.20 However, there has been a material increase in the capital programme for PC21. We have considered whether this might drive consequential capital maintenance and, if it does, how this might be included in the determination.

5.21 Figure 3 shows the relationship between asset maintenance expenditure and the number of consumers for the England & Wales water and sewerage companies which we use to benchmark NI Water's costs. There is a correlation between capital maintenance expenditure and the size of the companies. The scatter of individual annual data reflects management decisions on application of investment in individual years. The data averaged over an 8 year period emphasises the relationship.

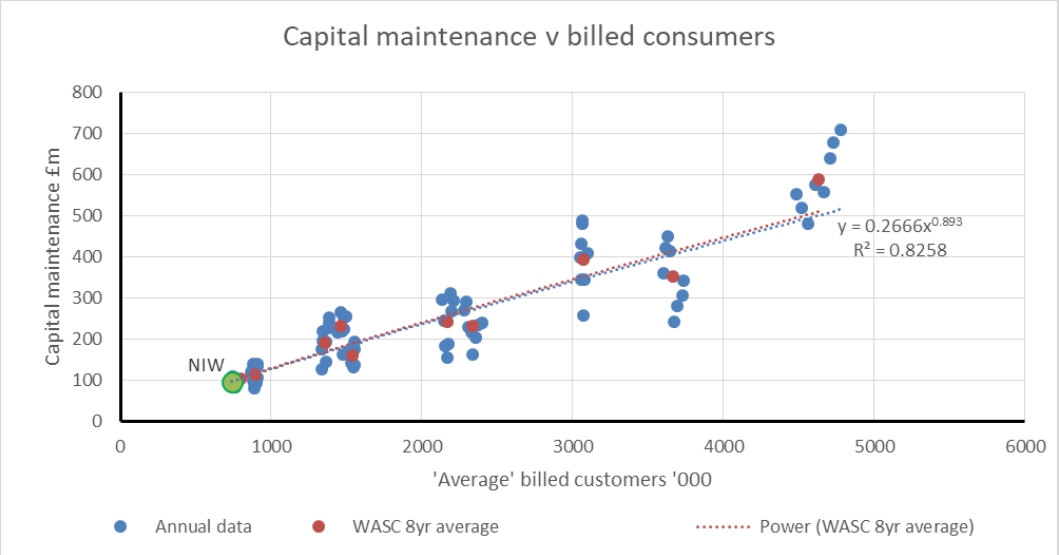

Figure 3: Capital maintenance expenditure of England and Wales WASCs relative to billed customers.

5.22 Figure 4 shows the relationship between capital maintenance expenditure and capital enhancement expenditure for the same companies and includes data for NI Water. The PC21 data point reflects the benchmark level of capital maintenance.

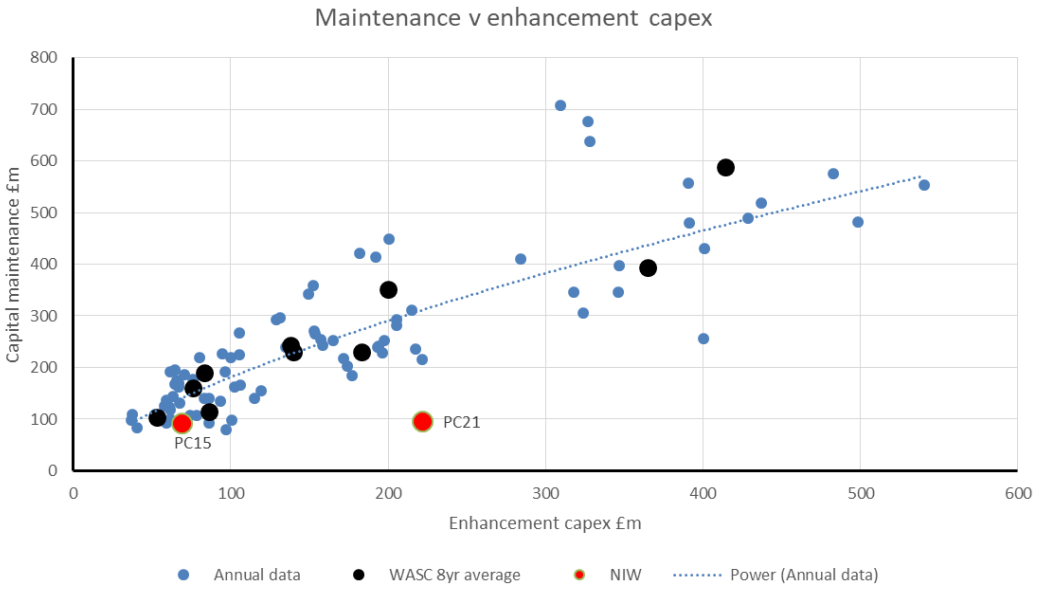

Figure 4: Maintenance capex of England & Wales WASCs relative to enhancement expenditure.

5.23 The data demonstrates that NI Water is an outlier in PC21 in respect of the scale of the capital programme when compared with the companies we use to determine a benchmark level of capital maintenance.

5.24 The parameters we use in the econometric assessment of capital maintenance reflects the scale of the company including number of consumers and quantity of assets and does not include the level of capital investment. This is reasonable in that capital maintenance will relate to the scale of the assets rather than the level of investment today. However, it is also true that the analysis cannot test the concept of consequential capital maintenance associated with the material increase in enhancement expenditure by NI Water in PC21. The close correlation between the scale of investment and the size of the comparator companies means that any level of consequential capital maintenance is already explained by the size of the company.

5.25 In the case of NI Water, we recognise that the increased capital investment in PC21 is associated with an increase in the number of relatively large enhancement projects in sewerage, wastewater and trunk mains. Without these projects the company's capital programme would be proportionate to the scale of capital investment of the comparator companies and it would not be necessary to consider consequential capital maintenance. However, the company has identified capital maintenance associated with these larger enhancement projects. To set a benchmark rate of capital maintenance only would require the company to fund the capital maintenance on these large enhancement projects by diverting funds from other essential maintenance

works. We therefore consider it appropriate to allow an additional sum to cover the capital maintenance associated with these major enhancement projects which will be added to the benchmark level of capital maintenance. Separating out these projects leaves a general programme of work which is proportionate to that carried out by other comparator companies which is adequately covered by the benchmarked capital maintenance.

5.26 We determined a reasonable sum for consequential capital maintenance by inspection of the company's capital programme, identifying sub-programmes of work where there was a major increase in capital maintenance expenditure since PC15, particularly those with increased enhancement activities. The programmes considered in this analysis and our allocation to consequential capital maintenance is summarised in the following tables:

- Table 5.3: Total capital investment considered in the consequential capital maintenance assessment identifies the sub-programmes considered in our analysis and identifies the increase in total expenditure.
- Table 5.4: Capital maintenance investment considered in the consequential capital maintenance assessment identifies the increase in capital maintenance in these sub-programmes and the consequential base maintenance allowance included in the draft determination.

		Total capital investment £m		
		PC15	PC21	Increase
	Business Plan submission	962.6	1907.6	944.9
00	Capitalised salaries and on-costs	83.8	121.8	38.0
01	Capital maintenance (water)	44.0	70.9	26.9
02	Capital maintenance (sewerage)	136.7	180.3	43.6
05	Water trunk mains	13.0	50.6	37.6
12	Sewerage programme	120.9	220.4	99.5
12	Sewerage programme (LWWP)	1.1	182.8	181.7
16	Wastewater treatment	81.3	208.5	127.2
16	Wastewater treatment (LWWP)	4.8	266.4	261.6
20	Management & General	75.4	167.7	92.3
	Sub-programme total	561.0	1469.3	908.3

Table 5.3: Total capital investment considered in the consequential capital maintenance assessment

5.27 The selected sub-programmes considered in this analysis explain 96% of the increased expenditure in PC21 compared to PC15.

		Total capital investment £m			
		PC15	PC21		Increase
	Business Plan submission	553.7	763.1	209.4	
00	Capitalised salaries and on-costs	47.9	60.9	13.0	7.8
01	Capital maintenance (water)	31.3	60.4	29.0	14.5
02	Capital maintenance (sewerage)	128.3	163.7	35.4	0
05	Water trunk mains	0.0	3.0	7.9	7.9
12	Sewerage programme	51.6	57.4	5.9	5.9
12	Sewerage programme (LWWP)	0.0	16.9	16.9	16.9
16	Wastewater treatment	21.7	40.1	18.4	18.4
16	Wastewater treatment (LWWP)	0.7	47.2	46.5	46.5
20	Management & General	59.6	92.8	33.2	0.0
	Sub-programme total	341.1	542.4	206.1	117.8

Table 5.4: Capital maintenance investment considered in the consequential capital maintenance assessment

5.28 We have reduced the consequential capital maintenance allowance identified above by 6.7% in line with the general reduction in capital investment in response to the Reporter's cost challenge. We have allowed £109.9m of consequential capital maintenance in our determination, an annual average of £18.3m subject to on-going efficiency described below. We have profiled the increase in our determination to reflect the profile of additional work in the relevant sub-programme. Further commentary on the individual sub-programme adjustments are included below:

- Capitalised salaries and on-costs. We have allowed 60% of the increase identified by the company in line with our adjustment to the increase in staffing levels for this sub-programme.

- Capital maintenance (water). In principle it is for the company to determine the allocation of general capital maintenance investment and we would expect changes in the allocation of capital maintenance between individual sub-programmes between price controls. However, we recognise the work that has been undertaken by the company through its DRRM modelling to establish capital maintenance need and the need to secure compliance at water treatment works. While the DRRM modelling is not yet secure, we have allowed 50% of the capital maintenance increase identified by the company as consequential capital.

- Capital maintenance (sewerage). Much of the increase in capital maintenance expenditure relates to £33m linked to mature compliance which the Reporter has challenged. We have not included this in our assessment of consequential capital maintenance.

- The stepped increase in trunk mains work to improve supply resilience comes with an increased level of capital maintenance which we have included as consequential capital.

- The sewerage and wastewater treatment programmes see the largest increases in expenditure in PC21 as the company seeks to address capacity issues which are the cause of development constraints. The associated increase in capital maintenance has been included as consequential capital maintenance.

- The company has included a stepped increase in management and general expenditure in PC21 with associated increase in capital maintenance. The capital maintenance activities included in the company's assessment are to maintain its existing assets and facilities something which is common to the comparator companies used in our econometric benchmarking. As these activities are adequately covered in the benchmarking we have not allowed the increase in costs from PC15 as consequential capital maintenance.

Adjustment for growth and on-going efficiency

5.29 Because we have included an upper quartile estimate in our triangulation of capital maintenance expenditure, we have not applied any further catch-up efficiency

5.30 The benchmark costs are assessed on historical costs. It is reasonable to assume that the continuing increase of the network will increase costs in the future. We also expect the company to deliver an on-going efficiency for PC21 which is represented by the capex frontier shift identified in Annex K.

5.31 We have used a comparative analysis of the capital maintenance costs of GB companies against number of billed consumers to establish a scaling factor for capital maintenance costs in PC21 as shown in Figure 3 above.

5.32 Applying this scaling to the benchmarked 2018-19 costs would result in a 5% increase in the PC21 period. However, when the frontier shift is applied, this reduces to an average increase over PC21 of 1.2%.

Summary assessment of capital maintenance.

5.33 Our assessment of capital maintenance is summarised below:

	£m/a
NI Water current capital maintenance expenditure	96.5
Upper quartile econometric estimate	91.4
Target cost at the end of PC21 after closing 80% of the gap to UQ	92.4
Average expenditure over PC21 (average current and target)	94.4
Adjusted for growth net of frontier shift (+1.2%)	95.6
Add consequential capital maintenance allowance	18.3
Determined average capital maintenance for PC21	113.9

Table 5.5: Draft determination of capital maintenance expenditure

Alternative Botex approach

5.34 In its Business Plan NI Water express concern about the use of econometric comparison with England and Wales water and sewerage companies to determine base maintenance given that companies are regulated on the basis of total spend. In this regime companies are incentivised to identify the best mix of capital maintenance and operational expenditure (botex) to minimise overall costs. This could result in some companies accepting higher operational costs to reduce capital maintenance expenditure while others might increase capital maintenance expenditure to reduce operational costs. The company was concerned that this might distort our econometric comparison of capital maintenance costs which is only one part of the overall cost base.

5.35 To address this we commissioned an economic comparison of total capital maintenance and operating costs as part of our overall econometric assessment. The results of this analysis are reported in Annex L. There was a close comparison of the econometric botex models and the separate opex and capital maintenance models. Our consultant concluded that *the similarity in average predicted costs between the two approaches is sufficient to support the conclusion that the disaggregated opex and capital maintenance models are consistent with the botex model results.*

5.36 Our conclusion is that NI Water has sufficient funds in the determined opex and capital maintenance to continue to deliver. However, we would welcome any proposals from the company to change the mix of capital maintenance and operational expenditure in a way which would reduce overall costs while delivering the same or improved service to consumers.

6. Individual Programmes of Work

Introduction

6.1 In this section we provide a more detailed commentary on the programme and the level of investment proposed by NI Water for PC21.

6.2 Our assessment of the programme is presented by sub-programme. These sub-programmes provide a practical sub-division of the overall investment plan based on similar types of assets, similar purpose of the investment and NI Water's management of the programme. It provides an aid for understanding.

Our approach to assessing capital cost estimates

6.3 We have used a range of top down and bottom up approaches to challenge the Business Plan and assess whether it has been reasonably costed. These include:

a) A top down econometric assessment of capital maintenance investment using data from comparator companies in England & Wales. A further allowance was included for consequential capital maintenance due to the increase size of the capital programme.

b) A comparison between historical unit costs of delivery and run rates of expenditure for items of work which continue from PC15 into PC21. We expect costs to remain the same or reduce for similar work unless a robust explanation for the increase is provided.

c) A review and challenge of the scope of works or the quantity of activities included in the costings.

d) Applying a general reduction in bottom up cost estimates of 6.7% based on the Reporter's comments on the application of scope and tender to out-turn risk.

e) We have also made some adjustments to the company's allocation of investment by purpose (enhancement / base) and by service. This included a systematic reallocation from infrastructure investment to non-infrastructure investment for service reservoir rehabilitation, metering and ICT.

6.4 The 6.7% adjustment based on the Reporter's comments relates to concerns over the level of risk allocated by the company when costing schemes. This resulted from the inclusion of material allocations for both scope and tender to outturn risk. The Reporter produced a Capex Balance Sheet which

indicated a broad range of potential over-estimation up to around £200m. . We are aware that in its engagement with the Reporter, the company acknowledged that there may have been an element of overestimation in its risk allocation, but maintained that this is likely to have been small.

6.5 The specific reviews of individual sub-programmes undertaken for the draft determination has identified that they were generally over-estimated. In some cases materially. This supports the Reporter's conclusions and so we have based our generic adjustment on the application of 60% of the potential overestimation identified.

6.6 We have only applied this adjustment in cases where we have not undertaken specific assessments on projects or programmes of work. Where our draft determination cost assessments are based on historic run rates of expenditure, or historic unit costs applied to projected activity levels, it has not been applied.

6.7 For the final determination we will continue to explore further opportunities to replace this adjustment with specific assessments. We will also use the overall findings from the specific assessments to judge the scale of any remaining generic adjustment to be applied.

6.8 Prior to publishing our draft determination we engaged with the company on a number of our sub-programme assessments to explain the rationale that had been applied and the outcome of the process. We plan to continue this engagement in the period between the draft and final determination as we develop our programme assessments further.

Sub-programme 00 – Capitalised salaries and on-costs

Background

6.9 NI Water incurs internal costs to manage the delivery of its capital programme which include costs of staff and internal support facilities. These salaries and on-costs are capitalised in the company's accounts and form a necessary part of the overall capital investment.

6.10 In Table 3.3 of its business plan, NI Water identified capitalised salaries and on-costs separately from the individual projects and programmes of work in its capital investment plan. We have followed this approach in our assessment of the capital investment submission.

6.11 NI Water has identified the need to increase the number of staff and costs to manage an expanded capital programme. The company's proposals show costs increasing from an average of £14.2m per annum in the last three years of PC15 to an average of 20.7m in PC21 (an increase of 45%

compared to an increase in the overall capital programme of 96% compared to the average over the last three years of PC15).

Assessment of NI Water's proposed investment

6.12 NI Water expects capitalised to increase from 277 in PC15 to 376 in PC21, an increase of PC21.

6.13 The unit rates for capitalised staff in PC15 and PC21 are calculated below.

	Nr	Cost £m	Unit rate £k/a	Change
PC15	277	14.22	51.34	
PC21	376	20.31	53.99	5.2%

Table 6.1: Units rates for capitalised salaries and on-costs

6.14 We have used average rates for capitalised staff in PC15 to determine costs for additional staff in PC21.

6.15 The company provided a statement of additional staff in PC21 by various categories. We have reviewed this

Category	Additional staff		Commentary
	BPS	DD	
ADD - Integrated Capital Delivery	32	25	Much of the additional work takes the form of major projects. Noting the allowance for consultancy design and project management we have allowed a reasonable level of additional resource to manage the project.
ADD - Integrated Environmental Modelling	3	3	Integrated Environmental Management provides the opportunity to investigate integrated catchment solutions which could provide better solutions at a lower cost. We support the addition of a central catchment team responsible for maintaining integrated catchment information and acting centre of expertise for integrated catchment management.
ADD - Living with Water Programme	7	7	The additional resource necessary to develop and deliver LWWP as a core management team with external liaison and stake holder management.
ADD - CPMO	16	4	We expect NI Water to already have a strong commercial approach to managing its existing programme and the works and have in place the necessary processes to deliver its programme of work efficiently. This should already include risk and value management, cost management and the management of contractors and consultants. While the company may wish to amend its management processes, these are not necessarily additional. We have included additional project management staff necessary to deliver the project work above and expect these staff to undertake risk management and contract management supported by the external project managers priced into the project costs. The company may wish to centralise some of these staff to improve efficiency in delivery.

Category	Additional staff		Commentary
	BPS	DD	
ADD - Strategic Client	11	8	The maintenance of asset information and costing systems is undertaken by the water and sewerage companies we use to benchmark NI Water's base maintenance. We have not allowed further resource to maintain these systems. The additional costs of modelling works have been identified as separate investment lines. We have allowed 3 additional staff to manage the increased level of activity in conjunction with the expended project management team included above. The company has asked for a core team of 5 to manage the ORA process and drive efficiency. We expect the ORA process to be undertaken by the project management team included above with a core team responsible for developing and maintaining the process. We have allowed for a core team of 2. We have allowed for 3 additional staff working on asset management data and development of asset management techniques.
ADD - Asset Lifecycle Planning	10	3	The capital maintenance element of the programme has not increased materially. The increase in capital maintenance is driven by consequential base maintenance on identified projects on the wastewater programme and should not require additional resource other than that identified above for project management. The maintenance of capacity and demand planning is part of the normal functions of a wastewater company and is inherent in the operational and base maintenance benchmarking we undertake to set and other base maintenance activities are inherent in the benchmarking we undertake to establish base maintenance costs.
ADD - Drinking Water Regulation, Analytic Services and SCAMP	10	2	The company has identified a range of risk and activities relating to water quality and water abstraction which it expects to increase in PC21. These are general activities which have been undertaken in PC15 and there is no expectation of an increase in PC21. Business as usual activities are included in the benchmark costs for operations and base maintenance. The cost of resources to manage the transitional works on the Analytical Services laboratories are included in the relevant project. Mature compliance costs have been included in opex. An additional 2 FTE have been included to support SCAMP and sampling activities.

Category	Additional staff		Commentary
	BPS	DD	
ADD - Finance & Regulation Directorate	4	3	We accept that the increased capital programme will increase the demand on financial resources to address the increased capital programme. We have allowed three additional staff.
ADD - Customer Services Directorate	6	5	We recognise the need for CSDD staff to be involved in the development and implementation of projects and that this need will increase as the number and scale of projects increase. Increased investment can be explained by circa 150 major projects concentrated in the water and wastewater sectors. We have allowed 5 additional staff.
Total	99	60	

Table 6.2: Assessment of capitalised salaries and on-costs

6.16 We consider the overall allowance for 60 additional staff to manage the increased capital programme to be reasonable.

Sub-programme 01 – Base maintenance (water)

Background

6.17 This sub-programme identifies funding for general capital maintenance expenditure required for water non-infrastructure assets that is not covered in other programmes of work. This expenditure is intended to secure the operation of these assets and the service that they provide. The investment included in the company's submission for this element of the sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
PSCEMD Audit Outputs	1.538	1.435	-0.103	-6.7%	57%
SR Rehab Programme of Works - Control Panel Replacement	2.413	1.682	-0.730	-30.3%	100%
WTW Treatability Studies to inform PC27	0.480	0.448	-0.032	-6.7%	100%
Dorisland Aqueduct replacement	1.401	1.308	-0.094	-6.7%	100%
WTW Base Maintenance	35.000	31.513	-3.488	-10.0%	90%
Raw Water PS Base Maintenance	1.221	1.139	-0.082	-6.7%	90%
WPS and WBS Base Maintenance	7.099	6.624	-0.476	-6.7%	90%
Chlorine Station Base Maintenance	2.193	1.134	-1.059	-48.3%	100%
Chemical and Sludge Tanks - Water	6.556	6.116	-0.439	-6.7%	100%
Faughan Weir Gates	1.000	0.933	-0.067	-6.7%	100%
PSCEMD Base Maintenance	7.720	7.203	-0.517	-6.7%	90%
iCAT for IOC - iSR Completion of PC15 Scope	0.969	0.904	-0.065	-6.7%	80%
iCAT for IOC - Completion of Gravity iSR's (mostly North Antrim) excluded from PC15 programme	0.485	0.452	-0.032	-6.7%	80%
iCAT for IOC - Installation of iWPS (Intelligent Water Pumping Stations)	5.123	4.780	-0.343	-6.7%	80%
Total	73.198	65.670	-7.528	-10.3%	90%

Table 6.3: Investment in base maintenance (water)

Base maintenance at WTWs, RWPS and WPS

6.18 The company has assessed its base maintenance requirements at water supply non-infra structure sites (water treatment works, raw water pumping stations and water pumping stations) using a Deterioration Risk and Reliability model. This was developed recently and has been used for investment planning for the first time in PC21.

6.19 This type of model uses an understanding of past failures, and the attributes of those assets that have failed, to build statistical relationships which are then used to predict when asset failures are expected to occur in the future. This forms the basis for assessing the level of repair and replacement activity required throughout the planning period and beyond.

6.20 The introduction of this type of assessment is a positive development. However it is noted that it is in the early stages of implementation and that confidence in the outputs will need to develop over time through utilisation and validation. These issues were highlighted by the Reporter in his review of the submission, including the need for the company to maintain a greater focus on data quality and output validation moving forward.

6.21 The base maintenance funding for water treatment works, raw water pumping stations and water pumping stations has largely been allowed in the draft determination. We deducted around £1.2m from the water treatment works budget to account for duplication of expenditure with the chemical and sludge tank programme (as identified through the Reporter's audit) and with base maintenance expenditure work included in sub-programme 04 (as identified through our query process). We then applied the generic Reporter adjustment to establish our pre-efficiency allowance.

PSCEMD expenditure

6.22 The Preservation of Services and Civil Emergency Measures Direction requires NI Water to secure water supply assets to preserve services and mitigate the effects of a Civil Emergency. DfI is the competent authority in respect of PSCEMD. It directs NI Water in relation to requirements and annual audits to assess compliance are undertaken by an approved external Certifier.

6.23 The company has submitted two 'water' PSCEMD business cases for PC21:

- ‘PSCEMD Audit Outputs’ covers the work required to address issues identified through the external certifier’s annual audit. It includes upgrades to security measures at chlorine gas storage facilities at service reservoir as well as the replacement of static tanks which have reached the end of their useful life.

- ‘PSCEMD Base Maintenance’ covers work identified by a consultant who was commissioned to carry out a review of the electronic and physical security measures, and communication links across NI Water’s clean water asset base. This was undertaken on a sample basis and the findings extrapolated to other sites. NI Water has categorised 59% of this work as enhancement

6.24 To establish the extent of work required in PC21, we engaged with DfI, as the competent authority.

6.25 DfI confirmed that the work identified by the external certifier is necessary. The costs in the ‘PSCEMD Audit Outputs’ business case have therefore been allowed subject to the generic Reporter adjustment. We have also checked and confirmed that the base/enhancement split reflects the breakdown of the investment proposed.

6.26 It is DfI’s opinion however that once the issues raised by the external certifier have been addressed, NI Water will have upgraded all sites in line with the requisite security guidance and advice notes. It is therefore reasonable to assume that the majority of any further work identified in the ‘PSCEMD Base Maintenance’ business case would be maintenance work required to ensure that the security provisions already installed are maintained and continue operate effectively. For the purposes of the draft determination we therefore changed the base maintenance allocation from 41% to 90%. This aligns with the allocations submitted by the company for the WTW, raw water pumping station and water pumping stations elements within the sub-programme.

6.27 We had asked NI Water to review the purpose allocation for this expenditure based on our concerns and received a response at the time of writing. The company’s response indicates that it believes the base maintenance allocation should be 64%. We have not been able to consider the supporting evidence provided by the company in the time available but will do so for the final determination.

6.28 We also remain concerned about the scale of the expenditure identified, particularly when many sites have recently been upgraded and are subject to annual audits by the external certifier. The consultant’s findings are potentially sensitive to the particular sites chosen for the sample audit and so we plan to review the detailed cost estimates and their extrapolation further

for the final determination.

Service Reservoir control panel rehabilitation

6.29 NI Water included a project for the replacement or refurbishment of 52 control panels at service reservoirs which are beyond their useful life. This work is necessary to maintain security of operation and supply. When we queried this expenditure, NI Water advised that the scope of work included in the original business case was incorrect. In its response the company resubmitted a lower cost estimate which has been allowed subject to the generic Reporter adjustment. This has resulted in a 30% reduction in costs from those submitted in the business plan.

WTW treatability studies

6.30 NI Water plans to carry out treatability studies at 12 sites to inform investment requirements for PC27 at estimated a cost of £40k per site. This is largely reflective of expenditure in PC15. NI Water has advised that this is the start of a cycle of undertaking treatability studies at 50% of WTWs in each regulatory price control period.

6.31 We recognise the need to review the effectiveness of treatment at water treatment works to ensure that the assets are maintained and emerging risks are identified and addressed. Therefore we have included the investment proposed by the company in the draft determination subject to the generic Reporter adjustment.

6.32 We expect the company to agree the prioritisation, timing and scope of the proposed studies with the Drinking Water Inspectorate (DWI). The company should plan this work to ensure that DWI has adequate information and sufficient time to assess the proposals in advance of it submitting its business plan for PC27. This did not occur for PC21 despite us including similar requirements in our PC15 final determination and this has had a direct impact on our ability to conclude on water treatment works investment in our draft determination.

Instrumentation, Control, Automation and Telemetry (ICAT)

6.33 NI Water has included 3 projects covering the investment required to upgrade instrumentation, control automation and telemetry at water distribution sites. This work standardises designs and facilitates automated remote control by using the telemetry system to interface between the corporate sections of the business and operational sites.

6.34 During PC21 the company plans to complete work at gravity service reservoirs sites which commenced in PC15 and extend the programme to 57

water pumping stations.

6.35 We recognise the benefits that ICAT functionality can deliver in terms balancing storage, improving resilience, 'calming' the network and improving efficiency of operation. We have therefore allowed the budget subject to the generic Reporter adjustment.

Chlorine station base maintenance

6.36 The company has inspected 83 chlorine dosing and/or chlorine analysis assets at service reservoir sites to establish condition assessments and the investment interventions required. The integrity of these assets is important due to the potential health and safety implications of failure.

6.37 Our assessment identified a potential overlap between the planned remedial work in this programme and that identified in the PSCEMD projects. The company confirmed that this was the case and reduced the submission accordingly. We have applied the generic Reporter adjustment to this lower estimate resulting in a pre-effciency allowance which is around 50% lower than the submission.

Chemical and Sludge Tanks – Water

6.38 This project covers the proactive replacement or refurbishment of chemical and sludge tanks at 18 water treatment works based on condition assessments. It includes for the supply and installation of bunded bulk chemical storage tanks (including PVC fill pipework, valves, fittings and support brackets where necessary). For the purposes of the draft determination we have allowed this budget subject to the generic Reporter adjustment.

6.39 For the final determination we will seek further evidence that there is no overlap of expenditure between this and other investment areas, such as water treatment works base maintenance and investment at water treatment works included under sub-programme 04.

Other asset replacement projects

6.40 The company has included 2 further projects covering work required at the Dorisland Aqueduct and Faughan Weir gates. These are key operational assets in need of replacement and the pre-efficiency budget has been allowed subject to the generic Reporter adjustment.

Sub-programme 02 – Base maintenance (sewerage)

Background

6.41 This sub-programme identifies funding for general capital maintenance expenditure required at wastewater non-infrastructure assets that is not covered in other programmes of work. This expenditure is intended to secure the operation of these assets and the service that they provide. The investment included in the company's submission for this element of the sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
WWTW Base Maintenance	140.000	99.831	-40.169	-28.7%	90%
WWPS Base Maintenance	30.000	27.990	-2.010	-6.7%	90%
Chemical and Sludge Tanks - Wastewater	13.549	12.642	-0.908	-6.7%	100%
Lisburn WWTW - Control Panels and Primary Tank Scrappers	1.998	0.000	-1.998	-100.0%	90%
Health & Safety - Assessment of GRP Flooring	0.999	0.932	-0.067	-6.7%	100%
Total	186.547	141.395	-45.152	-24.2%	91%

Table 6.4: Investment in base maintenance (sewerage).

Assessment of base maintenance (sewerage) investment

WwTW and WWPs Base maintenance

6.42 NI Water initially assessed its base maintenance requirements for wastewater treatment works and wastewater pumping using its new Deterioration Risk and Reliability model. This was similar to the approach adopted for the clean water base maintenance sub-programme 01. The company however reverted to alternative approaches in its submission due to concerns over the level of expenditure being predicted by the model.

6.43 NI Water has based its WwTW base maintenance requirements on PC15 run-rate expenditure and then uplifted this figure by £33m for investment to address risks associated with the implementation of a 'mature' compliance model in the future by NIEA (i.e. unannounced final effluent regulatory

sampling). We have removed the £33m related to mature compliance based on the Reporter's recommendation. The Reporter's recommendation is based on the fact that the estimate is high-level and lacking in clear rationale to explain and justify the cost, risk and base maintenance allocation assumptions. The generic Reporter adjustment was applied to the remaining budget to determine the pre-efficiency PC21 allowance. This resulted in a figure which was just under 30% lower than the company submission. Whilst we have removed the mature compliance element for the draft determination, we are prepared to consider this further if the company can provide a well-founded plan which clearly demonstrates that the investment will secure compliance in the longer term.

6.44 The company's wastewater pumping station asset submission based on a unit cost of £23k per site. We have accepted this figure and applied the generic Reporter adjustment to determine the pre-efficiency allowance for PC21, but will test the derivation of the unit rate further for the final determination.

Chemical and Sludge Tanks – Wastewater

6.45 This project covers the proactive replacement or refurbishment of chemical and sludge tanks at 27 wastewater treatment works >10,000PE and 141 wastewater treatment works <10,000PE. The requirements for sites >10,000PE were determined through individual site surveys to assess the condition of the assets. The requirements for sites <10,000PE were determined through the extrapolation of the findings from assessments undertaken at a sample of 12 sites.

6.46 For the purposes of the draft determination we have allowed the pre-efficiency budget subject to the generic Reporter adjustment. For the final determination we will seek further evidence that there is no overlap of expenditure between this and other investment areas, such as wastewater treatment works base maintenance and specific investment at wastewater treatment works included under sub-programme 16.

Lisburn WWTW - Control Panels and Primary Tank Scrappers

6.47 This project is for the replacement of end of life assets which have associated health and safety and reliability issues. The company indicates that this project was extracted from the general water treatment works allocation due to the bespoke nature of the work. The Reporter has reviewed the company's approach and indicated that it is sensible considering the specific nature of the work involved. The submitted costs have therefore been included subject to the generic Reporter adjustment.

Health & Safety - Assessment of GRP Flooring

6.48 This project is for the phased replacement of Fibre-Reinforced Polymer (FRP) walkways on a priority basis. These are no longer deemed suitable following the receipt of a number of health and safety alerts. Requirements have been identified through visual condition assessments at 126 sites carried out by a consultant on behalf of NI Water. The visual inspections have been supplemented by some limited sample tests. Due to the potential H&S implications, costs have been allowed subject to the generic Reporter adjustment.

Sub-programme 03 – Water resources and Supply Resilience

Background

6.49 This sub-programme covers how NI Water manages its responsibilities upstream of its water treatment works and assesses how best to maintain the balance between the supply and demand for water over the long term.

6.50 It contains 5 projects. The investment included in the company's submission for each element of the sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
WR & SR Plan Review	0.623	0.581	-0.042	-6.7%	0%
Inspections	7.784	7.108	-0.718	-9%	60%
SCAMP	5.116	4.773	-0.343	-6.7%	100%
Abstraction Monitoring	3.362	3.136	-0.225	-6.7%	96%
Mourne Wall Restoration	2.308	2.308	0.000	0%	100%
Totals	19.193	17.907	-1.286	-6.7%	85%

Table 6.5: Investment in Water resources and Supply Resilience

Water Resources and Supply Resilience Plan

6.51 NI Water has a statutory requirement to produce a water resources and supply resilience plan. The plan sets out how the company will maintain the balance between supply and demand for water over the long-term. The plan takes into account changes in population, housing, water usage and incorporates any predicted changes to our climate. It considers how water supplies would be maintained during an average dry year as well as during

critical periods such as severe winters, drought and also includes a drought plan.

6.52 Historically, NI Water revised its plan on a 5 year cycle but has moved to a 6 year cycle to align with regulatory price controls following legislative changes. This allows NI Water to incorporate the investment interventions identified in the water resources and supply resilience plan into its price control business plan submission.

6.53 As NI Water have a duty to produce the WR & SR plan, we have allowed the requested amount less the generic reporter adjustment of 6.7%

Reservoir inspections

6.54 The GB Reservoirs Act 1975 includes an inspection regime for "large raised reservoirs". The Reservoirs (Northern Ireland) Act is likely to be brought into effect during PC21 and will mirror the requirements of the GB legislation. This will make the inspection and maintenance of controlled reservoirs mandatory.

6.55 Despite the lack of local legislation NI Water has been acting in the spirit of the GB legislation for some time and has been carrying out "All Reservoir Panel Inspections" at its impounding reservoirs. All 45 impounding reservoirs were inspected during PC15 and these inspections have generated a list of works to be executed during PC21. Due to changes in legislation, 41 large service reservoirs capable of holding in excess of 10,000m^3 will also have to be inspected moving forward. The frequency of inspection is 10 years.

6.56 The funding requested by NI Water is to cover:

a) Work generated from PC15 inspections (£6.060m).

b) Anticipated cost of works generated from inspections of 41 service reservoirs (£1.000m).

c) Inspection of 45 impounding reservoirs and 20 service reservoirs during PC21 (£0.475m).

d) Retention of Supervising Engineer (£0.460m)

6.57 This work is driven by legislative requirements and is necessary to ensure the safety and integrity of these critical assets. In determining our pre-efficiency allowances we have:

- Allowed for the PC21 work generated by the PC15 inspections and the anticipated cost of works generated from inspections of 41 service

reservoirs less the generic Reporter adjustment.

- Allowed 50% of the funding for PC2 impounding reservoir inspections subject to the generic Reporter adjustment. We have reduced this allowance as only a limited number of impounding reservoirs require inspection during PC21 period based on the 10 year inspection cycle. The provision of this level of funding will allow 50% of inspections to be undertaken and for the company to start to 'smooth' the profile of inspections over forthcoming price control periods.

- Allowed all of the SR inspections less the generic Reporter adjustment as no inspections have been undertaken at these sites previously.

- Allowed the funding for the retention of a Supervising Engineer less the generic Reporter adjustment.

SCAMP

6.58 Sustainable catchment management planning (SCAMP) covers a broad range of activities in upstream catchments which aim to redress degradation of the landscape which can accelerate run-off and reduce water quality. Typical examples of activities are: working with farmers to reduce pesticide run-off; slowing run-off from peat bogs; managing fire risk on heather and managing livestock to reduce contamination of water courses. As a major owner of upland catchment, SCAMP provides NI Water with a framework for responsible and sustainable management of, landscape, biodiversity and heritage.

6.59 NI Water completed catchment management plans for all its 'live' catchments in PC15. At the start of PC21 there will be 23 active catchment management plans in place and the company plans to progress from planning to implementation of solutions to contribute to achieving SCAMP objectives based on a detailed list of costed activities.

6.60 We consider this an important focus for the company, with the potential to deliver real benefits to consumers and we have included the proposed investment subject to the generic reporter adjustment of 6.7%.

Abstraction Monitoring

6.61 NI Water abstraction licences will be reviewed by NIEA to ensure compliance with the Water Framework Directive. It is likely that new licences will require a greater detail of monitoring (flow) within the catchment and will have greater need for environmental measures to be introduced.

6.62 During PC15 NI Water undertook surveys on all abstraction points to

determine what additional monitoring arrangements would be needed to achieve NIEA's revised abstraction licence standards. A plan has been developed for implementation during PC21 in consultation with NIEA which involves installation of flow and quality monitoring equipment at a number of abstraction points and water treatment works on a priority basis.

6.63 NI Water needs to have a monitoring programme in place, as agreed with NIEA, to enable it to receive revised abstraction licences and meet the WFD requirements. We have, therefore, allowed the requested amount in full less the generic reporter adjustment of 6.7%

Mourne Wall Restoration

6.64 The Mourne Wall is a dry stone wall built around a section of the Mourne Mountains for the purposes of keeping livestock away from the impounding reservoirs in the area. The wall was constructed between 1904 and 1922 and is now a listed building meaning it falls under the 'Protocol for the Care of the Government Historic Estate'. Over time, and due to human interference, there are numerous sections of the wall which have collapsed or are on the verge of collapse.

6.65 NI Water has undertaken a detailed inspection of the wall and has identified a budget of (£2.308m) required to effect repairs. The cost estimate is based on unit costs from PC15 and so we have allowed the funding in full.

Sub-programme 04 – Water treatment works

Background

6.66 NI Water operates 23 water treatment works which deliver approximately 590Mld into supply. This includes around 260Mld produced by the four Public Private Partnership (PPP) water treatment works operated by NI Water Alpha which NI Water recently purchased from the previous concessionaire.

6.67 NI Water must maintain its water treatment works to secure their performance in relation to both the high quality and volume of water supplied to customers. NI Water's investment in PC15 has been focused on major upgrades at individual treatment works to maintain compliance, either on the basis of assessed risk or enforcement by DWI. The investment submission for PC21 is much broader with some level of enhancement investment proposed at 20 of the water treatment work sites.

6.68 The PC21 investment broadly falls into 3 categories.

a) Investment at water treatment works where persistent failures against

regulatory standards have occurred and enforcement is in place, or where assessed performance indicates that there is a high risk of persistent failures moving forward. NI Water seeks support directly from DWI for this type of investment through an 'Annex A' process and we take DWI's agreement as validation of the investment need.

b) Investment to help secure general improvements in performance at other works in terms of water quality, reliability, resilience and efficiency. For example, improvements to coagulation or filtration to help make treatment processes more robust. In this case NI Water does not seek support from DWI and we conclude on the need based on the evidence submitted by the company.

c) Investment to meet other drivers not directly related to the compliance of drinking water with the current water quality standards. This category includes investment to comply with internal Environmental Management System standards to help mitigate against pollution, assess and prepare for proposed EU amendments to the Drinking Water Directive and ensure that all water fittings comply with Water Fitting Regulations to help mitigate against contamination and risk to public health.

6.69 We deal with each of these areas of investment separately below.

Investment in Annex A water treatment works

6.70 NI Water has proposed investment at 13 sites. This includes the 4 PPP treatment works operated by NI Water Alpha. The investment included in the company's submission for this element of the sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Upgrade to Killyhevlin	0.422	0.393	-0.028	-6.7%	17%
Clay Lake Treatability Improvements	0.737	0.688	-0.049	-6.7%	9%
Lough Fea Treatability Improvements	0.673	0.628	-0.045	-6.7%	65%
Seagahan Treatability Improvements	0.947	0.883	-0.063	-6.7%	27%
Altnahinch Treatability Improvements	1.819	1.697	-0.122	-6.7%	32%
Dungonnell Treatability Improvements	0.390	0.364	-0.026	-6.7%	0%
Drumaroad Treatability Improvements	0.479	0.447	-0.032	-6.7%	0%
Derg Treatability Improvements	3.628	3.385	-0.243	-6.7%	13%
Caugh Hill Treatability Improvements	11.453	10.686	-0.767	-6.7%	5%
NIW Alpha WTWs Treatability Improvements	7.411	0.000	-7.411	-100%	6%
Total	27.959	19.172	-8.788	-31%	12%

Table 6.6: Investment in water treatment works.

6.71 NI Water issued nine water treatment works Annex A submissions to DWI. The NI Water Alpha sites were not included, but we understand that the company intends to make a further submission to DWI in relation to these sites in the near future.

6.72 DWI formally responded to the NI Water's Annex A submissions at the start of September 2020. In its response it expressed a number of concerns which we endorse, namely:

- That the proposed WTWs programme is 'back end' loaded. This is of particular concern for Annex A works which would be expected to be of higher priority. We note that Caugh Hill WTW which has been deferred in two previous price controls and represents over 40% of the total 'Annex A' cost is not scheduled for delivery until 2026-27. It is unclear why this would be the case if the need was clearly established.

- That Bouchier and Badenoch recommendations in relation to cryptosporidium have been identified at a number of sites. These

requirements were identified in the 1990s and investment to address any shortcomings might have been expected to have been prioritised in the interim.

- That the justification for the internal targets chosen by NI Water to assess risk and justify investment is not clear. For example THMs have been identified as a parameter of concern at seven of the nine 'Annex A' works and we are aware that the company reduced its internal target from 75µg/l to 50µg/l in 2018. Using this lower threshold to justify investment has the potential to drive inappropriate decisions and result in unnecessary investment if it is not clearly linked to the risk on non-compliance with regulatory standards. The justification for the change in internal standards will therefore need to be clearly evidenced in every circumstance to demonstrate that any associated investment is necessary prior to our final determination.

6.73 DWI's decisions in relation to each of the Annex A submissions are summarised in the table below.

	Parameters	DWI Decision Assessment	Further Information Requested
Altnahinch WTW	THMs, Aluminium, Turbidity	YES - Further information requested	A copy of the treatability study to be provided to enable a more detailed assessment of treatment requirements to be made.
Caugh Hill WTW	THMs	YES - Further information requested	Clarification required on whether recommendations contained in the Arup report and in the DWSP Risk Assessment Action Plan with respect to Cryptosporidium control and THMs are to be completed as they are not referred to in the Annex A.
Clay Lake WTW	Turbidity, THMs, Disinfection, Cryptosporidium	YES - Further clarification and discussion in relation to the detail of the proposals.	N/A
Derg WTW	THMs	Further information requested to enable assessment to be made	Further information identifying a preferred option is required to enable DWI to support the application to ensure THMs compliance will improve. An updated Annex A should be submitted removing works that are planned for completion in 2020/21 as part of the enforcement Notice. There is limited evidence that THMs is an issue at the WTW but appears to be more of a risk in distribution due to the length of the network.
Drumaroad WTW	Aluminium, Cryptosporidium	YES – Further information requested	Clarification on the presence or not of automatic coagulation and assurance that the proposed works will improve the water treatment process for aluminium compliance. Final investigation report into the cause of the Cryptosporidium is also required.
Dungonnell WTW	THMs	Further information requested to enable assessment to be made	A copy of the treatability study to be provided to enable DWI to establish the justification for concluding that Ion Exchange is the preferred option for the pilot study. Information to be provided on the interim measures to manage the risk until the pilot study is completed and the remedial works are complete.
Killyhevlin WTW	Cryptosporidium THMs	Further information requested to enable assessment to be made	A copy of the full treatability study to be provided, highlighting the areas of highest risk for Cryptosporidium and the specific recommendations referred to in Annex A.

Lough Fea WTW	Cryptosporidium Disinfection, Treated water quality (turbidity, aluminium, iron)	YES	N/A
Seagahan WTW	THMs, Cryptosporidium Turbidity	YES	N/A

Table 6.7: Annex A submissions.

6.74 It can be seen that two of the submissions received unqualified agreement, four received agreement pending the receipt of additional information on specific elements of the proposal and DWI requires further information on three of the submissions before it will be able to make an assessment.

6.75 The final decision on the full list of 'Annex A' submissions is therefore dependent on the receipt of the additional information requested from NI Water. We have therefore decided to wait until this process concludes and the exact requirements have been established before determining on the Annex A investment. This will be done for the final determination.

6.76 For the purposes of the draft determination we have taken a precautionary approach and included the investment submitted for the nine works for modelling purposes, following the application the generic Reporter adjustment.

6.77 We have excluded all of the investment proposed for the Alpha WTW sites at this stage. These sites were recently purchased by NI Water off the previous concessionaire. This process was subject to a cost benefit analysis and due diligence exercise. We therefore assume NI Water assured itself that it was purchasing fit for purpose assets which were operationally robust and capable of meeting regulatory standards. Any additional investment requirements should therefore primarily be base maintenance which we expect NI Water to address through its WTW Base Maintenance programme allocation in sub-programme 01.

Investment in other water treatment works

6.78 NI Water has proposed a range of investment at 9 other water treatment works sites. This includes the installation of auto-coagulation, filter upgrades, wash water upgrades and improvements to chemical dosing. The table below summarises the company's submission for these works and the outcome of our assessment for the draft determination. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Loughmacrory Treatability Improvements	0.488	0.455	-0.033	-6.7%	41%
Fofanny Treatability Improvements	0.176	0.164	-0.012	-6.7%	12%
Carran Hill Treatability Improvements	0.084	0.078	-0.006	-6.7%	22%
Belleek Treatability Improvements	0.149	0.139	-0.010	-6.7%	57%
Glenhordial Treatability Improvements	0.341	0.318	-0.023	-6.7%	60%
Lough Bradan Treatability Improvements	0.286	0.267	-0.019	-6.7%	19%
Killyhevlin DWW Tank	0.420	0.391	-0.028	-6.7%	0%
Carmoney Treatability Improvements	1.005	0.867	-0.137	-14%	96%
Glenhordial WTW Sludge Improvements	0.189	0.088	-0.101	-53%	2%
Total	3.136	2.768	-0.368	-12%	50%

Table 6.8: Investment in other treatment works.

6.79 The proposed investment represents average expenditure of around £350k per site. We recognise that an element of ongoing investment to help secure general improvements in performance at these works in terms of water quality, reliability, resilience and efficiency is likely to be required.

6.80 For the draft determination we checked the base/enhancement split applied by the company for each scheme by reviewing the individual elements of investment included within the company's costing system. In general the split proposed did not appear unreasonable apart from Carmoney WTW which the company has submitted as 99% Enhancement. Our assessment suggests this should be closer to 100% Base as it primarily relates to refurbishment of existing assets. This scheme was deferred from PC15 and we note that in the PC15 submission NI Water indicated it was 100% Base. So we have changed the base percentage from 1% to 96% based on the outcome of our assessment.

6.81 We have also made some cost adjustments to this programme. We have removed expenditure for a proposed treatability study at Carmoney which we believe should be covered by the 'WTW treatability Studies for PC27' programme of work in sub-programme 01. We have also removed 50% of the costs submitted for the Glenhordial sludge treatment project pending

clarification on expenditure included for work required at the receiving WwTW site.

6.82 For the remainder of sites we have allowed the submitted costs, following the application of the generic Reporter adjustment to establish the pre-efficiency allowances for the draft determination. However prior to the final determination we intend to reconsider:

- Why so many of the business cases refer to water quality issues when the risk is not deemed sufficient to merit an 'Annex A' submission.
- Why further treatability investment is required at Glenhordial WTW following completion of a treatability scheme in PC15 at a cost of around £0.6m.
- Whether some expenditure could be deferred pending completion of other remedial work or the investigation of alternative processes, for example remedial work to the soda ash system at Lough Bradan where lime dosing is being considered as an alternative.
- Whether work on containment of dosing lines is a duplication of work included in the EMS project.

Projects related to other drivers

6.83 NI Water included 3 further projects related to investment required for:

a) Pollution prevention activities at water treatment work sites. This is required to help ensure compliance with the company's internal Environmental Management System which has been updated to reflect NIEA's Pollution Prevention Guidelines. Example activities include diversion or sealing of site drainage from high risk areas, provision of new and refurbished bunds for tanks, provision of spill detection equipment and fuel interceptors to help prevent pollutants entering site drainage.

b) A review of the potential impact of the EU's recast of Directive 98/83/EC should this be adopted into UK law. This investment also covers a review of other emerging issues such as antimicrobial resistance and micro plastics.

c) A programme of work to ensure that all operational WTW sites comply with The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009. This will help mitigate the risk of contamination of the public water supply through back-syphonage.

6.84 We acknowledge the need for investment in these areas and have allowed

the expenditure subject to the generic Reporter adjustment. The resulting pre-efficiency allowances are detailed in the table below.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
WTW - EMS	1.341	1.251	-0.090	-6.7%	59%
DWD Recast & Emerging Issues Study	0.283	0.264	-0.019	-6.7%	0%
Back-syphonage WTW	1.091	1.018	-0.073	-6.7%	19%
Total	2.715	2.533	-0.182	-6.7%	37%

Table 6.9: Investment in other projects.

6.85 We recognise that there is uncertainty with regard to the impact that the re-cast of the Drinking Water Directive might have. DWI has indicated that the recast may be published in October following the EU's consideration of member state representations. If this is the case it will allow us to review NI Water's submitted costs for this element of expenditure from a more informed positon in advance of the final determination.

SP04 Summary

6.86 The following table summarises the outcome of the draft determination assessment for sub-programme 04.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Investment in Annex A WTWs	27.959	19.172	-8.788	-31%	12%
Investment in other WTWs	3.136	2.768	-0.368	-12%	50%
Projects related to other drivers	2.715	2.533	-0.182	-6.7%	37%
Total	33.810	24.472	-9.338	-28%	19%

Table 6.10: Summary of investment in SP04.

Sub-programme 05 – Water trunk mains

Background

6.87 NI Water proposed investment in 15 trunk main schemes with a pre-efficiency cost estimate of £53m. These drivers for the proposed schemes

are:

- To address supply demand deficits identified in the most recent Water Resource and Supply Resilience Plan.
- To improve interconnectivity within and between water resource zones in the North and West which are largely dependent on individual small water treatment works. This will ensure that supplies can be maintained if a works is out of service for technical or raw water quality reasons.
- To reinforce supplies in the areas served by Castor Bay Water treatment works.
- To improve the resilience of supplies to service reservoirs in rural areas in the west where there is insufficient capacity to restore supplies quickly following an incident or secure supplies in periods of high demand.

6.88 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of our assessment.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Trunkmain - High Tober	1.284	0.869	-0.414	-32.3%	44%
Edenasop to Killeter SR	1.328	1.124	-0.204	-15.3%	29%
Blacklough to Crocknabohill SR	3.130	2.920	-0.210	-6.7%	0%
Woodend to Drain main	3.973	3.026	-0.947	-23.8%	0%
Castor Bay to Ballydougan Trunk Main September 2019	6.433	6.002	-0.431	-6.7%	45%
Trunkmain - Killyhevlin Cavanacross B	2.072	1.933	-0.139	-6.7%	41%
Trunkmain - Whitespots B	0.347	0.323	-0.023	-6.7%	30%
Caugh Hill, Carmoney to Strabane Strategic Link Watermain	18.204	16.984	-1.220	-6.7%	0%
Northern Resource Zone Resilience - Phase 4	1.234	1.152	-0.083	-6.7%	0%
Western Resource Zone - Resilience	2.793	2.606	-0.187	-6.7%	23%

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Castor Bay Outage September 2019	4.314	4.025	-0.289	-6.7%	38%
Central WRZ Resilience and Supply	1.853	1.729	-0.124	-6.7%	0%
Trunkmain - Crescent Link	1.744	1.627	-0.117	-6.7%	44%
Trunkmain - Skeoge Link	1.811	1.690	-0.121	-6.7%	30%
Northern WRZ Resilience	2.500	0.000	-2.500	-100.0%	0%
Total	53.019	46.010	-7.009	-13.2%	17%

Table 6.11: Investment in trunk mains

Assessment of trunk main investment

6.89 We reviewed each scheme and challenged the scope and costings. In response to queries the company:

- Agreed that the costs for crossings included in some schemes were too high and provided updated costs which have been included in the draft determination.
- Provided a technical response to a challenge on comments on the scope of the proposed schemes including options for partial replacement of mains and the use of booster pumping. The company's response addressed the technical issues.
- Agreed that costs on the Northern WRZ Resilience scheme had been duplicated in the Business Plan and provided a revised schedule of costs.

6.90 The estimates were prepared using the company's IPAC costing system. We applied a generic 6.7% reduction to all costs in the sub-programme to reflect the Reporter's comments on the application of risk in the costing system.

6.91 The allocation to base maintenance reflects the company's assessment. We took account of the increase in the capital maintenance element of this sub-programme relative to PC15 when determining the allowance of consequential capital maintenance.

Sub-programme 06 – Service reservoirs and clear water tanks

Background

6.92 Service reservoirs are included in the water distribution network to balance short term water supply and distribution, typically over a day. The storage they provide limits the risk of large scale interruptions to supply due to failures of water treatment works, booster pumping stations and trunk mains. Clear water tanks (CWTs), located at water treatment works, serve the same general purpose. They hold the treated water before it is transferred into the network as well as providing contact time for disinfection.

6.93 The company has prioritised PC21 investment to focus on the expansion of one service reservoir and three clear water tanks. The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Loughmacrory Hill Service Reservoir	2.807	2.619	-0.188	-6.7%	1%
Fofanny CWT	3.240	3.023	-0.217	-6.7%	0%
Seagahan CTW	2.653	2.475	-0.178	-6.7%	1%
Drumaroad WTW CWT	0.547	0.547	0	0%	0%
Total	9.247	8.664	-0.583	-6.3%	0.6%

Table 6.12: Investment in service reservoirs and clear water tanks.

Assessment of service reservoir and clear water tank investment

6.94 The company identified its investment requirements for this sub-programme by using a risk prioritisation model which assesses each of its storage facilities based on their resilience and the impact of any failure. The projects chosen are amongst those facilities that NI Water has determined carry the highest modelled risk. We recognise that shortcomings at these sites have the potential to result in interruptions to supply and loss of customer pressure which would be detrimental to both the company and its customers.

6.95 Following analysis of the business plan submission and the resulting query responses, we are satisfied that the company has provided the necessary

justification to show that investment is required at all of the service reservoirs and clear water tanks shown in the table above.

6.96 Analysis of the submitted data and cost models shows that that the proposed investment is broadly in line with its historic spend in this area. A cost curve created from historic service reservoirs and clear water tanks data can be seen below, with the three new PC21 schemes shown in red. We have therefore allowed the costs subject to the generic Reporter adjustment.

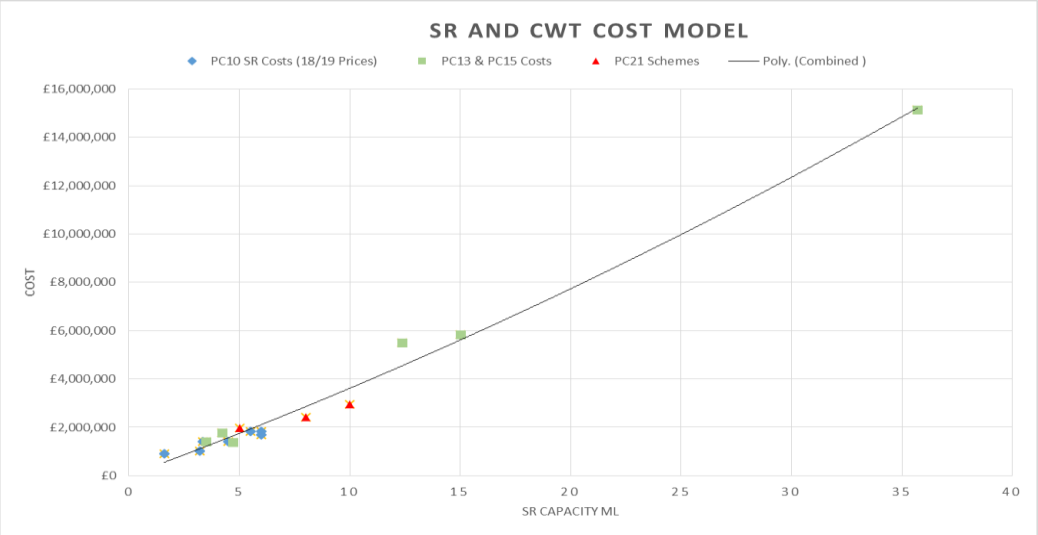

Figure 5: SR and CWT cost model

6.97 The Drumaroad CWT project is carrying over from PC15 and the £0.55 million submitted represents the cost necessary to complete the project. We have therefore allowed this figure and not applied the generic Reporter adjustment to this line of expenditure.

Sub-programme 07 – Service reservoir rehabilitation

Background

6.98 Service reservoirs provide balancing storage for potable water in the course of distribution to consumers. Maintaining the integrity of service reservoirs to limit contamination from the ingress of water or soil is essential to maintain the quality of water supplied. NI Water undertakes a regular programme of reservoir cleaning, inspections and rehabilitation to ensure that water quality is maintained.

6.99 NI Water also needs to be able to bypass service reservoirs, particularly ones with only one cell, so that they can be easily isolated for essential maintenance work such as cleaning, inspection and rehabilitation without interrupting the supply of water to customers.

6.100 NI Water's submission for PC21 includes for the ongoing programme of inspection and rehabilitation and the provision of operational bypasses at the last seven service reservoirs where they do not currently exist.

6.101 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
SR Rehab Programme	17.203	12.919	-4.285	-25%	100%
SR Bypass - Lettermire SR	0.079	0.074	-0.005	-6.7%	43%
SR Bypass - Radergan SR	0.093	0.087	-0.006	-6.7%	65%
SR Bypass - Sheriffs Mountain SR	0.116	0.108	-0.008	-6.7%	75%
SR Bypass - Ballybriest SR	0.099	0.092	-0.007	-6.7%	66%
SR Bypass - Ballyleighery North SR	0.053	0.050	-0.004	-6.7%	66%
SR Bypass - Ballybarnes SR	0.048	0.044	-0.003	-6.7%	72%
SR Bypass - Gortilea Baranilt Road SR	0.029	0.027	-0.002	-6.7%	0%
Total	17.720	13.401	-4.319	-24%	99%

Table 6.13: Investment in service reservoir rehabilitation

Assessment of investment in SR rehabilitation sub-programme

Service Reservoir Rehabilitation

6.102 NI Water introduced a risk based methodology in 2016 for assessing service reservoir refurbishment requirements which is based on the UKWIR Service Reservoir Toolkit. This has been aligned with the five year rolling programme to clean and inspect every service reservoir, water tank, clear water basin and break pressure tank. This methodology should help prioritise and minimise investment by ensuring that capital maintenance interventions are only undertaken at assets that are considered to have failed or are considered likely to fail within the 5-year review period. It should therefore help avoid additional speculative refurbishment work that may have occurred in the past.

6.103 When we reviewed the company submission we found the budget allocation to be significantly higher than the projected outturn costs for PC15. When we queried this with the company it explained that this was because not all of the rehabilitation work identified through the condition assessments had been undertaken due to budget constraints. The significant reduction in annual expenditure reported by the company for the last three years of PC15 may be evidence of this. The change in methodology is however also likely to have had an effect, as expenditure in the early stages of the price control period will have been based on older methodologies and so will not have benefited from the more targeted approach now being adopted.

6.104 We have requested specific details of the rehabilitation work undertaken in each year of PC15 to allow us to distinguish between the impact of the new methodology and the impact of budget constraints. This information has not yet been provided, so for the draft determination we have based projected expenditure on the average expenditure in the first three years of PC15. This has resulted in an allowance which is 25% less than the company's submission. Whilst this approach should have helped mitigate against the impact of budget constraints it is unlikely to have captured the full benefits realised through the new methodology. We hope to resolve this issue for the final determination once we have received the information requested from the company. The generic Reporter adjustment has not been applied to this programme of work as we have based our pre-efficiency allowance on historic costs.

Service Reservoir bypasses

6.105 The company has included investment to provide operational bypasses at the last seven service reservoirs where they do not currently exist. These are single cell reservoirs that can't currently be isolated easily for essential maintenance work such as cleaning, inspection and rehabilitation without risking interrupting the supply of water to customers.

6.106 The average cost of the seven schemes submitted for PC21 is broadly comparable to the average cost of work undertaken in PC15. We have therefore allowed the pre-efficiency costs subject to the generic Reporter adjustment.

Sub-programme 08 – Water mains rehabilitation

Background

6.107 NI Water provides treated water to consumers through water distribution mains with an estimated total length of 27,000 km. The length of mains per property is approximately twice the average for water service providers in

England & Wales, consistent with a consumer base distributed over smaller communities in a rural environment.

6.108 This sub-programme covers a planned programme of mains rehabilitation, including work associated with the removal of low pressure properties. Other investment in water mains, including the provision of water mains in new developments, mains requisition and reactive repairs, are included in sub-programmes 10 and 23.

6.109 The investment included in the company's submission for this sub-programme and the outcome of our assessment is shown in Table 6.14 below. This is followed by an explanation of how we have arrived at our determination for each of the four projects in this sub-programme.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Water mains rehabilitation	92.891	84.736	-8.155	-9%	51%
DG2 Low pressure	8.183	7.361	-0.822	-10%	2%
Low pressure development output	1.924	1.515	-0.409	-21%	54%
Studies to inform	6.647	6.202	-0.445	-6.7%	59%
Total	109.646	99.814	-9.831	-9%	48%

Table 6.14: Investment in water main rehabilitation.

Water main rehabilitation

6.110 Water main rehabilitation is the main budget line within this sub-programme. The business case proposed a budget of almost £93m for delivering 668km of mains rehabilitation plus an additional 92km for targeted mains renewal related to leakage reduction. The leakage element of the programme represents £10m of the budget.

6.111 We determined an appropriate capital budget allocation for this project by considering PC15 outturn costs, and also the output from the company's DRRM analysis.

6.112 The company highlighted several risks associated with the DRRM analysis in its business plan submission, which we considered when establishing an appropriate unit rate for water main rehabilitation.

6.113 NI Water pointed out that the DRRM modelling creates numerous work packages comprising of short lengths of main and that these would be inefficient to deliver. It has suggested that it may be appropriate to increase the overall output length in our determination as a result. We will consider

this further for the final determination.

6.114 It also noted that the overall reduction in mains rehabilitation length compared to PC15 represents a risk to serviceability. Our assessment of water infrastructure serviceability indicates that it is currently stable and it is forecast to remain stable throughout PC21 based on the company's submission. There is therefore currently no evidence to suggest that the rate of water main rehabilitation needs to be adjusted in the short term.

6.115 We adjusted the output from the DRRM analysis to account for the difference in size bands between mains delivered in PC15 and those predicted by the DRRM for PC21. We consider this appropriate as it reduces the risk of building up investment for later years if only small diameter mains are replaced during PC21 as a consequence of the output from the model.

6.116 This adjustment also brought the DRRM unit rate into line with the PC15 outturn unit rate of £108/m. In general, where a robust recent trend of outturn costs exist, our starting point for projecting expenditure is to use historic rates recently achieved. We believe this is appropriate for this sub programme and so we have based our allowances on a unit rate of £108/m

6.117 Following clarification provided by the company, the total length of mains associated with this project was confirmed to be 750.381km. This includes the length of mains associated with targeted leakage reduction.

6.118 We applied our unit rate to this length of mains and added additional costs for service reservoir and M&E work to get our pre-efficiency allowance of £84.736m for this programme of work. This is 9% lower than the figure submitted by the company.

Low pressure development output

6.119 The Low pressure development output project covers the removal of 20 properties from the low pressure register through the rehabilitation of 14km of water mains. It also covers work required to deliver a refresh of the DG2 Register, additional pressure logging, further network modelling and detailed analysis.

6.120 We applied the water mains rehabilitation unit rate to the length of mains being delivered by this project to determine a pre-efficiency allowance for PC21. This resulted in a figure which is 21% lower than the company submission. The tasks of refreshing the DG2 register, pressure logging etc. have also been included by the company in the Studies to inform project, so we have not allowed for them under this project.

DG2 low pressure

6.121 The DG2 low pressure project covers the installation and replacement of 22.8km of water mains, the installation of 39 new water pumping stations and the installation and adjustment of valves in the distribution system to address pressure issues at a submitted cost of £8.183m. The company adjusted the cost included for temporary pumping stations in response to one of our queries. This reduced the submission value from £8.183m to £7.889m.

6.122 We applied the generic Reporter adjustment to this updated figure to establish our pre-efficiency allowance of £7.361m for the draft determination. This is 10% lower than the company's submission. We have recently received information from the company which will allow us to complete a bottom up assessment for this programme of work and will adjust the allowance accordingly in our final determination when this work has been completed.

6.123 The output length for the DG2 low pressure project has been confirmed as 23.291km through our draft determination query process.

Studies to inform

6.124 The Studies to inform project covers a range of modelling outputs to enhance NI Water's network modelling capabilities at a cost of £6.647m. We will be seeking further information on the build-up and justification for these costs for the final determination, but for the purposes of the draft determination have allowed the submitted costs subject to the generic Reporter adjustment.

6.125 We note that there is a risk that some of the consultancy costs associated with hydraulic and ad-hoc modelling may be embedded in the PC15 outturn unit rate as these tasks have been ongoing during PC15. If this is the case the allowances may be adjusted to account for this in the final determination.

Output length

6.126 We have included all main laying activity identified in these programmes of work in the output length for this sub-programme. This results in a total length 788.122km which we believe aligns with the overall scale of the investment.

Sub-programme 09 – Leakage

Background

6.127 Some level of leakage is inherent in the operation of a pressurised water distribution network. While leakage represents a waste, both in terms of the water abstracted and the financial and social costs of treatment and distribution, NI Water must balance this against the cost of reducing leakage to determine an economic level of leakage. NI Water has prepared an economic level of leakage assessment for PC21 and has put in place plans to gradually reduce leakage to this economic level by the end of the price control period.

6.128 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Leakage	21.010[1]	19.602	-1.408	6.7%	100%
Leakage Enhancement	7.801	7.278	-0.523	6.7%	0%
Smart Networks	6.981	6.514	-0.408	6.7%	0%
Total	35.792	33.394	-2.398	6.7%	21.8%

Table 6.15: Investment in leakage control.

Assessment of leakage investment

6.129 The NI Water's business plan submission tables included a figure of around £15 million for the 'leakage' element of this sub programme. In the sub programme documents submitted by the company, it advised that the cost entered should have been around £21 million. This new total aligns with the detailed cost breakdown provided by the company and has therefore been included in the table above.

6.130 The PC21 leakage total submitted to us in the business plan represents a significant step change in investment when compared to the PC15 allocation. The company maintains that this is necessary because it has found it difficult to reduce leakage in PC15 and has failed to meet its reduction targets.

6.131 When analysing the leakage submission we identified that further evidence was required to justify the funding. The company has subsequently

[1] IPAC total of £15.930 million

submitted additional information to us which we are in the process of analysing. We will continue to work closely with the company to reach an appropriate determination for leakage and are likely to seek additional clarification on a number of costs before our final allocation is determined. The allowance may therefore be subject to change between the draft and final determination. Given the linkages between funding and levels of service, it is possible that changes to the proposed level of leakage reduction in PC21 may also be required.

6.132 We recognise that NI Water are investigating and pursuing new and innovative ways of reducing leakage. We appreciate the additional clarity that the company has provided in this regard following our queries on the original business plan submission. Prior to the final determination we will seek further information on these initiatives to allow us to complete our assessments. For example, an opportunity to review the project outcomes from the satellite imagery trial which is due to complete in the coming weeks. In addition, we plan to review innovation projects more broadly at our PC21 mid-term review to ensure benefits are being delivered and investment for the second half of the price control period is warranted.

6.133 The company has submitted an outline of their smart networks project which we have reviewed alongside their overarching strategy. We recognise the benefits that this could bring in terms of reducing the impact of interruptions to supply on consumers. However we will again be seeking further clarification on the costs and outputs submitted to allow us to make our final determination.

6.134 Due to the challenges the company has experienced throughout PC15 in reducing leakage, and the difficulties found when demonstrating value for money for any new initiatives, we believe there may be benefit in introducing regular update meetings during PC21. This would allow the outcome, effectiveness and benefits of new leakage strategies and initiatives to be discussed and assessed. We will engage with the company on the detailed arrangements for these regular checkpoint meetings and confirm these in the final determination.

Sub-programme 10 – Ops capital (water)

Background

6.135 NI Water manages part of the delivery of its capital programme through its operational teams, which carry out smaller schemes to address immediate needs. Approximately half of the work focuses on minor capital maintenance of water assets. The enhancement element of the investment covers:

- New connections to water supply;
- Provision of water mains in new developments;
- Lead communication pipe replacement where prompted by a failed water quality sample taken as part of the company's sampling programme, or at the request of a consumer.

6.136 The base maintenance element of the allocation cover the costs required to maintain a stable service in relation to this sub programme. There are four base maintenance elements, including;

- Water Supply
- Water Networks
- Networks Water (Civil)
- M&E Water

These elements of the budget are used to assist in the maintenance of network assets and to support the water supply and network functions through the installation and maintenance of equipment as required.

6.137 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Developer Services	16.241	12.801	-3.440	-21.2%	0%
Reactive Lead	2.952	2.239	-0.713	-24.2%	0%
New Connections	18.001	14.762	-3.239	-18.0%	0%
Capital Water BM	21.288[2]	24.405	3.118	14.6%	100%
Total	58.483	54.208	-24.275	-7.3%	45%

Table 6.16: Investment in Ops capital (water)

General

6.138 The company estimated its investment needs using projections of historic

[2] In IPAC this cost was separated into four sub elements (water supply, water networks, networks water – civil and M&E water) however for the determination we combined these elements as per the sub programme documents.

activities and costs and a bottom up assessment of need.

6.139 Given the reactive nature of many of the projects in this sub programme, our pre efficiency draft determination allowances have been calculated based on historic PC15 expenditure and, where appropriate, forecasted volumes of customer connections for PC21.

Developer Services (Mains to Housing)

6.140 NI Water has a statutory obligation to provide new mains to housing and new connections to developers. The costs submitted by the company for these activities were based on historic spend in PC15 with an additional allowance for growth. The company had estimated this growth allowance on the basis of the trend seen in PC15 to date.

6.141 Our approach to this aspect of the sub programme was similar to the company's. Historic costs from the first 5 years of PC15 were increased in line with the projected volume of work for PC21.

6.142 The company was unable to provide information on the number of developments, or the meterage of mains laid for the developments in PC15 to date. Therefore, in order to estimate the volume of work in PC21 we used the increase in the forecasted number of new connections in PC21 compared to PC15 as a multiplier. The number of new connections was used to project costs because we found that there was a strong correlation between historic connection numbers and spend against developer services. We have informed the company that the forecasted connection numbers will be reviewed prior to our final determination so that any variations to anticipated connection numbers at the end of PC15 can be taken into account.

6.143 Our analysis resulted in a minor reduction in allowance (-2%) when compared to the costs submitted by the company.

Reactive Lead

6.144 The reactive lead project is primarily driven by the Water Supply (Water Quality) Regulations for Northern Ireland. These regulations state that if a water sample has a lead concentration above the specified parameter (currently 10µg/l) then NI Water should replace its portion of the supply pipe or fittings which may be contributing to the lead levels as soon as is reasonably practicable. This project is largely reactive as it is either initiated when a water quality test reveals a lead failure, or at the specific request of a customer.

6.145 The company submitted a pre efficiency figure of around £2.9m to cover

expenditure for this project. Given the difficulty in estimating future volumes due to the reactive nature of this work, we have based our draft determination on the average historic spend over PC15. This has resulted in a pre-efficiency allowance of around £2.2 million, which is 24% lower than the company's submission.

New Connections

6.146 The company receives applications to connect from all new customers who require a connection to the potable water network. This project covers those connections that are less than 32mm in diameter. The majority of the connections are therefore for domestic premises. The company's business plan submission included a budget of around £18m for this project.

6.147 To determine an allowance for our draft determination we calculated a unit rate based on the costs and volumes from PC15. We then applied this unit rate to the forecast number of new connections submitted by NI Water in its business plan.

6.148 Our resulting draft determination pre-efficiency allowance of around £14.7 million represents an 18% reduction in expenditure when compared to the business plan submission.

6.149 We have informed the company that the forecasted connection numbers will be reviewed prior to our final determination so that any variations to anticipated connection numbers at the end of PC15 can be taken into account.

Capital Water Base Maintenance

6.150 The expenditure under the base maintenance project is required to assist in maintaining a stable service to customers in PC21. This expenditure comprises various maintenance activities on the water network. The company submitted a total project cost of £21.3m as part of their business plan.

6.151 Our draft determination allowance was calculated on the basis of historic expenditure in PC15, consistent with the methodology applied throughout this sub programme. This resulted in a pre-efficiency allowance of around £24.4m which is 15% higher than the business plan submission.

Sub-programme 12 – Sewerage

Background

6.152 NI Water proposed investment in sewerage schemes with a pre-efficiency

cost estimate of £439m. The detailed plan included 173 individual project entries. This includes individual projects lines for each unsatisfactory intermittent discharge which will be grouped catchment based schemes for delivery.

6.153 The key components of the programme are:

- Drainage are solutions to improve environmental quality and release development constraints which comprise 64% of the total costs.
- Capital maintenance schemes including sewerage rehabilitation and outfall maintenance.
- Work to reduce the risk of internal property flooding.
- Storm water separation and sustainable urban drainage pilot projects.
- Planning works included integrated drainage planning and real time modelling of the sewerage network.
- The installation of event duration monitors in critical locations agreed with NIEA.

6.154 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below where individual projects have been grouped by categories of work. This is followed by an explanation of our assessment.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Drainage Area solutions	325.9	299.2	-26.7	-8.2%	10.3%
100% base maintenance shemes	40.2	37.5	-2.7	-6.7%	100.0%
Flooding schemes	22.1	20.6	-1.5	-6.7%	4.0%
Storm water separation and SUDs pilot	19.8	18.5	-1.3	-6.7%	3.1%
Integrated planning and miscellaneous	7.2	6.8	-0.4	-5.2%	0.8%
Event duration monitors	24.0	14.0	-9.9	-41.5%	22.0%
Total	439.2	396.7	-42.5	-9.7%	18.4%

Table 6.17: Investment in sewerage schemes

Assessment of sewerage investment

6.155 We reviewed the business cases for a sample of drainage area schemes to assess the development of the outline solutions used to prepare the Business Plan and the scope of works costed. Developing solutions to unsatisfactory intermittent discharges in drainage require detailed analysis to understand hydraulic capacity and environmental impacts. Once drainage area model outputs are available further catchment modelling can be used to optimise solutions and costs. Until this detailed work is complete critical issues such as volume of storage, the location and configuration of the plant, land acquisition and access arrangements cannot be resolved with confidence.

6.156 Our review of a sample of sewerage projects confirmed that modelling work had yet to be completed or updated for many PC21 projects when the Business Plan was submitted. Where this is the case, the Business Plan costings were based on existing models where possible supported by expert judgement.

6.157 Experience of previous price controls has shown that these major sewerage projects are likely to be delayed and subject to cost increase as detailed solutions are developed. Since many of these projects will be delivered in the second half of PC21, there is an opportunity for the company to undertake further analysis and assessment before we finally determine an efficient cost for these projects. NI Water Business Plan included a development objectives for the completion of this work

6.158 In view of need to undertake further work to confirm the scope and costs of sewerage and wastewater treatment schemes, we expect NI Water to provide the following by the end of November 2020:

- A statement of the sewerage schemes whose scope is sufficiently well developed to allow them to be included in the final determination with confidence, with an explanation of why this is the case.

- A programme of further study and development work necessary to confirm the scope and costs of the remaining sewerage schemes included in its Business Plan. We plan to use this programme to define a ‘development objective’ for PC21 which will allow costs and outputs to be confirmed or re-determined through the Change Control process in time for the work to be incorporated in the last three years of PC21.

6.159 We have reviewed and challenged the estimates for the work proposed by

the company in its Business Plan. We have:

- Applied a 6.7% reduction works priced through IPAC to reflect the Reporter's feedback on the costing system and risk.
- We have reduced the estimated cost of Event Duration Monitors by over 40% to reflect NI Water's costs of delivering similar work in PC15.

6.160 The allocation to base maintenance reflects the company's assessment. We took account of the increase in the capital maintenance element of this sub-programme relative to PC15 when determining the allowance of consequential capital maintenance.

Sub-programme 16 – Wastewater treatment works – new starts

Background

6.161 NI Water proposed investment in wastewater treatment schemes with a pre-efficiency cost estimate of £510m. The detailed plan included 73 individual project entries.

6.162 The key components of the programme are:

- 50 schemes which will result in upgrades to wastewater treatment works associated assets which will increase treatment capacity and contribute the release of development constraints.
- Study work including marine modelling and integrated environmental modelling which will be used to optimise treatment solutions.
- A range of other targeted programmes of work across wastewater treatment including odour control, environmental management works, flow and event duration monitoring and sampling.

6.163 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below where individual projects have been grouped by categories of work. This is followed by an explanation of our assessment.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Wastewater treatment work schemes	456.3	426.1	-30.2	-6.6%	18.9%
Studies to inform future	15.3	14.2	-1.0	-6.7%	14.3%

development					
Other targeted works	38.1	35.6	-2.6	-6.7%	15.1%
Total	509.7	475.9	-33.8	-6.6%	18.5%

Table 6.18: Investment in wastewater treatment

Assessment of wastewater treatment investment

6.164 We reviewed a sample of the outline business cases for wastewater treatment included in the company's business plan. These ranged from detailed information based on development work in progress, to high level solutions worked up in some detail to scope an estimate to a simple statement of need with a supporting cost estimate.

6.165 The independent Reporter reviewed the methodology the company has adopted to determine future flows and loads necessary to size the works and the approach taken to size solutions. The works have been costed using IPAC and we have applied a 6.7% reduction to the estimates to reflect the Reporter's comments on the application of risk in IPAC. We will continue to review the scope of works and the estimates for the final determination.

6.166 The company has included a development objective for the further development of the LWWP programme treatment works in its Business Plan. The assessment of investment and tariffs in this draft determination is based on the straw-man solution estimates in subject to the risk adjustment described above. We will review and determine revised estimates from the company once work on the development objective is complete.

6.167 In view of the range detail of the business cases for other wastewater schemes in the of other Business Plan submission and the time the company has had to further develop solutions and estimates, we expect the company to provide the following by the end of November 2020:

- A statement of wastewater treatment schemes whose scope is sufficiently well developed to allow them to be included in the final determination with confidence, with an explanation of why this is the case.
- A programme of further study and development work necessary to confirm the scope and costs of the remaining wastewater treatment schemes included in its Business Plan. We will consider using this programme to define a 'development objective' for PC21 which will allow costs and outputs to be confirmed or re-determined through the Change Control process for works planned for the last three years of PC21.

6.168 While this approach is similar to that adopted for sewerage schemes, we have greater confidence in the company's plans and estimates for wastewater treatment. We are minded to determine costs for the full PC21 period at the final determination for this work (excluding the LWWP) subject to further review of estimates.

6.169 We have accepted need and scope of the investment for study work proposed by the company. We note the proposed development objectives linked to this work and expect the company to prepare a programme of work with outputs and delivery dates in advance of the final determination.

6.170 Other targeted works includes a range of work across wastewater treatment including odour control, environmental management works, flow and event duration monitoring and sampling. We have included the costs of this work subject to a more detailed review for the final determination.

6.171 The allocation to base maintenance reflects the company's assessment. We took account of the increase in the capital maintenance element of this sub-programme relative to PC15 when determining the allowance of consequential capital maintenance.

Sub-programme 17 – Small WWTW programme

Background

6.172 NI Water operates 775 small wastewater treatment works which serve a population equivalent (PE) of less than 250, with 308 of these serving a PE in the range 20-249. During PC15 the company has undertaken a rolling programme of upgrading works in the range of 20-249PE. The priorities for investment are agreed on an ongoing basis through regular engagement with NIEA. This programme of work has significantly reduced the number of works in this size band that do not comply with their descriptive consents. Projections submitted in NI Water's 2018-19 annual information return suggest that there will only be around 20 to 30 works which are non-compliant at the end of PC15.

6.173 The company's PC21 submission proposed delivering improvements to a further 36 works in the 20-249PE size band during P21. Three of these are to be delivered through sustainable solutions. Although the total number of outputs proposed is higher than the number of works currently expected to be non-compliant at the end of PC15, it is recognised that additional works will cross the 20PE threshold during the period and that other works already within the range may become non-compliant. We have therefore accepted

the total number of outputs proposed by NI Water for the purpose of estimating costs for the draft determination. We will however review this figure for the final determination once NI Water's ongoing engagement with NIEA to agree the priority programme for the PC21 has concluded.

6.174 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Rural WwTW Programme	13.564	9.474	-4.090	-30%	18%

Table 6.19: Investment in small wastewater treatment works.

Assessment of RWwIP investment

6.175 The company submitted a prioritised list of works in its business plan which it indicated would form the basis of the PC21 investment programme. Our initial review of the submission however identified that the company had not adequately taken account of the distribution of these works by size when projecting its cost estimate for PC21 from PC15 data. This is important if projections are to account for changes in size distributions between price control periods due to material cost differences between large and small works.

6.176 To allow us to estimate PC21 allowances effectively we asked NI Water to submit details of its PC15 investment programme. We used the outturn data submitted to establish an average cost of delivery for works in 3 separate size bands (<50PE, 51 to 150PE and 151 to 250PE). We applied these unit rates to the number of works in each size category in the company's priority list. This produced an allowance which was around 45% lower than the company's submission.

6.177 Following initial engagement on our estimate for PC21 the company provided the following supplementary information:

- Revised inflationary uplift information for historic cost data. This was based on construction dates rather than beneficial use dates to ensure the uplift applied aligned with when expenditure was actually incurred.
- A revised priority list of works which the company advised is now forming the basis of discussions with NIEA on the upgrades required for PC21.

- Information to demonstrate that land purchase will be required at a greater proportion of sites in PC21 and to allow this proportion to be quantified.

- An estimate of the cost uplift required for sites that require land based on an assessment of outturn costs from PC15.

6.178 In addition, NI Water indicated that it believed that 75% of PC21 schemes should allow for land and that the number of outputs for the price control period should be increased from 36 to 47.

6.179 We reviewed the additional information provided by NI Water and have accepted the revised inflationary uplift figures, the revised priority list and the company's estimate of the cost uplift for schemes that require land.

6.180 However our analysis of the additional information provided indicates that 60% is a more appropriate figure for the proportion of future schemes that might require land, rather than the 75% proposed by the company. We have also not yet seen sufficient evidence to suggest that an increase beyond the original number of outputs included in the business plan is justified.

6.181 We have therefore continued to use 36 works for assessing the PC21 allowance, have assumed that 60% of these will require land and have used the most recent list submitted by the company to estimate the proportional split of works by size prior to applying unit rates. This has resulted in a pre-efficiency allowance which is 30% less than the company's submission.

Sub-programme 18 – Ops capital (sewerage)

Background

6.182 NI Water manages part of the delivery of its capital programme through its operational teams which carry out smaller schemes to address immediate needs. The investment is dominated by minor capital maintenance of sewerage assets. The enhancement element of the investment covers new connections to the sewerage system and sewer adoption costs.

6.183 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Ops Capital Sewerage BM	57.974	62.389	4.415	8%	100%
Cost of Connections Sewerage	10.804[3]	7.702	-3.102	-29%	0%
DSCT and Sewer Adoption	0[4]	1.557	1.557	N/A	0%
Total	68.778	71.649	2.871	4%	87.1%

Table 6.20: Investment in Ops capital (sewerage).

General

6.184 The company estimated its investment needs using projections of historic activities and costs and a bottom up assessment of need.

6.185 We have analysed the submission and made our determination based on PC15 historic costs and, where appropriate, submitted forecasted volumes of work submitted by the company in its business plan.

Base maintenance

6.186 The base maintenance element of this sub programme is necessary to undertake small scale remedial and repair works as well as the maintenance and replacement of assets and instrumentation through planned and reactive maintenance. The company submission included nine separate sub projects within the base maintenance cost shown above.

6.187 Due to differences between how historic costs were recorded and how the submission has been broken down, we have had to undertake our base maintenance analysis at total cost level. Due to the reactive nature of the project, our assessment was based solely on the average annual expenditure in PC15 on the basis this should provide a reasonable indicator of future expenditure. Our resulting pre efficiency project allowance of around £63m is 8% higher than that submitted by the company.

6.188 The reason for the increase is that the company's submission was incorrectly calculated using a nominal price base and we have converted this to 2018-19 Prices.

Sewer Connections

6.189 NI Water has a statutory obligation to provide sewer connections to new

[3] IPAC costs submitted included nine separate sub projects within the base maintenance element of the sub programme. A determination was made against the sum total of these sub costs.
[4] This cost was mistakenly included against SP24. The cost submitted there was £1.413 million.

developments. The expenditure under this project relates to the cost of sewer connections where the connection is less that 30m in length.

6.190 To determine the required expenditure for the cost of sewer connections, we calculated a unit rate per connection based on PC15 activity. This unit rate was then multiplied by the company's forecast of connection numbers in PC21. This resulted in an allowance which is 29% lower than the company's submission. We have informed the company that the forecasted connection numbers will be reviewed prior to final determination to take account of activity rates at the end of PC15 and that this may impact the allowance for this project.

6.191 For the sewer connections element of this sub programme the company submitted a base/enhancement split of 32%/68%. We have amended this to 100% enhancement as we believe the full allocation should have been to Growth. The company has confirmed it agrees with this adjustment.

Developer services and sewer adoption

6.192 The developer services and sewer adoption allocation relates to the expenditure required to inspect sewerage assets constructed by a developer and adopt them into the NI Water network.

6.193 The company initially submitted this cost as part of sub programme 24 (New and Renew Sewerage). The company advised that this was done in error in one of its query responses and confirmed the costs should have been allocated to sub programme 18 which includes the historic costs. We have accepted the company's explanation and considered costs under this sub-programme instead.

6.194 Our determination was based on the historic expenditure in this area during PC15 and took into account the change in the number of sewer connections forecasted for PC21. This resulted in a pre-efficiency allowance of £1.557m

6.195 The forecasted connection numbers will be reviewed prior to final determination to take account of activity rates at the end of PC15 and that this may impact the allowance for this project.

6.196 The company has recently submitted information requesting that additional costs be allocated to this area of expenditure due to changes in working procedures. We will consider this request for the final determination.

Sub-programme 19 – Metering

Background

6.197 NI Water has around 70,000 non-domestic meters which it uses for billing purposes. These meters need to be maintained or replaced as they get older or malfunction to ensure that meter readings and therefore bills remain reasonably accurate. This programme covers the replacement of meters both as a result of reactive maintenance activities and through the proactive programme of replacement based on age.

6.198 The company installs new meters on newly built non-domestic properties and on existing non-domestic properties which previously didn't have a meter installed. The programme of works to install water meters on domestic properties ended during PC15 following changes to legislative requirements brought about by the Water and Sewerage Services Act (Northern Ireland) 2016. This decision was taken due to the absence of domestic billing in Northern Ireland.

6.199 This sub-programme relates only to meters for the purposes of billing customers and covers the majority of activity associated with maintaining, replacing and installing this meter stock. The costs associated with the repair and replacement of network meters (not used for billing customers) is recorded elsewhere.

6.200 The company's metering strategy for PC21 proposes the widespread installation of Smart meters as standard in Northern Ireland for the first time As opposed to the current practice of installing 'dumb' meters. The company has indicated that some of the meters will be fully capable smart meters while others, due to the remote location of the customer, will need to be AMR (automatic meter read) meters.

6.201 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination are shown in the table below. This is followed by an explanation of how we have arrived at our determination.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Metering - Meter Maintenance	5.710	5.896	0.187	3%	100%
Metering - Proactive Meter Exchange	3.538	2.974	-0.564	-16%	100%
Metering - Selective Installations	0.299	0.133	-0.166	-56%	0%
Metering - Non Domestic New Connections	0.333	0.104	-0.230	-69%	0%
Metering - General Meter Purchase	0.570	0.494	-0.076	-13%	100%
Smart Customer Meters for SP19 Metering Programme	0.985	0.842	-0.143	-15%	0%
PftF - Smart Metering	7.455	0.482	-6.973	-94%	40%
Total	18.889	10.924	-7.966	-42%	87%

Table 6.21: Investment in metering.

Meter maintenance and repair activity (MMR)

6.202 Meter maintenance activity is reactive in nature and therefore the level of future activity cannot be easily predicted. Consequently we have based our determination on PC15 historic costs and used annual averages for both unit costs and volumes of meters from the first four years of PC15 to project an allowance for PC21. This produced a figure which was marginally higher (3%) than the company's estimate.

Proactive meter exchange (PME)

6.203 NI Water's proactive meter exchange programme replaces all customer meters once they have either been in service for 17 years or have reached a high volumetric throughput. The company asserts that if a meter meets either of these criteria they no longer have confidence in its accuracy.

6.204 In order to determine an allowance for PC21 we obtained an extract from the company's meter database and calculated the number of meters that would have been in service for 17 years and therefore need to be replaced within the PC21 period. We applied an uplift to account for meters that would need to be replaced because they are recording high volumes and then a reduction to account for meters which will already have been replaced through meter maintenance activity (as meters approaching replacement age are more likely to fail). We based both these adjustments on information provided by the company. A unit rate for PME installation was then applied

based on outturn costs and activity volumes in the first 4 years of PC15. This resulted in an allowance which was around 16% lower than the company's submission. This difference was primarily due to NI Water not allowing for the overlap with the MMR activity in its calculations.

Selective and new non-domestic meter installations

6.205 To determine an allowance for selective installations and new non-domestic installations, we used the projected number of installations and connections submitted in the company's business plan and applied the average unit rates of installation from first 4 years of PC15. This produced an allowance which was around 60% lower for selective installations and 70% lower for new connections. These variances resulted from the company using rates which were not reflective of PC15 actual outturn unit costs in its submission.

General meter purchase

6.206 The allowance for the purchase of meters for the above installations was determined by applying the rate submitted by the company for a 'dumb' meter to the total combined number of installations from the MMR, PME, selective install and new connection activities detailed above. Our allocation allowed for an estimate of the number of MMR jobs that would not need a meter to be fitted. This resulted in an allowance which was 13% lower than NI Water's submission. This difference is primarily due to the companys allowing for fitting meters at all MMR jobs.

Smart meter installation for all business as usual activity

6.207 We recognise the benefits that Smart meters can provide in terms of efficiencies in meter reading activities and the provision of real time data which can help manage consumption and minimise leaks. We are also aware that non-domestic customers generally support the transition to Smart metering.

6.208 We have therefore accepted NI Water's proposals to upgrade all business as usual meter installations to smart meters as this appears to represent value for money based on the relatively low incremental cost. Adopting this approach will deliver a Smart meter penetration rate of just under 40% for all non-domestic meters by the end of PC21.

6.209 To determine the appropriate cost uplift required to fit smart meters we applied NI Water's uplift cost for installing a fully 'Smart' meter as this does not appear unreasonable. However for the final determination we will consider whether automatic meter reading installations should be subject to a different unit rate. Our determined allowance for this element of the

programme is 15% lower than NI Water's submission. This is a result of our lower estimate of the number of business as usual meters required.

Installation of additional Smart meters

6.210 NI Water also proposed replacing a further 22,000 'dumb' meters throughout PC21 in order to increase their smart meter penetration. These additional meter replacements would apply to meters that are still operational and functioning correctly. NI Water are therefore proposing to replace meters which are not 'life expired' in PC21 with Smart meters.

6.211 The cost associated with this additional programme of work is significant due to the high unit cost of each installation. Is it estimated that around £6m would be required to replace these fully operational and serviceable assets (note that this differs from original submission figure of around £7.5m due to a significant element of double counting). This estimate includes around £1m for the installation of enabling IT technology and systems. The company tried to justify this additional expenditure by linking it to Opex cost savings and submitted a simple payback analysis which showed the cumulative return becoming positive towards the end of PC27 to support this. However the cost benefit analysis submitted did not appear to be correct as it did not align with proposed activity levels during PC21.

6.212 We undertook a separate cost benefit analysis which suggests that, if the company continue to replace and install only the meters required (i.e. excluding the additional 22,000), the cumulative return would become positive at the start of PC27 rather than the end, as NI Water's analysis had showed. This earlier net positive is achieved due to the comparatively lower capital outlay required and appears to represent better value for money. Adopting this policy would avoid the early replacement of fully operational and serviceable assets and would still deliver Smart meter penetration rates of around 93% by the end of PC27 which we consider reasonable.

6.213 We have excluded the additional smart meter replacement activity and associated costs on the basis that it is not cost beneficial but have included a proportion of the enabling IT costs to support the installation of the 28,000 Smart meters through business as usual activity.

Sub-programme 20 – Management & General

Background

6.214 The category of 'management and general' covers the capital assets required to support the general delivery of services which are not directly related to the operational water and sewerage service assets. It includes the

provision and maintenance of general facilities and accommodation, vehicles, information technology (including hardware and software) and the updating of network records.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
20a. PC15 Carryover	0.221	0.221	0.000	0%	24%
20b.Analytical Services Resilience	13.360	12.465	-0.723	-6.7%	35%
20c. ICT Base/Refresh	61.884	44.141	-17.743	-29%	70%
20d. Estate	12.438	11.568	-0.871	-6.7%	75%
20e. Health & Safety	14.719	13.689	-1.030	7%	100%
20f. Planning for the Future	55.578	40.395	-15.182	-27%	34%
20g. Other Essential	16.569	14.254	-2.315	-14%	78%
Total	171.730	133.865	-37.864	-22%	72%

Table 6.22: Investment in management and general.

Assessment of management and general investment

20a: PC15 Carryover

6.215 This programme of work covers the completion of two unfinished projects from PC15. One of the projects is for the completion of a clean water hydraulic model rebuild (£50k) and the second is for the procurement of a service provider to implement deterioration modelling (£161k).

6.216 Given the need for NI Water to complete works which began during PC15, we are content to allow the amount of £221k as requested and have not applied the generic reporter adjustment.

20b: Analytical Services Resilience

6.217 NI Water currently operate two laboratory facilities. One is located at Gelvin Grange, Londonderry and is tasked with carrying out analysis of waste water and trade effluent samples. The other facility is located on the Westland campus and is tasked with the analysis of clean water samples.

6.218 In its business plan submission, NI Water made the case that both labs are in a sub-optimal condition and no longer fit for purpose without significant investment.

6.219 The company considered a significant number of options in its business case including, consolidation of facilities at one site, construction of two new

facilities and refurbishment of the existing facilities. NI Water concluded that the optimum solution is to build a new clean water facility at Westland and convert the existing garage space at Gelvin Grange into a new wastewater lab facility.

6.220 The selected option is not the least cost solution but was chosen because:

a) It allows construction of the new facilities without disrupting current operations.

b) Retaining two lab facilities provides redundancy in the event of closure of one facility.

c) Equipment currently in use will provide spare parts when the new facilities become operational.

6.221 The evidence of the need for new lab facilities is well documented and justified. The decision to retain two sites, although not the least cost option, appears to be the most advantageous from an operational standpoint and has the support of other key stakeholders. We have therefore allowed the cost submitted subject to the reporter's generic Reporter adjustment. This has resulted in a pre-efficiency allowance of £12.465m.

20c: Base/Refresh

6.222 Sub-programme 20c consists of a number of projects which cover the business-as-usual replacement of obsolete/end-of-life assets and renewal of software licences.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Lab Info Management System (LIMS)	0.150	0.150	0.000	0%	100%
Asset Management Plan (NIAMP6)	4.269	3.416	-0.853	-20%	100%
Automatic Sampling Machines	0.297	0.100	-0.197	-66%	100%
ICT Base/Refresh	11.489	10.889	-0.601	-5%	100%
ICT Telemetry, Telecoms & SCADA	15.011	12.600	-2.411	-16%	100%
Fleet	15.308	13.733	-1.575	-10%	89%
Capital Programme Management & Reporting (CPMR)	0.601	0.407	-0.193	-32%	70%
CPMR Re-platform	1.401	0.000	-1.401	-100%	100%
Deterioration Risk & Reliability Model (DRRM)	1.501	1.092	-0.409	-27%	80%
Cyber Resilience	5.441	4.900	-0.541	-10%	0%
Oracle Re-platform	2.915	2.400	-0.515	-18%	90%
Renew CBC Contract	3.501	3.256	0.245	-6.7%	100%
Total	61.884	44.355	-17.529	-28%	88%

Table 6.23: 20c Investment in base/refresh

ICT Base/Refresh

6.223 NI Water relies heavily on its ICT network, assets and server infrastructure to conduct its business. ICT systems are critical for enabling the workforce to deliver essential services to customers in an efficient manner. ICT systems are also essential for ensuring NI Water meets its legislative and environmental responsibilities.

6.224 This sub-programme is broken down into 17 separate projects, most of which involve the replacement of obsolete or end of life equipment.

6.225 The company's business plan submission proposes expenditure of £11.49m classified as 90% base and 10% enhancement. We believe that the expenditure should be classed as 100% base maintenance because, although new equipment may provide some minor additional benefits in terms of functionality, the customer will not receive a noticeable improvement in service. We also disallowed the requested innovation funding of £0.6m,

as this appears to be a subset of contact management in Planning for the Future.

6.226 Our pre –efficiency allowance of £10.889m is broadly in line with PC15 expenditure on ICT Base of £11.2 but around 5% lower than the company's submission.

ICT – Telemetry, Telecoms & SCADA

6.227 NI Water's operational telecommunications system is an enabler for;

a) SCADA (Supervisory Control and Data Acquisition): provides signals to allow processes to be remotely controlled.

b) Telemetry: transmission of data from remote locations to allow real time decision making.

c) Telecoms: Internal phone system and radio repeaters.

6.228 The equipment used to provide the above systems has a finite life span and is replaced on a rolling programme basis. We would therefore not expect to see significant variations in costs between price control periods.

6.229 The business plan for PC21 is broken down into 11 separate projects, most of which involve the replacement of obsolete or end of life equipment at a total cost of around £15m.

6.230 The company's business plan submission categorises the expenditure as 90% base and 10% enhancement. As with ICT – Base, we believe that this expenditure should be allocated entirely to base maintenance. This is because NI Water was unable to quantify any service enhancements in its business plan submission. So although the new equipment may provide some minor additional benefits in terms of functionality, it appears that the customer will not receive any noticeable improvement in service.

6.231 NI Water informed us during the query process that the expenditure in PC15 was £20.7m, but the majority of the projects are not listed in table 3.3. We were only able to identify expenditure of £12.5m during PC15 and have based our determination on this figure. This is 16% lower than the company's submission.

Fleet

6.232 NI Water has a fleet of around 589 vehicles which service the various needs of different functions within the business. It covers a broad range of vehicle types, including 4x4s, vans (small, medium and large), lorries and other specialist vehicles. The vehicles are renewed on a rolling basis to keep the

volume of less efficient, overage vehicles at an acceptable level.

6.233 In its business plan submission, NI Water requested a sum of £20.414m. This was later reduced to £15.307m as a result of an internal challenge. The purpose of the funding is to replace vehicles on a like-for-like basis in the first 3 years of PC21 and introduce alternatively fuelled vehicles (i.e. electric vehicles) in the last 3 years of the price control period. The move to electric vehicles brings with it the additional problems of requiring the installation of charging infrastructure which is dealt with in section 20f - Planning for the Future.

6.234 NI Water has classified the expenditure on fleet as 50% base, 50% enhancement. There is a difference in unit costs between conventionally fuelled vehicles and alternatively fuelled and it is this difference that we intend to allow as enhancement. We have therefore changed the split to 89% base and 11% enhancement.

6.235 Our assessment indicates that all options may not have been explored by the company. For example, Biodiesel is not yet available in Northern Ireland but may be a viable option in the near future. If this were the case, it would defer the need to invest in any additional charging infrastructure. Given the extent of uncertainties and the speed of developments in this area, we do not believe that it would be appropriate to allow investment for a wholesale move to electric vehicles during PC21 at this stage. However, we do recognise that commercial vehicles have a finite economic lifespan and must be replaced accordingly. We have therefore included a pre-efficiency allowance of £13.733m in the draft determination with the caveat that the actual funding requirements for the final three years of the price control be assessed and determined at the PC21 mid-term review. Our allowance is 10% lower than the company's submission.

20c: Other

6.236 We have included a pre-efficiency allowance of £15.967m for the remaining projects in this programme which represents a 20% reduction against the company's submission of £20.076m. We largely based our allowance on the projection of historic run-rates as there was no compelling evidence submitted to justify why this should increase. We have disallowed the CPMR Re-platform project as the need to complete this project in PC21 has not been demonstrated. We will consider this further for the final determination if the company can provide additional evidence to support this investment.

20d: Estate

6.237 NI Water is responsible for the upkeep of numerous structures which are classed as "Historic Estate". In addition, ongoing maintenance of operational and administrative premises is essential. The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Historic Estate	2.660	2.473	-0.186	-6.7%	100%
Westland Campus	8.959	8.330	-0.627	-6.7%	73%
Silent Valley	0.821	0.764	-0.057	-6.7%	9%
Total	12.438	11.568	-0.871	-6.7%	75%

Table 6.24: 20d Investment in Estate

General

6.238 We are concerned that there may be an overlap between the expenditure for the Westland Campus, the proposed construction of the IOC (SP20f), Health and Safety expenditure (SP20e) and the proposed construction of new labs (SP20b). We will engage with NI Water on these issues prior to the publication of the final determination. In the meantime we have accepted NI Water's proposals subject to the generic Reporter adjustment of 6.7%.

20e: Health & Safety

6.239 NI Water's Health and Safety (H&S) business case identifies numerous areas where improvements are required to ensure compliance with statutory obligations. The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Facilities H&S Compliance	10.000	9.300	-0.700	-6.7%	100%
Other	4.719	4.389	-0.330	-6.7%	90%
Total	14.719	13.689	-1.030	-6.7%	100%

Table 6.25: 20e Investment in Health & Safety

6.240 The company calculated its budget for 'Facilities H&S Compliance' using on a top-down analysis based on an area of available floor space (m^2). As part

of query 97, we asked for the locations of proposed expenditure, however we did not receive a response to this particular part of the query. We remain concerned that there may be an over-estimation of the floor space requiring H&S expenditure, given the proposed investment on Westland campus buildings, the proposed movement of staff to Westland from other sites and the proposed construction of the new laboratories.

6.241 For the purpose of the draft determination we have allowed the requested amount less the generic Reporter adjustment of 6.7%. This has resulted in a pre-efficiency allowance of £13.689m. We have also concluded that Facilities H&S Compliance allowance should be 100% base.

6.242 We intend to engage further with the company to establish a more accurate figure for the final determination.

20f: Planning for the Future

6.243 NI Water has proposed a range of investment within this sub-programme to deliver opex and capex efficiencies as well as delivering improvements in customer experience, environmental performance and building resilience. The investment included and the outcome of our assessment for the draft determination is shown in the table below.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
IOC	13.098	9.169	-3.929	-30%	100%
Monitors & Sensors	4.201	3.907	-0.294	-6.7%	100%
Energy Efficiency	10.470	3.892	-6.578	-63%	0%
Groundwater Abstraction	2.401	2.233	-0.168	-6.7%	0%
PV	6.001	5.581	-0.420	-6.7%	0%
Wind	2.201	2.047	-0.154	-6.7%	0%
EV Charging	1.801	0.000	-1.801	-100%	0%
Battery Storage	6.001	5.581	-0.420	-6.7%	0%
Performance Excellence	0.600	0.558	-0.042	-6.7%	60%
Asset Delivery	1.851	1.721	-0.130	-6.7%	70%
RCM	1.901	1.768	-0.133	-6.7%	60%
Contact Management	1.051	0.977	-0.074	-6.7%	0%
IOC (Living With Water Programme)*	4.001	0.000	-4.001	-100%	70%
Total	55.578	37.433	-18.144	-33%	34%

Table 6.26: 20f Investment in Planning for the Future

Intelligent Operations Centre (IOC)

6.244 NI Water propose to construct new offices at its Westland site in Belfast which as the main centre for operational staff. The company has identified further investment to provide car-parking and improving the overall Westland site which is linked to this investment.

6.245 The company has argued that the investment will increase efficiency, although any savings has been seen as a means of delivering catch-up efficiency as opposed to an additional saving.

6.246 Since the company developed its Business Plan new ways of working have emerged in response to COVID19. Flexible and home working has increased. There is some indication that major office employers will embrace flexible working in the longer term which may reduce demand for office space and the cost of office leases. NI Water's existing plans run counter to this direction of travel. Before reaching a decision on this project we expect NI Water to consider its approach in the light of new circumstances including the potential for more home working and the potential the costs of leased offices will reduce.

6.247 We have allowed 70% of the requested amount (£9.169m) pending review of an updated business case.

Energy Efficiency

6.248 The energy efficiency project consists of nine separate projects which NI Water wish to take forward during PC21. Seven of the projects have break-even points between 4 and 10 years and 2 have no tangible financial benefits identified.

6.249 We disallowed funding for the following three projects that advocated early replacement of serviceable equipment:

- Blower upgrades
- Pumping station upgrades; and
- Generator upgrades

6.250 Funding was disallowed because we are not clear that the NPC calculations support the need for this investment. Furthermore, it is not clear if any associated impacts on other sub-programmes have been taken into account.

6.251 We will engage further with the company on these issues prior to completing our final determination.

EV Charging

6.252 We have disallowed the funding for EV Charging on the basis that we are deferring EV expenditure until the mid-term review. We will reconsider this funding when the strategy for electric vehicles is formalised.

Other

6.253 We have removed 6.7% from all other projects in this sub-programme to reflect the generic Reporter adjustment.

20g – Other Essential Projects

6.254 NI Water describe this sub-programme as “Other essential M&G projects that are required to address a number of customer, environment and business efficiency needs”.

6.255 The investment included in the company’s submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
AD - Asset Management Excellence - ISO55001 Improvements	0.501	0.468	-0.034	-6.7%	0%
AD - Asset Strategy - Wastewater Asset Performance Modelling	0.550	0.514	-0.037	-6.7%	100%
AD - Asset Strategy - Water Asset Performance Modelling	3.350	3.126	-0.224	-6.7%	100%
BIM and CDE (Common Data Environment) Project	0.501	0.468	-0.034	-6.7%	0%
Corporate Communication - Education programme	0.401	0.374	-0.027	-6.7%	50%
Innovation - Capital Efficiencies	0.661	0.617	-0.044	-6.7%	50%
Innovation - Future Innovation	0.661	0.617	-0.044	-6.7%	50%
Innovation - KPI Data	0.661	0.617	-0.044	-6.7%	50%
Innovation - Operational Efficiencies	0.235	0.220	-0.016	-6.7%	50%
Studies to Inform PC27 - Top 271 Priority Drainage Areas	7.770	7.249	-0.521	-6.7%	100%
Urban Drainage Modelling - Live Models for IOC	0.600	0.560	-0.040	-6.7%	0%
Water Fountains (Refill Stations)	0.216	0.202	-0.014	-6.7%	100%
Water Resource Demand Management Activities	0.460	0.430	-0.031	-6.7%	0%
Totals	16.569	15.459	-1.110	-6.7%	85%

Table 6.27: 20g Investment in other essential projects

6.256 All projects within this sub-programme were allowed subject to the generic Reporter adjustment of 6.7%.

Sub-programme 23 – Water mains new and renew

Background

6.257 The water mains new and renew sub programme covers water mains

requisitions, public realm schemes and other programmes of work for the provision or repair of water mains outside the main programme of planned water main rehabilitation. It also covers the proposed programme of proactive lead pipe replacement.

6.258 The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
New water main (requisitions)	2.044	1.549	-0.495	-24%	0%
Roads - including Public Realm and Diversions	10.972	3.941	-7.031	-64%	62%
Trunk main rehabilitation	19.219	17.931	-1.288	-6.7%	93%
Proactive Lead pipe replacement	8.240	5.109	-3.13	-38%	0%
Water main Infra – Railways, Roads and Rivers	1.880	2.158	+0.278	+15%	100%
Total	42.354	30.687	-11.666	-28%	69%

Table 6.28: Investment in water mains new and renew.

New water main requisitions

6.259 This programme of work covers the requisition of water mains to connect new developments to the existing distribution system. NI Water must service developments in response to demand which will ultimately determine actual costs. For the purposes of its submission, the company estimated a cost of around £2m for this programme on the basis of historic run rates with an allowance for growth. In the absence of information on the extent of future requisitions, the assessment of costs on the basis of historic demand is reasonable. However we did not find any robust justification for the company's allocation of 42% growth which appears excessive. This compares to a growth rate of just under 5% in PC21 based on the company's submission for the total number of new connections.

6.260 In our draft determination we have projected the historic run rate of expenditure to estimate the water main requisition allowance for PC21, but have reduced the growth uplift to align with the company's estimate of the increase in the number of new connections. This results in a pre-efficiency allowance which is around 24% lower than the company's submission.

6.261 The connection numbers in the last 2 years of PC15 will have changed from those estimated in the submission due to actual demand and the impact of COVID-19. NI Water has been working to assess the impact this might have on projections for PC21 and we will continue to engage with the company with a view to establishing an agreed set of numbers for use in the final determination. The allowance for water main requisitions will be adjusted to reflect the outcome of this process when it has concluded.

Roads schemes including public realm and diversions

6.262 These programmes of work cover the cost of upgrade, repair and diversion of water mains as a consequence of work carried out by other bodies.

6.263 The roads schemes submitted cover the repair and diversion of water mains in advance of road works by the Department for Infrastructure. Public realm work covers water main improvements in advance of the development of high quality paved areas by the Department of Communities, particularly pedestrian areas in urban centres. NI Water is notified of this type of development work in advance and is expected to carry out any necessary infrastructure improvements to avoid the disruption and cost of having to do so after the work being undertaken by the other bodies has been completed.

6.264 NI Water's submission indicated that it had based its assessment of the PC21 investment required for public realm work of around £4.8m on historic spend. However when an exercise to map historic expenditure to PC21 project lines within this sub-programme was undertaken, no public realm work was identified. During engagement with the company, it advised that any public realm work required in PC15 had been undertaken by the water main rehabilitation contractor under sub-programme 08. This means that the historic costs have already been accounted for in our projected costs for water main rehabilitation and so we have not allowed the cost here.

6.265 In our engagement with NI Water, it indicated that it had not been undertaking some public realm improvements in PC15 due to budget constraints and that some level of additional provision might therefore be appropriate. If the company can provide evidence to support this view we will consider it for the final determination.

6.266 NI Water submitted a table identifying nine roads schemes planned for PC21. This included estimated costs of just over £4m for the diversion work required for both water mains and sewers. We did not assess these schemes individually for the draft determination but have applied the generic Reporter adjustment of 6.7% to get our pre-efficiency allowance. We will consider whether it would be more appropriate to undertake individual assessments for the final determination.

6.267 In addition to the nine named roads schemes NI Water included an additional £2m for 'future unknown schemes'. Our assessment of historic outturn costs indicates that actual costs are as likely to be lower than planned expenditure as they are to be higher. We have therefore removed the £2m included in the programme for 'future unknown schemes' on this basis.

6.268 The company has also included a small amount of carry over expenditure in this programme for the completion of work associated with the 'A6 Dungiven Drumahoe' road scheme which commenced in the second half of PC15. The figure of £0.175m submitted represents a small percentage of the overall expenditure on the project and has been allowed in full.

6.269 The outcome of our assessment for roads and public realm work is a pre-efficiency allowance which is 64% lower than the company's submission.

Trunk main rehabilitation

6.270 NI Water proposed a specific programme of trunk main rehabilitation for the first time in PC15. This was done in recognition of the fact that trunk mains laid over the last 60 to 100 years will reach the end of their useful life. For PC15 the allocation was based on the investment required to deliver a rate of rehabilitation of 2.5 km per annum rising to 5km per annum. This cautious rate of intervention was adopted to allow time for the company to complete its assessment of the condition of mains. We noted that we would expect the company to continue its investigations and be in a position to provide a more robust case for investment in the future.

6.271 For PC21 the company has submitted specific proposals for the rehabilitation of six trunk mains which it ranks highest in terms of the risk of failure and the consequence of failure based on interruptions to supply. The proposed investment totals just over £15m. For the draft determination we have applied the generic Reporter generic adjustment of 6.7% to these schemes to get our pre-efficiency allowance.

6.272 On initial inspection, the unit rates for these schemes appear high when compared with information on historic unit rates submitted by NI Water in response to queries on other parts of the business plan submission. We will investigate this further for the final determination and will seek additional clarification on the extent of the submitted costs.

6.273 The company also included two general budget lines within this programme of work.

- The first is for raw water trunk main rehabilitation at a pre-efficiency cost of around £1m. This is primarily to target work at raw water

aqueducts and associated structures identified through investigations being carried out under a separate Water Asset Performance Modelling project. Initially the company used deterioration risk and reliability modelling to estimate the costs. However the outputs from this process were not used, as the company acknowledged that the statistical relationships to predict failure were too uncertain given the fact there is very little failure data to drive the models. The submission therefore simply represents a holding budget for potential work and has been categorised as a development output by NI Water due to the uncertainty over the exact requirements.

- The second is a general pre-efficiency budget of around £2.8m for further trunk main rehabilitation work which has yet to been identified. The company has allocated 40% of this budget to enhancement in its submission. We have changed this to 7% to reflect the split of base and enhancement expenditure in the remainder of the sub-programme and the expected nature of this type work.

6.274 We recognise that further work may be required in both these areas as a result of ongoing investigations and assessments and so for the purposes of the draft determination we have included both these sums subject to the generic Reporter adjustment of 6.7%. However we will be seeking further evidence on how these budgets have been quantified prior to the final determination to establish whether they are fully justified.

Lead pipe replacement programme

6.275 The company's submission for proactive replacement of lead communication pipes is based on a continuation of the PC15 rate of 1,844 pipes per annum. This rate of replacement has been agreed by key stakeholders. The company stated that its pre-efficient cost of £8.2m was based on average outturn costs in PC15. Our initial assessment however indicated that the unit rate and total cost submitted were significantly higher than the company's historic data would suggest. We queried this during the draft determination process and received additional information which indicated that costs had reduced significantly in the latter stages of PC15 following a retender of the relevant framework contract in 2018-19.

6.276 For the draft determination we have applied the average unit rate for replacement since the establishment of this contract to the number of communication pipes being replaced in PC21 to determine an allowance. This has resulted in a pre-efficiency figure which is around 38% lower than the company submission.

Water infrastructure at railways, roads and rivers

6.277 This programme covers work required to locate, inspect, survey and rehabilitate pipework that crosses, or is adjacent to, railways, road bridges and rivers. Because of the location of these assets, they are difficult to access for inspection and repair. The consequence of failure is high, as is the risk of the failure causing a major interruption to supply.

6.278 In PC15 NI Water has concentrated on inspecting and rehabilitating infrastructure in the vicinity of Northern Ireland Railway assets as these are most critical in terms of impact and cost. The majority of this work will be completed in PC15 but there will be some carry over into PC21. Once work in the vicinity of railways has been completed, the work programme will move on to road bridges and river crossings for the remainder of PC21.

6.279 NI Water's submission identified a significant level of investment that might be required to complete all investigations in the future. It however also acknowledged that infrastructure in the vicinity of roads and rivers poses a lesser risk than that at railways and so the company constrained the budget in recognition of other competing investment priorities in PC21. The submitted pre-efficiency budget of around £1.88m was intended to allow the remaining work at railway sites to be completed and also enable surveys to take place at the highest priority road bridge and river crossing sites. Based on the activities and unit costs quoted in the company's business case we believe that the budget required to undertake this work has been underestimated. We have therefore increased the company's pre-efficiency allowance by around 15% accordingly. The generic Reporter adjustment has not been applied as this allowance has been estimated from historic costs.

Sub-programme 24 – New and renew sewerage

Background

6.280 The sub-programme of new and renew sewerage covers sewer requisitions, public realm schemes and other programmes of work for the provision or repair of sewers outside the main programme of planned sewer rehabilitation. The investment included in the company's submission for this sub-programme and the outcome of our assessment for the draft determination is shown in the table below. This is followed by an explanation of how we have arrived at the individual assessments.

	BP Pre-efficiency	DD Pre-efficiency	Variance to BP	% change	DD Base Allocation
Sewerage - FTS and sewers for adoption	26.683	23.635	-3.049	-11%	0%
Sewerage – Culmore DA development objective	8.775	8.187	-0.588	-6.7%	0%
Roads - Public realm	4.808	0.000	-4.808	-100%	N/A
Sewerage Infra – Railways, Roads and Rivers	1.151	0.873	-0.278	-24%	100%
Total	41.417	32.695	-8.722	-21%	3%

Table 6.29: Investment in new and renew sewerage.

Sewerage - First time services and sewers for adoption

6.281 The company's submission indicated that this programme of work covered the requisitioning of sewers to connect new developments to the existing sewerage network and for minor works required to facilitate the adoption of development sites into the public wastewater network.

6.282 However during the draft determination process NI Water clarified that sewers for adoption had been submitted as part of this business case in error and should have formed part of the Ops Capital Sewerage submission (sub-programme 18) as historic costs are embedded there. We have followed this approach and so our assessment of costs for sub-programme 24 only covers sewer requisitions.

6.283 The company indicated it had estimated the PC21 budget requirement of £25.27m for first time services on a pro rata uplift of outturn expenditure in the first 4 years of PC15, with a 1% cumulative allowance for growth. In the absence of information on the extent of future requisitions, this approach to the assessment of costs appears reasonable. However company's business plan submission indicates that it expects the number of sewer connections to reduce by around 6% in PC21, rather than increase. The growth assumption stated for this programme of work therefore does not appear reasonable.

6.284 For the draft determination we obtained an updated projection of PC15 outturn expenditure from the company and reduced this in proportion to the anticipated reduction in connection numbers in PC21. This results in a pre-efficiency allowance for first time services in PC21 which is around 6% lower than the company submitted.

6.285 The overall programme line is 11% lower because the sewer for adoption element of £1.413m has been removed and assessed as part of sub-programme 18 (Ops Capital – Sewerage) as advised by the company.

Sewerage – Culmore drainage area development objective

6.286 NI Water included a pre-efficiency budget of around £8.8m for work required to address capacity issues in a trunk sewer which is restricting development. The investment proposed would deliver a wastewater pumping station and just under 9km of large diameter pumping main. NI Water has acknowledged that the cost estimates are uncertain as they are based on a study completed in 2011. As a result they have categorised this as a development output and plan to complete a new drainage area plan, including hydraulic modelling, to confirm the exact requirements. This plan is ranked number one on the priority list that the company has agreed with NIEA.

6.287 For the purposes of the draft determination we have included this investment and applied the generic Reporter adjustment of 6.7% to get our pre-efficiency allowance. However the company should not proceed with any investment until it has completed its drainage area study, fully developed its solutions and submitted final proposals to us for separate determination. We will seek an update from the company on its programme for completing this work prior to completing our final determination.

Roads schemes including public realm

6.288 For PC15 this programme covered the costs of repair and diversion of sewers in advance of public realm and roads schemes carried out by other bodies. For PC21 NI Water has included the cost of sewerage work required in advance of roads works in sub-programme 23 as this will be carried out alongside equivalent work on water mains. As a result the only submission the company has made under this sub-programme for PC21 is for public realm work. This covers sewer improvements in advance of the development of high quality paved areas, particularly pedestrian areas in urban centres.

6.289 NI Water's submission indicated that it had based its assessment of the PC21 investment required for public realm work of around £4.8m on historic spend. However, as with SP23, when an exercise to map historic expenditure to PC21 project lines was undertaken, no public realm work was identified. The assumption is that any relevant expenditure in PC15 would have been undertaken by the sewer main rehabilitation contractor under sub-programme 12. This means that any historic costs would have already been accounted for elsewhere in our assessment and so we have not included an allowance for public realm work within this sub-programme.

6.290 In our engagement with the company, it indicated that it had not been undertaking some public realm improvements in PC15 due to budget

constraints and that some level of additional provision might therefore be appropriate. If the company can provide evidence to support this view we will consider it for the final determination.

Sewerage infrastructure at railways, roads and rivers

6.291 This programme covers the work required to locate, inspect/survey and undertake rehabilitation of pipework crossing or adjacent to railways, road bridges and rivers. Because of their location, these assets are difficult to access for inspection and repair. The consequence of failure is high, as is the risk of pipe failure causing a major pollution incident.

6.292 The submitted pre-efficiency budget of around £1.15m was to allow NI Water to undertake priority work on gravity sewers and wastewater pumping mains. In our commentary for sub-programme 23, we noted that the company had identified a significant level of investment that might be required to complete all water main and sewer investigations moving forward, but that it had constrained the budget for road and river work in PC21 in recognition of other competing investment priorities.

6.293 The budget allocated for sub-programme 24 does not appear to have been estimated from activity levels, but instead appears to be the balance of the overall constrained budget following deduction of the water main element. The constrained budget for both water mains and sewers of just over £3m compares to anticipated expenditure of around £6m in PC15. For the draft determination we have followed the same approach as the company and allowed the balance of the constrained budget following deduction of the water main element. This results in a pre-efficiency allowance which is 24% lower than the company's submission due to the fact that a higher figure was estimated for sub-programme 23 based on stated activity rates. However the overall pre-efficiency allocation across both sub-programmes for railway, road and river infrastructure work remains the same as in the company's submission. The Reporter's generic adjustment has not been applied as this budget is already constrained.