United Utilities Water Limited
Annual Performance Report 2017/18

Commentaries for APR tables 4J – 4W
Cost Assessment

July 2018

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Executive summary

Introduction

This document is designed to support tables 4J to 4W within UUW's 2017/18 Annual Performance Report (APR).

Tables 4J to 4W of the APR contain information on the allocation of expenditure to different investment categories. It also contains information on the drivers of expenditure, such as population served or asset capacities. This information and comparable information published by other water companies can be used by Ofwat, or others, to support the development of cost models that can be used within the PR19 process.

This document should be read alongside tables 4J to 4W and provides additional and detailed information on and issues and assumptions used in developing our reported values together, where relevant with our views on the relevance or effectiveness of using the data in developing the PR19 cost models.

We have found that the process of capturing information through a structured data process and then collaboratively reviewing this data, to try to ensure the information is a sensible cost driver and is being consistently reported has been very effective.

We are keen to ensure that this process is maintained and that companies continue to be actively involved in both clarifying any inconsistencies or anomalies that emerge in the reported data. We would like to emphasise that the effectiveness of the models can only reflect the consistency and accuracy of the input data. We believe it important that the cost models adequately take account of the accuracy and nature of the data used within the models.

Assurance

As the information within the APR tables J-W contain detailed cost breakdown it has inherent data reporting risks. Additionally, although this is the first time we have published this information, we have previously provided versions of the data for prior years to Ofwat, with some elements of this information having needed to be restated.

As a consequence of these risks this data was identified as a targeted area within our 2017/18 regulatory report Final Assurance Plan that is published on our website.

The activity that we have put in place, which have helped to mitigate these risks are:

- We recently implemented a major financial system upgrade roll out to improve the accuracy of reporting and definition of our cost reporting and ensure alignment to the new price controls.
- We have implemented a new reporting tool, CostPerform, to ensure that all directly rechargeable costs are allocated to the appropriate segment of the appropriate price control and that effectively weighted allocations of indirect costs can also be applied.
- The tool was audited by Corporate Audit, who confirmed that financial data had been completely and accurately transferred from the corporate finance system into CostPerform and then allocated in line with agreed methodologies to produce the service costs feeding into the year-end regulatory accounts.
- New information requirements to support the PR19 cost assessment process have been incorporated into our month six, month nine and yearend regulatory reporting.

As set out in the Final Assurance Plan we have applied a three lines of assurance review and governance approach.

All data has been subject to data owner and senior manager (Level 3) sign-off and independent expert / peer review of supporting information and audit trails;

The regulatory reporting process, including the cost assessment data, was reviewed by UU Corporate Audit. The audit covered the following areas, with no issues being noted:

- The validity consistency of the data reported in Sections 3 and 4 of the Annual Performance Report. This included sample testing to agree data back to underlying UU records and systems. Note: this review will not duplicate the work undertaken by KPMG;
- Consistency of the commentary with the underlying data within the APR;
- Compliance of the reported data in the APR with key aspects of Regulatory Guideline 3.10 "Guideline for the format and disclosures for the annual performance report";
- Overall governance arrangements in place to ensure the regulatory data is complete and accurate and reported in line with the required timescales;
- Confirmation that assurance activities detailed in UU's published Final Assurance Plan have been completed in line with the plan; and
- Review the proposed Assurance Report (to be published along with the Annual Performance Report 2017/18) to ensure it is a fair reflection of the associated assurance activities and results thereof.

The data within this submission was also added to the scope of the assurance review undertaken by our technical auditor Halcrow Management Sciences Limited (HMS) (part of the Jacobs group). HMS undertook an agreed upon procedures review and concluded that *"On the basis of our audit work and with exceptions as noted in Appendix 1 and 2, we are satisfied that the information within and which supports the RR18 has been assembled using appropriate data and methodologies and provides a reliable representation of Company performance. There is also good evidence of senior management engagement, governance and programme management".*

The results and findings from the review and assurance processes were presented to and discussed with the UUW Board, as part of their review and approval of the Annual Performance Report in June 2018.

The findings of the HMS review and the findings of the second line review undertaken by UU Corporate Audit are included within Appendix 1 of our APR, which is published on our website.

Key points from the detailed commentary

Wholesale expenditure – Tables 4J, 4K, 4L, 4M, 4N, 4O, 4V and 4W

To ensure any cost models are robust it is important that companies have been seen to have allocated their expenditure consistently. We have populated these tables in outturn prices and on a principal use basis.

Most of the allocations have been able to be directly identified and populated from information contained within corporate systems. Any assumptions that have needed to be made in allocating costs to lines within any of the table have been set out in this commentary document.

Totex expenditure in 2015/16, 2016/17 and to a lesser extent in 2017/18 was significantly higher than assumed in either the PR14 FD or in our PR14 business plan. 2017/18 expenditure in Water was in excess of the FD whereas 2017/18 Wastewater expenditure was lower than the FD assumption. The cumulative Wastewater position remains significantly higher than the FD.

The key reason for this increased expenditure is because we have chosen to accelerate our expenditure programme, to help to secure the performance improvements required to meet the challenges of our AMP6 outcomes and to secure longer term operational efficiencies.

Properties and population – Tables 4Q and 4U

We support the collection of the properties and population data as we consider it to be defined, reportable, potentially useful for cost assessment, and not obviously a replication of data reported elsewhere.

We consider that the location of a meter (Table 4Q lines 1 and 2) is a matter for company choice and is less relevant as a cost driver. To ensure consistency of wastewater data an assessment would need to be made as to whether all companies are calculating resident and non-resident population in a consistent manner.

We are undertaking significant work in West Cumbria, to address the issues associated with the planned revocation of a major abstraction licence from Ennerdale. This significantly impacts upon the values reported in this table, see individual line commentaries.

We also believe that the energy use measures may be relatively poor potential explanator of cost, as these measures are partially under management control, and so cannot be considered to be entirely exogenous.

Wholesale water non-financial data – Table 4P

The current reporting requirements for average pumping head could still be open to some interpretation and there is a risk companies are not reporting this information consistently. Average pumping head is calculated by taking total pumping head (i.e. the sum of the products of the total flow and mean lift at each pumping station) divided by the distribution input to give the average pumped head. There is a risk that companies assumptions and methodologies for determining the total flow and the mean lift are not being consistent applied across the industry. We set out potential areas of inconsistency in the relevant line commentaries below.

In completing this table we have used the published reporting requirements to determine the proportion of distribution input from each source type. Where sources of different types feed a works and the flow from these sources is combined prior to treatment, then all of the flow entering the works has been categorised as the more difficult to treat water. We classify difficulty to treat in the following order: river water > reservoir water > borehole water.

This is an appropriate method to develop a cost driver for water treatment works operational costs, but may not be appropriate for a water resources totex cost model (where for example capital costs of impounding reservoir maintenance or costs of managing catchment land may be a significant factor).

We also own and operate a number of cascade reservoir systems where water is transferred between reservoirs but from which there is only one abstraction point. The number of impounding reservoirs reported is therefore significantly lower than the actual number of impounding reservoirs that we operate and maintain. In terms of developing a suitable cost driver for totex models, it should be recognised that the costs of operating and maintaining a reservoir and its catchment land, would not be significantly different whether reservoirs were in a cascade or supplying a water treatment works directly.

The number of sources used varies from year to year depending on weather, demand and asset outages. The number of assets reported in the tables is therefore significantly lower than the actual number of assets that we need to operate and maintain. Therefore a simple number of sources employed will understate the actual cost and level of redundancy built within a system to manage demand peaks

The production capacity in each of the water treatment works type changes from year to year dependent on demand, rather than as a result of any changes in the actual number of works in each category.

We support the collection of number and treatment type of water treatment works.

We believe that mains length and population density are the best drivers of cost. We consider that the diameter of the mains could potentially duplicate some of the pumping head costs if both are included within a model and therefore these factors may have less explanatory power.

The current work volume measures are of limited use as they do not adequately reflect the substantial work that we have been undertaking on our major trunk mains, over recent years, such as slip lining the Vynrwy aqueduct.

We support the collection of both capacity and number of pumping stations; service reservoirs and water towers, although as many small pumping stations would have a higher cost than a single large asset, the results may still not provide good explanator of cost. Measures relating to the scale and complexity of the distribution network appear to be better cost drivers.

Non-financial data wastewater network and sludge –Table 4R

We support the collection of the wastewater network data as we consider it to be defined, reportable and potentially useful for cost assessment, although it is imperative that each company reports to consistent definitions.

However, it is important to consider the confidence grades (CG) applied to the data and the use of inferred information within any of the datasets provided. We have undertaken additional work during the year to improve the accuracy of our inferred data, on both the legacy and ex-private sewer network, where the use of inferred data could have substantial impacts upon the data being reported by different companies.

The performance of the wastewater network is influenced by a number of exogenous factors such as population density, level of urbanisation, rainfall levels and run off rates.

Non-financial data sewage treatment – Table 4S

We believe that the variables considered within this table will provide a good basis for the comparison of costs between companies. With the categorisations of drivers used being logical and consistent with operational and engineering cost drivers.

Non-financial data sludge and sludge treatment – Tables 4T

Our approach has been to move towards measuring sludge production using our Regional Sludge Operational Management (RSOM) system, which is providing us with greater accuracy in our data. We would welcome the opportunity to work with Ofwat and share best practice on calculation methods, to further improve consistency across the industry and improve comparability of the data.

We incinerate digested sludge (at Shell Green). This is included in Block B of Table 16 and excluded from Block A. It is critical that calculation methods for the quantity of each sludge activity are consistent for each line so that company comparisons can be made in a fair way. Only if that is done will the use of percentages within a company provide an effective comparison across companies. More detail on this is set out in our commentary for the Sludge (Revised) Table 16 Lines 5 - 6.

Table 4J – Atypical expenditure by business unit – Wholesale Water

Wholesale water expenditure overview

Total expenditure levels in the first three years of AMP6 are above the values assumed within the PR14 final determination. The key reason for the relative increase in expenditure over the last three years, above that assumed in the FD, is because we have chosen to accelerate our expenditure programme to enable us to target a better service level for customers, improve performance against our outcomes and to help to secure future efficiency savings. Despite this acceleration on a like for like basis we are expecting to outperform the allowed wholesale totex by c£100m, although as we are planning to invest an additional c£250m we expect to report an overspend over the full AMP6 period against the allowed wholesale totex of c£150m.

Since the final determination was published Ofwat have provided revised guidance (RAG 2.07) on cost allocation principles. This sets out that capital expenditures and associated depreciation of assets should be reported in the service of principal use of that asset with recharges made to the other services that use the asset. This has resulted in totex which would previously have been reported in the water service now being recorded in the wastewater service.

Block A – Operating expenditure

Line 4J.1 – Power

Power costs increase due to inflation and asset growth, with reductions due to efficiencies to reduce gross consumption and targeted lower cost time of usage.

Line 4J.2 – Income generated as negative expenditure

No commentary

Line 4J.3 – Abstraction charges/discharge consents

Abstraction charges are allocated 100% to Water Resources and discharge consents for Water Treatment sites 100% to Water Treatment within Water Network Plus..

Line 4J.4 – Bulk supply

Bulk supply costs are relatively small.

Line 4J.5 – Renewals expensed in year (infrastructure)

The total IRE expenditure in FY18 is broadly in line with the final determination assumptions. There has been an increased level of activity in the water network in the first three years of the period to secure AMP6 outcome delivery incentive (ODI) performance requirements.

Line 4J.6 – Renewals expensed in year (non-infrastructure)

We have not included any expenditure within this line.

Line 4J.7 – Other operating expenditure excluding renewals

Water receive a charge from Wastewater for Water Sludge produced as part of the Treatment process. Following clarification from Ofwat Water now makes recharge to Wastewater for Water used at Wastewater sites for which it receives the credit (excluding CCD) within Other Operating Expenditure, this is the primary driver behind value being slightly lower than in FY17.

Line 4J.8 – Local authority and Cumulo rates

Rates are currently assessed on a cumulo basis and are not asset specific, in line with the RAGs we split Water cumulo rates by GMEAV and therefore movements will occur as GMEAV moves over time without any real cost fluctuations in overall cumulo rates costs, therefore it is unlikely that splitting cumulo rates by business unit types will give any meaningful cost driver information. Whilst the Business Rates Revaluation occurred effective 1st April 2017, the impact to Water Cumulo rates for UUW was significantly smaller than the impact on some other companies.

Line 4J.9 – Total operating expenditure excluding third party services

This is a sum of lines 1-8, for an explanation of variance see the individual line commentary above.

Line 4J.10 – Third party services

The costs allocated to this line are relatively low.

Line 4J.11 – Total operating expenditure

This is a sum of lines 1-8, 10 for an explanation of variance see the individual line commentary above.

Block B – Capital expenditure (exc. atypicals)

To develop the capex values reported within this table we have, presented expenditure on a principal use[1] basis in accordance with RAG 2.07 and ensured that the capex costs align with the capex costs reported in other tables within our 2017/18 APR and Regulatory Accounts.

Line 4J.12 – Maintaining the long term capability of the assets - infra

IRE is reported within Section A - Operating Expenditure line 4J.5.

Line 4J.13 – Maintaining the long term capability of the assets - non-infra

Spend in the first three years of the AMP is relatively high compared to historic precedent due to acceleration of the maintenance programmes to respond to the challenges of our AMP6 ODIs together with work on a significant programme of information and operational technology being undertaken to support UUW's new operating model. The costs reported have been developed on a principal use basis. This has had the net effect of moving some expenditure from the water to wastewater service.

Line 4J.14 – Other capital expenditure - infra

Expenditure in this area is relatively high due to substantial expenditure on the "West Cumbria Future Strategy project" which is a major project to construct a pipeline and new water treatment facilities to provide additional water supplies from Thirlmere reservoir to the West Cumbria area.

Line 4J.15 – Other capital expenditure – non-infra

Non infrastructure enhancement has seen a slightly higher level of activity than previous years as a number of high profile and high cost projects progress, particularly the Thirlmere West Cumbria future strategy.

[1] **Principle use** - Since the final determination was published Ofwat have provided revised guidance (RAG 2.06) on cost allocation principles. This sets out that capital expenditures and associated depreciation of assets should be reported in the service of principal use of that asset with recharges made to the other services that use the asset.

Line 4J.16 – Infrastructure network reinforcement

Following changes to reporting post Developer Services reform we are aligning our systems to be consistent with the spirit of the data usage, as a result we have been prudent with the value reported within line but expect it to increase once the changes are embedded.

Line 4J.17 – Total gross capital expenditure excluding third party services

This is a sum of lines 12-16, for an explanation of variance see the individual line commentary above.

Line 4J.18 – Third party services

We have no capital expenditure included as third party services.

Line 4J.19 – Total gross capital expenditure

This is a sum of lines 12-16 and 18 for an explanation of variance see the individual line commentary above.

Line 4J.20 – Grants and contributions (price control)

Overall there has been a reduction in grants and contributions of £4.7m that relates to a one-off catch-up in revenue recognition for connections and infrastructure charges in FY17 as we didn't accrue for income prior to FY17. This has been offset partially by £1.34m due to an increase in the number of connections made (12% increase). There has also been a reduction in diversions compared with the previous year.

Line 4J.21 – Totex

This is a sum of lines 11, 19 and 20 for an explanation of variance see the individual line commentary above.

Block C – Cash expenditure (exc. atypicals)

Line 4J.22 – Pension deficit recovery payments

Pension deficit recover costs vary significantly across different years.

Line 4J.23 – Other cash items

We have no costs included in other cash items.

Line 4J.24 – Totex including cash items

This is a sum of lines 21 to 23, for an explanation of variance see the individual line commentary above.

Block D – Atypical expenditure

Line 4J.25 Storm impact (opex excluding IRE)

Line 4J.26 Storm impact (IRE)

Line 4J.27 Storm damage (Capex)

Expenditure in lines 4J.25-4J.27 is associated with the cost of storms Desmond and Eva. In December 2015, Desmond and Eva brought record breaking rainfall levels and several thousand homes and businesses were inundated with floodwater across Cumbria, Lancashire, Greater Manchester, Merseyside and Cheshire. The storms resulted to widespread damage to infrastructure and non-infrastructure assets.

Line 4J.28 2005 Cumulo rates refund

The expenditure relates to a £4.4m refund received in July 2017 relating to the 2005 Central List Rates Appeal.

Line 4J.29-34 Atypical expenditure lines

No further items have been classed as atypical

Line 4J.35 Total atypical expenditure

The total of lines 25 to 34.

Block E – Total expenditure

Line 4J.36 – Total expenditure

This is the sum of lines 24 and 35, for an explanation of variance see the individual line commentary.

Table 4K – Atypical expenditure by business unit – Wholesale Wastewater

Wholesale wastewater expenditure overview

Total expenditure levels in the first three years of AMP6 are above the values assumed within the PR14 final determination (FD). The key reason for the relative increase in expenditure over the last three years, above that assumed in the FD, is because we have chosen to accelerate our expenditure programme to enable us to target a better service level for customers, improve performance against our outcomes and to help to secure future efficiency savings. Despite this acceleration on a like for like basis we are expecting to outperform the allowed wholesale totex by c£100m. We are planning to invest an additional c£250m therefore expect to report an overspend over the full AMP6 period against the allowed totex of c£150m.

Since the final determination was published Ofwat have provided revised guidance (RAG 2.07) on cost allocation principles. This sets out that capital expenditures and associated depreciation of assets should be reported in the service of principal use of that asset with recharges made to the other services that use the asset. This has resulted in totex which would previously have been reported in the water service now being recorded in the wastewater service.

Block A – Operating expenditure (excl. atypicals)

Line 4K.1 – Power

Our power expenditure rises due to inflation and asset growth off set by efficiencies to reduce gross consumption and targeted lower cost time of usage.

Line 4K.2 – Income generated as negative expenditure

This line contains the ROC income from CHP generation at our wastewater treatment works. Income has increased in FY18 due to a full year's income from our biogas to grid plant at our Manchester Bioresources Centre (RHI – Renewable heat incentive and gas to grid).

Line 4K.3 – Discharge consents

We continue to review our consents with the Environment Agency (EA) to ensure that they are accurate. This line also includes costs charged by Canals and Rivers Trust and other discharge consent payments.

Line 4K.4 – Bulk discharge

We have no bulk supply or bulk discharge costs.

Line 4K.5 – Renewals expensed in year (Infrastructure)

We report our IRE expenditure in this line, with expenditure levels remaining broadly consistent with prior years.

Line 4K.6 – Renewals expensed in year (Non-Infrastructure)

We have not included any expenditure within this line.

Line 4K.7 – Other operating expenditure excluding renewals

We receive a recharge from the Water price control for water usage at WwTW.

Line 4K.8 – Local authority rates and Cumulo Rates

The underlying value of rates that we pay to local authorities continues to grow a little in line with the investments that we make to our wastewater asset base. Reported values in each year fluctuate predominantly due to the impact of price increases, accruals as well as adjustments for refunds and back charges.

Line 4K.9 – Total operating expenditure (excluding third party services)

This is the sum of lines 1 to 8 see individual lines above for commentary.

Line 4K.10 – Third party services

We recover costs from third parties that damaged our assets, when we are able to trace and bill that party. Charges are designed to recover the costs of the repair only.

Line 4K.11 – Total operating expenditure

This is a calculated line and is the total of lines 9 and 10.

Block B – Capital expenditure (excl. atypicals)

To develop the capex values reported within this table we have, presented expenditure on a principal use[2] basis in accordance with RAG 2.07 and ensured that the capex costs align with the capex costs reported in other tables within our 2017/18 APR and Regulatory Accounts.

Line 4K.12 – Maintaining the long-term capability of the assets - infra

IRE is reported within Section A - Operating Expenditure line 4K.5.

Line 4K.13 – Maintaining the long-term capability of the assets - non-infra

Spend in the first three years of the AMP6 period is relatively high compared to historic precedent. This is due to a combination of the acceleration of the maintenance programmes to respond to the challenges of our AMP6 performance commitments, the maintenance expenditure associated with major enhancement projects at Davyhulme WwTW and Oldham WwTW, together with a significant programme of information and operational technology being undertaken to support our new operating model. The costs reported for the AMP6 period for this line have been developed on a principal use basis. This has had the net effect of moving expenditure from the water to wastewater service.

Line 4K.14 – Other capital expenditure – infra

Expenditure levels are heavily dependent upon the nature and scale of the enhancement programmes and expenditure levels.

Line 4K.15 – Other capital expenditure – non-infra

Expenditure levels reported against this line are also dependent upon the nature and scale of the enhancement programmes.

Line 4K.16 – Infrastructure network reinforcement

Following changes to reporting post Developer Services reform we are aligning our systems to be consistent with the spirit of the data usage, as a result we have been prudent with the value reported within line but expect it to increase once the changes are embedded.

Line 4K.17 – Total gross capital expenditure excluding third party services

This is the sum of lines 12 to 16 see individual lines above for commentary.

Line 4K.18 – Third party services

We have no capital expenditure included as third party services.

[2] **Principal use** - Since the final determination was published Ofwat have provided revised guidance (RAG 2.06) on cost allocation principles. This sets out that capital expenditures and associated depreciation of assets should be reported in the service of principal use of that asset with recharges made to the other services that use the asset.

Line 4K.19 – Total gross capital expenditure

This is the sum of lines 12 to 16 and 18 for an explanation see individual line commentary.

Line 4K.20 – Grants and contributions

We have populated this line to be consistent with APR Table 4E.

Line 4K.21 – Totex (calculated line)

This is the sum of lines 11, 19 and 20.

Block C – Cash expenditure

Line 4K.22 – Pension deficit recovery payments

Pension deficit recover costs vary significantly across different years.

Line 4K.23 – Other cash items

We have no costs in other cash items.

Line 4K.24 – Totex including cash items (calculated line)

This is a sum of lines 21 to 23, for an explanation of variance see the individual line commentary above.

Block D – Atypical expenditure

Line 4K.25 Storm impact (opex excluding IRE)

Line 4K.26 Storm impact (IRE)

Line 4K.27 Storm damage (Capex)

Expenditure in lines 4K.25-4K.27 is associated with the cost of storms Desmond and Eva. In December 2015, Desmond and Eva brought record breaking rainfall levels and several thousand homes and businesses were inundated with floodwater across Cumbria, Lancashire, Greater Manchester, Merseyside and Cheshire. The storms resulted to widespread damage to infrastructure and non-infrastructure assets.

Line 4K.28-34 Atypical expenditure lines

No further items have been classed as atypical

Line 4K.35 Total atypical expenditure

The total of lines 25 to 34.

Block E – Total expenditure

Line 4K.36 – Total expenditure

This is the sum of lines 24 and 35, see individual lines for commentary.

Table 4L – Enhancement expenditure by purpose – Wholesale water

Wholesale water enhancement expenditure overview

Every project in our capital expenditure programme is recorded on our corporate system, the Capital Programme Management System (CPMS). Each project is proportionally allocated to purpose category drivers reflecting the percentage split of investment between purpose category drivers. For example if an enhancement project also has a maintenance element this will have at least two investment category mappings (enhancement and maintenance).

The investment category which is the principal driver for the project is assigned as the "prime" driver for the project (this is usually, but not always, the category with the highest proportion of the total spend).

In completing this table, we have adopted a three-stage process, which is in accordance with the previous August data submission reporting guidance: -

1. Expenditure has been allocated on a proportional basis by "capital expenditure" purpose category to identify the total enhancement expenditure associated with each project
2. Any supply demand enhancement is allocated to a supply demand line (line 4L.20 or 4L.21)
3. Any quality enhancement expenditure has been allocated on a prime quality driver basis (i.e. all enhancement expenditure has been allocated to a single driver even where that project addresses multiple enhancement drivers).

A summary of the expenditure within each line of this table is set out below, with the project level allocation to the key programmes set out below the line-by-line commentary.

Block A – Enhancement expenditure by purpose – Wholesale water

Line 4L.1 – NEP - Making ecological improvements at abstractions (habitats directive, SSSi, BAPs)

This line has been populated with capital expenditure linked to programmes that are driven by statutory obligations agreed with the Environment Agency and included in the National Environment Programme. The annual variances in expenditure are due to the different programmes of work during the AMP6 period. There are four key legislative drivers in AMP6: -

- Safeguard zones
- Water Framework Directive
- Eels and Elvers regulations
- Habitats Directive

Expenditure in the earlier part of AMP6 is driven by investigations and preparatory work with expenditure levels increasing in the later years of the AMP when the majority of the programme is fully mobilised.

Line 4L.2 – NEP – Eels Regulations (measures at intakes)

There is no expenditure associated with Eels regulations.

Line 4L.3 – Addressing low pressure

Low levels of expenditure in FY18.

Line 4.L4 – Improving taste/odour/colour

The expenditure allocated to this line is primarily focussed on mains and large diameter trunk main (LDTM) cleaning to reduce customer contacts for discolouration. During AMP6 we are investing to reduce manganese levels leaving Oswestry and other water treatment works.

Line 4.L5 – Meeting lead standards

Our investment in this area focuses on continuing to optimise our phosphate dosing, education campaigns, addressing the lead risk in public buildings and trials such as lining of lead pipes through to the customer tap.

Line 4L.6 – Supply side enhancements to the supply/demand balance (dry year critical/peak conditions)

Line 4L.7 – Supply side enhancements to the supply/demand balance (dry year annual average conditions)

In line with the approach taken in our PR14 business plan, we have reported all supply demand expenditure in these lines, including our work to resolve the forecast critical period and dry year supply demand deficit in West Cumbria, completion of our multi-AMP Southport strategy and network enhancements to supply major new developments in the region.

The South Egremont borehole scheme was completed in summer 2017 and in full operation the boreholes can now provide a WAFU increase of around 3 Ml/d. This enhances the supply security in West Cumbria and ensures continued environmental mitigation under the EDR conditions.

We have delivered a suite of interim measures in the West Cumbria resource zone to reduce abstraction from Ennerdale Water as much as possible. We consider that the Ml/d unit reported on lines 20 to 23 of table 4Q, does not reflect work that is currently underway to claim supply-demand benefits in future years or future AMPs.

The dry year critical period and dry year annual average supply side enhancements are the same.

Line 4L.8 – Demand side enhancements to the supply/demand balance (dry year critical/peak conditions)

Line 4L.9 – Demand side enhancements to the supply/demand balance (dry year annual average conditions)

There are no new demand side measures or supply side measures for the AMP6 period. However, work is ongoing to maintain the current enhanced levels of water efficiency and leakage activities, and as part of the interim measures in West Cumbria we have committed to reduce leakage as far as possible within the West Cumbria resource zone to reduce abstraction from Ennerdale Water.

Due to sensitive nature of the environment in West Cumbria and pressure to reduce abstraction from Ennerdale as far as practicable we will continue our extensive efforts through AMP6 to meet our very challenging leakage target for the rest of the AMP. Increases in demand or leakage poses a risk to meeting our SOSI targets as the resource zone surplus has been eroded.

Work continues to progress the Thirlmere Transfer scheme to provide alternative supplies for West Cumbria in 2021.

The dry year critical period and dry year annual average demand side enhancements are the same.

Line 4L.10 – New developments

Our expenditure reflects the length of new mains reported within the properties table. We have invested more against this line in FY18 than was forecast at PR14. This reflects the higher than anticipated activity levels.

Line 4L.11 – New connection element of new development (CPs, meters)

Our expenditure reflects the length of new mains reported within the properties table. We have invested more against this line in FY18 than was forecast at PR14. This reflects the higher than anticipated activity levels.

Line 4L.12 – Investment to address raw water deterioration (THM, nitrates, Crypto, pesticides, others)

This line includes expenditure for projects at treatment works for pesticides, nickel, taste and odour, manganese removal and concessionary supplies. The spend profile across the AMP reflects a number of projects which are required by the DWI to address deterioration of raw water quality at specific sites, plus two concessionary supply projects. The following projects have DWI support and are the main investment included in this line: -

- Oswestry WTW (Regulation 28 Notice for pesticides)
- Wayoh WTW (Regulation 28 Notice for pesticides)

Line 4L.13 – Resilience

Although we are undertaking a significant amount of work to improve the resilience of our asset base this is usually being undertaken as part of projects with other cost drivers and as such only a relatively low amount of expenditure is directly allocated to this line.

Line 4L.14 – SEMD

This line includes expenditure required to comply with security enhancement obligations under the Security and Emergency Measures Direction (SEMD).

Line 4L.15 – NEP – Investigations

No NEP investigations have been completed this year.

Line 4L.16 – Improvements to river flows

We have incurred no expenditure associated with river improvements this year.

Line 4L.17 - Metering (excluding cost of providing metering to new service connections) for meters requested by optants

Metering levels in the current investment period have significantly increased on previous levels of metering. These estimates were primarily based upon volumes predicted by an independent econometric model, with some additional uplifts in numbers anticipated as a result of promoting free meters to customers who were in debt, along with undertaking additional work within customers' homes to minimise the number of instances where a meter could not be fitted.

As set out in previous years' reports, the initial econometric model predictions overestimated uptake levels. To address this we have engaged an alternative consultant to create a revised model, more accurately able to predict future uptake levels. Within those original targets, uptake levels have not been as high as anticipated. Similarly, we have responded to customer feedback about the internal fitting of meters, which

has generated less opportunities to do additional work to facilitate internal meter installations than assumed.

Although we have not achieved the target for the year, we are encouraged by the significant growth in year and the early positive results of some of our newer metering campaigns. We will continue to focus on increasing uptake levels by promoting meters to customers we believe would benefit from a meter, which will be enhanced by the implementation of more sophisticated customer segmentation built into our billing system in 2018-19. We are optimistic that the combination of the enhanced proposition and more effective targeting will generate further growth in free meter take-up among customers in remaining years of this investment period.

Line 4L.18 – Metering - Metering (excluding cost of providing metering to new service connections) meters introduced by companies

We have not included any capital expenditure against this line.

Line 4L.19 – Metering - Metering (excluding cost of providing metering to new service connections) other

We have not included any capital expenditure against this line.

Lines 4L.20 – 34 Other capital expenditure purpose

We have not included any capital expenditure against these lines.

Line 4L.35 – Total enhancement capital expenditure

This line is a sum of the lines above see above line commentaries for more information.

Table 4M – Enhancement expenditure by purpose – Wholesale wastewater

Every project in our capital expenditure programme is recorded on our corporate system, the Capital Programme Management System (CPMS). Each project is proportionally allocated to purpose category drivers reflecting the percentage split of investment between purpose category drivers. For example if an enhancement project also has a maintenance element this will have at least two investment category mappings (enhancement and maintenance).

The investment category which is the principal driver for the project is assigned as the "prime" driver for the project (this is usually, but not always, the category with the highest proportion of the total spend).

In completing this table, we have adopted a three-stage process, which is in accordance with the previous August data submission reporting guidance: -

1. Expenditure has been allocated on a proportional basis by "capital expenditure" purpose category to identify the total enhancement expenditure associated with each project
2. Any supply demand enhancement is allocated to a supply demand line (line 4L.20 or 4L.21)
3. Any quality enhancement expenditure has been allocated on a prime quality driver basis (i.e. all enhancement expenditure has been allocated to a single driver even where that project addresses multiple enhancement drivers).

A summary of the expenditure within each line of this table is set out below, with the project level allocation to the key programmes set out below the line-by-line commentary.

Block A – Enhancement capital expenditure by purpose

Line 4M.1 – First time sewerage

We have reported negative expenditure against this line. This is because we have now completed the schemes at Mains Lane, Spittal Farm and Laithes and Catterlen. With a released accrual on Mains Lane producing the negative spend reported in the year. Currently in AMP6, we have just one first time sewerage scheme at Lench Fold, Rossendale planned and this will not be completed until later in the period. We are also investigating a potential scheme in Little Crosby, which could develop into a first time sewerage scheme.

Line 4M.2 – Sludge enhancement (quality)

The significant expenditure reported in previous years has now reduced due to the completion of projects at Leigh and Burnley.

Line 4M.3 – Sludge enhancement (growth)

We have reported no sludge enhancement against growth.

Line 4M.4 – NEP – Conservation drivers

We have reported no conservation driver expenditure.

Line 4M.5 – NEP – Eels regulations (measures at outfalls)

We have reported no Eels regulations expenditure.

Line 4M.6 – NEP – Event Duration Monitoring (EDM) at intermittent discharges

In AMP6 we have a significant programme of EDM projects, which will see over 2,000 monitors installed on our assets.

Line 4M.7 – NEP – Flow monitoring at sewage treatment works

This is a low-level cost driver within our NEP. We currently have one AMP6 project, which delivers later in the period.

Line 4M.8 – NEP – Monitoring of pass forward flows at CSOs

We have a programme of CSO monitoring.

Line 4M.9 – Schemes to increase flow to full treatment

We have a programme of CSO monitoring.

Line 4M.10 – Schemes to increase storm tank capacity

We have reported no expenditure in this line.

Line 4M.11 – NEP – Storage schemes to reduce spill frequency at CSO's, storm tanks, etc.

This has been and remains a major investment driver for AMP6. Projects that will reduce spill frequencies at CSOs, storm tanks etc. as a result of extensions to long sea outfalls or increased FTFT are included in line 31. The significant projects reported in this line are; Raby Cote, Ulverston WwTW, Keswick WwTW, Oldham WwTW, Blackpool South strategy, Preston WwTW and the Windermere catchment strategy.

Line 4M.12 – NEP – Chemical removal pilot/ investigations / options appraisal

This is generally a low-level cost driver with work being undertaken on the chemical investigation programme (CIP).

Line 4M.13 – NEP – National phosphorus removal technology appraisal

We do not have any projects with this driver.

Line 4M.14 – NEP – Groundwater schemes

We do not have any projects that have a prime groundwater driver.

Line 4M.15 – NEP - Investigations

This is a relatively low costs driver, with expenditure being driven by the specific programmes of work within the chemicals investigation programme.

Line 4M.16 – NEP – Nutrients (N removal)

We do not have any projects that have a prime nitrogen removal driver.

Line 4M.17 – NEP – Nutrients (P removal at activated sludge STW's)

This has been and remains a major investment driver for us. The scale of P removal has a major impact on the cost in delivering and subsequently operating the projects. The significant projects reported in this line are; Lower Weaver and Windermere.

Line 4M.18 – NEP – Nutrients (P removal at filter bed STW's)

This has been and remains a major investment driver for us. The scale of P removal has a major impact on the cost in delivering and subsequently operating the projects. The significant projects reported in this line are; Blackburn WwTW and Darwen WwTW.

Line 4M.19 – NEP – Reduction in sanitary parameters

This is a substantial investment driver including "no deterioration" projects. The significant projects reported in this line are; Oldam WwTW, Davyhulme WwTW, Kendal WwTW and Whaley Bridge WwTW.

Line 4M.20 – NEP – UV disinfection (or similar)

We made significant investment in this area during AMP5, with work in the year at Kendall WwTW.

Line 4M.21 – NEP – Discharge relocation

Expenditure has varied reflecting the delivery of the programme.

Line 4M.22 – NEP – Flow 1 schemes

We do not have any projects that have a prime Flow 1 driver.

Line 4M.23 – Odour

Although we continue to invest in odour control assets as part of new enhancement schemes or via maintenance of existing equipment, the level of expenditure on specific odour control schemes has reduced over time as issues have been addressed.

Line 4M.24 – New development and growth

Capital investment in new development and growth in sewerage services is a reasonably substantial investment driver for us with annual investment levels varying to reflect changes in the pace and location of development.

Line 4M.25 – Growth at sewage treatment works (excluding sludge treatment)

Expenditure in recent years has been substantial mainly due to specific enhancement work being required at some major works for example at Davyhulme WwTW. Investment levels will remain above the historic average during AMP6. The significant projects reported in this line are; Halton East and Cockermouth.

Line 4M.26 – Resilience

Although we invest in providing increased resilience to our asset base, this investment typically forms part of other enhancement schemes, with assets being constructed to meet increased resilience expectations or through maintenance programmes where existing assets are replaced with new and more resilient assets. As such we have not delivered any enhancement projects whose prime driver is resilience.

Line 4M.27 – SEMD

This has generally been a relatively low level cost driver in the wastewater service, with no expenditure in FY18.

Line 4M.28 – Reduced risk of flooding for property

In AMP6 the focus of the flooding programme has moved to addressing incidents caused by flooding other causes events, mainly through targeted maintenance activity, rather than through specific projects to reduce the risk of hydraulic sewer flooding.

Additional lines

We have added three lines to the table, which are significant AMP6 costs drivers.

Line 4M.29 – Private Sewers

This covers improvement to the network to bring the assets up to standards and reduce the risk of future serviceability issues.

Line 4M.30 – NEP phase 5 WFD schemes - treatment, increased storage or investigations

This line covers expenditure on WFD schemes.

Line 4M.31 – NEP requirement for bathing water / shellfish driver delivered through long sea outfall or increased FTFT

This line covers expenditure on sea outfall extensions, with major projects undertaken in Anchorsholme (near Blackpool) and in Morecambe.

Line 4M.36 – Total enhancement capital expenditure

This is a calculated line.

Table 4N – Sewage treatment operating expenditure

We support the use of operating expenditure for cost comparative purposes, however, it must be used in conjunction with the number of works in each size band, and the treatment works classification and consent conditions. For this table to be used for comparative purposes it is important that this information is gathered and allocated consistently by all companies.
Three sites are now classified as co-located and as a result have costs allocated to sewage treatment and sludge; Ambleside, Grange-Over-Sand and Eccles.
We continue to audit our sludge sites to ensure that assets and associated cost are allocated to the correct price control.
The number of large works has decreased this year from 66 to 64.

Lines 4N.1 – 4N.8 – Direct costs of STW size bands 1 – 6 and General and support costs of STW in size bands 1 - 6

We record the costs individually for size band six works. For size band one – five we have allocated the expenditure based on manpower.
We have removed other discharge costs and included it in service charges, these are in direct costs.

Line 4N.9 – Service charges for STWs in size band 6

We are still working with the Environment Agency (EA) on the consent review to ensure that we are charged appropriately for all of the assets for which we are responsible. We understand that from April 2018 the EA will begin changing its Charging Policy. We believe that this will mean significant changes to the charging regime.
Canal and River Trusts and other discharges costs are now included in this line.

Line 4N.10 – Estimated terminal pumping station costs size band 6 works

These are estimated costs, based on power and a proportional allocation of maintenance costs.

Line 4N.11 – Estimated sludge costs in size band 6 works

This is a calculated line.

Line 4N.12 – Total operating expenditure (excluding third party services)

This is a calculated line.

Table 4O – Large sewage treatment works

We support the use of operating expenditure for cost comparative purposes, particularly when used in conjunction with the treatment works classification and consent conditions. The information must be considered over time so that changes in consent conditions are appropriately assessed.
Whilst consents offer an insight into the probable technology employed at individual sites, it does not allow for an assessment of the amount of total load e.g. Phosphorus that must be removed through the process (the actual 'work' done). This limitation means that care must be taken in distinguishing between a perceived inefficiency relative to the amount of additional work undertaken when comparing sites with similar consents/permits.
The number of large works has decreased this year from 66 to 64.

Block A – Sewage treatment works explanatory variables

Line 4O.1 – Works name

This is standard information linking the works to the EA consent. Meols WwTW appears both as Meols WwTW (North Wirral) and North Wirral (Meols) therefore data has only been entered for one of these works.

Line 4O.2 – Classification of treatment works

For this data to be used for comparative purposes the Ofwat WwTW classifications need to be applied consistently across all companies. Without consistency data cannot be meaningfully compared.
Four works have changed classification this year;
Carlisle – We have identified an error in the classification this works should have been TB2 not SB.
Macclesfield – We have identified an error in the classification this works should have been TB2 not TA2.
Stockport – We have identified an error in the classification this works should have been SAS not TA2 as it does not have tertiary treatment.
Walton Le Dale – This works had UV treatment installed in AMP5, and classification had not been updated. This works should have been TA2 not SB.

Line 4O.3 – Population equivalent of load received

In order for this to be used for comparative purposes assurance would be required that every company is calculating population equivalent (PE) in a consistent manner.

Line 4O.4 – 4O.7 Suspended solids consent, BOD_5 consent, Ammonia consent and Phosphorus consent

This is standard information linking the works to the EA consent and needs to be considered in conjunction with operating costs. An understanding of the removal rates that need to be achieved to meet a consent is required if a true comparison between WwTW performance and opex are to be made.
This year the following changes have been made;
Altrincham has a new phosphorous consent
Chorley's ammonia consent has been reduced from 6mg/l to 1 mg/l
Horwich's phosphorous consent has been reduced from 2mg/l to 1mg/l
Hyde's phosphorous consent was missed in error last year this should have been 2mg/l.

Line 4O.8 – UV consent

This is standard information linking the works to the EA consent and needs to be identified in conjunction with operating costs. We have a significant number of smaller WwTW, which have a UV consent, these are

not currently considered in any of these tables. Throughout AMP6 we will see the introduction of an even greater number of inland works with a UV consent across all size bands.
Walton Le Dale has had a UV consent included this year.

Line 4O.9 – Load received by STW

This is a calculated line.

Line 4.O. 10 – Flow passed to full treatment

This is standard information linking the works to the EA consent and needs to be considered in conjunction with operating costs. The significant changes in flow are noted below;
Barrow in Furness – There have been some issues with the availability of 15 minute flow data
Bury – There have been some issues with the availability of 15 minute flow data
Congleton – There have been some issues with the availability of 15 minute flow data
Davyhulme – Flow has been calculated from the 15 minute flow data. Modernisation work at the WwTW has included improvements to flow measurement.
Fazakerley – Pumps are not pumping required flows at the last in line pumping station, these are being replaced
Kendal – Previous years data had been skewed by the effect of storm Desmond and Eva
Liverpool South – The availability of flow data has been impacted by a telemetry project and recommissioning
St Helens – There were issues with the availability of flow data last year, FY18 data should be more representative

Block B – Operating expenditure

One large works (Eccles) is now classified as co-located and as a result have costs allocated to sewage treatment and sludge.

Line 4O.11 – Direct expenditure

Payments to Canals and Rivers Trust have been reclassified from G&S to service charges, within direct expenditure.

Line 4O.12 – General and support expenditure

Operating costs vary year on year and can be influenced by many factors please refer to table eight for further comments.

Line 4O.13 – Functional expenditure

This is a calculated line.

Line 4O.14 – Service charges

We are still working with the EA on the consent review to ensure that we are charged appropriately for all of the assets we are responsible for. We understand from that from April 2018 the EA will begin changing its Charging Policy. We believe that this will mean significant changes to the charging regime.

Line 4O.15 – Estimated terminal pumping expenditure

These are estimated costs, based on power and a proportional allocation of maintenance costs.

Table 4P – Non-financial data for Wholesale water

Block A - Water Resources

Line 4P.1 – Proportion of distribution input derived from impounding reservoirs

The proportion of distribution input varies from year to year depending on weather, demand and asset outages. This year production from WTWs supplied by impounding reservoirs decreased, predominantly Oswestry WTW due to major capital project.

Line 4P.2 – Proportion of distribution input derived from pumped storage reservoirs

We have not currently classed any of our reservoirs as pumped storage reservoirs therefore the number is zero.

Line 4P.3 – Proportion of distribution input derived from river abstractions

The proportion of distribution input varies from year to year depending on weather, demand and asset outages. Production from WTWs supplied by river abstractions increased, predominantly Watchgate WTW, due to the outage at Oswestry WTW.

Line 4P.4 – Proportion of distribution input derived from boreholes, excluding managed aquifer recharge (MAR) water supply schemes

The proportion of distribution input derived from boreholes remains broadly the same as historic levels although it will vary from year to year depending on weather, demand and asset outages.

Line 4P.5 – Proportion of distribution input derived from artificial recharge (AR) water supply schemes

We do not currently have any of these schemes therefore the number reported is zero.

Line 4P.6 – Proportion of distribution input derived from aquifer storage and recovery (ASR) water supply schemes

We do not currently have any of these schemes therefore the number is zero.

Line 4P.7 – Number of impounding reservoirs

The number of sources varies from year to year depending on weather, demand and asset outages. The number of impounding reservoirs reported is significantly lower than the actual number of reservoirs that we operate and maintain. As per the Ofwat guidance for line 13: -

- A source is defined as an independent raw water supply that directly supplies a treatment works.
- Standby or mothballed sources from which no water has been obtained in the year should not be included.
  We have also used the previous Table 12 June Return reporting requirements (January 2011) to report the number of impounding reservoirs.
- If a treatment works receives water from a reservoir that has been filled by another reservoir then this is classified as one reservoir source.
- Reservoirs used only to regulate river flows have not been included in the source numbers.
  We own and operate a number of cascade reservoir systems where water is transferred between reservoirs but from which there is only one abstraction point to the water treatment works. River regulation reservoirs have also been excluded. The number of impounding reservoirs reported is therefore significantly lower than the actual number of impounding reservoirs that we operate and maintain in order to maintain supplies to customers. In terms of developing a suitable cost driver for totex models, it should be recognised that the costs of operating and maintaining a reservoir and its

catchment land would not be expected to be significantly different whether reservoirs were in a cascade or each supplying a water treatment works directly.

Table showing variance between number of impounding reservoirs reporting in accordance with reporting requirements and number operated and maintained

	2018
Number of impounding reservoirs reported in line 7.	47
Actual number of impounding reservoirs operated by UU.	166

We have classed lakes for example Windermere, Ullswater, Crummock as river abstractions as they are natural lakes with either no impounding structure or a weir at the outlet to raise the water level by circa one metre or so, and as a result spill most of the time.
The number of impounding reservoirs is slightly lower than last year because three impounding reservoirs have not been used this year.

Line 4P.8 – Number of pumped storage reservoirs

We have not currently classed any of our reservoirs as pumped storage reservoirs therefore the number is zero.
Our understanding is that there are a number of ways to define a pumped storage reservoir. We have a number of reservoirs which are similar to pumped storage reservoirs, but do not meet our interpretation of the definition set out by Ofwat. These include: -

- Storage reservoirs which are gravity fed from a river intake but which are remote from the supply source.
- Storage reservoirs which receive a mix of pumped and gravity supply.
- Storage reservoirs which receive either pumped or non-pumped potable water which will then need re-treating before supply to customers.
- Impounding reservoirs with natural inflow supplemented by a pumped supply.

We have assumed that none of our reservoirs are in the pumped storage reservoir category.

Line 4P.9 – Number of river abstractions

The number of sources varies from year to year depending on weather, demand and asset outages.

Line 4P.10 – Number of ground water sources, excluding managed aquifer recharge (MAR) water supply schemes

The number of boreholes used in a year can change significantly from year to year depending on weather, demand and asset outages. Abstraction from a number of our borehole groups is only measured as total abstraction from the group rather than individually. For these sites, it has been assumed that all boreholes in the group have been used during the reporting year.
Based on the definition of a source that has been used in line 13 as “an independent raw water supply to a treatment works” all boreholes which have been used in the report year have been included.
Based on Ofwat clarification we have aggregated the figures where there are multiple boreholes on a single site e.g. counted these as a single source.
The number of boreholes reported is disproportionately high when compared to the number of impounding reservoirs as we have a number of reservoir cascade systems where water is only abstracted from one of the reservoirs in the group. The totex costs of maintaining and operating a chain of impounding reservoirs would be expected to be significantly higher than the costs of an individual borehole.

Line 4P.11 – Number of artificial recharge (AR) water supply schemes

We do not currently have any of these schemes therefore the number is zero.

Line 4P.12 – Number of aquifer storage and recovery (AR) water supply schemes

We do not currently have any of these schemes therefore the number is zero.

Line 4P.13 – Total number of sources

The number of sources varies from year to year depending on weather, demand and asset outages.
We have reported the total number of sources as per the definition for line 13 and the historic Table 12 June Return reporting requirements (January 2011). This defines: -

- A source is defined as an independent raw water supply to a treatment works.
- Standby and mothballed sources have not been included.
- If a treatment works receives water from a reservoir that has been filled by another reservoir then this is classified as one reservoir.
- Reservoirs used only to regulate river flows have not been included in the source numbers.
- Bank side storage and non-impounding reservoirs have not been included as sources in their own right. The sources of water filling these reservoirs have been included in the source numbers.

This approach does not reflect the true number of sources which we operate in order to maintain supplies to customers. This is because we have a number of reservoir cascade systems where water is transferred from one reservoir to another but only abstracted from one reservoir in the group and also a number of non-impounding reservoirs from which water is abstracted. These reservoirs incur costs for operation and maintenance but are not included in the total number of sources.

Line 4P.14 – Total number of water reservoirs used for holding raw water (including impounding reservoirs, pumped storage and bank side storage)

There is a slight decrease in the number of water reservoirs. A review of reservoir classification has led to three reservoirs being classed as 'Treated Water Distribution' as opposed to 'Raw Water Storage'. These 3 reservoirs have been subtracted from the total number of raw water reservoirs. A small body of water on United Utilities catchment land has been identified as a non-statutory artificial reservoir. This structure, has been added to the list of raw water reservoirs.

Line 4.P15 – Total capacity of water reservoirs used for holding raw water (including impounding reservoirs, pumped storage and bank side storage)

The change in capacity is the result of the classification changes described in the commentary for Line 14.

Line 4.P16 – Total number of intake and source pumping stations

Line 4.P17 – Total number of raw water transfer pumping stations

Line 4.P18 – Total capacity of intake and source pumping stations

Line 4.P19 – Total capacity of raw water transfer pumping stations

We have a well-established raw water transport network that provides resilient supplies around our region. Our project to link West Cumbria into our Integrated Resource Zone will develop this capability but it will not have a material impact on our raw water transport pumping as the system design takes advantage of gravity. To report the number of pumping stations we have allocated pumping stations to activities, and hence reporting line, according to the guidance given in Appendix 2 of RAG4.07. The capacity of these pumps is allocated according to the principles of Appendix 2 in RAG2.07, with capacity assigned to the activity which is benefitting from that capability.

We note that this creates a deliberate disparity between the two lines; the capacity of raw water transport stations outstrips the number because it includes the proportion of the capacity of intake and source pumps that falls into the Raw Water Transport. This offers a fair representation of costs.

Line 4P.20 – Total length of raw water mains and conveyors

Last year we reported non-potable and partially treated main for treatment mains in this line. We are now required to report this separately in the new line 4P.64 which accounts for the significant decrease compared with last year.

Lines 4.P21 and 4.P22 – Average pumping head – resources and raw water transport

Water resources pumping is influenced by the hydrological conditions, as more water must be pumped in drier years to protect water resources and the environment. There have been no significant external influences on pumped head, such as droughts or aqueduct outages in FY18. The small exception is ongoing work at Oswestry WTW, a low pumping source, but this has been underway for a number of years. This is in contrast with FY17 which saw exceptionally dry weather over the Haweswater catchment. Pumping at Windermere is 38.5% lower than last year and Ullswater has reduced by 52%.
A change to reporting requirements (RAG2.07 Appendix 2) requires pumping that crosses price control boundaries to be split proportionally between the price controls.
This has not changed the total pumped head but has changed the allocations to the different price controls.

- Resource pumping has reduced by 20.51m as some of this pumping is now allocated to other price control units.
- Raw water transport pumping has increase by 14.37m as it gains most of the pumping previously allocated to resource pumping.
- Treatment pumping is unchanged as we had previously applied the Appendix 2 philosophy to final water pumping.
- Distribution pumping has increased slightly as it absorbs some pumping from boreholes directly into supply.

We have continued to review the data used to calculate pumping head and incorporate new data when it becomes available. This has added 10m to the total head.

Block B - Water Treatment

Lines 4P.23 to 36 -Total water treated by works type and size

There are relatively small changes in distribution input from year to year dependent on demand, irrespective of changes in number of works in each category.

- Lines 4P.25 and 4P.27: UV disinfection was installed at Woodgate Hill WTWs in 2016/17, moving these WTWs from a category SW2 to a category SW4.
- Lines 4P.26 and 4P.28: We operate mobile PAC dosing rigs that can be moved from one WTW to another when treatment is needed to remove the taste and odour compounds geosmin and 2-MIB. It was difficult to assign a treatment category to a site when the rigs were moved around and only used for a short period each year. To ensure maintenance and a more representative allocation of Opex spend, the mobile PAC dosing rigs have been nominally assigned to a WTW where they are most used in the last year. This explains the increase in DI for WTW in category SW3 and an increase in the DI for WTW in category SW5 in FY 2017/18.

- PAC dosing rigs have been assigned to the following WTW: Ashworth Moor WTW; Buckton Castle WTW; Castle Carrock WTW; Cloughbottom WTW; Fishmoor WTW; Haslingden Grane WTW; Hodder WTW; Laneshaw WTW; Mitchells WTW; Rivington WTW; Sweetloves WTW
- Lines 4P.30 and 4P.32: Phosphate dosing had not been considered when categorising WTWs historically. Slightly less than half of the P dosing at UU takes place at WTW. For the majority of WTW where we dose phosphate, it is done on sites at category SW3 or higher, and would not increase the category. For a small number of groundwater sites this changed the site category from GSD to GW2. This accounts for the changes in these categories.

Line 4P.37 – Total water treated at more than one type of works

A significant volume of treated water from Watchgate WTWs is retreated at three separate aqueduct take off points, Martholme WTWs, Townsend Fold WTW and Woodgate Hill WTWs. In 2016/17 we increased output from Woodgate Hill WTW to maintain supplies during the outage of the Hawswater Aqueduct. This accounts for the higher volume of water treated at more than one type of works in 2016/17 compared to 2017/18.

Lines 4P.38 to 51 – Total number of WTW by works size and type

There are relatively small changes in distribution input from year to year dependent on demand, irrespective of changes in number of works in each category. The majority of water treatment works categories have remained stable across the three year period however there have been a few changes: -

- Line 4P.40 and 4P.43: The change is accounted for by the WTW category for Woodgate Hill WTWs changing when the UV disinfection was installed in 2016, increase from SW2 to SW4.
- Lines 4P.41 and 4P.43: The commentary above for lines 4P.26 and 4P.28, relating to PAC dosing apply to these lines.
- Lines 4P.41-4P.43: Following a review of WTW's categories a small number of sites switched category.
- Lines 4P.45 and 4P.47: Borehole sites that have phosphate dosing moved from a category GSD to GW2.

Line 4P.52 – Number of treatment works requiring remedial action because of raw water deterioration

The number of water treatment works requiring remedial action due to raw water deterioration varies from one year to the next. In FY17 we completed work at one site (Loveclough). There is one remaining output UUT3477 Vyrnwy Notice – Oswestry WTW, this is expected to be completed in FY18/19.

Line 4P.53 – Zonal population receiving water treated with orthophosphate

We believe that a better measure would be to remain with the original line that was proposed by Ofwat (proportion of water treated with orthophosphate) rather than zonal population. If the number is being used to calculate cost then it makes sense for the number to represent the volume of phosphate being used rather than the amount of people being supplied. For example a small area that does not receive water that is phosphate dosed may only have 10 properties but if one of those properties is a large industrial user then the new measure would indicate a higher coverage of phosphate dose than is reality.
There has been no real change in the area of coverage with phosphate dose in FY18. The apparent reduction in population receiving orthophosphate is down to a change in the source population figures. Data now reflects the common assumptions used in WRMP and PR19 and is based on ONS data from Edge Analytics.

Line 4P.54 – Average pumping head - treatment

Water resources pumping is influenced by the hydrological conditions, as more water must be pumped in drier years to protect water resources and the environment. There have been no significant external

influences on pumped head, such as droughts or aqueduct outages in FY18. The small exception is ongoing work at Oswestry WTW, a low pumping source, but this has been underway for a number of years. This is in contrast with FY17 which saw exceptionally dry weather over the Haweswater catchment. Pumping at Windermere is 38.5% lower than last year and Ullswater has reduced by 52%.
A change to reporting requirements (RAG2.07 Appendix 2) requires pumping that crosses price control boundaries to be split proportionally between the price controls.
This has not changed the total pumped head but has changed the allocations to the different price controls.

- Resource pumping has reduced by 20.51m as some of this pumping is now allocated to other price control units.
- Raw water transport pumping has increase by 14.37m as it gains most of the pumping previously allocated to resource pumping.
- Treatment pumping is unchanged as we had previously applied the Appendix 2 philosophy to final water pumping.
- Distribution pumping has increased slightly as it absorbs some pumping from boreholes directly into supply.

We have continued to review the data used to calculate pumping head and incorporate new data when it becomes available. This has added 10m to the total head.

Block C - Water Distribution

Line 4P.55 – 4P.62 Potable mains

There are small movements in the km of mains reported each year as new mains are installed and other mains are abandoned.

Line 4P.56 – Total length of mains relined

Over the past five years we have not relined any of our water mains using spray lining techniques.

Line 4P.57 – Total length mains renewed

Mains renewal activity increased by 10% from previous year, mainly due to 6.0km of slip lining (mains renewal) associated with the West Cumbria (Thirlmere Transfer) project. This was offset with some deferral of work on the trunk mains cleaning programme and major capital schemes, due to the impact of the freeze thaw event in February/March 2018.

Line 4P.58 – Total length new mains

There has been an increase due to the higher volume of mains requisitions from the continuing growth in new developments in the region.
We are currently investing in a significant scheme in West Cumbria which will see changes in the treatment and distribution of water to customers in West Cumbria including new potable mains.

Line 4P.59 – Potable water mains (<320mm)

Line 4P.60 – Potable water mains 320mm – 450mm

Line 4P.61 – Potable water mains 450mm – 610mm

Line 4P.62 – Potable water mains >610mm

The total length of potable water mains by size band has remained broadly similar. The length of smaller mains is expected to continue growing as more homes are built. The construction of a new supply network connecting West Cumbria to Thirlmere Reservoir will increase the length of larger mains.

Line 4P.63 – Total length of non-potable and partially treated main for supplying customers

Some non-potable main feed both a United Utilities asset (e.g. a water treatment works) and a non-potable supply customer. In these cases it is assumed that their roles as raw water mains takes precedence and therefore they are reported under Table 12a, Line 18.

Line 4P.64 – Total length of non-potable and partially treated main for treatment

This new line splits out the previous Raw Water Mains and Conveyors line in Water Resources price control into two lines. The non-potable and partially treated mains for treatment have been identified from our GIS system. The length of Raw Water Mains and Conveyors has reduced by a corresponding amount.

Line 4P.65 – Capacity of booster pumping stations

This capacity measure may not be a good explanator of cost - many small pumping stations would have a higher cost than a single large asset. The definition has been updated to reflect RAG 2.07 Appendix 2. This requires pumping directly from boreholes into distribution, which has previously been reported as a purely raw water activity, to split between raw water and treated water distribution. This represents a 2,384KW increase from last year.

Line 4P.66 – Capacity of service reservoirs

This capacity measure may not be a good explanator of cost - many small reservoirs have a higher unit cost than a single large asset.
Following the Franklaw incident we are completing an enhanced programme of service reservoir inspection and cleaning. This has identified a number of sites that are in poor condition and abandonment is the best solution.
This trend is likely to continue at a slower pace in future years. When a service reservoir requires significant investment, replacement with a pumping station sometimes offers a lower whole life cost. There is therefore a slow but steady increase in the number and capacity of pumping stations. On average this equates to 1 pumping station and 77 KW per year. We predict this trend to continue.

Line 4P.67 – Capacity of water towers

As with pumping stations and service reservoirs, we do not currently consider this measure to be a good explanator of cost. In particular, it is the case that many small towers have a higher unit cost than a single large asset. The capacity of water towers has remained consistent across the three years and we would expect the value to remain reasonably consistent in the coming years.

Line 4P.68 – Distribution input

There has been an increase in distribution input of 39.3 Ml/d compared with the value reported for FY17.

This increase has been largely attributed to the winter and freeze thaw event, although there have also been increases in some other components.

Line 4P.69 – Water delivered (non-potable)

There is an increase in the water delivered (non-potable) over the reporting period. This increase can be related to an increase in overall consumption.

Line 4P.70 – Water delivered (potable)

There is an increase in the water delivered (potable) over the reporting period. This increase can be related to an increase in overall consumption.

Line 4P.71 – Water delivered (billed measured households)

Measured household water delivered has increased regionally. The increase is in line with historical trend and expected due to new properties and meter optants.
There is also increase in the underlying value measured per household consumption.

Line 4P.72 – Water delivered (billed measured non-households)

There has been a slight reduction in billed measured non-household, however there have been changes in definition of non-household as a result of market separation in FY18.

Line 4P.73 – Total leakage

The winter in 2016/17 was mild therefore there was an increase in leakage associated with colder weather in 2017/18, and a prolonged freeze during March 2018, with a very rapid thaw.

Line 4P.74 – Distribution losses

The winter in 2016/17 was mild therefore there was an increase in leakage associated with colder weather in 2017/18, and a prolonged freeze during March 2018, with a very rapid thaw.

Line 4P.75 – Water taken unbilled

Within this line we have included the total water which is taken unbilled (whether legally or illegally). Water that we have used for mains tests, flushing, washouts, running to waste, or has been incurred through burst mains or other leakage has been excluded. There is an increase of 3.8 Ml/d in the value of water taken illegally unbilled. This is partially caused by using a further increase in the number of void properties, and is being investigated as there was an increase from the long term level of void properties in both FY17 and FY18.

Line 4P.76 – Number of lead communication pipes

There has been a reduction in the number of lead communications pipes in-line with the number replaced and claimed as water outputs

Line 4P.77 – Number of galvanised iron communication pipes

We have seen no change in the number of galvanised iron communication pipes. Work required to verify communication pipe material and the volume of assets is ongoing. We believe that the number of galvanised iron communication pipes is low and is unlikely to change significantly in the future.

Line 4P.78 – Number of other communication pipes

The small increase compared to last year is in-line with anticipated connection growth and movement of lead pipes to other materials.

Line 4P.79 – Number of booster pumping stations

This may be a weak potential explanator of cost. Measures relating to the scale and complexity of the distribution network would appear to be better as they are stronger exogenous cost drivers.
We are seeing an increasing trend in this area due to a higher number of pumps. Over recent years, smaller service reservoirs have been abandoned and replaced with pumping stations. Although there has been a net increase in the number of pumping stations the net reduction in capacity.

Line 4P.80 – Total number of service reservoirs

This may be a weak potential explanator of cost. Measures relating to the scale and complexity of the distribution network would appear to be better as they are stronger exogenous cost drivers.
Following the Franklaw incident we are completing an enhanced programme of service reservoir inspection and cleaning. This has identified a number of sites that are in poor condition and abandonment is the best solution. Therefore the number of service reservoirs has dropped substantially this year. The majority of these reservoir are small so the effect on the total capacity has been smaller.
We are also currently investing in a significant scheme in West Cumbria which will see changes in the treatment and distribution of water to customers in the area, which will increase the number of service reservoirs by two.
Water towers have not been included in this number as these are reported separately in line 4P.81.

Line 4P.81 – Number of water towers

As with pumping stations and service reservoirs, we consider this a weak potential explanator of cost. Measures relating to the scale and complexity of the distribution network would appear to be better as they are stronger exogenous cost drivers.
There has been no change in the number of water towers.

Lines 4P.82 to 4P.89 – Total length of mains laid or structurally refurbished by age band

The mains length in each category is relatively stable across the three year period with only slight variation due to improvements in the records (including the implementation of a new geographical information system in FY14). The post 2001 category shows a more marked increase as newly laid mains continue to contribute to this category.
The trend five years shows the pattern that would be expected with fewer older mains as many of these have now been replaced with newer mains. There are however two noticeable exceptions: -

- Fewer mains were laid between 1941 and 1960, this corresponds with the Second World War and subsequent recovery
- More mains were laid in the 1981 to 2000 period, this corresponds with our significant NW90 programme which replaced cast iron mains.

We are currently investing in a significant scheme in West Cumbria which will see changes in the treatment and distribution of water to customers in West Cumbria: this will increase the length of mains in future years.

Line 4P.90 – Average pumping head – distribution

Water resources pumping is influenced by the hydrological conditions, as more water must be pumped in drier years to protect water resources and the environment. There have been no significant external influences on pumped head, such as droughts or aqueduct outages in FY18. The small exception is ongoing work at Oswestry WTW, a low pumping source, but this has been underway for a number of years. This is in contrast with FY17 which saw exceptionally dry weather over the Haweswater catchment. Pumping at Windermere is 38.5% lower than last year and Ullswater has reduced by 52%.
A change to reporting requirements (RAG2.07 Appendix 2) requires pumping that crosses price control boundaries to be split proportionally between the price controls.

This has not changed the total pumped head but has changed the allocations to the different price controls.

- Resource pumping has reduced by 20.51m as some of this pumping is now allocated to other price control units.
- Raw water transport pumping has increase by 14.37m as it gains most of the pumping previously allocated to resource pumping.
- Treatment pumping is unchanged as we had previously applied the Appendix 2 philosophy to final water pumping.
- Distribution pumping has increased slightly as it absorbs some pumping from boreholes directly into supply.

We have continued to review the data used to calculate pumping head and incorporate new data when it becomes available. This has added 10m to the total head.

Table 4Q –Properties and population and other – Wholesale Water

Block A - Properties and population

Line 4Q.1 – Residential properties billed for measured water (external meter)

Line 4Q.2 – Residential properties billed for measured water (not external meter)

The number of metered residential properties has increased consistently with the number of meter optants and due to new house building, we expect this increase to continue during the AMP6 period.

Line 4Q.3 – Business properties billed measured water

There has been a decrease in billed measured business properties since FY17 partly due to an increase in the number of empty premises on the billing system. The number of business properties at FY18 is based on the number of Service Points in the Central Market Operating System. UU Wholesale are in regular discussion with the Retailer to address this issue.

Line 4Q.4 Residential properties for unmeasured water

There has been a reduction in the number of residential properties billed for unmeasured water primarily due to the number of free meter optants.

Line 4Q.5 – Business properties billed for unmeasured water

There has been a reduction in number of business properties billed for unmeasured water partly as the result of an increase in the number of empty premises on the billing system. The number of business properties at FY18 year end is based on the number of Service Points in the Central Market Operating System. UU Wholesale are in regular discussion with the retailer to address this issue.

Line 4Q.6 – Total business properties connected at year end

The number of non-household properties has reduced slightly since FY17.

Line 4Q.7 – Total residential connected properties at year end

Improved confidence in the housing sector is reflected in the increased number of new properties connected for the period FY14 to FY17. The increased volume of new properties connected for this period exceeded the original forecast target. In FY18 we have seen this continue.

Line 4Q.8 – Total connected properties at year end

This line is a sum of lines 4Q.6 and 4Q.7 see variance explanation for these lines.

Line 4Q.9 – Number of residential meters renewed

There has been a reduction in the number of residential renewals for the second year running. We completed circa 73,000 household renewals as part of our end of life and uplift proactive programme back in FY16 the levels we have reported for FY18 is based on broadly the same volume of reactive work seen in previous years.

Line 4Q.10 – Number of business meters renewed

The number of business renewals has significantly reduced compared to last year because of a reduction in demand for business meter exchanges.

Line 4.Q11 – Number of meter optants

Metering levels in the current investment period have significantly increased on previous levels of metering. These estimates were primarily based upon volumes predicted by an independent econometric model, with some additional uplifts in numbers anticipated as a result of promoting free meters to customers who were in debt, along with undertaking additional work within customers' homes to minimise the number of instances where a meter could not be fitted.

As set out in previous years' reports, the initial econometric model predictions overestimated uptake levels. To address this we have engaged an alternative consultant to create a revised model, more accurately able to predict future uptake levels. Within those original targets, uptake levels have not been as high as anticipated. Similarly, we have responded to customer feedback about the internal fitting of meters, which has generated less opportunities to do additional work to facilitate internal meter installations than assumed.

Although we have not achieved the target for the year, we are encouraged by the significant growth in year and the early positive results of some of our newer metering campaigns. We will continue to focus on increasing uptake levels by promoting meters to customers we believe would benefit from a meter, which will be enhanced by the implementation of more sophisticated customer segmentation built into our billing system in 2018-19. We are optimistic that the combination of the enhanced proposition and more effective targeting will generate further growth in free meter take-up among customers in remaining years of this investment period.

Line 4Q.12 – Number of selective meters installed

We do not currently selectively meter properties.

Lines 4Q.13 and 4Q.14 – Total number of new business and residential connections

Continued confidence in the housing sector is reflected in the increased volume of new properties connected for the period FY14 to FY18. In addition, a special project was undertaken during FY16 to identify unreported connections by self-lay organisations. This contributed significantly to the increased volumes in FY16 and FY17 which is why we have seen a decrease in FY18.

Line 4Q.15 – Total population served

The increase in population of 0.7% is within the historic range. There is some movement between the water resource zones (no material impact on total value reported), which will be in part population movement or different rates of growth, and the yearly update of the water supply zones.

Line 4Q.16 – Number of business meters (billed properties)

Line 4Q.17 – Number of residential meters (billed properties)

The number of meters has changed in line with the movement in billed properties.

Line 4Q.18 – Company area

We have reported the company area served by the water business. The small increase in the Company Area is due to additional properties added near Whitchurch which were not included last year. Our region tends to be quite polarised, with areas of dense population, in the greater Manchester, Merseyside corridor and areas of very sparse population such as Cumbria.

Block B - Other

Line 4Q19 – Number of lead communication pipes replaced for water quality

OFWAT re-issued guidance to confirm the inclusion of all pipe work replaced for quality under a DWI supported programme and any work conducted under section 30 of the water regulations (interpreted as lead communication supply pipe replacement work). We have no DWI supported programme of lead replacement all lead pipes replaced are associated with the lead communication supply pipe replacement.

Line 4Q.20 – Total supply side enhancements to the supply demand balance (dry year critical/peak conditions)

Line 4Q.21 – Total supply side enhancements to the supply demand balance (dry year annual average conditions)

Our new groundwater supply scheme at South Egremont to offset sustainability reductions at Ennerdale Water was originally designed to supply 6.4 Ml/d. This scheme was to address the need to reduce abstraction from Ennerdale Water following an Environment Agency review of abstraction licences to comply with the EU Habitats Directive. However, following implementation of an Environmental Damage Notice at Ennerdale, there is significant benefit to customers and the environment of greater supply capability. The boreholes at South Egremont are one of several interim measures in the 2015 Water Resources Management Plan. This, along with the Summergrove rezoning scheme and enhanced water efficiency and leakage activity, make up the suite of interim measures aimed to reduce abstraction from Ennerdale Water until the Thirlmere Transfer Scheme is delivered. Whilst there are supply-side benefits associated with the boreholes, the driver behind the other interim measures is environmental to reduce Ennerdale Water abstraction, and so there aren't supply-side benefits associated with the schemes.

Pumping tests showed that groundwater abstractions can be sustainably maintained at higher levels for periods of time, and in 2013 the South Egremont scheme was re-designed for 11 Ml/d. However, a revised mode of operation has been agreed, with borehole output limited to 4 Ml/d in normal conditions (and only operated at 11 Ml/d when Ennerdale Water is below drought trigger 2). This together with associated operational changes at Crummock Water has led to a WAFU reduction of 3.1 Ml/d, offsetting the original scheme benefit of 3 Ml/d in the overall supply-demand balance.

Line 4Q.22 – Total demand side enhancements to the supply demand balance (dry year critical/peak conditions)

Line 4Q.23 – Total demand side enhancements to the supply demand balance (dry year annual average conditions)

There are no new demand side measures or supply side measures for the AMP6 period. However, work is ongoing to maintain the current enhanced levels of water efficiency and leakage activities, and as part of the interim measures in West Cumbria we have committed to reduce leakage as far as possible within the West Cumbria resource zone to reduce abstraction from Ennerdale Water. Work continues to progress the Thirlmere Transfer scheme to provide alternative supplies for West Cumbria in 2022.
When looking at the change in West Cumbria leakage from FY15 to FY18 this manifests as a negative value. However, the reported value in this line is zero as there no defined demand-side options included for AMP6 in the 2016 Water Resources Management Plan. The drivers behind the suite of interim measures in West

Cumbria is environmental, to reduce abstraction from Ennerdale Water until delivery of the Thirlmere Transfer scheme.

For all the four lines above we consider that the Ml/d unit does not reflect the work that is currently underway to claim supply-demand benefits in future years/AMPs, for example the Thirlmere Transfer scheme.

Lines 4Q.24, 4Q.25, 4Q.26 – Energy consumption – wholesale, network+ and water resources

These measures may be relatively poor potential explanators of cost as they will capture factors that are wholly under management control e.g. amounts of telemetry, and so cannot be considered to be entirely exogenous.
We believe that the water electricity consumption dataset is complete as this has been based on meter point administration number (MPAN) references. In previous years we undertook a desk based exercise to split the electricity consumption by water resources and network plus. Further work has been completed to categorise MPAN numbers by upstream service enabling us to produce a more accurate allocation based on site consumption. This change in methodology accounts for a greater proportion of energy costs being allocated to water resources.
Diesel consumption (associated with energy generation) accounts for a very small proportion of energy consumption and has not been included in the energy consumption figures, because the data is not currently available.

Line 4Q.27 – Peak factor

It is worth noting that given the large size of our supply area, the peak factor is likely to be lower than smaller companies, and also not representative of the scale of peaks and/or variability at smaller zonal scales. As the zone is large, weather patterns will be varied across the region at any given time, and therefore whilst high demand conditions may occur in one area, this has a lower influence on the overall peak factor. As a result, it is important to note that our system capability needs to plan and invest for higher peaks than the regional peak factor may imply, to ensure that demands can be met when peaks occur in localised areas.
Peak factor is calculated as a ratio of maximum to average consumption. Maximum and average consumption is calculated separately for each water resource zone and summated to give company level values. The calculation is based on daily and weekly data for the major components. For minor components annual values as reported during the annual returns have been used. We changed our methodology using a tile analysis for upstream loses in FY16, this enables us to use weekly upstream losses data in the peak factor calculations making it more robust.

Line 4Q.28 – Mean Zonal Compliance

Performance for FY18 showed an improvement on last year however our performance of 99.97% failed to meet the target of 100%. Achieving 100% compliance is challenging due to the influence of customer internal plumbing on several water quality parameters. We are working hard to address these issues and have been working closely with the DWI to learn lessons from the incidents we have experienced. We are implementing a water quality transformation plan delivering improvements at water treatment works and in the network to meet the increasingly challenging water quality targets.

Line 4Q.29 – Volume of Leakage above or below the sustainable economic level

Total leakage has risen in FY18 compared to FY17, as a result of a more extreme winter event, with a freeze-thaw occurring in March 2018. However despite this increase, over the last four financial years total leakage has remained significantly below the economic level.

We have followed the guidance when calculating this value, although we believe that using ELL would better reflect the cost company has to bear to maintain leakage at this, significantly lower than economic, level.

Table 4R – Wastewater network and Sludge

We support the collection of the wastewater network data as we consider it to be defined, reportable and potentially useful for cost assessment, although it is imperative that each company reports to consistent definitions.
However, it is important to consider the confidence grades applied and the use of inferred information within any of the datasets provided. This year we have continued with our data improvement project, which is improving the accuracy of our inferred data, on both the existing and ex private sewer network, where the use of inferred data could have substantial impacts upon the data being reported by different companies. This project also aimed to improve the general quality of the network data that we are submitting.
Network performance can be influenced by other factors such as rainfall levels, run off rates and population density or level of urbanisation, which are not considered in this data set.

Block A – Wastewater network

Line 4R.1 – Connectable properties served by s101A schemes completed in the report year

The number of first time sewerage projects can vary depending on the number of applications that are received from customers. We have not completed any schemes this year.

Line 4.R2 – Number of s101A schemes completed in the report year

We have not completed any schemes this year.

Line 4R.3 & 4R.4 – Total pumping station capacity

We extract pumping station numbers and capacity from our corporate management system. Pumping station data has checked and verified as part of our data improvement project by operational teams. We have made additional checks as we moved data on to a sap based system; this has removed any duplicate or decommissioned assets.
This year we have reported an increase both in the numbers of pumping stations and capacity of pumping stations. This is due to an increase in the numbers of stations that have transferred in to our ownership through private sewer legislation, though our data improvement projects. We also realised that some terminal pumping station data had been missed in last year's submission. As a result of the data improvement projects we have improved our confidence grade for these two lines.

Line 4R.5 – Total number of sewer blockages

The numbers of blockages that impact our network has reduced slightly this year. Our operating model continues to focus on reducing incident numbers and the impact they have on customers. Our reactive resolution vehicles and the equipment that they carry are key to this, as they are helping to identify the root cause of problems so that we can resolve incidents first time. We have worked hard over recent years to educate customers on what not to flush/pour into the network and we are starting to see the benefits of these campaigns.
A consistent methodology would need to be applied across all companies for this data to be effectively used for cost models.

Line 4R.6 – Total number of gravity sewer collapses

This year we have again, seen numbers of collapses reduce again. Over recent years we have enhanced the use of CCTV surveys and fully utilised our programme to identify structural defects and sewer deformations,

this has enabled us to proactively repair sewers, reducing the number of collapses and therefore reduce the impact on our customers.
A consistent methodology would need to be applied across all companies for this data to be effectively used for cost models.

Line 4R.7 – Total number of sewer rising main bursts/collapses

The number of collapses varies across the period, however, our performance has been reasonably stable over the last few years. We naturally see a fluctuation in performance in rising mains due to the level of operational technology and innovation that is available for rising main assets. We plan to continue our research to consider post incident materials testing following rising mains bursts, we hope this could be used to identify those assets where repeat failure of the rising main is likely and enable better planning of refurbishment and replacement schemes.
Due to the relatively low expenditure likely to be associated with rising main bursts/collapses over time we believe that other explanatory factors are more significant in explaining costs for models with limited degrees of freedom.

Line 4R.8 – Number of combined sewer overflows

Our profile of overflows changes over time. Increases in the number of overflows can be as a result of the adoption of previously private assets or the discovery and permitting of previously unknown/unpermitted assets. Decreases occur when assets are closed and also from the discovery that some assets do not exist (the permits for these assets are then surrendered). If multiple overflows are present at one location, the overflow numbers have been included within this line. Over AMP6 we are installing a significant number of event duration monitors on these assets. The information gathered from these monitors may drive future investment.
If this factor were to be used in benchmarking models then the most up to date values (i.e. current year) should be used as a basis for forecasting for future activity rather than a trend based on historic changes.

Line 4.R9 – Number of emergency overflows

Our profile of overflows changes over time. Increases in the number of overflows can be as a result of the adoption of previously private assets or the discovery and permitting of previously unknown/unpermitted assets. Decreases occur when assets are closed and from the discovery that some assets do not exist (the permits for these assets are then surrendered). If multiple overflows are present at one location, the overflow numbers have been included within Line 8. If this factor were to be used in benchmarking models then the most up to date values (i.e. current year) should be used as a basis for forecasting for future activity rather than a trend based on historic changes.

Line 4R.10 – Number of settled storm overflows

Our profile of overflows changes over time. Increases in the number of overflows can be as a result of the adoption of previously private assets or the discovery and permitting of previously unknown/unpermitted assets. Decreases occur when assets are closed and also from the discovery that some assets do not exist (the permits for these assets are then surrendered). If multiple overflows are present at one location, the overflow numbers have been included within line 8. If this factor were to be used in benchmarking models then the most up to date values (i.e. current year) should be used as a basis for forecasting for future activity rather than a trend based on historic changes.

Line 4R.11– Sewer age profile

The numbers of sewers constructed after 2001 grows steadily each year.

Line 4R.12 – Volume of trade effluent

There is minimal variance in the volume of trade effluent across this period and the change cannot be attributable to any one factor. We have seen efficiency and waste minimisation improvements implemented by trade customers, with various degrees of success. There is the potential that some small and fast changing traders e.g. vehicle washes, may not be consented and are not included in our reported values however, we believe that the volumes of these will be relatively low and therefore the variance is covered within the confidence grade. We will review our methodology to assess whether these traders are material. We do not believe that this line is required for cost comparison models as the flows and loads for significant works are accounted for elsewhere in the tables.

Line 4R.13 – Volume of wastewater receiving treatment at sewage treatment works

This line includes all flows not just domestic flows. We have seen a small increase in flows this year. The quality of the data provided for this table has increased across this AMP as we install more flow recording devices at our WwTW. Where a site is not MCERT'd we have estimated the flow based on the information we have available in relation to P.E and flow. This estimation is reflected in the confidence grade.
We do not believe that this should be used for comparative purposes, as it does not include losses from the network and it assumes a similar coverage of MCERT'd works across all companies. This measure does not consider the variability in dry weather flows and flow to full treatment and the potential costs in dealing with a significant range in flows.

Line 4R.14 – Length of gravity sewers rehabilitated

The length of gravity sewer rehabilitated varies across the five year period. This is as would be expected as our strategies and work banks are variable across the AMP. This trend is consistent with previous AMP's. We have changed our processes this year to ensure that all very small projects recorded and have seen an increase in the lengths of sewers rehabilitated.
We do not believe that this should be used a cost driver because it is a small dataset.

Line 4R.15 – Length of rising mains replaced or structurally refurbished

We currently maintain our rising mains on a reactive basis. We classify refurbishment of a rising main when we have replaced or re-lined a length of rising main to increase the expected lifespan of that asset. We have not refurbished any rising mains this financial year.
We do not believe that this should be used for cost comparative purposes, as companies may be working to inconsistent definitions of structural refurbishment.

Line 4R.16 – 4R.21 – Length of foul (only), surface water, combined public sewers, rising mains, total length of other wastewater network pipework and total length of "legacy" public sewers as at 31 March and
Line 4R.22 – Length of formerly private sewers and lateral drains (s105A sewers)

We have conducted an extensive data improvement project this financial year. The project has focused in improving the quality of our sewer records, particularly those records that are inferred. As a result of this we have seen a very small increase in our total sewer length this year. More importantly, we have seen an improvement in the confidence grade i.e. quality of this data. We hope to continue this process over the next year to make sure improvements to this data set.

Block B – Sludge

We use our Regional Sludge Operational Management (RSOM) system as the primary source of measuring sludge production.

Line 4R.23 – Total sewage sludge produced treated by incumbents

The FY18 figure is a measured number for digester feed predominantly from our RSOM system. A small number of sites were not measured fully by the RSOM system so estimates have been included for these sites. This has been reflected in our confidence grade. We have added to this figure a raw sludge production number for the sludge that we lime treat. Both figures exclude any inbound sludge trading and is constrained to the sludge produced within our region. It excludes the volume of lime addition, grit and screenings from sewage treatment and excludes grit and screenings arising from sludge treatment.
It excludes our sludge that is treated using lime by a 3rd party contractor, detailed in line 24.
Our sludge produced volume has risen slightly this year.

Line 4R.24 – Total sewage sludge produced treated by 3rd party sludge service provider

This figure is a raw sludge production number and excludes any inbound sludge trading and is constrained to the sludge produced within our region. It excludes the volume of lime addition, grit and screenings from sewerage treatment and excludes grit and screenings arising from sludge treatment. This figure is measured before going to be limed by a 3rd party contractor. The volume of sludge we report in this line has reduced as we have brought some third party sludge liming activities back in house.

Line 4R.25 – Total sewage sludge produced

This is a calculated line.

Line 4R.26 – Percentage of sludge produced and treated at a site of STW and STC co-location

We have interpreted the line to include all co-located indigenous sludge production and indigenous sludge from physically separate sites connected by pipeline where any sludge treatment activity takes place (thickening sites, dewatering sites and sludge treatment sites). We predominantly measure this sludge. Our reported percentage has reduced slightly this year as we have monitored sludge discharged in to our inlet works closely this year.

Line 4R.27 – Total sewage sludge disposed by incumbents

Volumes of sludge disposed have reduced this financial year. Increased downtime at our incinerator has resulted in less sludge being incinerated. This sludge has either been disposed of to agriculture or is held in temporary stockpiles awaiting disposal sludge held in stockpiles will be disposed of in future years).

Line 4R.28 – Total sewage sludge disposed by 3rd party sludge service provider

The liming plant at Carlisle has been brought back in to commission following damage caused by storms Desmond and Eva, (last year this sludge was disposed of to restoration). In order to comply with Biosolids Assurance Schemes (BAS) we have brought some liming and disposal activities back in house.

Line 4R.29 – Total sewage sludge disposed

This is a calculated line.

Line 4R.30 – Total measure of intersiting 'work' done by pipeline

The work done by pipeline has been calculated using the total tonnes dry solids moved from each start site to end location. The total volume was then multiplied by the distance in one direction to give the total work done.
We have interpreted the line to include all intersiting 'work' done by pipeline that transports both raw and treated sludge, one way only. For clarity in the future this line could be split into two pipelines:

- Total measure of raw sludge intersiting 'work' done by pipeline
- Total measure of treated sludge intersiting 'work' done by pipeline

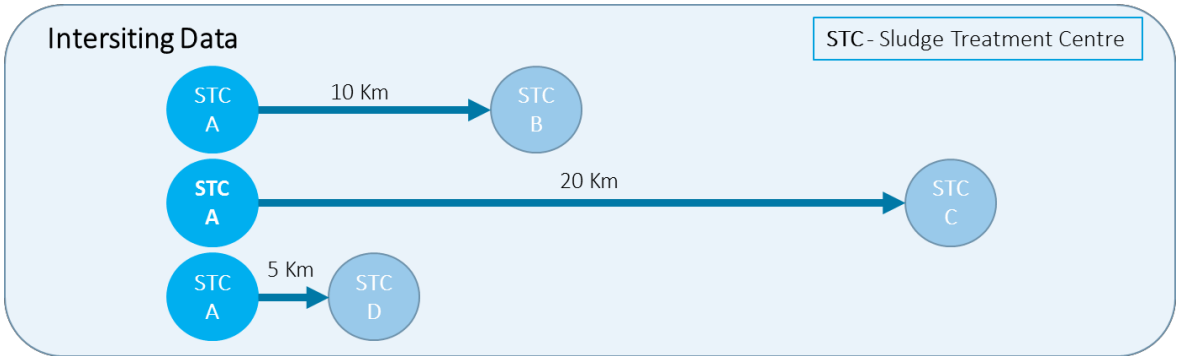
Our reported figure for FY18 has reduced as we have suffered a number of operational issues at some of our sludge treatment centers this year. As a result we have treated sludge at different treatment locations and therefore have moved sludge, by tanker rather than by pipeline.

Line 4R.31 – Total measure of intersiting 'work' done by tanker

We have interpreted the line to include all treated and untreated liquid sludge intersiting 'work' done as a liquid sludge, one way only.
The total work done via tanker has been calculated by:

- Calculating the total tTDS for each route
- Calculating the distance travelled in one direction
- The total distance for each route is then multiplied by the total tTDS
- The regional total is a sum of all of the routes

The diagram summarises this:



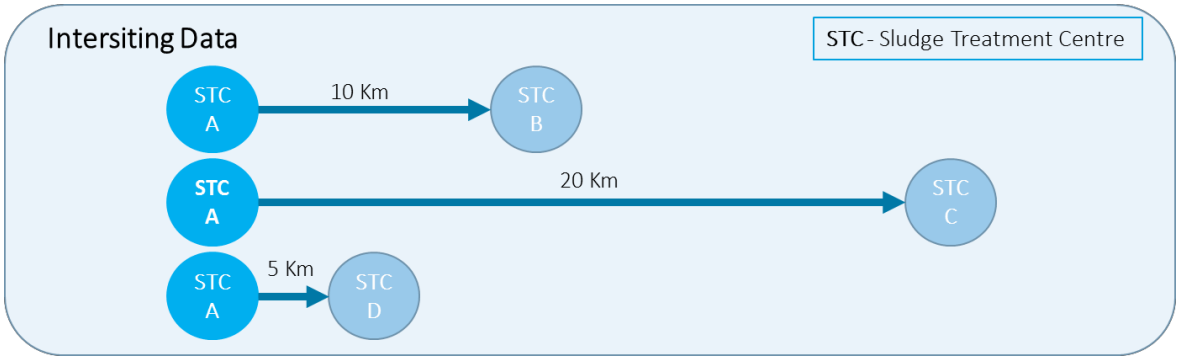
This figure is measured.
Sludge to land transport activity is excluded as this is captured under sludge disposal.

The figure that we have reported is higher than the last financial year. We have produced more sludge this year as we have seen a small rise in reported figures for both population and trade effluent discharges. Increased asset downtime has resulted in sludge being transported from site as a raw liquid sludge rather than as a thickened sludge.

Line 4R.32 – Total measure of intersiting 'work' done by truck

We have interpreted this line to include all untreated and treated sludge as a solid (cake) intersiting 'work' done, one way only. All of this work is all raw sludge cake movements.
The total work done via truck has been calculated by:

- Calculating the total tTDS for each route
- Calculating the distance travelled in one direction
- The total distance for each route is then multiplied by the total tTDS
- The regional total is a sum of all of the routes The diagram below summarises this:



Sludge to land transport activity is excluded as this is captured under sludge disposal. This financial year in order to mitigate for operational failures at some of our STCs we have deployed temporary centrifuges. This has increased the volumes of thickened sludge that we produce and transport via truck. To ensure that all of our sludge meets strict compliance guidelines we have stored sludge at strategic sludge storage facilities; this has in turn increased the volume of sludge that we have moved by truck.

Line 4R.33 – Total measure of intersiting 'work' done (all forms of transportation)

This is a calculated line.

Line 4R.34 – Total measure of intersiting 'work' by tanker (by volume tanker)

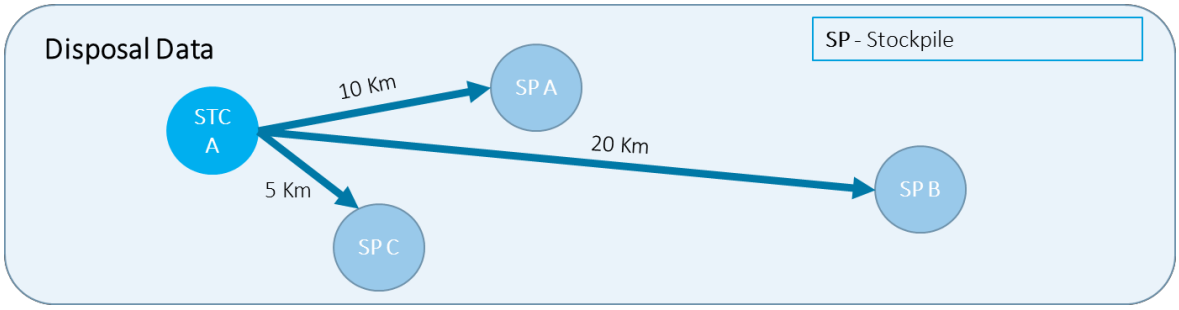
The figure that we have reported is higher than the last financial year. We have produced more sludge this year as we have seen a small rise in reported figures for both population and trade effluent discharges. Minor operational issues have resulted in sludge being transported from site as a raw liquid sludge rather than as a thickened sludge.

Line 4R.35 – Total measure of 'work' done in sludge disposal operations by pipeline

We do not dispose of any sludge by pipeline.

Line 4R.36 – Total measure of 'work' done in sludge disposal operations by tanker

The figures have been calculated from measured tTDS and distance travelled as recorded on our vehicles. The diagram below summarises how we have calculated this:

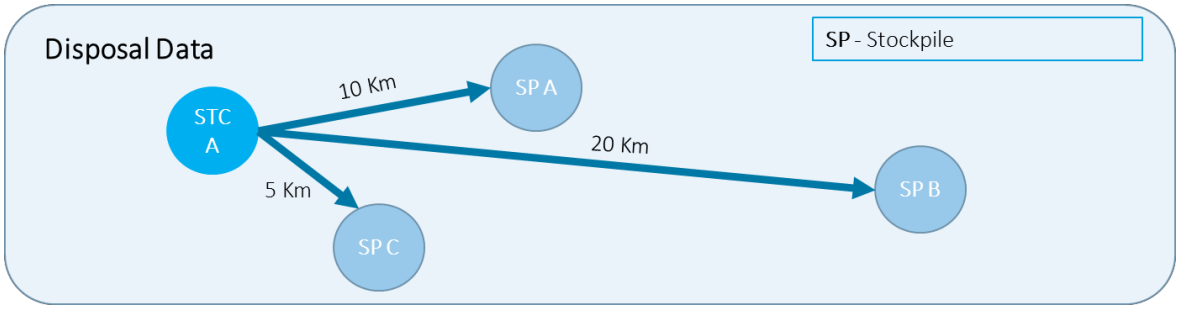


As can be seen from the trend in our numbers we are steadily reducing the volumes of sludge that we dispose of by tanker.

Line 4R.37 – Total measure of 'work' done in sludge disposal operations by truck

From FY17 onwards our vehicles have been able to record distances on board to automatically calculate distances travelled.

- This diagram below summarises how we have calculated the volumes of sludge disposed by truck:



Volumes disposed of by truck have increased this financial year. We have emptied and disposed of sludge that was being held in lagoons at Oldham WwTW. We have incinerated less sludge due to increased downtime at Shell Green, this sludge has been instead disposed of to agriculture. Some minor process failures at STC occurred, reducing the sludge quality standard produced. In order to appropriately dispose of the lower quality sludge we have had to transport it further away.

Line 4R.38 – Total measure of 'work' done in sludge disposal operations (all forms of transportation)

This is a calculated line.

Line 4R.39 – Total measure of 'work' done by tanker in sludge disposal operations (by volume transported)

As can be seen in our figures we are disposing of less sludge via tanker.

Line 4R.40 – Chemical P sludge as percentage of sludge produced at STW's

Over the past year, we have completed a more detailed analysis of phosphate loads. We have modelled a number of different scenarios with a % volatile solids that was more in line with the experiences of phosphate removal at WwTW facilities that already had chemical phosphate removal. This also assessed the impact of the type of process employed on site i.e. filter works or activated sludge. We will continue this study so that we can assess the impacts of; population, per capita figures, updating proposed P schemes and trade effluent loads.

Table 4S – Sewage Treatment – Explanatory variables

We believe that the variables considered within this table will provide a good basis for the comparison of costs between companies. It is imperative that the size, consent conditions, treatment works classifications, flow and load removal rates are all considered when making cost comparisons between companies, as each of these factors can influence the capex and opex that are required to build and operate a works to meet any given standard.

The breakdown of the phosphate (P) removal consent categories in the table is logical and seems to be based on the additional treatment that would be required to achieve the different levels of P removal. It should be noted that P removal with a consent of greater than 1mg/l may not require an additional process to capture solids. Additional solids capture stages at any WwTW will significantly increase both capex and opex requirements.

The breakdown of biochemical oxygen demand (BOD) categories within the table seem to be logical. The lower the BOD generally the larger the secondary treatment process required. A larger secondary process would result in an increase in both capex and opex. For a works with a BOD consent between 10-20 additional solids, it may be possible to achieve the consent without additional solids capture, but not in all circumstances.

The breakdown of ammonia categories is logical. The lower the ammonia consent the larger the secondary treatment required or there may be an increased likelihood that a tertiary stage will be required to achieve consent standards. This table may need to be divided so that activated sludge works and filter works can be considered separately as lower ammonia consents are easier to achieve with an activated sludge works than a filter works. A filter works with a consent of less than 5mg/l would usually require tertiary ammonia treatment whereas an activated sludge plant could be optimised to be able to achieve this.

There have been a number of changes this FY to the number of works that we operate and the size band that these works are in. This then changes the distribution of these works across consent categories. The changes are as follows;

Works Name	New Size Band	Previous Size Band
Askham	1	2
Dolphinholme	1	2
Eaton	1	2
Langdale	1	2
Little Budworth South	1	2
Warburton	1	New WwTW
Casterton	2	1
Greystoke	2	3
Orton	2	1
Weeton	2	1
Strines	3	2
Braystones	4	5
Cockermouth	4	5
Sedbergh	4	3
Staveley	4	3
Kingsley	5	4
Settle	5	4

Greengarth & Holmbrook WwTW was incorrectly recorded as a TB1 works this has now been corrected to a SB works.

Block A Load received at sewage treatment works

Lines 4S.1 – 4S.7 – Load received at sewage treatment works in size bands 1-6 and total load

Load received is a good comparator between WwTW. However, it is important that each company is calculating load using the same methodology.

Line 4S.8 – Load received by trade effluent customers at treatment works

It is important to understand the loads that we receive from trade customers. These loads can be difficult to treat and can significantly increase costs at a WwTW. Again, a consistent method to calculate load is needed between companies.

Block B Number of sewage treatment works

Lines 4S.1 – 4S.15 – Number of sewage treatment works in size band 1 – 6 and total number of works

Number of works is a good comparator between WwTW. However, it must be used in conjunction with consent, load and WwTW classification information.
This is standard information linking the works to the Environment Agency consent and needs to be considered in conjunction with operating costs. In AMP6 we will start to see the introduction of lower P consents at our works, with the lowest being 0.25mg/l at Windermere WwTW. The industry has accepted that consents can go as low as 0.5mg/l in AMP6 for P however, we have accepted three limits tighter than this in Cumbria in recognition of the sensitive environments they discharge to (Grasmere 0.4mg/l, Cleator 0.4mg/l and Windermere 0.25mg/l). The costs at these works may increase because of these particularly low P consents.
In AMP7 it is likely that there will be a requirement for some plants to remove priority substances (subject to the outcome of the CIP2 collaborative R and D project).
We have adopted one additional WwTW this FY.

Line 4S.16 – Current population equivalent served by STWs

The PE served by our works continues to steadily grow year on year.

Lines 4S.17 – 4S.25 Current population equivalent served by:

Line 4S.17 – Discharge relocation schemes

We have reported no discharge relocation schemes.

Line 4S. 18 – Filter bed STWs with tightened/new P consents

A project has been completed at Cleator WwTW.

Line 4S. 19 – Activated sludge STWs with tightened/new P consents

We have reported no discharge relocation schemes.

Line 4S. 20 – Groundwater protection schemes

We have reported no discharge relocation schemes.

Line 4S. 21 – STWs with a Flow1 driver scheme

We have reported no discharge relocation schemes.

Line 4S. 22 – STWs with tightened/new N consents

We have reported no discharge relocation schemes.

Line 4S. 24 – Tightened/new sanitary parameter consents and STWs with tightened/new UV consents

Projects have been completed at Ravenglass WwTW and Kendal WwTW.

Line 4S. 23 – New tightened / new sanitary parameters

Projects have been completed at Tarvin WwTW, Whalley Bridge WwTW, Davyhulme WwTW and Chorley WwTW.

Line 4S.25 – Population equivalent treatment capacity enhancement

Population equivalent (PE) enhancement at a WwTW does not reflect the scale of the impact of a new development on wastewater infrastructure. It also discounts any investment made on the wastewater network to incorporate growth and new development. PE as a measure of investment can only be reviewed against a baseline PE from which the improvements have been made at individual WwTWs. This information is available and can give an indication of the impact on that particular WwTW but many other variables influence the cost and scope of a project such as the current headroom, the sensitivity of the watercourse, the current size, age and reliability of the individual process units, the availability of land for expansion etc. The design criteria also has assumptions associated with PE (occupancy rates, water use, infiltration etc.) that can reduce confidence in the capacity enhancement accurately reflecting the PE it can accommodate. UU's ODI is potentially more representative of the impact of our investment. Baseline Km have already been calculated based on the contribution to that stretch of watercourse by that asset, so our investment at this site to accommodate a new development will definitely result in that watercourse being protected from the impact.

Despite this change in outcome for measuring supply demand investment the PE enhancement is useful in assessing trends of investment in relation to new development. Over time, we are able to understand whether more investment was required specifically for this purpose, or whether other project enhancements and resilience measures have reduced the need.

Projects have been completed at Davyhulme WwTW, Chorley WwTW, Whetherall & Great Corby WwTW, Cockermouth WwTW, Halton East WwTW and Papcastle WwTW.

Table 4T – Sludge treatment

Block A – Sludge treatment process

This table has been populated on the basis of the STC capability not the product that is produced.

Line 4T.1 – % sludge untreated

A small volume of our sludge has been sent to reclamation this year, which has been reported in this line.

Line 4T2 – % sludge treatment process – raw sludge liming

In order to continue to appropriately treat sludge during increased asset downtime some of our sludge treatment centres we have deployed temporary sludge liming facilities. We have also recommissioned Carlisle liming following damage caused by storms Desmond and Eva. As a result of this we have seen a small increase in the volumes of sludge that we lime.

Line 4T.3 – % sludge treatment process – conventional AD

The volumes of sludge that we treat using conventional processes remains relatively constant.

Line 4T.4 – % sludge treatment process – advanced AD

The volume if sludge that we treat using advanced processes remains relatively constant.

Line 4T.5 – % sludge treatment process – incineration of raw sludge

We do not use this treatment process.

Line 4T.6 – % sludge treatment process – incineration of digested sludge

We do not use sludge incinerator as a method of treatment. This line is not aligned to RAG4.07 as incineration of digested sludge is a disposal activity. We have reported the digested sludge incineration activity in line 4T.14.

Line 4T.7 – % sludge treatment process – phyto-conditioning/composting

We do not use this treatment process.

Line 4T.8 – % sludge treatment process – other (specify)

All of our sludge treatment processes have been included above.

Line 4T.9 – % sludge treatment process – Total

This is a calculated line.

Block B – (un-incinerated) sludge disposal route

Line 4T.10 – % sludge disposal route – landfill, raw

We have not used this disposal route.

Line 4T.11 – % sludge disposal route – landfill, partly treated

We have not used this disposal route.

Line 4T.12 – % sludge disposal route – land restoration/reclamation

We have interpreted the line to be calculated from a treated sludge figure (regardless of origin i.e. sludge traded in has been included in scope). We have interpreted this line to include the volume of lime addition, where relevant, as this is the physical volume of material actually disposed.

Line 4T.13 – % sludge disposal route – sludge disposed to farmland

We have interpreted the line to be calculated from a treated sludge figure (regardless of origin i.e. sludge traded in has been included in scope). We have interpreted this line to include the volume of lime addition, where relevant, as this is the physical volume of material actually disposed. We have disposed of more sludge to farmland this year as a result of increased downtime at our incinerator.

Line 4T.14 – % sludge disposal route – Other (specify)

We have calculated the volumes of digested sludge disposed via incineration from line 6 here as a treated sludge figure rather than a sludge produced figure (regardless of origin i.e. sludge traded in has been included).
We have excluded ash volumes produced from our incineration process from this table as it is not requested. Operational issues at Shell Green has reduced the volume of sludge that we disposed of this financial year using our incinerator.

Line 4T.15 – % sludge disposal route – Total

This is a calculated line.

Table 4U – Properties, population and other

Block A – Properties and population

Line 4U.1 – Household properties connected during the year

The number of properties connected continues to grow steadily each year.

Line 4U.2 – Non-household properties connected during the year

The number of non-household connections continues to grow steadily each year.

Line 4U.3 – Households properties billed unmeasured sewage

The number of unmetered households has decreased broadly in line with the number of meter optants.

Line 4U. 4 – Households properties billed measured sewage

The number of metered households has increased consistently with the number of meter optants and the number of new household connections.

Line 4U.5 – Households properties billed for sewage

This is a calculated line.

Line 4U.6 – Non-households properties billed unmeasured sewage

The number of unmetered non-households has decreased this year.

Line 4U.7 – Non-households properties billed measured sewage

The number of metered non-households has decreased this year but we have seen an increase in the number of void properties.

Line 4U.8 – Non-households properties billed for sewage

This is a calculated line.

Line 4U.9 – Void properties

The number of Void properties remained stable until FY14. Since FY15 there has been an increase in voids, primarily because we have carried out a review of properties marked as occupied on our systems, but where the name of the occupier was unknown. If we have been unable to determine the identity of the customer then we would no longer raise bills in the name of “the occupier” and would report the property as Void. This replicates the definition and practice included in the Ofwat best practice revenue recognition accounting policy as set out in Appendix 3 of RAG 3.07, issued in February 2013. It also brings our revenue recognition accounting policy in line with other Water Companies. The numbers of voids continues to increase this year. We are working with retailers to ensure that occupied properties are correctly billed.

Line 4U.10 – Number of properties

This is a calculated line.

Line 4U.11 – Resident population

Population is useful for comparative purposes, however, it is important that all companies use the same methodology for estimating populations and expected growth rates. It is also import to consider population density as we believe that this will vary significantly both within and between companies and may influence opex and capex costs. Through our data checks and validations we have identified that we have been reporting total population not resident population. We have corrected the data for this year. For previous years the non-resident population needs to be deducted from the reported resident population figure to calculate the true resident population figure.

Our populations are steadily rising year on year. This growth is a combination of expected regional growth and an improvement in data quality as a result of improvements to the accuracy of the drainage area mapping data used to assign population.

Line 4U.12 – Non-resident population

The number of non-residents continues to grow steadily. This data has a lower confidence grade as it is an extrapolation from a small data set.

Block B – Other

Lines 4U.13 – 4U.15 – Energy consumption – wholesale, Energy consumption – network + and Energy consumption - sludge

These measures may be relatively poor potential explanators of cost as they will capture factors that are wholly under management control e.g. amounts of telemetry, and so cannot be considered to be entirely exogenous.
We believe that the water electricity consumption dataset is complete as this has been based on meter point administration number (MPAN) references. In previous years we undertook a desk based exercise to split the electricity consumption by water resources and network plus. Further work has been completed to categorise MPAN numbers by upstream service enabling us to produce a more accurate allocation based on site consumption. This change in methodology accounts for a greater proportion of energy costs being allocated to sludge.
Diesel consumption (associated with energy generation) accounts for a very small proportion of energy consumption and has not been included in the energy consumption figures, because the data is not currently available.

Line 4U.16 – Population resident in National Parks, SSSIs and Areas of Outstanding Natural Beauty (AONB)

We have calculated the population that resides within areas of special designation. The population within these areas has slightly reduced this year. We have changed population data this year, the dataset is more aligned with our boundaries rather aligned to postcodes.
There is a possibility that the Lake District National Park may be designated as a World Heritage Site, this would make planning restrictions even more onerous. This would increase both opex and capex.
It may be important for this table to consider the number and type of assets or the PE served by assets that lie within an area of special designation, as this does make planning restriction more onerous. This would increase both opex and capex.

Line 4U.17 – Total sewerage catchment area

Our number has slightly decreased this year as we have made some data improvements with our geographical information system (GIS).

Line 4U.18 – Designated bathing waters

In the North West, we have a number of very large high profile bathing waters. We believe that the number of bathing waters may not be an adequate measure for cost modelling purposes. It may be more appropriate to assess the population equivalent that discharges in to bathing water.
We currently have 30 bathing waters in our region following the de-designation of Silloth bathing water prior to the 2018 bathing season. There are currently no consultations for the designation of bathing waters outstanding however we anticipate the de-designation of an additional bathing water at Allonby South

before the 2019 bathing season. There is the potential for additional designation of bathing waters particularly as open water swimming becomes more popular and we predict that over time more lakes will become designated bathing waters. We will treat newly designated bathing waters in the same manner promoting improvements where appropriate and supported by customers to ensure our assets are not preventing bathing waters achieving excellent status by 2040.
The current population equivalent served by wastewater assets that have been upgraded due to bathing waters investment is 1.9 million. These have received significant upgrades to reduce the risk of bacteria or viruses reaching these sensitive locations. This is a significant proportion of the population. Although there is a reduction in the number of designated bathing waters, the shellfish beds and the requirement to protect them remains. Therefore there will not be a reduction in operational costs due to the de-designation of bathing waters.
There remains a significant gap between the performance of bathing waters in the North West when compared with the rest of England which may result in the need for further investment. Customer insight and research into their views is key to whether enhancement beyond the current minimum sufficient standard is required. It is crucial that we ensure we maintain the performance of our assets to secure the resilience of these bathing waters in protecting the public health of our customers.

Line 4U.19 – Number of intermittent discharge sites with event duration monitoring

We have seen a significant increase in the number of EDMs installed this year. We will continue to deliver our substantial programme of monitor installations over the remainder of the AMP6 period.

Line 4U.20 – Number of monitors for flow monitoring at STW's

We have not installed any flow monitors for this driver to date.

Line 4U.21 – Number of odour related complaints

Numbers of odour related complaints remains reasonably constant.

Line 4U.22 – Volume of storage provided at CSOs, storm tanks, etc. to meet spill frequency requirements

We believe that volume of storage provided to meet spill frequency can be a good indicator for financial models as long as all companies apply a consistent definition. It must be noted that the solution provided to respond to an NEP driver may be different between companies and the scale of the programme of work may vary. This may lead to the construction of alternative processes, which provide the same benefits without the need for significant storage.
Further details of the volumes of storage delivered by projects in FY18 can be found in the evidence pack.

Line 4U.23 – Total volume of network storage

Over the past financial year we have completed a data improvement programme, and our number has reduced accordingly.

Table 4V – Operating cost analysis – Water Resources

Water resource cost analysis

A number of improvements have been made to the reporting of data within this table, when compared to the equivalent cost capture tables in FY17 which had relatively low Confidence grades. This has resulted in an increase in the levels of accuracy of costs and information captured between the various segments of this table.

Line 4V.1 – Power

Whilst the overall variance to data captured at FY17 remains broadly stable, there has been significant movement between the categories. Costs for Power are now assessed at MPAN level and where possible allocated to assets. This in turn allows for a more accurate assessment for example of Borehole cost allocations (i.e. by applying Regulatory cost guidance of the split between Water Resources & Water Network Plus costs). Following guidance during the Regulatory Accounting & PR19 process we have also reallocated some cost of pumped Impounding Reservoir abstractions from Water Abstraction (Water Resources) to Raw Water Transport (Network Plus) based upon Business unit receiving the benefit of the pumping activity.

Carbon Tax and Other Power costs are also split based upon a proportion of the Electricity costs.

Line 4V.2 – Income treated as negative expenditure

Income received from ROCs and electricity exports for Water Resources is minimal as it only relates to the activities at one asset.

Line 4.V3 - Local authority and Cumulo rates

The allocation of Cumulo and Local Authority Rates within Water is primarily allocated based upon PR09 GMEAV data. Impounding Reservoirs carry a large GMEAV value, as a result cost allocation is weighted to this asset type. Therefore it is unlikely that splitting cumulo rates by assets types will give any meaningful cost driver information. The primary movement from FY17 is as a result of the £4.4m 2005 Cumulo Rates refund and the proportion allocated to Water Resources in line with GMEAV. This is separately called out as atypical in table 4J.

Line 4.V - Other Direct

These are Abstraction Charges, IRE, as well as Employment, Contractor, Materials & Other costs that are directly attributable to Water Operations. Where possible the costs are allocated down to Asset specific items to drive cost allocations and where this is not possible management assessment is utilised to allocate costs to Water resources Assets. The primary movement from FY17 is as a result of timings of the Impounding Reservoir programme.

Line 4V.5 - Other Indirect

Other Indirect costs are formed from all those cost items not captured in lines 1 to 4, for example, Scientific Services, Other Business Activities and G&S. The costs are apportioned primarily based upon the proportion of Direct costs.

Line 4V.6 - Total before depreciation

This is a sum of lines 1-5.

Line 4.V7 – Historical Cost Depreciation

There were significant fixed asset systems development and data cleanse activities between FY13 and FY17 which has resulted in greater integration between our financial and operational asset registers. Consequently, we are now able to allocate our assets, and therefore depreciation, to the categories in Table 4V with greater confidence than in previous years.

Line 4V.8 – Total operating costs (excluding 3rd party)

This is a sum of line 6 and 7.

Section B – Other Expenditure – Wholesale Water

Line 4V.9 – Employment costs - directly allocated

The gross salaries and wages of all employees within direct cost in the Water Services Business Unit of UUW's Wholesale business (including agency and excluding contractors).

Costs are captured at cost type level excluding any capitalisation impacts and allocated into the subsequent Business Unit in line with the allocations utilised for table 4D/4J. The movement from the prior year is primarily in relation to an increase in FTE providing resilience to water operations as well as inflationary impacts, together with some changes to defined benefit pensions costs.

Line 4V.10 – Employment costs - indirectly allocated

The gross salaries and wages of all employees within all other departments except for the Water Services Business Unit of UUW's Wholesale business, the costs captured are in line with line 4V.9.

Costs are captured at cost type level excluding any capitalisation impacts and allocated into the subsequent Business Unit in line with the allocations utilised for table 4D/4J. The movement from the prior year is primarily in relation to a decrease in FTE supporting the Capital Programme and associated Support Services offset by inflationary impacts and some changes to Defined Benefit pensions costs.

Line 4V.11 – Number FTEs consistent with 4V.9 above

The total FTE of all employees within direct cost in the Water Services Business Unit of UUW's Wholesale business (including agency and excluding contractors) in line with costs detailed on line 4V.9. The FTE numbers are a proportionate allocation of total FTE utilised in direct operations. The movement from the prior year is primarily due to an increase in FTE providing Resilience to water operations as well and inflationary impacts and some changes to defined benefit pension's costs.

Line 4V.12 – Number FTEs consistent with 4V.10 above

The total FTE of all employees excluding those within direct cost in the Water Services Business Unit of UUW's Wholesale business (including agency and excluding contractors) in line with costs detailed on line 4V.10. The FTE numbers are a proportionate allocation of total FTE in all non-direct operations. The movement from the prior year is primarily in relation to a decrease in FTE supporting the Capital Programme and associated Support Services.

Line 4V.13 – Costs associated with Traffic Management Act

The cost of permits associated with the Traffic Management Act is allocated 100% to Treated Water Distribution. The costs have increased relative to FY17 primarily due to additional Highways Authorities that have now adopted a permitting scheme. Next year we expect the final three local authorities in the North West; Blackpool, Cumbria and Liverpool to apply the scheme. As these are all large authorities we expect costs to rise by around 20%.

Section C – Service Charges

Note the total of lines 14-16 reconciles back to the values reported in table 4D.3 and 4J.3 respectively following Ofwat guidance received during the cost capture process for FY17.

Line 4V.14 – Canal & River Trust service charges and discharge consents

The costs associated with Canal & River Trust service charges and discharge consents relates to BWB costs and is 100% allocated to Raw Water Abstraction. This relates to the abstraction of Water from Llangollen Canal at Hurleston and remains broadly similar to FY17.

Line 4V.15 – Environment Agency abstraction charges / discharge consents

Environment Agency service charges / discharge consents are directly to Business United based upon actual cost data. The EA service charge is allocated to Raw Water Abstraction and the Discharge Consent cost is allocated to Water Treatment. Historically Discharge Consents for water sites were incorrectly allocated to Raw Water Abstraction in prior years.

Line 4V.16 – Other abstraction charges/ discharge consents

Line 16 relates to abstraction costs paid to Severn Trent for the use of Vyrnwy. In FY17, Vyrnwy costs where reported against Other costs in table 4D/4J - Raw Water Abstraction, but is now included within abstraction charges / discharge consents within these tables.

Line 4V.17 – Statutory water softening

UU does not operate any statutory water softening schemes, as a result this line remains at a zero value.

Table 4W – Operating cost analysis – Sludge treatment

Sludge treatment opex by treatment type and Sludge disposal route

Sludge transport costs are not included within this table; these can be found in table 4E.
Shell Green dewatering has been included in the other column.
Three sites are now classified as co-located this has caused some reclassification of costs; these sites are Ambleside, Grange-Over-Sands and Eccles.
We have continued with our sludge audits to ensure that assets and associated costs are allocated to the correct price control.

Lines 4W.1 and 4W.9 – Power

Power costs reduce over time as energy generation benefit increases with implementation of new SBAP facility at Davyhulme. In FY16 improvements were made to the process for allocating power costs at co-located sites which led to a reduction in allocation to sludge treatment and an increase in sewage treatment. Adjustments have been made so that the sludge price control receives the benefits energy self generation.

Lines 4W.2 and 4W.10 – Income treated as negative expenditure

This line contains the ROC income from CHP generation at our wastewater treatment works. Income has increased in FY18 due to the full year effect of gas to grid.

Lines 4W.3 and 4W.11 – Local authority and Cumulo rates

The underlying value of rates that we pay to local authorities continues to grow in line with the investments that we make to our wastewater asset base. Reported values in each year fluctuate predominantly due to the impact of price increases, accruals as well as adjustments for refunds and back charges. This year rates have been assigned based on if the works is for WwTW, sludge treatment or is a co-located site. This has resulted in a reduction for the sludge price control.

Lines 4W.4 and 4W.12 – Other Direct

No sludge transport costs have been included in this line.

Lines 4W.5 and 4W.13 – Other Indirect

Lines 4W.6 and 4W.14 – Total before depreciation

These are calculated lines.

Lines 4W.7 and 4W.15 – Historical Cost Depreciation

There were significant fixed asset systems development and data cleanse activities between FY13 and FY17 which has resulted in greater integration between our financial and operational asset registers. Consequently, we are now able to allocate our assets, and therefore depreciation, to the categories in Table 4V with greater confidence than in previous years.

Lines 4W.8 and 4W.16 – Total operating costs (excluding 3rd party)

These are calculated lines.

Line 4W.17 – Employment costs –directly attributable

The gross salaries and wages of all employees within direct cost in the Wastewater Services Business Unit of UUW's Wholesale business (including agency and excluding contractors).

Costs are captured at cost type level excluding any Capitalisation impacts and allocated into the subsequent Business Unit in line with the allocations utilised for table 4E/4K. The movement from the prior year is primarily in relation to an increase in FTE as well and inflationary impacts and some changes to Defined Benefit pensions costs.

Line 4W.18 – Employment costs – indirectly attributed

The gross salaries and wages of all employees within all other departments except for the Wastewater Services Business Unit of UUW's Wholesale business, the costs captured are in line with line 4W.18.

Costs are captured at cost type level excluding any Capitalisation impacts and allocated into the subsequent Business Unit in line with the allocations utilised for table 4E/4K. The movement from the prior year is primarily in relation to an decrease in FTE supporting the Capital Programme and associated Support Services offset by inflationary impacts and some changes to Defined Benefit pensions costs.

Line 4W.19 - Number FTEs with line 4W.17

The number of FTEs has remained reasonably constant over the last three years.

Line 4W.20 - Number FTEs consistent with line 4W.18

The total FTE of all employees excluding those within direct cost in the Wastewater Services Business Unit of UUW's Wholesale business (including agency and excluding contractors) in line with costs detailed on line 4W.18. The FTE numbers are a proportionate allocation of total FTE in all non-direct operations. The movement from the prior year is primarily in relation to a decrease in FTE supporting the capital programme and associated support services.

Line 4W.21 - Costs associated with Traffic Management Act

The cost of permits associated with the Traffic Management Act which is allocated 100% to Sewerage Collection. The costs have increased relative to FY17 primarily due to additional Highways Authorities that have now adopted a permitting scheme. Next year we expect the final three local authorities in the North West; Blackpool, Cumbria and Liverpool to adopt the scheme. As these are all large authorities we expect costs to rise by around 20%.

Line 4W.22 – Costs associated with Industrial Emissions Directive (IED)

Although IED came in to law, Water Companies as a whole appealed the regulations and therefore the IED permits are in abeyance. We are currently operating without prejudice under EPR (PPC) we have included the costs of PPC compliance as this will form part of the IED requirements. The reported costs for PPC monitoring and reporting include the permit fees and manpower costs only. The PR19 data table submission and the IED Special factor claim will include additional costs for maintenance, power and fees for new permits. Subsequent APR tables will be populated on the same basis as the PR19 submission. We do not believe that the PPC costs are representative of IED costs. Should the decision by DEFRA uphold the changes in regulations then we will faced with circa 21 sites needing significant investment to bring them up to IED compliance and ongoing maintenance, monitoring and reporting costs. We have incurred a small amount of legal costs associated with preparing and submitting the appeals but these are not reported here.

Line 4W.23 – Canal and River Trust service charges and discharge consents

The total of lines 23 to 25 reconciles back to table 4E and 4K Service Charges and Discharge Consents.

Line 4W.24 – Environment Agency service charges/discharge consents

The total of lines 23 to 25 reconciles back to table 4E and 4K Service Charges and Discharge Consents.

Line 4W.25 – Other service charges/permits

The total of lines 23 to 25 reconciles back to table 4E and 4K Service Charges and Discharge Consents.