Appendix 1: Securing cost efficiency

Contents		Page

1. Overview of totex cost assessment ... 3

1.1 The development of Ofwat's PR19 cost assessment modelling approach ... 4

1.2 Maintaining IAP fast-track categorisation incentives ... 9

1.3 Conclusion ... 11

2. Business rates ... 12

Business rates annex– Application of VOA methodology ... **15**

3. Developer services ... 20

3.1 Modelling Developer Services costs ... 23

3.2 Data reliability issues ... 24

3.3 Charging and revenue recovery implications of applying the IAP Growth Model costs ... 24

3.4 Developer services volume correction ... 26

3.5 Potential remedies for developer charges ... 28

Developer services annex 1 – Background for modelling ... **33**

Developer services annex 2 – Growth model cost and data issues ... **35**

Developer services annex 3 – Reinforcement and strategic schemes ... **51**

1. Overview of totex cost assessment

We strongly support the approach that Ofwat has taken to cost modelling at PR19, and have actively sought to assist throughout the process.

Overall we consider it has been a success, generating botex and retail models that cover the fundamental cost drivers and yet remain 'sensibly simple' and intuitive from an engineering, operational and economic basis. Against a range of assessment criteria the botex models score highly and reflect a substantial improvement on PR14.

High level review of the botex models used in the IAP

Assessment criteria	Evaluation	Assessment
Models cover key cost drivers	Engineering perspective- Three primary variables covered - scale, network complexity and treatment complexity	✓
	Statistical perspective- Significance tests (T-tests) confirm model variables are individually important in explaining cost variability.	
Models address CMA feedback from PR14	Enhancement separated from base expenditure (botex)	✓
	Improved line of sight to engineering, economic and operational reality	
Models meet key statistical tests	High R^2 values - models can explain variance in costs	✓
	Model Coefficients conform to observed analysis	

In developing its PR19 models, Ofwat has – in conjunction with companies – undertaken a detailed data collection and cleaning process of cost assessment data. In the 2016 and 2017 cost assessment data submissions, **532 wholesale data queries and issues were generated to improve the maturity of the information** that has been used to develop models. This improvement has subsequently been subsumed into the annual reporting process with its associated assurance requirements. Importantly, these opportunities afforded to companies to arrive at representative data values was prior to the selection of the explanatory variables that have been used in the econometric cost models.

We recognise that alternative model choices and specifications will always be available. However, given the stage of the process and the fact that the chosen models are the product of a detailed, open and thorough development process; we think they should only be modified in exceptional circumstances – i.e. where they give rise to customer detriment or could negatively impact the reputation of the sector. Where specific issues arise from company representations, we think bespoke adjustments, rather than model changes, should be the default intervention.

Our acceptance of the fast track categorisation was made 'in the round'. This meant that we chose not to challenge specific enhancement cases and the design of aspects of the botex and retail models, some of which we don't think are justified when viewed in isolation. However we did raise issues with two non-botex elements (Business Rates and Developer Services) where they could have wider implications beyond Severn Trent. We have undertaken further analysis on these two issues and believe these can be addressed through pragmatic solutions that would deliver a better outcome for customers across the sector.

We also note the on-going debate regarding the 1.5% frontier efficiency shift. In the IAP responses strong evidence has been presented highlighting the significant problems with the Europe Economics analysis underpinning the 1.5% assumption, including its inconsistent and partial consideration of real price effects, the lack of account it takes of the recognised slowdown in productivity growth in the UK economy since the financial crisis, and its flawed use of evidence on past out-performance (in particular in the energy sector) to justify the proposed levels of productivity 'stretch'. Consistent with how other sector wide assumptions are being

considered (eg the WACC) we think any change needs to ensure no procedural disadvantage to fast track companies.

In the sections below we expand on these points – we first highlight the effectiveness of Ofwat's approach to developing botex models, we then analyse the modelling and data concerns raised by other companies, before discussing both the issues and potential solutions in relation to Developer Services and Business Rates.

1.1 The development of Ofwat's PR19 cost assessment modelling approach

Following on from the PR14 use of econometric models to expose efficient expenditure, Ofwat's approach to PR19 cost assessment has been developed through extensive engagement and challenge from a wide range of stakeholders.

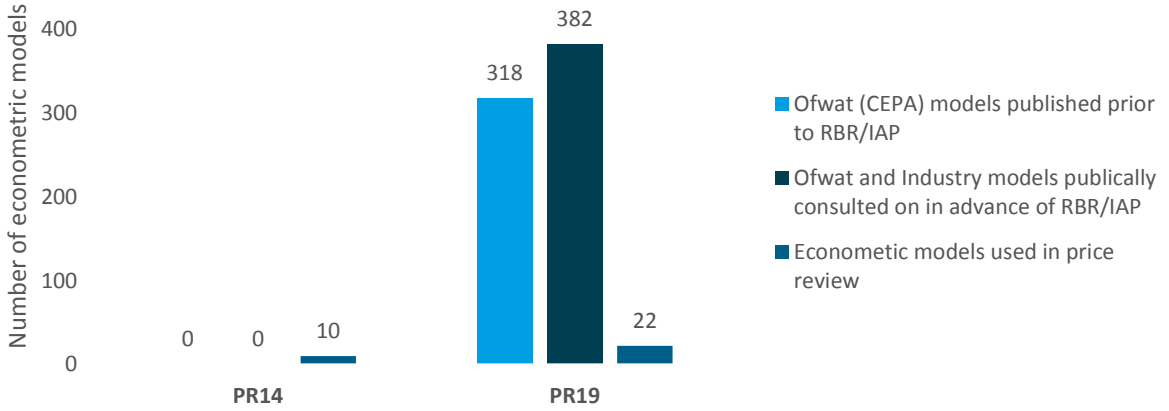
The starting point for the development of the econometric models was the CMA's assessment of the performance and appropriateness of PR14 models through the Bristol appeal. This identified: the need for more simplistic models (where the engineering basis could be clearly tested and justified); and the significant challenges of considering base and enhancement expenditure (totex) together in overarching econometric models.

Subsequently, detailed engagement has taken place. This has included an active industry wide Cost Assessment Working Group (CAWG) where companies, Ofwat and econometric/engineering specialists worked collaboratively to explore how to improve the PR14 approach. This resulted in more than 10 plenary working group meetings over a 2 year period and wide range of sub-groups on more focused aspects.

Engagement also included detailed involvement in the identification, collation and review of modelling data in specific cost assessment data submissions in 2016 and 2017 (now subsumed into the APR). Each submission was then followed by a detailed query process, running to 532 issues across the two submissions, to test the quality and comparability of the data – fully acknowledging its importance in developing robust models.

CAWG members then had the opportunity to input, and then subsequently respond to a detailed consultation on econometric cost modelling in March 2018. Collectively, the engagement has led to a step change in transparency relative to PR14, this can be seen in the graph which shows the number of models that were visible before and after RBR/IAP.

Transparency of model development between PR14 and PR19



Throughout this process, Ofwat has consistently recognised that developing cost models is challenging, and that it is appropriate to adopt a pragmatic approach. The March 2018 consultation, which included model design and assessment criteria, highlighted that Ofwat's aim was to develop models that are 'sensibly simple' and intuitive, capturing only the main cost drivers given engineering, operational and economic understandings.

As part of our engagement, we collaborated with engineering experts to create a framework that could help develop and test the coverage of water econometric models. The table below shows the fundamental factors

that it identified as driving water service costs. The framework stressed that these underlying factors need to be, either; accounted for in cost models, acknowledged and responded to outside of econometric models (such as in bespoke cost adjustments) or explicitly owned and managed by companies.

Fundamental factors driving wholesale water expenditure. Source: Severn Trent framework 'Identifying drivers of water costs', February 2018

Key underlying factor	Type of cost driver
1. The distance water has to be transported (which will be affected among other things by the relative locations of customers and sources of water)	**Scale factors**
2. The number of customers to whom water is distributed	
3. The quantity of water that has to/may have to be transported and treated	
4. The geography (including the topography) over which water has to be transported	**Network complexity factors**
5. Opportunities for the achievement of economies of scale in the transportation of water	
6. The extent to which transportation activities are affected by congestion issues	
7. Opportunities for the achievement of economies of scale in water treatment	**Treatment complexity factors**
8. The extent and forms of treatment that are required given the quality of raw water	
9. Regional differences in relevant input costs	**Regional and service related factors***
10. Service quality variations	
11. The significance of other customer characteristics that may affect transportation and treatment requirements	

**given that these drivers are regional in nature, not likely to be appropriate for industry wide econometric models – more appropriate for bespoke adjustments*

The framework did not imply that models should include an explanatory variable to reflect every factor. Rather, that there was a need to consider and identify the means and extent to which each factor is captured in a given model. Appropriate consideration can then be made in a suite of triangulated models, or be addressed outside of the modelled baseline. We used this approach (and a similar set of factors for wastewater and retail) to develop our own econometric models. This allowed us to both understand our current performance and input models into the cost assessment consultation. It has also been used to test that the models – our own models, those presented in the consultation and subsequently the models in Ofwat's IAP – are adequately specified.

We are reassured how models have evolved through the engagement process:

Fundamental critiques of PR14 totex models acknowledged

Models now consider botex (Base capex + opex) rather than totex.

Need for simplicity with a clear line of sight to underpinning engineering logic also embraced.

Cost drivers shown to be missing or poorly accounted for have been addressed

For example, acknowledgement of the role of density at both extremes of rurality and urbanity.

Cost drivers poorly reflecting underlying factors, or driving adverse behaviour, have been removed

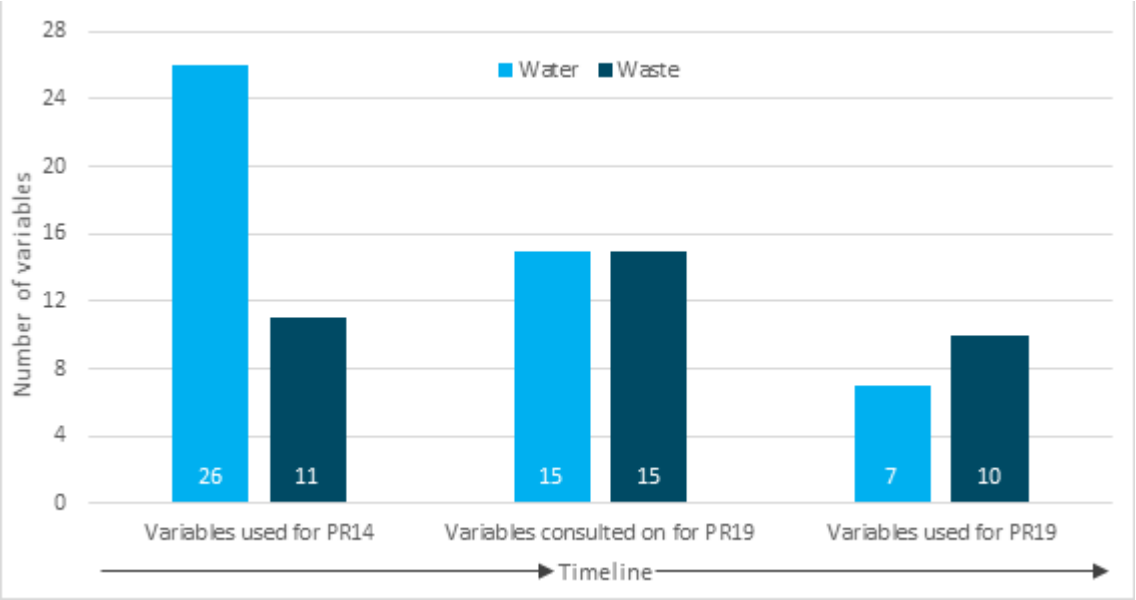
For example, removal of mains age as an explanatory driver (over simplification of true cost pressures and potential to penalise companies that have actively managed network over time).

Logical, but poor poorly specified drivers have been more appropriately specified

For example, refining waste treatment complexity variable - Ammonia consents from 1Mg to 3Mg (better reflects distribution across the industry and the cost pressures incurred.)

The graph below illustrates how totex/botex models have been refined though this engagement process. It reflects the move towards more 'sensibly simple' models and the way in which potential variables have been refined and focused through time reflecting improving data and understanding of the cost: cost-driver relationship inherent in the models.

Evolution of the number of variables being used across Ofwat's cost models



In practice, the vast majority of this detailed and collaborative process was focused on botex and retail econometric models. This is evident from Ofwat's modelling consultation where of the 382 models presented, 312 were botex models, 66 were retail models, and only 4 were enhancement models (none of the 189 company-developed models were enhancement models). This primary focus on botex (and retail) modelling was logical given it accounts for the vast majority of totex, that enhancement expenditure is generally not routine, and more difficult to compare across companies. However, it has meant that approaches to modelling totex that are outside of botex and retail models have been subject to a much lesser degree of scrutiny and review ahead of the IAP process. Our responses at the IAP stage, and to this DD, reflect this feature.

Appropriateness of Ofwat IAP botex econometric models

Given the extensive engagement on PR19 botex econometric modelling, we consider the approach followed to be fit for purpose. Ofwat's overarching requirement was a set of 'sensibly simple' models conforming to economic, operating and engineering expectations and econometric diagnostic tests. This is appropriate given the wider use of adjustments and assessment of efficient expenditure in the round.

Reassuringly, we note that the implied efficiency outputs from these models broadly benchmark to PR14 assessments of forecast efficiency. Accepting that company performance can vary over time, and that different models may accentuate the attributes of companies differently – dramatic swings in calculated efficiency should not be expected over relatively short periods of time.

Below, we set out a high level review of the wholesale IAP botex models using our framework, i.e. the coverage of fundamental drivers of cost in the model variables. We maintain that this type of analysis should be the primary basis for testing the appropriateness of models. We also review a range of high level statistical diagnostic tests – an important, but secondary, basis for model validation.

Review of the coverage of underlying factors and cost drivers in IAP wholesale botex models (as per Severn Trent framework, February 2018)

Type of cost driver	Water service econometric models in IAP	Wastewater service econometric models in IAP	Assessment
Scale factors **(incorporating underlying factors 1-3)**	The number of properties and mains length act as the scale drivers in Ofwat's models. These are always of the correct order of magnitude, statistically significant and represent the most fundamental driver of cost variance across firms.	Sewer length, load and the volume of sludge produced are the scale drivers across Ofwat's suite of wastewater models. These variables are always statistically significant and of a sensible order of magnitude.	✓
Network complexity factors **(incorporating underlying factors 4-6)**	The number of booster pumping stations serves as the main driver of network complexity. The density variable (and quadratic density) also partially accounts for this factor. Our analysis suggests that the density-cost relationship presented in the models in part reflects the sharp increase network costs in the most rural areas.	Pumping capacity is used as a proxy for network complexity in Ofwat's sewage collection models. The coefficients on the variable are a reasonable magnitude and are always statistically significant. Network and weighted average population density drivers also reflect 'congestion' costs incurred in urban areas.	✓
Treatment complexity factors **(incorporating underlying factors 7-8)**	The proportion of water treated in bands 3-6 and the weighted average complexity driver accounts for the higher cost associated with more complex treatment methods. Economies of scale is addressed indirectly though the density and quadratic density drivers	Appropriate rescaling of the Ammonia consent variable to better reflect fundamental engineering logic, thereby capturing a significant driver of company costs. Economies of scale is addressed through one of three drivers: load at band 1-3 STWs, Load at band 6 STWs and number of STWs per property	✓
Regional and service related factors **(incorporating underlying factors 9-11)**	Not accounted for in models, but likely to be appropriate given that these will disproportionately affect a small number of companies. Therefore, use of appropriately evidenced bespoke cost adjustments feels more appropriate.		✓

Throughout the process we have cautioned against the over reliance on statistical diagnostic tests given the relatively small sample size and the importance of following underlying engineering and economic logic. That

said, the high R^2 values demonstrated in all of Ofwat's IAP water and waste botex econometric models give confidence that they are able to explain the majority of the variance in costs using simple and easily interpretable models. In all cases, the explanatory variable coefficients conform to prior expectations based on engineering logic. Significance tests (T-Test) also confirm that the variables are material drivers of observed costs within the modelling data set.

In all cases, the Breusch-Pagan test of estimation method confirms the presence of company specific heterogeneity. This supports Ofwat's use of the random effects estimation method. There is a temptation to critique models for functional form using tests such as the Ramsey RESET. However, we consider it is appropriate to place greater weight on engineering and economic logic given the potential for such tests to lead to models which obscure the true drivers of cost.

Frontier shift assumptions

One aspect of Ofwat's cost assessment framework to which we had limited visibility prior to accepting fast track status was the assumption of the 1.5% frontier efficiency shift. This is applied as an 'overlay' to the outcome of the cost modelling process, and involves Ofwat assuming an additional level of efficiency improvement that all companies should be expected to achieve, after appropriate account has been taken of real price effects. Ofwat's provisional view that a 1.5% frontier efficiency shift should be assumed, and the Europe Economics' analysis that underpinned that view, was published at the end of January 2019. Like the approach to other sector wide assumptions, such as the cost of capital, our view is that this should be further considered in light of new evidence and updated consistent with the slow track DD timetable.

We understand this is a live debate, with many companies raising major concerns about the underlying analysis prepared by Europe Economics and how it has interpreted the available evidence on both real price effects and productivity. Some of the key challenges with the Europe Economics analysis include:

- Deviation from the established regulatory approach whereby regulators first estimate real price effects and then deduct an allowance for on-going productivity improvements;
- Europe Economics has concluded – on the basis of a partial and inconsistent assessment of the relevant evidence – that CPIH indexation sufficiently captures all input price inflation in the water sector whilst at the same time taking no account of the extent to which CPIH also captures on-going productivity improvements;
- Europe Economics has selectivity chosen what comparators to use when estimating productivity growth, disregarding without justification, the construction and transport sector which has had lower levels of productivity;
- It has ignored the slowdown in productivity growth that has been observed more generally in the UK economy since the financial crisis, with the Bank of England estimating a 0.3% productivity improvement going forward.
- The decision to apply an uplift to the productivity assumptions due to the application of totex and outcomes at PR19 doesn't appear to be well justified given that the analysis by KPMG focuses on outperformance, not efficiencies, with numerous commentators highlighting the generosity of the previous energy price review.

Like the approach to the cost of capital, we think if this assumption is being revisited in light of new evidence and feedback, this should be applied to all companies consistent with the slow track DD route.

Modelling concerns raised by other companies

We are aware that some companies have presented detailed econometric critiques of Ofwat's models in their IAP responses. Some of these arguments have more theoretical justification than others.

However, we remain of the view that econometric models by necessity should remain high level and ensure that there is adequate coverage against the principal cost drivers. Given the extensive prior engagement opportunities available, and our view of the appropriate coverage of fundamental cost drivers, we do not see that there is a strong case to modify models at this stage. Therefore, a cautious approach to considering the case for alternative models is merited. Ofwat should be also conscious of how changes to model specifications at this stage could affect the fast-track incentive.

The cost assessment working group and the ongoing model development process provided significant opportunities for the adequacy of different potential cost drivers and model forms to be examined and tested in detail. This detailed process, over an extended period of time, has seen an appropriate evolution and refinement of models as data and understanding has improved. Considerable work was done, for example, on the collection and incorporation of density measures. Given this context, significant caution should be applied before making radical adjustments to cost driver choices or coefficients resulting from data revisions made after it has become clear how information will be used. The opportunities for broader scrutiny and testing (through which the chosen IAP models have been refined and tested) are now much more limited. This is likely to increase the risk of poorly considered choices not being appropriately validated and potentially leading to unintended consequences.

Data concerns raised by other companies

Some companies have identified potential problems with their underlying data used to determine both model coefficients and totex forecasts. This has led to a series of forecast and historic data lines that populate econometric models being updated following the IAP. We would urge that Ofwat approach this kind of data reassessment with caution. As Ofwat noted in its econometric cost modelling consultation,[1] the data tables that companies submitted in July 2017 (which contained cost and cost driver information for 2011-12 to 2016-17) had been subject to extensive quality assurance, and Ofwat had explicitly emphasised to companies the importance of good quality data.

While in some circumstances it may be appropriate to take account of such data revisions, there should be a high bar for doing so. Remedial action should focus as far as possible on those companies that have identified limitations with their data – i.e. through bespoke cost adjustments that do not affect all companies.

1.2 Maintaining IAP fast-track categorisation incentives

It is important that the totex allowance provided for in our FD should preserve the efficiency performance assumed within the fast-track decision – the exception being where there is evidence that the decision runs counter to customers' interest, such as for Business Rates or where sector wide assumptions are being updated (like the frontier shift). This is critical to the efficacy of the fast-tracking process, and to securing benefits for future customers, such as encouraging greater ambition, and revealing what excellent performance looks like.

The success of the PR19 process in encouraging companies to bid-up in customers interests, has shown how powerful fast-tracking incentives can be in improving customer outcomes. Arguably no other price review has been as effective, and the Ofwat team should be proud of this achievement. For that incentive to be credible and effective in the future, it is vital that Fast Track companies do not appear to have been unfairly disadvantaged relative to Slow Track companies.

Maintaining such incentives will raise some inevitable and predictable tensions. It is to be expected that new information will be generated after the IAP stage that may challenge the desirability of aspects of the approach adopted for cost modelling. We emphasise that it would not be appropriate for such concerns to materially impact on the totex allowances provided to fast-tracked companies.

We note that under Ofgem's framework, the final determinations for fast-tracked companies are issued ahead of those of others and this acts to effectively 'lock-down' what was agreed.

[1] See, in particular, p5-6.

Other changes can and should be implemented to ensure customers' best interests are served. However when making changes consideration needs to be given to the implications for PR24 and beyond - for example it would be detrimental to customers if companies viewed the slow track route (with its opportunity to submit additional cost claims) as being preferable to the fast track route.

Fast-tracking acceptance – Considering efficient expenditure 'in the round'

Our acceptance of fast track was made 'in the round' such that there were areas of concern we had, but chose not to challenge. Rather, we took a practical and pragmatic view. For example, in arriving at our view of the appropriateness of the overall cost efficiency baseline we have noted, and therefore accepted:

- Remaining weaknesses inherent in the chosen IAP wholesale botex models. Including: the specification of included cost drivers (e.g. the definition of the water treatment complexity cost driver)); the level of model aggregation (i.e. the lack of wastewater models that integrate collection and treatment costs); and the potential over reliance on density and quadratic density variables (i.e. to reflect nonlinear network complexity as well as WTW economies of scale cost divers).
- The 100% challenge placed on the £18m discharge relocation schemes proposed for Packington and Measham STWs.
- Challenges to the scope of the raw water deterioration programme totalling £7m for schemes now endorsed by the DWI.

Any material modifications to econometric models between the draft and final determination leading to changes of forecast efficient botex would impact on this 'in the round' assessment. This would lead to a need to reconsider those components accepted in the round, or result in a material weakening of the fast-track incentives used at this and future reviews.

The three examples highlighted above are further introduced in turn below.

Specification of the water treatment complexity explanatory variable in botex models

The IAP water botex models include explanatory variables for treatment complexity. However, the metric used does not sufficiently differentiate the cost pressures due to more complex processes seen across the sector. As we stated in the 2018 cost assessment consultation, Ofwat's chosen complexity metric (water treated at complexity levels 3-6) will include most surface WTWs irrespective of quality and treatment requirement differences. Conversely, using complexity levels 4-6 (as per CEPA's and our own consultation models), identifies a distribution where costs are truly elevated due to the processes used.

Removal of discharge location schemes

The Packington and Measham obligations were included in WINEP3 under a Habitats Directive (phosphate) driver. It was made clear to us by the EA and Natural England that the only acceptable intervention is to relocate the discharges out of the River Mease Special Area of Conservation catchment. This is due to the fact that the river also exceeds Natural England's stipulated 'naturalised flow' requirements on account of our discharges. The WINEP3 document itself also clearly specified that the obligation was to relocate these discharges. However, given that there is no specific discharge relocation driver in the current WINEP (and therefore Ofwat's modelling suite), a 100% cost challenge was made.

Removal of raw water deterioration schemes

Three raw water deterioration schemes have not been included in the IAP baseline despite having support from the DWI. For the Newent and Epperstone nitrate mitigation schemes, whilst the DWI did not initially support these schemes, upon review it subsequently provided endorsement in letters dated 22nd June 2018 (available on request). Legal instruments are now in place for us to deliver on these commitments. For the Overton Scar arsenic mitigation scheme, the value in our plan was consistent with our submission to the DWI. As with all water quality schemes, we set out to the DWI the evidence driving the need for an intervention. This identified a

customer risk to arsenic exposure with the site currently at risk of exceeding PCV. It is within the margin of lab error for measuring arsenic – a health parameter with no known safe limit. The intervention is commended for support, rather than mandated, by DWI.

These later two examples are reflective of the wider challenge to our enhancement expenditure which we consider are not justified if considered in isolation. If Ofwat were to consider reopening botex modelling for the final determination, we think these points should also be addressed to retain a fair, consistent and balanced assessment of efficient totex in the round.

1.3 Conclusion

The detailed engagement on botex cost modelling has led to an approach which we consider delivers 'suitably simple' econometric models that give appropriate coverage to the fundamental drivers of cost, are intuitive from economic, operational and engineering expectations and satisfy a range of appropriate diagnostic tests. With respect to the potential for changing botex model forecasts between DD and FD, we consider that Ofwat should only deviate from these IAP models in exceptional circumstances. Where Ofwat consider that the case for industry wide modelling changes has been made, these should be undertaken in a way that does not erode the fast track incentive.

Whilst we acknowledge that there is no one way of modelling botex costs, caution must be given to modifying models at this stage. Such changes will not have the benefit of the detailed consultation and development process followed in deriving the IAP models and could be subject to distraction as a result of the regulatory implication now being known.

In two discrete non-botex areas (developer services and business rates), we suggest that applicability of the current approach needs to be reconsidered. These areas have not had the benefit of the extensive engagement afforded to the botex econometric models and could detrimentally impact customers. The way in which uncertainty (with regard to business rates) and revenue calculation (with regard to developer services) have been treated in the DD magnify our IAP concerns and give rise to sector wide risks. These are discussed in detail in sections 2 and 3 below.

We also acknowledge the live debate on the 1.5% frontier efficiency shift. Consistent with how Ofwat is approaching other sector wide assumptions like the cost of capital, it is important that fast track companies do not suffer a procedural disadvantages from any changes.

It is important for the effectiveness of future price reviews (and delivery of benefits to customers in the medium term) that the incentives associated with fast track are protected. We recognise the need to make changes to ensure customers' best interests are served. However when making such changes, it is important that Fast Track companies are not unfairly disadvantaged relative to Slow Track companies, otherwise it creates the risk that at PR24 companies will not submit stretching plans.

2. Business rates

The estimation of Business Rates presents a unique challenge for regulators at periodic price reviews. This arises due to two factors:

- Rateable Values are subject to a revaluation at different intervals to the Price Review (now every three years), which creates uncertainty about the future cost; and
- Companies will not all experience that same movement in Business Rates, primarily due to different investment decisions which drive differences in asset bases; but also due to varying outcomes from engagement with the Valuation Office Agency (VOA).

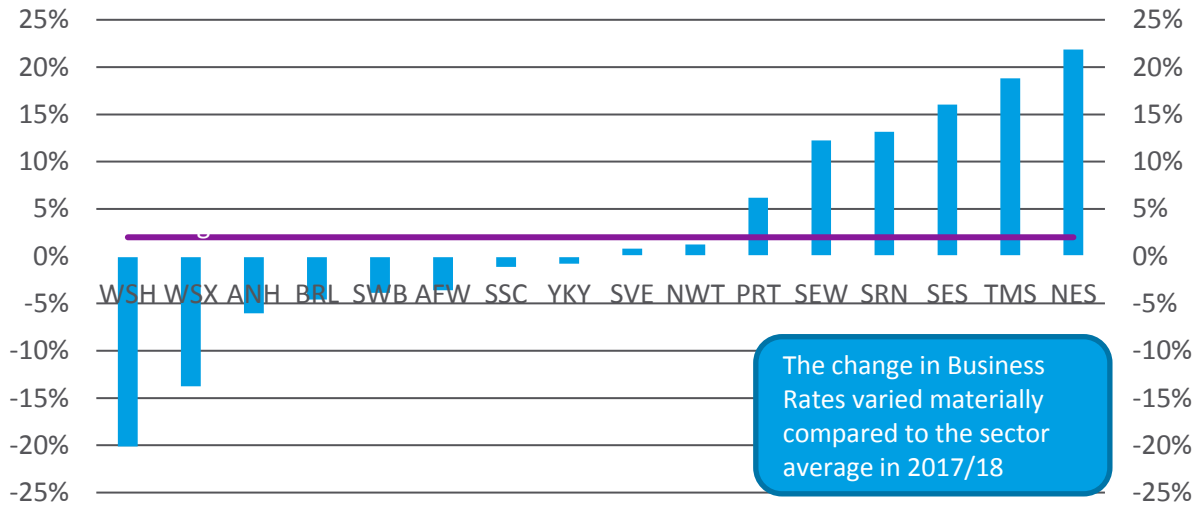
In other network industries regulators typically allow the cost of Business Rates to be passed through, treating it like other taxes such as Corporation Tax. For example the ORR allows a full pass through and so does Ofgem, provided companies can demonstrate that they have taken appropriate actions to minimise the cost to customers.

In the water sector, Ofwat has historically recognised that Business Rates are largely outside management control but used sharing factors to provide companies *with a residual incentive to argue for reasonable treatment in the rating review on behalf of customers* (PR14 Final Determination).

For PR19 a simple estimation approach has been adopted, which assumes that there is no change in Rateable Values (RVs) at the 2021 revaluation period. RVs are therefore rolled forward from 2017/18, and every company is therefore assumed to face broadly similar changes in Business Rates.

Whilst the logic for the PR19 approach might hold when we look at Business Rates in aggregate, at a company specific level history shows that following a revaluation, the resulting changes in Business Rates will vary significantly between companies, ranging from -20% to +22% at the last revaluation, as illustrated in the below.

Change in business rates at the last revaluation (2016 to 2017)



The PR19 assumption of broadly similar growth levels will mean some companies could outperform on this tax, resulting in customers having higher bills than they otherwise should be. For example if Business Rates move consistent with the 2017/18 revaluation, it would mean that some customers will pay c~£4 more per year (£20 over the AMP). This is equivalent to increasing the WACC for such companies by 20 basis points.

The risk of the above scenario eventuating is highly undesirable as it will create the perception amongst stakeholders that some companies are not paying their fair share of tax – which was one of the key reasons for changing corporation tax treatment at PR19. Such an outcome would also appear to be inconsistent with the National Audit Office's recommendations which noted that Ofwat should look to increase the pass-through to

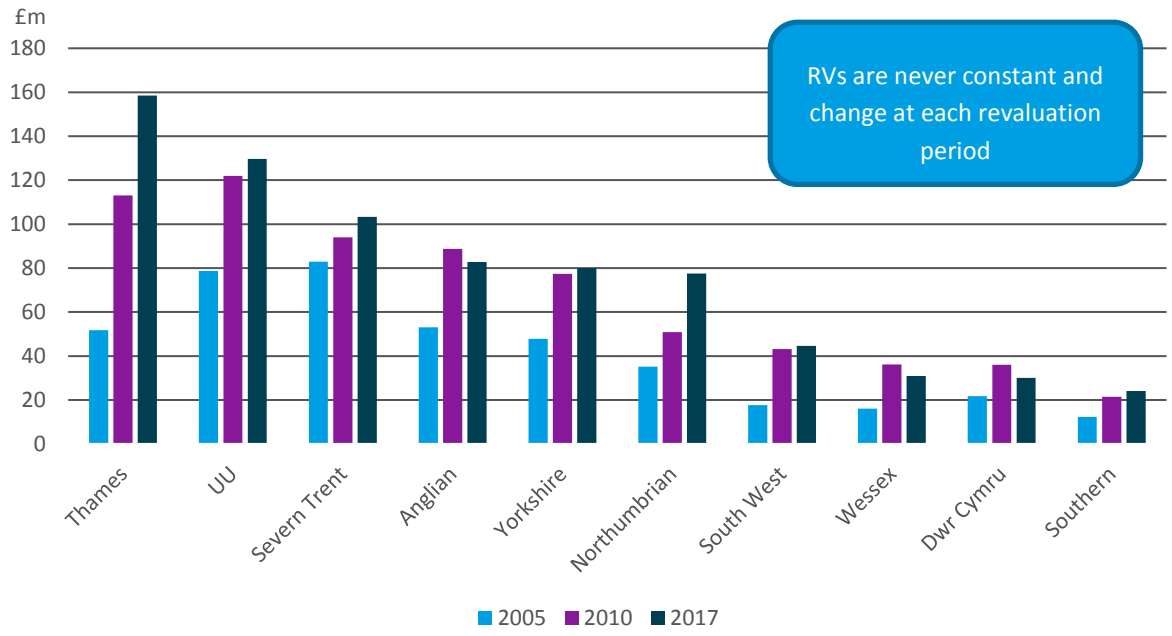
customers of costs or benefits which are outside companies' control, such as general movements in taxation or borrowing rates.

We recognise that companies can input into the Valuation Office Agency's revaluation of Business Rates, therefore some of the differences highlighted above could be attributed to more effective engagement with the VOA. For example at the last revaluation a small number of companies, including Severn Trent, updated the tenant share using the actual fixed asset register instead of rolling forward the asset base from PR04 or PR09. However the bulk of the differences will primarily reflect companies having different investment drivers (e.g. WFD requirements) and making different investments, thereby leading to changes in the asset base and average asset lives. This is why other regulators treat the costs as a pass through.

The assumption of constant rateable values is not consistent with history

We recognise that there is some uncertainty about how RVs will change at 2021. Historical precedent shows that RVs will change – either upwards or downwards and this will vary across companies. This point is illustrated in the figure below which shows the water RVs at each revaluation period.

Change in Rateable Values at each revaluation period



The VOA has a clear methodology for updating the RVs

At the 2017 revaluation the VOA spent considerable time developing a methodology that could be rolled forward. This methodology provides a clear basis for how Rateable Values should be updated at 2021 and can therefore help identify the likely differences between companies:

- Water – update for the PR19 financial model receipts and expenditure; and
- Waste – update for AMP6 civil assets and changes to construction prices.

In our plan we applied the 2017 VOA methodology and incorporated these specific adjustments to calculate the Rateable Values applicable in AMP7, as opposed to holding the RVs constant. This is the reason for the gap of £103m or 20%, between our view of Business Rates and Ofwat's forecast. We have since updated our estimate to reflect the Financial Model from the Draft Determination and an update on the construction price index used by the VOA. This suggests our Business Rates and therefore the gap is likely to increase a further £6m p.a. higher over 2021 to 2024 compared to our September plan.

The forecast in our plan is also made on the basis that the multiplier does not increase. In practice we think it highly likely that the multiplier will increase:

- Business Rates are a property tax with retail, commercial and industrial properties all contributing to HMT. Given the decline of the high street, it's likely that the multiplier will need to increase to ensure HMT recovers the target amount of revenue (ie, in response to more tax relief for retail businesses) and so more of the burden will fall on other sectors, particularly those that are less able to take steps in the short term to reduce or avoid rates, like the water sector.
- The potential reduction in Corporation Tax will require the Government to make up the shortfall through other taxes. This will again push more of the tax burden on immobile businesses.

The solution needs to address the uncertainty and avoid companies "winning" and "losing" on tax

The PR19 Draft Determination makes two assumptions that are unlikely to arise given historical experience – first that companies will face similar changes in Business Rates; and second Rateable Values will be unchanged at 2021. We also note that this would be inconsistent with the VOA methodology, leading to a situation in which some companies outperform on tax and others underperform. This outcome would run counter to the underlying message from the National Audit Office review of water regulation – which is to pass-through to customers' costs or benefits which are outside companies' control.

To address these issues we have identified two potential solutions, both of which would protect customers and have companies absorbing some risk.

Option 1 – update the Rateable Values using the VOA methodology, with companies absorbing the risk on the multiplier

- Water – use the October 2019 VOA communications of draft RVs and update Business Rates on this basis. This would be similar to the approach adopted at PR09 whereby Ofwat updated its Draft Determination to reflect the new information from the VOA published in October 2009. This information could be used and K factors updated before the financial model is closed for the final determination.
- Waste - update the Waste RVs for changes in construction costs predicted by BCIS in the Tender Price Index (TPI), which was used by the VO in the 2017 valuation.

Option 2 – Apply a Business Rates true-up mechanism at 2024/25

- Given the uncertainty about forecasting Business Rates, a simple solution would be to establish a true-up mechanism similar to Corporation Tax, but with a 75%:25% sharing rate (customer:company)
- This asymmetric sharing rate would provide companies with a residual incentive to engage with the VOA and minimise business rates, whilst customers would get the majority of any upside, preventing perceptions of companies underpaying tax.

Our preference would be to apply Option 1 given the availability of the October RVs for the water control and clear cost index for waste.

In the subsequent annex we set out in more detail the VOA methodology and how we have applied this to generate a forecast for our PR19 business plan.

Business rates annex– Application of VOA methodology

A1. VOA Methodology

The Valuation Office use different methods for assessing Wholesale Water and Wholesale Waste Rates. Below we set out the methodology for both water and waste.

A1.1 Water

Water rates covers everything required to supply water. It includes reservoirs, labs, treatment, maintenance, pipelines etc. The calculation is based on case law and uses a receipts and expenditure valuation "Profit Test" rather than individual properties tax.

The method derives a notional profit and splits this profit between Landlord and Tenant. The rates are calculated by taking the Landlord share of the notional profit (also known as the 'Divisible balance'), as illustrated below.

$$Rateable\ Value = Net\ Profit - Tenant's\ share$$

$$Business\ Rates\ = Rateable\ Value\ x\ Multiplier$$

Definitions	
Net profit / Divisible balance	Revenue (Allowed revenue adjusted for legacy adjustments and capital income); Less Expenditure (PAYG plus Run off depreciation plus retail household expenditure)
Tenant share	Return on tenant assets
Multiplier	Tax rate set by Treasury

The VOA calculation uses data from Ofwat's financial model and assumes a base year which is based on the first year of when the revaluation will apply. This means the base year assumed for the last valuation period 2017-2021 was 2017/18. For the 2021 valuation, the equivalent base year would be 2021/22.

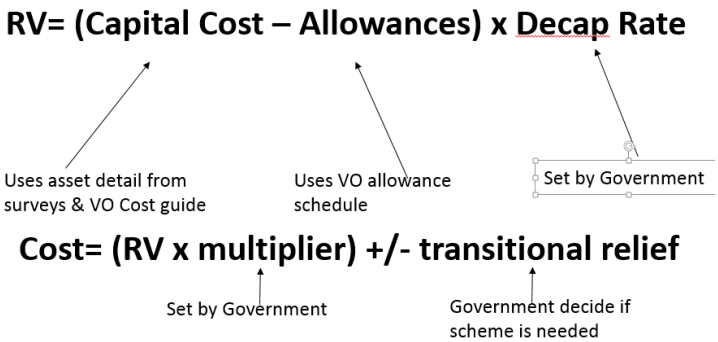
The factors to consider when forecasting for a revaluation year are:

- The allowable income and expenditure over period;
- The method for calculating tenant's share; and
- The change in multiplier.

The only factor to consider when forecasting for a non-revaluation year is the change in multiplier.

A1.2 Waste

Unlike water, for the waste control each sewage works has its own rates charge. However not all sewerage activity is rated – this is because sewers and sewerage pumping stations are exempt from rates. Below is a simple expression of how Waste rates are assessed for a sewage works:



The aim of this formula is to derive an Adjusted Replacement Cost for a site and then by applying the decapitalisation rate convert this cost to a proxy for rent as the RV for a site represents the rental amount that a tenant would be prepared to pay.

Definitions	
Capital Cost	This is the estimated replacement cost for the site
Survey	This is a site survey containing all the dimensions and other details of the rateable assets on the site
VO Cost Guide	This is a schedule of construction costs for all asset types/sizes used in conjunction with the survey details to calculate the capital cost
VO allowance schedule	This is a schedule of the discounts to asset costs that should be applied to take account of age and other obsolescence and the asset age at which these discounts should be applied
Decapitalisation Rate	Set by Government to convert capital value into an annual rental value

The factors to consider when forecasting for a Revaluation year are

- The predicted change in VO Cost guide. Prices are then fixed for rating list unless challenged

The predicted change in VO allowance schedule. The allowance is then fixed for rating list unless challenged

- The predicted change in Decapitalisation Rate. This is fixed for rating list.
- The change in multiplier. This is reset on revaluation then increases annually, usually in line with inflation

The factors to consider when forecasting for a non-revaluation year are:

- Any increase in RV due to new assets (from asset enhancement schemes)
- Any reduction in RV from appeals
- The change in multiplier
- The amount of transitional relief in particular year

A2. Basis of Severn Trent PR19 forecast

In this section we set out how we forecast our Business Rates in our Business Plan, using methodology set out above.

A2.1 Wholesale Water Forecast

We have calculated the forecast rates in our plan using the method and assumptions that we expect the VOA will apply;

- 2018/19, 2019/20 and 2020/21 –forecast rates are based on the RV from the 2017 valuation with the multiplier increasing in line with CPI (using the previous September annual increase)
- 2021/22 (the revaluation year) – based on the same methodology set by the VO for the 2017 valuation and the equivalent lines of data from the Ofwat financial model to determine the 2021 RV. The detailed VO methodology with the lines from the Ofwat financial model (March 2019) used in their calculation of divisible balance can be seen in the screenshot below.

			2021/22 Water network	2021/22 Water Resources	2021/22 Water	Ofwat financial model (March 2019)	Calculation method
1a		Wholesale Water - Final Allowed Revenues	695	86	780	Water Network line 198 & Water Resources line 198	
1b		Income from other sources	11	7	18	Water Network line 129 & Water Resources line 129	
1c		Smooth Reconciling 2015-20 performance	2	-	2	Water Network line 127 & Water Resources line 127	
1d		Return on capital	127	11	138	Water Network line 124 & Water Resources line 124	
1e		Adjustment from mid year figure for return on capital to 1st April 2017	(1)	(0)	(1)		Return on capital (1d) less average of prior year return capital (1d) plus current year return on capital (1d)
1f		Wholesale revenue	706	93	799		**Sum (Lines 1a, 1b, 1c, 1e)**
1g		Retail Household Allowed Revenue	41	5	46	F_inputs, lines 4, 5, 8, 9 (water households connected) plus Retail_residential lines 150, 152, 153, 155 (allowances for water customers)	Households connected multiplied by allowance
1h		**Total revenue**	**748**	**98**	**845**		**Line 1f plus line 1g**
2a		PAYG (wholesale water)	365	53	418	Water Network line 121 & Water Resources line 121	
2b		Wholesale Water - Depreciation (RCV run-off)	213	25	239	Water Network line 123 & Water Resources line 123	
2c		Depreciation for "landlord's" assets not allowed to the tenant when making a Business Rates assessment - 95%	203	24	227		VO 2017 assumption 95% multiplied by Depreciation (RCV run off) line 2b
2d		Household Retail Expenditure - Cost to serve (excluding net margin)	38	5	42	F_inputs, lines 4, 5, 8, 9 (water households connected) F_inputs, lines 10-13, 478, 479 (cost to serve for water customers)	Households connected multiplied by cost to serve
2e		Total expenditure	605	82	687		**Sum (lines 2a, 2b, 2c, 2d)**
2f		Divisible balance	142	15	158		1h less 2e
2g		**Divisible balance @ 19/20 prices**	**135**	**15**	**150**		**Line 1h indexed to November 2019 prices less line 2e indexed to April 2020 prices**

- the screenshot below shows the VO calculation and lines from the Ofwat financial model used to calculate the rateable value and forecast business rates for 2021.

			2021/22 Water network	2021/22 Water Resources	2021/22 Water	Ofwat financial model (March 2019)	Calculation method
2g		**Divisible balance @ 19/20 prices**	**135**	**15**	**150**		**Line 1h indexed to November 2019 prices less line 2e indexed to April 2020 prices**
3a		2017 revaluation - March 2017 (indexed to April 2020 prices)			736		
3b		Working capital			56		Line 2e indexed to April 2020 prices multiplied by 12 months
3c		Tenants capital			792		Line 3a plus line 3b
3d		Average RCV	4,476	405	4,881	Water Network line 1099 & Water Resources line 1099	
4a		WACC			2.8%		Ofwat headline blended WACC - 2.8%
4b		Tenant share			22		Tenants capital (3c) multiplied by WACC (4a)
4c		**Rateable value @ 19/20 prices**			**128**		**Divisible balance @ 19/20 prices (2g) less Tenant share (4b)**
4d		Tenant share			14.5%		Rateable value (4b) divided by dividible balance (2g)
4a		UBR multiplier			52.0%		2019/20 UBR inflated by CPI
4b		Business rates			67		Rateable value @ 19/20 prices (4c) multiplied by UBR multiplier (4a)
4c		**Business rates (2017/18 prices)**			**62**		**Business rates deflated to 2017/18 prices**

- For the years 2022/23 and 2023/24, forecast rates have been calculated on the basis of the 2021 RV with the multiplier increasing in line with CPI inflation; and

- 2024/25 – as a revaluation year, the same approach as used for the 2021 valuation has been used to calculate the RV and rates for the year.

The basis of our key assumptions have been set out below.

Assumption	Rationale
VO will use 2017 valuation methodology	At the 2017 valuation, considerable work was undertaken by us and other companies with the VO to develop a methodology that the VO could roll forward from revaluation to the next. We consider it is therefore reasonable to assume the 2017 methodology will be used in future revaluations
Multiplier not reset	The multiplier is set by central government and did not significantly reduce at the 2017 valuation (by just 1.8% of which half was due to the switch from RPI to CPI). Consistent with this decision we have applied the same multiplier at 2021, recognising that in practice it is likely to increase given the recent focus on Business Rates
Multipliers continue to increase by CPI inflation	In 2017 Autumn budget the government confirmed that it would bring forward the planned switch in the indexation of business rates from RPI to CPI by 2 years to April 18.
Transitional arrangements will not apply	Transitional arrangements have been assumed not to apply as no relief was allowed at the 2017 valuation despite a 13% increase in the RV.

A2.2 Wholesale Waste Forecast

As with water rates, we have calculated the forecast waste rates in our plan using the approach we expect the VOA will apply:

- 2018/19 to 2020/21
  - forecast rates are based on the RV from the 2017 valuation adjusted for additional rateable assets from sewage enhancement capital schemes that have completed during the year.
  - as for water, the multiplier is assumed to increase in line with CPI (using the annual increase in the September CPIH index) inflation. Transitional relief as shown in the table below has also been included in the forecast as an increase in rates because the waste RV in the 2017 valuation reduced rather than increased. The relief (which is a reduction of the benefit of the lower RV) has been applied over 4 years, which is the period over which the valuation applies.

	17/18		18/19		19/20		20/21		21/22		22/23		23/24		24/25	
	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m	RV £m	Cost £m
Sewage Treatment E (before transition)	55.63	26.55	55.63	27.34	55.63	28.12	55.63	28.95	68.42	36.74	68.42	37.43	68.42	38.04	68.42	38.52
Transition amount		2.37		1.16		0.49		0.17		0		0		0		0
Sewage Treatment -E (post transition)	55.63	28.91	55.63	28.5	55.63	28.61	55.63	29.12	68.42	36.74	68.42	37.43	68.42	38.04	68.42	38.52
Refunds prior years - E		-0.8		0		0		0		0		0		0		0
Sewage Treatment -W (No TR scheme)	0.51	0.26	0.51	0.26	0.51	0.27	0.51	0.28	0.63	0.35	0.63	0.36	0.63	0.37	0.63	0.37
Refunds prior years -W		0		0		0		0		0		0		0		0
Multiplier *upper UBR* E (act/est)		0.479		0.493		0.507		0.522		0.537		0.547		0.556		0.563
Multiplier W (act/est)		0.499		0.514		0.53		0.546		0.562		0.572		0.582		0.589
CPI Assumptions											1.80%		1.70%		1.20%	

- 2021/22 (the revaluation year) – assumed the RV will increase by 23% due to the rise in construction costs predicted by BCIS in the Tender Price Index (TPI) which was used by the VO in the 2017 valuation. We have also assumed that additional rateable assets from sewage enhancement capital schemes were decapitalised using an assumed decapitalisation rate of 4.4% to calculate the RV increase (basis of rate set out below). As with water, no change to the multiplier has been made other than to increase for CPI inflation.
- 2022/23 and 2023/24 – no changes have been made to RV prior to the addition of increases for capital enhancements.

- 2024/25 (revaluation year) – as there is more uncertainty of calculating the impact of a second revaluation and it is the final year of the period, the assumption is there will be no changes in RV, decapitalisation rate or multiplier (except for CPI uplift) as a result of a revaluation and transition arrangements would also not apply.

Assumption	Rationale
Continuation of contractors method	VO have consistently over successive revaluations used the 'Contractors test' for sewage assets, where each new asset is valued and added to the RV after decapitalisation (as set out in 1.2 above). We therefore consider it is reasonable to assume the VO will apply the same approach in the 2021 valuation for sewage assets.
Construction cost uplift 23%	Forecast is based on the BCIS TPI which was used by the VO in the 2017 valuation. The BCIS forecast is calculated on the movement in TPI between Q1 2015 and Q1 2019 as these represent the AVD dates of the 2017 and 2021 revaluations. The 23% increase is also consistent with the forecasted increase in the SPONS index which was used by the VO in the 2010 valuation.
Multiplier not reset	The multiplier is set by central government and did not significantly reduce at the 2017 valuation (reducing by just 1.8% of which half was due to the switch from RPI to CPI). We have therefore set the same multiplier at 2021 revaluation, albeit we consider this is likely to increase given the recent focus on Business Rates.
Multipliers continue to increase by CPI inflation	In 2017 Autumn budget the government confirmed that it would bring forward the planned switch in the indexation of business rates from RPI to CPI by 2 years to April 18.
Decapitalisation rate of 4.4%	The decapitalisation rate is set by central government and was assumed to be 4.4% at the 2017 valuation. As the cost of borrowing (key factor used in determining the rate) is at similar levels to when the rate was set in 2017, we consider it is reasonable to assume the rate will remain unchanged for the 2021 revaluation.
Transitional arrangements will not apply	Transitional arrangements for sewage assets are based on the change in RV on each asset rather than on the total RV of all sewage assets. As RV's on individual assets are most likely to change between revaluations, we consider it is reasonable to assume any transitional relief applied to limit the impact of both increases or decrease in RV's on individual assets will be net neutral on forecast rates.

3. Developer services

For developer services, both the assessment of costs and revenues, and the design and implementation of associated price control mechanisms, raise a number of significant but complex issues. The complexity arises from two main sources: (i) the introduction of substantial changes to the charging arrangements for developer services in AMP7; and (ii) the fact that developer services cover three distinct activities – new connections work, requisitions, and network reinforcement - that are subject to different cost drivers, different competitive conditions, and different charging arrangements.

Ofwat has understandably sought to develop and apply approaches that are relatively simple, notwithstanding this complexity. However, we do not believe that the approaches set out in the DD provide a coherent way forward, and instead consider them to raise material risks of adverse, unintended consequences. Avoiding such unintended consequences is of particular significance given the importance of effective developer services arrangements to growth opportunities.[2]

Our primary concerns are as follows:

- The IAP Growth Model does not provide a reliable view of costs
- Applying the unit cost outputs from the current IAP Growth Model to determine revenue allowances would create significant charging and revenue recovery problems that are out of line with our understanding of Ofwat's objectives
- There is insufficient flexibility in the DD arrangements to allow for the developer services revenue allowance to be adjusted to reflect what could be highly material deviations between what is assumed in the base revenue allowance and outturn conditions.

These are explained in further detail below.

The IAP Growth Model does not provide a reliable view of costs

The model itself is too simplistic because it does not take account of the fact that there are substantively different drivers of new connections, requisitions, and network reinforcement costs, and that implied unit reinforcement costs may differ significantly between companies for a number of important efficiency based reasons.

- A single mains connection will often allow for multiple properties to be connected, as with flats. The IAP Growth Model takes no account of the implications of the different volume measures this results in for the assessment of costs:
    - Requisition costs tend to be driven by the volume of mains connections a company provides, with that itself depending on the amount of contestable work it wins (and the proportion of SLO and NAV work differs significantly between company areas).
    - The volume of additional properties connected will tend to be much more important for connection charge-related costs (e.g. meter) and for reinforcement requirements.
- While reinforcement requirements will tend to be driven by longer-term growth forecasts for the number of connected properties, they are often not closely related to outturn growth levels in a given AMP, as reinforcements are often 'lumpy'. Also, average reinforcement costs per new property connected will be affected by factors such as density and topography, even when timing/lumpiness issues have been taken into account. Ofwat has rightly sought to reflect this kind of broader source of difference between companies in a botex modelling context, but the IAP Growth Model takes no account of such factors.

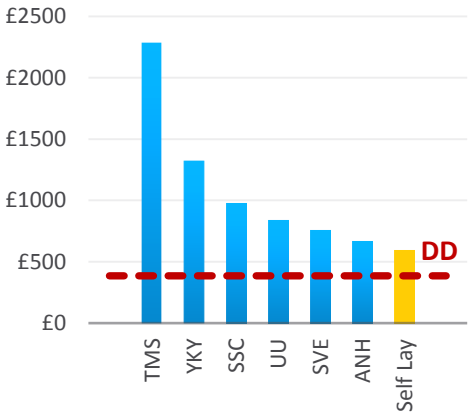
[2] For example, experience in Northern Ireland highlights how limitations in the developer services arrangements can effectively slow local development opportunities (e.g. https://www.bbc.co.uk/news/uk-northern-ireland-45945207).

- The data used in the model exhibits major comparability problems, because different companies have interpreted the implications of the AMP7 changes to developer services charging in markedly different ways in their data submissions. These problems undermine the reliability of the data used for both the historic and the forecast unit cost assessments using the IAG Growth Model.

Applying the unit cost outputs from the current IAP Growth Model to determine revenue allowances would create significant charging and revenue recovery problems that are out of line with our understanding of Ofwat's objectives

The DD sets a revenue allowance for developer services that implies charges should be significantly below our current rates and those of other competitors in the market (i.e., self-lay organisations).

Cost per plot compared to market participants[3]



If the approach set out in the DD were applied, then setting our developer services charges on cost-reflective basis – which is critical to the effective operation of contestable developer services markets – would result in a large over-recovery of developer services revenue.

Adjusting for this by reducing charges to other customers would be likely to trigger penalties under the Revenue Forecasting Incentive, and would in any case be in conflict with Ofwat's stated position that companies should not attempt to alter this revenue to correct for revenue imbalance elsewhere.[4]

There is insufficient flexibility in the DD arrangements to allow for the developer services revenue allowance to be adjusted to reflect what could be highly material deviations between what is assumed in the base revenue allowance and outturn conditions

The Developer Services Revenue Adjustment Mechanism (DSRAM) only partly addresses this issue and would not cover a wide range of foreseeable sources of deviation that are a function of the difficulties of specifying allowable developer services revenue in a reliable and appropriate manner up front.

One important source of tension here is that the maintenance of the broad balance of charges between groups has been a core principle underpinning reforms, and implies that significant changes in any given company's proportion of developer services costs recovered from developers would not be expected. There appear to be material risks concerning the consistency of core parts of Ofwat's DD approach with this underlying principle. In particular: the use of a single industry-wide estimate of the percentage of revenue recovered from developers (which is itself subject to major comparability problems) to set the allowance; and, the view that infrastructure charges should not be net negative.

It is also clear that the required amounts of work may differ from those that are assumed in ways that are not captured by DSRAM (e.g. because of HS2 uncertainty, or because of differences between forecast and actual

[3] Based on company publications. To convert these into an inclusive "per plot" value, we have aggregated average charges for a typical site of 50 plots with 22m of off-site mains.
[4] Revenue Forecasting Incentive (RFI): summary of responses to our informal consultation, May 2019.

diversion numbers), and that the complexity and/or location of work may necessitate higher than expected (cost-reflective) charges.

Potential remedies

The modelling of developer services costs was subject to only very limited stakeholder consideration ahead Ofwat's IAP (unlike the modelling of botex and retail costs, which had been subject to extensive consideration and engagement over the past few years, including through the cost assessment working group). We support Ofwat's recent industry query (CE-02), which should help reveal some of the inconsistencies in how developer services costs and revenues have been reported in company plans (in a context where there appears to have been widespread confusion over what is appropriate).

We consider that the responses to that query could be used to develop and apply a more robust and coherent approach to developer costs and revenues. In this chapter we provide further detail on the problems to be addressed, and potential solutions, which can be summarised as follows:

- **Split the developer services unit cost model** so that the unit costs of connections, requisitions and reinforcement are assessed separately. Using business plan data it would suggest a value of £192m would be appropriate – however we think this should be refreshed using data from query (CE-02). There is also a need to separately allow for strategic reinforcements where additional capacity is planned, but unlikely to be captured by a simple unit cost model (£25m in our case). Given the information currently available, we consider that an updated baseline for developer services, accounting for improved models and appropriate adjustments would be £217m.
- **Address data inconsistency issues** concerning costs and revenues to reduce the risk of spurious results arising from a lack of comparability. Use market evidence collected by Ofwat's Casework team on efficient cost levels to cross-check the reasonableness of modelled outcomes.
- **Include a simple 'true-up' mechanism** that allows for variances (other than those addressed by DSRAM) between the forecasts that underpinned the developer services revenue allowance and AMP7 outturn levels. This is important, as there is scope for significant tensions to arise between Ofwat's charging principles and rules on the one hand, and the specific way in which the developer services revenue allowance has been implemented on the other. Evidence from market rates and from Ofwat's casework could be used to inform the appropriateness of adjustments where appropriate. Imbalances could be addressed through a midnight adjustment to the RCV at PR24.

Given the materiality of this issue and the potential impact it could have on developers we think it is important to consider the implications on DMEX.

In combination, these steps could provide for much more robust estimates to underpin the setting of revenue allowances, and for greater flexibility in the way in which the developer services revenue allowance is applied in order to avoid perverse and unwanted side-effects arising.

The remainder of this section is structured as follows:

- **Section 3.1** reviews the approach to modelling developer services costs
- **Section 3.2** highlights the data reliability issues
- **Section 3.3** presents the charging and revenue recovery issues
- **Section 3.4** discusses the developer services volume correction
- **Section 3.5** presents potential remedies for developer charges
- **Annex 1** sets out background information on developer services activity and modelling
- **Annex 2** provides a detailed assessment of issues with the growth cost model, data provided by companies and revenue issues
- **Annex 3** provides additional background information on our reinforcement and strategic schemes

3.1 Modelling Developer Services costs

The assessment of water developer services costs has been undertaken in the IAP Growth Model (FM_E_WW_growth_IAP). The model considers three components of expenditure:

- connection costs (the act of physically connecting properties to the network);
- on-site requisitions (laying new water mains on development sites); and
- off-site network reinforcement (expanding the capability of the existing network so that it can cope with the new development).

The IAP Growth model consists of two unit cost models - one provides a calculation of the median level of historic cost/volume (£887) and the other a calculation of the median level of forecast cost/volume (£1,139). When triangulated, the unit cost used for IAP cost assessment is £1,013/New Connection.

We note that in Ofwat's methodology for PR19, when discussing developer services revenues it acknowledges that developer services costs vary from site to site and property to property. Consequently, companies are required to create charge bandings against which assessment will be made. However, when assessing cost in its IAP growth model, Ofwat has not taken any account of these variances, and its approach also appears to be inconsistent with how it assesses costs in dispute resolutions.

Our business plan contained £258m coded to water developer services costs (across lines 11 and 12 of Table WS2). This can be broken down into £70m relating to offsite network reinforcement (as shown in line 6 of Table App28), £73m relating to new connections (WS2 line 12) and £114m relating to on-site activity (residual of WS2 line 11). Severn Trent's forecast unit cost (using the simple method in the growth model) is £1989/New Connection, whereas Ofwat's model only provides for £1013/connection or £131m.

For a unit cost model to accurately reflect cost efficiency, two fundamental assumptions must hold.

- **That costs and activity levels within the models are measured in a consistent manner.**
- **That it is reasonable to treat the relationship between costs and the level activity as linear given the timescale of the model.**

Our view is that neither of these fundamental assumptions hold for the IAP Growth Model assessment. Firstly, companies have not provided consistent data on either costs or volumes. Secondly, we do not consider it appropriate to assume that overall developer services costs are related to a singular activity level.

In our view, to form a reasonable view of efficient costs, different activity drivers should be used for the three main components of developer services costs. Due to these factors, we believe that under the IAP Growth Model our costs are not being compared on a like for like basis when benchmarked against other companies, and that the model outputs cannot be relied upon, because they result from an over-simplified and insufficiently well-founded view of the relationship between activity and cost.

In practice, with most of the cost modelling effort ahead of the IAP process having focused on botex and retail cost modelling (for good reasons), relatively limited attention had been given to issues associated with modelling developer services costs. The recent query with respect to developer services indicates that Ofwat is looking to refine its approach in order to reflect some of the key complexities and limitations that have been highlighted in responses to the IAP. We welcome Ofwat's query, and strongly support the need for such refinement.

In particular, we consider it appropriate to model developer services costs using separate unit cost estimates for connections, requisitions and reinforcement work, in recognition of the substantively different cost drivers that apply. For reinforcement work, strategic reinforcement raises further assessment difficulties, as such reinforcement is only likely to be closely related to levels of development activity when viewed over many years and several AMPs. This suggests that a different approach to costs assessment is appropriate where additional capacity is being provided for use in future controls, as the activity driver of such costs is effectively absent if a measure of activity within the AMP is used as the denominator. We provide further details on our strategic reinforcements below.

3.2 Data reliability issues

Our analysis of company business plans, charging statements and Ofwat data/guidance has highlight a range of data consistency issues that have major bearing on the assessment of developer services costs and revenues. Accounting for developer services expenditure has changed significantly in the recent past. This is further complicated by a divergence in guidance between England and Wales. Consistency issues are summarised in the table, below, and further detail is provided in Annex 2 to this section.

Summary of data concerns with IAP water growth model.

Issue	Description
Cost data consistency	Inconsistent treatment identified through time and between companies (e.g. impact of IFRS changes in early AMP6) cast significant doubt on the reliability of historical unit cost comparisons.
	Inconsistent approach to forecast cost data is apparent for connection costs: some companies show a zero cost entry (and appear to treat all relevant cost as opex)
	Different approaches to treatment of Asset Value Payment (as a cost item or revenue deduction)
Volume data consistency	Results are heavily affected by the volume denominator used for the unit cost calculations, the values from which are then compared between companies. Significant differences are apparent between companies in terms of whether volume figures are based on number of connections or number of properties connected, in a context where the relationship between the latter and activity is far from straightforward (as e.g. flats have multiple properties for a single connection, and properties connected may capture contestable work undertaken by other parties).
Other grants and contributions issues	Companies differ in terms of how transition issues have been accounted for: some developments were begun (or will begin) in AMP6 under the old rules and will be completed in AMP7. We have accounted for the AVPs associated with those AMP6 developments as a cost in AMP7, but companies vary in their treatment of this. Ofwat's calculations of revenue recovery rates (from developers) are affected by a range of differences in approach by companies to what is included in both the numerator and the denominator.

3.3 Charging and revenue recovery implications of applying the IAP Growth Model costs

Applying the unit cost outputs from the current IAP Growth Model to determine revenue allowances would create significant charging and revenue recovery problems that are out of line with our understanding of Ofwat's objectives. In particular:

- If the approach set out in the DD were applied, then setting our developer services charges on cost-reflective basis – which is critical to the effective operation of contestable developer services markets – would result in a large over-recovery of developer services revenue.
- Adjusting for this by reducing charges to other customers would be likely to trigger penalties under the Revenue Forecasting Incentive, and would in any case be in conflict with Ofwat's stated position on such interactions.

These issues are addressed in turn.

Developer charging and cost-reflectivity

In order to set charges to developers that are consistent with Ofwat's cost modelling and decisions on recovery rates, Severn Trent would need to make significant reductions in its charge levels. If we matched Ofwat's

assumptions, this would be concentrated in the charges for new connections and requisitions, which are the areas that are open to competition (see the Table below).

Implied income, disaggregated into categories

Per connection	Plan	Restated*	Challenge	DD
Connection charges (s45)	55	55	(27)	28
Infrastructure charge receipts (s146)	(36)	(36)	36	-
Requisitioned mains (s43, s55 & s56)	94	94	(40)	54
Diversions (s185)	-	90	-	90
Total amount	112	202	(31)	172

* The DD brings diversions within the scope of the control – this restates the plan with diversions.

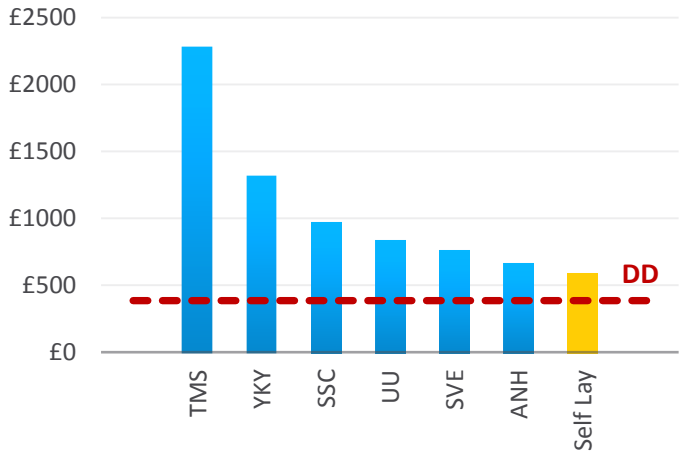
If we set a minimum of zero for infrastructure charges as Ofwat assumes, this implies a challenge of around £67m rather than £31m. It is possible to consider the effect this could have by looking at the implied correction factors that would be calculated in App28 as a result of the Draft Determination. We are unclear why these were not included in our DD letter, as we would expect them to form part of our Determination in the same way as Retail Correction Factors and the variables comprising the Bioresources control.

Implied developer service correction factors compared to our plan

Per connection		Plan	DD	Reduction	%
No main:	Non-contestable	£23	£12	-£11	-49%
	Contestable	£676	£374	-£302	-45%
Small sites	Non-contestable	£144	£74	-£70	-49%
	Contestable	£1,141	£631	-£510	-45%
Standard sites	Non-contestable	£144	£74	-£70	-49%
	Contestable	£1,437	£795	-£642	-45%
Large sites	Non-contestable	£144	£74	-£70	-49%
	Contestable	£1,445	£800	-£645	-45%

To match these assumptions, the company would need to reduce its developer charges to a level below that of other market participants, as illustrated in the figure below.

Cost per plot compared to market participants[5]



Our benchmarking requires some assumptions in order to enable a price per plot comparison (which is the basis on which we charge and similar to the basis for Ofwat's volume correction). We recognise that we may not be at the frontier of efficiency for developer services activity and this is the message from the chart above: SLPs are

[5] Based on company publications. To convert these into an inclusive "per plot" value, we have aggregated average charges for a typical site of 50 plots with 22m of off-site mains.

typically able to deliver lower charges for the sites they successfully target. However, market evidence suggests that our charges are (if anything) lower than industry average. They are sufficient for SLPs and NAVs to compete, as evidenced by the level of such activity within our area of appointment.

Our benchmarking tallies with Ofwat casework, as discussed in Annex 2 - our developer services charges were found to be in line with market norms. Emma Kelso recently wrote to all companies reminding the industry of its obligation to ensure that other providers are able to compete; in this context it would be highly problematic for the control to imply charge levels below the cost of contestable activity. In practice, we could not reduce our charges in this way because we would be imposing a margin squeeze on our competitors.

Implications for the Revenue Forecasting Incentive

If we did not reduce our charges to the levels implied by the DD, then we would expect to recover revenue significantly in excess of that allowed for in Ofwat's developer services model. Because developer services revenue is included within the combined controls for Network Plus, the effect of charging more than Ofwat has assumed would be that we need to reduce other charges to compensate. It is not obvious how we could do this, because it is clearly against the intention of the new Revenue Forecasting Incentive (RFI).

While the basic revenue correction in the RFI includes developer income, the penalty calculation does not. This incentivises companies to ensure that primary charges (i.e. the amount billed to all other customers) matches the equivalent value in the determination.

In its summary of responses to the informal RFI consultation, Ofwat noted that:

"Excluding developer services revenues for the purposes of calculating a penalty in the RFI recognises that companies **should not attempt to alter this revenue to correct for revenue imbalance elsewhere.**

- the number of new connections is demand-led and companies should aim to provide new connections as soon as possible; and
- **companies' connection charges should be set in accordance with our charging rules and should be cost reflective**."

We support these principles – developer charges should be cost-reflective, and we do not think it is right that customer bills should be altered to take account of variations in developer income (or vice-versa). But this leaves us with an issue, since we believe **cost-reflective charges will drive us to collect c£13m more income per year than allowed for in the Draft Determination**.

It is not really possible to balance 'excess' developer charges revenue by reducing other charges to developers. If we collect more than the DD assumes because we are charging a cost-reflective rate for requisitions, we cannot remedy this by reducing our fees below cost after two years. Nor can we reduce infrastructure charges, since Ofwat expects these to broadly match reinforcement costs over the course of AMP7.

The scale of the inconsistency between the DD allowance for developers services costs – based on the IAP Growth Model – and the actual level of costs on which we consider we would have to continue to base our charges (given, in particular, the contestable nature connections and requisitions work) therefore creates a perverse situation. This further emphasises the importance of addressing the underlying problems with developer services cost modelling.

3.4 Developer services volume correction

One of the reasons why the RFI excludes developer services income from its penalty calculation is that these should be covered by the end of period forecasting incentive: the Developer Services Revenue Adjustment Mechanism (DSRAM). However, this mechanism only deals with changes driven by volume. It is clear that the DSRAM is not capable of addressing the issues raised in the above section. If the base revenue allowance is not sufficient to allow for cost-based rates to be charged, then there will be an imbalance from the outset that will not be corrected. Also, the volume-related correction that DSRAM does provide for will only properly

compensate for volume differences if the original unit rate is sufficient to cover cost-based charges. As subsequently set out, we do not believe this is the case.

In practice, however, we consider there to be a range of foreseeable material sources of deviation between the circumstances assumed in the setting of the base revenue allowance and the circumstances that actually prevail in AMP7 that it would be appropriate to adjust for, but that would not be captured by DSRAM. One important source of tension here is that the maintenance of the broad balance of charges between groups has been a core principle underpinning reforms, and implies that significant changes in any given company's proportion of developer services costs recovered from developers would not be expected. There look to be material risks concerning the consistency of core parts of Ofwat's DD approach with this underlying principle, in particular: the use of a single industry-wide estimate of the percentage of revenue recovered from developers (which is itself subject to major comparability problems) to set the allowance; and, the view that infrastructure charges should not be net negative. There are many other reasons why it might be appropriate for developer services income to differ materially from forecast and these go beyond the volume of activity undertaken, including:

- **More complex work**. For example, a greater proportion of the work might require barrier pipe (used in contaminated land); this is more expensive than regular connections and we would have to charge for it in order to avoid a margin squeeze.
- **More development in capacity-constrained areas.** Work could take place in areas of the network where there is limited capacity. This would require more reinforcement activity than forecast in our plan. Under Ofwat's charging rules, this ought to be reflected within infrastructure charges.
- **Diversions work differs from plan**. In the Draft Determination, Ofwat has included diversions within the control, commenting that it expects us to recover all charges from developers. As elaborated on in annex 2, we are only permitted to recover 82% of work under the Highway and Streetworks Act. If more of our work is HSWA-driven, we will recover less of our cost.
- **HS2 uncertainty.** In our Plan and in response to Ofwat's query, we excluded HS2 diversions from the control. We strongly believe that these grants have nothing to do with charges to any of our customers – developers or regular bill-payers – and should not influence what they pay. If Ofwat chooses to include these within the control, any variation in the amount recovered due to delays or overruns will impact on the amount recovered.

Given the potential materiality of these issues, and the likelihood that some material deviations between assumed and actual circumstances that affect revenues will arise, we think there should be a mechanism to allow for appropriate adjustments to be made. In particular, if there is no adjustment mechanism to address these types of deviations, then there is a material risk that cost reflective charging will result in significant levels of over-recovery, because of exogenous circumstances being different to what was assumed. This would then create a perverse need to reduce charges in other areas (which – as was highlighted above – may then lead on to further adverse effects).

For the avoidance of doubt, we do not propose that the DSRAM mechanism should be made any more complex. Rather, as we set out further below, we propose that there should be an additional simple mechanism to "mop up" differences that are not related to volume, providing a way of dealing with the revenue correction problems that cannot be resolved through the RFI.

We note that the operation of the DSRAM itself is another source of deviation. This is because the DSRAM makes a distinction between the volume of contestable and non-contestable connections, with a different correction factor (unit rate) for each. Unfortunately, there is not a clean division between the volume numbers where contestable and non-contestable activities are undertaken – there are many jobs where *part* of the work is undertaken by a Self-Lay Provider and part by ourselves. For example:

- we might undertake all the work including the digging of trenches, main-laying and final connection; or
- the SLP could prepare the trench and leave the remaining work to us; or

- the SLP could dig, lay the main and undertake all work except the final connection.

The first two options would count towards the "number of contestable connections" denominator in the DSRAM but the proportion of the cost we bear would differ. Given that a non-contestable final connection would be included within all the jobs, all of them would also count towards the non-contestable denominator. It is likely that boundary issues associated with DSRAM will need to be addressed at some point, in order to ensure that it is applied in a coherent and consistent manner.

3.5 Potential remedies for developer charges

We propose that the issues identified in the above sections could be addressed by the following:

- Split the developer services unit cost model so that the unit costs of connections, requisitions and reinforcement are assessed separately. Allow also for the separate assessment of strategic reinforcements where additional capacity is planned that is not expected to be used in AMP7.
- Address major data inconsistency issues concerning costs and revenues to reduce the risk of spurious results arising from a lack of comparability.
- Include a simple 'true up' mechanism that allows for variances (other than those addressed by DSRAM) between the forecast activity that underpinned the developer services revenue allowance and AMP7 outturn levels. This is important, as there is scope for significant tensions to arise between the following of the Ofwat's charging principles and rules on the one hand, and the specific way in which the developer services revenue allowance has been implemented on the other. Where relevant evidence from market rates and from Ofwat's casework could be used to inform the appropriateness of adjustments. Imbalances could be addressed through a midnight adjustment to the RCV.

In combination, these steps could provide for much more robust estimates to underpin the setting of revenue allowances, and for greater flexibility in the way in which the developer services revenue allowance is applied in order to avoid perverse and unwanted side-effects arising. These proposals are considered in turn.

3.5.1 Splitting the developer services unit cost model

The problems with the IAP Growth Model were highlighted above. While we fully support Ofwat's efforts to develop and use 'suitably simple' cost models, we consider the IAP Growth Model to be overly simplistic, and not suitable. This view follows both because its structure (which using a single measure of unit cost for all developer services activities) does not align well with economic, engineering and operational realities, and because the model has delivered results that we consider not plausible. In particular, we do not consider the finding that our developer services costs are 50% inefficient to be a reasonable one given the competitive context within which much of that activity is conducted, and Ofwat's own assessment of costs in its casework.

In terms of approach, we propose the following changes:

- Splitting the unit cost model, such that a separate unit cost measure is generated for connections, requisitions and reinforcement work;
- Separating out 'strategic' reinforcement work where investment relates to the provision of long-term capacity requirements rather than the connections made during AMP7.

We consider this second point important. Whilst some 'shallow' reinforcement is relatively routine and can be expected to occur in most periods, there is also likely to be a periodic need for larger scale reinforcements. The need for these reinforcements will tend to reflect the accumulated impact of growth over a prolonged period rather than the connections in a single AMP. Therefore, the level of required reinforcement activity is not likely to strongly correlate with connections volumes within a five-year period.

The above point is particularly relevant for strategic schemes that may only start to be reflective of growth over many AMP periods due to the variance in our network capacity for a given location at the time of the new development. One relatively straightforward means of seeking to take account of lumpiness, might be to use a

higher volume figure when assessing the unit cost of relevant reinforcement activity to reflect the fact that some of the relevant volume would not be captured in new connection figures for the coming AMP.

Ultimately, it seems unlikely that strategic schemes can be adequately captured by a simple unit cost approach alone and over a relatively short time period. We think it appropriate to assess strategic schemes outside of unit cost modelling. From an SVE perspective this treatment is merited given the scale of the relevant planned investments (c£25m on strategic schemes). Note - we have undertaken our own bottom-up assessment of reinforcement costs and set ourselves a £25m efficiency challenge, reducing our reinforcement costs from £70m to £46m – recognising the importance of challenging our own costs and assumptions to close the gap.

The assumptions underpinning our reinforcement costs and bottom-up assessment are set out in Annex 3.

3.5.2 Addressing major data inconsistency issues

We summarised some of the key sources of data inconsistencies in Section 3.2 above, and provide further detail in Annex 2. From the information currently available to us, these consistency issues might be addressed in the following ways:

- Not relying on the historical unit cost model given the apparent extent of the inconsistencies in the historic treatment of costs between companies, and extent of the changes arising under the new charging arrangements (such that historic measures of costs may not be a good predictor of future costs);
- Ensuring that the new connections unit cost figures include gross expenditure;
- Making sure the SLP activity is consistently treated (including appropriate recognition of the difference for Welsh companies). For AMP7 this would require removal of AVPs from WS2 totex for Welsh companies for the purposes of consistent model construction alongside English companies. Then the addition of the AVPs back on to the modelled cost forecasts (£21m in the case of Severn Trent for transitional payments relating to activity stating in AMP6 but still being incurred in AMP7);
- Using the contestable volume for requisitions and new connections (to make sure that the self-lay market is not materially skewing the models)

These issues could be addressed using existing data held in APP 28, WS2 and WS3. We have included our current assessment of the impact of adopting these changes (and the model splitting proposals presented above) in the table below.

Assessment of Severn Trent developer services expenditure given the remedies identified and data from business plan tables. Note the WSH New connections expenditure includes opex. WSX, AFW, PRT and SES zero new connections expenditure substituted by new connections revenue.

	New connections	Requisitions	Network reinforcement	Contestable New properties	Total New connections	New connections (Contestable)	Requisitions (contestable)	Network reinforcement (Total)
	AMP7 Expenditure (£m)			Volume (000)		Unit cost (denominator)		
ANH	78.9	84.2	55.9	180.3	183.8	0.437	0.467	0.304
NES	41.7	18.7	14.4	83.7	91.2	0.498	0.224	0.158
NWT	46.4	54.6	40.7	139.2	139.2	0.333	0.392	0.292
SRN	45.0	55.4	2.3	38.2	65.0	1.177	1.451	0.035
TMS	92.6	132.5	25.3	76.6	215.5	1.208	1.728	0.117
WSH	24.5	38.6	4.4	4.2	45.4	5.840	9.207	0.098
WSX	9.8	12.7	4.2	30.0	33.3	0.326	0.423	0.127
YKY	30.1	5.1	5.7	109.7	109.8	0.275	0.046	0.052
AFW	47.4	23.2	30.7	81.3	81.3	0.582	0.285	0.377
BRL	10.0	12.8	4.0	19.0	29.1	0.526	0.674	0.137
PRT	3.0	3.8	1.1	9.6	9.6	0.308	0.395	0.116
SES	8.4	1.8	3.9	1.3	12.6	6.751	1.448	0.307
SEW	30.5	30.6	22.5	11.6	46.4	2.633	2.635	0.485
SSC	28.0	31.0	16.0	29.5	41.0	0.947	1.049	0.390
SVE	73.4	93.5	70.3	119.2	129.8	0.616	0.784	0.542
HDD	1.4	2.7	1.3	2.5	2.4	0.532	1.066	0.541
SWB	21.0	16.7	9.7	42.5	46.3	0.493	0.394	0.210

Updated Unit costs (median company)	**0.532**	**0.674**	**0.210**
SVE AMP7 model prediction (£m)	**63.381**	**80.419**	**27.315**
SVE AMP7 model prediction aggregation of three unit costs			**£171m**
SVE AMP7 AVP transition (schemes started in AMP6 but concluding in AMP7)			**£21m**
SVE AMP7 Network reinforcement strategic schemes (not captured in unit cost)			**£25m**
SVE AMP7 total developer services expenditure			**£217m**

In practice, the accuracy of the above analysis depends on other the comparability of the underlying data that it draws upon. We would expect the query that Ofwat has issued to identify some underlying inconsistencies in business plans that it would be appropriate to address.

3.5.3 Addressing developer services revenue imbalances

As highlighted earlier, we consider it appropriate for PR19 to provide a more comprehensive approach to addressing imbalances in developer services income. Given that these will be driven by differences in both cost

and volume, we think that the best approach would be a midnight adjustment to the Regulatory Capital Value. Our logic for adjusting through the RCV is that:

- This work is capital in nature;
- It is not desirable for other customers to see volatile bills because of imbalances in developer revenue that are driven by cost or volume, as Ofwat has noted in its RFI publications; and
- As we have highlighted in section 3.3, a downward adjustment to future developer income could have a damaging impact on competition (an upward adjustment could also be damaging as it could encourage developers to choose alternative providers even if they were less efficient than Severn Trent).

How a developer services RCV-adjustment could work

We think that a simple correction for the total difference in developer services income should be taken forward to the RCV at PR24. Our proposed approach would work with both the Revenue Forecasting Incentive (RFI) and Developer Services Revenue Adjustment Mechanism (DSRAM). The adjustment could be calculated as follows:

	A	Grants and contributions assumed in the determination, inflated with CPIH
Plus:	B	Volume adjustment under the DSRAM, as laid out in Appendix 7 of the methodology
Less:	C	Actual grants and contributions included within the revenue control
Plus:	D	Legitimate cost adjustments (explained below)

The total amount taken forward to the RCV at PR24 would take account of the time value of money, in the same way that this is considered within the RFI at present. Differences in revenue arising because of developer services could then be removed from the calculation of the Revenue Forecasting Incentive, allowing the main revenue correction in period to mirror the penalty calculation.

Step D would reflect that the control will inevitably be set on the basis of an estimated proportion of developer services costs being recovered from developers, and estimated amounts of different types of work being required. The adjustment mechanism would allow companies to identify where the appropriate application of developer charging principles and rules has resulted in outturn levels of revenue and different types of activity (not already captured by DSRAM) being materially different from those estimates used in the control.

Interaction with cost incentives

We note that variations in developer costs and charges should not impact on conventional cost-sharing incentives, as Ofwat set out in its final methodology (Appendix 7, p29):

"We will not apply cost sharing rates to developer services activities. This provides a strong efficiency incentive to lower average costs of providing new connections."

In our Draft Determination, Table 3.6 (Totex subject to cost sharing rates) includes the total grants and contributions and therefore appears to suggest a change in policy. We believe that the original PR19 methodology is correct – if developer service charges are being considered as revenue that falls within the scope of the wholesale network plus controls, there should not be a secondary adjustment where they are also treated as a deduction from cost.

For grants that are treated as part of the revenue control, we think that the income and associated costs should be removed from cost sharing to avoid any double-counting. Only non-developer grants should be included in cost sharing – as discussed above, we think that the costs and income associated with HS2 is an example that *should* be considered along with general totex because it is not related to our charges and the company has little or no control over the amount or timing of this income.

Conclusion

Dealing with differences in capital income through the RCV provides a simple solution to imbalances in developer income. It is compatible with the Developer Services Revenue Adjustment and preserves incentives to reduce

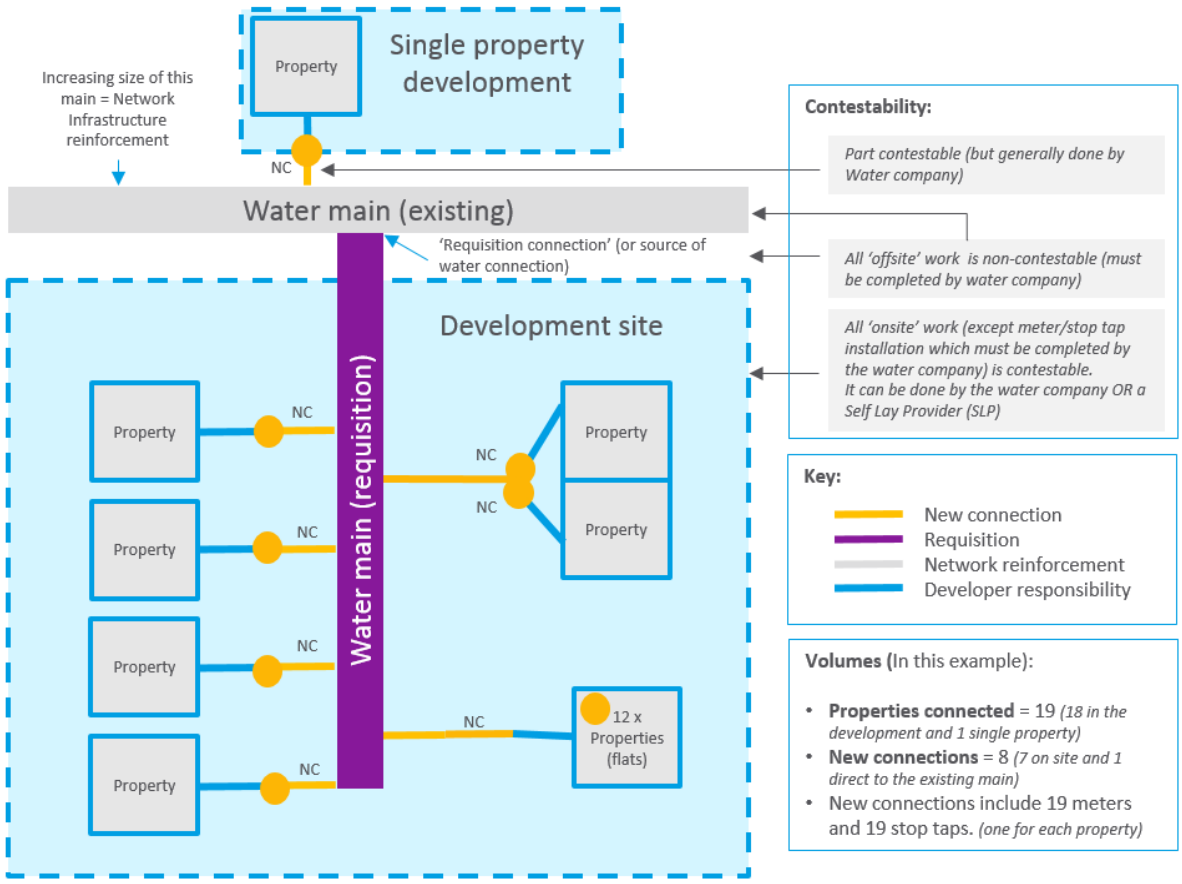
costs for developers as envisaged in the methodology. Removing the developer services element from the main revenue correction avoids potential distortions to the market and better incentives to preserve bill stability for household customers.

Developer services annex 1 – Background for modelling

There are three primary activities in developer services - new connections, requisitions and network reinforcement. In the figure below we show how these interact and which are contestable by other market participants – Self Lay Providers (SLPs) and New Appointees (NAVs).

Note that the areas that are contestable by a NAV are slightly different to those contestable by SLPs because the NAV *is* a water company within its area of appointment – therefore the NAV can make the final connection between its own main and a property on a site; it is only the final connection to the incumbent's main which a NAV cannot do.

Schematic of developer services activity



The undertaking of contestable work by the incumbent varies significantly between companies depending on their policy, the type of development in the area and the efficiency of the company's costs.

The example above shows how volumes can be counted differently depending on the definition being followed, with the development involving 19 properties being connected (with 19 new meters and stop taps), but only 8 new connections being provided (because some single connections serve multiple properties, as is typically the case with flats). In practice, measures of the forecast growth in property numbers and connections are further complicated by:

- The lag between new development activity and occupation of new properties (which can result in a significant difference between when a physical connection is provided and when the associated additional properties begin to be served);
- Properties deemed void because they cannot be legally billed, or being removed from void status (which can result in reductions or increases in the number of billed properties that are unrelated to new connection activity);

- Subdivision or demolition of existing properties: (which can result in an increase or decrease in the number of properties without there being any new connection activity).

Finally, the amount of network reinforcement work required for the existing network does not relate straightforwardly to the scale of on-site activity. This is because network reinforcement requirements are heavily affected by the local and companywide attributes of the region and the network. Where companies have existing available network capacity, no network reinforcement may be necessary. This could be due to the inherent capacity of the network, historic activity previously undertaken or the location of the new development relative to past or ongoing strategic investments, which are typically large scale and undertaken infrequently. This means that network reinforcement requirements tend not to be closely related to new connection, property or customer volumes other than when considered over very long time periods (i.e. multiple AMPs).

Developer services annex 2 – Growth model cost and data issues

In the IAP and DD our developer services costs were assessed as being 50% inefficient. This result seems unlikely given that:

- This is a standard activity not dissimilar to base expenditure, where Ofwat's IAP assessment showed Severn Trent was close to Ofwat's challenging efficiency baseline.
- Our AMP6 costs were market-tested through competitive tendering. Standard activities are highly comparable, and contractors work across the industry, so it appears unlikely that our rates are markedly different from those offered to other companies.
- A large portion of the work is open to direct competition. If our rates were 50% higher than the efficient level then we would expect to lose all contestable work to NAV operators and SLPs.

It is notable that the sole reason for our water service totex costs not being upper quartile is the prediction of the growth model.

We have undertaken detailed analysis based on companies business plan submissions, charging statements and Ofwat data/guidance. We have identified a series of reasons why reported developer services expenditure will vary due to interpretation of regulatory definitions and the transition to new charging rules. While we note that Ofwat attempted to address some cost allocation issues before the IAP, our analysis suggests that this was not sufficient to address all inconsistencies. We were therefore pleased to see Ofwat's industry-wide query which should help to deal with some of these issues. However, as we note in our query response there are still significant uncertainties– not least because the rules for Wales are still being considered so it is not clear whether these will change to the same model as England or some alternative and, if so, when.

Because companies did not correctly interpret the implications of the new rules, we do not believe that the model accurately reflects the actual cost per connection that companies incur or their relative efficiency. As previously noted, we also do not believe that one simple model adequately reflects the variability inherent in these costs.

We summarise our findings in the table, below.

Summary of concerns with IAP water growth model.

Issue	Description
Cost data consistency	Accounting for developer services expenditure has changed significantly in the recent past. This is further complicated by a divergence in guidance between England and Wales.
	Analysis shows that historical developer services costs appear to be inconsistently treated through time and between companies. For example the impact of IFRS changes in early AMP6. Consequently the historical data being used in Ofwat's model is highly unlikely to be on a consistent basis between companies or over time.
	For some companies, the forecast developer services data also appears to be on an inconsistent basis. For example, missing connections costs and treatment of spend as opex. Where these companies have the potential to move the median unit cost, this is likely to lead to bias within the model.
Volume data consistency	Volume data needs to be on a consistent basis (between and within companies) and sensibly reflect the costs that are being modelled. Our analysis, using other volume data in WS3 and APP28, identified material departures in both cases. The volume denominator used in unit cost models has an equally large impact on the unit cost model as the consistent allocation of costs.
	The New Connections, Requisitions and Network reinforcement components of developer services costs have distinct cost characteristics with different principle cost drivers. These differences are not currently reflected by the model.
	The most problematic are the way in which contestable activities not undertaken by the company are considered, and the way in which lumpy network reinforcement expenditure is taken into account.

Benchmarking against other information also raises concerns with the model outputs. Before concluding that differences in costs within the growth model are due to inefficiency, we think it would be prudent to triangulate the results of the model with other evidence:

- Evidence from developer services casework disputes and Ofwat's published view of the level of efficient costs.
- 3rd party benchmarking of our unit (per metre) cost for mains laying – a major component of requisitions and network reinforcement activity.
- Comparison of company charges for requisitions as set out in published charges.
- Consideration that our requisitions costs are subject to market testing. Contestability of requisitions activity means that companies can only win work against self-lay providers where they are competitive on cost.

In the sections below, we explore both the cost and volume elements summarised in table 1 followed by consideration of the additional complexities of developer services grants and contributions. Finally, we consider some of the benchmarking which supports the efficiency of our costs.

Cost data consistency

There are three key points relating to cost data consistency in table 1 above. Firstly, the changes to the charging rules in England; secondly the inconsistency that is apparent in the historical data set; and finally, further inconsistencies in the forecast data. In some instances these three elements are interlinked.

We note that the charging rules around developer services are currently different between England and Wales, following the changes which are currently being implemented in England. Specifically, one key component of cost, Asset Value Payments (AVPs), is changing in England. On face value this would suggest that Welsh companies should expect to have higher costs than those in England (and higher revenues) in AMP7. However, our analysis suggests that not all companies have historically included AVPs within their costs and therefore the position is not so clear cut.

In light of the changes to charging rules, we have undertaken a series of simple tests to understand the comparability of costs that are included in company business plans and therefore, inputted into Ofwat's growth model.

The tests are based on the following fundamental premises:

- **Developer services costs should be greater than or equal to the revenues received**
- **Costs in WS2 should be gross of Grants and Contributions (G&C). It is implausible to have zero developer services costs**
- **Accounting for – and the volume of – self-lay activity (including treatment of AVPs) can significantly distort requisitions expenditure.** Some companies have treated this as capex, opex, a cash transaction or as a rebate to Developer services charges.

In summary, we consider that our findings questions the validity of the unit costs derived (i.e. the representativeness of the median unit cost) and the robustness of efficiency assumptions being made for each company (i.e. the reflectiveness of the derived unit cost to the costs being assessed for each company).

There appears to be a significant amount of discretion open to companies when reflecting this activity in their accounts. We are not setting out to show which way might be correct or otherwise. For the purposes of cost assessment, we consider that any of the definitions could be made to work. However, a robust cost model requires a consistent approach and appropriate comparison to the activity for which the costs relate. We do not believe this currently exists in the data used.

Developer services costs in comparison to revenue

Developer services revenues are complex, have been subject to change and will follow a diverging path for English and Welsh companies in AMP7. However, the fundamental premise that costs should be greater than or equal to related revenues remains established. This is set out in Defra, Welsh Government and Ofwat charging guidance/rules.

The fundamental component of revenues associated with developer services are set out in the table, below.

Components of Developer Services charges and their interaction with expenditure.

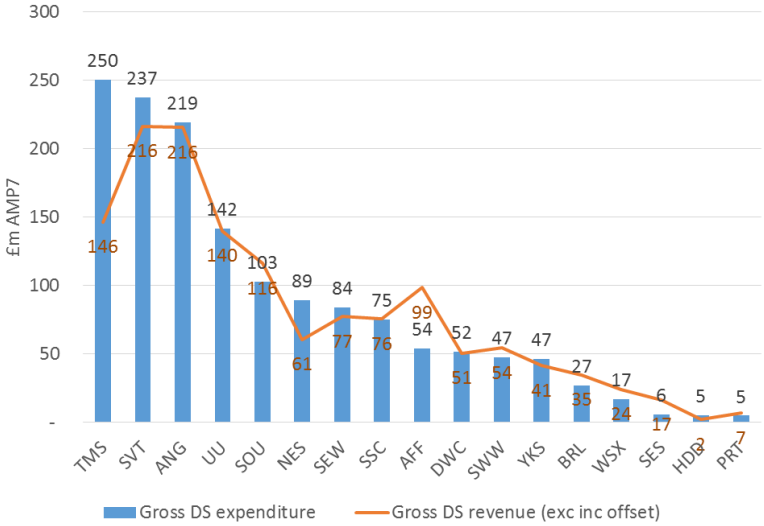
Revenue type	What does the revenue relate to?	Revenue = costs AMP6?	Revenue = Costs AMP7?	Consistency between companies?
Requisitions charge	Construction of new water mains on a development site	**No** – income offset is deducted	**Yes** (except in Wales)	**No** – some still appear to have income offset deductions (including non-Welsh)
New connections charge	Construction of comm. pipes from main to property boundary, plus installation of meter and stop tap	**Yes** – other than metering costs, any timing differences or discount schemes	**Yes** – other than metering costs, any timing differences or discount schemes	**No** – some have no costs in data tables so unclear. We have a discount scheme for AMP7.
Infrastructure charge	Contribution for upsizing of existing network assets (mains, DSRs, pumps) to cope with additional connections	**No** – revenue based on max charge set in licence	**No** – over a 5 year period should be equivalent BUT – income offset for requisitions is deducted	**No** – some have only deducted income offset until charge is nil. No income offset here for Wales Treatment of AVP not consistent

Diversions charges are similar to developer services revenues but relate to a different set of costs. They cover income for moving water mains and other assets due to construction or highways work, and other major infrastructure works. Whilst broadly linked to growth, not all activity is due to new development directly. Costs are not fully recovered in revenues – where New Roads and Streetworks Act applies, only 82% of costs are recoverable to deduct value for 'betterment'. This is laid out in the legislation, so there is no opportunity to negotiate the proportion of the costs that the public authority will bear – only the scope of the work required to divert our mains or sewers. Taken together, around 90% of diversions are usually funded by developers, but the proportion can vary from year to year depending on the mix of work.

As set out above, in order to compare developer service costs and revenues on a comparable basis, AVPs need to be removed from expenditure and Income offset removed from revenue. Similarly, diversions revenues should not be considered as they do not relate to developer service enhancement expenditure and are charged to the organisation requiring the assets to be moved (e.g. highway authorities or railway companies) rather than developers.

The figure below sets out the comparison of AMP7 developer services costs and associated revenues across the sector.

Recovery of Developer services expenditure from developer revenues (removing AVP transition costs, income offset to infrastructure revenue and diversions revenue) – Source: APP28 and WS2



Small levels of under recovery can be expected, this is due to the likely use of discounts to incentivise developers to deliver water efficient solutions. However, some companies appear to be significantly under recovering Gross Developer Services expenditure. This would suggest that additional expenditure may have been coded to the developer services cost lines (e.g. diversions related expenditure).

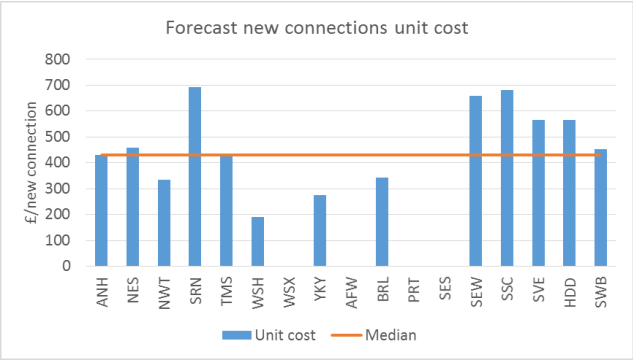
However, a larger sub-set of companies appear to be over recovering from developers. This would suggest the Developer services costs may have been excluded from WS2 (e.g. new connections costs considered as net rather than gross expenditure).

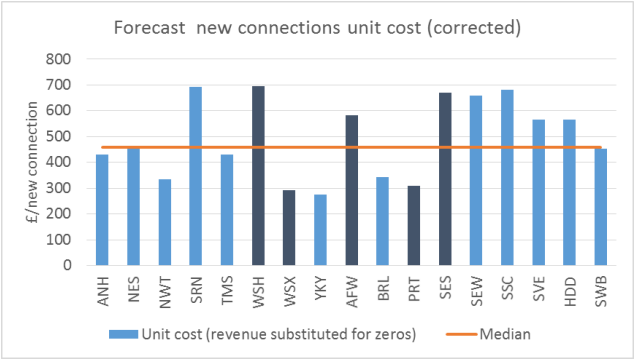
We consider that the above findings cast serious doubt on the comparability of the costs currently being used in Ofwat's IAP growth model.

Missing new connections expenditure

When reviewing new connections capex line 12 in WS2 (which inputs into the IAP growth model), we note that there is a significant variance between the companies. Four companies show zero expenditure, whereas others show material departures relative to the rest of the industry. Given that there are non-contestable elements to new connections activity (installation of meter and stop tap), it is not plausible for new connections expenditure to be zero – assuming some new development will occur in each company.

Comparison of new connections expenditure in business plans (left) and modifications made to better reflect gross expenditure (right)





Reviewing Welsh Water's data, we can see that a significant proportion of expenditure has been allocated to Opex. This will not be considered in the growth model as only capex is considered. Given that this will reflect the same activity as incurred by other companies, it is not logical to remove this expenditure for the purpose of model development. This is even more significant given that Welsh Water were the median company in Ofwat's forecast unit cost.

There are a range of potential reasons why companies may have removed connections expenditure: costs presented net of G&C (effectively removing gross costs); categorised as opex (as per Welsh Water); or categorised as new development (such companies would not be shown as under recovering in the previous analysis).

It is clear that new connections costs are not being considered consistently, this will distort the development of models and the efficiency interpretations following their use. We have considered that it might be pragmatic is use new connections revenues in place of new connections costs where the latter can be shown to be missing. This modification is presented in the figure, above.

Differences in accounting treatment of self-lay.

As set out in the table below, developers (via self-lay providers) can contest for on-site new development activity. This includes all requisitions work (except for the connection of the requisition to the existing network) and the majority of new connections activity. The way in which this activity is accounted for is complex, has varied over time and will be subject to different guidance in England and Wales (at least for a time). With regards to cost assessment, the accounting treatment used by each company will determine whether or not this work is reflected in the totex values reported in WS2. Given that contestable activity is a significant component of developer services expenditure, and some companies have very material self-lay input, this has the potential to materially distort developer services cost data being used in model development.

The table below sets out the basis for Asset Value Payments and Income offset in AMP6 and AMP7.

Developer Services expenditure recovery mechanisms

Type	Operation	AMP6	AMP7	Consistency?
Income offset (deduction to income)	Reduction to developer revenues to split cost between developers and water customers for additional assets	Calculated for site work only on requisitions costs. Is the lower of 12 years revenue from properties on site or requisitions cost. Deducted from Req. charge	Guidance to 'maintain balance' between customer and developer charge. Deducted from infra. Charge. Same level of benefit as currently provided on requisitions schemes.	**No** – different rules in Wales. Some appear to have included twice (on requisitions and infrastructure) Some only include up to value of infra charge (so have reduced income offset amount).
Asset value payment (AVPs)	Cost to company to pay SLP for work done on site. Mirrors the income offset methodology.	N/a no revenue in AMP6 (capex or cash rather than negative revenue)	Added to income offset value to 'maintain balance' with customer costs (i.e. water customers effectively still incur this).	**No** – not clear if asset value is added to requisitions income offset. Some have tapered off payments in AMP7 others have stopped at year 1.

Currently, Severn Trent uses AVPs to pay SLPs for the work they undertake. Costs are derived on the same basis as the income offset calculation. These AVP costs are capitalised and therefore contribute to the requisition costs included in Line 11 of WS2. Review of business plan tables suggests that this is not likely to be the case for

all companies. These costs could alternatively be considered as opex, or dealt was as a cash transaction (rather than Totex) and therefore removed entirely from WS2 capital spend.

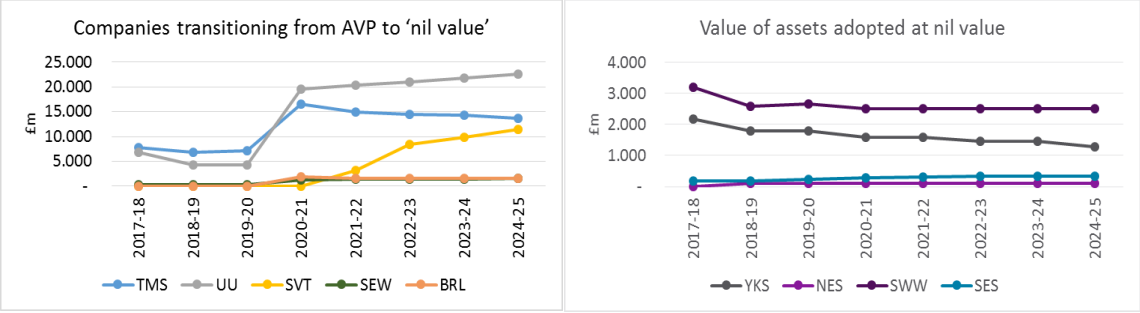
For AMP7, our assumption is that £21m of the £114m requisitions expenditure will be via AVPs. These relate solely to the finalisation of new developments already started in AMP6 prior to the changes to the charging rules that will start in AMP7. Consequently they taper off though AMP7 and are not expected in AMP7.

An alternative approach to reflecting costs incurred by SLPs is to account for it in the revenue charges. Ofwat's charging rules for English companies stipulate this for English companies in AMP7 (but not Welsh Companies). In this approach, no asset value payment is made and the assets are adopted onto the balance sheet at nil value. Instead, the income offset associated with the SLP work is added to the rebate to developer services charges. Given the transition from AVPs we have shown the value of assets adopted at nil value to increase through AMP7 and should stabilise in AMP8 when they will relate to all new development.

On a net basis, there is theoretically no change relative to the previous approach using AVPs. However, the fundamental impact on the gross costs being used in cost assessment will depend on the accounting treatment of this rebate. Where this is considered a cash transaction, the totex values in WS2 will reduce given that SLP work is now treated through revenue rather than cost. This is likely to lead to a material difference between historic and forecast expenditure. This calls into question the comparability of the historic and forecast unit costs within the IAP growth model.

Our analysis shows a wide range of inconsistencies to the above understanding. Using APP28 data, for English Companies, we would anticipate the assets adopted at nil value to step up between AMP6 and AMP7 as AVPs are phased out. However, this is not the case for the majority of companies.

Transition of assets adopted at nil value between AMP6 and AMP7



The left graph of figure above can be interpreted as follows:

- Three companies (Severn Trent, South East and Bristol) show an increase from zero across the AMP6/7 boundary. This infers a move from AVPs to developer services charge rebates. Severn Trent shows a transition of increasing assets adopted at nil value across AMP7 as the payments made for existing schemes are concluded.
- Two companies (Thames and UU) show a similar step change at the AMP6/7 boundary. This again infers a similar change from AVPs to charge rebates. However, a background level of assets adopted at nil value is seen in AMP6. This infers that, either the companies were partially using the charge rebate approach in AMP6, or there is another source of assets adopted at nil value.

The right graph of the figure above shows:

- Four companies show a consistent amount of assets adopted at nil value in AMP6 and AMP7. This infers that the companies have either historically used charge rebates or have presented their historic data in accordance with the new charging rules.
- The remaining eight companies show no assets adopted at nil value in either AMP6 or AMP7. For Welsh Water and Hafren Dyfrdwy, this is anticipated because Ofwat's charging rule change does not affect Welsh

Companies. We infer that AVPs will therefore continue to be used and accounted for as these companies have done historically.

- For the remaining six English companies, we can infer that either the AVP approach is being retained or no SLP work in anticipated (however, this is not consistent with other data lines).

Each of the scenarios above has the potential to impact on the totex reported in WS2. Given the relative significance of contestable and SLP activity, we strongly believe that this effect should be exposed and adjusted for prior to using data in a cost model.

To further complicate the issue, in a change relative to AMP6, income offset (again, only for English companies) will be applied to the infrastructure charge rather than the requisitions charge from 2020. Where the size of requisition related rebate is greater than the infrastructure charge, the net infrastructure charge will be shown in APP28 as negative (however, it appears that some companies have limited the size of the rebate to prevent the charge turning negative).

In its Draft Determination Ofwat has said that it does not recognise this as being the position prior to the adoption of the new approach and has set the infrastructure charge as zero for six companies. However, on any objective assessment there is no obvious reason why the level of income offset should be no greater than infrastructure charges since the two are not related.

Volume data applicability and consistency

Volume data applicability

For there to be an appropriate level of confidence in a unit cost model, in addition to the need for a consistent set of costs, attention also needs to be focused on the applicability and consistency of the volume data being used. The denominator volume data needs to be both consistent and appropriately reflect the costs included in the numerator. The IAP growth model uses the total new connections data presented in WS3 (and linked into APP28 block A).

At the highest level, total new connections appears to be an attractive denominator. As per the figure in annex 1, in simplistic terms, total new connections can be considered as the number of new front doors anticipated over the period. This will accurately reflect the number of communication pipes delivered. However, use of such a metric across the broad spectrum of developer services costs can be problematic. This can be because:

- different volume drivers may better reflect particular costs;
- total volume metrics do not consider whether or not the company has actually incurred totex given the contestable market; and
- high level volume metrics are unlikely to reflect network reinforcement activity over an AMP timescale.

The number of meters/stop taps installed is more likely to reflect the number of new billed properties connected than the total ‘new connections’ as defined. The fundamental difference between new connections and new properties relates to buildings that have one connection but multiple bill payers (e.g. new flats). If considering new properties, timing should also be considered, large scale development sites may incur developer services costs several years before new properties are ‘connected’.

Whilst requisitions activity is volume driven, it will not necessarily relate directly to either new connections or new properties, this is because the fundamental driver of the requisition cost is the length of the main to be laid and the ground conditions that will be encountered. Logical arguments could be made for the pragmatic use of either a new connections or new properties metric.

Contestability in delivering developer services activity provides a significant challenge for cost modelling. Where costs incurred by SLPs are not included in costs used in modelling (as discussed in the cost data consistency section above), volumes used in models must match the scope of the costs reported. This is a particular risk

because the extent of SLP activity varies quite widely across the industry and there will be a variance been accounting treatment between English and Welsh companies in AMP7 (as well as any existing variations).

Finally, over the relatively short time period of an AMP, Infrastructure network reinforcement activity is very weakly driven by developer services volumes. Activity can be considered as shallow or deep reinforcement. The former relates to activity close to the development site that is directly linked to the occurrence of the new development. The latter is more strategic in nature and not attributable to any specific development. As described earlier in the document, for both types (but specifically the deep reinforcement), the activity is fundamentally affected by the local and companywide attributes of the region and the network. Where companies have existing network capacity, no network reinforcement may be necessary. This disparity between new development volumes is less of an issue for Severn Trent, but be particularly pronounced in small companies (such as Hafren Dyfrdwy) where there is much reduced opportunity for lumpy expenditure to even itself out across larger operating areas.

In summary, given the distinct differences between the various components of developer services and the way in which they interact with different volume drivers, we believe that there is a good case to undertaking cost assessment for new connections, requisitions and network reinforcement separately. This can then allow costs to be closer aligned to cost drivers that better reflect the costs, or allow departures to be clearly identified and separately addressed.

Volume data consistency

We have noted the various merits or problems of different volume metrics above. However, irrespective of the metric chosen, our analysis shows that there appear to be significant inconsistencies in the way that various volumes are reported in business plan tables.

The table below sets out a range of interlinked potential volume drivers extracted from WS3 and APP28. The total new connections volume data used on the IAP growth models is coloured blue.

Analysis of volume metrics from 2018 business plans.

AMP7 data	Total new connections	New billed properties (including voids to be billed)	New billed properties (explicitly removing voids)	New properties connected	Net Change in total billed (or billable) properties
BP Location	WS3,L13,14 or APP28 block A	WS3 L1-5	WS3 L1-5 minus APP30	APP28 block I	WS3 L8
Interpretation (what should this data mean?)	New buildings connected across AMP7	Increase in billed properties across AMP7 (from new buildings being occupied **or** voids being occupied)	Increase in billed properties across AMP7 (from new buildings being occupied)	Future increase in billed properties as a result of DS activity *(however, definition is ambiguous)*	Net change in billed (or billable) properties (New billable properties built in AMP7 – billable properties demolished in AMP7)
ANH	183.8	178.2	184.8	180.3	178.4
NES	91.2	90.6	84.1	90.5	84.3
NWT	139.2	122.4	122.4	139.2	121.7
SRN	65.0	73.8	62.5	65.0	65.0
TMS	215.5	215.5	199.5	166.6	215.5
WSH	45.4	53.0	48.6	45.4	45.1
WSX	33.3	30.9	30.8	33.3	30.5
YKY	109.8	104.5	89.1	109.7	103.8
AFW	81.3	81.3	79.5	81.3	81.3
BRL	29.1	29.4	29.4	29.1	29.1
PRT	9.6	9.6	9.4	9.6	9.6
SES	12.6	12.6	10.6	12.6	11.0
SEW	46.4	46.4	47.4	46.4	51.8
SSC	41.0	45.4	39.1	41.2	40.8
SVE	129.8	160.9	112.7	154.0	112.7
HDD	2.4	4.0	4.0	2.8	4.0
SWB	46.3	46.6	46.2	46.3	46.1
Inference if equal to 'Total new connections'	Na	• 1 for 1 relationship between new connections and new properties billed (no new flats) • No timing discrepancy between DS new connections and properties being occupied (all DS work finished in one year) • No change in voids (i.e. no properties currently unoccupied are occupied)	• 1 for 1 relationship between new connections and new properties billed (no new flats) • No timing discrepancy between DS new connections and properties being occupied (i.e. all DS work finished in one year)	• 1 for 1 relationship between new connections and new properties billed (no new flats)	• 1 for 1 relationship between new connections and new properties billed (no new flats) • No disconnections undertaken throughout AMP7.

Key: Blue = growth model volume used;
Red = Equal to model volume;
Yellow = within 2% of Total new connections volume

We have set out our interpretation of the scope of each column. Given these interpretations, it is not logical for values to remain the same across the columns for each company. However, in many cases, the data is the same (coloured red) or very close (coloured yellow) to the new connections data used in the IAP Growth model. We have set out the counter intuitive inferences that must be made if the values are equal. Given these findings, this casts significant doubt on the comparability of each of these metrics. It is clear that companies must have interpreted the scope of each in a variety of different ways. Given the significance (and sensitivity) of calculated unit costs to these different volumes, the accuracy of derived models and the inferred efficiency generated from them must be called into question.

As discussed in the section above, there is a strong case for using contestable volumes (i.e. volumes of contestable activity delivered by companies) where it is the case that WS2 totex only includes contestable costs. We believe this to be the case for both new connections and requisitions (but not network reinforcement). In both cases, use of a total volume will materially distort any unit cost. This distortion will also be to differing extents for each company given the variance of self-lay activity across the industry.

Contestable volumes data can be derived from APP28, Block I. This isolates the number of properties to which contestable services were provided during the year. As set out above, we have interpreted this definition as relating to new properties rather than new connections. Whilst the consistent use of new properties or new connections data is unlikely to materially impact on model performance, our earlier analysis suggests that companies are likely to have made differing interpretations leading to inconsistency within data lines. This is further complicated by the potential for differing interpretation of what 'the provision of contestable developer water services' means. Our analysis suggests that companies may have considered this to be:

- A property/connection where the company has undertaken a component of the developer services activity (i.e. the requisition or the contestable components of the connection) - this is Severn Trent's interpretation.
- A property/connection were the company has undertaken all of the developer services activity (i.e. the requisition and the new connection)
- A property/connection that is subject to the contestable market (i.e. all requisition and new connections activity)

Such inconsistency will likely cause comparability issues if used in a model, but would still be relevant on a company by company basis.

Data issues with the modelling of grants and contributions

Ofwat's approach as set out in the draft determination

Developer services revenues were not part of Ofwat's IAP, but the way in which revenues are assessed raises important consistency issues, and can potentially result in effects that we consider highly undesirable and not appropriate. The overall approach to assessing revenue for developer services is to assume that a proportion of the relevant costs will be recovered. If those costs are determined in a manner that is not consistent with market rates, the implied charges that result will not reflect the rates that we must apply in a competitive market.

In the Draft Determination, Ofwat has assumed that a proportion of the cost it has modelled should be recovered from developers, with the remainder being borne by regular customers. At face value, this approach appears logical and we can understand why it has been adopted – it seems reasonable that companies should not be able to recover more than their costs from developers. However, as we set out below, inconsistencies in company data have materially distorted the modelling of *the appropriate rate of recovery*, such that we do not consider the identified average level to be reliable to use.

In the grants and contributions model, Ofwat calculates our recovery rate as an average of 37% over the course of AMP7, which is very low relative to Ofwat's calculated industry average of 48%. However, because of the issues with company data (see Annex 2), we do not believe this industry average is valid; the percentage of expenditure represents different things for different companies.

Ofwat's recovery rate formula is set out below (the bold items are discussed in the subsequent section):

$$\frac{\text{Infrastructure Charges (}\textbf{Net of Income Offset}\text{) + Requisitions + Other Contributions (price control)}}{\text{New development totex [Network Reinforcement + Requisitions + }\textbf{Asset Value Payments}\text{]}}$$

The limitations of using the results from this formula for the determination of revenue recovery rates include that:

- Some companies appear to have stated their costs net of grants. This will have the effect of reducing the denominator and inflating the implied recovery rate.
- Some companies have alternative accounting treatments whereby part of the cost or income will not be captured by this calculation.
- The approach of comparing companies on the basis of a single rate ignores the extent to which growth expenditure can relate to reinforcement that is 'shallower' or 'deeper' in the network. In doing so, it ignores the effect that both the relevant charging rules and the contestability of the relevant services (to which the costs relate) can have on recovery rates.

A separate recovery rate of 75% has been set for new connections element of new development based on full cost recovery, less the discount we apply for water efficient developments. We think this is an appropriate approach to adopt, as it looks at the activity separately, rather than attempting to aggregate a specific type of 'local' activity with others, such as deep reinforcement, where the basis for, and approach to, cost recovery is quite different.

We note, though, that there appear to be material data problems related to new connections costs (which have implications for the overall modelling of developer services costs). For example (as noted in annex 2), some companies did not include any costs at all for new connections.

A smaller challenge has been applied to grants and contributions for the wastewater service. The effect is less pronounced because the changes in charging rules are less significant as discussed below. We have therefore focussed on the water service in our response.

Impact of new charging rules

The bold items in the Ofwat's recovery formula are altered by the new charging rules. There is a significant effect on Ofwat's calculation of the cost recovery rate from company assumptions about (i) the effect of the new rules and (ii) the pace of transition. Given the problems with underlying data and the impact of the new approach, we do not think that applying a single recovery rate for all other growth expenditure across the AMP is reasonable.

The "income offset" was previously the element of company expenditure that was not funded by a developer. When a developer used a Self-Lay Provider, an equivalent Asset Value Payment was made to the SLP and this was also company expenditure.

Under the new rules, this company-funded expenditure becomes a deduction spread across infrastructure charges. The net effect on recovery rates would be neutral if there was no timing difference between expenditure and contributions, as can be seen in the simple stylised example below:

Stylised impact of new charging rules

	Old	New	Effect of new approach
Reinforcement Expenditure	10	10	
Requisitions Expenditure	20	20	
Total Expenditure	**30**	**30**	
Requisitions contribution	2	20	Developer pays 100% cost of new mains to any provider
Infrastructure charge	10	10	
Income offset	-	(18)	"Income offset" = net requisitions expenditure
Net contributions	**12**	**12**	
Net expenditure	**18**	**18**	
Recovery rate	40%	40%	

However, the timing is not the same, for two reasons:

Carry-over from AMP6

Some developments were begun (or will begin) in AMP6 under the old rules and will be completed in AMP7. We have to honour the agreements made with developers and SLPs for sites where building commences before 1 April 2020 – these reflect the charging arrangements published up to that point. Our customers will have put together their business cases based on that expectation, so we cannot impose a new approach while a development is underway. In our plan we assume that AVPs for pre-existing developments will taper off, but that some will still be paid in the fourth year of AMP7.

Payment of the "income offset" through the infrastructure charge

Although this might have the same aggregate value as the current approach, the timing and distribution will differ.

- At present developers that requisition mains are presented with two choices – paying for mains and then collecting the income offset each year for 12 years (Relevant Deficit), or an up-front discount from the cost

of the mains based on forecast revenue over the period (the Discounted Aggregate Deficit). We are not aware of any developer choosing the first option.

- In future, developers who requisition a main from us or pay an SLP will pay more up-front because they will not receive an Asset Payment'. This is because infrastructure charges are due when each property is connected, so the credit will be staggered rather than an up-front discount. This will have implications for developer cash flow, but also importantly for the timing of when the credit would be expected to appear in data that companies submit to Ofwat.

A period of transition to the new rules was reflected in our underlying assumptions on cost and income, which causes a rising profile in Ofwat's calculation of our recovery rate.

Impact of transition on Ofwat calculated recovery rate

£m, 2017-18 prices		20-21	20-22	20-23	20-24	24-25
Expenditure						
Requisitions		16.9	18.1	19.2	19.6	20.0
Asset Value Payments		9.6	7.1	2.6	1.3	-
Network reinforcement		12.2	15.5	16.2	13.1	13.3
Total new development	**WS2 L11**	**38.8**	**40.8**	**38.0**	**33.9**	**33.3**
Income						
Requisitions		16.9	18.1	19.2	19.6	20.0
Gross infrastructure charge	App28 L8	13.0	13.3	14.1	13.9	13.5
Income offset applied to IRC	App28 L8	(24.2)	(22.9)	(19.8)	(19.0)	(18.2)
Other (non-price control)	App28 L12	7.0	2.8	0.6	-	-
Total income		**12.7**	**11.3**	**14.0**	**14.5**	**15.3**
Ofwat calculated recovery rate		33%	28%	37%	43%	46%

It is clear that the recovery rate grows because of the transition away from AVPs - the items classed as expenditure reducing as developments under the old rules are completed. Our overall recovery rate is depressed by our interpretation of the requirements for the income offset, discussed in the next section.

Importantly, we have reflected requisitions income as 100% of requisitions cost – this is critical to avoid damage to the market for SLPs and NAVs.

Treatment of income offset and effect of capping

Ofwat intervened to set infrastructure charges to a minimum of zero; we note that some companies had already set a floor on their charge and this also influenced the average recovery rate. After making this adjustment, the industry average recovery rate rises from 48% to 66%. In its Draft Determination (SVE.CE.C1), Ofwat restates the objective from its Charging *Rules for New Connection Services* – "that companies should take reasonable steps to ensure that the existing balance of charges between developers and other customers... should be broadly maintained."

A negative infrastructure charge was always a potential outcome of the change in charging rules. There is no relationship between the "income offset" and infrastructure charges and therefore no reason why the former should be less than the latter.

- The income offset was under the historical charging arrangements based on local requisition costs and capped at 12 years' water bills on new developments. The level of activity is relatively steady in a large company. Our historic data showed that through this approach customers paid for 91% of requisitioned mains and we included this discount against infrastructure charges in AMP7 (the income offset is 91% of requisitions and AVPs in the table above).

- Infrastructure charges (under the new charging rules) are based on average network reinforcement expenditure. This includes some strategic schemes which are very irregular. In small companies there could be little or no reinforcement within a five year period, implying an infrastructure charge of zero if the rules were applied rigidly. For example, in Hafren Dyfrdwy's wastewater business, no reinforcement is required over the next five years but a significant investment in a single AMP could drive a large charge in a later AMP.

If Ofwat is satisfied that waiving the infrastructure charge is sufficient to "broadly" maintain the balance between developers and other customers, we can accept that intervention in the round. The key requirements for us are to ensure that the controls are consistent with a sustainable approach to developer (including infrastructure) charging, and do not undermine the market for contestable activities under the new charging. This latter point means that developer charges must cover all requisition costs, and we should not be penalised for charging on this basis.

Most developers choose to lay sewers on site and therefore the change in the treatment is less material. There are few sites where we are required to lay sewers and therefore the value of the "income offset" is small; the infrastructure charge remains positive even after it is applied.

Benchmarking model performance and efficiency

Benchmarking against Ofwat's developer services casework

We have reviewed Ofwat's information note 17/02

- https://www.ofwat.gov.uk/wp-content/uploads/2017/02/IN-1702-New-connections-benchmarking-costs.pdf).

This considers the efficiency of new connections costs for use when determining developer services disputes. A matrix of minimum, median and maximum costs are identified by varying length and ground condition. Requisitions and Network reinforcement are not in the scope of these costs. The document states that *"as a starting point, we would expect the costs for a new water supply connection to be no more than the median costs set out in the table. However, we determine each case on its merits and we may deviate from this where there is reason to do so."*

We have sought to benchmark the IAP model and our own costs against this information. We are aware that Ofwat's casework largely relate to small scale new development (analogous to the single property development in figure in annex 1). Given the lack of economies of scale, these costs are likely to be higher than an overall company programme that includes larger development sites. Therefore, we have used a high level categorisation of our current programme to arrive at an appropriately weighted unit cost. For large development sites, we have assumed that the most appropriate unit cost to be 'verge' ground conditions. This is the cheapest cost and likely to be most representative because there is no need to reinstall the highway or use traffic management on large development sites. Self-lay activity has been removed from the analysis. Our assumed weightings are set out in table 6, below.

Developer Services programme weighting assumed when benchmarking against IN17/02 costs. These reflect the current Severn Trent programme.

	Single property development (Delivered by company)			**Large development site** (delivered by company)	**Delivered by Self lay**
	33%			**25%**	**42%**
Ground conditions	**verge**	**footway**	**Carriageway**	**Analogous to verge**	**Not included in analysis**
0-5m	2%	16%	27%	45%	
5-9m	2%	14%	24%	40%	
9m+	1%	5%	9%	15%	

Using the weightings in the table, the following unit costs per new connection are derived (depending on whether Ofwat's median or minimum costs are used):

- £866 – Assuming Median costs for both the single property and large development site components
- £738 – Assuming Median costs for single property and Minimum for large development site
- £527 – Assuming Minimum costs for both single property and large development site

These values are greater than new connections unit costs derived from new connections expenditure (WS2 line 12) and contestable new connections volume (APP28 Block I). Severn Trent's forecast unit cost is £616. This suggests that the new connections component of the IAP growth model forecasts are materially lower than Ofwat's view of efficient costs for the purpose of case determinations. This variance would further support our view that the data being used for modelling developer services costs is not on a consistent basis, and will lead to non-robust expenditure predictions.

Benchmarking against company charging schemes.

We have reviewed company charging schemes to try to understand the interaction with the IAP growth model unit costs.

While we accept that such information cannot be truly reconciled given that the volumes across the various charges would be required, and we have not taken account of requisition related income offsets, it does provide a useful cross check of the modelling results to assess whether they are producing consistent results. Where they are clearly not, particularly for the historical unit cost which should relate to these charges, it would further suggest that the data being used in models is inconsistent.

Review of company charging schemes to infer expected unit costs.

	2018/19 Charging schemes					IAP Growth model (per connection)	
	Requisition Charge (per metre laid)	Infra. Charge (per property)	Connection Charge (per connection)	Smallest possible DS charge*	Largest possible DS charge*	Historical Unit cost	Forecast unit cost
HDD	Not published**	£379	£143 - £285***	£522**	£664**	£908 (DVW)	£2,242
SVE	£24-£185	£424	£308-£3,257 (5-12m price)	£574	£3,866	£2,070 (SVT)	£1,989
ANH	£29-£368	£460	£813-£3,143	£1,302	£3,971	£1,306	£1,513
SRN	£55-£420	£200	£225-£6,582	£480	£7,202	£858	£1,580
SWB	£50-£240	£98	£146-£2,079	£294	£2,417	£779 (SWT)	£1,198
TMS	£190-£1,040	£140	£240 - £7,860	£570	£9,040	£1,088	£1,161
WSH	Not published**	£379	£293-£1,899 (2m including meter up to 63mm diameter)	£672**	£2,278**	£750	£1,139
UUW	£35-£308	£356	£396-£6,417 (2-10m)	£787	£7,081	£1,334	£1,017
NES	£38-£326	£185-£240 per house	£355-£3,210 (5-10m price)	£578	£3,776	£887	£978
YKY	£40-£175	£250 (£75 x consumption/125 estimated at 4)	£762-£1,139 (2-10m)	£1,052	£1,564	£525	£373

Red= Historical unit cost derived from business plan data is not compatible with charging scheme.
Yellow = Historical model derived from business plan data requires company developer services programme to be at the extremes of the charging range.
* Assuming 1 metre of requisition and extremes of the charge ranges
** WSH and HDD do not include requisitions charge component as this is site specific due to different charging rules. HDD have a fixed cost of £651 or £1450 depending on region + a bespoke quote,
*** HDD connections charge relates to an application fee and meter cost, site specific costs are not included.

As can be seen in the table above, the charges as published versus the IAP growth model unit costs provide widely varied results. We have sought to show the smallest possible and largest possible developer services charge. At the highest level, these extremes should be expected to bracket the historic unit cost implicit in the unit cost model. The analysis shows that this is not the case for YKY with ANH and WSH also being close to the smallest possible value.

From the analysis above, we can conclude that, whilst it is difficult to compare, our charges appear to be in line with those charged by other companies. However when looking at the cost assessment results we appear an outlier. Therefore we can infer that the modelling input data is unreliable given the variation evident in the data set.

Supplementary support for the efficiency of our developer services costs

Whilst this submission focuses on the issues relating to the consistency and robustness of the IAP modelling approach taken for developer services. We consider that there other forms of evidence that suggest that our developer services costs are efficient relative to the industry. These are summarised at high level here.

- As included in Appendix 5 of our September business plan, through Arcadis, we have undertaken 3rd party benchmarking of our unit cost for mains laying. It sought to benchmark the PR14 cost curves used to develop programme costs against a range of comparators. We have then demonstrated the efficiency of our PR19 costs relative to these PR14 curves. A major component of requisitions and network reinforcement activity relates to mains laying activity. Arcadis found our costs to be potentially industry leading when addressing the replacement of smaller diameter mains. We've also built in further efficiencies delivered in AMP6 and increased the efficiency rate to offset upward costs pressures observed by Arcadis.
- Comparison of company charges schemes as set out in table 4 shows that our developer services charges are in line with other companies. For example highest requisition charge per metre laid is second lowest of the charges analysed. Charges must be set in line with expenditure to ensure compliance with competition act requirements.
- Our requisitions and new connections costs are subject to market testing due to contestability of the activities. Logically, this means that we can only win work against self-lay providers if our unit costs are competitive (and compliant with the competition act).
- With the exception of developer services, Ofwat's IAP cost assessment approach shows all other major components of our business plan totex expenditure to be either industry leading or upper quartile relative the rest of the industry.

Developer services annex 3 – Reinforcement and strategic schemes

Network reinforcement is non-contestable and is likely to involve very different activities compared to on-site (new connections and requisition) work. Therefore, the appropriateness of aggregating network reinforcement costs with costs that relate to activity within contestable markets is highly questionable on both a scope and cost driver basis. **A separate unit cost model for network reinforcement (as shown in the table in section 3.5.2 above) would remove some of these issues.**

However, whilst some shallow reinforcement is relatively routine and can be expected to occur in most periods, there is also likely to be a periodic need for larger scale reinforcements. The need for these reinforcements will tend to reflect the accumulated impact of growth over a prolonged period rather than the connections in a single AMP. Therefore, the level of required reinforcement activity is not likely to strongly correlate with connections volumes within a five year AMP period. This is particularly the case for strategic schemes that may only start to be reflective of growth over many AMP periods due to the variance inherent capacity in our network for a given location at the time of the new development. These strategic schemes are not likely to be adequately captured by a simple unit cost approach that considers new development over a relatively short time period.

In our September Submission we included £70.288m of cost for all off-site reinforcement work to cater for new developments. This was based on AMP5 and known AMP6 costs inflated by the anticipated change in new connections volumes in AMP7. We have since done a full review of our cost forecasts. This now considers AMP6 historical reinforcement expenditure by three separate cost drivers:

- Routine network reinforcement for specific new development sites
- Strategic reinforcement for much larger new development sites
- Network reinforcement to account for erosion in network capacity as a result of incremental growth over time)

This approach allows us to use the latest cost and volume information, and to better understand the proportion of our costs that are less likely to be driven by new development volume anticipated in AMP7 – namely expenditure for strategic housing, industrial or commercial growth areas and restoration of strategic network capacity eroded by incremental new development over time.

If we were to use a unit cost model for all reinforcement activity, our latest view of AMP7 expenditure would suggest a unit cost of £293 (17/18 Price Base) per property in network reinforcement costs. However, if you consider only the routine reinforcement, this drops to £148/new property anticipated in AMP7. This exposes the need to remove strategic and network capacity restoration reinforcement costs.

As we illustrated in the table in section 3.5.2, we consider that it would be sensible for Ofwat to replicate this approach using industry wide data to derive its cost baseline for this routine network reinforcement activity. Using our updated unit cost of routine reinforcement expenditure (£148/new property), this shows that we will incur £21.452m in AMP7 **plus** the cost of strategic schemes.

Strategic and network capacity restoration schemes

Applying a disaggregated approach to network reinforcement cost modelling (introduced above), we estimate the need for £25.504m for strategic and network capacity restoration schemes in AMP7. This is derived from AMP6 expenditure scaled by the increase in anticipated AMP7 new properties. Note, this represents an internal challenge of £25m on our September plan, reducing our reinforcement costs from £70m to £46m.

This expenditure cannot be expected to correspond with the routine unit cost identified above. For example, phase 2 of our strategic network reinforcement scheme in Newark will incur £6m (in addition to £10m already incurred in AMP5 and 6) relating to a strategic growth area of 16,000 future properties. This is a unit cost of £1,027/property – 7 times greater than our routine unit cost.

We have identified £15m of interventions needed in AMP7 for strategic new development and for the restoration of the network capacity. These are described in the Table below. This non-routine reinforcement

activity is likely to grow through the AMP as schemes are confirmed and interventions defined. Therefore we consider that our £25.504m value (derived from AMP6 expenditure) to be representative.

There are a number of reasons driving the amount of strategic schemes in our plan.

- Significant strategic development sites at the extremities of our water supply boundaries (Lincolnshire, South-East Leicestershire and South Warwickshire) have driven increased costs. Given their peripheral location, there are limited local supplies in these areas and therefore water has to be moved long distances through our trunk main network to reach development sites.
- We are choosing to cater for long term (20 year planning horizon) development needs when considering trunk main or distribution service reservoir maintenance. Whilst investing once is much more efficient from a whole life cost perspective, by taking a long term strategic approach we may appear less efficient in the short term versus companies that may not be considering investment in this holistic way.

AMP7 Strategic Project Costs

New Development Area	Properties or development areas	Off-site scope of work	Costs (£m)
Newark - Phase 2	16,000 new homes and associated employment/industrial development	This is the second phase of work that follows on from the enabling infrastructure constructed in AMP6	£6.485m
Worcester	Strategic development sites across Worcester. Our hydraulic models indicate that 6,400 homes would suffer low pressure if no reinforcement work was carried out.	Multiple reinforcements are required to provide network capacity across Worcester. Initially feasibility indicates that 19km of new and upsized main will be required in total.	£3.447m
Birmingham (Erdington DSR)	Multiple developments across Birmingham	Work is required at one of our largest Service Reservoirs in Birmingham (Erdington) to ensure that additional demand can be balanced across the network.	£1.359mm
Leicester Phase 1	Strategic development sites to the South of Leicester	Phase 1 of our strategic upgrades to the Leicester trunk main system will require the upsizing of 6.6km of main. Project costs are split between infrastructure maintenance and off-site reinforcement.	£1.426m
Leicester Phase 2	Strategic development sites to the South of Leicester	Phase 2 of our strategic upgrades to the Leicester trunk main system will require the upsizing of 6.2km of main which will complement the work completed in Phase 1. Project costs are split between infrastructure maintenance and off-site reinforcement.	£1.281m
Melton Mowbray Phase 4	6,100 new homes and 50 hectares of employment land around Melton Mowbray.	This is an extension of Phase 3 of the upsizing work carried out in AMP6 and includes for a further 10.2km of trunk main to be upsized. Project costs are split between infrastructure maintenance and off-site reinforcement.	£1.001m
Derby	700 new homes at the Kingsway Hospital development site	We will be duplicating 1km of 400mm trunk main to reinforce the network around the new development site. This project has commenced in AMP6 (£288k planned to be spent) and will complete in AMP7 (remaining £337k of project costs.	£0.337m

The bespoke AMP7 reinforcement costs presented above have been informed by the information we have gathered from our AMP6 programme (described below). It also supports our assertion that these costs will likely grow throughout the AMP. For AMP6, we have undertaken a thorough feasibility assessment on each strategic project and considered multiple options. The design and construction element of the projects have been procured and delivered through our 'One Supply Chain' Engineering Framework. We are therefore confident that our costs for these projects are both justified and efficient.

AMP6 Strategic Network reinforcement projects

New Development Area	Properties or development areas	Off-site scope of work	Costs (£m)
Newark - Phase 1	16,000 new homes and associated employment/industrial development	A multi-phase project is required to supply up to 16,000 new homes around Newark-on-Trent. Phase 1 of this project has involved the construction of 14km of new trunk mains. This is split between a 9km section to service the initial stages of development and a 5km section to bring 6Ml/d of new water into the Control Group to prevent existing properties suffering low pressure as a result of the additional demand.	£7.178m
Rugby (Radio Mast site)	6,200 new homes to the east of Rugby (known as the Radio Mast site)	An 8km 450mm diameter trunk main to connect the development area to the existing trunk main network.	£3.447m
Rugby (Barby DSR)	Multiple developments across Rugby	Barby DSR is the primary feed point for the town of Rugby and its surrounding villages. Multiple developments over recent years, as well forecast future development, has reduced our ability to cope with fluctuating demands and provide resilience in the event of a treatment works outage or inlet main failure. Our solution to this has been to provide a new 5Ml cell to boost the overall capacity of the site from 25Ml to 30Ml.	£2.084m
North Staffordshire (Hanchurch DSR)	Catering for development projections through to 2035	The Hanchurch DSR directly supplies 57,000 properties across Stoke-on-Trent and Newcastle-under-Lyme as well as supporting supplies to the wider North Staffordshire area. The original DSR was built in 1891 with further cells constructed in 1929. The DSR required full replacement in AMP6 due to structural issues causing water quality failures. We have therefore constructed a new 43Ml reservoir which includes an increase of 9Ml in useable capacity to cater for future development projections through to 2035. Total project costs are £11.086m of which approximately 13% is associated with catering for new development.	£1.503m
Melton Mowbray (Phase 1,2 and 3)	6,100 new homes and 50 hectares of employment land around Melton Mowbray.	We are in the process of completing a number of projects to support the development of 6,100 new homes in Melton Mowbray. Phase 1 was to increase the capacity of the Ab Kettleby Service Reservoir from 0.75Ml to 3.2Ml. This project was started in AMP5 and completed in AMP6. Phase 2 involved upsizing a 2.4km section of trunk main downstream of the Service Reservoir from 12" to 18". Phase 3 is currently ongoing and involves upsizing a 4km stretch of trunk main that moves flows from south to north (22% of this project is accounted for as off-site reinforcement with the remainder being infrastructure renewal). A Phase 4 is planned for AMP7 to complete the up-sizing work.	£1.443m
Stafford	Multiple new developments across the Stafford Water Resource Zone	We are planning to increase our abstraction up to full licensed capacity at our Weston Jones Boreholes (near Newport in Staffordshire). These additional flows will be pumped via an existing trunk main to our Hob Hill Water Treatment Works before passing into the distribution system that serves Stafford where the additional 3Ml/d will support supplies to new developments. Approximately 40% of the project costs are attributable to off-site reinforcement with the remainder covering the development of additional water resources and the maintenance of existing trunk mains.	£1.259m
North Gloucester (Maisemore Trunk Main)	Multiple developments to the north of Gloucester	We have replaced 7.2km of 14" and 9" unlined cast iron trunk main to resolve mains failure and water quality complaints. At the same time we have replaced a 2.6km section of main with a larger pipe to facilitate new developments to the north of Gloucester. 26% of the total project cost is accounted for as off-site reinforcement.	£0.750m
Droitwich and Worcester	2500 homes in Droitwich & up to 6200 homes across Worcester	A new Booster Station was required to serve a planned 2500 home development to the south of Droitwich. Subsequent to this we have started work on a linked project to provide capacity for up to 6200 new homes around Worcester. This project is in the early stages of feasibility and design and will be constructed in AMP7.	£0.784m
Hinckley	1000 new homes	We have installed 1.3km of 12" main to support the development of 1,000 houses in Hinckley.	£0.552m