Appendix 7.1 Developer Services cost assessment

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Whilst we accept that our developer services costs may not be frontier, we do not believe that our unit price is more than 50% inefficient, as suggested by the IAP growth model.

This is particularly stark given Ofwat's IAP assessment showing Hafren Dyfrdwy to outperform Ofwat's challenging efficiency baseline at both an Appointee and Water service level. We also note that were it not for the prediction of the IAP growth model, our enhancement cost base would have been assessed as efficient overall.

Having reviewed all the PR19 data tables, we conclude that there are a range of inconsistencies in the information provided in relation to developer services; within companies' tables, between companies, and over time. Whilst we see that Ofwat has made some adjustments to try and address this, in particular for future network reinforcement spend, we believe other data within the PR19 tables can be used to evidence these continuing inconsistencies. Furthermore, we know that the rules are different in Wales to England. IFRS changes during AMP6 mean some historical data is almost certainly inconsistent and that the changes to charging rules which are not yet fully in force are likely to have created further inconsistencies as companies get to grips with the full implications of this.

In this document we set out analysis that shows that Ofwat's IAP assessment of developer services water costs may **under-predict efficient expenditure for Hafren Dyfrdwy by £2.2m**.

Given our findings, we highlight some pragmatic steps Ofwat could take to ensure a more consistent data set is obtained from companies, both by using existing data to cross check and verify (for example developer services revenues, and other volumes submitted in WS3 and App28 block I) and potentially requesting further confirmations (for example value and treatment of asset value payments).

We set out potential developer services cost and volume data queries in 7.1.6.

The remainder of this section is structured as follows:

7.1.1 Understanding Developer Services activity and modelling

The schematic below (fig. 1) sets out the various components and attributes of developer services activity. It sets out how the three components (new connections, requisitions and network reinforcement) interact.

We also highlight where the contestable elements lie. The undertaking of contestable work by the company (rather than the developer via a self-lay provider) varies significantly between companies depending on company policy, the type of development in the area and the efficiency of the company's costs.

The example also shows how volumes can be counted differently between depending on the definition being followed. This is further complicated by the interaction with the change in customers over time. This is also affected by the lag between new development activity and occupation of new development sites by bill payers as well as the occupation of existing properties (termed voids).

Finally, the network reinforcement work on the existing network is not shown as being scalable to the on-site activity. This is because this fundamentally is 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 could be due to the inherent capacity of the network, historic activity previously undertaken or the location of the new development relative to strategic assets. Typically, activity can be close to the site (termed shallow reinforcement), or more strategic in nature and not attributable to any specific development (termed deep reinforcement). This latter type is typically large scale and undertaken infrequently and will not reflect new connection, property or customer volumes in anything but very long time periods (i.e. multiple AMP periods).

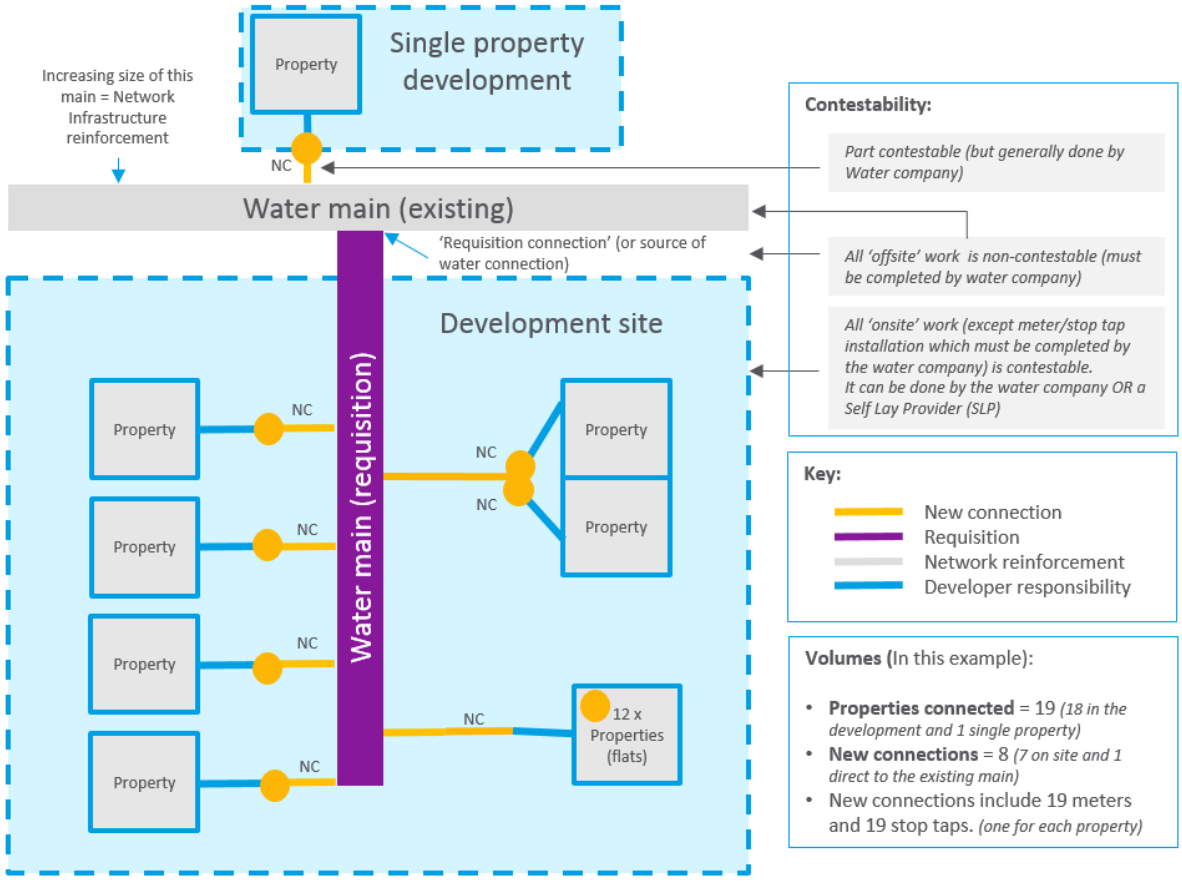

Figure 1: *Schematic of developer services activity identifying three components (New connections, Requisitions and Network Reinforcement). The contestability and volume descriptors are also identified).*

Ofwat's approach to assessing Developer services expenditure

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);
- 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 based on the median historic cost/volume (£887) and another based on the median 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. This omission also appears to be inconsistent with its own practice in dispute resolution as well as in variance to the methodology.

Our business plan contained £5.362m coded to water developer services costs (across lines 11 and 12 of Table WS2). This can be broken down into £1.295m relating to offsite network reinforcement (as shown in line 6 of Table App28), £1.353m relating to new connections (WS2 line 12) and £2.714m relating to on-site activity (residual of WS2 line 11). Hafren Dyfrdwy's forecast simple unit cost is £2,242/New Connection, whereas Ofwat's model only provides for £1,013/connection or £2.422m (49%).

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

1. **That costs and activity within the models are consistent.**
2. **That the activity actually reflects the costs given the timescale of the model.**

Our view is that firstly, companies have not provided consistent data on either cost or volumes, in part due to differing rules between England and Wales, and secondly that different drivers should be used for different components of developer services cost. Due to these factors, we believe that our costs are not being compared on a like for like basis when benchmarked against other companies, and the over simplified model outputs cannot be relied upon.

7.1.2 Concerns with the IAP growth model

Whilst we accept that our developer services costs may not be frontier, we do not believe that our unit price is more than 50% inefficient. This is particularly stark given Ofwat's IAP assessment showing Hafren Dyfrdwy to outperform Ofwat's challenging efficiency baseline at both an Appointee and Water service level. We also note that the reason for our enhancement costs not also being upper quartile relates solely to the prediction of the IAP 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. Whilst we note that Ofwat has attempted to address this issue, through the transfer of expenditure into developer services where it considers that costs have been incorrectly allocated. Our analysis suggests that this has not sufficiently reflected all inconsistencies. Consequently, we do not believe that the model accurately reflects the actual costs per connection companies incur, are forecasting to incur or the relative efficiency of the estimates. 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 table 1, below.

Table 1: *Summary of concerns with IAP water growth model.*

Issue	Description
Cost data consistency (Section 7.1.3)	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 (Section 7.1.4)	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.
Linkage of costs and cost drivers (Section 7.1.4)	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 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.

In addition to the evidence of inconsistent data in company submissions impacting on the performance of the model, we also consider that benchmarking against other information also raises concerns with the model outputs and supports the efficiency of our costs. This includes:

- 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.

We explore each of the three elements summarised in table 1 in further detail in the sections below.

7.1.3 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 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**: Treatment as capex, opex, cash transaction or through 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 table 2, below.

Table 2: 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'.

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.

Figure 2 sets out the comparison of AMP7 developer services costs and associated revenues across the sector.

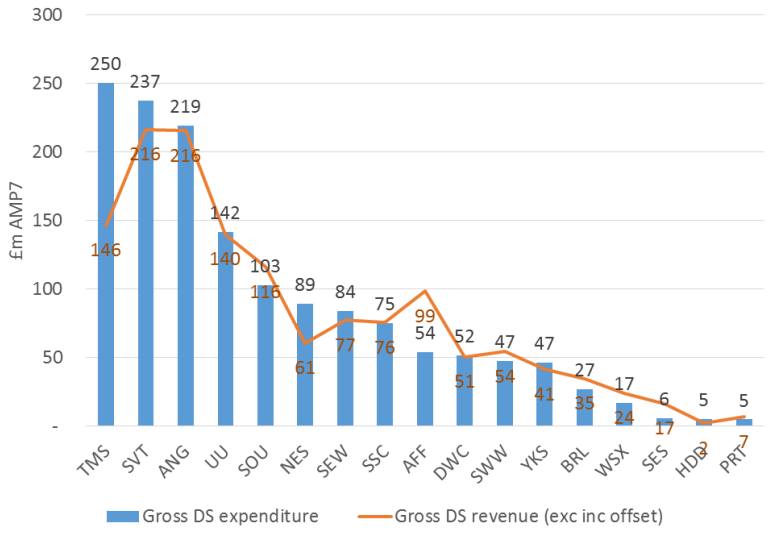

***Figure 2:** Recovery of Developer services expenditure from developer revenues (removing AVP transition costs, income offset to infrastructure revenue and diversions revenue) – Source: APP28 and WS2*

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.

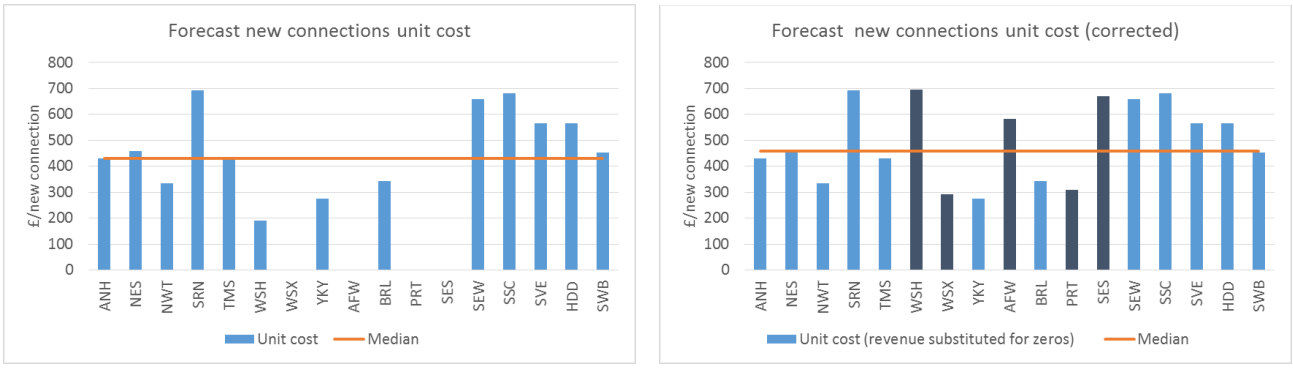

***Figure 3**: Comparison of new connections expenditure in business plans (left) and modifications made to better reflect gross expenditure (right)*

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 figure 3, above.

Differences in accounting treatment of self-lay.

As set out in fig 1, 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.

Table 3 sets out the basis for Asset Value Payments and Income offset in AMP6 and AMP7.

Table 3: *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, AVPs are used by Hafren Dyfrdwy (and Severn Trent) to pay SLPs for the work they undertake. Costs were derived on the same basis as the income offset calculation. For Hafren Dyfrdwy and Severn Trent, 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 £0.985m of the £2.714m requisitions expenditure will be via AVPs. However, the very small volumes for Hafren Dyfrdwy mean that these assumptions could be strongly influenced by the choices made at a very small number of development sites.

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.

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.

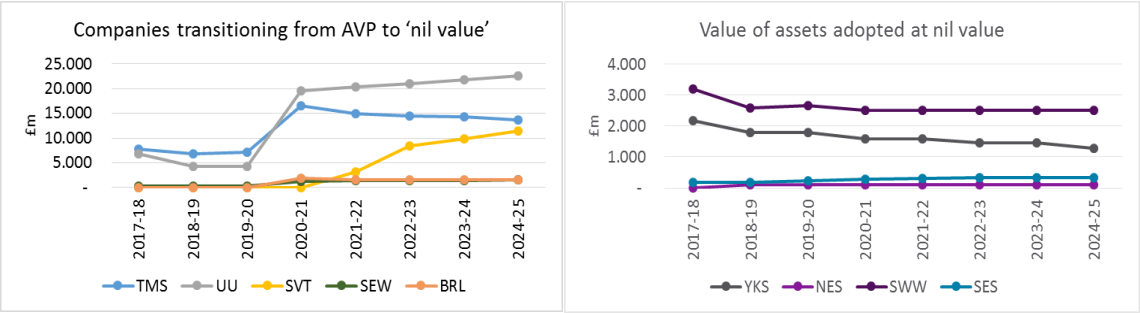

Figure 4: *Transition of assets adopted at nil value between AMP6 and AMP7*

The left graph of figure 4 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 figure 4 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 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). Careful consideration of this issue will need to be made when revenue allowances are set.

Interaction with company charging schemes.

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

Whist 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.

Table 4: *Review of company charging schemes to infer expected unit costs. 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.*

	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

As can be seen in the table 4, 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 table 4, 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.

7.1.4 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 fig 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 will 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.

Table 5 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.

Table 5: *Analysis of volume metrics from 2018 business plans. Key: Blue = growth model volume used; Red = Equal to model volume; Yellow = within 2% of Total new connections volume*

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.

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 Hafren Dyfrdwy'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.

7.1.5 Benchmarking model performance and efficiency

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 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.

Table 6: *Developer Services programme weighting assumed when benchmarking against IN17/02 costs. These reflect the current Severn Trent programme. We consider this to be applicable across the industry. Historic Hafren Dyfrdwy data is in complete and will be subject to inter-annual volatility due to its size.*

	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 table 6, 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). Hafren Dyfrdwy's unit cost is £532 and also forms the median unit cost across the industry. 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 supports 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.

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 (as per figure 1). 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.

7.1.6 Potential remedies

The issues we have identified relate to a systematic performance of the model rather than the particular circumstances of Hafren Dyfrdwy. Consequently, we suggest that, whilst a company specific remedy could be derived, it would be more appropriate to identify a remedy that could be applicable to all companies. However, we also set out potential company specific remedies below.

Company remedy

From the current information available, an appropriate remedy for Hafren Dyfrdwy could be:

- to remove the historical unit cost model (given that it is clear that historic treatment of costs are inconsistent between companies and relative the future costs, i.e. historic costs are not likely to be a good predictor of future costs);
- make sure that the new connections unit cost includes gross expenditure (currently the majority of the new connections costs of the median company have not been considered as they have been accounted for as opex);
- make 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 (£0.985m in the case of Hafren Dyfrdwy);
- disaggregate costs into the components of new connections, requisitions, and infrastructure reinforcement (to enable the appropriate costs and volumes to be matched and allow for benchmarking against wider regulatory data and company charging schemes); and
- use the contestable volume for requisitions and new connections (to make sure that the self-lay market is not materially skewing the models).

This remedy can be undertaken using existing data held in APP 28, WS2 and WS3. The completion of all of these remedies is set out in table 7, below. This would lead to a modelled value of £3.592m in addition to the £0.985m of AVPs. This is an increase of £2.155m, for Hafren Dyfrdwy relative to the IAP water growth model.

Table 7: *Assessment of Hafren Dyfrdwy 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	0.738
NES	41.7	18.7	14.4	83.7	91.2	0.498	0.224	0.101
NWT	46.4	54.6	40.7	139.2	139.2	0.333	0.392	0.181
SRN	45.0	55.4	2.3	38.2	65.0	1.177	1.451	0.030
TMS	92.6	132.5	25.3	76.6	215.5	1.208	1.728	0.221
WSH	24.5	38.6	4.4	4.2	45.4	5.840	9.207	0.070
WSX	9.8	12.7	4.2	30.0	33.3	0.326	0.423	0.048
YKY	30.1	5.1	5.7	109.7	109.8	0.275	0.046	0.078
AFW	47.4	23.2	30.7	81.3	81.3	0.582	0.285	0.298
BRL	10.0	12.8	4.0	19.0	29.1	0.526	0.674	0.546
PRT	3.0	3.8	1.1	9.6	9.6	0.308	0.395	0.005
SES	8.4	1.8	3.9	1.3	12.6	6.751	1.448	0.507
SEW	30.5	30.6	22.5	11.6	46.4	2.633	2.635	0.633
SSC	28.0	31.0	16.0	29.5	41.0	0.947	1.049	0.219
SVE	73.4	93.5	70.3	119.2	129.8	0.616	0.784	0.417
HDD	1.4	2.7	1.3	2.5	2.4	0.532	1.066	0.417
SWB	21.0	16.7	9.7	42.5	46.3	0.493	0.394	0.046

	Updated Unit costs (median company)	**0.532**	**0.674**	**0.219**
	HDD AMP7 model prediction (£m)	**1.353**	**1.716**	**0.523**
	HDD AMP7 model prediction agg. (£m)		**3.592**	
	Re-inclusion of AVPs (£0.985m)		**4.577**	

Industry wide remedy

Whilst we consider that the potential company specific remedy identified above would be more reflective of our costs and be relatively easy to undertake, this would not necessarily improve the reflectiveness of model predictions for all companies. This is because, from the analysis we have taken, we can be confident that other companies have interpreted data differently and have accounting policies that will lead to further inconsistency. For this reason, we suggest that a more appropriate solution would be to re-collect some developer services cost and volume data.

We have set out below (in table 8 and 9) an appropriate set of cost and volume data lines and definitions that could be collected through a query. This will allow the analysis that we have undertaken in table 7 (or similar) to be completed with increased confidence that the data will be on a consistent basis, and therefore any derived model predictions and efficiency interpretations are robust.

Identified developer services costs data query

The following developer services cost table, and accompanying definitions, if obtained for all companies for both the forecast period (as below) and the AMP6 period would allow Ofwat to model the three elements of developer services individually and ensure that appropriate cost drivers were used for each.

Table 8: *Identified developer services costs data query*

	Cost Data (£m, 3db)	20/21	21/22	22/23	23/24	24/25	Line Commentary (including significant assumptions made)
1	New connections expenditure (activity by company)						Including basis for what has been defined as a new connection.
2	Other new connections activity by SLP – equivalent value of activity not undertaken by company						Including confirmation of how/ if this is accounted for (e.g. adopted at nil value, with no customer contribution and lower connections charge, or is there an impact with AVPs or income offset?)
3	New connections income						Including justification for variance to lines 1 and 2 above (e.g. timing and discounts to incentivise water efficiency)
4	Requisitions expenditure (activity by company) excluding any income offset						Including basis for what has been defined as requisitions expenditure.
5	Requisitions expenditure (Asset Value payments to SLPs)						Including confirmation of how the AVP is accounted (Capex, Opex or cash transfer and therefore not affecting Totex).
6	Other Requisitions activity not undertaken by company and not subject to AVPs						Including explicit confirmation of how this has been recovered and whether or not this has been accounted in a way that affects Totex.
7	Income offset applied when calculating requisitions charge						Including basis for income offset calculation.
8	Requisitions income						Including explanation of how this relates to lines 4-7 above and basis for any further variance not identified.
9	Network reinforcement expenditure (activity by company)						Including confirmation that this accounts for both 'deep and shallow reinforcement'
10	Income offset applied when calculating infrastructure charge						Including basis for income offset calculation.
11	Infrastructure income						Including explanation of how this relates to line 9 and 10 above and basis for any further variance not identified.

Developer services cost data query definitions

1. New connections expenditure (activity by company). On-site new connections activity. Including, provision of communication pipe, stop tap and meter. Recovered from developers through new connections charge.

2. Other new connections activity by SLP – equivalent value of activity not undertaken by company. New connections activity undertaken by SLP/developers. Likely to be adopted at nil cost with no upfront cost (but future liability) incurred by the company. Report the cost that would have been incurred if the company were to perform the contestable activity that will be completed by the SLP.

3. **New connections income.** Charge to developers to recover new connections expenditure incurred. As a starting point, the charge should reflect line 1 for both English and Welsh companies. Note that this was collected in APP28 line 7.

4. **Requisitions expenditure (activity by company) excluding any income offset.** On-site activity incurred by the company that is not new connections expenditure. Including, laying of new mains on site and connection of new mains to existing mains. Recovered from developers though requisitions charge.

5. Requisitions expenditure (Asset Value payments to SLPs). Payment made to SLP for activity that they have undertaken. Cost calculated using income offset rules. Note that according to new charging rules, this should only relate to Welsh companies (and English Companies with transitional costs) in AMP7.

6. Other Requisitions activity ('payment' for activity not undertaken by company and not funded by AVPs). Likely to be recovered from developers though rebate to infrastructure charge as calculated by income offset. This will relate to English, but not Welsh companies in AMP7.

7. Income offset applied when calculating requisitions charge. Reduction to requisitions charge to represent future revenue generated from increased customer base as a result of activity reported in line 4. In AMP7 this is applicable for Welsh companies only.

8. Requisitions income. Charge to developers to recover requisitions expenditure incurred. As a starting point, for English companies in AMP7 this should reflect line 4. As a starting point, for Welsh companies in AMP7 this should reflect line 4 + line 5 – line 7. Note that this was collected in APP28 line 9.

9. Network reinforcement expenditure (activity by company). Off-site activity to deliver no net deterioration to customers as of growth. Note this this should include both 'deep' and 'shallow' network reinforcement. Recovered from developers though the infrastructure charge. Note that this was collected in APP28 line 6.

10. Income offset applied when calculating infrastructure charge. Reduction to infrastructure charge to represent future revenue generated from increased customer base as a result of activity reported in line 4 and line 6. In AMP7 this is applicable for English companies only.

11. Infrastructure income. Charge to developers to recover network reinforcement expenditure incurred. For English companies in AMP7, an income offset rebate is applied for requisitions activity (both for activity incurred by the company and SLPs). As a starting point, for English companies in AMP7 this should reflect line 9 – line 10. As a starting point, for Welsh companies in AMP7 this should broadly reflect line 9. Note that this was collected in APP28 line 8.

Identified developer services volume data query

The following developer services volume table, and accompanying definitions, if obtained for all companies for both the forecast period (as below) and the AMP6 period would allow Ofwat to model the three elements of developer services individually and ensure that appropriate cost drivers were used for each.

Table 9: *Identified developer services volume data query*

	Volume data (000s, 3db)	20/21	21/22	22/23	23/24	24/25	Line Commentary (including significant assumptions made)
1	Total new connections						Including basis for what has been defined as a new connection.
2	Total new properties (from new development)						Including basis for variance between property values presented in WS2 (e.g. timing discrepancies between new development work and occupation of property)
3	New connections where self-lay providers/developers will undertake some contestable activity						Including confirmation of what has been considered as contestable activity. Including description of whether or not material differences between contestable new connections activity and contestable requisitions activity forecast to be undertaken by SLPs are anticipated.
4	New properties where self-lay providers/developers will undertake some contestable activity						
5	New connections where the water company will undertake some contestable activity						
6	New properties where the water company will undertake some contestable activity						
7	New connections where the water company will undertake all contestable activity						
8	New properties where the water company will undertake all contestable activity						

Developer services volume data query definitions

1. Total new connections. This is the number of buildings connected. This can be considered as the number of communication pipes or boundary stop taps installed. This should not take account of the fact that some new connections will lead to multiple new properties (e.g. flats).

2. Total new properties (from new development). This is the future increase in billed properties as a result of new development incurred in the year. This should take account of circumstances were one new connection will lead to multiple new properties (e.g. flats). Change in property numbers as a result of the occupation of voids or demolition of existing properties should not be included.

3. New connections where self-lay providers will undertake some contestable activity. New connections definition as per line 1. 'Some contestable activity' is considered as the undertaking of either: some requisitions activity; and/or some new connections activity. Note that line 7 plus line 3 should equal line 1.

4. New properties where self-lay providers will undertake some contestable activity. New properties definition as per line 2. 'Some contestable activity' is considered as the undertaking of either: some requisitions activity; and/or some new connections activity. Note that line 8 plus line 4 should equal line 2.

5. New connections where the water company will undertake some contestable activity. New connections definition as per line 1. 'Some contestable activity' is considered as the undertaking of either: some contestable requisitions activity; and/or some contestable new connections activity. This activity needs to be over and above non contestable requisitions and new connection activity (i.e. connection of the new main to the existing main and inspection of the connection to the property). Variance to line 1 will represent the new connections where all contestable activity is undertaken by developers/SLPs. Note that line 3 and line 5 should have common new connections, therefore, these lines should not equal line 1.

6. New properties where the water company will undertake some contestable activity. New properties definition as per line 2. 'Some contestable activity' is considered as the undertaking of either: some contestable requisitions activity; and/or some contestable new connections activity. This activity needs to be over and above non contestable requisitions and new connection activity (i.e. connection of the new main to the existing main and inspection of the connection to the property). Variance to line 2 will represent the new properties where all contestable activity is undertaken by developers/SLPs. Note that line 4 and line 6 should have common new connections, therefore, these lines should not equal line 2.

7. New connections where the water company will undertake all contestable activity. New connections definition as per line 1. 'All contestable activity' is considered as the undertaking of all contestable (and non-contestable) requisition and new connections activity. This means that there will be no activity completed by the SLP/developer. Note that line 7 plus line 3 should equal line 1.

8. New properties where the water company will undertake all contestable activity (activity could be requisition or new connection work) New properties definition as per line 2. 'All contestable activity' is considered as the undertaking of all contestable (and non-contestable) requisition and new connections activity. This means that there will be no activity completed by the SLP/developer. Note that line 8 plus line 4 should equal line 2.