PR24 Cost Assessment Working Group
Growth expenditure at PR24 and data collection

Draft for discussion

7 April 2022

Ofwat

Agenda

(1) Welcome and housekeeping (13:00 to 13:05)

(2) Improving the assessment of growth-related expenditure at PR24

Assessment of growth-related costs at PR24, Arup (13:05 to 13:35)
Additional data collection for PR24, Ofwat (13:35 to 13:55)
Breakout session (13:55 to 14:35)

(3) Closing remarks (14:35 to 14:40)

Assessment of growth-related costs at PR24, Arup

ARUP

Ofwat

Assessment of growth-related costs at PR24

CAWG Workshop

7th April 2022

ARUP

Agenda

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Scope and approach

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Scope

In January-March 2022, Arup was commissioned by Ofwat to analyse whether separate assessments of growth-related costs including sewer flooding, are appropriate and feasible at PR24. Growth expenditure relates to costs driven by population growth and greater business activity.

The objective of Arup's work is to produce recommendations on proportionate and feasible methods for assessing four growth-related cost lines at PR24:

1. Water network reinforcement
2. Wastewater network reinforcement
3. Growth at wastewater treatment works
4. Reduce risk of sewer flooding to properties

On-site developer costs such as new connections, requisition mains and diversions are outside the scope of this work.

Water network reinforcement	Expenditure related to the provision or upgrading of network assets (e.g. water mains, tanks, service reservoirs) to provide for new customers with no net deterioration of existing levels of service.
Wastewater network reinforcement	Expenditure related to the provision or upgrading of infrastructure network assets (e.g. sewers and pumping stations) to provide for new customers with no net deterioration of existing levels of service.
Growth at WwTWs	Expenditure to meet or offset changes in demand from new and existing customers at sewage treatment works.
Reduce sewer flooding risk to properties	Expenditure for the purpose of enhancing the public sewerage system to reduce the risk to properties and external areas of flooding from sewers. It excludes expenditure with maintenance of asset capability.

RAG Definitions of cost lines in scope

Source: 2020-21, 4.09 RAG available at: https://www.ofwat.gov.uk/wp-content/uploads/2021/02/RAG-4.09-final.pdf

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Approach

Growth-related costs and costs to reduce sewer flooding can be assessed through one or a combination of cost assessment options.

The extent to which an assessment option is viable depends on whether the cost line meets certain criteria.

Arup has determined assessment options suitable for each cost line through the step-wise process summarised in the figure on right.

While tailored to the scope of Arup work, the framework followed is consistent with Ofwat's principles of cost assessment set out in its December 2021 consultation.

1. Suitability for separate assessment	Materiality; site/scheme-specific factors; complementarities with base costs.
2. Cost drivers	Through causal narratives based on technical insights. At the company level to align with Ofwat data collection and assessment practices.
3. Variables	Variables to measure potential cost drivers from readily available sources. Exogenous and minimum risk of perverse incentives.
4. Model testing	Test significance of drivers in explaining costs through econometric model suites. Based on data currently available.
5. Model assessment	Model assessment and selection using Ofwat's model selection criteria for cost assessment.
6. Recommended options	Recommend assessment options based on model robustness and root cause analysis of why models are insufficiently robust.

Arup framework for choosing suitable assessment approaches

Source: Arup analysis

Drivers and variables

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Water network reinforcement

The level of expenditure in reinforcing the water network to accommodate more customers without deterioration of service is a function of multiple drivers. The causal narrative analysis has flagged a range of plausible drivers of 'potential major importance' and 'potential minor importance'.

Water Network Reinforcement

Key: Potential major importance | Potential minor importance

	Driver	Variable
Assets	Capacity headroom (potential major importance)	None found or none readily available. Difficult to quantify.
Demographical	Change in volume of water carried in the network (potential major importance)	Direct measure: change in water delivered, which has the potential to capture changes in consumption patterns such as reduction in PCC. However, some risk of perverse incentives exist. Indirect measures: new properties, population growth
Behaviours	Water usage behaviours (potential minor importance)	PCC (direct measure) would create perverse incentives, hence discarded. Captured through 'water delivered' (indirect measure).
Behaviours	Planning standards (potential minor importance)	No direct measure found readily available. Captured through 'water delivered' (indirect measure).
Geographical	Urbanisation (potential major importance)	Population density, properties per km of mains.
Geographical	Topography (potential minor importance)	Pumping capacity per km of mains.
Economies of scale	Size of the company (potential minor importance)	Properties, length of mains, population served (direct measure). Captured through 'water delivered' (indirect measure).

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Wastewater network reinforcement

The reinforcement of the wastewater network needs to be planned and designed to accommodate additional volume of wastewater that needs to be conveyed from new customers' properties to wastewater treatment works. The analysis of causal narratives has identified multiple plausible drivers listed below.

Wastewater Network Reinforcement

Key: Potential major importance | Potential minor importance

	Driver	Variable
Assets	Capacity headroom (potential major importance)	None found or none readily available. Difficult to quantify.
	Drainage system (potential minor importance)	Combined sewers.
Demographical	Change in volume of wastewater carried in the network (potential major importance)	Direct measure: change in wastewater treated which has the potential to capture changes in consumption and in the drainage system. However, some risk of perverse incentives exist. Indirect measures: new properties, population growth.
Behaviours	Water usage behaviours (potential minor importance)	PCC (direct measure) would create perverse incentives, hence discarded. Captured through 'volume of wastewater carried' (indirect measure).
	Planning standards (potential minor importance)	No direct measure found readily available. Captured through 'volume of wastewater carried' (indirect measure).
Geographical	Urbanisation (potential major importance)	Population density, properties per km of sewer.
	Topography (potential minor importance)	Pumping capacity per km of sewer.
Economies of scale	Size of the company (potential minor importance)	Properties, sewer length, population served (direct measures). Captured through 'wastewater treated (indirect measures).

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Growth at wastewater treatment works drivers and variables

Changes in wastewater flow and load from new and existing customers, both households and non-households, are conveyed to WwTWs where additional capacity may be required to treat additional flow and load. Causal analysis has identified multiple drivers determining water companies' growth-related expenditure at WwTWs:

Growth at wastewater treatment works

Key: Potential major importance | Potential minor importance

	Driver	***Variable***
Assets	**Capacity headroom** (Potential major importance)	None found or none readily available.
	Intensity of treatment (Potential major importance)	Load requiring tertiary treatment.
	Size of treatment works (Potential minor importance)	Load treated at band sizes 1 to 3 (%); load treated at band size 6.
Demographical	**Change in PE** (Potential major importance)	Change in PE equivalent served by WwTW.
	Change in volume of wastewater treated (Potential minor importance)	Direct measure: change in wastewater treated which has the potential to capture changes in consumption and in the drainage system. However, some risk of perverse incentives exist. Indirect measures: new properties, population growth.
Behaviours	**Water usage behaviours** (Potential minor importance)	PCC (direct measure) would create perverse incentives, hence discarded. Captured through change in PE (indirect measure).
Economies of scale	**Size of the company** (Potential minor importance)	Properties, load, population served (direct measures). Captured through change in PE (indirect measure).

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Sewer flooding drivers and variables

An analysis of causal narratives has identified multiple plausible drivers determining water companies' spending in reducing the risk of sewer flooding to properties:

Sewer flooding — Key: Potential major importance | Potential minor importance

Sewer flooding	***Driver***	***Variable***
Weather & Climate	**Properties at risk** (major)	None found readily available as a direct measure*. Total number of connected properties (indirect measure).
	Drainage of surface water (major)	Urban rainfall run off.
Behaviours	**User behaviours** (minor)	Indirect measure: number of food service establishments per km of sewer. Some endogeneity issues exist as water companies can, to some extent, influence user behaviours.
Assets	**Drainage system** (major)	Combined sewers.
Geographical	**Urbanisation** (minor)	Population density, properties per km of sewer.
	Topography (minor)	Pumping capacity per km of sewer.
	Geology (minor)	None found readily available.
Economies of scale	**Size of the company** (minor)	Indirectly accounted for through total number of properties connected.

*A direct measure that focuses on exogenous drivers of sewer flooding risk would need to focus on runoff (volume and risk level) and location of properties.

Findings and recommendations

Network reinforcement conclusions

Standalone econometric models based on historical data and reflecting the causal narratives are insufficiently robust.

This is likely a reflection of:

Change in reporting/allocation practices is likely to create challenges in comparative assessment based on historical data.

Synergies with asset replacement costs (part of base costs).

The features of growth (e.g., a few big developments vs several small developments; a few large business facilities vs several small ones) are localised and difficult to capture through company-level variables currently available.

The same volume of growth may trigger different spending levels depending on whether it is concentrated in parts of the network with headroom available or in parts of the network with limited headroom.

Therefore, Arup recommends the following:

Option 1:
Separate assessment from base costs through comparative assessment using information that better reflects localised features of growth and mitigates changes in reporting / allocation practices. This option would need to be supported by additional data collection and testing of business plan data.

Option 2:
Keep as part of base costs is also a viable option, due to reporting/allocation issues and synergies with base asset replacement. Base models also account for variations in headroom to some extent due to longer data series. Should Ofwat keep this cost line combined with base costs, it is recommended that Ofwat considers testing a driver to capture growth as part of the base cost econometric models.

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Growth at wastewater treatment works conclusions

An econometric model explaining cumulative costs as a function of cumulative change in PE and intensity of treatment is a very strong candidate to assess growth at WwTW costs at PR24.

This model specification using historical 10-year capex and 4-year totex, shows:

- Predictive power consistent with a sufficient level of robustness
- Estimated coefficients aligned with causal narratives
- Parsimonious and sensible
- Actual v. predicted costs ratio ranges between 0.4 and 1.7
- Additional drivers reduce model validity
- Estimated model results are stable
- Statistically valid

Therefore, Arup recommends the following:

- A standalone econometric model is a viable option for assessing growth at WwTW cost at PR24.
- Depending on the spread of the ratio between actual and predicted costs, consider supplementing the econometric model with a cost adjustment claims process for companies that show very high actual v. predicted cost ratios.

Variable name	10-year capex cumulative (2011-12 to 2020-21)	4-year totex cumulative (2017-18 to 2020-21)
PE change served by WwTWs (000s)	0.00162	0.00289
Load receiving tertiary treatment (%)	0.0183	0.00112
Volume WW change (Ml/yr)		
Load treated in WwTW size bands 1-3 (%)		
Constant	2.525	2.896
Dependent variable	GWwTW capex (ln)	GWwTW totex (ln)
Estimation method	OLS	OLS
N	10	10
R^2	77%	76%
RESET test	Pass	Pass
VIF score (mean)	1.0	1.0

= Significant at 1% = Significant at 5% = Significant at 10%

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Sewer flooding conclusions

Standalone econometric models based on historical data and reflecting the causal narratives are insufficiently robust.

This is likely a reflection of:

Substantial synergies with base costs:

a) Regular inspection and maintenance
b) Customer education and awareness
c) Asset replacement

Lack of a suitable variable measuring the number of properties at risk accounting for:

a) Volume and risk of rainfall, including impacts of climate change
b) Location of properties, legacy properties at risk and new properties that may become at risk as a result of climate change

Therefore, Arup recommends the following:

Option 1:

Keep sewer flooding costs with base costs and consider testing a drainage driver as part of the base cost models.

This is not an unreasonable option as the base costs already account for a number of drivers of sewer flooding as identified from our causal narrative, including total number of properties connected, which causal narrative and modelling results suggest being an important, albeit imperfect, indirect measure for properties at risk.

Option 2, appropriate if a suitable variable for quantifying the number of properties at risk is found:

- Work with the industry (e.g. through DWMPs) to develop a suitable variable for quantifying properties at risk of sewer flooding – although it may be challenging to develop a variable focussed on exogenous drivers of flooding only
- Separate assessment of sewer flooding costs based on unit cost model with properties at risk as a driver
- Consider testing drainage driver as part of base cost models to account for synergies with base costs

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Final remarks

Based on historical data, standalone cost modelling seems a viable option for growth at WwTWs.
But it has proved a challenging option for other growth-related cost lines.

More accurate data on costs and more granular data on cost drivers may improve the ability of developing standalone models.

Ofwat may want to reassess the suitability of options if other relevant information becomes available.

The ability to model growth-related cost lines may improve with business plan forecast data.

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Summary of base consultation responses relating to growth cost drivers / explanatory variables, Ofwat

PR24 data request – growth

- The ‘Assessing base costs at PR24’ consultation responses provided suggestions for additional data collection to facilitate PR24 growth cost assessment.

- The following slides set out the additional data that has been proposed by companies. That includes any initial definition provided and our initial questions to assist companies on whether it might be a priority to collect the data.

- Slide 28 (site-specific developer services data) sets out additional data we propose to collect to support our assessment of site-specific costs. We currently hold only one year of data in this area (2020-21).

- We note that additional data collection may need to be **prioritised** in areas where a standalone assessment based on current / historical data has proven to be challenging, or where we do not hold sufficient years of data.

Network reinforcement table 2J

Infrastructure network reinforcement costs for the 12 months ended					
Line description	Units	DPs	Network reinforcement capex	On site / site specific capex (memo only)	RAG 4 reference
Wholesale water network+ (treated water distribution)					
Distribution and trunk mains	£m	3			2J.1
Pumping and storage facilities	£m	3			2J.2
Other	£m	3			2J.3
Total	£m	3	0.000	0.000	2J.4
Wholesale wastewater network+ (sewage collection)					
Foul and combined systems	£m	3			2J.5
Surface water only systems	£m	3			2J.6
Pumping and storage facilities	£m	3			2J.7
Other	£m	3			2J.8
Total	£m	3	0.000	0.000	2J.9

Table 2J breaks down network reinforcement costs.

To enable assessment of network reinforcement costs, we could collect more data on the cost drivers shown on this slide, ie

- Length of distribution and trunk mains
- Length of foul sewers
- Length of surface water sewers
- Length of combined sewers
- Pumping stations / capacity installed (water and wastewater)

The majority of this data is already collected in APRs (tables 6B, 6C and 7C, as shown in Annex 1).

But current data does not distinguish between mains / sewers / capacity installed for maintenance, resilience or growth. Total length of mains/sewers data also includes requisition mains/sewers, which are outside of the scope of network reinforcement.

Should we collect more granular additions data (eg by investment driver – maintenance; resilience; network reinforcement; and requisition mains/sewers)? **Would it be possible to overcome allocation issues when assets have multiple benefits** (eg both network reinforcement and resilience)?

Network reinforcement – mains, sewers and pumping stations

	Item	Units	Company definition	Ofwat's initial questions
1	**Length of water main laid (ANH)**	km	Length of water main laid in whole or in part for growth. Even if an element of capital maintenance is involved, this would impact diameter rather than length.	• Is the definition of distribution/trunk mains for network reinforcement clear to the industry? • Is the diameter of the main also a relevant factor for costs? And/or the material? • How would a company apportion the length of main if the investment related to both growth and resilience, or growth and capital maintenance? • Total length of mains is used as a driver in the base models. Would that capture the variation in network reinforcement costs?
2	**Length of sewer laid (rising main and gravity) (ANH)**	km	Length of sewer (rising main and gravity) laid in whole or in part for growth. Even if an element of capital maintenance is involved, this would impact diameter rather than length.	• Would we need to collect the data for foul, combined systems and surface water only systems separately? • Is the diameter of the sewer also a relevant factor for costs? And/or the material? • How would a company apportion the length of sewer if the investment related to both growth and resilience, or growth and capital maintenance? • Total length of sewers is used as a driver in the base models. Would that capture the variation in network reinforcement costs?
3	**Pumping stations built or upgraded (ANH)**	nr	Number of pumping stations built or upgraded	• Is an assessment on capacity installed more accurate than number of stations, as the former can account for both built and upgraded stations, and the size of the pumping station?
4	**Total capacity of pumping stations built or upgraded (ANH)**	kW	Capacity of pumping stations built or upgraded	• Pumping capacity data collected in the Cost Assessment 2017 data collection was flagged as poor quality. Is data quality still a concern? • Would it be easy / robust to identify the capacity installed for network reinforcement only? • How would a company apportion the capacity installed if the investment related to both growth and resilience, or growth and capital maintenance?
5	**More granular reporting of expenditure (ANH)**	£m	This could include new build, mitigation/incremental upgrade, conveyance.	• Unclear what expenditure the company refers to? • How would it be used for cost benchmarking? • Could it be disproportionate?

Network reinforcement – mains, sewers and pumping stations (continued)

6	**Distance gained in network reinforcement (km) (SEW)**	km	n/a	• It appears these data lines are aimed at capturing the same drivers proposed by Anglian Water: • Would distance be covered by the length of mains data? • Is elevation aiming to capture the same driver as pumping capacity? What data would be of greater quality / accuracy, elevation or pumping capacity?
7	**Elevation gained in network reinforcement (SEW)**	n/a	n/a	

Network reinforcement - headroom

	Item	Units	Company definition	Ofwat's initial questions
8	**Property capacity created by investment in pumping stations and pipes (ANH)**	n/a	Head room capacity created in line with design assumptions	• Could a measure for headroom be robustly developed? • What would be deemed as 'normal conditions' and 'peak conditions'? • Even if a measure could be developed, is the overall company headroom a meaningful indicator, or rather is the local headroom that drives investment? • On the basis of the above, would it be disproportionate to focus our efforts on developing a headroom measure?
9	**Available capacity in treated network (Ml/d) (SEW)**	n/a	n/a	
10	**Available headroom under normal conditions (Ml/d) (SEW)**	n/a	n/a	
11	**Available headroom under peak conditions (ML/d) (SEW)**	n/a	n/a	
12	**Additional network property capacity provided (YKY)**	n/a	n/a	

Growth at wastewater treatment works

	Item	Units	Company definition	Ofwat's initial questions
13	**Number or scale of WRCs where permit compliance is 'beyond available technology' (nr or 000s) (ANH)**		Beyond available techniques as defined by the Environment Agency.	• Is this a material driver of growth at STW expenditure? • How widespread is this issue? • What type of investment does it lead to for a company when its treatment work is deemed beyond available technology?
14	**Additional treatment capacity (Population equivalent (PE)) provided through new Sewage Treatment Works (STWs) (YKY)**		n/a	• Would we introduce a distortion in companies' investment choices if our assessment distinguished between capacity provided through expansion of STW and through new STW? • How would this data be used to assess the aggregate expenditure line of growth at STW? • Wouldn't an assessment based on overall PE increase (such as that proposed by Arup) be more agnostic to investment decisions?
15	**Additional treatment capacity (PE) provided through expansion of STWs (YKY)**		n/a	
16	**STW size band specific data and costs (WSX)**	£m	n/a	• We collect direct costs at different STW size bands (7A), nr of STWs in each band (7D) and the load they receive / treat (7D). Unclear what additional data and costs are meant here? • How would this data be used to assess growth at STW expenditure?
17	**Changes in Dry Weather Flow (DWF) permits (WSX)**		Where the tightened quality permits cannot be met by the site's existing process capability, additional expenditure is needed to ensure compliance.	• Is this a material driver of growth at STW expenditure, compared to compliance with other types of permits? • How widespread is this issue?

Risk of sewer flooding to properties – for info only (discussed at CAWG 16th March)

	Item	Units	Company definition	Ofwat's initial questions
n/a	**Proportion of sewage that flows through combined sewers**	%	This proportion would influence cost as the sewage which flows through combined sewers would lead to greater sewage collection pumping costs per population served, as well as a greater utilisation of storm tanks. This can also increase the likelihood of storm discharges. This will be increasingly important if we are looking at partially treating all sewage. Collecting this data can support industry goal of reducing sewage spills.	• Is this highly correlated with the % combined sewers by length? • Is there readily available information to estimate load passing through combined sewers?
n/a	**Internal sewer flooding events caused by severe weather (UUW)**	nr	Splitting out the reporting of internal sewer flooding into those events recorded during periods of severe weather and all other events would allow understanding of the impact of extreme weather events on the sector.	• We expect this data is readily available given previous reporting. Is that correct? • Are there endogeneity concerns? • Are there more suitable exogenous weather related variables available (eg rainfall)?
n/a	**Proportion of connected properties with a cellar (YKY)**	%	If the presence of cellars leads to internal flooding that would not otherwise occur then companies with a high proportion of cellars are limited in their ability to achieve the common internal flooding targets (or achieving them becomes more costly).	• Is the data readily available? • Would it pose a disproportionate burden on companies? • Is there alternative data available that captures similar information (eg proxy)?
n/a	**Proportion of flooding events that occur in cellared properties (YKY)**	%		

Additional drivers suggested were:
- % combined sewers by length, which we collect data for in APRs (data quality needs to be reviewed)
- Urban runoff, which can be collected from third party sources

Site-specific developer services data

Assessment of site-specific developer services expenditure (new connections, requisition mains, diversions) was outside the scope of the Arup project.

We are considering collecting the following additional data related to site-specific developer services in the April / May cost assessment data request and subsequent APRs:

1. Site-specific developer services expenditure and cost driver data (APR tables 4N, 4O and 4Q, as shown in Appendix 1)

Tables 4N, 4O and 4Q were collected for the first time in the 2020-21 APR. We are proposing to collect additional outturn data in this format going back to 2017-18. This would provide 5 years of outturn data, which should better enable cost benchmarking analysis.

2. Additional site-specific developer services cost driver data

- Number of single property developments (eg infill)
- Breakdown of new properties by development size
- Household versus non-household connections / properties for SLP connections.

More details on our approach to regulating developer services will be provided in the draft and final PR24 methodology.

As indicated in the Information Notice 2021/22, , we will also be following up with a separate 2021-22 developer services data request shortly, which follows the 2020-21 developer services data request that companies submitted in October 2021. We intended for this request to be sent to companies before the end of March. But it has been slightly delayed because of unforeseen circumstances. Rest assured the data request will be a reduced version of the 2020-21 request, focusing on collecting data that has proven to be most valuable based on our analysis.

Breakout questions

Breakout room questions

1. **Arup presentation.** We welcome any comments on Arup's findings. In particular – what do you think are the material challenges in assessing these expenditure lines? Are the allocation issues and synergies with base too material to allow for a standalone assessment for lines (1) and (3)?
   1) Network reinforcement
   2) Growth at STW
   3) Risk of sewer flooding

2. **Data collection.** Which items should we prioritise for data collection to support:
   - Network reinforcement;
   - Growth at STW; and
   - Site-specific growth.

   Can you please provide an indication of your top 3 areas? Do you have any initial comments on your ability to back-cast this data to 2011-12? Do you have any concerns about the quality of company information available to support this process?

Closing remarks

Closing remarks

- We are currently preparing a data request containing the additional data lines discussed at the 16th March CAWG, and potentially some data areas discussed today. We plan to issue the data request in April/May with responses due alongside the APR submission in July 2022.
- We welcome further written feedback in relation to the data request. To facilitate this, we have prepared a standard pro-forma based on the tables discussed today, similar to the pro-forma submitted after the 16th March CAWG.
- We expect responses by **COP 19th April**. If you are unable to meet this deadline, please let us know.
- We will consider the best way to follow-up on the data request(s) on receipt of your feedback.
- There are no further CAWG meetings planned for this year. Please let us know if there are any areas where you would like to present on at a future workshop.

Annex 1 – APR tables 4N, 4O and 4Q; and APR tables 6B, 6C and 7C

APR Table 4N – developer services water expenditure

Developer services expenditure for the 12 months ended 31st March 2021 - water resources and water network+

Line description		Units	DPs	Expenditure in report year						RAG 4 reference	(F
					Water network+						
				Water resources	Raw water transport	Raw water storage	Water treatment	Treated water distribution	Total		
New connections	Capex	£m	3						0.000	4N.1	
New connections	Opex	£m	3						0.000	4N.2	
Requisition mains	Capex	£m	3						0.000	4N.3	
Requisition mains	Opex	£m	3						0.000	4N.4	
Infrastructure network reinforcement	Capex	£m	3						0.000	4N.5	
Infrastructure network reinforcement	Opex	£m	3						0.000	4N.6	
s185 diversions	Capex	£m	3						0.000	4N.7	
s185 diversions	Opex	£m	3						0.000	4N.8	
Other price controlled activities	Capex	£m	3						0.000	4N.9	
Other price controlled activities	Opex	£m	3						0.000	4N.10	
Total developer services expenditure - capex	Capex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	4N.11	
Total developer services expenditure - opex	Opex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	4N.12	
Total developer services expenditure	Totex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	4N.13	

APR Table 40 – developer services wastewater expenditure

Developer services expenditure for the 12 months ended 31st March 2021 - wastewater network+ and bioresources

Line description		Units	DPs	Expenditure in report year									RAG 4 reference
				Wastewater network+					Bioresources				
				Foul	Surface water drainage	Highway drainage	Sewage treatment and disposal	Sludge liquor treatment	Sludge Transport	Sludge Treatment	Sludge Disposal	Total	
New connections and requisition sewers	Capex	£m	3									0.000	40.1
New connections and requisition sewers	Opex	£m	3									0.000	40.2
Infrastructure network reinforcement	Capex	£m	3									0.000	40.3
Infrastructure network reinforcement	Opex	£m	3									0.000	40.4
s185 diversions	Capex	£m	3									0.000	40.5
s185 diversions	Opex	£m	3									0.000	40.6
Other price controlled activities	Capex	£m	3									0.000	40.7
Other price controlled activities	Opex	£m	3									0.000	40.8
Total developer services expenditure	Capex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.9
Total developer services expenditure	Opex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.10
Total developer services expenditure	Totex	£m	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.11

APR Table 4Q – Developer services new connections, properties and mains

Developer services - New connections, properties and mains

Line description	Units	DPs	Water	Wastewater	Total	RAG 4 reference
Connections volume data						
New connections (residential – excluding NAVs)	nr	0			0	4Q.1
New connections (business – excluding NAVs)	nr	0			0	4Q.2
Total new connections served by incumbent	nr	0	0	0	0	4Q.3
New connections – SLPs	nr	0				4Q.4
Properties volume data						
New properties (residential - excluding NAVs)	nr	0			0	4Q.5
New properties (business - excluding NAVs)	nr	0			0	4Q.6
Total new properties served by incumbent	nr	0	0	0	0	4Q.7
New residential properties served by NAVs	nr	0			0	4Q.8
New business properties served by NAVs	nr	0			0	4Q.9
Total new properties served by NAVs	nr	0	0	0	0	4Q.10
Total new properties	nr	0	0	0	0	4Q.11
New properties – SLP connections	nr	0				4Q.12
New water mains data						
Length of new mains (km) - requisitions	nr	0				4Q.13
Length of new mains (km) - SLPs	nr	0				4Q.14

APR Table 6B – water pumping capacity and number of pumping stations

Treated water distribution - assets and operations for the 12 months ended

Line description	Units	DPs	Input	RAG 4 reference
Assets and operations				
Total installed power capacity of potable water pumping stations	kW	0		6B.1
Total number of potable water pumping stations that pump into and within the treated water distribution system	nr	0		6B.20
Number of potable water pumping stations delivering treated groundwater into the treated water distribution system	nr	0		6B.21
Number of potable water pumping stations delivering surface water into the treated water distribution system	nr	0		6B.22
Number of potable water pumping stations that re-pump water already within the treated water distribution system	nr	0		6B.23
Number of potable water pumping stations that pump water imported from a 3rd party supply into the treated water distribution system	nr	0		6B.24

APR Table 6C – length of mains

Water network+ - Mains, communication pipes and other data for the 12 months e

Line description	Units	DPs	Input	RAG 4 reference
Treated water distribution - mains analysis				
Total length of potable mains as at 31 March	km	1		6C.1
Total length of potable mains relined	km	1		6C.2
Total length of potable mains renewed	km	1		6C.3
Total length of new potable mains	km	1		6C.4
Total length of potable water mains (≤320mm)	km	1		6C.5
Total length of potable water mains >320mm and ≤ 450mm	km	1		6C.6
Total length of potable water mains >450mm and ≤610mm	km	1		6C.7
Total length of potable water mains > 610mm	km	1		6C.8

APR Table 7C – wastewater pumping stations capacity and number, length of sewers

Wastewater network+ - Sewer and volume data for the 12 months e

Line description	Units	DPs	Input	RAG 4 reference
Wastewater network				
Total pumping station capacity	kW	0		7C.3
Number of network pumping stations	nr	0		7C.4
Length of foul (only) public sewers	km	0		7C.16
Length of surface water (only) public sewers	km	0		7C.17
Length of combined public sewers	km	0		7C.18
Length of rising mains	km	0		7C.19
Length of other wastewater network pipework	km	0		7C.20
Total length of "legacy" public sewers as at 31 March	km	0	0	7C.21