SRN PR19
Draft Determination
Business Plan Data Tables
Commentary

29 August 2019

Version: 1.0 Final

from Southern Water

Contents

Note, updates at draft determination have been highlighted in yellow throughout.

Models Commentary	
Financial model	This has been re-run to reflect impact of additional £75m capex re IAP query SRN-DD-CE-003 and following response to query SRN_11 from Ofwat. Draft determination: The model has been re-run to reflect revised Totex and Ofwat's intervention on PAYG rates.

App26 - RoRE Scenarios

Commentary

This commentary gives a high level description of the process used to generate individual risks the business could face in AMP 7, how they could combine to form the P10 and P90 ranges of risk as expressed by impact on RORE, and how they have been used to construct a number of scenarios specific to Southern Water. The resulting risks and scenarios have been used to inform our analysis of RORE risks, carried out by Oxera, and to inform the review of financeability, assured by KPMG. We supplied our assumptions as described below to Oxera. Oxera's Report is sent as a Technical Annex (TA.16.1) Risk Assessment: Methodology and Assumptions.
At the draft determination we have updated our revised views on totex, PAYG rates, RCV, ODIs and performance commitments. The scenarios at draft determination have again been used to inform our financeability analysis.

Individual risks

Development
We have consulted a wide range of sources and business experts to identify the nature and magnitude of risks to be included in the analysis. These sources are:
The existing company risk register
The uncertainty that has been considered around our PR19 totex cost forecasts, where we have forecasts for capex that reflect a c.P50 level of confidence in the costs.
Recent events within Southern Water and elsewhere in the industry, to identify sources and magnitudes of risks (for example, the recent freeze-thaw and dry weather events, recent precedent on pollution incidents and resulting fines)
Workshops to generate sources of risk relevant to the PR19 plan

We have used these inputs to generate a long list of potential risks, covering variations in volume and revenue, and a range of sources of risk to opex, capex, financing costs and ODIs. Potential areas of risk include, for example:
- Macroeconomic shocks, Power costs, Chemical costs, Business Rates , Pollution, Compliance failures, IT systems failures, Extreme weather, including "too cold", "too wet", and "too dry", Network problems resulting from deteriorating asset health conditions, Rising bad debt, Customer service performance, Developer service performance

The long list has then been discussed with business experts within Southern Water in each area. The experts have identified known examples of occurrences within or outside Southern Water to inform the magnitude of a severe but still plausible level of risk, which may be significantly larger than the precedent considered. Where there was no obvious recent precedent to draw on, judgement has been used by the experts to identify appropriate upside and downside risks**.**

Mitigation

In each case, the experts have considered what mitigation of the risk is available, and have adjusted the risk to allow for such mitigation having taken place in the event the risk crystalizes. It is assumed that the magnitude of the events extend beyond the ability of short term mitigation to reduce the impact, in the case of downside risks.
For example, it is possible to hedge short term fluctuation in power costs by using combinations of buying forward, options and swaps in the traded or over the counter markets. But eventually, these hedges will expire and when they need to be replaced, it may be that the cost of replacing them has increased (or decreased) unavoidably due to movements in the market prices of power.
Similarly, the company has in place a range of strategies and tools for avoiding and managing down bad debt from our retail customers. An economic downturn or a large reduction in trust in the company could nevertheless cause an increase in bad debt beyond our ability to manage the change (or conversely, could reduce bad debt in the event of positive movements).
In each case, the magnitude of the risks shown is assumed to exceed the short term ability to mitigate the effects. Totex shocks are shown before any impact of cost sharing rates.

Likelihood

For each specific risk, the experts have used judgement to identify the magnitude of a P10 (downside) and P90 (upside) event. The “centre” of the event is assumed to be what is expressed in the plan, i.e. zero totex out or underperformance, delivery performance is on target, ODIs do not trigger etc.
Oxera has then used these inputs to model the distribution of P10 and P90 RORE impacts overall.

In response to Ofwat feedback in the IAP we have altered the balance between the downside (P10) and upside (p90) scenarios, to make the risks more symmetric. In general we have assumed the same upside as downside for totex risks. There are however exceptions, where we believe that totex risks are skewed to the downside, such as additional totex to remedy compliance failures, or remedies for It systems problems. We have used a statistical process to determine which risks are included in the overall p10 / P90 scenario. Overall, we have included in our RoRE scenario totex downside risks of £121m, and upsides of the same magnitude, as shown in the table below. Details of this process are given below, and in our response to IAP action SRN.RR.A6.

We have also updated the RoRE analysis for up to date values for our ODIs and RCVs

Summary of all impacts included in the RoRE analysis – table below updated at draft determination.

Impact	P10 impacts £m – Business plan	P10 impacts £m IAP	P10 impacts £m DD	P90 impacts £m Business plan	P90 impacts £m IAP	P90 impacts £m DD
Revenue	0	0	0	0	0	0
Totex	-121	-121	-121	+78	+111	+111
Residential retail costs	-30	-30	-30	0	0	0
ODIs	-116	-217	-275	+35	+87	+65

WaterworCX	-35	-35	-43	+37	+37	+36
Financing	-28	-27	-27	+28	+27	+36
Total	-330	-430	-496	+178	+262	+248

Specific Scenarios - Development

The individual risks and the impact data described above have been used to create a number of company-specific scenarios, that are intended to capture a narrower range of events but, where risks crystallize, they are more severe. So, for example, the single year dry weather costs identified above have been used to extend the risk to a three year long drought occurring within AMP7. A severe wet weather event is assumed to cause flooding sufficiently severe that both an important water treatment works and waste water treatment works are out of action at the same time, incurring extra remedy costs, penalty ODIs and fines for non-compliance with our permits at the treatment works.

These scenarios are intentionally downside only, in order to explore our resilience in the case of reasonably severe large scale or long duration events.

Mitigation

The scenarios generally use individual mitigated annual risks in combination, but sometimes over several years. In reality in the event of long duration incidents we anticipate we could take further action by re-prioritising activity, using learning from the early stages of a sustained event to find lower cost solutions, finding temporary solutions that increase resilience in the short term etc.

Likelihood

We have considered downside-only scenarios, so as a result the company-specific scenarios do not show upside values. We consider that, while large scale upside shocks are possible, they are both less likely and would be of smaller magnitude than downside shocks.

We do not attach a specific probability to the company specific scenarios. By combining a limited number of individual risks at the P10 level, and extending the scope and / or duration as appropriate, we are implicitly creating scenarios with a probability between p10 and P50. Since we have not added extra mitigation actions the company could take in the event of severe or extended duration events, it is likely that the probability of the company-specific scenarios is in the lower half of the P10 – P50 range.

1. P10 / P90 scenario ODIs and approach to totex shocks

The overall P10 / P90 scenario has been created by Oxera's modelling process, described in their report. We have used a statistical approach to construct an overall P10 and P90 scenario. We have considered each ODI to be represented by a series of bi-nominal distribution, and have taken the standard deviation of the distribution in order to identify how many ODIs, each individually calibrated at the P10 and P90 levels, might trigger over the five year period.

Schematic of method			
Standard deviation of binomial distribution			
In one year		**In five years**	
N = number of ODIs	= 20	N = number of ODIs observations =	100
p = number that trigger the maximum penalty, which happens with probability of 1 / 10		p = number that trigger the maximum penalty, which happens with probability of 1 / 10q	

q = 1-p			
variance	σ^2= npq	variance	= σ^2
	20 (1/10) (9/10)		=100 (1/10) (9/10)
	=1.8		=9
standard deviation	=σ	standard deviation	=σ
	=1.3		=3
centre of the distribution is 2		Centre of the distribution is 9	
At the 98% confidence level (2 standard deviations)		At the 98% confidence level (2 standard deviations)	
2 + (2 1.3) ODIs trigger at maximum		9 + (2 3) ODIs trigger at maximum	
	=4.6		=15
		Or about 3 trigger at max in each year	
		In order to show a conservative measure, choose highest value and 2 close to average	

In order to show a conservative value, we have intentionally chosen the largest ODI by absolute value, and then the remainder of the number of ODIs suggested by the statistics from the median by absolute value, and the relevant number on either side of the median.

We have adopted a similar approach in the P10 and P90 scenario for the individual totex, revenue or other cost shocks we have identified. We do not have a framework that can assign specific probabilities to the risks we identified. Instead we ranked the risk in order of absolute size, and chose all the risks in the 2nd and third quartiles as those that would be included in to overall P10 / P90 scenario.

WaterworCX for a high RORE case (pre tax adjustment)
Line 79: D-MeX impact wastewater network plus ~ High RoRE case (pre tax adjustment). Our method now selects the D-Mex ODI, and the upside value of D-Mex is now included in the high RoRe Case

WaterworCX for a low RORE case (pre tax adjustment)
Line 82: D-MeX impact wastewater network plus ~ Low RoRE case (pre tax adjustment). Our method now selects the D-Mex ODI, and the downside value of D-Mex is now included in the low RoRe Case

2. Prolonged drought
Scenario: A prolonged period of drought, beginning relatively early in AMP 7, requires the implementation of drought plans for a sustained period, encompassing three dry winters and two dry summers.
Measures that we would introduce include:
- Maximising use of water import trades. These are generally higher cost sources so totex over-runs are incurred relative to the plan.
- Advertising and marketing campaigns to reduce consumption; temporary use bans and drought orders to manage supply; recommissioning of unused sources, network distribution modifications and tinkering. The magnitude has been assumed to be three times the level of the single year event contained in the P10 / P90 scenario.
- The magnitude is considered to be a conservative estimate of the costs and in reality other mitigation actions at lower cost might be found over time.

Other events that occur:
- ODI penalties are triggered and are paid out at the maximum level for water availability and service interruptions for three years
- Interruptions to supply and usage restrictions impact perceptions of customer service and the company's position on the C-Mex incentive falls, triggering additional ODI penalties of £15m.

Magnitude:
Additional totex costs: £77m
ODI Penalties including C-Mex £43m
Total: £120m

3. Severe bad weather
A period of sustained heavy rainfall causes flooding and disruption in a particular year. The combination of flooding and disruption to power supplies causes unplanned outages at a significant water treatment works and waste treatment works at the same time.

Measures that we would introduce include:
- Identify alternative sources of temporary or mobile power supply, increasing totex
- Incur additional remedy measures for both water and waste to re-direct supply, restore capacity and re-commission the affected works.

Other events that occur:
- Environmental and regulatory compliance failures cause fines from both the EA and DWI and / or Ofwat
- Flooding ODIs trigger for the waste water measures

- There is an impact on customer service and penalties are incurred via C-Mex

Magnitude:
Additional totex costs: £45m
ODI Penalties including C-Mex: £34m
Total: £79m

4. Major compliance failure
Performance deteriorates at wastewater treatment works, resulting in material compliance failures around discharge consents into the environment. The nature of the failure is such that significant unplanned expenditure is needed in multiple treatment works and supporting systems.
Other events that occur:
- The failure is sufficiently severe that Ofwat imposed fines for a breach of Licence. Fines are not subject to cost sharing. All the scenarios consider the impact of totex downsides before any cost sharing.
- Waste water compliance ODIs trigger material penalties

Magnitude:
Additional totex costs: £40m
Fine: £20m
ODI Penalties: £60m
Draft determination update - the magnitude is now generic, to reflect a major compliance failure.

WS1 - Wholesale water operating and capital expenditure by business unit		
Line description		Commentary
A	Operating expenditure (excluding Atypical expenditure)	
1	Power	Execution Plan for 2019-20 rolled over into 2020-21 as base Opex. This was then updated for any AFCs, new items of expenditure (principally WRMP related) and any non-inflation related power adjustments. Efficiency was then applied at a totex level, please refer to efficiency chapter. Revisions to operating expenditure at the IAP response stage are discussed in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Line A7 – updated to reflect revised totex in response to cost efficiency challenge
2	Income treated as negative expenditure	
3	Abstraction Charges / Discharge consent	
4	Bulk supply	
	Other operating expenditure	
5	~ Renewals expensed in year (Infrastructure)	
6	~ Renewals expensed in year (Non-Infrastructure)	

7	~ Other operating expenditure excluding renewals	(-£0.131m adjustment from IAP). Revised water botex (including growth) position also stated in PR19 draft determination representation proforma table (RP1).
8	Local authority and Cumulo rates	
10	Third Party Services	
B	Capital Expenditure (excluding Atypical expenditure)	
12/13	Maintaining the long term capability of the assets	Draft determination: water botex (including growth) position also stated in PR19 draft determination representation proforma table (RP1).
14/15	Other capital expenditure ~ infra/non infra	Values updated to reflect impact of additional £75m capex re IAP query SRN-DD-CE-003. Draft determination: Line B15 - updated to reflect revised totex in response to cost efficiency challenge.
C	Totex	
20	Grants and contributions ~ operating expenditure	Nil
21	Grants and contributions ~ capital expenditure	All G&C relate to capital expenditure
D	Cash Expenditure (excluding Atypical expenditure)	
23	Pension deficit recovery payments	This is driven by App22
24	Other cash items	No Atypicals have been forecast, so those included are 2017-18 related only
E	Atypical expenditure	
26	Hants Abstraction Enquiry	
28	Discolouration Fine	

WS2 - Wholesale water capital and operating enhancement expenditure by purpose		
Line description		Commentary
A	Enhancement expenditure by purpose ~ capital	
1	WINEP / NEP ~ Making ecological improvements at abstractions (Habitats Directive, SSSI, NERC, BAPs)	This line shows AMP6 capex enhancement investment for NEP making ecological improvements at abstractions (Habitats Directive, SSSI, NERC, BAPs). No capex enhancement investment forecast for making ecological improvements at abstractions in AMP7.
2	WINEP / NEP ~ Eels Regulations (measures at intakes)	No capex enhancement investment forecast for Eels regulations.
3	WINEP / NEP ~ Invasive non-native species	No capex enhancement investment forecast for INNS.
4	Addressing low pressure	No capex enhancement investment forecast for low pressure.

<table>
<tr><td>5</td><td>Improving taste / odour / colour</td><td>No capex enhancement investment forecast for improving taste /odour/ colour.</td></tr>
<tr><td>6</td><td>Meeting lead standards</td><td>This line shows the AMP7 capex enhancement investment for meeting leads standards.

£19.848m has been identified to eliminate lead pipe water quality risk by:
- replacing lead communication pipes
- replacing all water mains in the District Metered Areas (DMA's) within the Deal Water Supply Zone (WSZ)
- as part of a pilot in the Deal WSZ, provide a lead pipe focused advice service and local media campaign
- Setup a community fund to subsidise the removal of lead pipework in the home.

More information on this enhancement investment requirement is provided in the Wholesale Water TA.11.WN04 Business Case - Water Networks. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>7</td><td>Supply side enhancements to the supply/demand balance (dry year critical / peak conditions)</td><td>This line shows AMP6 and AMP7 capex enhancement investment for Supply side enhancements to the supply/demand balance (dry year critical / peak conditions).

The table below summarises the £31.839m capex enhancement investment required to deliver supply side enhancements to the supply/demand balance (dry year critical / peak conditions) in AMP7:

<table>
<tr><th>Schemes</th><th>Total Spend IAP</th><th>Total Spend DD</th></tr>
<tr><td>WRMP Future AMPs Planning</td><td>6.657</td><td>0.000</td></tr>
<tr><td>Ford WWTW Indirect Potable Water Reuse (20Ml/d)</td><td>9.635</td><td>9.635</td></tr>
<tr><td>Hardham groundwater licence variation</td><td>0.610</td><td>0.610</td></tr>
<tr><td>Transfer to Rotherfield WSW & Rogate BH rehabilitation</td><td>3.365</td><td>3.365</td></tr>
<tr><td>Scheme to bring Smock Alley back into service</td><td>3.754</td><td>3.754</td></tr>
<tr><td>SEW Kingston to SWS KT (Wingham)</td><td>3.425</td><td>3.425</td></tr>
<tr><td>Utilise full existing transfer capacity</td><td>2.534</td><td>2.534</td></tr>
<tr><td>Flemings and Woodnesborough WSW licence variation</td><td>0.610</td><td>0.610</td></tr>
<tr><td>East Woodhay WSW</td><td>1.249</td><td>1.249</td></tr>
<tr><td>Mitigation and monitoring activities (Itchen/Candover/Test)</td><td>0.000</td><td>0.000</td></tr>
<tr><td>WS2 Line 7 Total</td><td>31.839</td><td>25.181</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>More information on this AMP7 enhancement investment requirement is provided in the Wholesale Water TA.11.WN01 Business Case – Supply Demand Balance.

Investment in this area has been updated at the IAP response stage and is discussed in more detail in ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: Summary table above has been updated to illustrate the change made at draft determination for WRMP future AMPs planning (£0m). This change is in-line with Ofwat’s modelling challenge. This change and the remaining WRMP investment requirements are itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing WRMP long-term enhancement.</td></tr>
<tr><td>8</td><td>Supply side enhancements to the supply/demand balance (dry year annual average conditions)</td><td>This line shows AMP6 and AMP7 capex enhancement investment for Supply side enhancements to the supply/demand balance (dry year annual average conditions).

The table below summarises the £228.856m capex enhancement investment required to deliver supply side enhancements to the supply/demand balance (dry year annual average conditions)

<table>
<tr><th>WRMP Capex</th><th>Total Spend IAP</th><th>Total Spend DD</th></tr>
<tr><td>Bournemouth Water supply from Knapp Mill</td><td>£35.220m</td><td>£35.220m</td></tr>
<tr><td>Coastal Desalination - Shoreham Harbour</td><td>£8.752m</td><td>£7.000m</td></tr>
<tr><td>Sussex Coast - Lower Greensand</td><td>£1.855m</td><td>£1.855m</td></tr>
<tr><td>Hardham winter transfer: Stage 2</td><td>£2.363m</td><td>£2.363m</td></tr>
<tr><td>Aylesford WWTW Indirect Potable Water Reuse - Eccles Lake</td><td>£5.132m</td><td>£5.132m</td></tr>
<tr><td>Additional import from PWC Gaters Mill</td><td>£8.967m</td><td>£8.496m</td></tr>
<tr><td>Fawley desalination</td><td>£0.000m</td><td>£0.000m</td></tr>
<tr><td>Sandown WwTW Indirect Potable Reuse (8.5Ml/d)</td><td>£4.879m</td><td>£4.879m</td></tr>
<tr><td>Otterbourne to Andover to Kingsclere</td><td>£30.321m</td><td>£30.321m</td></tr>
<tr><td>Testwood to Otterbourne pipeline</td><td>£26.276m</td><td>£26.276m</td></tr>
<tr><td>Romsey Town and Broadlands valve</td><td>£0.998m</td><td>£0.998m</td></tr>
<tr><td>WS2 Line 8 Total</td><td>£124.763m</td><td>£122.530m</td></tr>
</table>

For more information on this AMP7 enhancement investment requirement is provided in the Wholesale Water TA.11.WN01 Business Case – Supply Demand Balance.

See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Draft determination: Summary table above has been updated to illustrate the £0.5m reduction made at draft determination for the additional import from Gaters Mill; this is to align with information we have been presenting externally in relation to the PWC transfers and Havant Thicket scheme.

After internal challenge and review, it is noted that the decision was taken late on not to challenge £1.752m of the Ofwat funding allowance gap relating to the Coastal Desalination – Shoreham Harbour scheme. Therefore, we acknowledge a £1.752m cost reduction not included within the data tables.

These changes and the remaining WRMP investment requirements are itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing WRMP long-term enhancement.

See also draft determination representation: Securing cost efficiency, water enhancement cost challenge.</td></tr>
<tr><td>9</td><td>Demand side enhancements to the supply/demand balance (dry year critical / peak conditions)</td><td>No Capex enhancement investment forecast for demand side enhancements to the supply/demand balance (dry year critical / peak conditions)</td></tr>
<tr><td>10</td><td>Demand side enhancements to the supply/demand balance (dry year annual average conditions)</td><td>This line shows AMP6 and AMP7 capex enhancement investment for Demand side enhancements to the supply/demand balance (dry year annual average conditions).
The table below summarises the £33.117m Capex enhancement investment required to deliver demand side enhancements to the supply/demand balance (dry year annual average conditions).

<table><tr><th>WRMP Schemes</th><th>Total Spend</th></tr><tr><td>Intelligent Network – supply Demand Enhancement</td><td>13.870</td></tr><tr><td>Leakage</td><td>19.247</td></tr></table>
More information on this AMP7 enhancement investment requirement is provided in the Wholesale Water TA.11.WN01 Business Case – Supply Demand Balance. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing WRMP long-term enhancement.

See also draft determination representation: Securing cost efficiency, funding for upper quartile leakage.</td></tr>
<tr><td>11</td><td>New developments</td><td>This line shows AMP6 and AMP7 capex enhancement investment for new developments.

£57.708m capex enhancement investment is required in AMP7 to deliver new development requisitions (£55.434m) and water networks enhancements associated with growth (£2.273m).</td></tr>
</table>

<table>
<tr><td></td><td></td><td>More information on this AMP7 enhancement investment requirement is provided in the Wholesale Water TA.11.WN01 Business Case - Supply Demand Balance. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: Very minor financial rounding related updates at draft determination. This unchanged investment is itemised as part of water botex (including growth) in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>12</td><td>New connections element of new development (CPs, meters)</td><td>£44.955m capex enhancement investment is required to deliver S45 new connections element of new developments (CPs, meters). See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised as part of water botex (including growth) in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>13</td><td>Investment to address raw water deterioration (THM, nitrates, Crypto, pesticides, others)</td><td>This line shows AMP6 and AMP7 capex enhancement investment for addressing raw water deterioration (THM, nitrates, crypto, pesticides, others).

The table below summarises the £55.412m capex enhancement investment required to deliver raw water deterioration associated with nitrate:

<table><tr><th>Raw Water Deterioration - Capex</th><th>Total</th></tr><tr><td>Nitrate Schemes</td><td>£55.412m</td></tr></table>
More information on this enhancement investment requirement is provided in the Wholesale Water TA.11.WN02 Business Case - Nitrate. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).

See also draft determination representations: Securing cost efficiency, water enhancement cost challenge and securing cost efficiency, cost allowance for raw water deterioration.</td></tr>
<tr><td>14</td><td>Resilience</td><td>No capex enhancement investment forecast for resilience.</td></tr>
<tr><td>15</td><td>SEMD</td><td>This line shows AMP6 capex enhancement investment for SEMD.</td></tr>
</table>

<table>
<tr><td></td><td></td><td>No capex enhancement investment forecast for SEMD in AMP7.</td></tr>
<tr><td>16</td><td>Non-SEMD related security enhancement</td><td>No capex enhancement investment forecast for non-SEMD related security.</td></tr>
<tr><td>17</td><td>WINEP / NEP ~ Drinking Water Protected Areas (schemes)</td><td>No capex enhancement investment forecast for WINEP DWPA schemes.</td></tr>
<tr><td>18</td><td>WINEP / NEP ~ Water Framework Directive measures</td><td>No capex enhancement investment forecast for WINEP WFD measures.</td></tr>
<tr><td>19</td><td>WINEP / NEP ~ Investigations</td><td>No capex enhancement investment forecast for WINEP investigations.</td></tr>
<tr><td>20</td><td>Improvements to river flows</td><td>No capex enhancement investment forecast for improvements to river flows.</td></tr>
<tr><td>21</td><td>Metering (excluding cost of providing metering to new service connections) for meters requested by optants</td><td>No capex enhancement investment forecast for meter requested by optants. There is a minor adjustment in 2017/18.
It is noted that Southern Water completed a Universal Metering Programme in AMP5/6. Investment associated with increasing metering coverage further is included within Demand side enhancements (see lines 9 and 10 above).</td></tr>
<tr><td>22</td><td>Metering (excluding cost of providing metering to new service connections) for meters introduced by companies</td><td>Investment associated with increasing metering coverage further

<table><tr><th>WRMP Schemes</th><th>Total Spend</th></tr><tr><td>Installation of AMR meters</td><td>£10.658m</td></tr></table>
Investment in this area has been updated at the IAP response stage and is discussed in more detail in ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>23</td><td>Metering (excluding cost of providing metering to new service connections) for businesses</td><td>No capex enhancement investment forecast for metering at businesses.</td></tr>
<tr><td>24</td><td>Impounding Reservoirs enhancement</td><td>£11.513m capex is required to deliver resilience enhancements at our impounding reservoir sites in AMP7. New Environment Agency (EA) reservoir drawdown guidance has led to a requirement for improved facilities at our impounding reservoir sites in AMP7. The table below summarises the investment requirements and the sites

<table><tr><th>Impounding Reservoirs - Capex</th><th>Total Spend</th></tr></table></td></tr>
</table>

		<table><tr><td>Impounding Reservoirs - Bewl, Darwell, Weirwood, Powdermill, Testwood Lakes</td><td>£11.513m</td></tr><tr><td>Impounding Reservoirs - South Hill, Hardham, Plenty Brook, Purbrook, Wishing Tree</td><td>£0.000m</td></tr><tr><td>3rd Party Services</td><td>-£2.163m</td></tr><tr><td>WS2 Line 24 Total</td><td>£9.350m</td></tr></table> Part ownership of assets at Bewl and Weirwood means there is a capex contribution from South East Water. The net Southern Water capex investment for these impounding reservoir resilience enhancements will be £9.350m once 3rd party services have been taken into account. More information on this enhancement investment requirement is provided in the Wholesale Water TA.11.WR02 Business Case - Impounding Reservoirs. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Very minor financial rounding related updates at draft determination. After internal challenge and review, it is noted that the decision was taken late on not to challenge £1.9m of the Ofwat funding allowance gap. Therefore, we acknowledge a £1.9m cost reduction not included within the data tables. However, our revised investment position of £7.45m totex is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency - water enhancement cost challenge.
25	Strategic Regional Solutions	Row added to reflect impact of additional £75m capex re IAP query SRN-DD-CE-003 Draft determination: Strategic enhancement solution investment has been updated to match Ofwat's figure of £82m at draft determination. However, since the data tables were locked down we have been able to confirm a further adjustment to this investment line; taking this investment up to £84.3m. This revised position is itemised in the PR19 draft determination representation proforma table (RP1).

		See also draft determination representation: Securing cost efficiency, strategic solution development SRN company specific response. Noted that in this response document we provide evidence relating to the £84.3m investment requirement.
B	Enhancement expenditure by purpose ~ operating	
40	WINEP / NEP ~ Making ecological improvements at abstractions (Habitats Directive, SSSI, NERC, BAPs)	No opex enhancement investment forecast for making ecological improvements at abstractions. It is noted that line 57 includes investment for WFD associated water resources abstraction enhancements.
41	WINEP / NEP ~ Eels Regulations (measures at intakes)	This line shows AMP6 and AMP7 opex arising from capex enhancement investment for AMP6 eel regulations schemes. £0.008m opex enhancement investment in AMP7 relates to opex arising from capex associated with the completed delivery of AMP6 eel screen capex schemes. As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the AMP7 investment shown in Wholesale Water TA.11WR01 Business Case – Raw Water Pumping. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).
42	WINEP / NEP ~ Invasive non-native species	No opex enhancement investment forecast for INNS.
43	Addressing low pressure	No opex enhancement investment forecast for low pressure.
44	Improving taste / odour / colour	No opex enhancement investment forecast for improving taste /odour/ colour.
45	Meeting lead standards	No opex enhancement investment forecast for meeting lead standards.
46	Supply side enhancements to the supply/demand balance (dry year critical / peak conditions)	This line shows AMP6 and AMP7 opex arising from capex enhancement investment for AMP6 Supply side enhancements to the supply/demand balance (dry year critical / peak conditions). No opex enhancement investment forecast in AMP7 for the supply side enhancements to the supply/demand balance (dry year critical / peak conditions). As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the AMP7 investment shown in Wholesale Water TA.11WN01 Business Case – Supply Demand Balance.

<table>
<tr><td></td><td></td><td>See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.
Draft determination: In-line with Ofwats modelling challenge, £1m opex arising from capex cost has been removed. As this investment has been removed it is not itemised in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>47</td><td>Supply side enhancements to the supply/demand balance (dry year annual average conditions)</td><td>No opex enhancement investment forecast for the supply side enhancements to the supply/demand balance (dry year annual average conditions)</td></tr>
<tr><td>48</td><td>Demand side enhancements to the supply/demand balance (dry year critical / peak conditions)</td><td>No opex enhancement investment forecast for the demand side enhancements to the supply/demand balance (dry year critical / peak conditions)</td></tr>
<tr><td>49</td><td>Demand side enhancements to the supply/demand balance (dry year annual average conditions)</td><td>The table below summarises the £36.412m opex enhancement investment required in AMP7 to deliver demand side enhancements to the supply/demand balance (dry year annual average conditions)

<table><tr><th>WRMP - Supply/Demand Balance Opex</th><th>Total</th></tr><tr><td>Target 100 water efficiency activity</td><td>£36.412m</td></tr><tr><td>TUBS and NEU Ban Central</td><td>£0.000m</td></tr><tr><td>WS2 Line 49 Total</td><td>£36.412m</td></tr></table>
For more information on this AMP7 enhancement investment requirement is provided in the Wholesale Water Technical Annex TA.11.WN01 Business Case – Supply Demand Balance.

Investment in this area has been updated at the IAP response stage and is discussed in more detail in ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing WRMP long-term enhancement.</td></tr>
<tr><td>50</td><td>New developments</td><td>No opex enhancement investment forecast for new developments.</td></tr>
<tr><td>51</td><td>New connections element of new development (CPs, meters)</td><td>No opex enhancement investment forecast for new connections element of new developments.</td></tr>
<tr><td>52</td><td>Investment to address raw water deterioration (THM, nitrates, Crypto, pesticides, others)</td><td>This line shows AMP6 and AMP7 opex arising from capex enhancement investment for AMP6 and AMP7 raw water deterioration schemes. It also shows the AMP7 opex investments required to deliver raw water deterioration catchment requirements.

The table below summarises the £22.914m opex enhancement investment required to deliver raw water deterioration associated with nitrates, pesticides and other raw water quality deterioration parameters in AMP7:</td></tr>
</table>

		<table><tr><th>Raw Water Deterioration - Opex</th><th>IAP Total</th><th>DD Total</th></tr><tr><td>AMP7 Nitrate Schemes AFCs</td><td>£3.960m</td><td>£3.960m</td></tr><tr><td>AMP7 Nitrate Catchment Schemes</td><td>£5.555m</td><td>£5.555m</td></tr><tr><td>AMP7 Pesticide Catchment Schemes</td><td>£4.963m</td><td>£4.963m</td></tr><tr><td>AMP7 Catchment Compliance Schemes</td><td>£3.000m</td><td>£0.000m</td></tr><tr><td>AMP6 Nitrate, Pesticides and Other Raw Water Deterioration Schemes AFCs</td><td>£5.436m</td><td>£5.436m</td></tr><tr><td>WS2 Line 52 Total</td><td>£22.914m</td><td>£19.914m</td></tr></table> £3.960m investment relates opex arising from capex for operation of new nitrate removal plants built in AMP7. £5.555m, £4.963m, and £3.000m of catchment management activity is required as a least cost option for avoiding the need to build or replace nitrate, pesticide and/or other water quality improvement plants in future. £5.436m is included as the opex arising from capex for the AMP6 built nitrate removal plants, pesticide removal (GAC) plants and other AMP6 raw water deterioration schemes. More information on this AMP7 enhancement investment requirement is provided in the Wholesale Water TA.11.WN02 Business Case - Nitrate and the Wholesale Water TA.11.WR03 Business Case - Catchment Management Solutions. As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the AMP7 investment shown in Wholesale Water TA.11.WR03 Business Case - Catchment Management Solutions. Note we have updated this line of the table in line with our response to query “Query_SRN_IAP_CA_008”. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’. Draft determination: Summary table above has been updated to illustrate the change made at draft determination for catchment compliance (£0m). This change is in-line with Ofwat’s modelling challenge. This change and the remaining raw water deterioration investment requirements are itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representations: Securing cost efficiency, water enhancement cost challenge; and, securing cost efficiency, cost allowance for raw water deterioration.
53	Resilience	No opex enhancement investment forecast for resilience.

54	SEMD	This line shows AMP6 and AMP7 opex arising from capex enhancement investment for AMP6 eel regulations schemes. £0.960m opex enhancement investment in AMP7 relates to opex arising from capex associated with the completed delivery of AMP6 SEMD capex schemes. As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the AMP7 investment shown in Wholesale Water technical annexes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).
55	Non-SEMD related security enhancement	No opex enhancement investment forecast for non-SEMD related security.
56	WINEP / NEP ~ Drinking Water Protected Areas (schemes)	No opex enhancement investment forecast for WINEP DWPA schemes. Note we have updated this line of the table in line with our response to query "Query_SRN_IAP_CA_008".
57	WINEP / NEP ~ Water Framework Directive measures	£2.5m opex enhancement investment is required to deliver WINEP WFD measures in AMP7. More information on this enhancement investment requirement is provided in the Wholesale Water TA.11.WR03 Business Case - Catchment Management Solutions. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's very minor £0.178m modelling challenge at draft determination, we have revised this cost down to £2.320m. This change is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, water enhancement cost challenge.
58	WINEP / NEP ~ Investigations	£15.209m opex enhancement investment is required in AMP7 to deliver WINEP investigations. Investigations include: DWPA, biodiversity, and water resources abstraction. More information on this enhancement investment requirement is provided in the Wholesale Water TA.11.WR03 Business Case - Catchment Management Solutions. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: After internal challenge and review, it is noted that the decision was taken late on not to challenge £3m of the Ofwat funding allowance gap. Therefore, we acknowledge a £3m cost reduction not included within the data tables. However, our revised investment position of £12.2m is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, water enhancement cost challenge.
59	Improvements to river flows	No opex enhancement investment forecast for improvements to river flows.
60	Metering (excluding cost of providing metering to new service connections) for meters requested by optants	No opex enhancement investment forecast for meter requested by optants.
61	Metering (excluding cost of providing metering to new service connections) for meters introduced by companies	No opex enhancement investment forecast for meter requested by companies.
62	Metering (excluding cost of providing metering to new service connections) for businesses	No opex enhancement investment forecast for metering at businesses.
63	Impounding reservoir enhancement	

WS10 - Transitional spending in the wholesale water service

Commentary

No transition investment identified. As described in the 'securing cost efficiency' chapter of the draft Ofwat methodology document (July 2017), a move to an outcome and totex based framework means that we are able to manage investments without the need for using the transitional investment mechanism. Through good longer term planning, Southern Water will manage investment to meet regulatory, statutory and legal requirements in AMP7 without the need for AMP7 transitional investment.

Draft determination: Line 8 - Supply side enhancements to the supply/demand balance (dry year annual average conditions) – Water resources and water treatment columns: £4.1m of transitional spend has been included to fund the early start of Strategic Enhancement Solution design work. This funding was identified post the IAP stage following confirmation of the Strategic Enhancement Solution approach. We drew attention to it in the document called “SRN strategic resources follow up to SRN.CE.A3” submitted on 3 May 2019. Here we asked for £11.2m of transitional spending in 19/20 to fund the simultaneous development of the de-salination plant and alternatives to it.

Ofwat has proposed £82m of development funding for all the strategic resources developments, and elsewhere in this representation we have accepted this proposal (in fact we are now asking for £84.3m). Ofwat also proposes that 10% of this amount is attributable to Gate 1, which in our case will be September 2020. We therefore anticipate spending up to £8.2m to develop the schemes to Gate 1, and have applied 50% to each of 19/20 and 20/21, hence the amount of £4.1m.

References:

Interventions against IAP actions SRN.CE.A1 Draft determination representation: Securing cost efficiency, strategic solution development – SRN company specific response and Other, Havant Thicket reservoir.

WWS1 - Wholesale wastewater operating and capital expenditure by business unit		
Line description		Commentary
A	Operating expenditure	
1	Power	Internal budget for 2019-20 rolled over into 2020-21 as base opex. This was then updated for any enhancement opex, new items of expenditure and any non-inflation related power adjustments. Efficiency was then applied at a totex level, please refer to efficiency chapter. There is a validation error on line 9, due to the table not reconciling to Bio3. This is due to Bio3 including depreciation, which has not been included in operating expenditure on WWS1. Revisions to operating expenditure at the IAP response stage are discussed in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Line A7 - updated to reflect revised totex in response to cost efficiency challenge (£0.131m adjustment from IAP). Unchanged wastewater botex position also stated in PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste; and, securing cost efficiency, Ofwat's forecast of weighted average density (waste).
2	Income treated as negative expenditure	
3	Service charges / Discharge Consents	
4	Bulk discharge	
	Other operating expenditure	
5	~ Renewals expensed in year (Infrastructure)	
6	~ Renewals expensed in year (Non-Infrastructure)	
7	~ Other operating expenditure excluding renewals	
8	Local authority and Cumulo rates	
B	Capital expenditure	
12-13	Maintaining the long term capability of the assets	Unchanged wastewater botex position also stated in PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste; and, securing cost efficiency, Ofwat's forecast of weighted average density (waste).
14	Other capital expenditure ~ infra	As per the IAP response, the fair value of sewers adopted under section 104 WIA has been excluded from this table. Draft determination: Updated to reflect revised totex in response to cost efficiency challenge.
15	Other capital expenditure ~ non~infra	Draft determination: Updated to reflect revised totex in response to cost efficiency challenge.

16	Infrastructure network reinforcement	Draft determination: Updated to reflect revised totex in response to cost efficiency challenge.
C	Totex	
20	Grants and contributions ~ operating expenditure	Nil
21	Grants and contributions ~ capital expenditure	All G&C relate to capital expenditure
D	Cash Expenditure	
23	Pension deficit recovery payments	This is driven by App22
24	Other cash items	
E	Atypical expenditure	
26	Ofwat and EA investigations including legal defence costs	No Atypicals have been forecast, so those included are 2017-18 related only

WWS2 - Wholesale wastewater capital and operating expenditure by purpose		
Line description		Commentary
A	Enhancement expenditure by purpose - capital	
1	First time sewerage (s101A)	This line shows AMP6 and AMP7 capex enhancement investment for S101A schemes. £4.577m of S101A enhancement capex investment in AMP7 relates to a potential 3 sites where we believe that we may have AMP7 S101A obligations. It is not clear at this stage when these schemes will be completed. Hence, why the spend profile has been evenly allocated over AMP7. See Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth for more information on the AMP7 investment. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1).
2	Sludge enhancement (quality)	No capex enhancement investment forecast for sludge quality.

3	Sludge enhancement (growth)	This line shows AMP6 and AMP7 capex enhancement investment for sludge growth. This line includes AMP7 capital costs of £4.820m for additional sludge as a result of growth drivers. See Wholesale Wastewater TA.12. BR01 Business Case - Bioresources Treatment & Growth for more information on these sludge growth requirements in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £4.242m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1).
4	WINEP / NEP ~ Conservation drivers	This line shows AMP7 capex enhancement investment for WINEP conservation drivers. £14.903m of enhancement capex investment is required in AMP7 to meet the Shellfish no deterioration conservation driver at sites that do not require UV treatment to be installed. The remaining Shellfish no deterioration driver scheme costs do include UV treatment and are included in WWS2 Line 21. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on these Shellfish no deterioration schemes and solutions in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £13.102m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
5	WINEP / NEP ~ Eels Regulations (measures at outfalls)	No capex enhancement investment forecast for eels regulation.
6	WINEP / NEP ~ Event Duration Monitoring at intermittent discharges	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP event duration monitoring at intermittent discharges. £4.419m enhancement capex investment has been identified in AMP7 for monitoring WINEP drivers. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more

		detail on these monitoring driver requirements, sites and solutions in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at Draft determination, we have reduced this investment line down to £3.919m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
7	WINEP / NEP ~ Flow monitoring at sewage treatment works	This line shows AMP7 capex enhancement investment for WINEP flow monitoring at sewage treatment works. £0.242m enhancement capex investment has been identified in AMP7 for delivery of WINEP flow monitoring at sewage treatment works. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on this monitoring driver requirement, sites and solutions in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
8	NEP ~ Monitoring of pass forward flows at CSOs	No capex enhancement investment forecast for monitoring of pass forward flows at CSOs.
9	WINEP / NEP ~ Schemes to increase flow to full treatment	This line shows AMP7 capex enhancement investment for WINEP schemes to increase flow to full treatment. £145.025m enhancement capex investment has been identified in AMP7 to deliver WINEP requirements to increase flow to full treatment under the U_IMP5 (DWF: FFT) driver. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on this U_IMP5 (DWF: FFT) driver requirements, sites and solutions in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £143.354m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
10	WINEP / NEP ~ Storage schemes at STWs to increase storm tank capacity	This line shows AMP7 capex enhancement investment for storage schemes at STWs to increase storm tank capacity. £88.113m enhancement capex investment has been identified in AMP7 to deliver WINEP requirements to increase storm tank capacity STWs under the U_IMP6 (Storm Tanks) driver. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on these storage schemes at STWs in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Very minor financial rounding related updates at draft determination. After internal challenge and review, it is noted that the decision was taken late on not to challenge £7.6m of the Ofwat funding allowance gap. Therefore, we acknowledge a £7.6m totex cost reduction not included within the data tables. However, our revised investment position of £81.93m totex is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
11	WINEP / NEP ~ Storage schemes in the network to reduce spill frequency at CSOs, etc	This line shows AMP7 capex enhancement investment for WINEP storage schemes in the network to reduce spill frequency at CSOs, etc. £0.440m enhancement capex investment has been identified in AMP7 to deliver WINEP storage scheme requirements in the network to reduce spill frequency at CSOs etc (under the U _IMP4 driver). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on these storage schemes in the network to reduce spill frequency at CSO's etc in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: This unchanged investment is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
12	WINEP / NEP ~ Chemicals removal schemes	This line shows AMP7 capex enhancement investment for chemical removal schemes. £2.518m enhancement capex investment has been identified in AMP7 to deliver WINEP requirements under chemical removal scheme drivers. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on this U-IMP4 driver requirements, sites and solutions in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: It is noted Ofwat have allowed an additional £0.7m of totex investment in their draft determination enhancement model for chemical removal. This additional £0.7m totex cost increase is not included within the data tables. However, our revised investment position of £3.24m totex, which includes the extra allowance, is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
13	WINEP / NEP ~ Chemicals monitoring / investigations / options appraisals	No capex enhancement investment forecast for WINEP – chemicals monitoring / investigations / options appraisal.
14	NEP ~ National phosphorus removal technology investigations	No capex enhancement investment forecast for WINEP – national phosphorus removal technology investigations.
15	WINEP / NEP ~ Groundwater schemes	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP groundwater schemes. £32.949m capex enhancement investment is required to deliver AMP7 Phase 3 of the Thanet groundwater protection and infiltration reduction scheme. More information on this enhancement investment requirement in AMP7 is provided in the Cost Efficiency TA.14.2 CAC2 - Thanet Groundwater Protection Scheme. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £29.814m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
16	WINEP / NEP ~ Investigations	This line shows AMP6 capex enhancement investment for NEP investigation schemes. No AMP7 capex enhancement investment forecast for WINEP investigations. AMP7 studies and investigations are being delivered through opex as detailed in line 63.
17	WINEP / NEP ~ Nutrients (N removal)	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP nutrient (N removal) schemes. £2.996m enhancement capex investment has been identified in AMP7 to deliver WINEP requirements that require nutrient nitrate removal to be installed. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the sites and solutions requiring nitrate nutrient removal in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing Thanet CAC. See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
18	WINEP / NEP ~ Nutrients (P removal at activated sludge STWs)	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP nutrient (P removal at activated sludge STWs). £55.518m of enhancement capex investment has been identified in AMP7 to deliver WINEP requirements that require Phosphorus removal / treatment at activated sludge plant sites. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the sites and solutions requiring Phosphorus nutrient removal at an activated sludge plant site in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: Very minor financial rounding related updates at draft determination. This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
19	WINEP / NEP ~ Nutrients (P removal at filter bed STWs)	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP nutrient (P removal at filter bed STWs). £155.675m of enhancement capex investment has been identified in AMP7 to deliver WINEP requirements that require Phosphorus removal / treatment at filter bed sites. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the sites and solutions requiring Phosphorus nutrient removal at filter bed sites in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Very minor financial rounding related updates at draft determination. This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
20	WINEP / NEP ~ Reduction of sanitary parameters	This line shows AMP6 and AMP7 capex enhancement investment for WINEP / NEP reduction of sanitary parameter schemes. £28.656m of enhancement capex investment has been identified in AMP7 to deliver WINEP requirements that require a reduction of other sanitary parameters (i.e. BOD and Ammonia) at our wastewater treatment work sites. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the sites and solutions requiring Phosphorus nutrient removal at filter bed sites in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1).

		See also draft determination representations: Securing cost efficiency, Ofwat's approach to environmental obligations; and, securing cost efficiency, sanitary parameters.
21	WINEP / NEP ~ UV disinfection (or similar)	This line shows AMP7 capex enhancement investment for UV disinfection (or similar). £13.051m of enhancement capex investment has been identified in AMP7 for WINEP driver related UV treatment schemes. These UV schemes are included to deliver under the WINEP Shellfish no deterioration driver. The remaining Shellfish no deterioration driver scheme costs that do not include UV treatment and are included in WWS2 Line 4. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on these UV disinfection schemes requirements, sites and solutions in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representations: Securing cost efficiency, Ofwat's approach to environmental obligations; and, securing cost efficiency, UV disinfection: optioneering efficiency.
22	NEP ~ Discharge relocation	This line shows AMP6 capex enhancement investment for NEP discharge relocation. No AMP7 capex enhancement investment forecast for discharge relocation.
23	NEP ~ Flow 1 schemes	This line shows AMP6 capex enhancement investment for NEP flow 1 schemes. No AMP7 capex enhancement investment forecast for Flow 1 schemes.
24	Odour	No capex enhancement investment forecast for odour.
25	New development and growth	This line shows AMP6 and AMP7 capex enhancement investment for new development and growth. £122.244m of enhancement capex investment has been identified in AMP7 for new development and growth. See Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth for more information on this investment in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Very minor financial rounding related updates at draft determination.

		This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.
26	Growth at sewage treatment works (excluding sludge treatment)	This line shows AMP6 and AMP7 capex enhancement investment for growth at sewage treatment works (excluding sludge treatment). £97.241m of enhancement capex investment has been identified in AMP7 for growth at sewage treatment works (excluding sludge treatment). See Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth for more information on this investment in AMP7. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: Very minor financial rounding related updates at draft determination. This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.
27	Resilience	This line shows AMP7 capex enhancement investment for resilience schemes. No AMP7 capex enhancement investment forecast for Resilience. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.
28	SEMD	This line shows AMP6 capex enhancement investment for SEMD. No AMP7 capex enhancement investment forecast for SEMD.
29	Non-SEMD related security enhancement	No capex enhancement investment forecast for non-SEMD related security.
30	Reduce flooding risk for properties	This line shows AMP6 and AMP7 capex enhancement investment for reducing flooding risk for properties. £10.284m of enhancement capex investment has been identified in AMP7 to support reduction of flooding risk to customer properties. See Wholesale Wastewater TA.12. WW04 Business Case – Sewers and Rising Mains and TA.12. WW07 Business Case – Flooding and Pollution Strategies for more details

		on this improvement area of investment. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.
31	Transferred private sewers and pumping stations	Costs shown are for a scheme to bring Inherited pumps up to useable standard
32	WFD Manage uncertainty Special case	This shows actual / projected capital investment for the AMP6 WFD managing uncertainty special case schemes in the remainder of AMP6. Note that these forecast costs are subject to change as we look to deliver these AMP6 NEP requirements on time.
33	AMP 6 Bathing Water enhancement	This shows actual / projected capital investment for the AMP6 Bathing Water enhancement programme in the remainder of AMP6. Note that these forecast costs are subject to change as we look to deliver these AMP6 Bathing Water Enhancement requirements as planned.
34	NEP Bathing Water	This shows actual / projected capital investment for the AMP6 NEP Bathing Water schemes in the remainder of AMP6. Note that these forecast costs are subject to change as we look to deliver these AMP6 NEP Bathing Water requirements on time as planned.
35	Woolston part 2	This shows the 2017/18 capital investment for the AMP6 Woolston Part 2 scheme i.e. the secondary driver to the UWWTD
36	Pollution Resilience	This line shows £10.325m of enhancement capex investment associated with improving pollution performance in AMP7. This improvement in pollution has significant support from customers and stakeholders. See Wholesale Wastewater TA.12. WW04 Business Case – Sewers and Rising Mains, TA.12. WW02 Business Case - Network Pumping Stations, and TA.12. WW07 Business Case – Flooding and Pollution Strategies for more details on this improvement area of investment in AMP7. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing pollution enhancement. See also draft determination representation: Securing cost efficiency, funding for upper quartile pollution targets.

<table>
<tr><td>37</td><td>Bathing Water Enhancement Programme</td><td>£21.251m of enhancement capex investment in AMP7 associated with improving 5 bathing waters to 'Good' and 2 bathing waters to 'excellent' bathing water standards. More information on this investment in AMP7 is provided in the Cost Efficiency TA.14.1 Cost Adjustment Claim 1 – Bathing Water.

Investment in this area has been updated at the IAP response stage and is discussed in more detail in ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: In-line with Ofwat’s modelling challenge at draft determination, we have reduced this investment line down to £20.55m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing Bathing Water CAC.</td></tr>
<tr><td>B</td><td colspan="2">Enhancement expenditure by purpose - operating</td></tr>
<tr><td>48</td><td>First time sewerage (s101A)</td><td>This line shows the AMP6 S101A delivery schemes opex arising from capex for AMP6 and AMP7.

£0.410m of AMP7 enhancement opex arises from the AMP6 capex investment in S101A schemes. No opex arising from capex has been identified for the AMP7 S101A capex detailed in line 1.

As this is opex that comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1).</td></tr>
<tr><td>49</td><td>Sludge enhancement (quality)</td><td>No opex enhancement investment forecast for sludge quality.</td></tr>
<tr><td>50</td><td>Sludge enhancement (growth)</td><td>This line shows AMP6 and AMP7 opex arising from capex data for delivery of sludge growth schemes.

£1.629m of AMP7 opex enhancement investment is the opex arising from the sludge growth enhancement capex investment detailed in line 3 and the opex arising from capex from AMP6 capex investments. The table below shows the opex data included in this line for AMP7:

<table>
<tr><th>Sludge enhancement (growth) opex</th><th>AMP7 Opex Investment</th></tr>
<tr><td>AMP7 Opex AFC</td><td>£0.789m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£0.840m</td></tr>
<tr><td>Total</td><td>£1.629m</td></tr>
</table>
</td></tr>
</table>

		See Wholesale Wastewater TA.12.BR01 Bioresources Treatment & Growth for more information on the AMP7 opex arising from capex. The AMP6 opex that comes from AMP6 investment has been excluded from the investment shown in this technical annex. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £0.789m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1).
51	WINEP / NEP ~ Conservation drivers	This line shows AMP7 opex arising from capex for WINEP conservation drivers. £0.556m of opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 4 (shellfish no deterioration schemes). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £0.430m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
52	WINEP / NEP ~ Eels Regulations (measures at outfalls)	No opex enhancement investment forecast for eels regulation.
53	WINEP / NEP ~ Event Duration Monitoring at intermittent discharges	This line shows AMP6 opex arising from capex data for NEP event duration monitoring at intermittent discharges. £1.055m of AMP7 enhancement opex is arising from AMP6 capex investment in Event Duration Monitoring schemes. No opex arising from capex has been identified for the AMP7 delivery of event duration monitoring capex detailed in line 6. As this is opex that comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

		Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £0.935m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
54	WINEP / NEP ~ Flow monitoring at sewage treatment works	No opex enhancement investment forecast for flow monitoring at sewage treatment works.
55	NEP ~ Monitoring of pass forward flows at CSOs	No opex enhancement investment forecast for monitoring of pass forward flows.
56	WINEP / NEP ~ Schemes to increase flow to full treatment	This line shows AMP7 opex arising from capex for WINEP schemes to increase flow to full treatment. £3.276m of AMP7 opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 9 (UWWTR - U_IMP5 (DWF: FFT) driver schemes). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £3.240m. This revised investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
57	WINEP / NEP ~ Storage schemes at STWs to increase storm tank capacity	This line shows AMP7 opex arising from capex for WINEP storage schemes at STWs to increase storm tank capacity. £1.408m of AMP7 opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 10 (UWWTR - U_IMP6 (Storm Tanks) driver). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: After internal challenge and review, it is noted that the decision was taken late on not to challenge £7.6m of the Ofwat funding allowance gap. Therefore, we acknowledge a £7.6m totex cost

		reduction not included within the data tables. However, our revised investment position of £81.93m totex is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
58	WINEP / NEP ~ Storage schemes in the network to reduce spill frequency at CSOs, etc	This line shows AMP7 opex arising from capex for WINEP Storage schemes in the network to reduce spill frequency at CSOs, etc. £0.006m of AMP7 opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 11 (WINEP requirements under the U _IMP4 driver). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
59	WINEP / NEP ~ Chemicals removal schemes	This line shows AMP7 opex arising from capex for WINEP chemical removal schemes. £0.042m of AMP7 opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 12. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: It is noted Ofwat have allowed an additional £0.7m of totex investment in their draft determination enhancement model for chemical removal. This additional £0.7m totex cost increase is not included within the data tables. However, our revised investment position of £3.24m totex, which includes the extra allowance, is itemised in the PR19 draft determination representation proforma table (RP1).

		See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
60	WINEP / NEP ~ Chemicals monitoring / investigations / options appraisals	This line shows AMP7 opex arising from capex for WINEP chemicals monitoring / investigations / options appraisals. £1.978m of AMP7 enhancement opex investment is required to deliver chemicals monitoring / investigations / appraisals in AMP7. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex costs included. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1); included within wastewater WINEP studies and investigations (£19.1m). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
61	NEP ~ National phosphorus removal technology investigations	No opex enhancement investment forecast for national phosphorus removal technology investigations.
62	WINEP / NEP ~ Groundwater schemes	This line shows the AMP6 groundwater schemes opex arising from capex. £0.235m of AMP7 enhancement opex arising from the AMP6 capex investment in groundwater schemes. No opex arising from capex has been identified for the AMP7 groundwater schemes capex detailed in line 15. As this is opex that comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: In-line with Ofwat's modelling challenge at draft determination, we have reduced this investment line down to £0m. This update was made late in the process; therefore, the data table remains unchanged from IAP response. As this cost has been removed this investment line item does not appear in the PR19 draft determination representation proforma table (RP1). See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.
63	WINEP / NEP ~ Investigations	This line shows AMP7 opex arising from capex for WINEP investigations.

<table>
<tr><td></td><td></td><td>£21.318m of opex enhancement investment has been identified to deliver all the required WINEP studies and investigations programme in AMP7. See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex costs included and the breakdown of these costs by driver code. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: After internal challenge and review, it is noted that the decision was taken late on not to challenge £4.3m of the Ofwat funding allowance gap. Therefore, we acknowledge a £4.3m cost reduction not included within the data tables. However, our revised investment position of £19.1m is itemised in the PR19 draft determination representation proforma table (RP1); this £19.1m includes the totex required to deliver all WINEP investigations including chemical investigations.

See also draft determination representation: Securing cost efficiency, Ofwat’s approach to environmental obligations.</td></tr>
<tr><td>64</td><td>WINEP / NEP ~ Nutrients (N removal)</td><td>This line shows both AMP6 and AMP7 opex arising from capex investment associated with nutrient nitrate removal.

£5.877m of AMP7 enhancement opex arises from the AMP6 and AMP7 capex investments in nitrate nutrient removal schemes (see line 17 for the AMP7 capex associated with this opex). The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>WINEP – Nutrient (N removal)</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex AFC</td><td>£0.073m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£5.804m</td></tr>
<tr><td>Total</td><td>£5.877m</td></tr>
</table>

As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. Information on the AMP7 costs are explained in more detail in this technical annex. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1).</td></tr>
</table>

<table>
<tr><td></td><td></td><td>See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.</td></tr>
<tr><td>65</td><td>WINEP / NEP ~ Nutrients (P removal at activated sludge STWs)</td><td>This line shows AMP6 and AMP7 opex arising from capex and AMP7 opex investment associated with nutrient phosphorus removal at activated sludge works sites.

The AMP7 opex investment comes to £6.340m. £5.511m of this opex relates to enhancement opex arising from AMP6 and AMP7 capex investments in phosphorus removal at activated sludge sites (see line 18 for the AMP7 capex associated with this opex). The remaining £0.829m of opex is required to deliver opex catchment solutions under the WFD improvement P driver. The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table><tr><th>WINEP – Nutrient (P removal at activated sludge STWs)</th><th>Opex Investment</th></tr><tr><td>AMP7 Opex WFD_IMP_P</td><td>£0.829m</td></tr><tr><td>AMP7 Opex AFC</td><td>£3.540m</td></tr><tr><td>AMP6 Opex AFC</td><td>£1.971m</td></tr><tr><td>Total</td><td>£6.340m</td></tr></table>
As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. Information on the AMP7 opex costs are explained in more detail in this technical annex. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'.

Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1).

See also draft determination representation: Securing cost efficiency, Ofwat's approach to environmental obligations.</td></tr>
<tr><td>66</td><td>WINEP / NEP ~ Nutrients (P removal at filter bed STWs)</td><td>This line shows AMP6 and AMP7 opex arising from capex and AMP7 opex investment associated with nutrient phosphorus removal at filter bed sites.

This line shows both AMP6 and AMP7 opex arising from capex investment associated with nutrient phosphorus removal at filter bed works sites. The AMP7 opex investment comes to £22.722m. £13.034m of this opex relates to enhancement opex arising from AMP6 and AMP7 capex investments in phosphorus removal at filter bed sites (see line 19 for the AMP7 capex associated with this opex). The</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>remaining £9.688m of opex is required to deliver opex catchment solutions under the WFD_IMP_P driver. The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>WINEP – Nutrient (P removal at activated sludge STWs)</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex WFD_IMP_P</td><td>£9.688m</td></tr>
<tr><td>AMP7 Opex AFC</td><td>£10.443m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£2.591m</td></tr>
<tr><td>Total</td><td>£22.722m</td></tr>
</table>

As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. Information on the AMP7 opex costs are explained in more detail in this technical annex. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1).

See also draft determination representation: Securing cost efficiency, Ofwat’s approach to environmental obligations.</td>
</tr>
<tr>
<td>67</td>
<td>WINEP / NEP ~ Reduction of sanitary parameters</td>
<td>This line shows both AMP6 and AMP7 opex arising from capex investment associated with reduction of sanitary parameters at WINEP sites.

The AMP7 opex investment equals £2.472m. This opex relates to enhancement opex arising from AMP6 and AMP7 capex investments in reduction of sanitary parameters at WINEP sites (see line 20 for the AMP7 capex associated with this opex). The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>Drivers requiring reduction of sanitary parameter</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex AFC</td><td>£1.032m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£1.440m</td></tr>
<tr><td>Total</td><td>£2.472m</td></tr>
</table>

As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme. Information on the AMP7 opex costs are explained in more detail in this technical annex.</td>
</tr>
</table>

		Investment in this area has been updated at the IAP response stage and is discussed in more detail in 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representations: Securing cost efficiency, Ofwat's approach to environmental obligations; and, securing cost efficiency, sanitary parameters.
68	WINEP / NEP ~ UV disinfection (or similar)	This line shows AMP7 opex arising from capex for WINEP UV disinfection. £0.411m of AMP7 opex enhancement investment is the opex arising from capex from the enhancement capex investment detailed in line 21 (shellfish no deterioration driver schemes requiring UV treatment). See Wholesale Wastewater TA.12. WW06 Business Case - Wastewater Environmental Programme for more details on the opex arising from capex for these schemes. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representations: Securing cost efficiency, Ofwat's approach to environmental obligations; and, securing cost efficiency, UV disinfection: optioneering efficiency.
69	NEP ~ Discharge relocation	No opex enhancement investment forecast for discharge relocation.
70	NEP ~ Flow 1 schemes	This line shows the AMP6 Flow 1 schemes opex arising from capex. There is £0.020m of AMP7 enhancement opex arising from the AMP6 capex investment in Flow 1 schemes. As this is opex that comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1). See also draft determination representations: Securing cost efficiency, Ofwat's approach to environmental obligations.
71	Odour	No opex enhancement investment forecast for Odour.

<table>
<tr>
<td>72</td>
<td>New development and growth</td>
<td>This line shows both AMP6 and AMP7 opex arising from capex investment associated with delivery of growth schemes.

£2.230m of AMP7 enhancement opex arises from the AMP6 and AMP7 capex investments in growth schemes (see line 25 for the AMP7 capex associated with this opex). The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>New development and growth</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex AFC</td><td>£0.040m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£2.190m</td></tr>
<tr><td>Total</td><td>£2.230m</td></tr>
</table>

As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth. Information on the AMP7 costs are explained in more detail in this business case. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1).

See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.</td>
</tr>
<tr>
<td>73</td>
<td>Growth at sewage treatment works (excluding sludge treatment)</td>
<td>This line shows both AMP6 and AMP7 opex arising from capex investment associated with delivery of growth schemes at sewage treatment works (excluding sludge treatment).

£1.139m of AMP7 enhancement opex arises from the AMP6 and AMP7 capex investments in growth schemes at sewage treatment works (see line 26 for the AMP7 capex associated with this opex). The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>Growth at sewage treatment works (exl. Sludge treatment)</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex AFC</td><td>£0.164m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£0.975m</td></tr>
<tr><td>Total</td><td>£1.139m</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td>As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in Wholesale Wastewater TA.12.WW05 Business Case - Wastewater Growth. Information on the AMP7 costs are explained in more detail in this business case. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1).

See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.</td></tr>
<tr><td>74</td><td>Resilience</td><td>No opex enhancement investment forecast for resilience.</td></tr>
<tr><td>75</td><td>SEMD</td><td>No opex enhancement investment forecast for SEMD.</td></tr>
<tr><td>76</td><td>Non-SEMD related security enhancement</td><td>No opex enhancement investment forecast for non-SEMD related security.</td></tr>
<tr><td>77</td><td>Reduce flooding risk for properties</td><td>This line shows a combination of AMP6 opex arising from capex flooding reduction schemes and AMP7 opex investment associated with improving flooding performance in AMP7 (this AMP7 investment is in required in conjunction with line 30). The table below shows the breakdown of the opex investment for AMP6 and the AMP7 investment:

<table>
<tr><th>Flooding Enhancement</th><th>Opex Investment</th></tr>
<tr><td>AMP7 Opex</td><td>£5.648m</td></tr>
<tr><td>AMP6 Opex AFC</td><td>£0.052m</td></tr>
<tr><td>Total</td><td>£5.700m</td></tr>
</table>

As the AMP6 opex comes from AMP6 investment, this opex has been excluded from the investment shown in the Wholesale Wastewater TA.12.WW04 Business Case - Sewers & Rising Mains and TA.12.WW07 Business Case - Flooding & Pollution Strategies. Information on the AMP7 costs are explained in more detail in these business cases. See also ‘Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1’.

Draft determination: This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1).

See also draft determination representation: Securing cost efficiency, cost allowances for growth - water and waste.</td></tr>
</table>

78	Transferred private sewers and pumping stations	This line shows AMP6 and AMP7 opex arising as a result of adopting some 750 plus former private pumping stations. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment is itemised as part of wastewater botex (including growth) in the PR19 draft determination representation proforma table (RP1).
79	WFD Manage uncertainty Special case	No opex is forecast for this AMP6 Bathing Water enhancement investment area.
80	AMP 6 Bathing Water enhancement	No opex is forecast for this AMP6 Bathing Water enhancement investment area.
81	NEP Bathing Water	No opex is forecast for this AMP6 NEP bathing water investment area.
82	Woolston part 2	Opex arising from capex figures for Woolston Part 2 AMP6 scheme are included in line 64.
83	Pollution Resilience	This line shows AMP7 opex enhancement investment associated with pollution resilience. £0.353m of enhancement opex investment associated with improving pollution performance in AMP7 (this AMP7 investment is required in conjunction with line 36). This improvement in pollution has significant support from customers and stakeholders. More detailed information on this investment is provided in the Wholesale Wastewater TA.12.WW04 Business Case - Sewers & Rising Mains and TA.12.WW07 Business Case - Flooding & Pollution Strategies. See also 'Response to IAP Annex 6 – Securing Cost Efficiency PART A SRN.CE.A1'. Draft determination: This unchanged investment position is itemised in the PR19 draft determination representation proforma table (RP1) in the lines referencing pollution enhancement. See also draft determination representation: Securing cost efficiency, funding for upper quartile pollution targets.