United Utilities Water

DRAFT Drainage and Wastewater Management Plan 2023

Technical Appendix 4 – Risk Based Catchment Screening

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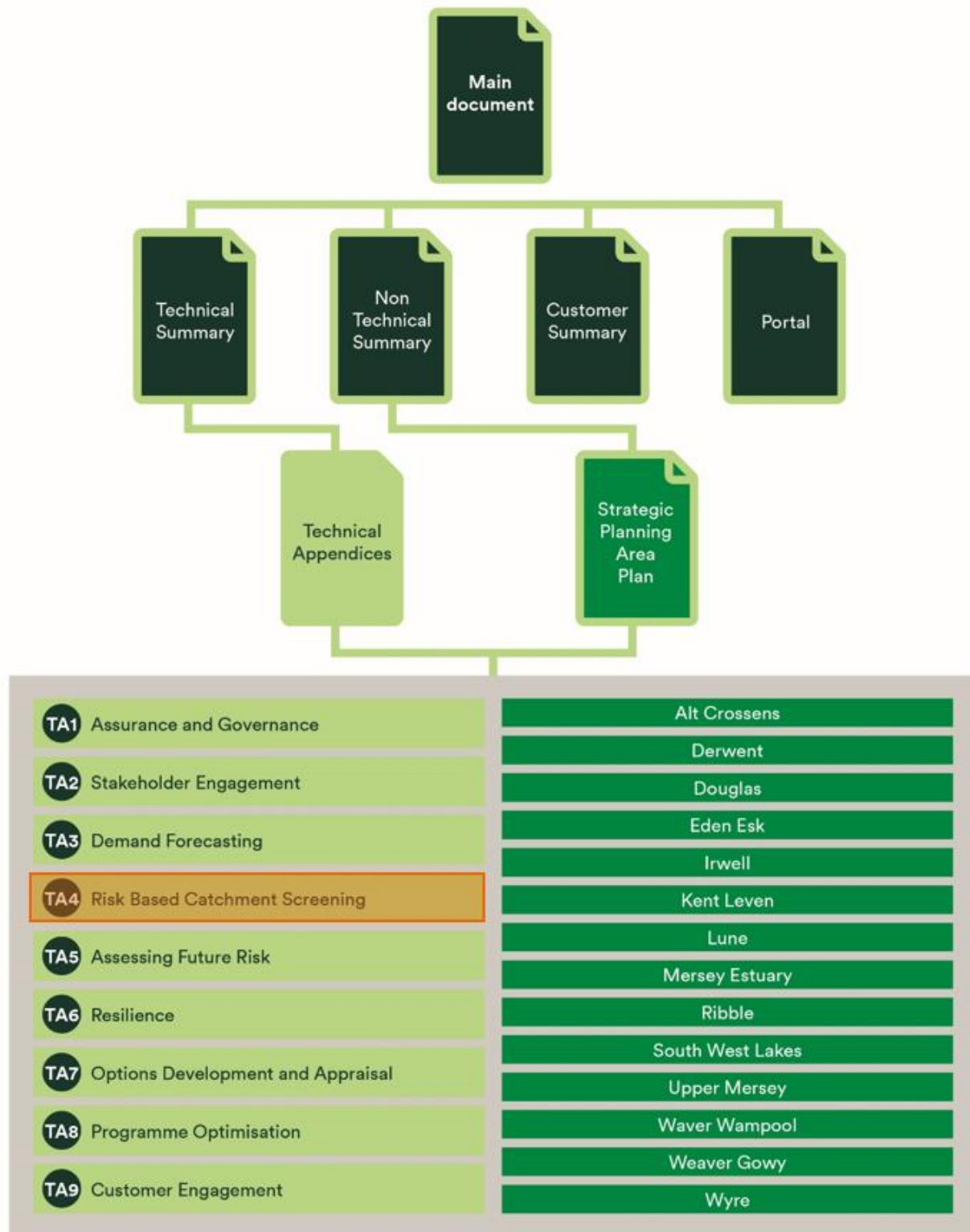
June 2022

United Utilities

Water for the North West

Executive summary

As we approach the second quarter of this century, our drainage and wastewater assets are under increasing stress. The pressures generating this stress include climate change, population growth and ageing infrastructure, all of which are having negative consequences on asset health. One of the primary aims of the DWMP is about how we can work collaboratively with our partners to develop long-term plans to extend, improve and maintain a robust and resilient drainage and wastewater system. To ensure that the effort is focused in the right places, an approach was needed to understand which of our wastewater catchments are at the highest risk of experiencing issues in the future. Hence the Risk-Based Catchment Screening (RBCS) process was developed. In RBCS, each catchment draining to a wastewater treatment works is assessed against a range of indicators. These assessments are high level and draw on mainly historic data from already established reporting systems. It is, therefore, considered a pragmatic and proportionate approach to shortlist sites for the Baseline Risk and Vulnerability Assessments (BRAVA), which in turn will be used to develop Options to inform this plan and the next Price Review.

This document explains where the RBCS process sits within the DWMP framework and how it interacts with Strategic Context (the preceding stage), and BRAVA (the subsequent stage). In RBCS, each catchment is assessed against 17 standard indicators and two bespoke indicators. For each of these indicators, there is a high-level description, methodology and a discussion of any limitations. Details are then included on how a breach against an indicator impacts on whether a catchment proceeds to BRAVA, and if so, which assessments would be required. Details on the BRAVAs which were undertaken can be found in 'Technical Appendix 5 – Assessing Future Risk (TA5)'. Finally, there is a discussion on the financial year 2019 (FY19) indicator breaches, which were previously shared with the industry steering group in December 2019, and the results from the Annual Review in financial year 2020 (FY20) and financial year 2021 (FY21) .

Figure 1 DWMP document structure

Acronyms

For a list of acronyms, refer to document C0003.

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1.   Introduction

1.1.   The DWMP framework states that all Tactical Planning Units (TPU) are to be subjected to a high-level, risk-based review to determine if more detailed supply/demand assessments are required. This involves assessing the TPU against a range of indicators and reporting the results.

1.2.   In terms of the DWMP management structure shown in Figure 2, the Risk-Based Catchment Screening (RBCS) process sits between Strategic Context, and Baseline Risk and Vulnerability Assessment (BRAVA). In RBCS a series of high-level assessments linked to the Planning Objectives (set out in Strategic Context), was used to review and screen each TPU to determine whether a more detailed BRAVA assessment was required.

Figure 2 RBCS and the DWMP management structure [1]
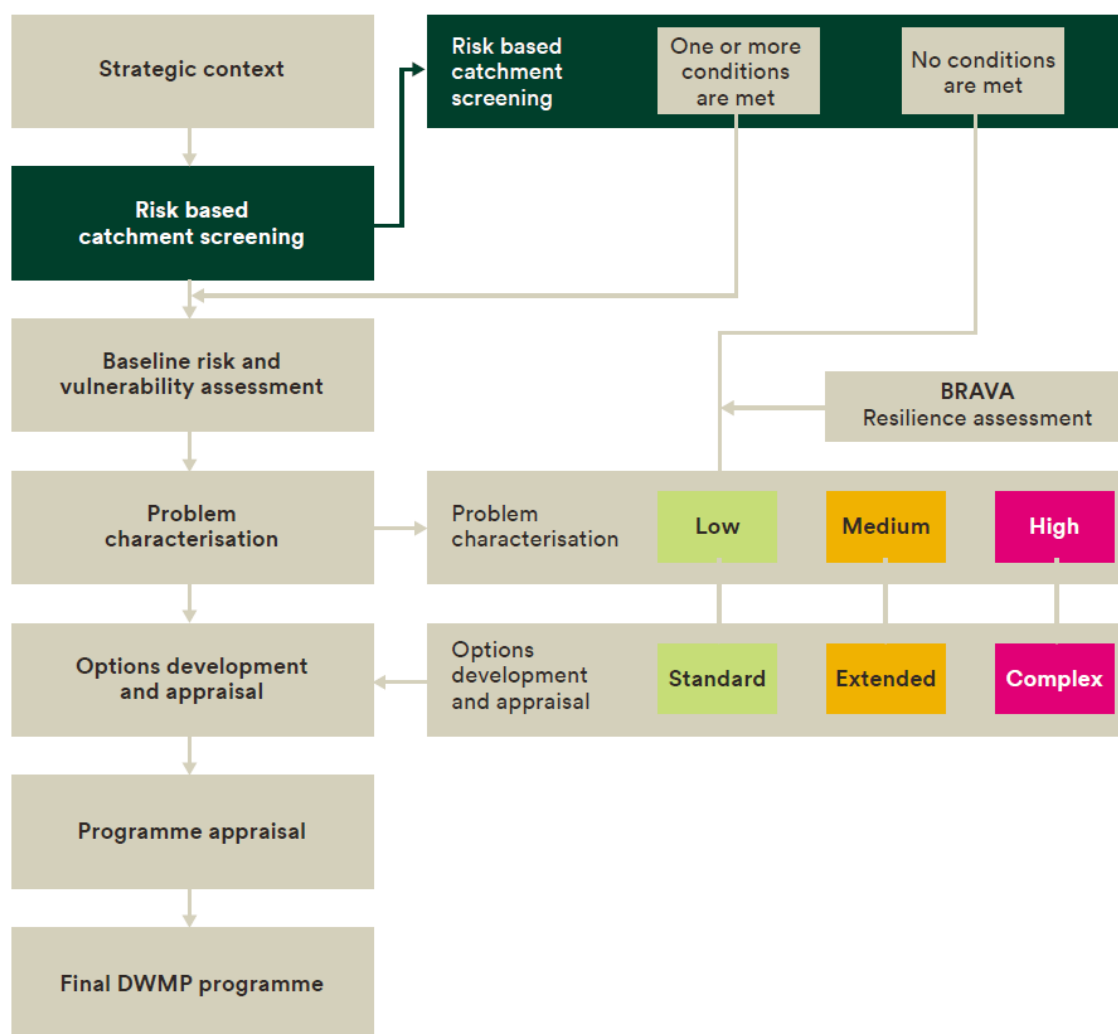
1.3.   The RBCS assessments were undertaken for a series of indicators. There are 17 standard indicators which are designed to span the key aspects of a wastewater company's responsibilities: from the network, to the treatment works, to their interaction with the environment. Since the purpose of the DWMP is to focus effort on areas where there are existing risks and vulnerability, historic data was used for the assessment of each indicator. To maintain the high-level screening nature of this stage, this data should be readily available from company reporting systems.

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[1] The framework, Figure 4-1

1.4.   There is also scope for a company to include additional indicators reflecting specific company priorities. To capture the potential impact of sludge on wastewater, United Utilities Water (UUW) has additionally included 'Sludge Facilities' as an indicator. Although the standard indicator on 'WwTW Quality Compliance' is designed to capture failing works, UUW also felt it important to capture those works which were at risk of failing in the future. Hence the inclusion of 'Proximity to Permit' as a second bespoke indicator. Each indicator is described in Section 2.

1.5.   The results from the RBCS assessments were then verified with operational managers. Only following this verification process were the results used to inform BRAVA. The final BRAVA recommendation list for each TPU was also reviewed with operational managers.

2. Indicators and process

2.1 Overview

2.1.1 Figure 3 lists the 19 RBCS indicators and the colours show which category each indicator belongs to. Further details on how a breach against an RBCS indicator impacts on the list of BRAVAs undertaken are given in Section 3.1.

Figure 3 The process from RBCS to BRAVA
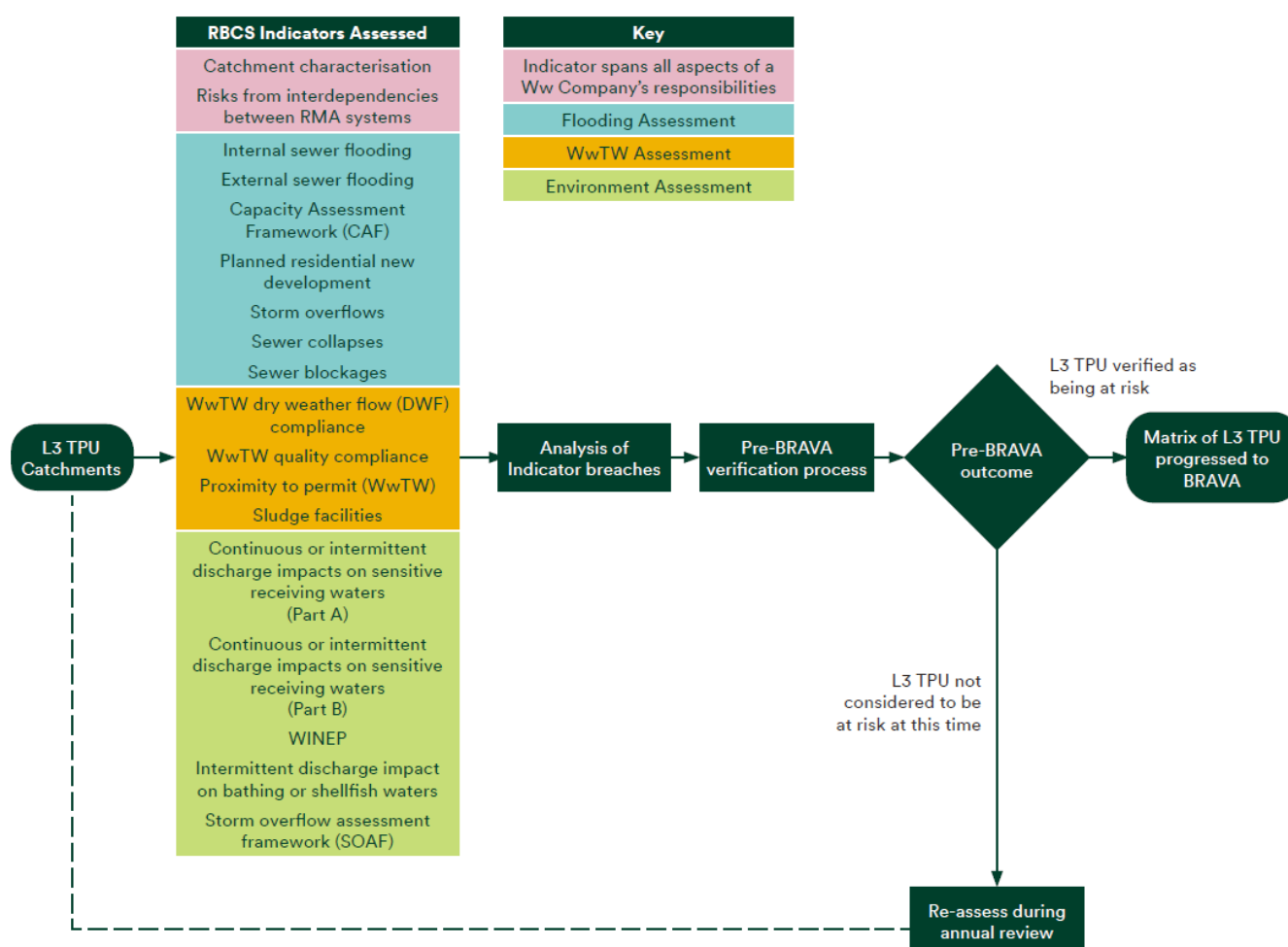
2.1.2 The RBCS assessment was first run in 2018 (FY19) and shared with the industry steering group in December 2019. These have since been updated for FY20 and FY21. The results from these updates will be used as a starting point for DWMP23.

2.2 Catchment characterisation (Tier 2)

2.2.1. The purpose of this indicator is to identify where there are catchments which are vulnerable to sewer flooding as a result of an extreme wet weather event. It aligns with the 'Risk of sewer flooding in a storm' metric from the common performance commitment set prior to the investment period from 2020 to 2025.

2.2.2. This assessment included all catchments irrespective of size. In addition to requiring standard catchment data on sewer length, population etc. this assessment comprised 15 sub-assessments e.g., topography funnelling of flows, proximity to rivers/seas. The vast majority of TPUs breached this indicator.

2.3   Intermittent discharges impact upon bathing or shellfish waters

2.3.1.   The purpose of this indicator is to understand where water company operations are having an impact on bathing or shellfish waters.

2.3.2.   The Company's historic NEP records, along with the WINEP3 Tracker, were used to identify intermittent discharges with a bathing water or shellfish water permit. This list of discharges was cross-checked against the company's permit database to confirm that they are all still active. For all active discharges, spill frequency data was retrieved from the previous five years (where available). As defined in the framework's Appendix B, the spill threshold for each asset was set slightly above the spill threshold stated in the permit. A TPU was considered to breach this indicator if it contains at least one asset exceeding the spill threshold for any of the analysed years.

2.4   Discharges impact upon other sensitive receiving waters (Part A)

2.4.1.   The purpose of this indicator is to understand where water company operations are impacting on Designated Sites such as SSSI's or Ramsar sites.

2.4.2.   The Major Landowners Group (MLG) 'Remedies' list was obtained from Natural England (NE). This is a list of actions required by major landowners to improve or maintain NE's Designated Sites. The list was filtered to only show:

- • Remedies where United Utilities Water are the 'Responsible Party';

- • Remedies to resolve an 'Adverse Condition' within 'Freshwater Drainage' or 'Freshwater Pollution Discharges'; and

- • Remedies where the 'Remedy status' is 'Identified' or 'Not Agreed'.

2.4.3.   The filtered list of sites was then reviewed against the list of schemes on the National Environment Programme (NEP), and any site forming part of an NEP commitment, and completed prior to the DWMP base year (for Cycle 1, this was 2020), was excluded. The remaining sites were then mapped to the nearest TPU.

2.4.4.   As defined in the framework, this indicator also needs to include any actions within a Diffuse Water Pollution Plan (DWPP) belonging to United Utilities Water (UUW). The list of MLG Remedies on land owned by UUW was obtained and filtered to only show sites with a DWPP identified as a 'Remedy'. To identify whether UUW is listed as a delivery partner in the DWPP, the Site Improvement Plan (SIP) for the Designated Site was referred to. Note, only sites requiring UUW's involvement in improving the discharge were included. The filtered list of sites was then reviewed against the list of schemes on the NEP, as described in the previous paragraph, and the remaining sites were mapped to the nearest TPU.

2.5   Discharges impact upon other sensitive receiving waters (Part B) (Tier 2)

2.5.1.   The purpose of this indicator is to understand where water company operations are impacting on sensitive receiving waters not addressed by other indicators.

2.5.2.   A list of the 'threats' to Natural England's (NE) Designated Sites was required for this indicator. The list was filtered to show:

- • Threats where United Utilities Water is the action owner; and

- • Threats to water pollution only.

2.5.3.   This filtered list of sites was then reviewed against the list of schemes which have ever been on the NEP, and any scheme forming part of an NEP commitment was excluded. The remaining list of threats was mapped to the nearest TPU. A TPU was considered to breach this indicator if it contained at least one site within the remaining list of sites.

2.6   Storm overflow assessment framework (SOAF)

2.6.1.   The purpose of this indicator is to identify where there are spills which are currently breaching SOAF, or have the potential to breach SOAF in the future.

2.6.2.   All spills with EDM data were included in the analysis. Depending on how many years of EDM data is available, SOAF states a sliding threshold of risk between 40 and 60 spills a year. However, for this assessment, a more conservative approach to the breach threshold was taken by assuming a breach if the number of spills in a year exceeds 40, irrespective of the number of years of data available. A TPU was therefore considered to breach this indicator if it contained at least one overflow where the *average* number of spills per year over the monitoring period exceeded 40. Sites were identified as a *possible* breach where the average was less than 40 but there was at least one year with more than 40 spills. The TPUs containing the *possible* breaches were also included in the number of breaches, to mitigate the risk of these sites breaching the SOAF triggers in the future.

2.7   Capacity assessment framework (CAF)

2.7.1.   The purpose of this indicator is to identify where there are current capacity constraints in the network as a leading indicator to service failure in the future.

2.7.2.   As per the latest industry guidance, there are two different methods for assessing sewer capacity: Initial and Enhanced. The Initial Methodology uses basic pipe capacity metrics, but the Enhanced Methodology requires outputs from a network model. Where data was available, the Enhanced Method was used. For the year 2020, the network model was used to generate surcharge return periods for pipes and the average number of spills per year for storm overflows. TPUs containing a high proportion of frequently surcharging pipes or frequently spilling storm overflows were considered to breach this indicator.

2.8   Internal sewer flooding

2.8.1.   The purpose of this indicator is to identify where there are issues with internal flooding which may be indicative of capacity constraints. It is aligned to the common performance commitment on internal flooding set prior to the investment period from 2020 to 2025, apart from extreme events are excluded.

2.8.2.   Flood incident data used to generate the externally reported value was obtained for the previous three years and extreme events were excluded. This data was mapped to identify which TPU it related to. For the same time frame, the number of properties in each TPU was also obtained and the regional total reconciled with externally reported values. The number of incidents per TPU was then normalised by calculating the number per 10,000 properties. The 'Industry Upper Quartile' data was taken from Technical Appendix 1 referenced in DWMP framework Appendix B.

2.8.3.   A small catchment was considered to breach this indicator if there are at least two incidents over the last three years. For all other catchments, the threshold becomes the lesser of the average normalised company performance over three years, or the industry upper quartile. A larger catchment was considered to breach this indicator if the normalised number of flooding incidents in any of the preceding three years exceeds this threshold, and there are at least two incidents over the last three years.

2.8.4.   During the pre-BRAVA consultation with operational managers, the incident data was verified, plus those sites with active schemes to resolve flooding were excluded from the results.

2.9   External sewer flooding

2.9.1.   The purpose of this indicator is to identify where there are issues with external flooding which may be indicative of capacity constraints. It aligns with the asset health performance commitment on external flooding set prior to the investment period from 2020 to 2025.

2.9.2.   The incident data used to generate the externally reported value was obtained for the previous three years. This data was mapped to identify which TPU it related to. A list of active schemes intended to resolve external flooding was obtained, and the scheme location was used to identify the areas which should be excluded from the analysis due to measures already being in place to reduce flood risk. For the same time frame, the number of properties in each TPU was also obtained and the regional total reconciled with externally reported values. The number of incidents per TPU was then normalised by calculating the number per 10,000 properties. The 'Industry Upper Quartile' data was taken from Technical Appendix 1 referenced in DWMP framework Appendix B.

2.9.3.   A small catchment was considered to breach this indicator if there are more than ten incidents over the last three years. For all other catchments, the threshold becomes the lesser of the average normalised company performance over three years, or the industry upper quartile. A larger catchment was considered to breach this indicator if the normalised number of flooding incidents in any of the preceding three years exceeds this threshold, and there are more than ten incidents over the last three years.

2.10   Pollution incidents

2.10.1.   The purpose of this indicator is to identify where water industry-owned assets have made an unexpected release of wastewater that has caused environmental damage. It aligns with the definitions of pollution incidents within the latest Environmental Performance Assessment (EPA).[2] p.3-7 Note, from 2021 this includes incidents from pumping stations that were formerly private but adopted in October 2016.

2.10.2.   To align with the EPA assessment timescales, the data for this indicator was based on a calendar year (CY). The list of pollution incidents used to generate the externally reported value was obtained for the previous three years. Any incidents relating to bioresources were removed, before the rest of the incident data was mapped to identify which TPU it related to. For the same time frame, the kilometres of sewer within each TPU were obtained and the aggregated regional total reconciled with externally reported values by applying an uplift factor. The number of incidents per TPU was then normalised by calculating the number of incidents per 10,000km of sewer length. For the FY20 and FY21 annual updates, it wasn't considered necessary to repeat the sewer length analysis for those TPUs which had already undergone the full suite of network BRAVAs, so for the annual updates this assessment was only repeated for TPUs which did not already have a hydraulic model for BRAVA (using the same sewer length uplift factor as FY19).

2.10.3.   A TPU was considered to breach this indicator if it had at least one Category 1 or 2 incident from the last three years, or the average annual performance for any of the previous three years was above the threshold defined in the EPA. In addition, if the average annual performance breach was due to a single Category 3 incident, there were to be no measures in place to resolve that incident.

2.11   Wastewater treatment works quality compliance

2.11.1.   The purpose of this indicator is to identify where there are failing wastewater treatment works. It aligns with the failures identified within the Environmental Performance Assessment[2] (EPA) and the common performance commitment on treatment works compliance set prior to the investment period from 2020 to 2025.

2.11.2.   As per the EPA criteria, a discharge at a wastewater treatment works was considered as failing if it breached any one of the numeric permit limits (including sanitary and non-sanitary parameters, nutrient parameters and UWWTD parameters). A TPU was considered to breach this indicator if in any of the previous three years, the wastewater treatment works had a discharge confirmed as failing and measures had not been identified to address the cause of failure.

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[2] https://www.ofwat.gov.uk/wp-content/uploads/2021/01/EPA-methodology-version-8-October-2020.pdf

2.12   WwTW dry weather flow compliance

2.12.1.   The purpose of this indicator is to identify where there are wastewater treatment works with a risk of exceeding their dry weather flow (DWF) permit.

2.12.2.   For sites which hold a numeric DWF permit, flow data from the previous calendar year was collated and the flow which is exceeded 90% of the time (Q90) was calculated.

2.12.3.   For the FY19 analysis, a TPU was considered to breach this indicator if the Q90 exceeds the DWF permit for two consecutive years out of five. From FY20 onwards, a TPU will breach this indicator if Q90 exceeds DWF for three out of five years (including the most recent calendar year).

2.13   Storm overflows

2.13.1.   The purpose of this indicator is to identify where there are permit risks relating to storm overflows that have not been captured by other indicators.

2.13.2.   Network and treatment works' operators were consulted to understand where assets had been flagged through business-as-usual processes as being at risk of permit non-compliance and did not have corrective action underway. These assets were then mapped to identify which TPU they related to.

2.13.3.   A TPU was considered to breach this indicator if it was flagged as being at risk of permit non-compliance.

2.14   Risks from interdependencies between RMA (Risk Management Authority) drainage systems

2.14.1.   The purpose of this indicator is to identify where there are risks due to interactions between RMA drainage systems.

2.14.2.   The surface water flooding maps produced by both the Environment Agency and the Highways Agency were overlaid on top of United Utilities Water's sewer network. For each TPU, the number of properties within a third-party flood risk area was calculated and represented at a TPU level as the number of impacted properties per 10,000 properties.

2.14.3.   A TPU was considered to breach this indicator if the normalised number of impacted properties is above the company upper quartile.

2.14.4.   The limitation with this methodology is that smaller TPUs were breaching the indicator without having many manholes at risk. To address this, all indicator breaches were verified during the pre-BRAVA consultation to understand actual risks.

2.15   Planned residential new development

2.15.1.   The purpose of this indicator is to understand where the increase in new development is likely to have an impact on the existing wastewater assets. For each TPU, the future population forecast was assessed against existing population to understand the relative increase, and the threshold for breaching the indicator was set in line with existing and future parameters. Non-residential new development was not assessed as there was high uncertainty in development forecasts on the allocation of non-households.

2.15.2.   Prior to the RBCS analysis, regional assessments were made using local authority planning data. This data was applied at the local issue level (L4) and collated to the TPU. In line with local plan horizons, the information from these assessments was rarely greater than a ten-year forecast, therefore, for population forecasts up to 2050, regional assessment data was used.

2.15.3.   Baseline property numbers were refreshed annually, and property forecasts were screened. This was completed using updated plan-based data, and areas of growth that were not previously highlighted were reviewed to understand if additional baseline risk assessments were required. For the FY19 RBCS

analysis, the 2019 property update was used. For the FY20 and FY21 RBCS updates, the 2020 update was used.

2.16 The Water Industry National Environment Programme (WINEP)

2.16.1.   The purpose of this indicator is to identify where the company may need to invest in the future to meet environmental obligations. The WINEP was used to identify these locations.

2.16.2.   WINEP3 was used for this assessment. Measures identified as having a confirmed driver but assessed as not cost beneficial were included, as were measures defined as investigations or option appraisals. Since all coastal models were run as investigations in WINEP3, any catchment that actively contributes to Bathing Water Quality was also included. Note, this assessment excluded any investment identified in the WINEP for delivery during the current investment cycle. High frequency spiller investigations (U_INV) were excluded to avoid double counting with the SOAF indicator, and, as stated in Appendix B, 'Monitor only' drivers were also excluded. The locations of the measures to be included were mapped to the relevant TPU.

2.16.3.   A TPU was considered to breach this indicator if it contained a WINEP site identified for future investment.

2.17 Sewer collapses

2.17.1.   The purpose of this indicator is to identify where the integrity of the sewer system is at risk. It is aligned to the common performance commitment on sewer collapses set prior to the investment period from 2020 to 2025.

2.17.2.   The company's regulatory reporting system was used to extract the sewer collapse records from the previous three years. Small TPUs were considered to breach this indicator if there were two or more collapses in any of the preceding three years. For all other TPUs, the collapses data was normalised by sewer length (number of incidents per 10,000km of sewer) and a breach was considered to occur if the normalised collapses performance in any of the preceding years was greater than the company average for the last year.

2.17.3.   The sewer length for each TPU was calculated using corporate data, and the aggregated regional total was reconciled with externally reported values by applying an uplift factor. For the FY21 annual updates, it wasn't considered necessary to repeat the sewer length analysis for those TPUs which had already undergone the full suite of network BRAVAs, so for those years this assessment was only repeated for TPUs which did not already have a hydraulic model for BRAVA (using the same sewer length uplift factor as FY19).

2.18 Sewer blockages

2.18.1.   The purpose of this indicator is to identify where there have been obstructions in a sewer, which causes a reportable problem (not caused by hydraulic overload). It aligns with the asset health performance commitment on sewer blockages set prior to the investment period from 2020 to 2025.

2.18.2.   The company's regulatory reporting system was used to extract the sewer blockage records from the previous three years. All the data was then normalised by sewer length, as described in Section 2.17. A TPU was considered to breach this indicator if the number of blockages (normalised by sewer length) in any of the preceding years was greater than the company average.

2.19 Sludge facilities

2.19.1.   The purpose of this indicator is to identify where there are sludge treatment facilities. Since sludge production and treatment have the potential to significantly affect wastewater treatment, it was felt that this indicator was required to ensure that facilities potentially impacted proceeded to BRAVA.

2.19.2.   A list of sludge treatment facilities was collated. This included sites with sludge thickening, dewatering, digestion and/or lime addition. A TPU was considered to trigger this indicator if it contained a site with sludge treatment facilities.

2.20 Proximity to permit

2.20.1.   The purpose of this indicator is to identify where there are wastewater treatment works which are at risk of failing in the future. Although the standard indicator 'Wastewater treatment works quality compliance' is designed to capture failing works, it was felt important to capture those works which were at risk of failing in the future.

2.20.2.   For all sites with final effluent water quality monitors, the monthly sampling data from the past four years was assessed in terms of proximity to permit and allocated a risk status. The total number of months for which the wastewater treatment works was classified as either 'High' or 'Medium' risk was then used to determine if this indicator was breached. Note, sites that breached their permit were excluded from this indicator as they would be picked up through the treatment works compliance indicator.

3.   Progression to BRAVA

3.1   Tier classification

3.1.1.   In line with the framework, each indicator was allocated a tier number to show the significance of that indicator on the decision for a TPU to proceed to BRAVA. Almost all indicators are Tier 1, with the exception of Blockages and Collapses (unclassified), and the Tier 2 indicators listed below:

- Catchment characterisation;
- Discharge impacts on sensitive receiving waters (Part B)
- Sludge facilities
- Proximity to permit

3.1.2.   All breaches against a Tier 1 indicator will trigger a BRAVA. If a TPU only has breaches against Tier 2 indicators, there must be at least two Tier 2 breaches to validate proceeding to BRAVA. A single breach against a Tier 2 indicator will not trigger a BRAVA. If no indicators are breached, it is assumed the TPU area is not vulnerable to changes in future risks, but a Resilience assessment is still required. The initial RBCS results were reviewed with operational managers prior to commencing BRAVA. For sites which only triggered a small number of indicators, discussions were held on which BRAVA assessments would be appropriate to run. The process of reviewing the RBCS results prior to BRAVA is discussed in further detail in TA5.

4.   Other considerations

4.1   Normalisation

4.1.1.   For several of the network indicators, normalisation was applied to the results so that relative risk can be assessed and compared to company average/upper quartile performance. This can lead to some TPUs not breaching the stated thresholds, despite localised risk. This was discussed through the pre-BRAVA consultations and, where not being considered as part of current delivery programmes, they were captured for further investigation or inclusion within BRAVA.

4.2   Insufficient data risk

4.2.1.   Where there is insufficient data to apply the indicator, it is classed as 'at risk' to highlight where more information or data is required for future iterations of RBCS.

5.   RBCS outputs

5.1   Tactical planning unit (TPU) results

5.1.1.   The FY19 RBCS results were previously shared with the industry steering group in December 2019. An extract from these results is provided in Table 1. The format of the results is that each TPU is listed along with some key facts, and any blue shading within the main body of the table indicates that the TPU has breached a particular indicator. Logic formulae are then used to determine if a TPU should proceed to BRAVA. Out of 567 TPUs assessed, 397 were flagged as requiring BRAVA. Although this is nearly 70% of TPUs proceeding to BRAVA, these sites represent over 99% of the population in the company area.

Table 1 Extract from tactical planning unit RBCS results for United Utilities Water

Level 1 Company Name	Level 2 Strategic Planning Area	Level 3 Tactical Planning Unit Ref	Name	Total Population Equivalent (Per APR Table 4S Line 16)	1 Catchment Characterisation (Tier 2)	2 Bathing or shellfish waters	3 Discharge to sensitive waters (part A)	4 Discharge to sensitive receiving (part B) (Tier 2)	5 SOAF	6 CAF	7 Internal Sewer Flooding	8 External Sewer Flooding	9 Pollution Incidents
United Utilities	Mersey Estuary	BIRKE-WW1	Birkenhead	179,046									
United Utilities	Douglas	BISPG-WW1	Bispham Green	95									
United Utilities	Ribble	BLACK-WW1	Blackburn	272,701									
United Utilities	Douglas	BLKRD-WW1	Blackrod	5									
United Utilities	Eden and Esk	BLENC-WW1	Blencarn	127									
United Utilities	Derwent (NW)	BLENN-WW1	Blennerhasset	303									
United Utilities	Derwent (NW)	BLIND-WW1	Blind Crake	141									
United Utilities	Irwell	BOLTO-WW1	Bolton	381,527									

5.2   Consolidation to strategic planning area and company area

5.2.1.   The TPU results were consolidated to SPA and company area using population equivalent (PE) to normalise the data. The results from the consolidation process are given in Table 2 and Table 3. In Table 2, the blue and yellow shading has been used to indicate the percentage of the population in each SPA living in a TPU which breaches each indicator (see key).

Table 2 Strategic planning area RBCS results for United Utilities Water

strategic planning area	Total population equivalent	Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator					
		Catchment Characterisation (Tier 2)	Bathing or shellfish waters	Discharge to sensitive waters (part A)	Discharge to sensitive receiving waters (part B) (Tier 2)	SOAF	CAF
Alt/Crossens	390,787	100%	23%	0%	0%	97%	57%
Derwent (NW)	87,018	98%	61%	0%	0%	93%	26%
Douglas	627,680	100%	84%	0%	0%	100%	91%
Eden and Esk	172,330	95%	0%	0%	0%	91%	22%
Irwell	1,035,600	100%	0%	0%	0%	100%	21%
Kent/Leven	121,578	99%	85%	0%	1%	97%	83%
Lune	167,333	97%	87%	0%	0%	73%	95%
Mersey Estuary	1,971,195	100%	13%	17%	0%	93%	38%
Ribble	999,351	100%	61%	0%	0%	95%	61%
South West Lakes	140,407	98%	74%	0%	0%	97%	43%
Upper Mersey	2,324,930	100%	0%	1%	0%	96%	92%
Waver_Wampool	13,568	94%	0%	0%	0%	84%	96%
Weaver/Gowy	586,038	99%	0%	0%	0%	91%	59%
Wyre	280,986	100%	98%	0%	0%	98%	100%

strategic planning area	Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator						
	Internal Sewer Flooding	External Sewer Flooding	Pollution Incidents	WwTW Q compliance	WwTW DWF compliance	Storm overflows	Other RMA systems
Alt/Crossens	99%	100%	35%	0%	0%	46%	58%
Derwent (NW)	83%	88%	81%	1%	1%	20%	9%
Douglas	96%	100%	91%	60%	8%	17%	82%
Eden and Esk	79%	86%	82%	0%	0%	71%	24%
Irwell	99%	100%	99%	16%	18%	78%	98%
Kent/Leven	91%	95%	93%	2%	3%	10%	86%
Lune	91%	92%	67%	0%	1%	12%	84%
Mersey Estuary	98%	100%	55%	31%	0%	71%	46%
Ribble	98%	99%	56%	0%	3%	35%	65%
South West Lakes	86%	95%	44%	0%	0%	8%	50%
Upper Mersey	100%	100%	80%	4%	0%	69%	21%
Waver_Wampool	68%	68%	78%	0%	4%	14%	4%
Weaver/Gowy	94%	97%	94%	31%	0%	28%	21%
Wyre	99%	99%	9%	0%	0%	7%	92%

strategic planning area	Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator					
	Planned residential development	WINEP	(Sewer Collapses)	(Sewer Blockages)	Sludge Facilities	WwTW close to breaching permit
Alt/Crossens	99%	99%	26%	100%	81%	43%
Derwent (NW)	80%	88%	92%	42%	54%	8%
Douglas	100%	95%	5%	87%	68%	70%
Eden and Esk	96%	95%	85%	9%	76%	64%
Irwell	99%	52%	100%	63%	91%	36%
Kent/Leven	90%	84%	95%	99%	68%	56%
Lune	98%	88%	92%	97%	77%	2%
Mersey Estuary	100%	91%	46%	78%	91%	50%
Ribble	100%	78%	91%	81%	80%	71%
South West Lakes	97%	98%	98%	43%	49%	0%
Upper Mersey	99%	83%	87%	99%	74%	61%
Waver_Wampool	78%	100%	81%	88%	0%	0%
Weaver/Gowy	98%	27%	63%	92%	44%	41%
Wyre	99%	98%	99%	94%	90%	90%

Grey text	This is a Tier 2 indicator. A breach against a Tier 2 indicator would not trigger BRAVA if it is the **only** indicator breached.
(Grey text in brackets)	This is an unclassified indicator. A breach against an unclassified indicator will not influence whether a TPU proceeds to BRAVA.

0-33%	0-33% of the population in the SPA live in a TPU which breaches this indicator
33-66%	33-66% of the population in the SPA live in a TPU which breaches this indicator
66-100%	66-100% of the population in the SPA live in a TPU which breaches this indicator

5.2.2.   In Table 3 the blue and yellow shading has been used to indicate the percentage of the population in the company area living in a TPU which breaches each indicator (see key).

Table 3 Company area RBCS results for United Utilities Water

company area	Total population equivalent	Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator					
		Catchment Characterisation (Tier 2)	Bathing or shellfish waters	Discharge to sensitive waters (part A)	Discharge to sensitive receiving waters (part B) (Tier 2)	SOAF	CAF
United Utilities	8,918,802	100%	24%	4%	0%	95%	62%

company area	Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator						
	Internal Sewer Flooding	External Sewer Flooding	Pollution Incidents	WwTW Q compliance	WwTW DWF compliance	Storm overflows	Other RMA systems
United Utilities	97%	99%	71%	16%	3%	54%	51%

company area	Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator					
	Planned residential development	WINEP	(Sewer Collapses)	(Sewer Blockages)	Sludge Facilities	WwTW close to breaching permit
United Utilities	99%	80%	71%	83%	78%	54%

Grey text	This is a Tier 2 indicator. A breach against a Tier 2 indicator would not trigger BRAVA if it is the **only** indicator breached.
(Grey text in brackets)	This is an unclassified indicator. A breach against an unclassified indicator will not influence whether a TPU proceeds to BRAVA.

0-33%	0-33% of the population in the company area live in a TPU which breaches this indicator
33-66%	33-66% of the population in the company area live in a TPU which breaches this indicator
66-100%	66-100% of the population in the company area live in a TPU which breaches this indicator

5.3   Annual review

5.3.1   Overview

5.3.1.1.   Annual reviews were undertaken for all indicators where the data was considered to have changed and could lead to a TPU which was not previously proceeding to BRAVA, now triggering the BRAVA process. The data associated with Catchment characterisation, Other RMA systems, and WINEP, was not

considered to have changed, and so these indicators were not included in the FY20 and FY21 annual review.

5.3.2   FY20 Annual review

5.3.2.1.   For the indicators which were re-assessed as part of the FY20 annual review, the TPU summary results are presented alongside the FY19 TPU summary results in Figure 4.

Figure 4 No. of TPUs breaching each indicator in FY20 (vs FY19)
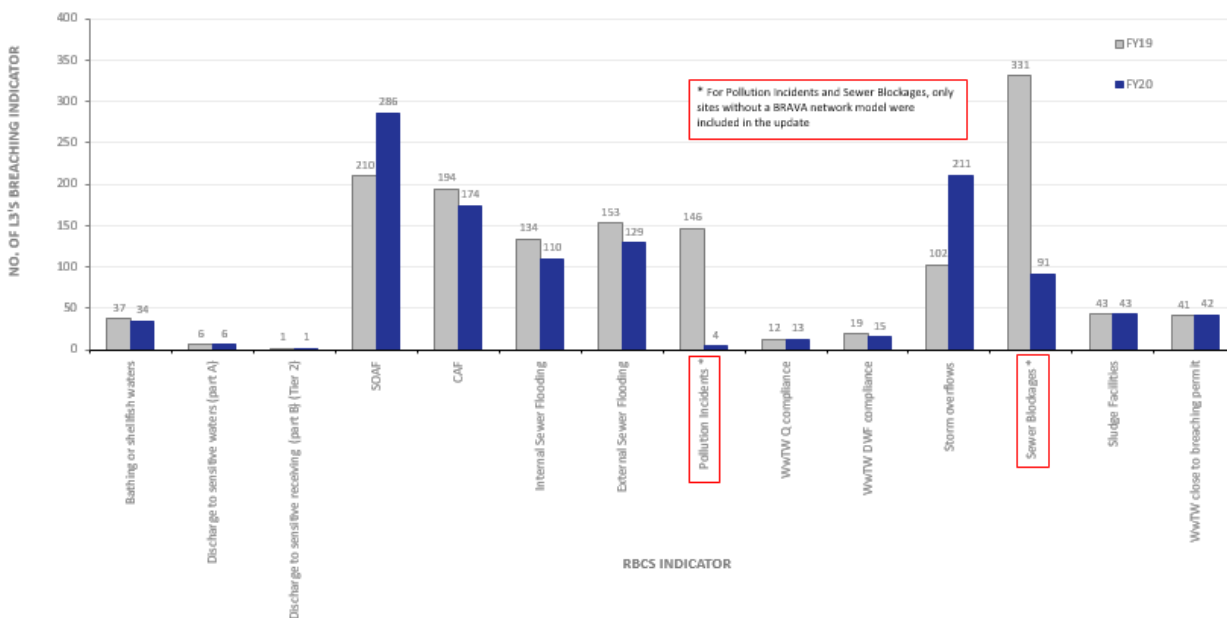
5.3.3   FY21 Annual review

5.3.3.1.   For the indicators which were re-assessed as part of the FY21 annual review, the TPU summary results are presented alongside the FY19 TPU summary results in Figure 5.
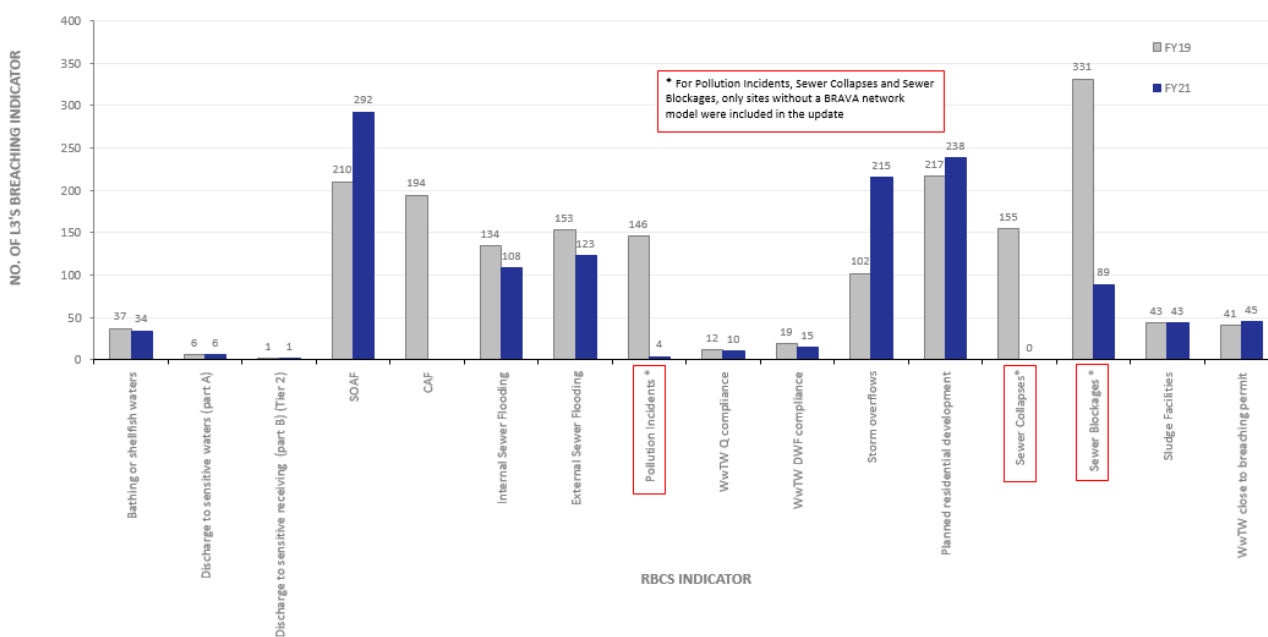
Figure 5 No. of TPUs breaching each indicator in FY21 (vs FY19)

5.3.4   Impact on BRAVA

5.3.4.1.   As detailed in Table 4, the FY21 results showed 21 new TPUs now proceeding to BRAVA (versus FY19 results). For each of these TPUs, the blue shading in the table shows the newly-breached indicators which triggered BRAVA. Where possible, these TPUs have been incorporated into BRAVA. However, some sites were identified too late for incorporation into BRAVA and so will therefore be closely monitored and fed into the next cycle of DWMP.

Table 4 New risk sites identified since FY19

| strategic planning area | tactical planning unit | | PE | SOAF | CAF | Pollution Incidents | Storm overflows | Planned residential development |
	Ref	Name						
Weaver/Gowy	ARCLI-WW1	Arclid	179					Breach
Douglas	BISPG-WW1	Bispham Green	96		Breach			
Kent/Leven	BOUTH-WW1	Bouth	94				Breach	
Weaver/Gowy	BRHSE-WW1	Brookhouse Green	18	Breach				
South West Lakes	DRIGG-WW1	Drigg Tanks	165					Breach
Weaver/Gowy	EATNN-WW1	Eaton	133			Breach		
Kent/Leven	ENDMO-WW1	Endmoor	641			n/a		Breach
Upper Mersey	HERLN-WW1	Heron Lane	9		Breach	n/a		
Weaver/Gowy	HOOGR-WW1	Hoo Green	32					Breach
Derwent (NW)	IRBYZ-WW1	Ireby	199	Breach	Breach		Breach	
South West Lakes	KIRKL-WW1	Kirkland	156	Breach	Breach	n/a		
Weaver/Gowy	MOSTS-WW1	Moston South	12					Breach
Eden and Esk	MOTHE-WW1	Motherby	299	Breach		n/a		
Kent/Leven	OUTGA-WW1	Outgate	42			Breach		
Derwent (NW)	PARDS-WW1	Pardshaw	114	Breach				Breach
South West Lakes	PICAZ-WW1	Pica	462	Breach				
Eden and Esk	SKELT-WW1	Skelton	313	Breach		n/a		
Kent/Leven	STAVC-WW1	Staveley-In-Cartmel Tank	3				Breach	
Derwent (NW)	TORPE-WW1	Torpenhow	164	Breach	Breach	n/a	Breach	
Weaver/Gowy	WHTGT-WW1	Whitegate	86	Breach				
Lune	YEWTC-WW1	Yew Tree Cottage (Melling)	239					Breach

Colour codes	Description
(Light Yellow)	No Breach
(Dark Blue)	Tier 1 Breach (new since FY19)

6.   Conclusions and recommendations

6.1.   The FY19 RBCS assessment confirmed that 70% of TPUs would proceed to BRAVA. This represents over 99% of the population within the company area. These percentages require monitoring, particularly when there are new sites identified as proceeding to BRAVA through the annual updates and no BRAVAs have previously been undertaken. Note, depending on timings, for any new TPUs identified as proceeding to BRAVA following the annual review, it may not always be possible to incorporate the TPUs into BRAVA for that cycle of DWMP.

6.2.   The purpose of including sewer collapses and sewer blockages in this analysis will be reviewed since neither impacts directly on the decision to send a TPU to BRAVA.

Appendix A

Table A1 Indicator breach thresholds

Indicator	Breach thresholds to be applied at the tactical planning unit (TPU) level		
	Breach description (per TPU)	Threshold value	Units
Catchment characterisation	Risk score	4 or 5	score out of 5
Intermittent discharge impact on bathing or shellfish waters	Spills during the BW season exceeds threshold value Spill per year exceeds threshold value	5 14	spills spills
Continuous or intermittent discharge impact on sensitive receiving waters (Part A)	Entries in Natural England's MLG Remedies workbook when filters in value column applied	Filters to be applied: *Responsible Party* = UUW *Adverse Condition* = Freshwater Drainage or Freshwater Pollution Discharges *Remedy status* = Identified or Not Agreed	none
Continuous or intermittent discharge impact on sensitive receiving waters (Part B)	Entries in Natural England's MLG Threats workbook when filters in value column applied	Filters to be applied: *Action owner* = UUW *Threats* = Water Pollution	none
Storm overflow assessment framework (SOAF)	Average number of spills over last three years exceed threshold value, **and/or** Spills in a year exceed threshold value for at least one year from last three years	40	number of spills in a year
Capacity assessment framework (CAF)	Risk score for surcharge return period for pipes **and/or** Spills per year for storm overflows equals the threshold value	4 or 5	score out of 5
Internal sewer flooding (lesser of a. or .b)	a. Internal flooding incidents exceed the Industry Upper Quartile, **or**	1.68	incidents per 10,000 properties in a year
	b. Internal flooding incidents exceed the average normalised company performance over three years	3.77	incidents per 10,000 properties in a year
	and Internal flooding incidents over three years is at least the threshold value	2	total number of incidents over three years

Breach thresholds to be applied at the tactical planning unit (TPU) level			
Indicator	**Breach description (per TPU)**	**Threshold value**	**Units**
Internal sewer flooding (small catchments)	Internal flooding incidents over three years is at least the threshold value	2	total number of incidents over three years
External sewer flooding (lesser of a. or .b)	a. External flooding incidents exceed the Industry Upper Quartile	14.81	incidents per 10,000 properties in a year
	b. External flooding incidents exceed the average normalised company performance over three years **and**	43.64	incidents per 10,000 properties in a year
	External flooding incidents over three years exceeds the threshold value	10	total number of incidents over three years
External sewer flooding (small catchments)	External flooding incidents over three years is more than the threshold value	10	total number of incidents over three years
Pollution incident category 1,2,3	Number of Category 1 or 2 incidents over three years is at least the threshold value, **or**	1	total number of Cat. 1 or 2 incidents over 3 years
	EPA threshold value (per 10,000km sewer) is exceeded for any of the previous three years	25	average annual performance per 10,000km sewer length
Wastewater treatment works quality compliance	Number of failing discharges is at least the threshold value for any of the previous three years	1	number of failing discharges at a wastewater treatment works in a year
WwTW dry weather flow (DWF) compliance (FY19 only)	Number of consecutive years from the past five years where DWF classed as failing exceeds the threshold value	2	number of consecutive years from the past five years where DWF classed as failing
Storm overflows	Number of incidents relating to storm overflows in the network and/or treatment works is at least the threshold value (over three years)	1	total number of incidents over three years
Risks from interdependencies between RMA systems	Number of properties within a TPU (per 10,000 properties) which lie within the Environment Agency (EA) flood risk map or the Highways Agency (HA) flood risk map and exceeds the threshold value. The upper quartile of all company data was used as the threshold value	1281	impacted properties per 10,000 properties

Breach thresholds to be applied at the tactical planning unit (TPU) level			
Indicator	**Breach description (per TPU)**	**Threshold value**	**Units**
Planned residential new development	Acceptable percentage increase in population growth exceeds the threshold value	varies with existing PE and number of years look ahead (see Table B-3 in Appendix B)	% population growth
WINEP	The number of measures listed in the latest WINEP defined as investigations, option appraisals or non-cost beneficial exceeds the threshold value. (Excludes investment within current cycle, and high frequency spillers.)	1	measure on the WINEP
Sewer collapses	Number of sewer collapses normalised per 10,000km (in any of the preceding three years) exceeds the company average for the last year	7.49	average sewer collapses per 10,000km (for last year)
Sewer collapses (small catchments)	Number of sewer collapses per year (in any of the preceding three years) is at least the threshold value	2	incidents per year
Sewer blockages	Number of sewer blockages normalised per 10,000km (in any of the preceding three years) exceeds the company average over the last three years	276	average sewer blockages per 10,000km (over three years)
Sludge facilities	Wastewater treatment works contains sludge thickening facilities, dewatering facilities, digestion facilities and/or lime addition facilities	none	none
Proximity to permit	Final effluent data classified as a threshold value by corporate systems	high or medium	risk level

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