Problem Characterisation
Tangmere (TANG)

This document describes the causes of the risks identified by the Baseline Risk and Vulnerability Assessment (BRAVA). The BRAVA results for this wastewater system are summarised in Table 1. The results indicate that flooding, pollution and water quality are the main concerns in this wastewater system. We have completed risk assessments for 2050 where we have the data and tools available to do so. For the other planning objectives, we will explore how we can predict future risks for the next cycle of DWMPs. All the risk assessment methods need to be reviewed after the first DWMPs have been produced with a view to improve the methods and data for future planning cycles.

Table 1: Results of the BRAVA for Tangmere wastewater system

Planning Objectives		2020	Driver	2050
1	Internal Sewer Flooding Risk	0	-	
2	Pollution Risk	0	-	
3	Sewer Collapse Risk	2	Operational	
4	Sewer Flooding in a 1 in 50-year storm	1	Hydraulic	1
5	Storm Overflow Performance	0	-	0
6	WTW Water Quality Compliance	0	Quality	1
7	Flooding due to Hydraulic Overload	1	Hydraulic	1
8	WTW Dry Weather Flow Compliance	0	-	1
9	Good Ecological Status / Good Ecological Potential	0	-	
10	Surface Water Management	0	-	
11	Nutrient Neutrality	1	Unknown	1
12	Groundwater Pollution	1	Operational	
13	Bathing Waters	2	Customer	
14	Shellfish Waters	NA	-	

Key

BRAVA Risk Band	
NA	Not Applicable*
0	Not Significant
1	Moderately Significant
2	Very Significant

*No issues relevant to planning objective within Wastewater System

Investment Strategy

The risks identified in this wastewater system mean that we have assigned the following investment strategy:

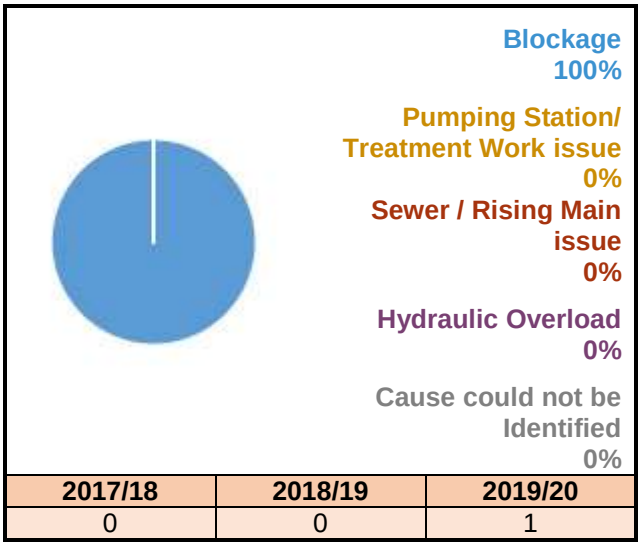
Improve

This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address current performance issues (and consider future risks when implementing improvements).

Planning Objective 1: Internal Sewer Flooding Risk

The number of internal sewer flooding incidents reported during the three years considered by the risk assessment are shown in Figure 1. The total number of connections in this wastewater system means there have been less than 1.68 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

Figure 1: Number of internal flooding incidents per annum and causes

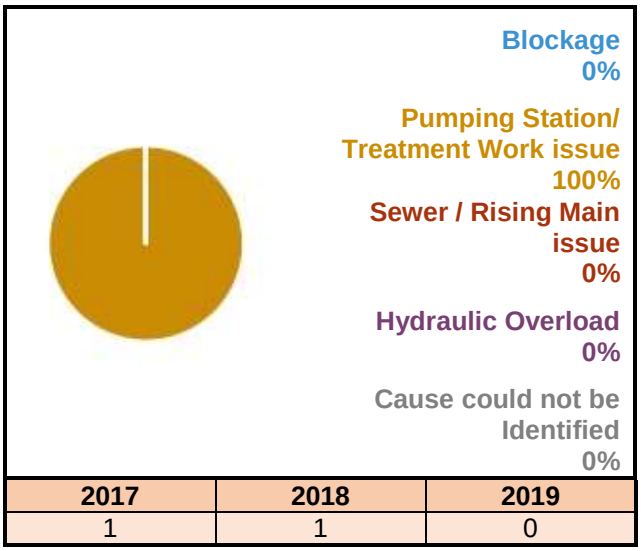


2017/18	2018/19	2019/20
0	0	1

Planning Objective 2: Pollution Risk

The number of pollution incidents reported during the three years considered by the risk assessment are shown in Figure 2. The length of sewer in this wastewater system means there have been less than 24.51 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

Figure 2: Number of pollution incidents per annum and causes



2017	2018	2019
1	1	0

Planning Objective 3: Sewer Collapse Risk

The number of sewer collapses reported during the three years considered by the risk assessment are shown in Table 2. The length of sewer in this wastewater system means there have been more then 9.44 incidents per 1,000km per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.

Table 2: Sewer collapses and rising main bursts

Sewer Collapse	**2017/18**	0
	2018/19	0
	2019/20	0
Rising Main Bursts	**2017/18**	2
	2018/19	4
	2019/20	2

The primary driver is 'Operational' as the cause of these collapses and bursts is due to the age and condition of the sewers.

Planning Objective 4: Sewer Flooding in a 1 in 50 Year Storm

The risk of flooding in a 1 in 50 year storm is moderately significant in 2020 and 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 50 - 60 properties within this wastewater system are in areas that could flood by water escaping from sewers. This model prediction increases the number of properties in areas at risk from flooding to approximately 100 - 200 by 2050.

Our wastewater networks are generally designed with capacity for up to a 1 in 30 year storm, hence flooding is expected to occur during more severe storms such as a 1 in 50 year event. Flooding will occur due to insufficient capacity of the drainage system either on the surface before it enters the drainage system, and/or from manholes, in people's homes or at a low point elsewhere in the system.

Planning Objective 5: Storm Overflow Performance

The storm overflow performance risk has been assessed as not significant in 2020 and 2050.

Planning Objective 6: Wastewater Treatment Works Water Quality Compliance

The risk of non-compliance with our wastewater quality permit has been assessed as not significant for 2020 but is predicted to increase to moderately significant by 2050. This is because the wastewater treatment works has no record of compliance failure during the last three years (2018-2020). However it was assessed to not have adequate capacity to cope with future growth in the wastewater system.

Planning Objective 7: Flooding due to Hydraulic Overload

This is an assessment of the risk of flooding from sewers during a 1 in 30 year storm, and more frequent rainfall, to understand where flooding could occur. The risk of sewer flooding due to hydraulic overload is moderately significant in 2020 and 2050. The annualised number of properties in areas at risk of flooding is shown in Table 3.

Table 3: Annualised number of properties at risk per 10,000 connections.

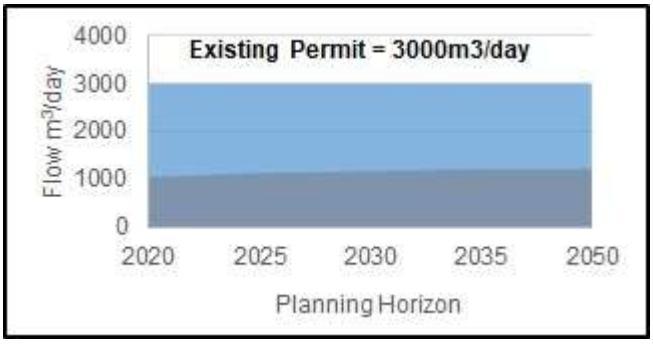
Rainfall Return Period (yr)	Number of Properties at Risk		Annualised per 10,000 connections	
	2020	2050	2020	2050
1 in 1	0	7	0	4
1 in 2	0	10	0	4
1 in 5	0	18	0	3
1 in 10	6	60	1	6
1 in 20	35	84	2	4
1 in 30	40	86	1	3
Total Annualised			**4**	**24**

This indicates that the capacity of the wastewater network can be exceeded during 1 in 30 year storms (or more frequent events). Future growth, creep and/or climate change are not anticapted to significantly increase the risk by 2050.

Planning Objective 8: Wastewater Treatment Works Dry Weather Flow Compliance

The risk of Wastewater Treatment Works Dry Weather Flow Compliance is not significant for 2020 but is predicted to increase to moderately significant in 2050, shown in Figure 3. This is because the predicted DWF in 2050 might be between 80% and 100% of the current permit.

Figure 3: Recorded and predicted dry weather flow with existing permit



Planning Objective 9: Good Ecological Status / Good Ecological Potential

Table 4: Waterbodies not achieving GES/GEP

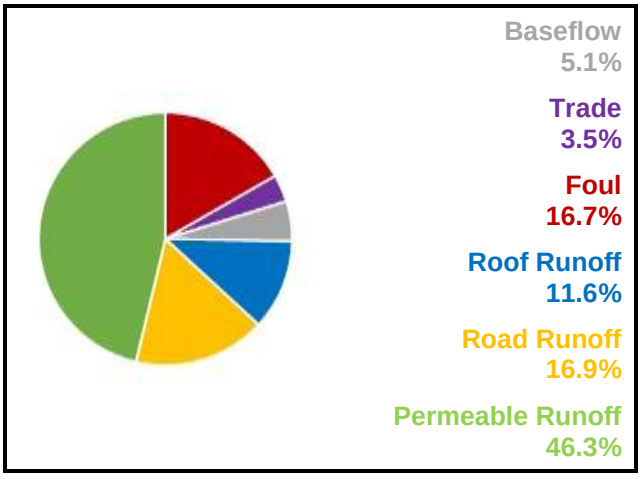
Waterbody	Classification	EA-Status	Activity
Aldingbourne Rife	Ammonia (Phys-Chem)	Moderate	Sewage discharge (continuous)

Table 4 shows the waterbodies connected to this wastewater system are not achieving Good Ecological Status or Potential (GES/GEP). The Environment Agency has attributed the 'reasons for not achieving good status' to water company operations. Our risk assessment has been assessed based on the worst assigned status (Moderate) and has been moderated from moderately significant to not significant because of the presence of Tertiary Treatment at the wastewater system Treatment Works.

Planning Objective 10: Surface Water Management

Figure 4 illustrates the sources of water flowing in the wastewater system during a 1 in 20 year storm. It shows that surface water runoff from roofs, road and permeable surfaces constitutes more than 74.8% of the flow in the sewers. The total contribution of foul water from homes is 16.7% with business contributing 3.5%. The baseflow is infiltration from water in the ground and makes up 5.1% of the flow in the system.

Figure 4: Sources of water flowing in sewers during a 1 in 20 year storm



Planning Objective 11: Nutrient Neutrality

Table 5: Habitat Sites hydraulically linked to wastewater system

Habitat Sites	
Solent and Dorset Coast	Nitrate permit review required

The risk to internationally designated habitat sites from this wastewater system is moderately significant in 2020 and 2050. This is because Natural England have advised that there is a risk to condition for the habitat sites that are hydraulically linked to our wastewater system, listed in Table 5.

Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is moderately significant. The wastewater system network of sewers extends across geographical areas that are designated as a Source Protection Zone (SPZ) for water supply. An estimated 23% of the sewer network crosses SPZ 1 or SPZ 2 and infiltration in the wastewater system is estimated to be of concern, based on infiltration equation used in the Wastewater Treatment Works Dry Weather Flow Compliance planning objective.

The primary driver is 'Operational' due to condition of our assets.

Planning Objective 13: Bathing Waters

The designated bathing waters that could be affected by discharges from this wastewater system are shown in Table 6, along with the current classification from the Environment Agency.

Table 6: Bathing Water annual results

Bathing Waters	Annual Results		
	2017	2018	2019
Felpham	Sufficient	Sufficient	Sufficient
Bognor Regis East	Good	Excellent	Good

The risks from this wastewater system on Felpham and Bognor Regis East bathing waters has led to an assessment of is very significant.

The primary driver is ‘Customer’ due to suspected foul to surface water misconnections as well as suspected agriculture affecting the bathing waters in this wastewater system.

Planning Objective 14: Shellfish Waters

The discharges from this wastewater system do not impact on any designated shellfish waters.