



# Problem Characterisation

## Thornham (THOR)

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 Thornham wastewater system**

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

### 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).

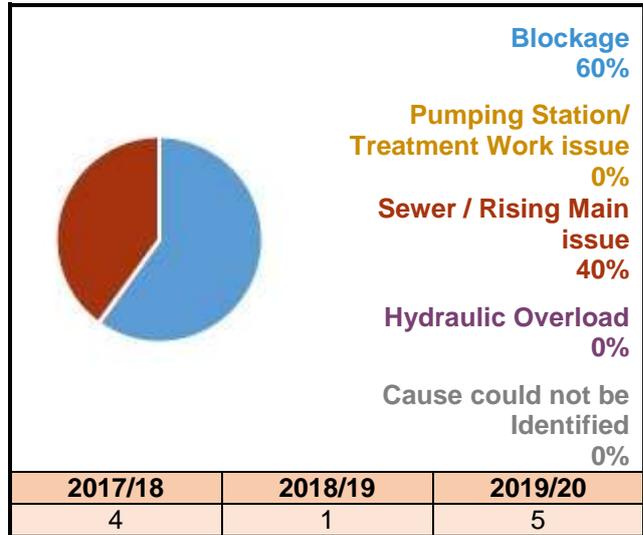


**Planning Objective 1: Internal Sewer Flooding Risk**

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 more than 3.35 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.<sup>2</sup>

The primary driver for internal sewer flooding in this wastewater system is 'Customer'. Blockages caused 60% of all incidents recorded in this wastewater system. Blockages are often caused by fats, oils, grease, nappies, wet wipes and sanitary products within the system. These items are non-flushable and should not be disposed of into wastewater systems.

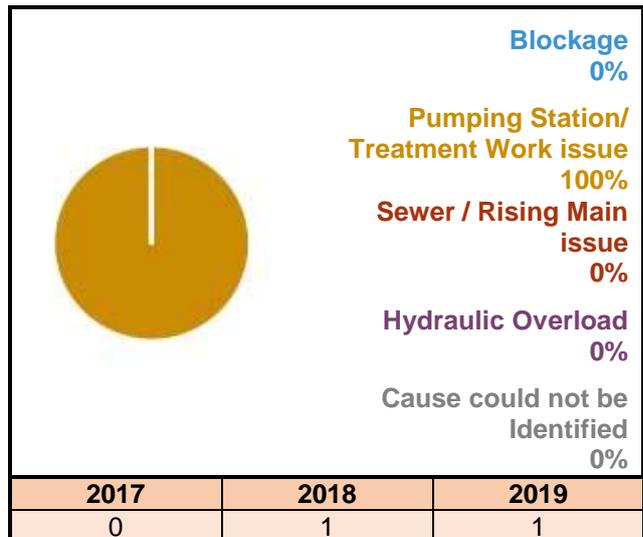
**Figure 1: Number of internal flooding incidents per annum and causes**



**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**



**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 less than 5.72 incidents per 1,000km per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

**Table 2: Sewer collapses and rising main bursts**

Sewer Collapse	2017/18	1
	2018/19	1
	2019/20	0
Rising Main Bursts	2017/18	1
	2018/19	0
	2019/20	0

### 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 300 - 400 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 700 - 800 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 very significant for both 2020 and 2050. Table 3 shows the overflows that discharge above the low threshold set for storm overflow discharges to Shellfish Water, Bathing Water and inland rivers.

The primary driver for the Storm Overflow Performance is 'Hydraulic.'

**Table 3: Overflows exceeding discharge frequency threshold per annum**

	Number of overflows		Threshold for number of discharges per annum		
	2020	2050	Low	Medium	High
<b>Shellfish Waters</b>	1 High	1 High	Less than 8	Between 8-10	10 or more
<b>Bathing Waters</b>	0 Medium	1 High	Less than 3	Between 3-10	10 or more
<b>Freshwater</b>	1 Medium	1 Medium	Less than 20	Between 20-40	40 or more

### 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. The risk The annualised number of properties in areas at risk of flooding is shown in Table 4.

**Table 4: 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	1	108	1	68
1 in 2	10	164	4	65
1 in 5	71	322	13	58
1 in 10	144	431	14	41
1 in 20	253	563	12	27
1 in 30	325	656	11	22
<b>Total Annualised</b>			<b>54</b>	<b>281</b>

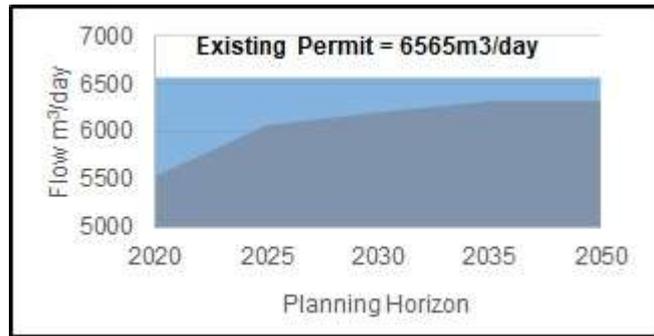
This indicates that the existing capacity of the wastewater network can be exceeded during 1 in 30 year storms (or more frequent events), and that the risk will increase due to future growth, creep and/or climate change by 2050.

**Planning Objective 8: Wastewater Treatment Works Dry Weather Flow Compliance**

The risk of Wastewater Treatment Works Dry Weather Flow Compliance is moderately significant for both 2020 and 2050. This is because the average annual dry weather flow for 2017, 2018 and 2019 has been between 80% and 100% of the current permit, shown in Figure 3. The predicted DWF in 2050 is also expected to remain below 100% of the current permit.

The primary driver is 'Quality' due to the permit and capacity at the treatment work.

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



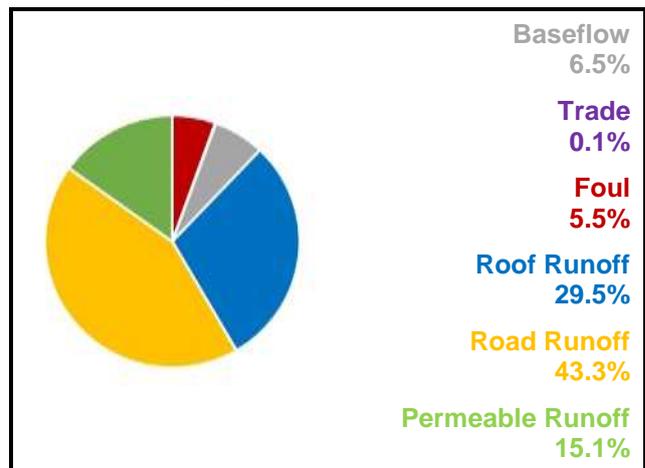
**Planning Objective 9: Good Ecological Status / Good Ecological Potential**

This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

**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 87.9% of the flow in the sewers. The total contribution of foul water from homes is 5.5% with business contributing 0.1%. The baseflow is infiltration from water in the ground and makes up 6.5% 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

The risk to internationally designated habitat sites from this wastewater system is very 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.

**Table 5: Habitat Sites hydraulically linked to wastewater system**

Habitat Sites	
Chichester and Langstone Harbours	Phosphate permit review required Overflow Spills
Solent and Dorset Coast	Phosphate permit review required Overflow Spills
Solent Maritime	Phosphate permit review required Overflow Spills

### Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is not significant. Although our wastewater network crosses over Source Protection Zones (SPZ) used for water supply, there is no evidence to suggest our network is leaking into these SPZs.

### 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. The risks from this wastewater system on these bathing waters is not significant. This is because all the designated bathing waters affected by this wastewater system have passed annual inspections..

**Table 6: Bathing Water annual results**

Bathing Waters	Annual Results		
	2017	2018	2019
West Wittering	Excellent	Excellent	Excellent
Eastoke	Excellent	Excellent	Excellent

### Planning Objective 14: Shellfish Waters

The discharges from this wastewater system can affect the designated shellfish waters shown in Table 7. The risk of not achieving the faecal standards for shellfish in these designated waters from this wastewater system is moderately significant. This is because the CEFAS classification for the shellfish waters is Long Term Class B.

**Table 7: Shellfish Waters linked to wastewater system**

Shellfish Waters
Chichester Harbour (Emsworth)
Chichester Harbour (Thornham)
Chichester Harbour (Chichester)