Drainage and Wastewater Management Plan

Sittingbourne
Wastewater System Plan

from Southern Water

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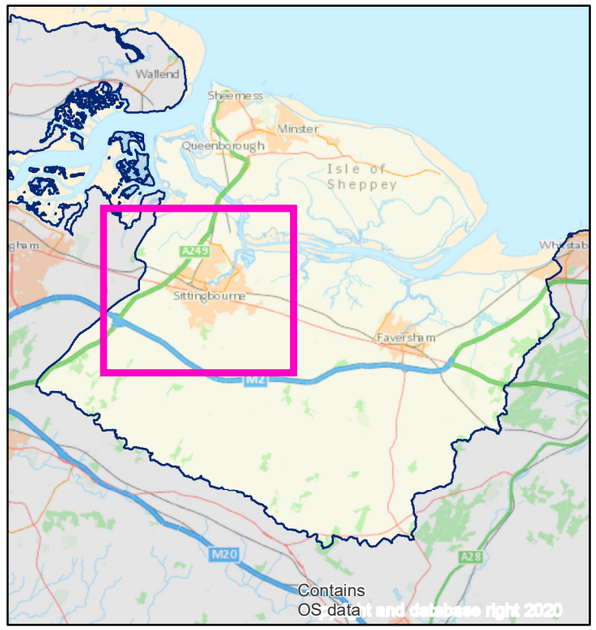
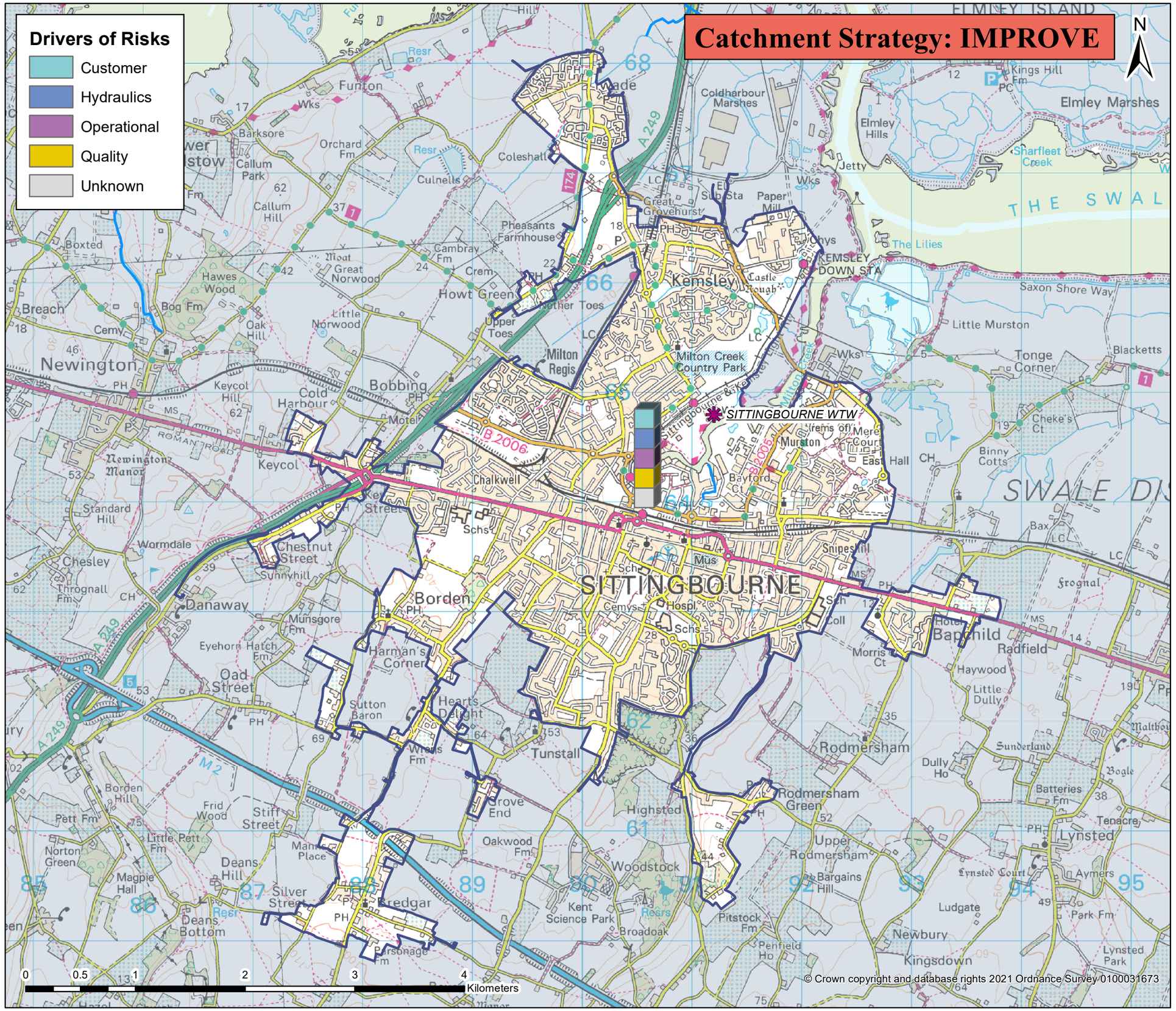
Sittingbourne wastewater system: map and key facts



Population Equivalent (PE)	**59,931**
Discharge Waterbody	**Milton Creek**
Number of Pumping Stations	**34**
Number of Overflows	**9**
Length of Sewer (km)	**398.9**
Catchment Reference	**SITT**

BRAVA Results Table (SITT)			
	Planning Objective	**2020**	**2050**
1	Internal Sewer Flooding Risk	1	
2	Pollution Risk	0	
3	Sewer Collapse Risk	0	
4	Risk of Sewer Flooding in a 1 in 50 year storm	1	1
5	Storm Overflow performance	2	2
6	Risk of WTW Compliance Failure	0	2
7	Risk of flooding due to Hydraulic Overload	1	2
8	Dry Weather Flow Compliance	1	2
9	Good Ecological Status / Potential	0	
10	Surface Water Management	1	
11	Nutrient Neutrality	2	2
12	Groundwater Pollution	2	
13	Bathing Waters	NA	
14	Shellfish Waters	1	



Problem Characterisation
Sittingbourne (SITT)

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 Sittingbourne wastewater system

Planning Objectives		2020	Driver	2050
1	Internal Sewer Flooding Risk	1	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	2
7	Flooding due to Hydraulic Overload	1	Hydraulic	2
8	WTW Dry Weather Flow Compliance	1	Quality	2
9	Good Ecological Status / Good Ecological Potential	0	-	
10	Surface Water Management	1	Hydraulic	
11	Nutrient Neutrality	2	Unknown	2
12	Groundwater Pollution	2	Operational	
13	Bathing Waters	NA	-	
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

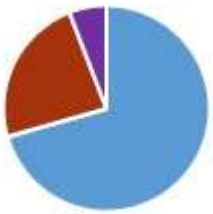
This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address 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 between 1.68 and 3.35 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'moderately significant' band.

The primary driver for internal sewer flooding in this wastewater system is 'Customer'. Blockages caused 71% 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



Blockage 71%

Pumping Station/ Treatment Work issue 0%

Sewer / Rising Main issue 24%

Hydraulic Overload 6%

Cause could not be Identified 0%

2017/18	2018/19	2019/20
4	10	3

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

Blockage 50%

Pumping Station/ Treatment Work issue 50%

Sewer / Rising Main issue 0%

Hydraulic Overload 0%

Cause could not be Identified 0%

2017	2018	2019
0	1	1

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**	2
	2018/19	3
	2019/20	0
Rising Main Bursts	**2017/18**	0
	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 1500 - 1600 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 2200 - 2300 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
Shellfish Waters	1 High	1 High	Less than 8	Between 8-10	10 or more
Bathing Waters	0 Medium	0 High	Less than 3	Between 3-10	10 or more
Freshwater	2 Medium	2 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 very 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	109	257	69	162
1 in 2	163	387	64	152
1 in 5	471	791	85	143
1 in 10	728	1168	69	111
1 in 20	986	1607	48	78
1 in 30	1207	1876	40	62
Total Annualised			**375**	**709**

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 2020 but is predicted to increase to very significant in 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. This is because the predicted DWF in 2050 is expected to exceed 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

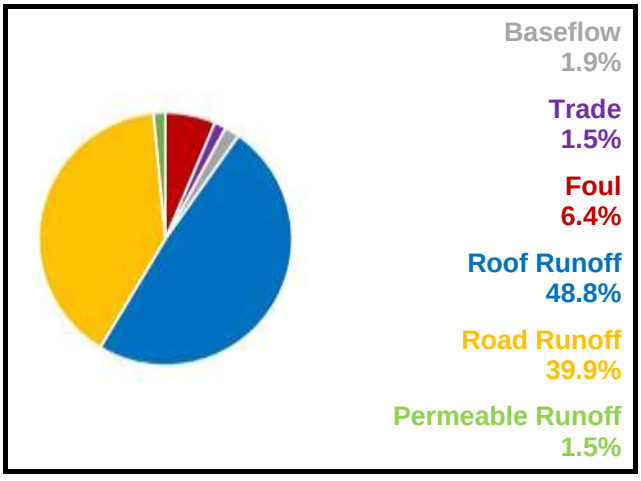
This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

Planning Objective 10: Surface Water Management

Our initial high level assessment indicated that there is moderately significant interaction between surface water flooding and flooding from sewers in this wastewater system.The cause of this localised flooding is the capacity of the drainage network in these areas to convey both wastewater and surface water run-off.

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 90.2% of the flow in the sewers. The total contribution of foul water from homes is 6.4% with business contributing 1.5%. The baseflow is infiltration from water in the ground and makes up 1.9% 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	
The Swale	Phosphate and Nitrate permit review required Overflow Spills
Medway Estuary & Marshes	Condition Assessment after 2025

Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is very significant. The wastewater system network of sewers extends across geographical areas that are designated as a Source Protection Zone (SPZ) for water supply. Sewer survey data indicates that parts of the sewer network are in poor condition and are likely to leak sewage.

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

Planning Objective 13: Bathing Waters

This wastewater system does not discharge into a designated bathing water.

Planning Objective 14: Shellfish Waters

The discharges from this wastewater system can affect the designated shellfish waters shown in Table 6.

Table 6: Shellfish Waters linked to wastewater system

Shellfish Waters
Swale Central

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.

Generic Options Assessment for: Sittingbourne (SITT)

Planning Objectives		2020	Driver	2050
PO1	Internal Flooding	1	Customer	-
PO2	Pollution Risk	0	-	-
PO3	Sewer Collapse	0	-	-
PO4	Risk of Sewer Flooding in 1 in 50 yr	1	Hydraulic	1
PO5	Storm Overflow Performance	2	Hydraulic	2
PO6	Risk of WTW Compliance Failure	0	Quality	2
PO7	Annualised Flood Risk/Hydraulic Overload	1	Hydraulic	2
PO8	DWF Compliance	1	Quality	2
PO9	Achieve Good Ecological Status	0	-	-
PO10	Improve Surface Water Management	1	Hydraulic	-
PO11	Secure Nutrient Neutrality	2	Unknown	2
PO12	Reduce Groundwater Pollution	2	Operational	-
PO13	Improve Bathing Water Quality	NA	-	-
PO14	Improve Shellfish Water Quality	1	Unknown	-

Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
Source (Demand) Measures (to reduce likelihood)	Control / Reduce surface water run-off		Y	-	Natural Flood Management; rural land management and catchment management; SuDS including blue and green infrastructure; storm management
	Reduce groundwater levels		N	Reducing groundwater levels would reduce the risks from infiltration into the network. However, in practice, reducing groundwater levels will be detrimental to the environment, ground conditions and is prohibitively too costly to implement. For these reasons, this generic option has been discounted.	Reduce leakage from water supply pipes; pump away schemes to locally lower groundwater near sewer network
	Improve **quality** of wastewater		Y	-	Domestic and business customer education; incentives and behaviour change (reduce Fats, Oils & Grease, wet wipes etc.); monitoring trade waste at source; on-site black water and/or greywater pre-treatment
	Reduce the **quantity** / demand		Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source
Pathway (Supply) Measures (to reduce likelihood)	Network Improvements		Y	-	Asset optimisation; additional network capacity; storage; separate flows; structural repairs; re-line sewer pipe and manholes; smart networks.
	Improve Treatment Quality		Y	-	Increase treatment capacity; rationalisation of treatment works (centralisation / de-centralisation); install tertiary plant; UV plant or disinfection facilities; innovation; improve Technical Achievable Limits; new WTWs
	Wastewater Transfer to treatment elsewhere		Y	-	Transfer flow to other network or treatment sites; transport sewage by tanker to other sites
Receptor Measures (to reduce consequences)	Mitigate impacts on Air Quality		N/A	Not included in first round of DWMPs	Carbon offsetting; noise suppression /filtering; odour control and treatments
	Improve Land and Soils		N/A	Not included in first round of DWMPs	Sludge soil enhancement
	Mitigate impacts on receiving waters		Y	-	River enhancement, aeration
	Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
Other	Study / Investigation		Y	-	Additional data required; hydraulic model development; WQ monitoring and modelling

August 2021
Version 1

Sittingbourne Wastewater System - Outline Options Appraisal

Generic Option	Location of Risk	Planning Objective and Description of Risk	Option Reference	Description	Further Description	Unconstrained Option?	Constrained Option?	Feasible Option?	Net Benefits	Estimated Cost	Preferred Option	Best value / Least cost or Reasons for Rejection
Control/ Reduce surface water entering the sewers												
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Catchment wide	PO1 - Internal Flooding	SITT.SC03.1	Customer Education Programme	Customer education programme targeting Miller Close, London Road, Beauvoir Drive, High Street, Pippin Close, East Street, Starveacre Lane, Staplehurst Road, Station Street, and Coombe Drive, to reduce the risk.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Road / Street	PO2- Pollution Risk	SITT.SC03.2	Customer Education Programme	Customer education programme to reduce the risk.	No						Deliver the required outcome
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	London Road, High Street, East Street, Staplehurst Road, Station Street	PO1 - Internal Flooding	SITT.SC03.3	Jetting programme	Increase frequency of MST (Maintenance Scheduled Tasks).	Yes	Yes	Yes	Minor Positive +	£135K	Yes	Best Value
Control / Reduce the quantity / flow of wastewater entering sewer system	Sittingbourne WTW	PO8 (2050)- Dry Weather Flow	SITT.SC04.1	Water Efficient Appliance / Measures	Southern Water aims to reduce water consumption to 100 l/h/d by 2040.	No						Deliver the required outcome
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC01 Swanstree Avenue	PO4 & PO7 - Growth	SITT.PW01.1	Upsize	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC02 Canterbury Road	PO4 & PO7 - Growth	SITT.PW01.2	Upsize	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC03 Iwade	PO4 & PO7 - Growth	SITT.PW01.3	New ring sewers and sewer upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC04 London Road	PO4 & PO7 - Growth	SITT.PW01.4	New PS and rising main, upsizing and online storage	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC05 London Road	PO4 & PO7 - Growth	SITT.PW01.5	Upsizing	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC06 Swale Way	PO4 & PO7 - Growth	SITT.PW01.6	Two new PS and RM, gravity sewer directly to the WTW	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC07 A249	PO4 & PO7 - Growth	SITT.PW01.7	New PS, RM, and gravity sewer	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC10 A249	PO4 & PO7 - Growth	SITT.PW01.8	Upsize	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC011 Saffron Way	PO4 & PO7 - Growth	SITT.PW01.9	Upsize	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC012 Newbridge Avenue	PO4 & PO7 - Growth	SITT.PW01.10	Upsize	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC13 Grovehurst Road t	PO4 & PO7 - Growth	SITT.PW01.11	Upsize	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC014 Quinton Road	PO4 & PO7 - Growth	SITT.PW01.12	New PS and rising main	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC015 Sittingbourne WTW	PO4 & PO7 - Growth	SITT.PW01.13	Increase pumping rate and inlet penstocks openings, new RM	DAP Option.	Yes	Yes	Yes	Major Positive +++	£630K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Highsted- Inner Zone SPZ2 TCZ Keycol- Inner Zone SPZ2 TCZ Danaway- SPZ2 TCZ	PO1 – Internal Flooding PO12 – Groundwater Pollution	SITT.PW01.14	Pipe Rehabilitation Programme	Targeted CCTV / electroscan surveys and proactive sewer rehabilitation to reduce risk of sewer collapse.	Yes	Yes	Yes	Minor Positive +	£625K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SITT FC017 - SITTINGBOURNE WTW	PO5 ,PO7, and PO14 – Spills, Flooding, and SW	SITT.PW01.15	Additional Storage Capacity	Offline storage of 2744m3 required to achieve a 3 Spill 2020 solution.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	SITTINGBOURNE WTW	PO6 - WTW compliance	SITT.PW02.1	Increase Capacity	Increase biological capacity at the Treatment Works.	Yes	Yes	Yes	Minor Positive +	£26,080K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	SITTINGBOURNE WTW	PO8 (2050) - Dry Weather Flow	SITT.PW02.2	Permit Review	Increase capacity at the Works and review Dry Weather Flow permit to reduce risk to DWF compliance.	Yes	Yes	Yes	Minor Positive +	£2,995K	Yes	Best Value
Wastewater Transfer												
Mitigate impacts on Air Quality (e.g. Carbon neutrality, noise, odour)												Not included in the first round of DWMPs
Improve Land and Soils												Not included in the first round of DWMPs
Mitigate impacts on Water Quality	The Swale, Medway Estuary & Marshes	PO11 - Secure Nutrient Neutrality	SITT.RC03.1	River enhancement and mitigation	Reduce consented permit levels for nutrients and solids in the final effluent from treatment works.	No						Do customer support it and Risk and uncertainty - future resilience
Mitigate impacts on Water Quality	The Swale, Medway Estuary & Marshes	PO11 - Secure Nutrient Neutrality	SITT.RC03.2	Effluent re-use	Re-use of effluent from site - pumping of this effluent ot potable porcess treatment works.	No						Cost Effective
Reduce consequences Properties (e.g. Property Flood Resilience)	TBC	PO1- Internal Flooding	SITT.RC04.1	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	The Swale Medway Estuary & Marshes	PO11 - Continuous (WTW treated effluent) and/or intermittent (storm overflow) wastewater discharges affecting Nutrient Neutrality (NN)	SITT.OT01.1	Nutrient Budget	Study / Investigation required to understand the impact of wastewater discharges and achieve or prevent deterioration from Natrural England's revised Common Standards Monitoring Guidance (rCSMG) targets Total Phosphorus and Total Nitrogen.	Yes	Yes	Yes	Minor Positive +	£75K	Yes	Best Value
Study/ investigation to gather more data	Highsted- Inner Zone SPZ2 TCZ Keycol- Inner Zone SPZ2 TCZ Danaway- SPZ2 TCZ	PO12- Ground Water Pollution	SITT.OT01.2	Study and Investigations	Study / Investigation required to understand ground water pollution mechanisms.	Yes	Yes	Yes	Minor Positive +	£100K	Yes	Best Value
Study/ investigation to gather more data	Swale Central	PO14- Shellfish Water Quality	SITT.OT01.3	Study overflows discharging to SW	Study / Investigation required to understand the impact of wastewater discharges, and achieve or prevent deterioration of shellfish waters Linking with 'Asset Strategy and Planning Team'.	Yes	Yes	Yes	Minor Positive +	£100K	Yes	Best Value

Sittingbourne Wastewater System - Outline Options Appraisal

Generic Option	Location of Risk	Planning Objective and Description of Risk	Option Reference	Description	Further Description	Unconstrained Option?	Constrained Option?	Feasible Option?	Net Benefits	Estimated Cost	Preferred Option	Best value / Least cost or Reasons for Rejection
Study/ investigation to gather more data	SITT P012 ST PAULS STREET SITTINGBOURNE CSO	PO5, PO7, PO14 - Spills, Flooding, and SW	SITT.OT01.4	Modelling investigation	No offline storage required to achive a 3 spill 2020 or 2050 solution No offline storage required to achive a 10 spill 2020 or 2050 solution No offline storage required to achive a 20 spill 2020 or 2050 solution Storage volume needs to be confirmed due to discrepancies between EDM and model data.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	SITT FC016 Crown Quay Lane CSO	PO4, PO5 and PO7 - Growth Projected population by 2040: 79,470	SITT.OT01.5	Modelling investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	Catchment wide	PO1 - Internal Flooding (hydraulic causes) PO4 - 1 in 50 year Flood Risk PO10 - Surface Water Management	SITT.OT01.6	Hydraulic Study	Hydraulic surveys and verification to improve model confidence and accuracy of network simulations.	Yes	Yes	Yes	Minor Positive +	£190K	Yes	Best Value

DWMP Investment Needs

1. The options listed in the DWMP Investment Needs below are the preferred options in our DWMP. They will need further refinement as we implement the DWMP to confirm the exact location and scope of action needed, and the cost.

2. The costs are indicative costs for planning purposes only. The basis for the cost estimates, including assumptions and uncertainties, are explained in our DWMP Investment Plans.

3. The table of Investment Need provides an indicative cost so we know what level of funding is needed to reduce the risks. It is not a commitment to fund or deliver any option.

4. The Indicative Timescale is when the investment is needed. Some options may take several investment periods to achieve the desired outcomes.

5. Potential Partners have been identified in the table of Investment Needs. This is to indicate where there may be opportunities for us to work with these partners when developing and delivering these options. It is not a commitment by any of the partners to work with us.

6. These options will inform our future business plans as part of the Ofwat periodic review process to secure the finance to implement these options.

7. The options listed are prioritised by the method stated in the Programme Appraisal Technical Summary.

Date : May 2023
Version : 1.0

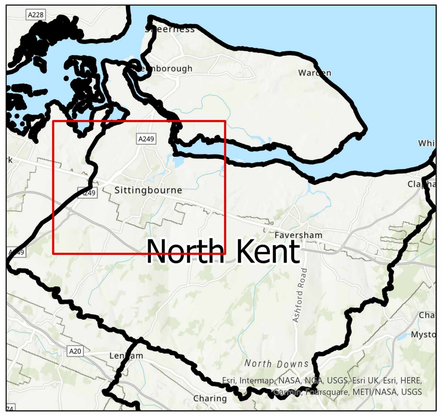
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
North Kent								
Sittingbourne								
SITT.SC03.1	North Kent	Sittingbourne	London Road, High Street, East Street, Staplehurst Road, Station Street	Customer Education Programme: Targeted campaign to reduce the amount of FOG (fats, oils and grease) and unflushables discharged into the sewer network	£115K	AMP8 onwards	-	PO1
SITT.SC03.3	North Kent	Sittingbourne	London Road, High Street, East Street, Staplehurst Road, Station Street	Enhanced Sewer Maintenance: Increase targeted sewer jetting to reduce the number of blockages in the network	£135K	AMP8 onwards	-	PO1
SITT.PW01.1	North Kent	Sittingbourne	Swanstree Avenue	Growth scheme from our Drainage Area Plan (DAP): Upsize 225mm diameter sewer on Swanstree Avenue	£630K	AMP9	-	PO4 PO7
SITT.PW01.2	North Kent	Sittingbourne	Canterbury Road	Growth scheme from our Drainage Area Plan (DAP): Upsize 225mm diameter sewers on Canterbury Road	£630K	AMP9	-	PO4 PO7
SITT.PW01.3	North Kent	Sittingbourne	Iwade area	Growth scheme from our Drainage Area Plan (DAP): Construct two new gravity sewers in Iwade area. Upsize three sections of existing sewer network.	£630K	AMP9	-	PO4 PO7
SITT.PW01.4	North Kent	Sittingbourne	London Road i	Growth scheme from our Drainage Area Plan (DAP): Upsize sewers and construction of new gravity sewer on London Road.	£630K	AMP9	-	PO4 PO7
SITT.PW01.5	North Kent	Sittingbourne	London Road ii	Growth scheme from our Drainage Area Plan (DAP): New Pumping Station (100m3 wet well) and new rising main.	£630K	AMP9	-	PO4 PO7
SITT.PW01.6	North Kent	Sittingbourne	Swale Way	Growth scheme from our Drainage Area Plan (DAP): 2 new gravity sewers for Kent Science Park, and 2 New Pumping Stations and rising mains.	£630K	AMP9	-	PO4 PO7
SITT.PW01.7	North Kent	Sittingbourne	A249 i	Growth scheme from our Drainage Area Plan (DAP): New gravity sewer. New Pumping Station (PS) and rising main (RM).	£630K	AMP9	-	PO4 PO7
SITT.PW01.8	North Kent	Sittingbourne	A249 ii	Growth scheme from our Drainage Area Plan (DAP): Upsize 150mm diameter sewer on Wises Lane to 375mm.	£630K	AMP9	-	PO4 PO7
SITT.PW01.9	North Kent	Sittingbourne	Saffron Way	Growth scheme from our Drainage Area Plan (DAP): Upsize sewers on Saffron Way	£630K	AMP9	-	PO4 PO7
SITT.PW01.10	North Kent	Sittingbourne	Newbridge Avenue	Growth scheme from our Drainage Area Plan (DAP): Upsize 225mm diameter sewer on Newbridge Avenue	£630K	AMP9	-	PO4 PO7
SITT.PW01.11	North Kent	Sittingbourne	Grovehurst Road	Growth scheme from our Drainage Area Plan (DAP): Upsize sewer on Grovehurst Road	£630K	AMP9	-	PO4 PO7
SITT.PW01.12	North Kent	Sittingbourne	Quinton Road	Growth scheme from our Drainage Area Plan (DAP): Construction of new gravity sewer on Quinton Road	£630K	AMP9	-	PO4 PO7

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
SITT.PW01.13	North Kent	Sittingbourne	Sittingbourne WTW	Growth scheme from our Drainage Area Plan (DAP): Increase the pumping rate of Sittingbourne WTW Storm Pump. New rising main for WTW. Increase inlet penstocks openings .	£630K	AMP9	-	PO4 PO7
SITT.PW01.14	North Kent	Sittingbourne	Highsted, Keycol, Danaway - Inner Zone SPZ2 TCZ	Sewer Rehabilitation: Targeted CCTV or electroscan surveys to check the integrity of sewers and reline or renew them to reduce the risk of groundwater pollution	£625K	AMP9	Kent County Council	PO1 PO12
SITT.PW02.1	North Kent	Sittingbourne	Sittingbourne WTW	Increase treatment capacity to allow for planned new development	£28,445K	AMP9	-	PO6
SITT.PW02.2	North Kent	Sittingbourne	Sittingbourne WTW	Increase capacity to allow for planned new development	£2,995K	AMP9	-	PO8
SITT.OT01.2	North Kent	Sittingbourne	Highsted, Keycol, Danaway - Inner Zone SPZ2 TCZ	Study and Investigation: Investigate the risk of groundwater pollution from trade effluent conveyed within the sewer system	£100K	AMP9 to AMP10	Environment Agency	PO12
SITT.OT01.3	North Kent	Sittingbourne	Swale Central	Study and Investigation: Understand the potential impact of wastewater discharges, and achieve or prevent deterioration of shellfish waters	£100K	AMP8	Environment Agency	PO14
SITT.OT01.6	North Kent	Sittingbourne	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£190K	AMP8	-	PO1 PO4 PO10
SITT.WINEP01.1	North Kent	Sittingbourne	SITTINGBOURNE SSO	Reduce the number of storm discharges from SITTINGBOURNE SSO by creating below-ground storage	£4,230K	AMP10	-	PO5
SITT.WINEP01.3	North Kent	Sittingbourne	EAST STREET LITTLEHAMPTON CSO	New or improved screen to reduce aesthetics impacts from storm discharges at EAST STREET LITTLEHAMPTON CSO	£130K	AMP12	-	PO5
SITT.WINEP01.4	North Kent	Sittingbourne	CHALKWELL ROAD SITTINGBOURNE CSO	New or improved screen to reduce aesthetics impacts from storm discharges at CHALKWELL ROAD SITTINGBOURNE CSO	£130K	AMP12	-	PO5
SITT.WINEP01.5	North Kent	Sittingbourne	MILL WAY SITTINGBOURNE CSO	New or improved screen to reduce aesthetics impacts from storm discharges at MILL WAY SITTINGBOURNE CSO	£130K	AMP12	-	PO5
SITT.WINEP01.6	North Kent	Sittingbourne	ATTLEE WAY GROVEHURST CEO	New or improved screen to reduce aesthetics impacts from storm discharges at ATTLEE WAY GROVEHURST CEO	£130K	AMP12	-	PO5
SITT.WINEP01.7	North Kent	Sittingbourne	IWADE CEO	New or improved screen to reduce aesthetics impacts from storm discharges at IWADE CEO	£130K	AMP12	-	PO5
SITT.WINEP01.8	North Kent	Sittingbourne	RIDHAM AVENUE KEMSLEY CEO	Reduce the number of storm discharges from RIDHAM AVENUE KEMSLEY CEO by creating below-ground storage	£1,350K	AMP12	-	PO5
SITT.WINEP.PO2.1	North Kent	Sittingbourne	Sittingbourne WTW	Action to reduce total phosphorus and/or total nitrogen levels from discharges which drain to internationally designated sites where there is a risk from nutrients	£40,600K	AMP10	-	PO9 PO11

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
SITT.WINEP01.2	North Kent	Sittingbourne	ST PAULS STREET SITTINGBOURNE CSO	Reduce the number of storm discharges from ST PAULS STREET SITTINGBOURNE CSO by a combination of SuDS and storage options	£13,300K	AMP10	-	PO4 PO5 PO7

Drainage and Wastewater Management Plan: Location of Potential Options SITTINGBOURNE Wastewater system in North Kent River Basin Catchment

(i) This map should be read in conjunction with the list of Investment Needs for this wastewater system
(ii) The areas shown on this map are the potential locations for the options. The location of the risk may be elsewhere in the system.
(iii) Labels for each location are the option references in the list of Investment Needs
(iv) Drainage Area Plan (DAP) options on flooding and growth are not shown.



- Customer Education
- Pipe Rehabilitation
- Asset Resilience
- Wastewater Treatment
- WINEP Nutrient Neutrality
- WINEP Storm Overflows

SITT.WINEP01.7
SITT.SC03.1
SITT.SC03.3
SITT.WINEP01.8
SITT.WINEP01.6
SITT.SC03.3
SITT.SC03.1
SITT.SC03.3
SITT.SC03.1
SITT.PW02.2
SITT.WINEP.PO2.1
SITT.PW01.14
SITT.WINEP01.5
SITT.WINEP01.1
SITT.WINEP01.2
SITT.WINEP01.4
SITT.SC03.3
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