



Drainage and Wastewater Management Plan

Fullerton
Wastewater System Plan



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**Southern
Water** 

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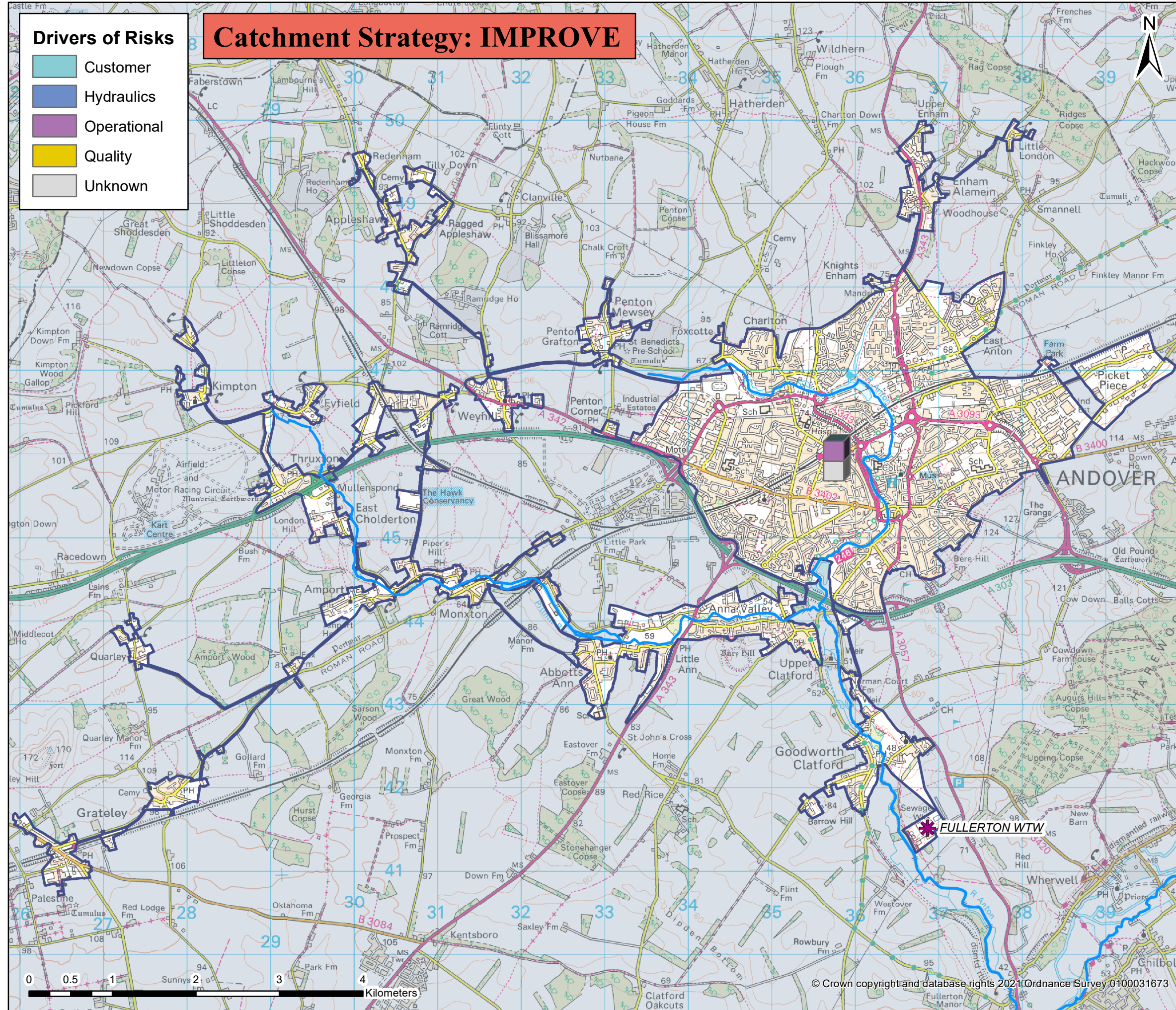
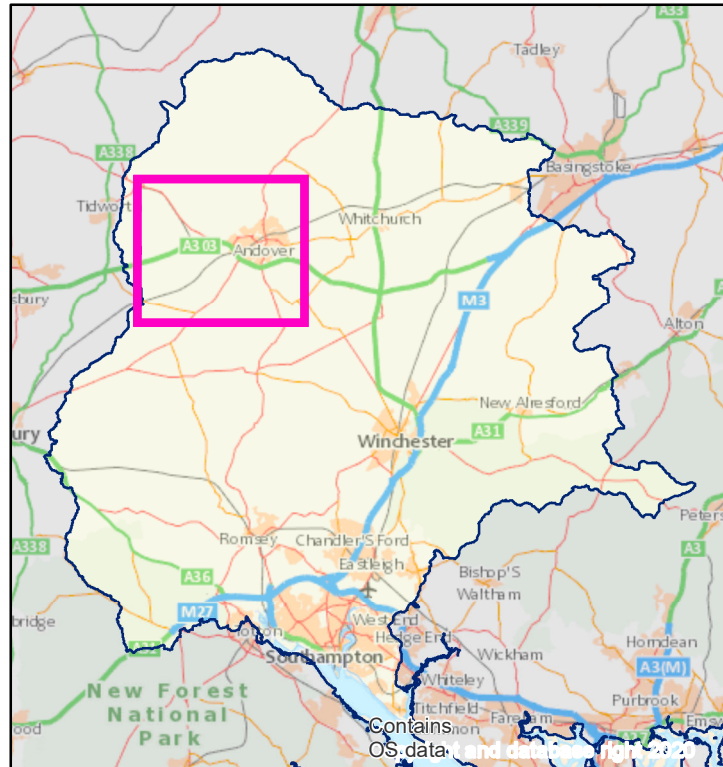
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Fullerton wastewater system: map and key facts



Population Equivalent (PE)	55,810
Discharge Waterbody	Anton - Lower
Number of Pumping Stations	46
Number of Overflows	2
Length of Sewer (km)	360.4
Catchment Reference	FULL

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



Problem Characterisation

Fullerton (FULL)

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 pollution and water quality are the main concerns in this wastewater catchment. 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 Fullerton wastewater system

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

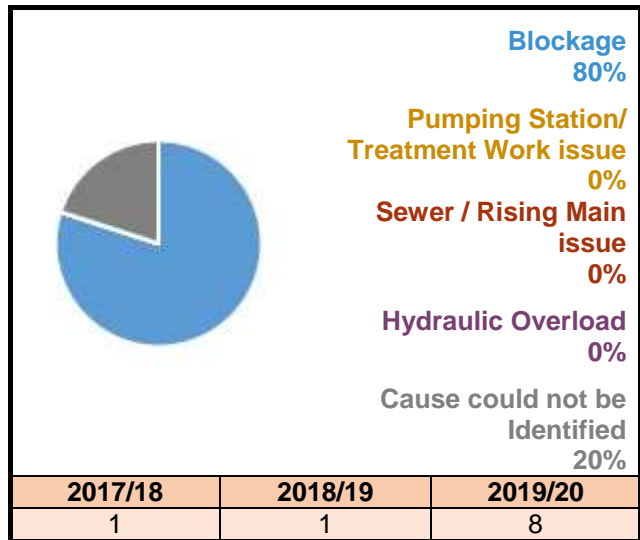
This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address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

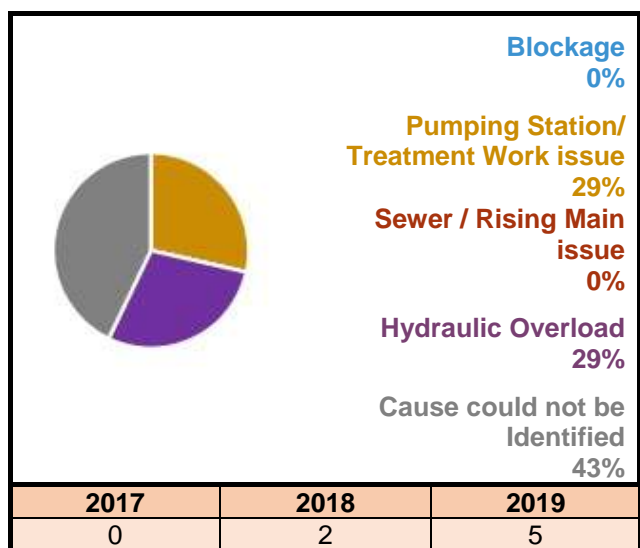
Figure 1: Number of internal flooding incidents per annum and causes



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 more than 49.01 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.

Figure 2: Number of pollution incidents per annum and causes



This planning objective requires further investigation to better understand the causes of risks and the drivers. The main cause of incidents contributing to 43 % of incidents, is Unknown in this wastewater system. Further information is needed to understand the cause of this risk.

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	0
	2018/19	2
	2019/20	0
Rising Main Bursts	2017/18	0
	2018/19	0
	2019/20	1

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

The risk of flooding in a 1 in 50 year storm is not significant in 2020 or 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 40 - 50 properties within this wastewater system are in areas that could flood by water escaping from sewers.

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

Our initial assessment is that flooding from hydraulic overload is not significant in this wastewater catchment for both 2020 and 2050. Our network modelling indicates that the risk of flooding due to hydraulic overload is not significant in this wastewater system. This is because there are a small proportion of properties in areas at risk from flooding as 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	2	7	1	4
1 in 2	6	7	2	3
1 in 5	7	11	1	2
1 in 10	11	41	1	4
1 in 20	41	48	2	2
1 in 30	48	66	2	2
Total Annualised			10	18

This indicates that the wastewater network currently has capacity for storm events for which the system was designed and the capacity is unlikely to be exceeded in the future.

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 might exceed the current permit.

The primary driver is 'Operational' because the contribution of infiltration to the baseline DWF is estimated to be above 50%, based on an equation using the recorded flow (Q90), the resident population reported in 2019 as well the contribution of trade effluent and cesspits from the annual return for 2019.

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



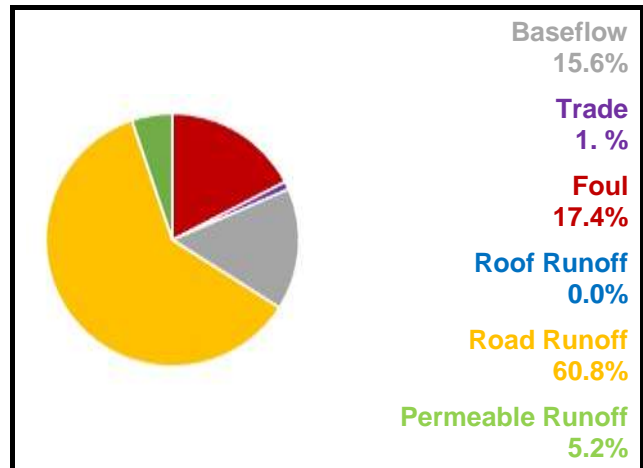
Planning Objective 9: Good Ecological Status / Good Ecological Potential

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 66. % of the flow in the sewers. The total contribution of foul water from homes is 17.4% with business contributing 1. %. The baseflow is infiltration from water in the ground and makes up 15.6% 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 moderately significant in 2020 but rises to very significant in 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 4.

Table 4: Habitat Sites hydraulically linked to wastewater system

Habitat Sites	
Solent Maritime	Nitrate permit review required
Solent & Southampton Water	No Threat/Remedy Identified or Anticipated
Solent and Dorset Coast	Nitrate permit review required

Our growth forecast suggest that more than 2,000 new homes could occur in this wastewater system by 2050 which means the risk to habitat sites increases to very significant by 2050.

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 27% 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

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

Planning Objective 14: Shellfish Waters

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

Generic Options Assessment for: Fullerton (FULL)



Planning Objectives		2020	Driver	2050	Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
PO1	Internal Flooding	0	-	-	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
PO2	Pollution Risk	2	Unknown	-		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
PO3	Sewer Collapse	0	-	-		Improve quality of wastewater		N	None of the significant risks are caused by the quality of wastewater entering the wastewater system.	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
PO4	Risk of Sewer Flooding in 1 in 50 yr	0	-	0		Reduce the quantity / demand		Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source
PO5	Storm Overflow Performance	0	-	0	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.
PO6	Risk of WTW Compliance Failure	0	Quality	1		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
PO7	Annualised Flood Risk/Hydraulic Overload	0	-	0		Wastewater Transfer to treatment elsewhere		N	The causes of risk are not due to where our systems discharge to the environment or our ability to increase the capacity to connect more homes. Transferring wastewater for treatment elsewhere will not reduce any of the significant risks in this catchment.	Transfer flow to other network or treatment sites; transport sewage by tanker to other sites
PO8	DWF Compliance	1	Operational	2	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
PO9	Achieve Good Ecological Status	0	-	-		Improve Land and Soils		N/A	Not included in first round of DWMPs	Sludge soil enhancement
PO10	Improve Surface Water Management	0	-	-		Mitigate impacts on receiving waters		Y	-	River enhancement, aeration
PO11	Secure Nutrient Neutrality	1	Unknown	2		Reduce impact on properties		N	There are no properties affected by the significant risks in this catchment, hence reducing impacts at property level will not mitigate any significant risks.	Property flood resilience; non-return valves; flood guards / doors; air brick covers
PO12	Reduce Groundwater Pollution	2	Operational	-	Other	Study / Investigation		Y	-	Additional data required; hydraulic model development; WQ monitoring and modelling
PO13	Improve Bathing Water Quality	NA	-	-						
PO14	Improve Shellfish Water Quality	NA	-	-						

Fullerton 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)												
Control / Reduce the quantity / flow of wastewater entering sewer system												
Network Improvements (eg increase capacity, storage, conveyance)	Thrupton Racecourse	PO8, PO12	FULL.PW01.1	Sewer relining	Relining of sewers following electroscanning survey.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Furzedown Lane Ampport Wps, Furzedown Lane Ampport Wps,	PO2- Pollution Risk	FULL.PW01.2	Maintenance Programme WPS	Improve resilience: Review operation and maintenance of Furzedown Lane Ampport pumping station to improve resilience.	Yes	Yes	Yes	Minor Positive +	£235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO2- Pollution Risk	FULL.PW01.3	Additional Storage	Additional Storage.	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO8 (2050)- Dry Weather Flow	FULL.PW01.4	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment.	No						Cost Effective
Network Improvements (eg increase capacity, storage, conveyance)	Andover- Inner & Outer Zone TCZ	PO12- Ground Water Pollution	FULL.PW01.5	Pipe Rehabilitation Programme	Total length of sewer within protection zones- 91.	Yes	Yes	Yes	Minor Positive +	£5,595K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	FULLERTON WTW	PO6 (2050)- WTW compliance	FULL.PW02.1	Increase Capacity	Catchment was banded 0 in 2020 (however should be Band 1); ARM Risk = 5923 of which 99.	Yes	Yes	Yes	Minor Positive +	£35,100K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	FULLERTON WTW	PO8 (2050)- Dry Weather Flow DWF Permit=19291m3 5739m3/day removal is required to achieve below 80% permit. The DWF is expected to exceed the current permit in 2050	FULL.PW02.2	Permit Review	Proposed permit-26464m3.	Yes	Yes	Yes	Minor Positive +	£2,970K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)												
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												
Reduce consequences Properties (e.g. Property Flood Resilience)												
Study/ investigation to gather more data	Truxton Racecourse	PO8, PO12	FULL.OT01.1	Electro-scanning of sewer	To identify leaks.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment wide	PO8, PO12	FULL.OT01.2	sewer condition survey	Survey to identify sewer condition and potential repair locations.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment Wide	PO2- Pollution Risk	FULL.OT01.3	Investigation into causes	Further investigation to identify the cause of the pollution incident.	No						Cost Effective and Deliver the required outcome
Study/ investigation to gather more data	Catchment Wide	PO8 (2050)- Dry Weather Flow	FULL.OT01.4	Infiltration Reduction Plan	Relining/improving structural grades of sewers across the catchment.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Study/ investigation to gather more data	Solent Maritime Solent & Southampton Water Solent and Dorset Coast	PO11 - Nutrient Neutrality	FULL.OT01.5	Nutrient Budget	Catchment is Hydraulically linked to; Solent Maritime (Threat/Remedy Identified or Anticipated) Solent & Southampton Water (NO Threat/Remedy Identified or Anticipated) Solent and Dorset Coast (Threat/Remedy Identified or Anticipated).	Yes	Yes	Yes	Minor Positive +	£75K	Yes	Best Value
Study/ investigation to gather more data	Andover- Inner & Outer Zone TCZ	PO12- Ground Water Pollution	FULL.OT01.6	Study and Investigations	Total length of sewer within protection zones- 87.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment Wide	PO1 PO2 PO12	FULL.OT01.7	Study and Investigations - Private Laterals	Study / Investigation: Identify locations of private lateral connections across the catchment, to better understand whose maintenance responsibility they are.	Yes	Yes	Yes	Minor Positive +	£TBC - With Partners	No	Best Value
Study/ investigation to gather more data	Catchment wide	PO1 PO5	FULL.OT01.8	Study and Investigations - NFMs	Study / Investigation: Identify suitable location/s for NFMs in the Fullerton catchment (update hydraulic model).	Yes	Yes	Yes	Minor Positive +	£TBC - With Partners	No	Best Value

Drainage and Wastewater Management Plan (DWMP)

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

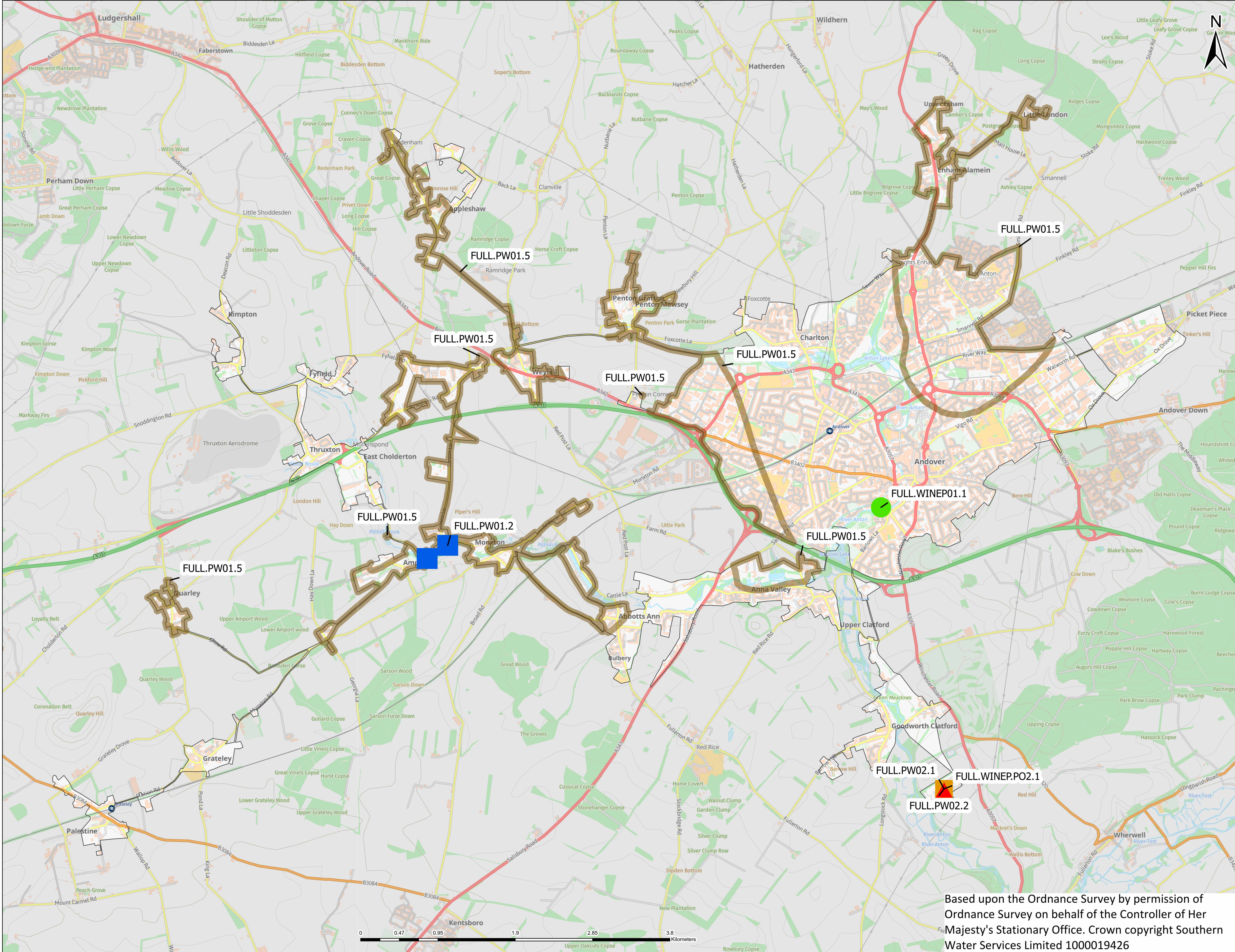
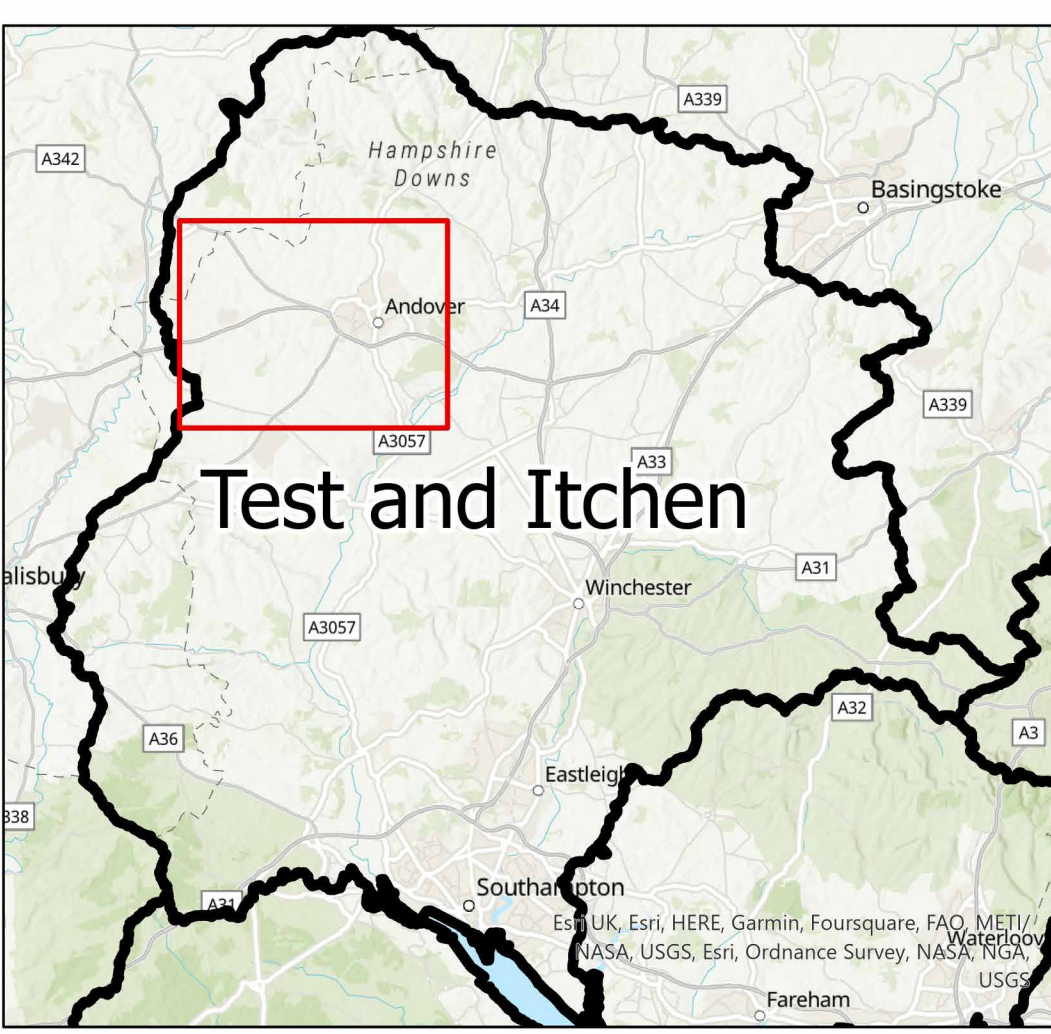
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Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
Test and Itchen								
Fullerton								
FULL.PW01.2	Test and Itchen	Fullerton	Furzedown Lane Amport WPS	Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents	£235K	AMP8 onwards	-	PO2
FULL.PW01.5	Test and Itchen	Fullerton	Andover- Inner & Outer Zone 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	£5,595K	AMP9	-	PO12
FULL.PW02.1	Test and Itchen	Fullerton	Fullerton WTW	Increase treatment capacity to allow for planned new development	£35,100K	AMP11	-	PO6
FULL.PW02.2	Test and Itchen	Fullerton	Fullerton WTW	Increase capacity to allow for planned new development	£4,000K	AMP8	Environment Agency	PO8
FULL.WINEP01.1	Test and Itchen	Fullerton	ANTON LANE ANDOVER CEO	New or improved screen to reduce aesthetics impacts from storm discharges at ANTON LANE ANDOVER CEO	£130K	AMP11	-	PO5
FULL.WINEP.PO2.1	Test and Itchen	Fullerton	Fullerton WTW	Conversion of existing tertiary treatment to denitrification to achieve 10mg/l Total Nitrogen permit (WINEP action 08SO104008)	£7,167K	AMP8	-	PO9 PO11
FULL.WINEP.PO2.2	Test and Itchen	Fullerton	Fullerton WwTW	Optimise existing process (WINEP OAR 08SO102635)	£120K	AMP8	-	PO9

Drainage and Wastewater Management Plan: Location of Potential Options FULLERTON Wastewater system in Test and Itchen 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

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