



Drainage and Wastewater Management Plan

East Worthing
Wastewater System Plan



from
**Southern
Water** 

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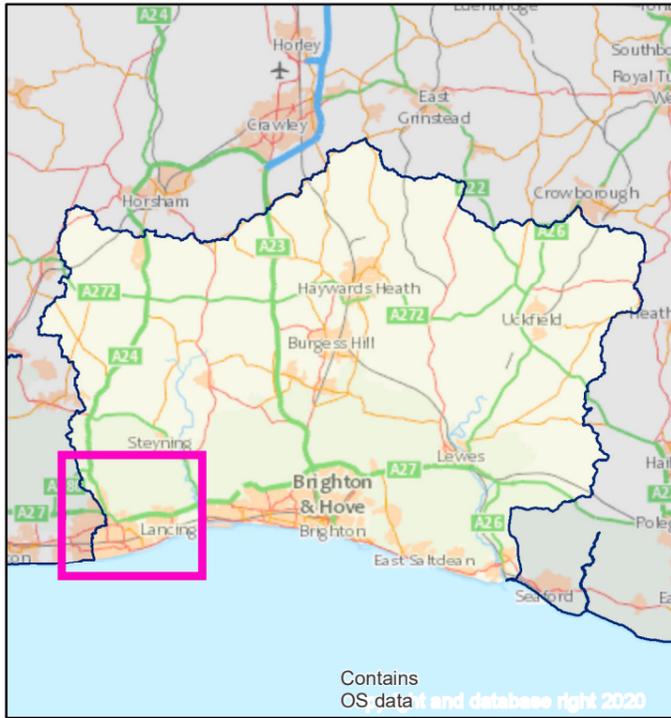
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East Worthing wastewater system: map and key facts



Population Equivalent (PE)	142,261
Discharge Waterbody	Long sea outfall into English Channel
Number of Pumping Stations	49
Number of Overflows	9
Length of Sewer (km)	1167.2
Catchment Reference	WOEA

BRAVA Results Table (WOEA)		
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	2	2
5 Storm Overflow performance	1	1
6 Risk of WTW Compliance Failure	0	0
7 Risk of flooding due to Hydraulic Overload	2	2
8 Dry Weather Flow Compliance	0	1
9 Good Ecological Status / Potential	0	
10 Surface Water Management	2	
11 Nutrient Neutrality	NA	NA
12 Groundwater Pollution	1	
13 Bathing Waters	2	
14 Shellfish Waters	NA	





Problem Characterisation

East Worthing (WOEA)

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 East Worthing 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	2	Hydraulic	2
5	Storm Overflow Performance	1	Hydraulic	1
6	WTW Water Quality Compliance	0	-	0
7	Flooding due to Hydraulic Overload	2	Hydraulic	2
8	WTW Dry Weather Flow Compliance	0	-	1
9	Good Ecological Status / Good Ecological Potential	0	-	
10	Surface Water Management	2	Hydraulic	
11	Nutrient Neutrality	NA	-	NA
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).

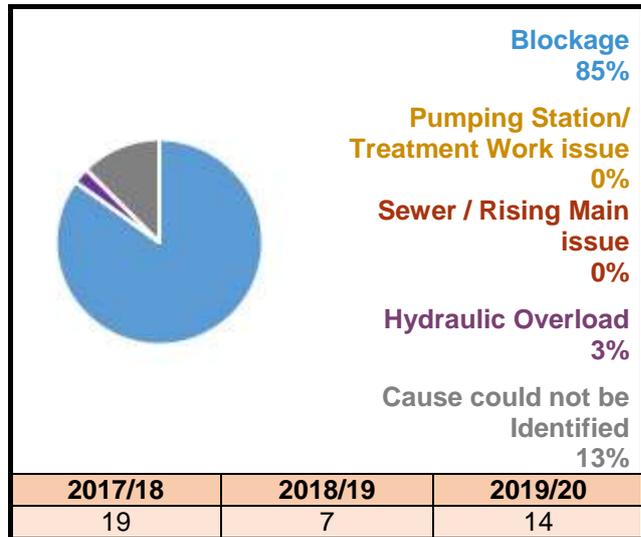


Planning Objective 1: Internal Sewer Flooding Risk

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 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 85% 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.

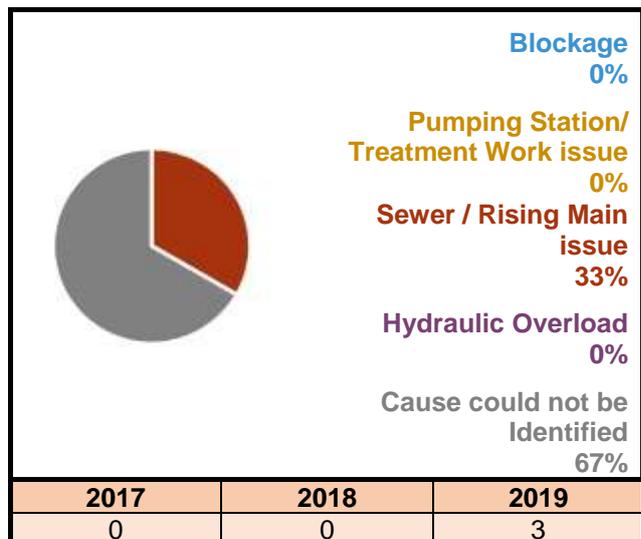
Figure 1: Number of internal flooding incidents per annum and causes



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	2
	2018/19	2
	2019/20	3
Rising Main Bursts	2017/18	0
	2018/19	0
	2019/20	4

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

The risk of flooding in a 1 in 50 year storm is very significant in 2020 and 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 6400 - 6500 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 13100 - 13200 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 moderately significant in 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 numbers for the 2050 assessment may be lower than the 2020 assessment. This is because the 2050 figures are predicted from modelling, whereas the 2020 figures are based on actual recorded data and include spills due to blockages or operational issues which cannot be forecast into the future.

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	0 Medium	0 Medium	Less than 8	Between 8-10	10 or more
Bathing Waters	2 Medium	1 Medium	Less than 3	Between 3-10	10 or more
Freshwater	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 both 2020 and 2050. This is because the wastewater treatment works has no record of compliance failure during the last three years (2018-2020).

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 very significant in 2020 and 2050. 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	282	899	178	568
1 in 2	459	1285	181	506
1 in 5	1365	4026	247	730
1 in 10	2589	6462	246	615
1 in 20	3989	9085	195	443
1 in 30	5158	10677	169	350
Total Annualised			1216	3212

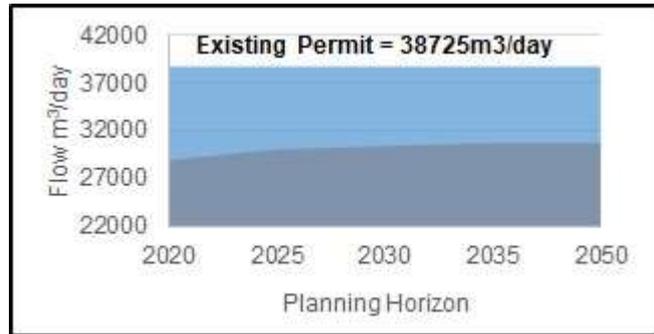


This indicates that the existing capacity of the wastewater network can already be exceeded during 1 in 30 year storms (or more frequent events).

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 is expected to 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

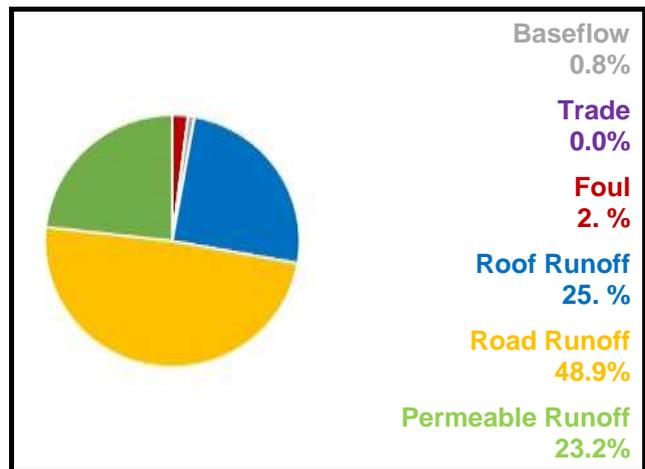
This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

Planning Objective 10: Surface Water Management

Our initial high level assessment indicated that there is very 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 97.1% of the flow in the sewers. The total contribution of foul water from homes is 2.0%. The baseflow is infiltration from water in the ground and makes up 0.8% 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

This wastewater system is not hydraulically linked to Habitat Sites noted as under threat by Natural England.

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. 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

The designated bathing waters that could be affected by discharges from this wastewater system are shown in Table 5, along with the current classification from the Environment Agency.

Table 5: Bathing Water annual results

Bathing Waters	Annual Results		
	2017	2018	2019
Worthing	Poor	Good	Excellent
Lancing (Beach Green)	Sufficient	Excellent	Excellent

The risks from this wastewater system on Worthing, Lancing (Beach Green) bathing waters has led to an assessment of is very significant.

The primary driver is 'Customer' due to evidence of 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.

Southern Water

August 2021
Version 1

Generic Options Assessment for: East Worthing (WOEA)



Planning Objectives		2020	Driver	2050	Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
PO1	Internal Flooding	1	Customer	-	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	0	-	-		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		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
PO4	Risk of Sewer Flooding in 1 in 50 yr	2	Hydraulic	2		Reduce the quantity / demand		Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source
PO5	Storm Overflow Performance	1	Hydraulic	1	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	-	0		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	2	Hydraulic	2		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	0	-	1	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	2	Hydraulic	-		Mitigate impacts on receiving waters		N	The receiving waters are not adversely impacted by our wastewater operations. Hence, offsetting any adverse impacts on receiving waters will not reduce any of the significant risks in this catchment.	River enhancement, aeration
PO11	Secure Nutrient Neutrality	NA	-	NA		Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
PO12	Reduce Groundwater Pollution	1	Operational	-	Other	Study / Investigation		Y	-	Additional data required; hydraulic model development; WQ monitoring and modelling
PO13	Improve Bathing Water Quality	2	Customer	-						
PO14	Improve Shellfish Water Quality	NA	-	-						

East Worthing 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	East Worthing WTW CSO	PO5- Sewer Overflows	WOEA.SC01.1	Surface Water Separation	Surface Water Removal (40%) will reduce the total predicted flood volume by 17%.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Sea Lane Goring WPS CSO	PO5- Sewer Overflows	WOEA.SC01.2	Surface Water Separation	Surface Water Removal (40%) will reduce the total predicted flood volume by 17%.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Smopting Road Worthing Outside 22 CSO	PO5- Sewer Overflows	WOEA.SC01.3	Surface Water Separation	Surface Water Removal (40%) will reduce the total predicted flood volume by 17%.	No						Cost Effective
Control/ Reduce surface water entering the sewers	SIDL FC01_1 - Old Shoreman Road	PO4 and PO7 Flooding	WOEA.SC01.4	Surface Water Separation	DAP Option.	No						
Control/ Reduce surface water entering the sewers	SIDL FC01_1 - Ham Road	PO4 and PO7 Flooding	WOEA.SC01.5	Surface Water Separation	DAP Option.	No						
Control/ Reduce surface water entering the sewers	SIDL FC01_3 -Durington Lane	PO4 and PO7 Flooding	WOEA.SC01.6	Surface Water Separation	DAP Option.	No						
Control/ Reduce surface water entering the sewers	SIDL FC01_4 - Alinora Crescent	PO4 and PO7 Flooding	WOEA.SC01.7	Surface Water Separation	DAP Option.	No						
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Marine Parade, properties adjacent to A2025, Columbia Drive	PO1- Internal Flooding	WOEA.SC03.1	Customer Education Programme	Targeted education programme in known incident areas to reduce the risk.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050)- Dry Weather Flow	WOEA.SC04.1	Water Efficient Appliance / Measures	Southern Water aims to reduce water consumption to 100 l/h/d by 2040.	Yes	No					Environmental - Strategic Environmental Assessment
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO8 (2050)- Dry Weather Flow	WOEA.PW01.1	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment.	No						Cost Effective and Deliver the required outcome
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide excluding Goring-by-Sea and Coastal areas until Lancing Beach	PO12- Ground Water Pollution	WOEA.PW01.2	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment to reduce risk of exfiltration to the Source Protection and Ground Water Capture Zones.	Yes	Yes	Yes	Minor Positive +	£12,190K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C05 - Marine Crescent/Alinora Avenue	PO4 and PO7 - Growth	WOEA.PW01.3	Upsizing and Offline Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C06 - Marine Crescent	PO4 and PO7 - Growth	WOEA.PW01.4	Upsizing, new sewer and Offline Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C07 - West Parade/ Bolsover Road/Lincett Drive	PO4 and PO7 - Growth	WOEA.PW01.5	Upsizing and Offline Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C08 - Victoria Road/ Winchester Road	PO4 and PO7 - Growth	WOEA.PW01.6	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C09 - Merton Terrace/Chatsworth Road	PO4 and PO7 - Growth	WOEA.PW01.7	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C10 - Ham Road/ Ladydell Road/Homefield Road/Lyndhurst Road/Brougham Road	PO4 and PO7 - Growth	WOEA.PW01.8	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C11- Lose Lane	PO4 and PO7 - Growth	WOEA.PW01.9	Upsizing and Offline Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C12 - Penfold Road/Dominion Road	PO4 and PO7 - Growth	WOEA.PW01.10	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C13- Old Shoreman Road/Grindstead Lane/West way/New Salts Farm Road	PO4 and PO7 - Growth	WOEA.PW01.11	Upsizing, new sewer and Offline Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C14 - Goring street/Romany Road	PO4 and PO7 - Growth	WOEA.PW01.12	Upsizing, Offline Storage and online storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£6,660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C01 SalvingtonRoad (Option 1)	PO4 and PO7- Flooding DG5 External - 7 DG5 Internal - 0 Flood Vol. m³ - 1059 (1 in 30)	WOEA.PW01.13	Offline Storage	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C02 SalvingtonRoad (Option 2)	PO4 and PO7- Flooding DG5 External - 7 DG5 Internal - 0 Flood Vol. m³ - 1059 (1 in 30)	WOEA.PW01.14	Offline Storage & Conveyance	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C03 Manor Way (Option 1)	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.15	Upsizing and Online Storage	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	DAP WOEAF C04 Manor Way (Option 2)	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.16	Upsizing and Online Storage	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	SIDL FC01_1 - Old Shoreman Road	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.17	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,855K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SIDL FC01_1 - Ham Road	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.18	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£870K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SIDL FC01_3 -Durlington Lane	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.19	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£3,235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	SIDL FC01_4 - Alinora Crescent	PO4 and PO7- Flooding DG5 External - 33 DG5 Internal - 0 Flood Vol. m³ - 344.7 (1 in 30)	WOEA.PW01.20	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£4,195K	Yes	Best Value

East Worthing 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
Improve treatment (capacity and quality at existing works or develop new WTWs)	East Worthing WTW	PO8 (2050)- Dry Weather Flow	WOEA.PW02.1	Permit Review	Increasing the treatment capacity at the treatment works, to ensure permit is below 80% and reduced risk of exceeding.	Yes	Yes	Yes	Minor Positive +	£1,505K	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												
Reduce consequences Properties (e.g. Property Flood Resilience)	Catchment Wide	PO1, PO4, PO7 and PO10- Flooding Objectives	WOEA.RC04.1	Flood Mitigation for Flooding	Flooding mitigation to consider options (but not limited to); Non-return Values, Smart Airbricks, Flood Doors, Jetting sewers via Maintenance Scheduled Tasks.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment Wide	PO8 (2050)- Dry Weather Flow	WOEA.OT01.1	CCTV Survey - Condition Assessment / Infiltration Study	Investigation work to determine the structural condition of the sewer network within the catchment, identifying areas of high infiltration and/or poor structural condition with potential to infiltrate.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment Wide excluding Goring-by-Sea and Coastal areas until Lancing Beach	PO12- Ground Water Pollution	WOEA.OT01.2	CCTV Survey - Condition Assessment / Infiltration Study	Investigation work to determine the structural condition of the sewer network within the catchment.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	Catchment Wide / East Worthing WTW CSO, Sea Lane Goring WPS CSO, Sompting Road Worthing outside 22 CSO	PO13- Bathing Water Quality	WOEA.OT01.3	Studies / Investigations	Investigations continuing under the Bathing Water Programme to be completed to identify misconnections (foul to surface) along with sewer rehabilitation.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Study/ investigation to gather more data	WOEA FC15 - EAST WORTHING WTW (ICM link: TQ1603851X.1)	PO5, PO13 and PO14 - Spill Assessments	WOEA.OT01.4	Storage (East Worthing WTW)	The DAP model has a confidence score of 2 and was last verified in 2018.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	WOEA FC16 - EAST WORTHING WTW (ICM link: DUM0048.2)	PO5, PO13 and PO14 - Spill Assessments	WOEA.OT01.5	Storage (East Worthing WTW)	The DAP model has a confidence score of 2 and was last verified in 2018.	No						Technically feasible Cost Effective Deliver the required outcome Environmental risk mitigatable Do customer support it Risk and uncertainty - future resilience
Study/ investigation to gather more data	WOEA FC17 - SEA LANE GORING CSO	PO5 and PO13 - Spill Assessments	WOEA.OT01.6	Storage (Sea Lane Goring)	The DAP model has a confidence score of 2 and was last verified in 2018.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	WOEA FC19 - SOMPTING ROAD WORTHING OUTSIDE 22 CSO	PO5 and PO13 - Spill Assessments	WOEA.OT01.7	Storage (Sompting Road Worthing Outside 22)	The DAP model has a confidence score of 2 and was last verified in 2018.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	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

Version : 1.0

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
Adur and Ouse East Worthing								
WOEA.SC03.1	Adur and Ouse	East Worthing	System Wide	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	Worthing Borough Council West Sussex County Council	PO1
WOEA.PW01.2	Adur and Ouse	East Worthing	System Wide (excluding Goring-by-Sea and Coastal areas until Lancing Beach)	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	£12,190K	AMP9 to AMP10	-	PO12
WOEA.PW01.3	Adur and Ouse	East Worthing	Alinora Avenue	Growth scheme from our Drainage Area Plan (DAP): Upsizing sewer and storage tanks to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.4	Adur and Ouse	East Worthing	Marine Crescent	Growth scheme from our Drainage Area Plan (DAP): Upsizing sewer, storage tanks and creating new sewers to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.5	Adur and Ouse	East Worthing	West Parade, Bolsover Road and Lincett Drive	Growth scheme from our Drainage Area Plan (DAP): Upsizing sewer and storage tanks to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.6	Adur and Ouse	East Worthing	Victoria Road and Winchester Road	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers in Victoria Road and Winchester Road to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.7	Adur and Ouse	East Worthing	Merton Terrace and Chatsworth Road	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers in Merton Terrace and Chatsworth Road to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.8	Adur and Ouse	East Worthing	Ham Road, Ladydell Road, Homefield Road, Lyndhurst Road, Brougham Road	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers in Ham Road, Ladydell Road, Homefield Road, Lyndhurst Road, Brougham Road to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.9	Adur and Ouse	East Worthing	Lose Lane	Growth scheme from our Drainage Area Plan (DAP): Upsizing sewer and storage tanks to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.10	Adur and Ouse	East Worthing	Penfold Road, Dominion Road	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers in Penfold Road, Dominion Road to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.11	Adur and Ouse	East Worthing	Old Shoreman Road, Grindstead Lane, West way, New Salts Farm Road	Growth scheme from our Drainage Area Plan (DAP): Upsizing sewer, storage tanks and creating new sewers to accommodate flows from future development	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.12	Adur and Ouse	East Worthing	Goring street, Romany Road	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£6,660K	AMP9	Worthing Borough Council West Sussex County Council	PO4 PO7
WOEA.PW01.17	Adur and Ouse	East Worthing	Old Shoreman Road	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£1,855K	AMP9	-	PO4 PO7
WOEA.PW01.18	Adur and Ouse	East Worthing	Ham Road	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£870K	AMP9	-	PO4 PO7

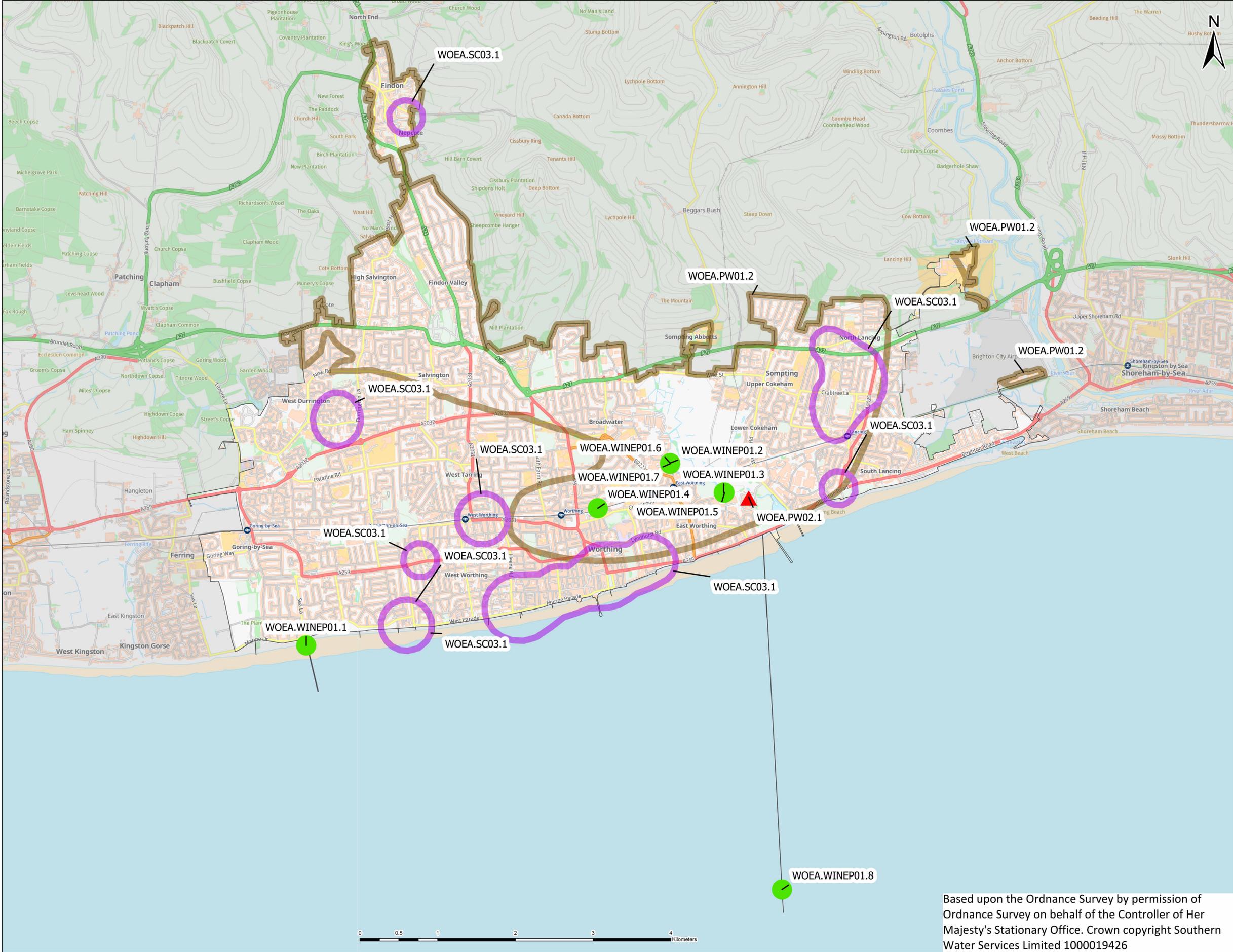
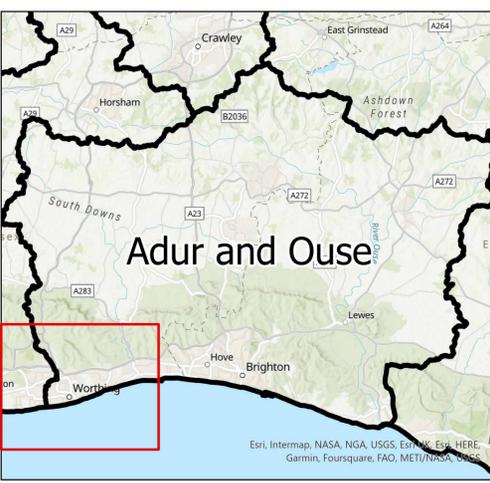
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
WOEA.PW01.19	Adur and Ouse	East Worthing	Durington Lane	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£3,235K	AMP9	-	PO4 PO7
WOEA.PW01.20	Adur and Ouse	East Worthing	Alinora Crescent	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£4,195K	AMP9	-	PO4 PO7
WOEA.PW02.1	Adur and Ouse	East Worthing	East Worthing WTW	Increase capacity to allow for planned new development	£1,505K	AMP9	-	PO8
WOEA.OT01.8	Adur and Ouse	East Worthing	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£450K	AMP8	-	PO4 PO5 PO7 PO10
WOEA.WINEP01.1	Adur and Ouse	East Worthing	SEA LANE GORING CSO	New or improved screen to reduce aesthetics impacts from storm discharges at SEA LANE GORING CSO	£130K	AMP12	-	PO5
WOEA.WINEP01.3	Adur and Ouse	East Worthing	CORTIS AVENUE WORTHING CSO	New or improved screen to reduce aesthetics impacts from storm discharges at CORTIS AVENUE WORTHING CSO	£130K	AMP12	-	PO5
WOEA.WINEP01.4	Adur and Ouse	East Worthing	IVY ARCH ROAD WORTHING CSO	New or improved screen to reduce aesthetics impacts from storm discharges at IVY ARCH ROAD WORTHING CSO	£130K	AMP12	-	PO5
WOEA.WINEP01.5	Adur and Ouse	East Worthing	CARNEGIE ROAD WORTHING CSO	New or improved screen to reduce aesthetics impacts from storm discharges at CARNEGIE ROAD WORTHING CSO	£130K	AMP10	-	PO5
WOEA.WINEP01.6	Adur and Ouse	East Worthing	WIGMORE ROAD WORTHING OUTSIDE 16 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at WIGMORE ROAD WORTHING OUTSIDE 16 CSO	£130K	AMP10	-	PO5
WOEA.WINEP01.7	Adur and Ouse	East Worthing	SOMPTING ROAD PENFOLD ROAD WORTHING CSO	New or improved screen to reduce aesthetics impacts from storm discharges at SOMPTING ROAD PENFOLD ROAD WORTHING CSO	£130K	AMP10	-	PO5
WOEA.WINEP01.8	Adur and Ouse	East Worthing	EAST WORTHING CEO	Reduce the number of storm discharges from EAST WORTHING CEO by a combination of SuDS and storage options	£96,515K	AMP10	-	PO4 PO5 PO7
WOEA.WINEP01.2	Adur and Ouse	East Worthing	SOMPTING ROAD WORTHING OUTSIDE 22 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at SOMPTING ROAD WORTHING OUTSIDE 22 CSO	£130K	AMP12	-	PO5

Drainage and Wastewater Management Plan: Location of Potential Options EAST WORTHING

Wastewater system in Adur and Ouse 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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