Drainage and Wastewater Management Plans (DWMPs)

Investment Needs Workshop for the North Kent River Basin Catchment

Wednesday 9 March 2022

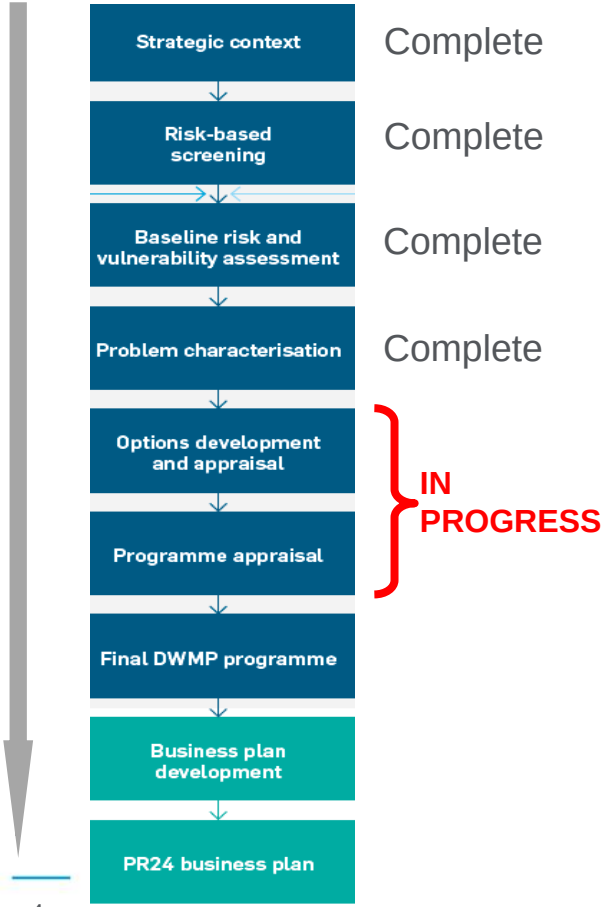
from Southern Water

Agenda

1. Welcome and Purpose
2. Investment Planning Process
3. Review of Investment Needs
4. Programme Appraisal
5. Delivering the DWMP Investment Needs
6. Next steps

Welcome and Purpose

Our Journey So Far …



Complete

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IN PROGRESS

Working with others:

Aug 2020	Webinars: What is a DWMP?
Sept 2020	Workshops: RBCS and Planning Objectives
Dec 2020	Webinars: National BRAVA results
March 2021	Webinars: Additional BRAVA Results
May 2021	Workshops: Problem Characterisation & ODA
Aug-Oct 2021	Workshops: Identifying Unconstrained Options
Sept 2021	Initial public consultation
Dec 2021	Webinars: Water Company funding
Jan 2022	Webinar: FCERM Partnership Funding
March 2022	Workshops: Investment Needs
June 2022	Public consultation
March 2023	Publish final DWMP

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Purpose of Today's Workshop

Our aim today is to:

- Discuss and refine the investment needs identified in the draft DWMP
- Flag any missing investment needs
- Discuss prioritisation and timing for investment needs
- Review opportunities to co-create and co-deliver solutions
- Look at total investment needs across the river basin

Presentation: Investment Planning

Wastewater Systems in North Kent Catchment

- 5 sewer catchments
- 5 WTWs
- 134 WPS
- 1038km sewers
- 11% area
- 93% homes connected

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BRAVA Results: North Kent River Basin Catchment

Wastewater Catchment Reference	Wastewater Catchment Reference	Population Equivalent	Sewer Length (KM)	Planning Objective													
				Internal Sewer Flooding Risk	Pollution Risk	Sewer Collapse Risk	Risk of Sewer Flooding in a 1 in 50 year storm	Storm Overflow performance	Risk of WTW Compliance Failure	Risk of flooding due to Hydraulic Overload	Dry Weather Flow Compliance	Good Ecological Status / Potential	Surface Water Management	Nutrient Neutrality	Groundwater Pollution	Bathing Waters	Shellfish Waters
				2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
SITT	SITTINGBOURNE	59,931	398.856	1	0	0	1	2	0	1	1	0	1	2	2	NA	1
QUEE	QUEENBOROUGH	38,684	313.872	1	2	2	2	2	0	2	1	0	1	2	0	0	1
FAVE	FAVERSHAM	26,291	210.411	2	2	1	1	2	0	1	0	1	1	2	1	NA	1
ECHU	EASTCHURCH	7,648	90.541	0	2	0	1	2	0	1	0	0	0	2	0	0	1
TEYN	TEYNHAM	3,966	23.980	2	0	0	0	0	0	1	0	0	0	2	0	NA	1

Results shown for 2020 only

NF	Not Flagged *
NA	Not Applicable **
0	Not Significant
1	Moderately Significant
2	Very Significant

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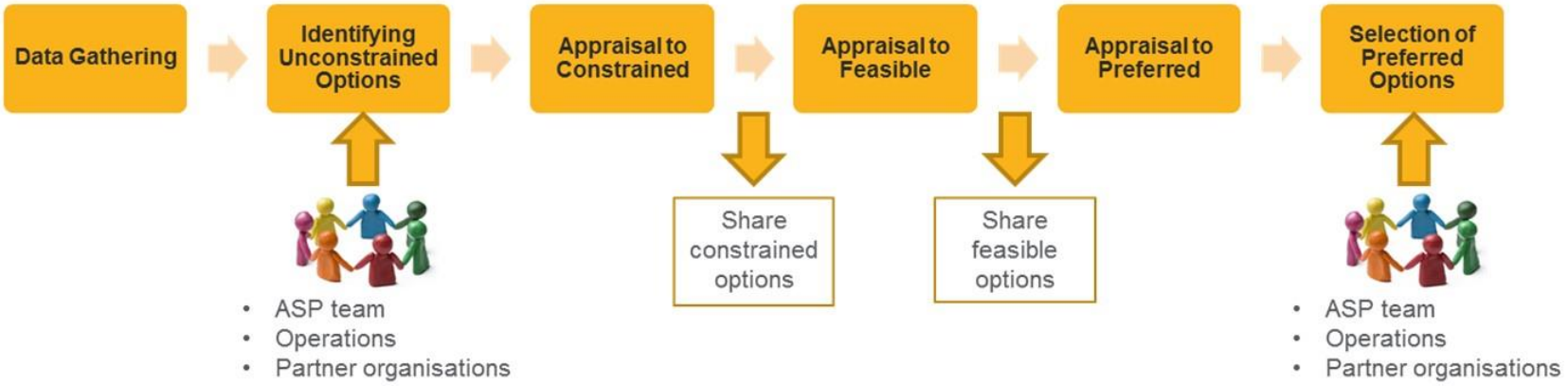
Option Development and Appraisal



North Kent River Basin :

Unconstrained Option Development meetings held on:

- Faversham 06 October 2021
- Queenborough 23 September 2021
- Sittingbourne 06 October 2021

Options Development Process
Unconstrained Options

Source
Pathway
Receptor

Location of Risk	Description of Risk	Unconstrained Option	Option Description	Option Referer	GO Outp	L4 Area	Source of the UO
Source Demand Measures							
Control/ Reduce surface water entering the sewers				CHIC.SC01	Yes		
CHICHESTER WTW Overflow	**PO5- Sewer Overflows** Bathing Water 2020 Spilling CSO (also above in-land river spilling threshold) Spill Volume- Xm3	Surface Water Separation	Surface Water Removal (40%) will reduce the total predicted flood volume by 77%.	CHIC.SC01.1		Chichester WTW and Catchment Wide	EDM data via BRAVA PO5 Hydraulic Model Data
Pathway (Supply) Measures							
Network Improvements				CHIC.PW01	Yes		
CHIC FC01 Summersdale Road	PO4 and PO5 - Growth Projected population for CHIC catchment by 2040: 35550 Development population for CHIC catchment by 2040: 2402 Number of houses to be completed by 2040 at CHIC catchment: 1100	Upsizing	Growth solutions developed for the DAP have not been assessed for suitability. Potential erroneous data includes, but is not limited to, developments completed since DAP, change of connection location and development size. The DAP model has a confidence score of 2 and was last verified in 2014 The key risks between DAP and DWMP models are: model network used, rainfall, ground infiltration and levels files applied Option solution: Upsize pipes	CHIC.PW01.4			DAP Option Position statement: CHICGR001 Option 1 Plan 1.1
Receptor Measures							
Mitigate impacts on Water Quality				CHIC.RC03	Yes		
CHICHESTER WTW	**PO11 - Nutrient Neutrality** Chichester and Langstone Harbours, Solent and Dorest Coast, Solent Maritime	River enhancement and mitigation	Reduce consented permit levels for nutrients and solids in the final effluent from treatment works. This would have to be undertaken in agreement with the Environment Agency.	CHIC.RC03.1		CHICHESTER WTW	
Other							
Study/ investigation to gather more data				CHIC.OT01	Yes		
Chichester and Langstone Harbours, Solent and Dorest Coast, Solent Maritime	**PO11 - Nutrient Neutrality** Chichester and Langstone Harbours, Solent and Dorest Coast, Solent Maritime (Include reason for Banding)	Nutrient Budget for investigations.	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 (TP) and Total Nitrogen (TN) on the Chichester and Langstone Harbours, Solent and Dorest Coast and Solent Maritime.	CHIC.OT01.2		Catchment Wide	Natural England supplied 'Water Dependent Habitat Sites' Table via BRAVA PO11

(*this is an extract of the table*)

All options identify the BRAVA Planning Objective risk they address

Options identified by:

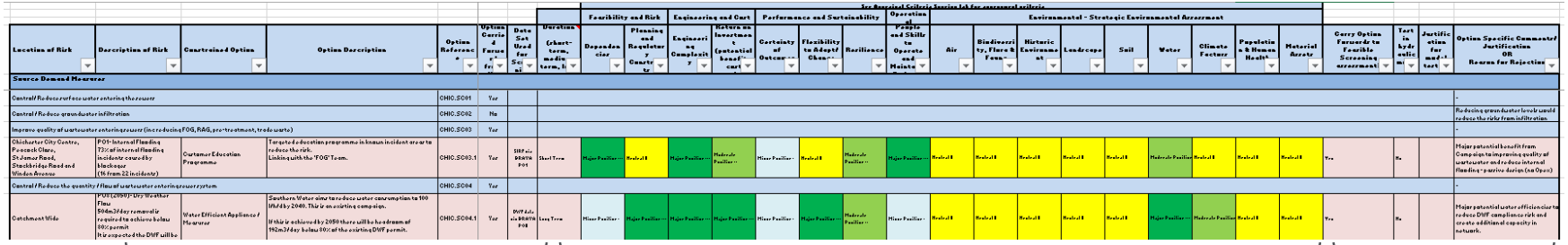
Technical Team

Previous plans and modelling (e.g. Drainage Area Plans)

Our staff and partners

Options Development Process
Benefits Screening

Multi-criteria sustainability appraisal of potential benefits – enables screening and selection of ‘best benefit’ options



Carry forward constrained options

Appraises constrained options for the five areas identified by the national DWMP framework:
1) Feasibility and Risk (2 Questions)
2) Engineering and Cost (2 Questions)
3) Performance and Sustainability (3 Questions)
4) Operational (1 Question)
5) Environmental (9 questions, aligned to WRMP & SEA)

Options with more than two Minor Negatives (--) or one Major Negative (---) are screened out.

All other options pass to Feasible Option stage for costing

DWMP Appraisal Criteria	Datasets/ Key Themes	Effect	Description
Feasibility and Risk •Dependencies	•Permission for access to land •Need to work in partnership •Dependent upon others taking action (e.g. customers) •Dependent upon other actions / projects being completed	+++	Major Positive
		++	Moderate Positive
		+	Minor Positive
		0	Neutral
		-	Minor Negative
		--	Moderate Negative
		---	Major Negative
		?	Uncertain

Extract from Criteria

Scoring of options uses a +++/ --- approach and includes guidance on interpretation for each appraisal criteria

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Options Development Process
Feasible Options to Preferred Options

DWMP Data Tables

FEASIBLE OPTION 1	
Drainage Area/Catchment	CHIC - Chichester
Strategic Need	PO5 - Storm Overflow Performance, PO13 - Improve Bathing Water Quality, PO14 - Improve Shellfish Water Quality
DWMP Option Reference	Option Title
CHIC_PW01.3	CHIC FC09 - CHICHESTER WTW - Storage
DAP Option Reference	
Scheme Builder Reference	

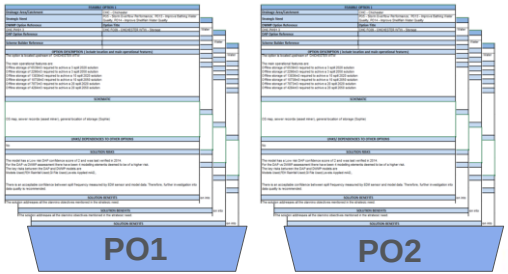
OPTION DESCRIPTION (include location and main operational features)
The option is located upstream of CHICHESTER WTW The main operational features are: Offline storage of 6539m3 required to achive a 3 spill 2020 solution Offline storage of 2290m3 required to achive a 3 spill 2050 solution Offline storage of 13836m3 required to achive a 10 spill 2020 solution Offline storage of 10738m3 required to achive a 10 spill 2050 solution Offline storage of 7873m3 required to achive a 20 spill 2020 solution Offline storage of 4284m3 required to achive a 20 spill 2050 solution
SCHEMATIC
OS map, sewer records (asset miner), general location of storage (Sophie)
LINKS/ DEPENDENCIES TO OTHER OPTIONS
No
SOLUTION RISKS
The model has a Low risk DAP confidence score of 2 and was last verified in 2014. For the DAP vs DWMP assessment there have been 4 modelling elements deemed to be of a higher risk. The key risks between the DAP and DWMP models are Models Used,FEH Rainfall Used,GI File Used,Levels Applied mAD,. There is an acceptable confidence between spill frequency measured by EDM sensor and model data. Therefore, further investigation into data quality is recommended.
SOLUTION BENEFITS
The solution addresses all the planning objectives mentioned in the strategic need.

Each Wastewater System may have multiple feasible options.

Some Options may:
- address multiple BRAVA risks
- need to be combined to fully mitigate a BRAVA risk

“Preferred Options” are best value options

“Baskets of Measures” are created for the preferred option where more than one feasible option is required to reduce the risk for a planning objective to band 0



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Outputs from Options Development Stage

- Table of Investment Needs for the Wastewater Catchment
- Each Investment Need assessed in terms of risk band reduction

Location	Issues	Option	Indicative Cost	Indicative Timescale	Potential Partners

Definitions:

- Location: Specific known location of the risk e.g. hotspot, high spilling CSO
- Issues: Description of the issue the option is tackling e.g. flooding
- Indicative Cost: Our initial estimate of the investment needed to deliver the option
- Indicative Timescale: Based upon when the risk occurs (now or in the future)
- Potential Partners: Opportunities to work with others

Investment Needs – Faversham (FAVE) – page 1 of 2

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Option Ref	Location of Risk	Issues	Option	Indicative Cost	Indicative Timescale	Potential Partners
FAVE.PW01.14	Selling- Inner Zone (SPZ 2) / Total Capture Zone and Shepherd Neame (within Nitrate Vulnerability zone)	Groundwater Pollution	Targeted CCTV or electroscan surveys and proactive sewer rehabilitation to reduce risk of groundwater contamination	£980k	Medium term	Environment Agency
FAVE.OT01.7	Unknown	Groundwater Pollution	Investigate if there is infiltration from stormwater culverts and whether they need relining	£TBC	Short term	Kent CC, Swale BC
FAVE.PW01.1	Quay Lane Wastewater Pumping Station (WPS)	Internal Flooding due to WPS faults	Enhanced maintenance to improve WPS resilience and reduce flooding incidents	£233k	Short term	-
FAVE.OT01.1	Preston Street, The Street & St. Johns Road	Internal Flooding: Unknown causes	Study: Investigate the root cause of internal flooding incidents due to unknown reasons and verify the risk using the hydraulic model of the sewer network	£232k	Short term	-
FAVE.SC03.1	Cross Lane, Whitstable Road, Church Hill & Forbes Road	Internal Flooding due to Blockages	Target customers with a campaign to reduce FOG and unflushables discharged into the sewer network.	£116k	Short to long term	Kent CC, Swale BC
FAVE.PW01.3	Cross Lane, Whitstable Road, Church Hill & Forbes Road	Internal Flooding due to Blockages	Improve frequency of sewer jetting to reduce FOG and unflushables discharged into the sewer network.	£46k	Short term	-
FAVE.PW01.15	Davington Hill, West Street & Lower Road	Foul & Combined Sewer Flooding	Flood Storage: Attenuate excess flows in sewer network using storage tanks to reduce risk of flooding (option priced based on storage but surface water separation is the preferred option)	£3.89M	Short term	Kent CC
FAVE.PW01.16	Market Street & Roman Road	Foul & Combined Sewer Flooding	Flood Storage: Attenuate excess flows in sewer network using storage tanks to reduce risk of flooding (option priced based on storage but surface water separation is the preferred option)	£1.53M	Short term	Kent CC
FAVE.OT01.8	Catchment wide	Foul / Combined Sewer Flooding	Hydraulic Model improvements: Surveys and reverification to improve model confidence and accuracy of simulations.	£200k	Short term	-
FAVE.PW02.1	Faversham Wastewater Treatment Works (WTW)	Pollution due to WTW faults	Enhanced maintenance to improve WTW resilience and reduce pollution incidents	£6.97M	Short term	-
FAVE.PW01.4	Abbeyfields WPS & Hazebrouk Road WPS	Pollution due to WPS faults	Enhanced maintenance to improve WPS resilience and reduce pollution incidents	£931k	Short term	-

Investment Needs – Faversham (FAVE) – page 2 of 2

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Option Ref	Location of Risk	Issues	Option	Indicative Cost	Indicative Timescale	Potential Partners
FAVE.SC03.2	Area upstream of Abbeyfields WPS	Pollution due to Blockages	Target customers with a campaign to reduce FOG and unflushables discharged into the sewer network.	£116k	Short to long term	Kent CC, Swale BC
FAVE.PW01.5	Area upstream of Abbeyfields WPS	Pollution due to Blockages	Improve frequency of sewer jetting to reduce FOG and unflushables discharged into the sewer network.	£11k	Short term	-
FAVE.PW01.7	Court Street Faversham CSO	CSO Spills	Construct storage tank to reduce storm overflows and potential impacts on Faversham Creek and Shellfish Waters	£2.32M	Short term	-
FAVE.PW01.8	Abbey Road Faversham CSO	CSO Spills	Construct storage tank to reduce storm overflows and potential impacts on Faversham Creek and Shellfish Waters	£781k	Short term	-
FAVE.PW02.4	Faversham WTW	WTW Dry Weather Flow Compliance	Review DWF permit for the WTW with the EA, and increase capacity of Primary and Final Settlement Tanks	£2.09M	Short term	Environment Agency
FAVE.PW01.9	Lakeside Avenue, The Street & Oare Road WPS	Growth & Flooding	Growth Drainage Area Plan (DAP): Upsize sections of local sewers and increase pumping rate at Oare Road WPS to accommodate flows from future development	£TBC	Short to medium term	-
FAVE.PW01.10	Ospringe Street	Growth & Flooding	Growth DAP: Upsize sections of local sewers on Ospringe Street to accommodate flows from future development	£TBC	Short to medium term	-
FAVE.PW01.11	Athelstan Road & The Mall	Growth & Flooding	Growth DAP: Upsize and relay sections of local sewers to accommodate flows from future development	£TBC	Short to medium term	-
FAVE.PW01.12	Brent Road & Quay Lane WPS	Growth & Flooding	Growth DAP: Upsize local sewers, lay new sewer and increase pumping rate at Quay Lane to accommodate flows from future development	£TBC	Short to medium term	-
FAVE.OT01.3	Catchment wide	Ecological Status of Waterbodies	Study & Investigations to understand the impact of wastewater discharges and identify measures required to achieve good ecological status in the Sarre Penn and River Wantsum	£697k	Short term	Environment Agency
FAVE.OT01.4	Catchment wide	Nutrient Balance in Habitat Sites	Study & Investigations to understand the impact of wastewater discharges and identify measures required to secure Nutrient Neutrality in The Swale	£76k	Short term	Environment Agency, Natural England
FAVE.OT01.5	Swale Central & Swale East	Shellfish Waters	Link to ongoing Shellfish Waters studies within business and use recommended measures to develop solutions in next DWMP cycle	£0k	Short term	Environment Agency

Investment Needs – Queenborough (QUEE) – page 1 of 3

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Option Reference	Location of Risk	Issues	Option Description	Indicative cost	Indicative timescale	Potential partners
QUEE.SC03.1	Sheerness area	Blockages, internal flooding	Enhanced and targeted customer education campaign to reduce FOG and unflushable items in the sewers	£116k	Short term	—
QUEE.SC03.2	Sheerness area	Blockages, internal flooding	Enhanced maintenance: proactive jetting	£195k	Short term	—
QUEE.OT01.4	Catchment wide	Flooding & Drainage	Study Model improvements: 3 month flow survey to catch both storm and dry data and calibrate these against the model should be conducted	~£100k	Short term	—
QUEE.SC01.2	Northern and Southwest part of catchment	Flooding & Drainage	Surface water separation to provide a long term solution to reduce flooding in the town and storm overflow discharges	~£1.0M	Short to Medium term	Kent CC
QUEE.SC01.1	Coastal areas	Surface water flooding	Partnership opportunity: Work with local councils to mitigate surface water flooding in coastal areas through implementation of SuDS	£ TBC	Medium to Long term	Kent CC Natural England
QUEE.PW01.1	Minster area	Pollution	Pipe rehabilitation programme: CCTV surveys, sewer integrity checks, re-lining and renewal of rising mains (including costal areas under tidal influence)	£42k	Medium term	Kent CC
QUEE.PW01.3	Sheerness area	Sewer collapse	Pipe rehabilitation programme: CCTV surveys, sewer integrity checks, re-lining and renewal of rising mains (including costal areas under tidal influence)	£6.6M	Medium term	Kent CC
QUEE.PW01.4	The Broadway / The Leas / Southsea Avenue	Foul / Combined Sewer Flooding	Drainage Area Plan (DAP) Option: Local sewer upsizing and new rider sewer on Southsea Avenue, Seaside Avenue and The Leas. Construct online storage tank and upsize local sewers in The Broadway.	£ TBC	Short term	—
QUEE.PW01.6	Delamark Road / Broadway / High Street	Foul / Combined Sewer Flooding	DAP Option: Construct new storage tank, foul sewer and reconstruct existing manhole with a new weir	£ TBC	Short term	—
QUEE.PW01.7	Barton Hill Drive	Foul / Combined Sewer Flooding	DAP Option: Upsize sections of local sewers and construct new sewer and box culvert. Connect 12 properties in Lower Road and Barton Hill Drive to the new sewer in Barton Hill Drive.	£ TBC	Short term	—
QUEE.PW01.9	Castlemere Avenue / Dumergue Avenue	Foul / Combined Sewer Flooding	DAP Option: Upsize and relay sections of local sewers and increase pumping capacity at Rushenden Road WPS. Transfer all pumped flows from Drove Road WPS directly to the inlet works at Queenborough WTW.	£ TBC	Short term	—

Investment Needs – Queenborough (QUEE) – page 2 of 3

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Option Reference	Location of Risk	Issues	Option Description	Indicative cost	Indicative timescale	Potential partners
QUEE.PW01.10	Oak Lane / Cliff Gardens	Foul / Combined Sewer Flooding	DAP Option: Abandon sewer connection in Chequers Road and sections of local sewer. Construct new flow diversion chamber and WPS with rising main. Upsize local sewers in Oak Avenue and Oak Lane.	£ TBC	Short term	—
QUEE.PW01.12	Scrapsgate Road	Growth & Flooding	Growth DAP Option: Upsize local sewers on Scrapsgate Road	£6.2M	Short term	—
QUEE.PW01.13	Marine Avenue	Growth & Flooding	Growth DAP Option: Upsize sections of local sewers and construct a box culvert in the field west of Marine Avenue	£6.2M	Short term	—
QUEE.PW01.14	Minster Road	Growth & Flooding	Growth DAP Option: Upsize sections of local sewers on Minster Road	£6.2M	Short term	—
QUEE.PW01.15	Parish Road	Growth & Flooding	Growth DAP Option: Upsize sewer on Parish Road and relay sewers on Dreadnought Avenue	£6.2M	Short term	—
QUEE.PW01.16	Thistle Hill Way	Growth & Flooding	Growth DAP Option: Upsize sections of local sewers on Thistle Hill Way and Minster Road and relay smaller sewer on Thistle Hill Way	£6.2M	Short term	—
QUEE.PW01.17	Drove Road WPS transfer to WTW	Growth & Flooding	Growth DAP Option: Transfer all pumped flow from Drove Road WPS directly to the inlet works at Queenborough WTW	£6.2M	Short term	—
QUEE.PW01.18	Queenborough Road	Growth & Flooding	Growth DAP Option: Upsize sections of sewer on Queenborough Road	£6.2M	Short term	—
QUEE.PW01.19	West Street	Growth & Flooding	Growth DAP Option: Upsize sections of sewer in West Street and Brielle Way and construct box culvert in West Street	£6.2M	Short term	—

Investment Needs – Queenborough (QUEE) – page 3 of 3

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Option Reference	Location of Risk	Issues	Option Description	Indicative cost	Indicative timescale	Potential partners
QUEE.PW01.20	Marine Parade, Sheernes	Growth & Flooding	Growth DAP Option: Construct birfucation manhole and tank sewer for excess storm flows from network.	£6.2M	Short term	—
QUEE.PW01.11	Brielle Way Westminster CSO	Storm Overflow	Provide offline storage of approximately 520m3 or separate rainfall runoff at source to reduce spills from the CSO at Brielle Way Westminster	£846k	Short term	—
QUEE.PW02.2	Queenborough WTW	Storm Overflow	Increase capacity of storm tanks at the treatments works – approximate upsize required of 4000m3 - or separate rainfall runoff at source to reduce storm discharges at Queenborough WTW	£3.3M	Short term	Natural England
QUEE.OT01.2	South Street Queenborough WPS	Storm Overflow	Provide additional storage in the network or separate rainfall at source to reduce spills from the CSO at South Street WPS (model improvements required)	~£1M	Short term	Kent CC
QUEE.OT01.3	Wards Hill WPS	Storm Overflow	Provide additional storage in the network (approximately 100m3) or separate rainfall at source to reduce spills from the CSO at Wards Hill WPS	~£1M	Short term	—
QUEE.PW02.3	Queenborough WTW	Dry Weather Flow Compliance	Increase capacity at the Treatment Works and review Dry Weather Flow permit to reduce risk of DWF compliance	£2.5M	Medium term	EA
QUEE.OT01.5	The Swale	Nutrients	Study / Investigation: Determine the potential impact of wastewater discharges and achieve or prevent deterioration from Natural England's revised Common Standards Monitoring Guidance (rCSMG) targets Total Phosphorus and Total Nitrogen	£76k	Short to Medium term	Natural England
QUEE.OT01.1	Seafront	Saline intrusion	Surveys to review asset condition and identify disjoints, manhole ingression and locations of saline intrusion along seafront	~£100k	Short to Medium term	Kent CC
QUEE.OT01.4	Catchment wide	Flooding (hydraulic causes)	Study / Investigation: Hydraulic surveys and verification to improve model confidence and accuracy of network simulations	~£100k	Short term	—

Investment Needs – Sittingbourne (SITT) - page 1 of 2

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Option Reference	Location of Risk	Issues	Option Description	Indicative cost	Indicative timescale	Potential partners
SITT.SC03.1	London Road, High Street, East Street, Staplehurst Road, Station Street	Blockages, internal flooding	Enhanced and targeted customer education campaign to reduce FOG and unflushable items in the sewers	£120k	Short term	—
SITT.SC03.3		Blockages, internal flooding	Enhanced maintenance: proactive jetting	£140k	Short term	—
SITT.OT01.6	Catchment wide	Flooding & Drainage	Study Model improvements: 3 month flow survey to catch both storm and dry data and calibrate these against the model should be conducted	£70k	Short term	—
SITT.PW01.1	Swanstree Avenue	Growth & Flooding	Growth DAP Option: Upsize sewer on Swanstree Avenue	£630k	Long term	—
SITT.PW01.2	Canterbury Road	Growth & Flooding	Growth DAP Option: Upsize sewers on Canterbury Road	£630k	Long term	—
SITT.PW01.3	Iwade area	Growth & Flooding	Growth DAP Option: construct two new gravity sewers in Iwade area; upsize three sections of existing sewer network	£630k	Long term	—
SITT.PW01.4	London Road	Growth & Flooding	Growth DAP Option: Upsize sewer and new gravity sewer on London Road; new Pumping Station and new rising main	£630k	Long term	—
SITT.PW01.5	London Road	Growth & Flooding	Growth DAP Option: Upsize sewers on London Road	£630k	Long term	—
SITT.PW01.6	Swale Way	Growth & Flooding	Growth DAP Option: 2x new gravity sewers for Kent Science Park; 2x new pumping stations and rising mains	£630k	Long term	—
SITT.PW01.7	A249	Growth & Flooding	Growth DAP Option: new gravity sewer; new pumping station and rising main	£630k	Long term	—
SITT.PW01.8		Growth & Flooding	Growth DAP Option: upsize sewer on Wises Lane	£630k	Long term	—
SITT.PW01.9	Saffron Way	Growth & Flooding	Growth DAP Option: upsize sewers on Saffron Way	£630k	Long term	—
SITT.PW01.10	Newbridge Avenue	Growth & Flooding	Growth DAP Option: Upsize 225mm diameter sewer on Newbridge Avenue	£630k	Long term	—
SITT.PW01.11	Grovehurst Road	Growth & Flooding	Growth DAP Option: Upsize sewers on Grovehurst Road	£630k	Long term	—

Investment Needs – Sittingbourne (SITT) – page 2 of 2

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Option Reference	Location of Risk	Issues	Option Description	Indicative cost	Indicative timescale	Potential partners
SITT.PW01.12	Quinton Road	Growth & Flooding	Growth DAP Option: Construction of new gravity sewer on Quinton Road	£630k	Long term	—
SITT.PW01.13	Sittingbourne WTW	Growth & Flooding	Growth DAP Option: Increase the pumping rate of Sittingbourne WTW Storm Pump. New rising main for WTW. Increase inlet penstocks openings .	£630k	Long term	—
SITT.PW01.14	Highsted, Keycol, Danaway - Inner Zone SPZ2 TCZ	Groundwater pollution, Tidal influence, pollution events	Pipe rehabilitation programme: CCTV surveys, sewer integrity checks, re-lining and renewal of rising mains (including in coastal areas under tidal influence) to reduce pollution events, sewer collapses and DWF compliance risk	£3.1M	Short to Medium term	Kent CC
SITT.PW01.15	Sittingbourne WTW	Spills, Flooding, and Shelfish Waters	Provide offline storage of approximately 2744m3 or separate rainfall runoff at source to reduce spills from the Works	£1M	Short to Medium term	—
SITT.PW02.1	Sittingbourne WTW	Risk of Compliance Failure	Increase biological capacity at the Treatment Works	£167M (tbc)	Medium term	—
SITT.PW02.2	Sittingbourne WTW	Dry Weather Flow Compliance	Increase capacity at the Works and review Dry Weather Flow permit to reduce risk of DWF compliance	£3M	Medium term	—
SITT.OT01.1	The Swale, Medway Estuary & Marshes	Nutrients	Study / investigation: Determine the potential impact of wastewater discharges to achieve or prevent deterioration from Natural England's revised Common Standards Monitoring Guidance (rCSMG) targets Total Phosphorus and Total Nitrogen	£76k	Medium term	Natural England, Environment Agency
SITT.OT01.2	Highsted, Keycol, Danaway - Inner Zone SPZ2 TCZ	Groundwater Pollution	Study / Investigation: Understand ground water pollution risks and mechanisms	£100k	Short term	Environment Agency
SITT.OT01.3	Swale Central	Storm Overflows discharging into Shellfish Waters	Study / Investigation: Understand the potential impact of wastewater discharges, and achieve or prevent deterioration of shellfish waters	£100k	Short term	Environment Agency
SITT.OT01.4	St Pauls Street Sittingbourne CSO	Spills, Flooding, and Shellfish Wwaters impact	Provide additional storage or separate rainfall at source to reduce storm overflows from St Pauls Street CSO	~£1M	Short to Medium term	—
SITT.OT01.5	Crown Quay Lane CSO	Growth (DAP)	Provide additional storage or separate rainfall at source to reduce storm overflows from Crown Quay Lane CSO	~£1M	Short to Medium term	—
SITT.OT01.6	Catchment wide	Flooding (hydraulic causes)	Study / Investigation: Hydraulic surveys and verification to improve model confidence and accuracy	£125k	Short term	Kent CC

Questions

Review of Investment Needs

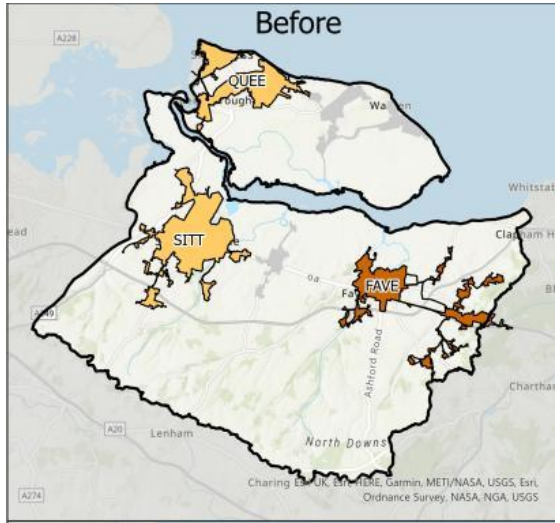
Risks in the North Kent Catchment

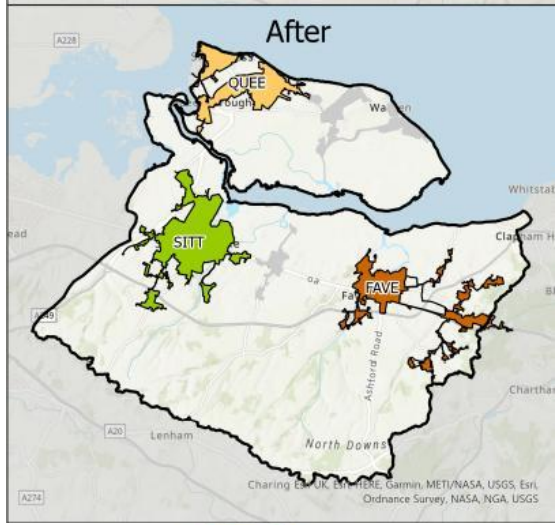
BRAVA Results indicated the main risks in this river basin catchment are for the following Planning Objectives (PO):

- Nutrients (PO11)
- Storm Overflows (PO5)
- Pollution (PO3)
- Flooding (PO7)

PO1 – Internal Flooding

North Kent	PO1	Internal Flood Incidents (Nr in 3yrs)			BRAVA	
Option Type	Est Cost(£)	Reduction Req'd for Band 0	Total	Band 0 Reduction Target	Before	After
Faversham						
FAVE.OT01.1 - Flooding Investigation	£232 K	0	18	13	2	2
FAVE.PW01.1 - Maintenance Programme WPS	£233 K	1				
FAVE.PW01.3 - Jetting Programme	£46 K	1				
FAVE.SC03.1 - Customer Education Programme	£116 K	1				
Queenborough						
QUEE.OT01.4 - Hydraulic Study	£100 K	0	18	14	1	1
QUEE.SC03.1 - Customer Education Programme	£116 K	5				
QUEE.SC03.2 - Jetting programme	£194 K	5				
Sittingbourne						
SITT.OT01.6 - Hydraulic Study	£70 K	0	17	5	1	0
SITT.SC03.1 - Customer Education Programme	£116 K	3				
SITT.SC03.3 - Jetting programme	£137 K	3				





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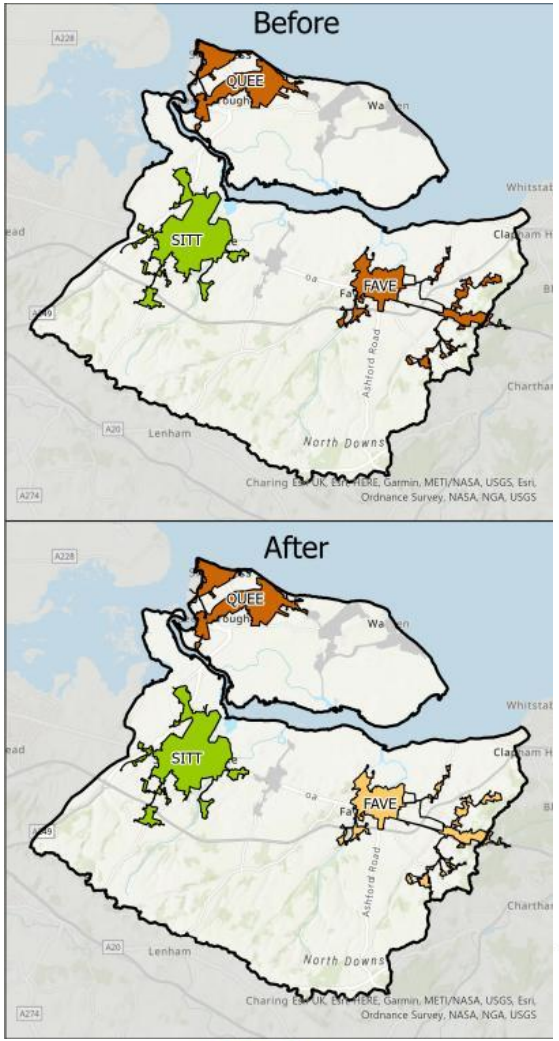
PO2 – Pollution Risk

North Kent	PO2	Pollution Incidents (Nr in 3yrs)			BRAVA	
Option Type	Est Cost(£)	Reduction Req'd for Band 0	Total	Band 0 Reduction Target	Before	After
Faversham						
FAVE.PW01.4 - Maintenance Programme WPS	£931 K	2	6	5	2	1
FAVE.PW01.5 - Jetting Programme	£11 K	1				
FAVE.PW02.1 - Maintenance Programme WTW	£6970 K	1				
FAVE.SC03.2 - Customer Education Programme	£116 K	1				
Queenborough						
QUEE.PW01.1 - Pipe Rehabilitation Programme	£42 K	1	5	4	2	2
QUEE.SC03.1 - Customer Education Programme	£116 K	1				
QUEE.SC03.2 - Jetting programme	£194 K	1				
Sittingbourne	-	-	-	-	0	0



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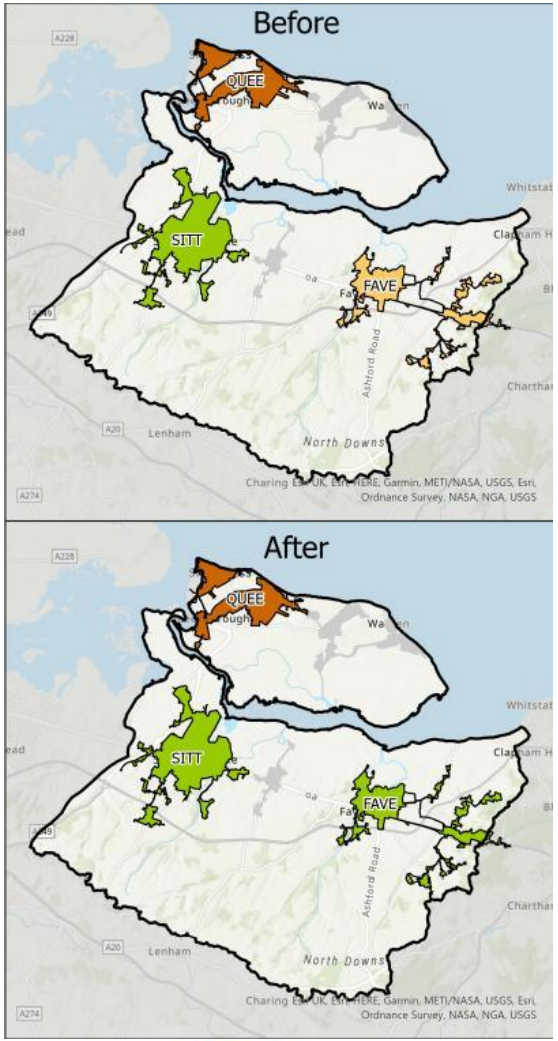
PO3 – Sewer Collapse

North Kent	PO3	Collapses and Bursts (Nr)			BRAVA	
Option Type	Est Cost(£)	Reduction Req'd for Band 0	Total	Band 0 Reduction Target	Before	After
Faversham						
FAVE.PW01.6 - Pipe Rehabilitation Programme	£317 K	3	5	2	1	0
Queenborough						
QUEE.PW01.3 - Pipe Rehabilitation Programme	£6630 K	9	17	14	2	2
Sittingbourne	-	-	-	-	0	0



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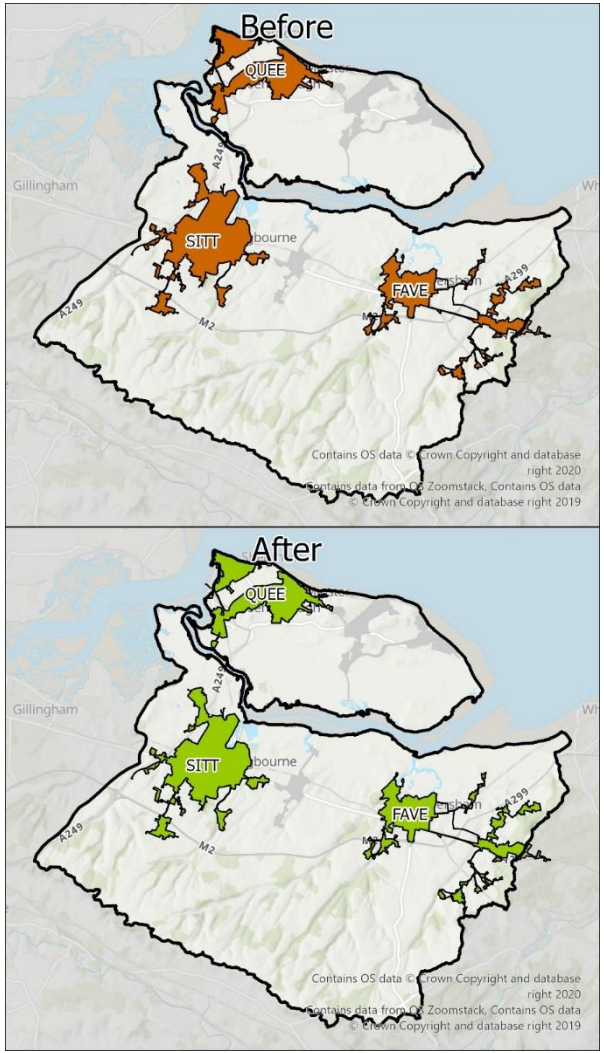
PO5 – Storm Overflow

North Kent	PO5	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.PW01.7 - Storage Tank	£1000 K	2	0
FAVE.PW01.8 - Storage Tank	£781 K		
Queenborough			
QUEE.OT01.2 - Study / modelling investigation	£1000 K	2	0
QUEE.OT01.3 - Study / modelling investigation	£1000 K		
QUEE.PW01.11 - Storage	£846 K		
QUEE.PW02.2 - Storm Tanks Upsize	£3294 K		
Sittingbourne			
SITT.OT01.4 - Modelling investigation	£1000 K	2	0
SITT.OT01.5 - Modelling investigation	£1000 K		
SITT.PW01.15 - Additional Storage Capacity	£1000 K		



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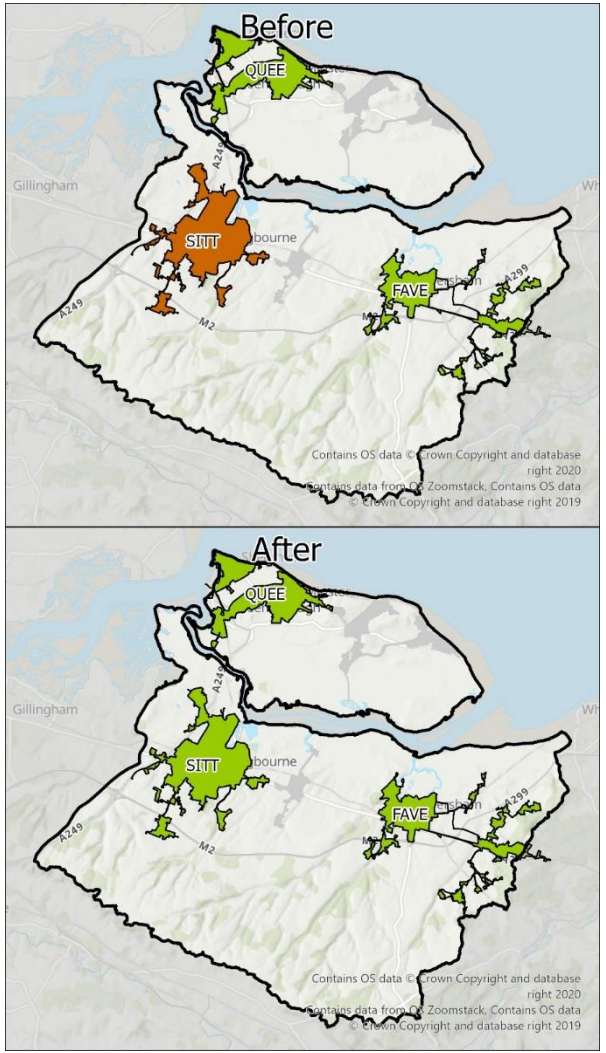
PO6 – WTW Compliance Failure

North Kent	PO6	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Faversham	-	0	0
Queenborough	-	0	0
Sittingbourne			
SITT.PW02.1 - Increase Capacity	£167337 K	2	0



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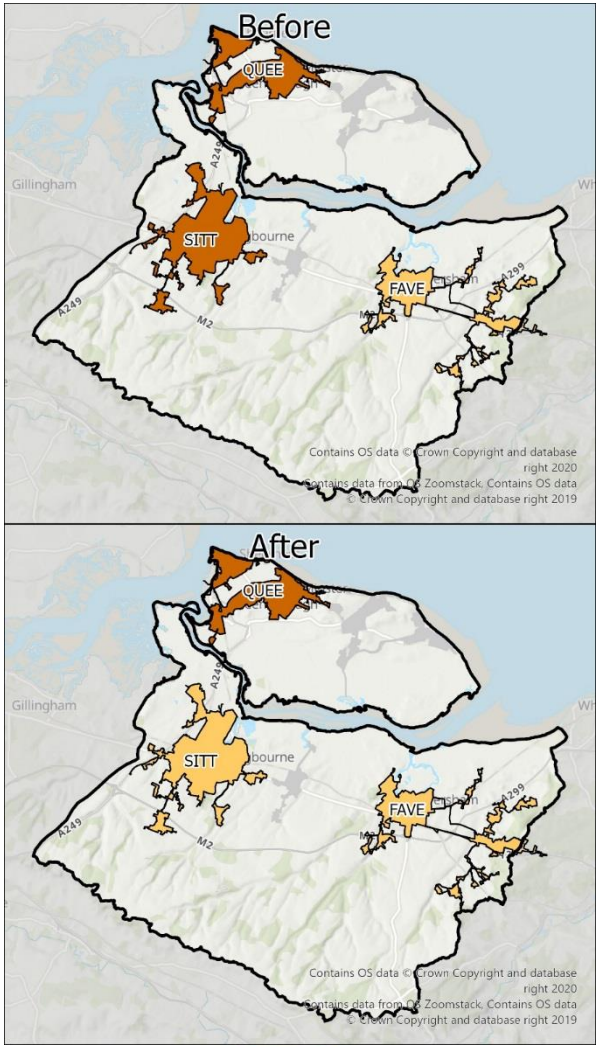
PO7 – Hydraulic Overload

North Kent	PO7	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.PW01.10 - Upsizing	£TBC	1	1
FAVE.PW01.11 - Upsizing/online storage	£TBC		
FAVE.PW01.12 - Upsizing/Relaying new sewer/ Increase Quay Lane WPS pump rate	£TBC		
FAVE.PW01.15 - Storage Tank	£3889 K		
FAVE.PW01.16 - Storage Tank	£1530 K		
FAVE.PW01.9 - Upsize and WSP pump rate increase	£TBC		
Sittingbourne			
SITT.OT01.4 - Modelling investigation	£100 K	2	1
SITT.OT01.5 - Modelling investigation	£519 K		
SITT.PW01.1 - Upsize	£629 K		
SITT.PW01.10 - Upsize	£629 K		
SITT.PW01.11 - Upsize	£629 K		
SITT.PW01.12 - New PS and rising main	£629 K		
SITT.PW01.13 - Increase pumping rate and inlet penstocks openings, new RM	£629 K		
SITT.PW01.15 - Additional Storage Capacity	£1000 K		
SITT.PW01.2 - Upsize	£629 K		
SITT.PW01.3 - New ring sewers and sewer upsizing	£629 K		
SITT.PW01.4 - New PS and rising main, upsizing and online storage	£629 K		
SITT.PW01.5 - Upsizing	£629 K		
SITT.PW01.6 - Two new PS and RM, gravity sewer directly to the WTW	£629 K		
SITT.PW01.7 - New PS, RM, and gravity sewer	£629 K		
SITT.PW01.8 - Upsize	£629 K		
SITT.PW01.9 - Upsize	£629 K		



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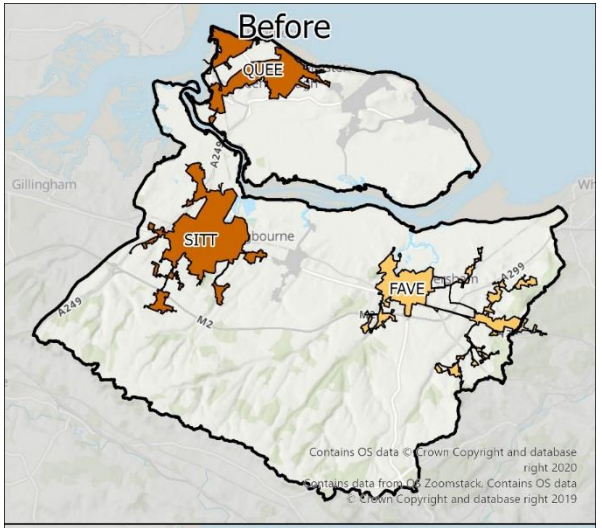
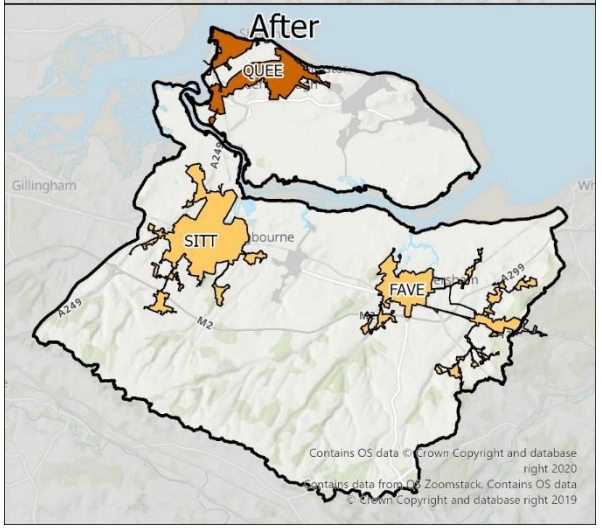
PO7 – Hydraulic Overload

North Kent	PO7	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Queenborough			
QUEE.OT01.3 - Study / modelling investigation	£100 K	2	2
QUEE.PW01.10 - Upsizing and Flow Transfer	£TBC		
QUEE.PW01.12 - Upsizing	£6235 K		
QUEE.PW01.13 - Upsizing	£6235 K		
QUEE.PW01.14 - Upsizing	£6235 K		
QUEE.PW01.15 - Upsizing and Relay	£6235 K		
QUEE.PW01.16 - Upsizing and Reduce diameter	£6235 K		
QUEE.PW01.17 - Transfer flow from WPS to WTW	£6235 K		
QUEE.PW01.18 - Relay and Upsizing	£6235 K		
QUEE.PW01.19 - Box culvert / Upsizing	£6235 K		
QUEE.PW01.20 - Parallel Tank Sewer	£6235 K		
QUEE.PW01.4 - Upsizing and Online Storage	£TBC		
QUEE.PW01.5 - Upsizing and Offline Storage	£TBC		
QUEE.PW01.6 - Upsizing, new sewer and Offline Storage	£TBC		
QUEE.PW01.7 - Upsizing, Online Storage and Reconnection	£TBC		
QUEE.PW01.8 - Pump transfer, Reconnection, Upsize and Pump rate increase	£TBC		
QUEE.PW01.9 - Upsize, Flow transfer and Pump rate increase	£TBC		
QUEE.PW02.2 - Storm Tanks Upsize	£6235 K		
QUEE.SC01.1 - SuDS	£TBC		
QUEE.SC01.2 - Surface water separation	£1000 K		





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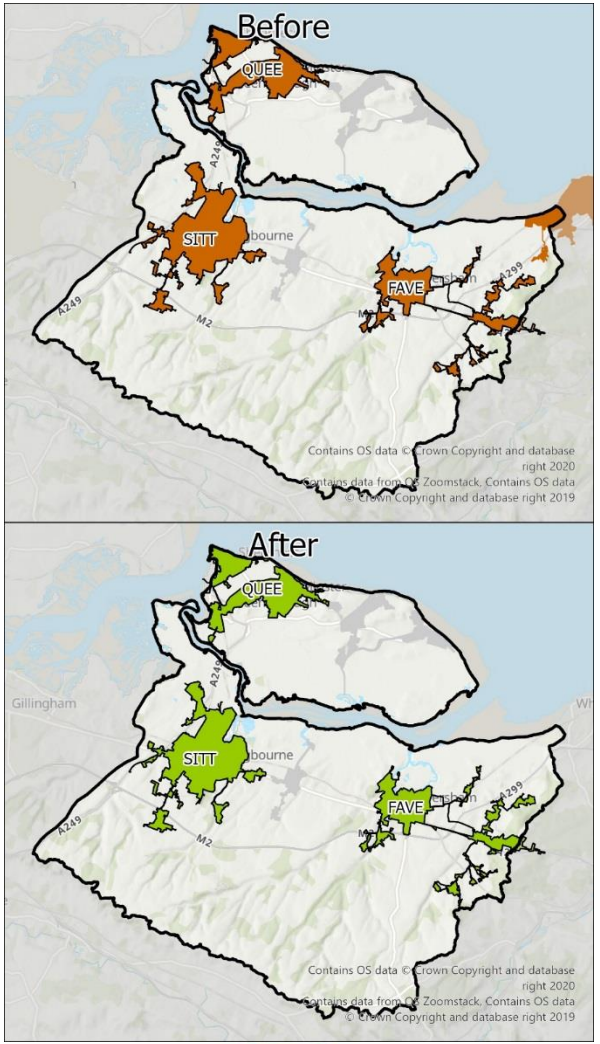
PO8 – DWF Compliance

North Kent	PO8	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.PW02.4 - DWF Permit Increase	£2090 K	2	0
Queenborough			
QUEE.OT01.1 - Investigation to reduce saline intrusion	£100 K	2	0
QUEE.PW02.3 - Increase DWF Capacity	£2491 K	2	0
Sittingbourne			
SITT.PW02.2 - Increase DWF Capacity	£2996 K	2	0



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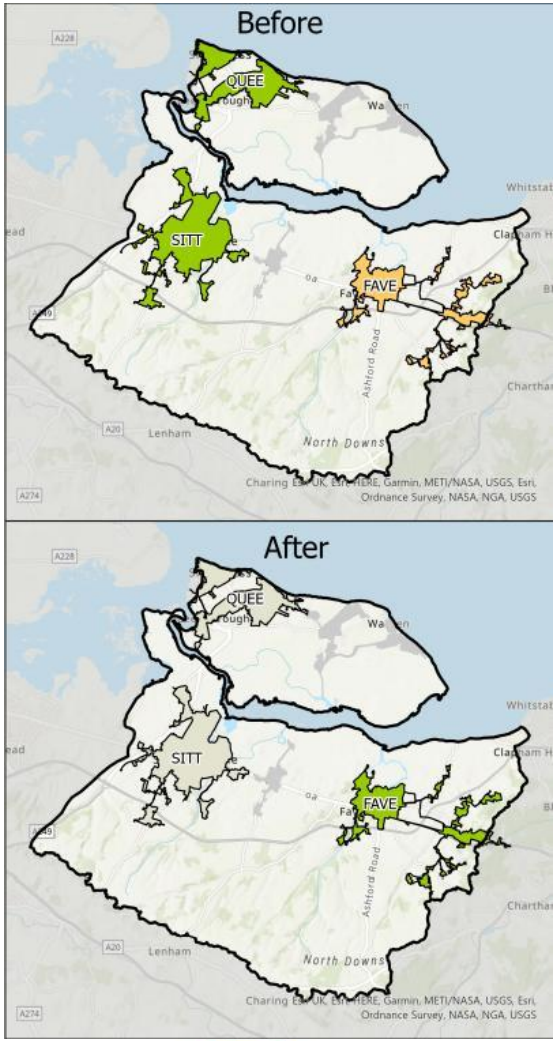
PO9 – Good Ecological Status

North Kent	PO9	BRAVA	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.OT01.3 - Study and Investigations to Achieve Good Ecological Status	£697 K	1	0
FAVE.PW01.7 - Storage Tank	£2323 K	1	0
FAVE.PW01.8 - Storage Tank	£781 K	1	0
Queenborough	-	0	0
Sittingbourne	-	0	0



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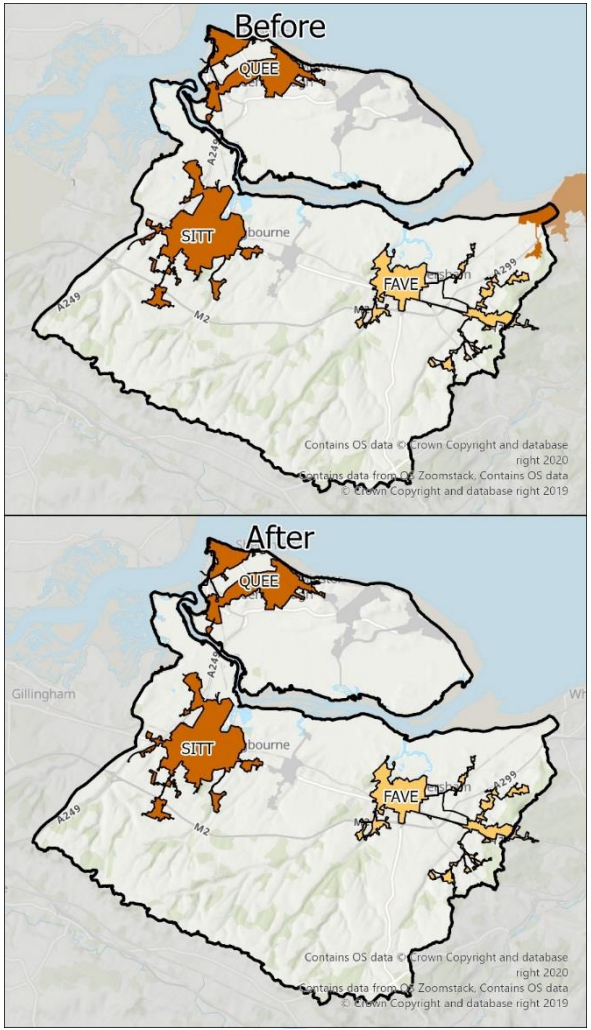
PO11 – Nutrient Neutrality

North Kent	PO11	BRAVA (2050)	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.OT01.4 - Nutrient Budget	£76 K	2	1
Queenborough			
QUEE.OT01.5 - Nutrient Budget	£76 K	2	2
Sittingbourne			
SITT.OT01.1 - Nutrient Budget	£76 K	2	2



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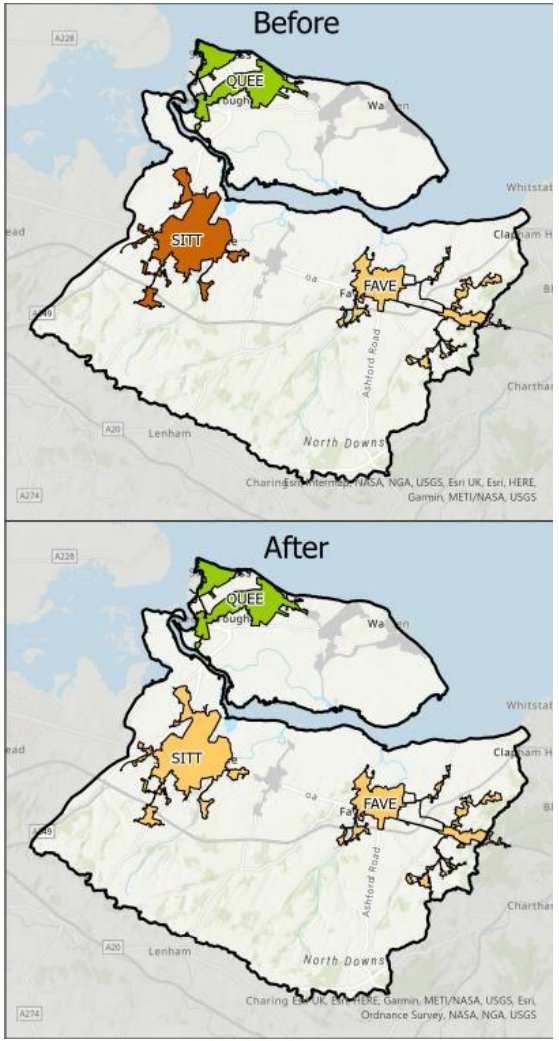
PO12 – Groundwater Pollution Risk

North Kent	PO12	BRAVA	
Option Type	Est Cost(£)	Before	After
Faversham			
FAVE.OT01.7 - Investigate Infiltration	£TBC	1	1
FAVE.PW01.14 - Pipe Rehabilitation Programme	£979 K		
Queenborough	-	0	0
Sittingbourne			
SITT.OT01.2 - Study and Investigations	£100 K	2	1
SITT.PW01.13 - Increase pumping rate and inlet penstocks openings, new RM	£629 K		
SITT.PW01.14 - Pipe Rehabilitation Programme	£33019 K		



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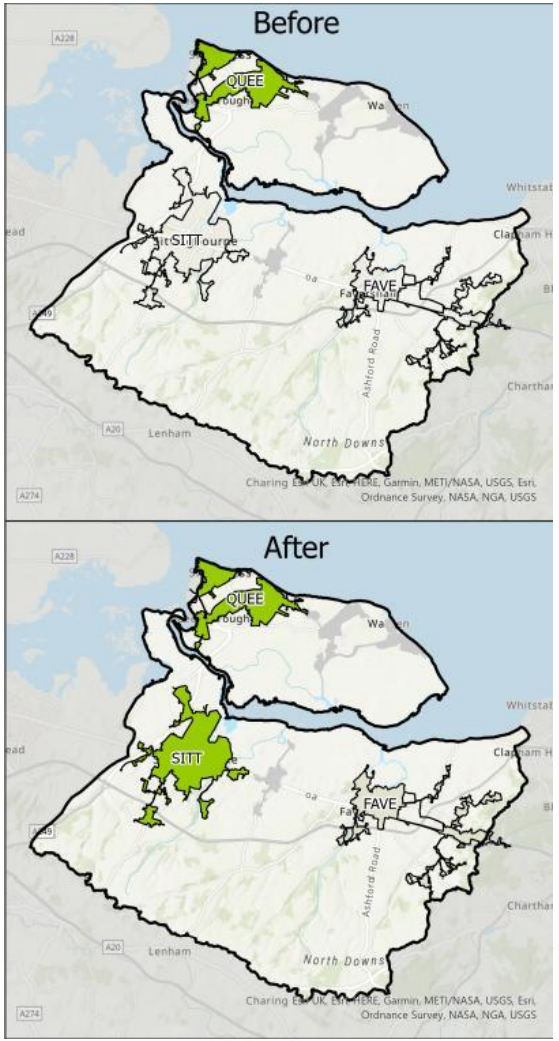
PO13 – Bathing Water

North Kent	PO13	BRAVA	
Option Type	Est Cost(£)	Before	After
Faversham	-	0	0
Queenborough	-	0	0
Sittingbourne	-	0	0



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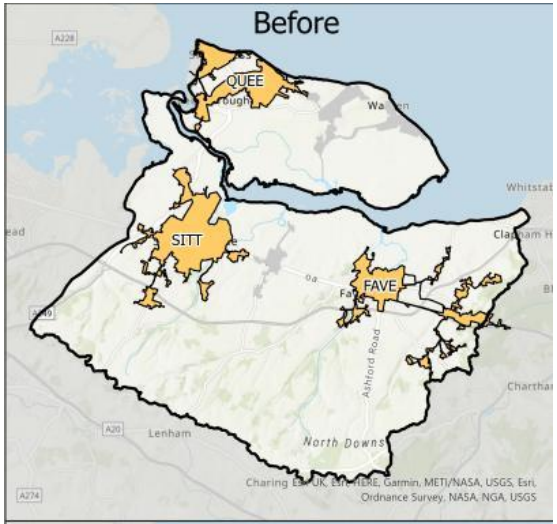
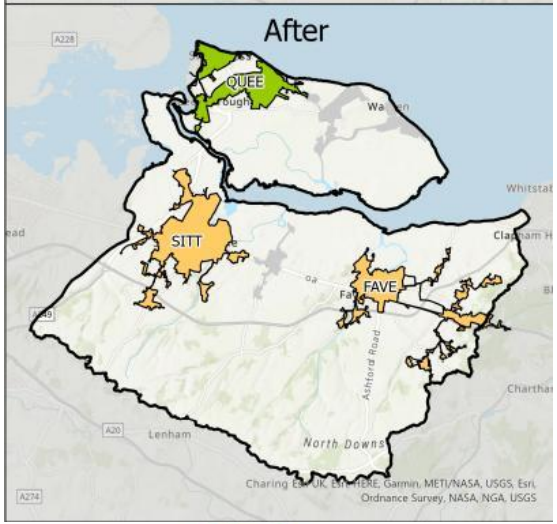
PO14 – Shellfish Water

North Kent	PO14	BRAVA	
Option Type	Est Cost(£)	Before	After
Faversham	-	0	0
Queenborough			
QUEE.OT01.2 - Study / modelling investigation	£1000 K	1	0
QUEE.PW01.11 - Storage	£846 K	1	0
Sittingbourne			
SITT.OT01.3 - Study overflows discharging to SW	£100 K	1	1
SITT.OT01.4 - Modelling investigation	£1000 K	1	1
SITT.PW01.15 - Additional Storage Capacity	£1000 K	1	1





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Other Issues from the DWMP Feedback / Input Log

- Rising groundwater issues / investigation of other potential uses
  - for example for agricultural irrigation – linked into the WRMP
- Investigation into tide-locking and groundwater rebound
- Recognition of the importance of recreational / social uses of the water environment
- Hazardous substances / micro-plastics
- Agricultural run off
- Cumulative impacts of discharges on the Swale

Programme Appraisal

Programme Appraisal

- Purpose: to develop an optimised ‘best value’ plan of measures to achieve the planning objectives
- Process: Collated all the investment needs from the 61 wastewater catchments, with information on costs and risk band reductions (across all 14 planning objectives)
- Extrapolated investment needs to other wastewater catchments in the river basin based on average cost per band reduction for each planning objective
- Optimise and prioritise investment needs for the final DWMP consultation

DWMP Cost & Risk Band Reduction: North Kent

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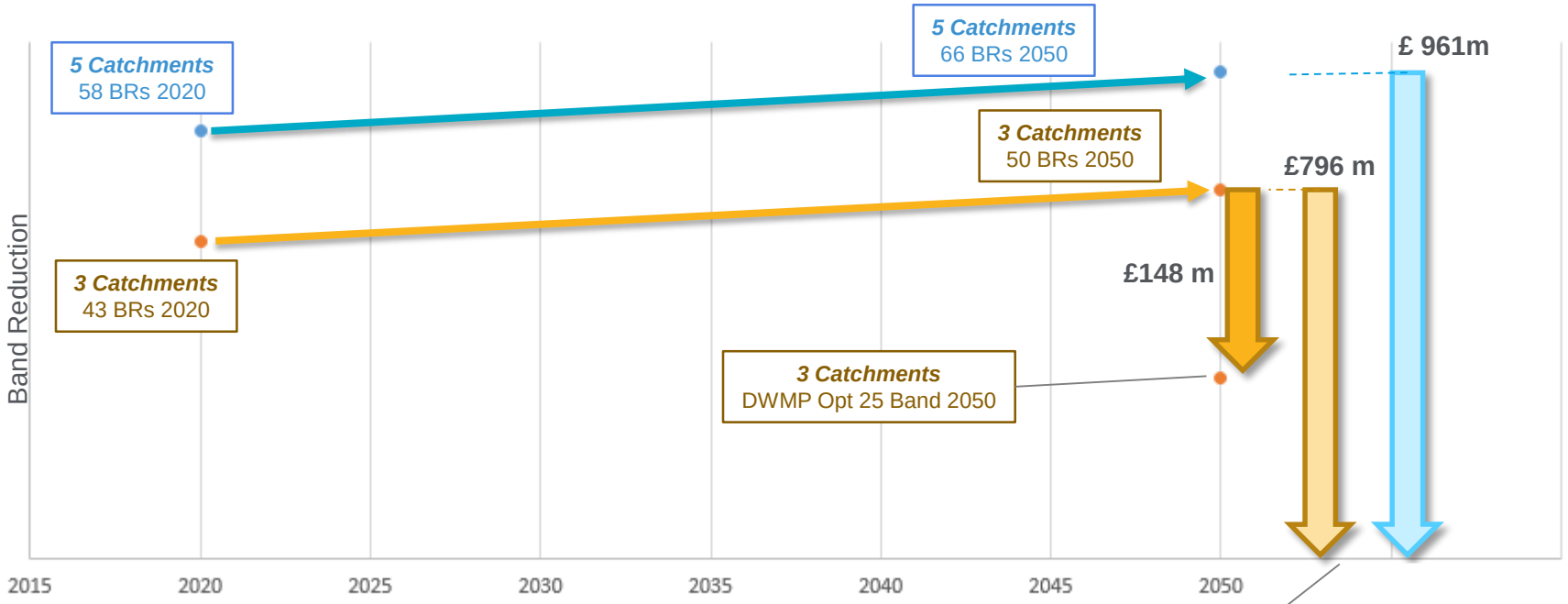


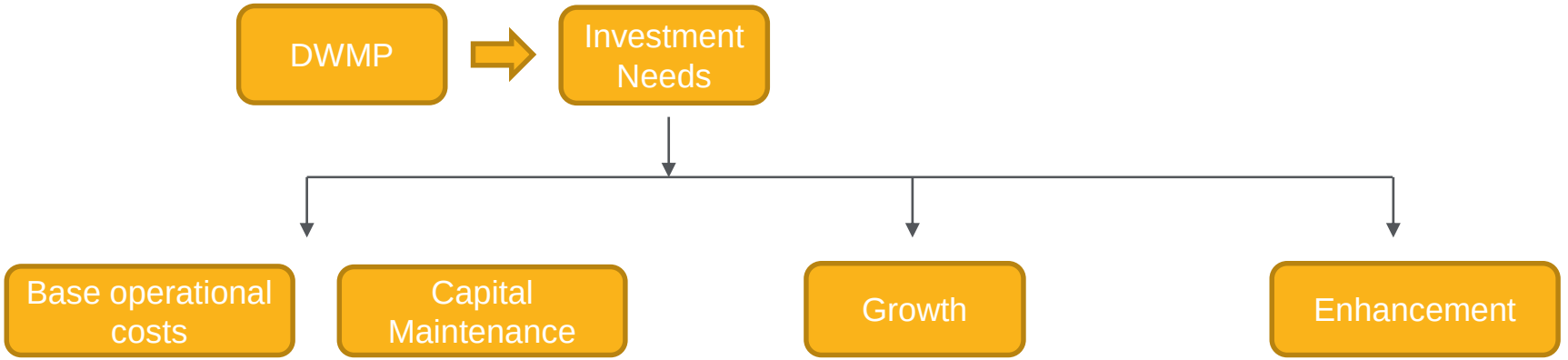
3 catchments = 125,000 population
5 catchments = 137,00 population

WATER for LIFE from Southern Water

Questions

Delivering the DWMP Investment Needs

Funding the DWMP Investment Needs in PR24



Maintain existing wastewater system to meet expected performance levels

Developer contributions and shareholder investment (included in base for Price Review 2019)

Improve system for better performance, new regulations, climate change etc

WATER for LIFE from Southern Water

Examples of Enhancement Spend

- New environmental requirements
- New or emerging water quality risks or tightening of regulations
- Other new statutory or regulatory requirements
- Customer supported improvements – special cost cases
- Level of service improvement beyond upper quartile performance – special cost cases supported by customers

How to Fund Enhancements?

WINEP

Water Industry National Environment Programme: Owned by the EA
Potential for funding through this route if investment needs meet specific drivers set by the EA

Or

Special Cases

To meet customer needs

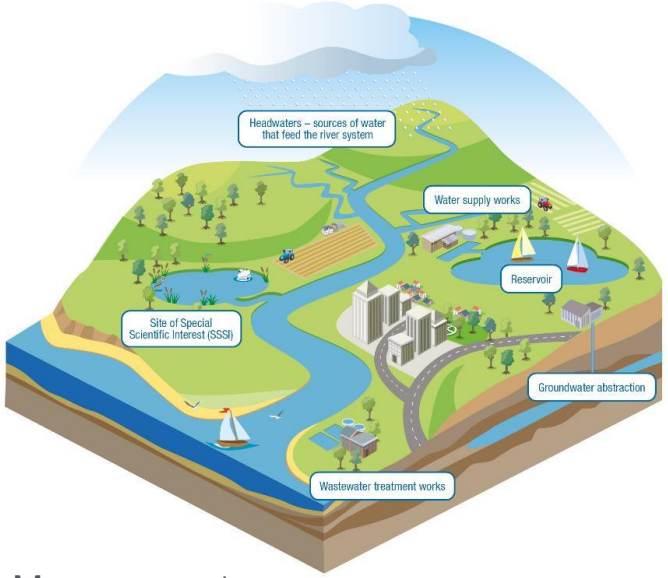
Special cases have a high evidence threshold, and must have:

- ✓ A clear need
- ✓ Clear efficient cost of delivery
- ✓ Customer support – Including a clear willingness to pay extra for it
- ✓ Clear cost benefit + proven environmental & social value
- ✓ Customer protection from non-delivery or significant underspend

Catchment and nature-based solutions

Key findings from our DWMP:

- Significant percentage of rainfall in sewers
- Need to tackle sewer flooding and storm overflows at source – surface water separation / attenuation
- Potentially huge benefits to people & the environment



Pathfinder projects in AMP7 – pioneering solutions in AMP7 to support our business cases for next Business Plan (PR24)

Catchment portfolios have been developed in our Water Resources Management Plan (WRMP), which include solutions such as:

- River restoration
- Nutrient and sediment reduction
- Working with farmers to improve land management practices
- Sustainable drainage systems (SuDS)

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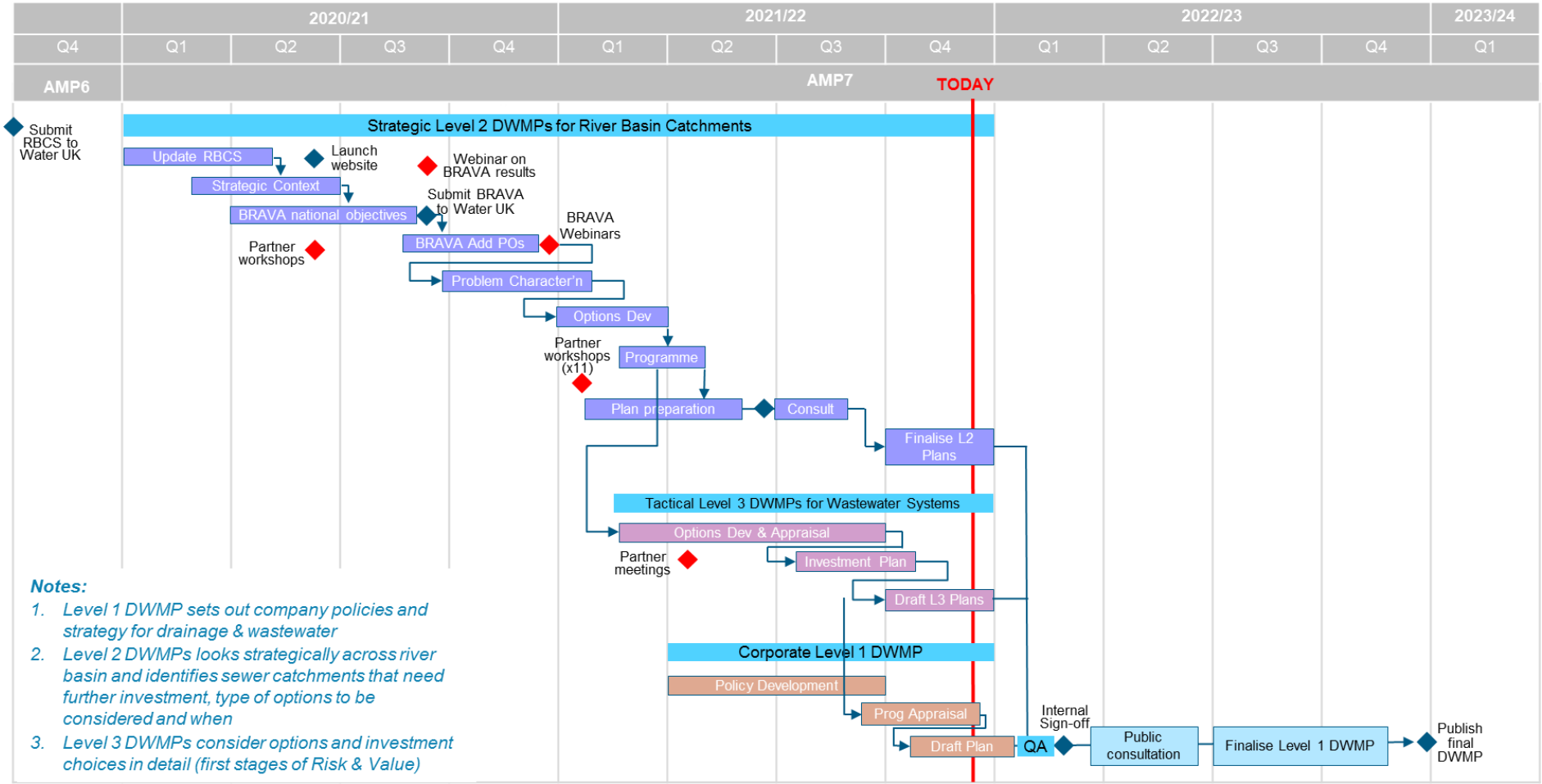
Next Steps

Our DWMP Delivery Programme



Notes:

1. *Level 1 DWMP sets out company policies and strategy for drainage & wastewater*
2. *Level 2 DWMPs looks strategically across river basin and identifies sewer catchments that need further investment, type of options to be considered and when*
3. *Level 3 DWMPs consider options and investment choices in detail (first stages of Risk & Value)*

Questions

Summary

Summary of Workshop

Our aim today was to:

- Discuss and refine the investment needs identified in the draft DWMP
- Flag any missing investment needs
- Discuss prioritisation and timing for investment needs
- Review opportunities to co-create and co-deliver solutions
- Look at total investment needs across the river basin

Poll

Thank you for participating today

Website: www.southernwater.co.uk/dwmp

Contact us: DWMP@southernwater.co.uk

from Southern Water