

Drainage and Wastewater Management Plans

Level 2 Strategic Planning Area Overview:

Lower Trent SPA

Draft DWMP (June 2022)

WONDERFUL ON TAP



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Background

For our Drainage and Wastewater Management Plan (DWMP) we have split our region into Strategic Planning Areas which closely align with the River Basin Management Catchments. The aim of this document is to share the outputs of our DWMP that specifically relate to the Lower Trent Strategic Planning Area.

This document focusses on the Lower Trent Strategic Planning Area (SPA) which is aligned to the Trent Lower and Erewash River Basin Management Catchment.

Within the Severn Trent area of the Lower Trent SPA there are 107 Wastewater Treatment Works (WwTW) catchments serving a residential population nearing 1,317,055 people and 535,699 properties. This makes it the 2nd largest SPA across Severn Trent region, serving 12.7% of the company's total population.

We completed Risk Based Catchment Screening (RBCS) as part of the DWMP assessment process, where all 107 catchments were assessed in line with the criteria set out in the Framework. The purpose of the RBCS was to assess each catchment against 17 metrics to determine the level risk, to screen out lower risk catchments enabling us to focus our attention and more detailed assessment in areas with greater priority. This resulted in 76 catchments triggering progression to the next stage, known as BRAVA, where more detailed assessment and hydraulic modelling was undertaken. This resulted in 99.2% of the connected residential population of the Lower Trent SPA undergoing more detailed assessment, with those not triggering at present being kept under review to ensure any new risks are taken into consideration in future RBCS refresh.



The map below shows the extent of the Lower Trent SPA, with catchments coloured green if they have progressed to detailed assessment (known as Baseline Risk and Vulnerability Assessment, or BRAVA), with those catchments which have been screened out as part of RBCS shown in red.

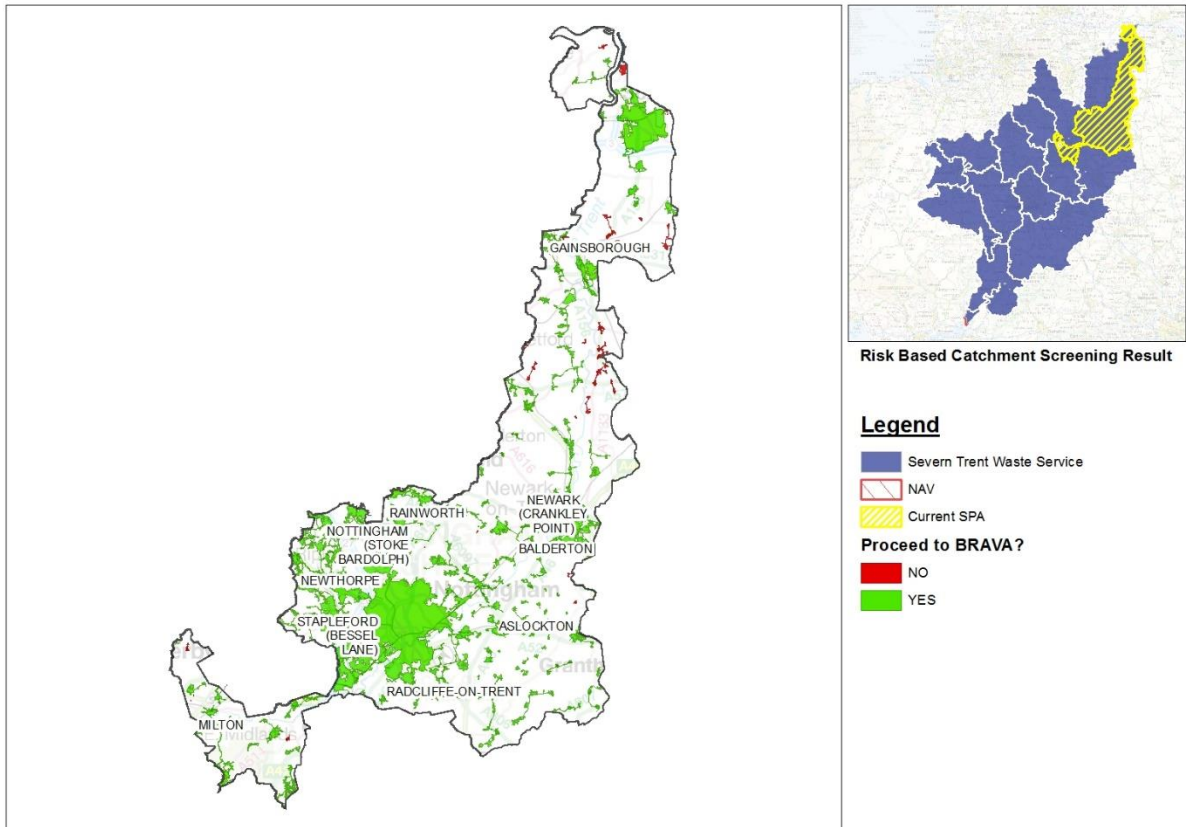


Figure 1. Map of the Lower Trent SPA showing catchments which triggered BRAVA (green) and lower priority catchments (red)

Assessing Catchments

In terms of catchments, Table 1 lists all catchments within the SPA, identifying the size and whether they have proceeded to more detailed assessment or screened out following the RBCS.

We have grouped each catchment into three categories based on their size, which reflect the strategic approach:

- **Large** - Catchments over 10,000 population are often complex with multiple interactions. They are likely to benefit from phased interventions to meet immediate needs which align with the overall long term catchment strategy.
- **Medium** - Catchments with populations between 2,000 and 10,000 are not expected to be overly complex hydraulically but may require mini strategies to address risks.
- **Small** – Catchments with populations less than 2000; this forms the majority of our catchments. Where risks need to be addressed, they are not usually complex hydraulically, however there are often more interactions with other drainage systems which require more in-depth local feasibility work to understand the root cause and identify potential interventions. Due to the often more rural nature, smaller catchments often have fewer physical constraints that could make a solution complex.

Where a catchment has not been assessed, this is because it did not trigger as part of the Risk Based Catchment Screening (RBCS) stage of the DWMP process. These catchments have been assessed as being lower risk but this will be kept under review should changes in the catchment warrant further assessments.

Table 1. Summary of the catchment size distribution and which catchments triggered a more detailed assessment (BRAVA)

Assessed			Not assessed
Large Sized Catchments >10,000 population	Medium Sized Catchments 10,000 - 2,000 population	Smaller Catchments <2,000 population	Catchments which did not trigger more detailed assessment (BRAVA)
ASLOCKTON (11252) BALDERTON (11253) BEESTON (LILAC GROVE) (11331) GAINSBOROUGH (11396) HARBY (11136) HEANOR (MILNE HAY) (11293) ILKESTON (HALLAM FIELDS) (11330) KIRKBY IN ASHFIELD (14931) MILTON (11534) NEWARK (CRANKLEY POINT) (11264) NEWTHORPE (11294) NOTTINGHAM (STOKE BARDOLPH) (11285) RADCLIFFE-ON-TRENT (11275) RAINWORTH (11311) SCUNTHORPE (YADDLETHORPE) (11452) STAPLEFORD (BESSEL LANE) (11295) TOTON (LONG EATON) (11296)	BOTTESFORD (11257) CALVERTON (11259) COLLINGHAM (11262) CROPWELL BISHOP (11258) EAST BRIDGFORD (11266) EAST MARKHAM (11376) ETWALL (11530) FARNDON (11270) FARNSFIELD (11271) FINDERN (11656) KEYWORD (11210) KIRTON-IN-LINDSEY (11510) MELBOURNE (11513) PINXTON (11309) PYE BRIDGE (11310) SCOTTER (11451) SHARDLOW (11660) SOUTHWELL (11249) SUTTON ON TRENT (CROMWELL) (11250) WALKERINGHAM (11476) WEST BURTON (11473) WORTHINGTON (11174)	ALVERTON (17942) BARNSTONE (MAIN ROAD) (14526) BRANSTON (11127) BREEDON (11180) CROXTON KERRIAL (11132) EAKRING (11303) EAST BUTTERWICK (11375) ELSTON (11267) ELTON (17954) FLINTHAM (11272) GOTHAM (11187) GRANBY VILLAGE DRAIN (14698) GUNNESS (11404) HAWKSWORTH (14615) KINOULTON (11138) KIRKLINGTON (11279) KNEESALL (11325) KNEETON (14613) LANGAR (11280) LANGAR LIMES FARM (17609) LAXTON (14614) LUDDINGTON (11504) NETHER BROUGHTON (11147) NORTH WHEATLEY (11429) OWTHORPE (17936) RAMPTON (11439) REDMILE (11276) SCREVETON (17680) SHELTON (NOTTS) (17843) SIBTHORPE (17975) SUTTON VILLAGE (SUTTON LANE) (14693) THOROTON (14518) THRUMPTON (11170) TICKNALL (11550) TITHBY (17623) TRUSLEY (11580) WOOLSTHORPE (11251)	ADLINGFLEET (18559) AISBY (17932) ALKBOROUGH (11347) BARNSTONE (11254) BLYTON (11364) BURTON STATHER (11369) COTHAM (18479) COTTAM (11339) DALBURY LEES (11570) EAST FERRY (17971) EAST STOCKWITH (11377) ETWALL (BROOMHILL COTTAGES) (11527) ETWALL (GRAVEL PIT COTTAGES) (11528) GROVE (14696) HALAM (11273) HEADON CUM UPTON & ASKHAM (11354) HIGH SANTON (11413) LAUGHTERTON (11499) LOW MARNHAM (17933) LOW SANTON (11502) MARTON (11507) NORTH & SOUTH CLIFTON (EAST MIDS) (11337) NORTHORPE (11433) PILHAM (14694) SALTERFORD (11278) STAUNTON (14619) THORNEY (11459) TORKSEY (11467) WILDSWORTH (CARR LANE) (19822) WILLOUGHTON (11481) WILSON (11172)

To find out more about how the RBCS assessment was undertaken please refer to the 'RBCS Technical Summary' and for detail relating to how catchments performed see the RBCS tables included within the supporting documentation.

Key Stakeholders

Working together with our stakeholders is key to the success of the DWMP, especially recognising that there are opportunities when working together to have wider benefits than just improvements to the wastewater system. Table 2 summarises the key stakeholders and organisations covering this SPA. As part of our ongoing process in developing the DWMP for this area we have undertaken a series of workshops with these stakeholders along with engaging with these Authorities via our digital systems. This will continue over the Draft DWMP consultation period in 2022 to help develop our Final DWMP plan in 2023.

Table 2. Summary of the key stakeholders and organisations we are working with

Local Planning Authorities	Lead Local Flood Authorities	Other
Amber Valley	Derbyshire	Derbyshire Wildlife Trust
Ashfield	Leicestershire	Environment Agency
Bassetlaw	Lincolnshire	Lincolnshire Wildlife Trust
Bolsover	North Lincolnshire	Lower Trent and Erewash CaBA Group
Broxtowe	Nottingham	Natural England
East Riding of Yorkshire	Nottinghamshire	Nottinghamshire Wildlife Trust
Erewash	Yorkshire	Trent Rivers Trust
Gedling		Trent Valley IDB
Mansfield		
Melton		
Newark and Sherwood		
North Lincolnshire		
North West Leicestershire		
Nottingham		
Rushcliffe		
South Derbyshire		
South Kesteven		
West Lindsey		
Central Lincolnshire		

We've produced a lookup spreadsheet in the supporting documentation which will enable stakeholders to filter by SPA, Local Planning Authority or LLFA to determine which catchments are of particular interest within the operational area.

Collaborative working opportunities in the Lower Trent SPA

As part of our normal day to day activities we work closely with other risk management authorities to support and develop collaborative working opportunities. This includes the reduction of the risk of fluvial flooding whereby the public sewerage system can get inundated by high river flows and where joint solutions to improve surface water management can deliver multiple source flood benefit. Our DWMP approach builds on existing practices we already have in place to engage with stakeholders and so we envisage the outputs of DWMP will help reinforce this, both as part of our ongoing AMP7 programme but also in readiness for AMP8. This activity is firstly aimed at supporting Environment Agency with the six-year Flood and Coastal Erosion Risk Management (FCERM) investment programme running from 1 April 2021 to 31 March 2027 to better protect 336,000 homes and non-residential properties. We also work with the Lead Local Flood Authorities, the Local Planning Authorities and other drainage body owners as part of our collaborative flood resilience approach.

With the six-year programme covering 2021 to 2027, the DWMP Cycle 1 planning horizon (2025-2050) will only overlap for the last two years of Flood and Coastal Erosion Risk Management (FCERM) schemes within this programme. However, as part of our ongoing engagement, we are working with the Environment Agency, Lead Local Flood Authorities and other Risk Management Authorities to support the development of (and where viable the delivery of) potential FCERM schemes and studies within the Lower Trent SPA in various locations including:

- Beechdale, Nottingham
- Burringham, North Lincolnshire
- Calverton, Nottinghamshire
- Haydn Road Greening Retrofit SuDS in Nottingham
- Ilkeston Sewerage and Surface Water Strategy in Derbyshire
- Lowdham, Nottinghamshire

- Mapperley Park, Nottingham
- Melbourne flood risk management scheme in Derbyshire
- Newthorpe, Nottinghamshire
- Nottingham City Retrofit SuDS Programme
- Redmile, Leicestershire
- River Trent Partnership
- Southwell Flood Risk Management Scheme
- Upper Day Brook Catchment Strategy, Nottinghamshire

We are working with Derbyshire County Council on the development of surface water & sewer strategies in Melbourne and Ilkeston. We are developing options to manage flood risk and are proposing a blend of traditional as well as blue green / natural infrastructure. We are working with Nottingham City Council on potential suds retrofit projects in Nottingham to increase resilience to more extreme weather.

Nottinghamshire County Council, Severn Trent and Gedling Borough Council have developed an integrated drainage strategy for the Upper Day Brook, which we are using to inform potential collaborative schemes.

We are aware of, or engaged in, other catchment partnerships and initiatives in the catchment, for example the River Leen Strategy which is an Environment Agency and Nottingham City Council led initiative seeking to sustainably manage flood risk across the catchment by bringing partners and stakeholders together to deliver multiple benefits.

During the previous 6-year programme (2015 to 2021), we worked in partnership with Nottingham City Council by contributing and supporting the delivery of the Day Brook Blue Green Infrastructure project in Nottingham which reduced flood risk to 160 properties and re-naturalised part of an urbanised watercourse. We also worked in partnership with Nottinghamshire County Council to deliver a strategic scheme in Newark to reduce flood risk to over 350 properties. We will continue to seek and develop opportunities to collaborate with other Risk Management Authorities to manage flood risk within the current 6-year programme. As part of the consultation period in 2022 and 2023, we will also work closely with stakeholders and partners to identify future opportunities to align plans and to co-create potential schemes for potential inclusion in future FCERM programmes.

The Lower Trent SPA falls within the Humber Flood Risk Management Plan (FRMP) area. FRMPs are strategic statutory plans which have measures for high-risk Flood Risk Areas (FRAs). FRMPs have been developed by the Environment Agency, working together with Lead Local Flood Authorities and Risk Management Authorities (RMAs). The draft second cycle FRMP for the Humber River Basin District covering the period 2021 – 2027 has recently been produced and consulted on in October 2021. We contributed to this draft FRMP by developing and incorporating measures. We also worked with other Risk Management Authorities to support other measures and we fed back to the consultation.

Within the Lower Trent SPA, there are 7 Flood Risk Areas (FRAs) in the FRMP, these are 'Beeston (Broxtowe) FRA', 'Derby FRA', 'Gunthorpe FRA', 'Long Eaton FRA', 'Newark-on-Trent FRA', 'Nottingham FRA' and 'West Bridgeford FRA'. The FRAs are catchment areas deemed to be at significant risk of flooding from surface water and/or rivers and the sea. Where Flood Risk Areas have been identified we are supporting the Environment Agency and Lead Local Flood Authorities to better understand and address the risk where applicable. We will seek opportunities to align FRMP activities with DWMP strategies in this current second cycle and future FRMP cycles.

Additionally, the Lower Trent SPA is included within the Humber River Basin Management Plan (RBMP) area which sets out environmental objectives and the programme of measures for protecting and improving the water environment.

Water Framework Directive

The core aim of the Water Framework Directive (WFD) is to prevent deterioration of the water environment and improve water quality by managing water in river basin districts. Based on Environment Agency measures river health, waterbodies that have a classification status of less than ‘Good’ are classified based on their Reasons for Not Achieving Good Status (RNAGS).

As part of our River Pledge our aim is for our operations to not be the reason for unhealthy rivers by 2030 based on Environment Agency measures (RNAGS). Working together with the Environment Agency we are currently sharing information to support the development of our AMP8 Water Industry National Environmental Programme (WINEP) list. We will also continue to educate, advocate and use our convening powers to help others to address their issues too.

Across the Lower Trent SPA there are 73 river water bodies. When looking at rivers reaching Good Ecological Status across the SPA, 22.5% of the problem is caused by Water Industry activity and 77.5% by other reasons. Figure 2 shows the breakdown of RNAG responsibility by sector.

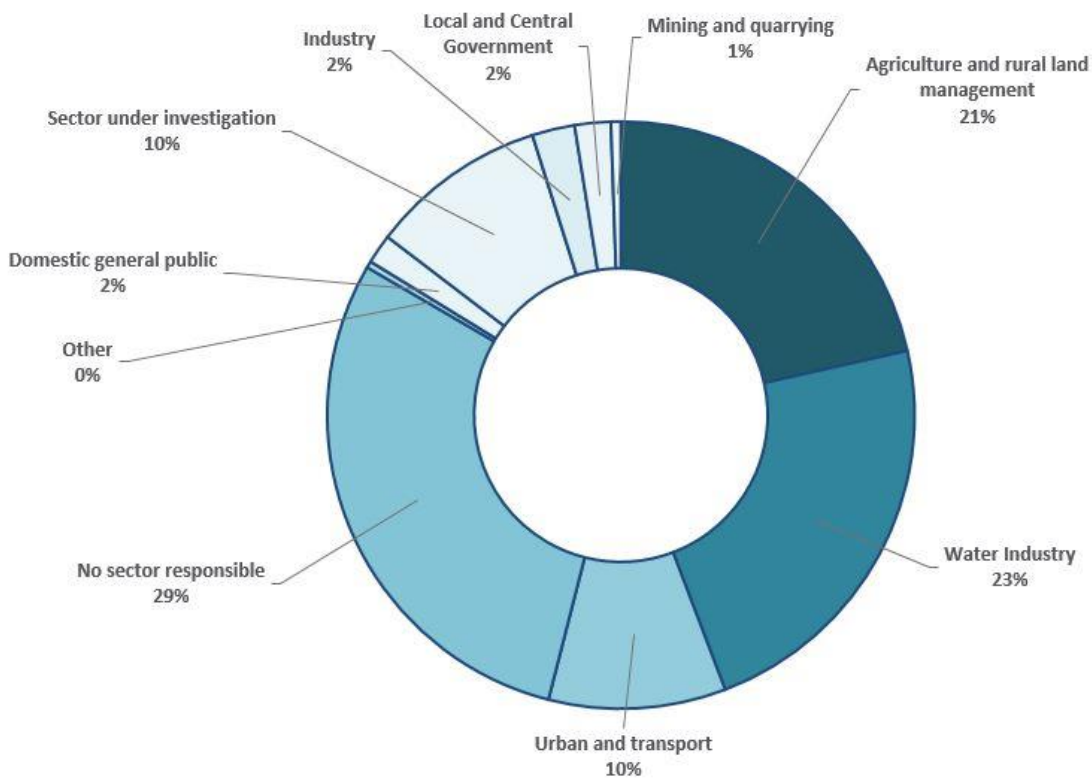


Figure 2. Reasons for Not Achieving Good Ecological Status by Sector and Activity across the Lower Trent SPA

Assessment of SPA Catchment Needs

As part of our Baseline Risk and Vulnerability Assessments (BRAVA) we have assessed each catchment against six Common Planning Objectives and four Opportunity Indicators (Table 4). More detail about how these have been developed and measured can be found in our Technical Summaries Section. Our Planning Objectives have allowed us to understand what the priorities of our catchments within this SPA are and where our strategies should be focussed to deliver a best plan for our customers and stakeholders. Each Planning

Objective and Opportunity Indicator have been scored according to 3 priority risk bands (Band 0/1/2) which are explained in Table 3a and Table 3b. These scores are based on a no intervention scenario which gives us the scale of the problem that needs to be addressed by the DWMP and does not mean that our plan is to do nothing. We have collated the catchment level scores at SPA level, according to the DWMP Framework, so that we can share what the current and future needs are within the SPA to identify the high-level strategic direction needed to address these needs. A catchment Level detailed breakdown can be found in the supporting documentation.

Table 3a. Description of the priority risk bands for Common Planning Objectives

Band	Priority Level	Description
2	Short Term Priority	The needs of the catchment indicate that performance warrants more immediate investigation and is a short term priority to improve performance. The solution to remedy the need could be simple or complex which can be understood through Option Development and Appraisal stage of DWMP.
1	Medium Term Priority	The needs of the catchment indicate that performance appears to be borderline and therefore needs further investigation in the Options Development and Appraisal stage of DWMP.
0	Long Term Priority	The needs of the catchment indicate that performance is not triggering specific risk thresholds and current baseline performance (or projected 2050 performance) is not a significant issue or concern. This is a long-term priority to address sider strategic needs. Where there may localised needs there is the mechanism to address through 'business as usual' investment decisions.
N/A	Not Assessed	Where a planning objective has not been assessed due to not being able to project to 2050

Table 3b. Description of the priority risk bands for Opportunity Indicators

Band	Opportunity Level	Description
2	Good	This indicates the catchment is likely to offer good opportunities for DWMP interventions to benefit a particular indicator
1	Reasonable	This suggests there are reasonable opportunities across a catchment to support an indicator.
0	Limited	Based on the characteristics of the catchment our assessment suggests there are limited opportunities to support an indicator, however there may still be some benefits which could still be gained.
N/A	Not Assessed	Where an opportunity indicator has not been assessed due to not being able to project to 2050

Table 4. Needs of the Lower Trent SPA in relation to the Planning Objectives and Opportunity Indicators.

Ref	Planning Objective	2020	2050	Comments
Common Planning Objectives				
CPO1	Internal Sewer Flooding Risk	1	N/A	Based on the average number of internal sewer flooding incidents reported over the 3 year period from 1st April 2018 to 31st March 2020.
CPO2	Pollution Risk	0	N/A	Based on the average number of pollution incidents reported over the 3 year period from 1st April 2018 to 31st March 2020.
CPO3	Sewer Collapse Risk	0	N/A	Based on the average number of sewer collapses reported over the 3 year period from 1st April 2018 to 31st March 2020.
CPO4	Risk of internal sewer flooding in a 1 in 50-year storm	0	1	Based on the Ofwat guidance for Risk of Sewer Flooding in a Storm Methodology and incorporating enhancements to align with the assessment of surface water and fluvial flood risks assessments used by Environment Agency/LLFAs.
CPO5	Storm Overflow Performance	0	0	Based on the Water UK 21 st Century Drainage Capacity Assessment Framework to assess storm overflow performance.
CPO6	Risk of wastewater treatment works quality compliance failure	0	0	This considers pressures on flow and quality permit compliance at Wastewater Treatment Works, plus any technological limitations or physical site conditions which could limit available solutions.

Opportunity Indicators				
O11	Risk of surface, fluvial and groundwater flooding	2	N/A	This indicator uses the Environment Agency surface water flood risk maps to identify properties at risk of surface water flooding which could potentially benefit from co-created drainage and wastewater solutions
O12	Sustainable accommodation of future growth	0	N/A	This indicator looks at how likely it is that new development would connect to a foul/combined sewer as no suitable surface water sewers are available or the ground conditions limit use of Sustainable Drainage Systems (SuDS).
O13	Effective wastewater asset resilience	2	N/A	High level assessment of WwTW and major pumping station resilience against fluvial (river) flooding, electricity supply failures and communication outages
O14	Supporting Water Resource Management Plan strategies	1	N/A	This indicator assesses potential opportunities to integrate DWMP surface water management strategies to offset groundwater and river abstraction constraint within WRMP.

Developing Options

To help us develop a best value, long-term approach to managing the future risks within each catchment we have assessed each catchment against a series of interventions. This ensures a good understanding of what options may be viable to consider as part of our long-term plan. The DWMP Framework identifies a long list of ‘generic options’, which fall into three main themes; reduce demand, optimise existing capacity or increase supply of capacity (Figure 3). We have grouped these tactical interventions into Intervention Themes (Table 5), and a detailed explanation of these options and how we have considered them are included in the ‘ODA Screening Technical Summary’.

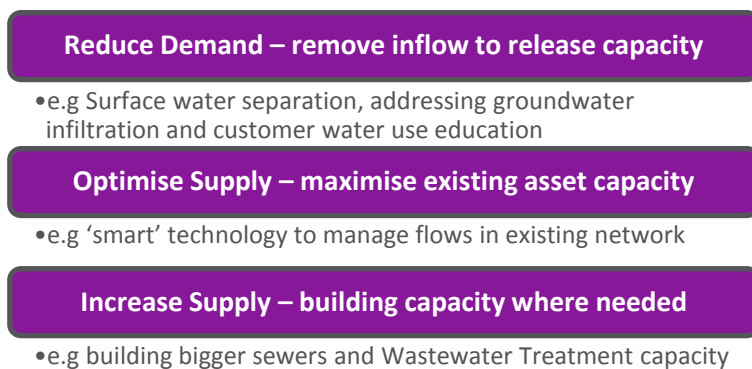


Figure 3. Main categories of options addressed through the DWMP

Table 5. Summary of the Intervention Themes considered when developing options at catchment level

Type	Intervention Theme	Aim of Intervention
Reduce	Domestic water Consumption Management	Working with customers to reduce inflow from domestic properties to reduce base flows
	Trade Flow Demand Management	Working with non-household traders to identify opportunities to pre-treat flows on site to offset load issues at the WwTW
	Customer Education	Customer awareness on the impact of sewer misuse, water consumption and increase of impermeable area creep. This is a company level activity.
	Surface Water Inflow Management	Managing surface water entering the sewer network through surface water separation and SuDS strategies
	Infiltration Management	Sealing of pipes to reduce groundwater ingress due to changes in groundwater tables.
Optimise Sewerage Network	Managing Exceedance Flow Paths	Mitigating sewer exceedance flood risk by managing flow paths. This is a business-as-usual activity.
	Sewer Flow Management to Optimise Headroom	Identify opportunities within the sewer network where alterations can be made to make better use of existing spare capacity.

Type		Intervention Theme	Aim of Intervention
		Storm Overflow Rationalisation	Identify opportunities to combine multiple Storm Overflows into a single asset designed to improved modern design standards.
		Active System Control	Using smart technology to dynamically manage flows in the wastewater system during heavy rainfall.
		Operational Performance Management	Maintenance of the network such as routine cleanse to reduce blockage risk. This is a business-as-usual activity.
	Wastewater Treatment	River Catchment Flexible Permitting	Use of river reach permitting to meet environmental objectives for the watercourse.
		WwTW Treatment Optimisation	Optimising existing treatment capacity by transferring flows to an alternative WwTW with spare headroom.
		Storm Overflow Effluent Treatment	Treatment of storm overflow effluent to improve the water quality before release into sensitive environments.
		Product Recovery	Using technology to extract products from the flows into the WwTW. This is a bespoke option rather than within strategic DMWP scope.
Build	Sewerage Network	Sewer Capacity Upgrades	Traditional capacity upgrades including building new sewers and attenuation tanks.
		Sewer rehabilitation	Repair of structural condition of sewers through replacement, sewer lining or patch repairs to reduce risk of collapse, burst or blockage. This is a business-as-usual activity covered through capital maintenance plans.
	Wastewater Treatment	WwTW Capacity Upgrades	Traditional capacity upgrades including building additional treatment capacity.
		WwTW Capital Maintenance	Repair and maintenance of existing assets at WwTW. This is a business-as-usual activity covered through capital maintenance plans.
Environmental	SuDS for Groundwater Recharge	SuDS Strategies to support groundwater recharge to support water availability objectives.	
	Natural Flood Management	Use of Natural Flood Management to manage flood levels where they interact with and inundate the wastewater system.	
Indirect Measures	Influencing Policy	Influencing policy on growth, planning, surface water connections to reduce inflow. This is a company level activity.	
	Investigate and Monitor	Understand root cause and risk. This is a company level activity.	
	Future Technology	To await or develop new technology to support with meeting objectives. This is a company level activity.	

Each of the 76 WwTW catchments within the Lower Trent SPA have been assessed against each of the intervention options. These have been assessed based on the individual characteristics of each catchment using in-depth knowledge of the catchment by our Technical Experts.

The intention of the assessment was to understand what solutions may be viable within a catchment, enabling the interventions to be married against the needs to determine which solutions may be viable. It is unlikely that a single intervention would be applicable to the entire catchment as some parts of a catchment may be amenable to an intervention which would not work elsewhere in the catchment. However, the purpose of this exercise is to understand what could comprise feasible interventions which should be assessed in more detail as part of Option Development and Appraisal.

The findings of the assessment of interventions are summarised for 76 catchments in this SPA in Figure 4, which indicates which options are the most feasible. Based on an assessment of catchment needs and characteristics, the larger text indicates which interventions are likely to be more viable across all catchments in the SPA. This does not mean the less viable interventions will be discounted altogether as once we get to the next phase of detailed optioneering there may be parts of a catchment where these interventions would be used, but our analysis indicates they are not primary interventions. Overall, this indicates that the main

interventions worth considering further are traditional interventions to increase supply of capacity within the wastewater network or look at options to reduce inflow into the sewerage system through improved surface water inflow management. The added benefit of the latter being this also provides opportunities to work with other flood risk management authorities to deliver wider flooding benefits.

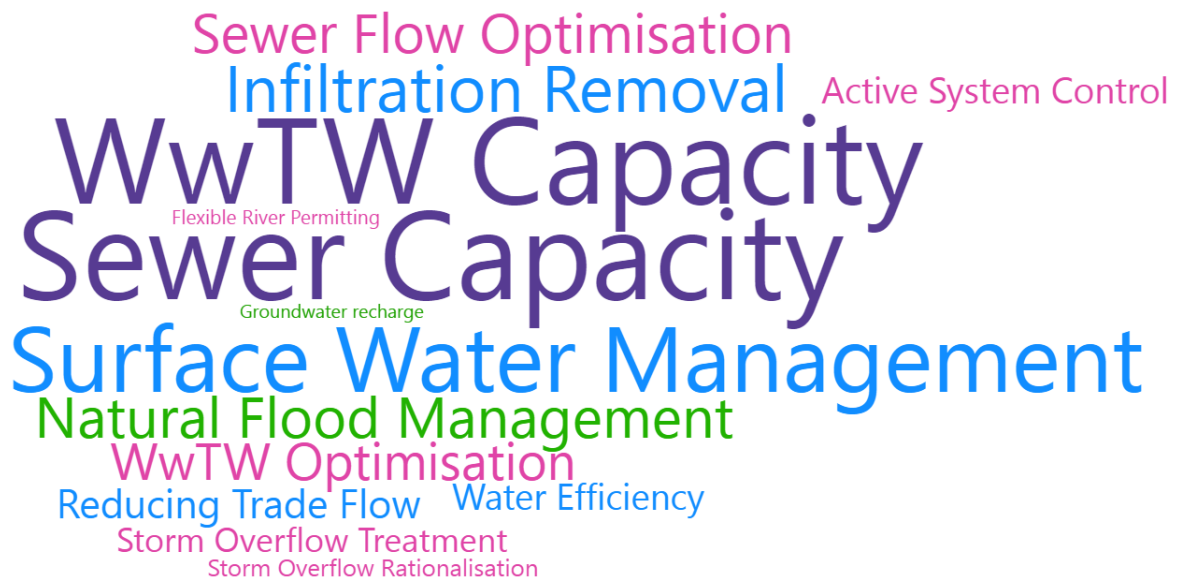


Figure 4. Summary of the most viable options available within the Lower Trent SPA

Interventions

As part of our Option Development and Appraisal assessment we have focussed on traditional interventions to represent the ‘supply’ activities, and more nature-based surface water removal options to achieve ‘demand’ reduction. The assessments from the option viability will be used to inform project development during the future stages of our catchment management.

Internal sewer flooding in a 1 in 50 year storm

This aims to understand the level of risk across a catchment to internal sewer flooding in a 1 in 50 year storm to identify what interventions would be required to reduce the risk. A 1 in 50 year storm is a probabilistic means of indicating the likelihood of a heavy rainfall event causing flooding from the sewerage network. This is often shown as a 1 in 50 chance of occurring in a year, sometimes shown as a 2% annual probability. This does not mean an event will only occur every 50 years, it is purely an indication of its statistical annual probability. Internal Sewer flooding planning objective and how the strategic options and interventions were developed can be found in the ‘Internal Sewer Flooding Technical Summary’.

Figure 5 provides an overview of the level of risk across this SPA and how it is likely to deteriorate by 2050 due to the impacts of climate change, new development and urban creep. We have assessed this for both 2°C and 4°C global warming scenarios.

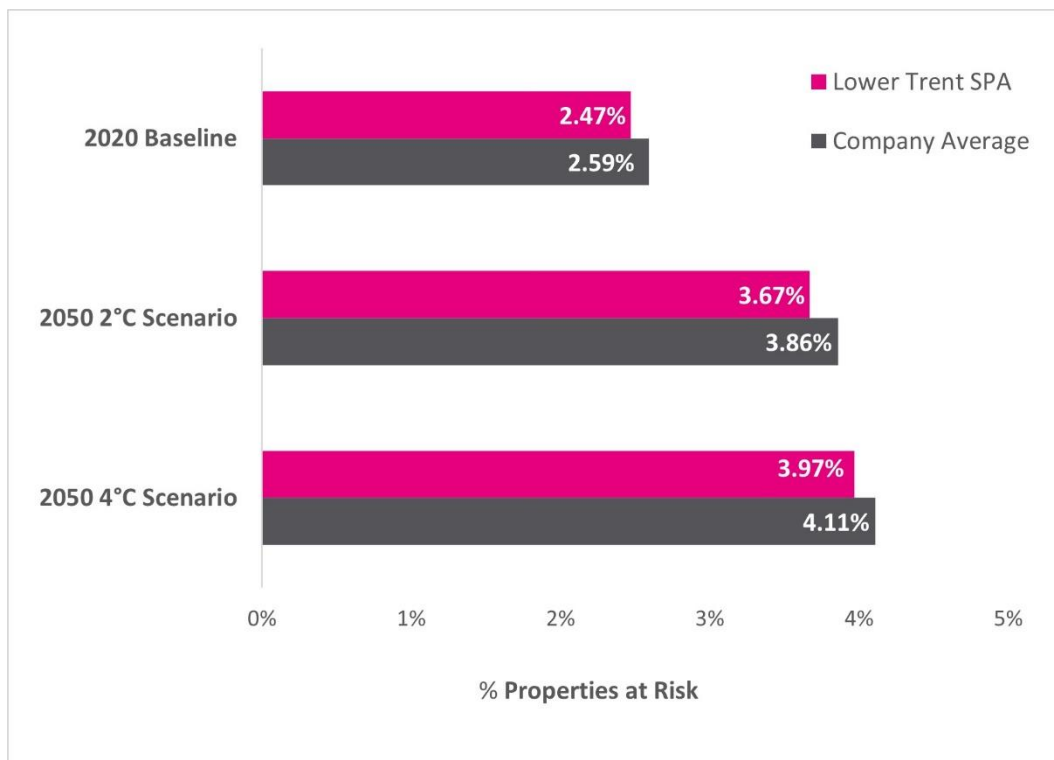


Figure 5. Comparison of the risk of internal sewer flooding in a 1 in 50 year storm between Lower Trent SPA and the Company as a whole for a range of scenarios.

Within the Lower Trent, the risk of internal flooding in a 1 in 50 year storm is below the company average across the different scenarios and the main areas of risk are found within the following large catchments, namely Ilkeston (Hallam Fields) and Gainsborough. Without intervention a further 6,589 properties are expected to become at risk across all the assessed catchments within this SPA, therefore our options need to ensure future pressures do not result in deterioration of current performance.

Table 6 summarises the current and future flood risks based on our assessment of priority risk level for a 2°C global warming scenario. Our immediate focus is to mitigate the risks associated with catchments forecast to fall within band 2 ‘Short Term priority’ by 2035.

Table 6. Assessment of risk of sewer flooding in a 1 in 50 year storm showing which catchments fall within which priority bands (NOTE: This table is listed in order of its population size)

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
11285	NOTTINGHAM (STOKE BARDOLPH)	606,500	0	0	0	0	1
11452	SCUNTHORPE (YADDLETHORPE)	108,363	1	1	1	1	2
11296	TOTON (LONG EATON)	66,743	0	0	0	0	1
11264	NEWARK (CRANKLEY POINT)	64,083	0	0	0	0	0
11330	ILKESTON (HALLAM FIELDS)	50,597	1	1	2	2	2
11294	NEWTORPE	47,705	0	0	1	1	1
11293	HEANOR (MILNE HAY)	32,892	1	1	1	1	2
14931	KIRKBY IN ASHFIELD	28,826	0	0	0	0	0
11295	STAPLEFORD (BESSEL LANE)	28,409	1	1	1	1	2
11396	GAINSBOROUGH	27,558	2	2	2	2	2
11311	RAINWORTH	22,596	0	0	0	0	0
11331	BEESTON (LILAC GROVE)	21,985	0	0	0	0	1
11275	RADCLIFFE-ON-TRENT	18,735	0	0	0	0	0
11534	MILTON	17,264	1	1	1	1	2
11252	ASLOCKTON	14,713	0	0	0	0	0
11253	BALDERTON	10,690	0	0	0	0	1
11249	SOUTHWELL	9,848	0	0	0	0	0
11259	CALVERTON	9,532	0	0	0	0	1
11309	PINXTON	9,266	1	1	1	1	2
11136	HARBY	9,251	0	0	0	0	0

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
11310	PYE BRIDGE	9,165	2	2	2	2	2
11210	KEYWORTH	7,062	0	0	0	0	1
11513	MELBOURNE	5,310	1	1	2	2	2
11476	WALKERINGHAM	4,748	0	0	0	0	0
11250	SUTTON ON TRENT (CROMWELL)	4,688	0	0	0	0	0
11660	SHARDLOW	4,083	0	0	0	0	1
11376	EAST MARKHAM	3,976	0	0	0	0	0
11257	BOTTESFORD	3,820	0	0	0	0	0
11451	SCOTTER	3,603	0	0	0	0	0
11271	FARNSFIELD	3,351	0	0	0	0	0
11510	KIRTON-IN-LINDSEY	3,276	0	0	0	0	1
11258	CROPWELL BISHOP	3,198	0	0	0	0	1
11262	COLLINGHAM	3,138	0	0	0	0	0
11530	ETWALL	2,934	0	0	1	1	2
11174	WORTHINGTON	2,786	0	0	0	0	0
11270	FARNDON	2,415	0	0	0	0	0
11473	WEST BURTON	2,137	0	0	0	0	0
11138	KINOULTON	2,128	0	0	0	0	0
11266	EAST BRIDGFORD	2,109	0	0	0	0	0
11656	FINDERN	1,901	1	1	2	2	2
11439	RAMPTON	1,847	0	0	0	0	0
11369	BURTON STATHER	1,704	NA	NA	NA	NA	NA
11504	LUDDINGTON	1,557	0	0	0	0	0
11364	BLYTON	1,530	NA	NA	NA	NA	NA
11187	GOTHAM	1,462	0	0	0	0	0
11147	NETHER BROUGHTON	1,354	0	0	0	0	0
11467	TORKSEY	1,126	NA	NA	NA	NA	NA
11404	GUNNESS	1,057	0	0	0	0	0
11499	LAUGHTERTON	968	NA	NA	NA	NA	NA
11276	REDMILE	929	0	0	0	0	0
11375	EAST BUTTERWICK	844	0	0	0	0	0
11267	ELSTON	827	0	0	0	1	1
11180	BREEDON	792	0	0	0	0	0
11507	MARTON	681	NA	NA	NA	NA	NA
11127	BRANSTON	587	0	0	0	0	0
11272	FLINTHAM	575	0	0	0	0	0
11429	NORTH WHEATLEY	573	0	0	0	0	0
11550	TICKNALL	566	0	0	0	1	2
11132	CROXTON KERRIAL	565	0	0	0	0	0
11481	WILLOUGHTON	498	NA	NA	NA	NA	NA
11303	EAKRING	478	0	0	0	0	0
11251	WOOLSTHORPE	418	2	2	2	2	2
11337	NORTH & SOUTH CLIFTON (EAST MIDS)	411	NA	NA	NA	NA	NA
11279	KIRKLINGTON	375	0	0	0	1	1
11354	HEADON CUM UPTON & ASKHAM	346	NA	NA	NA	NA	NA
17609	LANGAR LIMES FARM	343	0	0	0	1	1
14698	GRANBY VILLAGE DRAIN	320	1	1	1	1	1
11347	ALKBOROUGH	270	NA	NA	NA	NA	NA
14526	BARNSTONE (MAIN ROAD)	261	2	2	2	2	2
11570	DALBURY LEES	223	NA	NA	NA	NA	NA
11377	EAST STOCKWITH	221	NA	NA	NA	NA	NA
14614	LAXTON	218	0	0	0	0	0
11325	KNEESALL	197	0	0	0	0	0
11254	BARNSTONE	166	NA	NA	NA	NA	NA
11459	THORNEY	148	NA	NA	NA	NA	NA
11172	WILSON	125	NA	NA	NA	NA	NA
17680	SCREVETON	114	2	2	2	2	2
11170	THRUMPTON	109	2	2	2	2	2
14696	GROVE	108	NA	NA	NA	NA	NA
14615	HAWKSWORTH	107	0	0	0	0	0
11433	NORTHORPE	102	NA	NA	NA	NA	NA
11339	COTTAM	97	NA	NA	NA	NA	NA
17971	EAST FERRY	95	NA	NA	NA	NA	NA
11413	HIGH SANTON	84	NA	NA	NA	NA	NA
18559	ADLINGFLEET	81	NA	NA	NA	NA	NA
17954	ELTON	77	1	1	1	1	1
14694	PILHAM	77	NA	NA	NA	NA	NA
14518	THOROTON	67	2	2	2	2	2
17975	SIBTHORPE	64	0	0	0	0	0
19822	WILDSWORTH (CARR LANE)	61	NA	NA	NA	NA	NA
11580	TRUSLEY	60	2	2	2	2	2
18479	COTHAM	56	NA	NA	NA	NA	NA
14693	SUTTON VILLAGE (SUTTON LANE)	55	0	0	0	0	0

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
17942	ALVERTON	54	0	0	0	0	0
17843	SHELTON (NOTTS)	45	1	1	2	2	2
17936	OWTHORPE	43	0	0	0	0	1
17932	AISBY	42	NA	NA	NA	NA	NA
14613	KNEETON	40	2	2	2	2	2
11528	ETWALL (GRAVEL PIT COTTAGES)	35	NA	NA	NA	NA	NA
14619	STAUNTON	34	NA	NA	NA	NA	NA
17623	TITHBY	31	0	0	0	0	0
17933	LOW MARNHAM	25	NA	NA	NA	NA	NA
11273	HALAM	21	NA	NA	NA	NA	NA
11527	ETWALL (BROOMHILL COTTAGES)	11	NA	NA	NA	NA	NA
11280	LANGAR	8	0	0	0	0	0
11502	LOW SANTON	8	NA	NA	NA	NA	NA
11278	SALTERFORD	6	NA	NA	NA	NA	NA

When looking at intervention options, we have modelled three principal intervention themes:

- Traditional – Building ‘grey’ sewer capacity interventions
- Surface water separation - assessing 3 scenarios: 10%, 30% and 50% separation of roads and footpaths
- Hybrid – a mix of traditional ‘grey’ and nature based ‘green’ solutions. Where surface water interventions on their own do not meet the desired level of performance, we have reinforced any shortfall with traditional sewer-based solutions.

Traditional

Figure 6 indicates the cost vs benefit for meeting different performance levels across the Lower Trent SPA using traditional interventions. This shows the balance between percentage of properties at risk and indicative costs to 2050. For this SPA, reducing the risk from sewer flooding to zero has an indicative cost in the region of £1,012 million by 2050 (to alleviate current baseline risk and to mitigate future pressures from climate change, creep and new development). Whereas maintaining current performance against future pressures is indicated to require investment levels on the region of £ 220 million by 2050.

Risk of internal sewer flooding in a 1 in 50 Year Storm

2°C Climate Change Scenario

Risk of internal sewer flooding in a 1 in 50 Year Storm

4°C Climate Change Scenario

Investment Option	Indicative Cost (£m)	Properties at Risk
Maintain Current Risk	£220.5	2.4%
Basic Investment*	£ 86.8	3.1%
Enhanced Investment**	£213.3	2.5%
Aspirational: Zero Flooding	£1,012.4	0%

Investment Option	Indicative Cost (£m)	Properties at Risk
Maintain Current Risk	£264.	2.4%
Basic Investment*	£ 92.6	3.4%
Enhanced Investment**	£255.9	2.5%
Aspirational: Zero Flooding	£1,086.8	0%

*Cost to ensure no catchments are within the highest flooding risk band

**Cost to ensure no catchments are within the medium flooding risk band

Figure 6. Indicative cost of traditional ‘grey’ capacity increase interventions for a range of performance options. For each option, the resultant percentage of properties at risk is shown.

In the graph above, strategic options are shown using the band 0/1/2 risk thresholds used for BRAVA. As part of Option Development and Appraisal we have assessed what level of interventions would be needed to ensure a catchments risk does not exceed a risk threshold. For some catchments this could see risk deteriorate as indicated by the Basic Investment Option.

Surface Water Separation

Where catchment characteristics indicate catchment wide surface separation strategies are likely to be viable, we have also assessed options to remove surface water from the public sewerage system. The added benefit being that such solutions may also provide wider opportunities to support co-creation of projects with other risk management authorities and reduce carbon use from our movement and processing of this rainfall induced flow. This could provide surface water flood risk benefits by working together to manage above ground flows before it would have otherwise entered the public sewerage network.

The findings of this analysis are summarised in the Figure 7, with the indicative costs to reduce sewer flooding to zero being £1,033m - £1,124 million depending on the scale of viable surface water separation. The added benefit of this approach being that it provides potential opportunities to support reduction of wider flood risk benefits. Figure 7 shows the indicative costs of four different performance options for traditional ‘grey’ infrastructure capacity improvements against 10%, 30% and 50% surface water separation options.

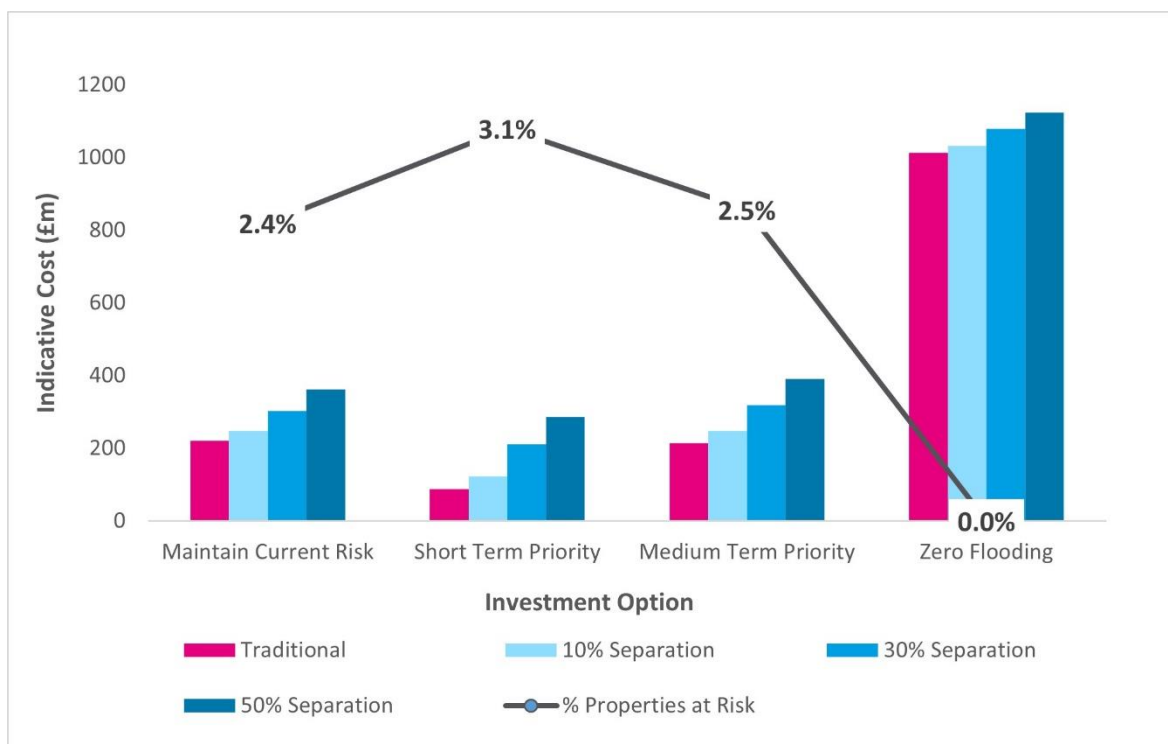


Figure 7. Graph indicating costs vs risk options for Traditional vs 10%/30%/50% Separation scenarios.

Storm Overflows

All our Storm Overflows are subject to permits issued by the Environment Agency which specify the standard which must be met before diluted effluent can be discharged into the environment during rainfall periods to help protect properties from flooding. We have assessed the performance of our storm overflows in line with the Common Planning Objective (CPO) which used the same scoring methodology as set out in the 2017 Capacity Assessment Framework (CAF). Using actual rainfall records over a recent 10-year period we have used our hydraulic sewer models to inform likely performance of our storm overflows in a ‘typical year’. Note that these results will differ from reportable Event Duration Monitoring (EDM) as such spills are based on actual rainfall which fell across a catchment during a calendar year. Hence a wetter than average year is likely to be reflected in higher EDM spills, with lower spills in drier years. In line with the CPO/CAF, the intention of using typical year annual rainfall and best available hydraulic sewer modelling (developed in line with industry standard best practice) is to provide an indication of which catchments would benefit from more detailed investigations to confirm performance.

The findings of the assessment are summarised in Table 7 for the Lower Trent SPA: Within this table we outlined as ‘No Overflows’ identifies that this planning objectives is not relevant to the catchment, whereas ‘Not Applicable’ indicates that the catchment did not trigger more detailed BRAVA assessment.

Table 7. Results of the storm overflow risk assessment for the Lower Trent SPA catchments.

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
11285	NOTTINGHAM (STOKE BARDOLPH)	606,500	0	0	0	0	0
11452	SCUNTHORPE (YADDLETHORPE)	108,363	1	1	1	1	1
11296	TOTON (LONG EATON)	66,743	1	1	1	1	1
11264	NEWARK (CRANKLEY POINT)	64,083	1	1	1	1	1
11330	ILKESTON (HALLAM FIELDS)	50,597	0	0	1	1	1
11294	NEWTORPE	47,705	2	2	2	2	2
11293	HEANOR (MILNE HAY)	32,892	1	1	1	1	1
14931	KIRKBY IN ASHFIELD	28,826	1	1	1	1	1
11295	STAPLEFORD (BESSEL LANE)	28,409	0	0	0	0	0

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
11396	GAINSBOROUGH	27,558	1	1	1	1	1
11311	RAINWORTH	22,596	0	0	0	0	0
11331	BEESTON (LILAC GROVE)	21,985	1	1	1	1	1
11275	RADCLIFFE-ON-TRENT	18,735	2	2	2	2	2
11534	MILTON	17,264	2	2	2	2	2
11252	ASLOCKTON	14,713	1	1	1	1	1
11253	BALDERTON	10,690	0	0	0	0	1
11249	SOUTHWELL	9,848	2	2	2	2	2
11259	CALVERTON	9,532	0	0	0	0	0
11309	PINXTON	9,266	2	2	2	2	2
11136	HARBY	9,251	1	1	1	1	1
11310	PYE BRIDGE	9,165	2	2	2	2	2
11210	KEYWORTH	7,062	0	0	0	0	1
11513	MELBOURNE	5,310	2	2	2	2	2
11476	WALKERIGHAM	4,748	0	0	0	0	0
11250	SUTTON ON TRENT (CROMWELL)	4,688	0	0	0	0	0
11660	SHARDLOW	4,083	0	0	0	0	0
11376	EAST MARKHAM	3,976	0	0	0	0	0
11257	BOTTESFORD	3,820	2	2	2	2	2
11451	SCOTTER	3,603	0	0	1	1	1
11271	FARNSFIELD	3,351	1	1	1	1	1
11510	KIRTON-IN-LINDSEY	3,276	2	2	2	2	2
11258	CROPWELL BISHOP	3,198	2	2	2	2	2
11262	COLLINGHAM	3,138	2	2	2	2	2
11530	ETWALL	2,934	0	0	0	0	0
11174	WORTHINGTON	2,786	0	0	0	0	0
11270	FARNDON	2,415	0	0	1	1	2
11473	WEST BURTON	2,137	1	1	1	1	1
11138	KINOULTON	2,128	0	0	0	0	0
11266	EAST BRIDGFORD	2,109	1	1	1	1	1
11656	FINDERN	1,901	0	0	1	2	2
11439	RAMPTON	1,847	0	0	0	0	0
11369	BURTON STATHER	1,704	NA	NA	NA	NA	NA
11504	LUDDINGTON	1,557	0	0	0	0	0
11364	BLYTON	1,530	NA	NA	NA	NA	NA
11187	GOTHAM	1,462	0	0	0	0	0
11147	NETHER BROUGHTON	1,354	2	2	2	2	2
11467	TORKSEY	1,126	NA	NA	NA	NA	NA
11404	GUNNESS	1,057	0	0	0	0	0
11499	LAUGHTERTON	968	NA	NA	NA	NA	NA
11276	REDMILE	929	2	2	2	2	2
11375	EAST BUTTERWICK	844	1	1	1	1	1
11267	ELSTON	827	2	2	2	2	2
11180	BREEDON	792	NA	NA	NA	NA	NA
11507	MARTON	681	NA	NA	NA	NA	NA
11127	BRANSTON	587	0	0	0	0	0
11272	FLINTHAM	575	2	2	2	2	2
11429	NORTH WHEATLEY	573	NA	NA	NA	NA	NA
11550	TICKNALL	566	2	2	2	2	2
11132	CROXTON KERRIAL	565	2	2	2	2	2
11481	WILLOUGHTON	498	NA	NA	NA	NA	NA
11303	EAKRING	478	NA	NA	NA	NA	NA
11251	WOOLSTHORPE	418	NA	NA	NA	NA	NA
11337	NORTH & SOUTH CLIFTON (EAST MIDS)	411	NA	NA	NA	NA	NA
11279	KIRKLINGTON	375	0	0	0	0	0
11354	HEADON CUM UPTON & ASKHAM	346	NA	NA	NA	NA	NA
17609	LANGAR LIMES FARM	343	2	2	2	2	2
14698	GRANBY VILLAGE DRAIN	320	2	2	2	2	2
11347	ALKBOROUGH	270	NA	NA	NA	NA	NA
14526	BARNSTONE (MAIN ROAD)	261	2	2	2	2	2
11570	DALBURY LEES	223	NA	NA	NA	NA	NA
11377	EAST STOCKWITH	221	NA	NA	NA	NA	NA
14614	LAXTON	218	0	0	0	0	0
11325	KNEESALL	197	1	1	1	1	2
11254	BARNSTONE	166	NA	NA	NA	NA	NA
11459	THORNEY	148	NA	NA	NA	NA	NA
11172	WILSON	125	NA	NA	NA	NA	NA
17680	SCREVETON	114	2	2	2	2	2
11170	THRUMPTON	109	2	2	2	2	2
14696	GROVE	108	NA	NA	NA	NA	NA
14615	HAWKSWORTH	107	2	2	2	2	2
11433	NORTHORPE	102	NA	NA	NA	NA	NA
11339	COTTAM	97	NA	NA	NA	NA	NA

Ref	Catchment Name	Population	2020	2025	2030	2035	2050
17971	EAST FERRY	95	NA	NA	NA	NA	NA
11413	HIGH SANTON	84	NA	NA	NA	NA	NA
18559	ADLINGFLEET	81	NA	NA	NA	NA	NA
17954	ELTON	77	2	2	2	2	2
14694	PILHAM	77	NA	NA	NA	NA	NA
14518	THOROTON	67	NA	NA	NA	NA	NA
17975	SIBTHORPE	64	NA	NA	NA	NA	NA
19822	WILDSWORTH (CARR LANE)	61	NA	NA	NA	NA	NA
11580	TRUSLEY	60	NA	NA	NA	NA	NA
18479	COTHAM	56	NA	NA	NA	NA	NA
14693	SUTTON VILLAGE (SUTTON LANE)	55	2	2	2	2	2
17942	ALVERTON	54	0	0	1	1	2
17843	SHELTON (NOTTS)	45	2	2	2	2	2
17936	OWTHORPE	43	0	0	0	0	0
17932	AISBY	42	NA	NA	NA	NA	NA
14613	KNEETON	40	2	2	2	2	2
11528	ETWALL (GRAVEL PIT COTTAGES)	35	NA	NA	NA	NA	NA
14619	STAUNTON	34	NA	NA	NA	NA	NA
17623	TITHBY	31	0	0	0	0	0
17933	LOW MARNHAM	25	NA	NA	NA	NA	NA
11273	HALAM	21	NA	NA	NA	NA	NA
11527	ETWALL (BROOMHILL COTTAGES)	11	NA	NA	NA	NA	NA
11280	LANGAR	8	0	0	0	0	0
11502	LOW SANTON	8	NA	NA	NA	NA	NA
11278	SALTERFORD	6	NA	NA	NA	NA	NA

Figure 8 gives an indication of the levels of investment likely to be needed to reduce spill counts to different levels during an average typical year. For our Draft DWMP, these costs are based on spill count using the same EA 12/24 block spill counting methodology used for EDM spill reporting (the ‘12/24’ spill count is explained in CIWEM Urban Drainage Group Good Practice Guide ^[1]), however this does not consider the potential to cause environmental harm. Further assessment will be undertaken ahead of the Final DWMP submission once government policy on future expectation of storm overflow performance is published in Autumn 2022.

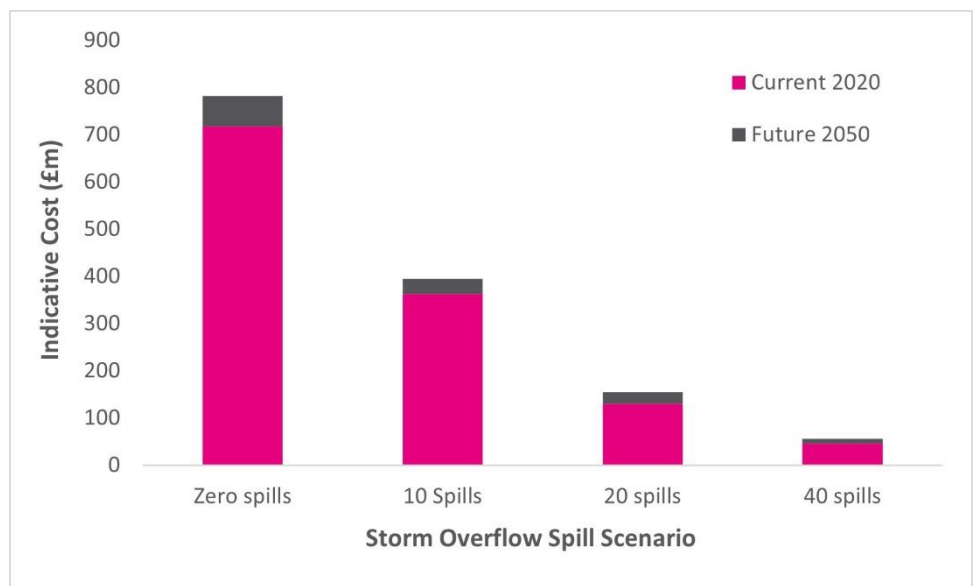


Figure 8. Indicative investment needs to reduce storm overflow spill counts to different levels during an average typical year.

¹ https://www.ciwem.org/assets/uploads/CIWEM_UDG_EDM_Good_Practice_Guide_2021_final.pdf

Wastewater Treatment Works

All our Wastewater Treatment Works (WwTW) are subject to permits issued by the Environment Agency which specify the standard which must be met before treated effluent can be discharged into the environment. These standards consider the ability of the receiving waterbody to accommodate treated effluent and considers dilution and current water quality status. We are passionate about meeting our legal duty under Section 94 of the Water Industry Act in maintaining 100% permit compliance.

Many of our WwTW do not have large amounts of spare headroom built into their design just in case there is significant new development allocated within its catchment. Whilst we take account of foreseeable growth set out in local development plans when we upgrade our WwTW, we try to avoid building oversized, potentially expensive assets with underutilised capacity which can be inefficient and costly to operate. As a result, many WwTW could struggle to accommodate future pressures from climate change, growth, and urban creep by 2050 and still maintain permit compliance without investment.

The method we have used to assess WwTW compliance can be found in the 'WwTW Capacity Technical Summary'. As part of our DWMP optioneering we have assessed our treatment against four criteria (summarised in Table 8) to understand future challenges to maintain permit compliance and to inform what intervention options are available.

Table 8. Summary of the WwTW capacity assessment criteria

WwTW Assessment Criteria	Explanation
Flow Headroom	Assessment of the Q80 recorded flow (see glossary) compared to current permit. We use this to understand how many new homes could be accommodated before we need to apply for a revised discharge permit
Process Treatment Headroom	Assessment of how current processes are meeting quality parameters
Environmental Capacity	Assessment of the limitations of current best available treatment technologies which will constrain what is technical achievable to treat. It accounts for the cost of building, operating and maintaining high-tech processes in perpetuity and considers the impact of energy and chemical hungry processes on climate change. If current treatment processes are close to what is technically achievable to treat this could constrain future interventions and our ability to meet tighter permit standards to maintain environmental standards.
Site Constraints	Assesses the available land footprint available on a site which may limit possibilities to expand the site in the future. This includes physical constraints such as rivers, railways, roads or existing developments.

The results of our assessments for the WwTW within the Lower Trent SPA are shown in Table 9.

Table 9. Results from the WwTW capacity assessment, these highlights where existing improvements works are planned in the short term for AMP7 (2020-2025)

Ref	Catchment Name	Population	2020	2025	2030	2035	2050	Subject to AMP7 scheme?
11285	NOTTINGHAM (STOKE BARDOLPH)	606,500	0	0	0	0	0	
11452	SCUNTHORPE (YADDLETHORPE)	108,363	0	0	0	0	0	Yes
11296	TOTON (LONG EATON)	66,743	0	2	2	2	2	Yes
11264	NEWARK (CRANKLEY POINT)	64,083	0	0	0	0	1	
11330	ILKESTON (HALLAM FIELDS)	50,597	0	0	0	0	0	Yes
11294	NEWTORPE	47,705	0	0	2	2	2	Yes
11293	HEANOR (MILNE HAY)	32,892	0	2	2	2	2	Yes
14931	KIRKBY IN ASHFIELD	28,826	0	0	2	2	2	Yes
11295	STAPLEFORD (BESSEL LANE)	28,409	0	2	2	2	2	Yes
11396	GAINSBOROUGH	27,558	0	0	0	0	0	
11311	RAINWORTH	22,596	0	0	0	0	0	Yes
11331	BEESTON (LILAC GROVE)	21,985	2	2	2	2	2	
11275	RADCLIFFE-ON-TRENT	18,735	0	0	2	2	2	
11534	MILTON	17,264	2	2	2	2	2	
11252	ASLOCKTON	14,713	0	0	0	0	0	

Ref	Catchment Name	Population	2020	2025	2030	2035	2050	Subject to AMP7 scheme?
11253	BALDERTON	10,690	0	0	0	0	1	Yes
11249	SOUTHWELL	9,848	0	0	0	0	1	Yes
11259	CALVERTON	9,532	0	0	0	1	1	Yes
11309	PINXTON	9,266	0	2	2	2	2	Yes
11136	HARBY	9,251	0	0	0	0	0	
11310	PYE BRIDGE	9,165	0	0	0	0	0	Yes
11210	KEYWORTH	7,062	0	2	2	2	2	
11513	MELBOURNE	5,310	0	2	2	2	2	Yes
11476	WALKERINGHAM	4,748	0	0	0	0	0	
11250	SUTTON ON TRENT (CROMWELL)	4,688	0	0	0	0	1	
11660	SHARDLOW	4,083	0	0	0	1	1	
11376	EAST MARKHAM	3,976	0	0	0	0	0	
11257	BOTTESFORD	3,820	0	0	0	0	0	Yes
11451	SCOTTER	3,603	0	0	0	0	1	
11271	FARNSFIELD	3,351	0	0	0	1	1	
11510	KIRTON-IN-LINDSEY	3,276	0	0	0	0	0	Yes
11258	CROPWELL BISHOP	3,198	0	0	0	0	1	Yes
11262	COLLINGHAM	3,138	0	0	2	2	2	
11530	ETWALL	2,934	0	0	0	1	1	Yes
11174	WORTHINGTON	2,786	0	2	2	2	2	Yes
11270	FARNDON	2,415	0	0	0	0	1	
11473	WEST BURTON	2,137	0	0	0	0	0	
11138	KINOULTON	2,128	0	0	0	0	1	
11266	EAST BRIDGFORD	2,109	0	0	0	0	0	Yes
11656	FINDERN	1,901	0	0	0	1	1	Yes
11439	RAMPTON	1,847	0	0	2	2	2	Yes
11369	BURTON STATHER	1,704	NA	NA	NA	NA	NA	
11504	LUDDINGTON	1,557	0	0	0	0	0	
11364	BLYTON	1,530	NA	NA	NA	NA	NA	
11187	GOTHAM	1,462	0	0	0	0	1	Yes
11147	NETHER BROUGHTON	1,354	0	0	0	0	0	
11467	TORKSEY	1,126	NA	NA	NA	NA	NA	
11404	GUNNESS	1,057	0	0	0	0	0	
11499	LAUGHTERTON	968	NA	NA	NA	NA	NA	
11276	REDMILE	929	0	0	0	0	0	
11375	EAST BUTTERWICK	844	0	0	0	0	0	
11267	ELSTON	827	0	0	0	0	1	
11180	BREEDON	792	0	2	2	2	2	Yes
11507	MARTON	681	NA	NA	NA	NA	NA	
11127	BRANSTON	587	0	0	0	0	0	
11272	FLINTHAM	575	0	0	0	0	1	
11429	NORTH WHEATLEY	573	0	0	0	0	1	
11550	TICKNALL	566	0	2	2	2	2	
11132	CROXTON KERRIAL	565	0	0	0	0	0	Yes
11481	WILLOUGHTON	498	NA	NA	NA	NA	NA	
11303	EAKRING	478	0	0	0	0	1	
11251	WOOLSTHORPE	418	0	0	0	0	0	
11337	NORTH & SOUTH CLIFTON (EAST MIDS)	411	NA	NA	NA	NA	NA	
11279	KIRKLINGTON	375	2	2	2	2	2	
11354	HEADON CUM UPTON & ASKHAM	346	NA	NA	NA	NA	NA	
17609	LANGAR LIMES FARM	343	2	2	2	2	2	
14698	GRANBY VILLAGE DRAIN	320	0	0	0	0	1	
11347	ALKBOROUGH	270	NA	NA	NA	NA	NA	
14526	BARNSTONE (MAIN ROAD)	261	0	0	0	0	0	
11570	DALBURY LEES	223	NA	NA	NA	NA	NA	
11377	EAST STOCKWITH	221	NA	NA	NA	NA	NA	
14614	LAXTON	218	2	2	2	2	2	
11325	KNEESALL	197	0	0	0	0	1	
11254	BARNSTONE	166	NA	NA	NA	NA	NA	
11459	THORNEY	148	NA	NA	NA	NA	NA	
11172	WILSON	125	NA	NA	NA	NA	NA	
17680	SCREVEYTON	114	0	0	0	0	0	
11170	THRUMPTON	109	0	0	0	0	0	
14696	GROVE	108	NA	NA	NA	NA	NA	
14615	HAWKSWORTH	107	0	0	0	0	0	
11433	NORTHORPE	102	NA	NA	NA	NA	NA	
11339	COTTAM	97	NA	NA	NA	NA	NA	
17971	EAST FERRY	95	NA	NA	NA	NA	NA	
11413	HIGH SANTON	84	NA	NA	NA	NA	NA	
18559	ADLINGFLEET	81	NA	NA	NA	NA	NA	
17954	ELTON	77	0	0	0	0	0	
14694	PILHAM	77	NA	NA	NA	NA	NA	
14518	THOROTON	67	0	0	0	0	0	

Ref	Catchment Name	Population	2020	2025	2030	2035	2050	Subject to AMP7 scheme?
17975	SIBTHORPE	64	0	0	0	0	0	
19822	WILDSWORTH (CARR LANE)	61	NA	NA	NA	NA	NA	
11580	TRUSLEY	60	0	0	0	1	1	
18479	COTHAM	56	NA	NA	NA	NA	NA	
14693	SUTTON VILLAGE (SUTTON LANE)	55	0	0	0	0	0	
17942	ALVERTON	54	0	0	0	0	0	
17843	SHELTON (NOTTS)	45	0	0	0	0	0	
17936	OWTHORPE	43	0	0	0	0	0	
17932	AISBY	42	NA	NA	NA	NA	NA	
14613	KNEETON	40	0	0	0	0	0	
11528	ETWALL (GRAVEL PIT COTTAGES)	35	NA	NA	NA	NA	NA	
14619	STAUNTON	34	NA	NA	NA	NA	NA	
17623	TITHBY	31	0	0	0	0	0	
17933	LOW MARNHAM	25	NA	NA	NA	NA	NA	
11273	HALAM	21	NA	NA	NA	NA	NA	
11527	ETWALL (BROOMHILL COTTAGES)	11	NA	NA	NA	NA	NA	
11280	LANGAR	8	0	0	2	2	2	
11502	LOW SANTON	8	NA	NA	NA	NA	NA	
11278	SALTERFORD	6	NA	NA	NA	NA	NA	

When it comes to intervention options, future interventions at WwTW are more complex due to a varied mix of different investment drivers that need to be considered. Investment needs at WwTW are driven by multiple drivers, namely capital maintenance (to deal with life expired assets), growth (to increase process capacity to accommodate new development) and effluent quality improvements where the Environment Agency request changes to permit requirements as set out in the Water Industry National Environmental Programme (WINEP). Due to the complex nature of WwTW processes, it is rare that investment deals with a single driver.

For our draft DWMP, it is not possible to isolate capacity related investment needs on their own, as this is linked with ongoing discussions regarding the WINEP, and alignment to capital investment needs for PR24.

Summary of programme outputs

From the DWMP assessments this indicates the following needs for catchments within the Lower Trent SPA:

Main bullet points of our future plan:

First 5 years we will

- We will continue with our river pledge and ensure that we do not cause any RNAGs within our drainage area (overflow and treatment works)
- We will focus on the Defra priority areas (Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC)) for removal of local ecological impact from our assets (overflows and treatment works)
- Ensure we have no high priority (band 2) catchments in regard to overflows by reducing spill frequency in these catchments by implementing a pragmatic balance of blue / green and grey engineering solutions.
- For all overflows invested in we will ensure that they have appropriate screening controls in place to reduce aesthetic impact on the watercourses
- We will start to implement interventions in our high priority (band 2) catchments in regard to flooding by implementing a pragmatic balance of blue / green and grey engineering solutions with our aim being to complete this work by 2035.
- Ensure there is no deterioration in our catchments in regard to overflows, flooding and treatment works
- We will continue with investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and incorporating new guidance from DEFRA, OFWAT and the EA. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

Over the next 5 to 10 years

- We will focus on the Defra priority areas (Eutrophic sensitive areas) for removal of local ecological impact from our assets (overflows and treatment works)
- Ensure we have no medium term priority (band 1) catchments in regard to overflow by reducing spill frequency in these catchments by implementing a pragmatic balance of blue / green and grey engineering solutions.
- For all overflows invested in we will ensure that they have appropriate screening controls in place to reduce aesthetic impact on the watercourses
- Ensure we will continue to reduce flood risk in our catchments by focusing on the medium term priority (band 1) catchments in regard to flooding by implementing a pragmatic balance of blue / green and grey engineering solutions.
- Ensure there is no deterioration in our catchments in regards to overflows, flooding and treatment works
- We will continue with investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and incorporating new guidance from DEFRA, OFWAT and the EA. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

Over the next 10 to 25 years

- Ensure we have no overflow spilling more than 10 times per average year by reducing spill frequency in these catchments by implementing a pragmatic balance of blue / green and grey engineering solutions.
- For all overflows in our system, we will ensure that they have appropriate screening controls in place to reduce aesthetic impact on the watercourses
- Ensure we will continue to reduce flood risk in our catchments by focusing on the medium and long term priority (band 1 and 0) catchments in regard to flooding by implementing a pragmatic balance of blue / green and grey engineering solutions.
- Ensure there is no deterioration in our catchments in regard to overflows, flooding and treatment works
- We will continue with investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and incorporating new guidance from DEFRA, OFWAT and the EA. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

What's next?

From our analysis undertaken so far, this has helped us better understand the performance of those catchments within this SPA which have proceeded through DWMP. This allows us to understand the expected long term investment needs across our catchments and this is already being used to support and inform the development of our PR24 Business Plan. The PR24 investment period covers 2025 to 2030 and so will help deliver the first five years of our first 25 year DWMP.

As the scope of DWMP is intended to inform the most appropriate high level direction for a catchment, we are not able to give more details as to what specific schemes are likely to be built. This level of detail will follow as part of our PR24 delivery, as we need to complete detailed scheme specific feasibility investigations to decide what actual schemes will look like. However, the schemes we build will be aligned to our long term DWMP strategies, with delivery optimised to ensure schemes are commissioned when required, and where necessary phased to manage any uncertainties.

Between now and the publication of our Final DWMP by 31st March 2023, we will be carrying out further evaluation on the more immediate intervention needs identified in our Draft DWMP and so we would welcome any comments in relation to this catchment, or our wider Draft DWMP content.