United Utilities Water

DRAFT Drainage and Wastewater Management Plan 2023

Douglas DWMP

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United Utilities

Water for the North West

Contents

Acronyms

For a list of acronyms, refer to document C0003.

1. Introduction to the DWMP

The Drainage and Wastewater Management plan (DWMP) is a long-term plan setting out how we intend to maintain robust and resilient drainage and wastewater systems, now and in the future. This is the first time that we are developing the plan and we have taken a comprehensive approach as we recognise the importance of long-term planning.

The heart of the plan will be built around collaborative and innovative working whilst encompassing all activities relating to drainage, flooding and delivering a wastewater service that protects the environment. We have led on this plan, but have developed it in consultation with our partners as we will be delivering the DWMP in partnership with other organisations such as the Environment Agency and local councils.

By developing the DWMP, we have an opportunity to:

- provide a basis for more collaborative and integrated planning alongside stakeholders across the region to tackle shared and interrelated risks relating to drainage, flooding and protecting the environment;
- strengthen partnership working with all key stakeholders to drive integrated investment in the environment and communities;
- develop a plan that will help address the increasing environmental expectations from customers and stakeholders and work towards the ambitions set out in Defra's 25-year plan;
- collectively explore innovative solutions such as Sustainable Drainage Systems (SuDS) and nature-based solutions to understand what is best for the North West; and
- embed Systems Thinking to better understand drainage and environmental interactions, and to maximise the potential for integrated solutions.

Throughout the DWMP process, we have engaged with stakeholders to share our data and findings, to ensure that the solutions delivered are co-created, drive efficiencies and will benefit the communities and environment that we live and work in.

The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

Figure 1 Geographical scales applied for planning and collaboration within DWMP

The plan is made up of five main stages (Figure 2) which each contribute to developing the most sustainable and effective future for the North West. These stages include setting out the long-term ambition for the region, identifying risk and understanding the possible interventions and solutions that could be developed.

Figure 2 Five stages of the DWMP

Across the North West, there are 14 Strategic Planning Areas (SPAs) and the purpose of this document is to share local, place-based information.

We will share the results from the different stages of the DWMP and how the DWMP plans to make a difference in the Douglas SPA.

2. Background to the Douglas catchment

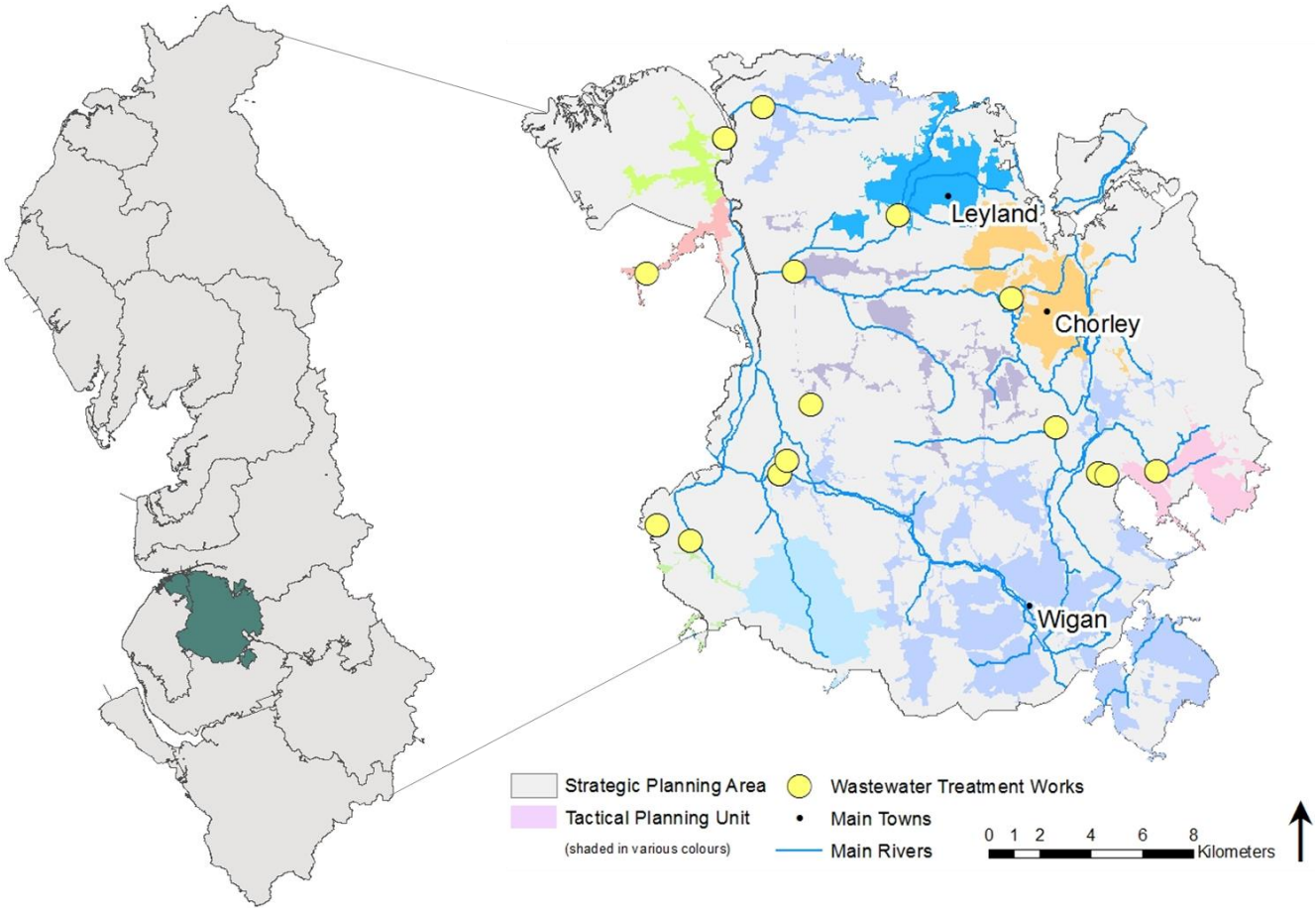
The Douglas catchment starts on Winter Hill, on the West Pennine Moors and eventually the river joins the Ribble Estuary. The catchment is made up of a number of urban conurbations (Wigan, Skelmersdale, Leyland and Chorley) and agricultural land. The River Douglas is the main river that flows through the catchment along with other watercourses such as the River Lostock, River Yarrow, Carr Brook, River Tawd and the Leeds and Liverpool Canal. The catchment flows north which has the potential to impact upon bathing waters along the Fylde coast [(1)].

There are two main sub catchments:

- Douglas - the sub catchment extends from the moors above Rivington Reservoir through Horwich, Wigan and Hesketh Bank at the Ribble Estuary. The area supports a range of benefits from sources of drinking water, to fisheries and recreation. The main risks in this area are due to urban, industrial and diffuse pollution, and also mine water discharges.
- Yarrow and Lostock - the sub catchments covers the Chorley and Leyland area and has been modified for flood protection and urbanisation. The River Yarrow supports healthy populations of salmon, trout, water voles and otters. The mains risks in this area are due to flooding and the areas varies from moderate to poor Water Framework Directive (WFD) classification [(1).]

There are 15 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Douglas SPA. A TPU is the drainage catchment area encompassing all the sewers and wastewater assets e.g. pumping stations, which drain into the associated wastewater treatment works. The TPUs within the SPA vary in size from larger catchments such as Wigan to smaller, rural catchments such as Dark Lane. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Douglas SPA



There are numerous strategic management plans within the Douglas that are owned by various other organisations. Within the Douglas catchment, there are active management plans such as:

- The Environment Agency River Basin Management Plan (RBMP) and Flood Risk Management Plan (FRMP);
- Lead Local Flood Authority (LLFA) Surface Water Management Plans (SWMP); and
- Local council plans.

Each of these strategic plans focuses on managing particular risks and links to programmes of work. A high level summary of these management plans is shown in Table 1.

The DWMP aims to collaborate, share best practice and to align with other strategic plans throughout the SPA. This will help to highlight common challenges, ambitions and goals where there are shared or interconnected risks and opportunities.

Table 1 Summary of stakeholder management plans

Management plan	Overview	Key aspects for the Douglas catchment
River Basin Management Plan (RBMP) [2][3] **Owner:** Environment Agency	A river basin district covers an entire river system, including river, lake, groundwater, estuarine and coastal water bodies. The RBMP aim is to improve the quality of our water environment to best support wildlife, agriculture, and businesses, and to boost regeneration and recreation.	The majority of rivers within the catchments are classified as moderate status. The main reasons for not achieving good ecological status are physical modifications and pollution from a range of sources including rural areas, towns, cities and transport and wastewater. Predicted future and emerging challenges are due to invasive Non-native species, and pollution from a range of sources including agriculture and rural areas, towns, cities and transport and wastewater.
Flood Risk Management Plan (FRMP)[4] **Owner:** Environment Agency	The FRMP is a strategic plan, which reviews and develops measures to manage the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. The plan outlines flood risk areas, hazards, and sets out measures and objectives to manage flood risk.	Flood risk within the catchment is from a variety of sources; rivers, tidal, surface water, ordinary watercourses, sewers and reservoirs. There are more than 15,000 people (approx. 3.5 %) and 1,900 non-residential properties are at risk of flooding from rivers and the sea. Approximately 15% of the agricultural land and 90% of SSSI sites are at risk of flooding in the area. Fluvial, pluvial and sewer flooding poses the greatest risk in urban areas such as Wigan, Chorley, Croston and Leyland. Flood risk can be directly from rising rivers but the most frequent flooding is caused by surface water drains either being unable to cope with intense rainfall, or because they are unable to discharge to rivers due to high levels. The December 2015 flood affected numerous areas of the catchment such as Parbold, Croston and Wigan. Since the floods, a programme of recovery is in place which includes a review of potential options to provide mitigation. Economic growth and development in Wigan, Chorley, West Lancashire and South Ribble could present funding opportunities if complimentary options can be identified to reduce flood risk and allow development. Across the Douglas Catchment there are 43 measures from earlier plans to manage flood risk.

Surface Water Management Plan (SWMP)[5] **Owner:** Lead Local Flood Authority (LLFA)	A SWMP is a plan which outlines the preferred surface water strategy for a location. Although owned and led by the LLFA, a SWMP is produced in collaboration with other drainage owners, water companies included. Partners work together to understand the surface water flood risk in an area and agree an approach to address these issues innovatively and in a cost-effective way, and where appropriate, in partnership. A SWMP is a long-term plan and should influence development. The decision on whether a SWMP is appropriate is down to the LLFA, generally they are produced for areas considered to experience a high flood risk. United Utilities Water (UUW) continues to work closely with LLFAs and supports the development of SWMPs where required, and the delivery of SWMPs where they are published.	
Catchment Based Approach (CaBA) Catchment Plan[3] **Owner:** River Douglas Catchment Partnership	The aim of the partnership is to bring together stakeholders to create and deliver a focussed, sustainable and collaborative action plan to deliver benefits within the catchment.	The partnership's vision is to: • Build a robust evidence base to address catchment challenges as climate changes and population grows • Improve fish passage and habitat for native species whilst addressing Invasive Non-native Species • Work collaboratively and secure finance, to deliver integrated, multi-benefit programmes, to improve the water environment for wildlife and people Work with local councils to deliver river improvements alongside economic, environmental and social priorities. Similarly to the RBMP, the main current and future risks in the catchment are due to physical modifications and pollution from a range of sources including rural areas, towns, cities and transport and wastewater.

2.1 Strategic Planning Group (SPG)

We appreciate that there are many organisations with formal roles and responsibilities relating to drainage, flooding and protection of the environment. By participating in the creation of a DWMP much more can be achieved compared to working on our plans in isolation.

Within DWMP, SPGs have been a key form of engagement with stakeholders across the region. SPGs have operated at a local, catchment scale to allow stakeholders to input into the identification of priority and shared risk locations, and develop an understanding of potential collaborative solutions to tackle shared risks. The SPGs have covered a wide range of issues including reducing flooding and improving water quality. A key driver is understanding where there may be potential to achieve multiple benefit through solutions.

Through the SPGs, we have been able to consult with strategic partners on the various stages of the DWMP (Figure 4) and share outputs as and when they become available. This has been a two-way process and stakeholders have had the opportunity to share information with us such as action plans, confirmed projects, priority areas and ambitions for the future which could be developed and delivered in partnership. We have been able to review and incorporate the information shared during the different stages of the DWMP process.

Within the Douglas SPA we have engaged with stakeholders such as:

- The Environment Agency;
- Lancashire County Council;
- Wigan Council; and
- Groundwork (host of the Douglas Catchment Based Approach (CaBA) partnership).

More information on co-creation activity undertaken with the SPG can be found in Technical Appendix 2 - Stakeholder Engagement (TA2). The outputs from this activity in the Douglas catchment are outlined in Section 4.

Figure 4 DWMP framework for engagement

3. Risk identification

A key component of the DWMP has been around risk identification. This has been a mixture of both historical risk and forecast risk. Activities to understand this were completed through the Risk Based Catchment Screening (RBCS) and Baseline Risk and Vulnerability Assessment (BRAVA) stages. We have also undertaken numerous additional assessments to understand wider resilience and catchment risks.

Further detail on the approaches can be found in Technical Appendix 4 - Risk Based Catchment Screening (TA4) and Technical Appendix 5 - Understanding Future Risk (TA5).

3.1 Risk Based Catchment Screening (RBCS) and Horizon Scan

The RBCS stage is a series of high-level assessments that are used to review and screen each TPU to determine whether a more detailed assessment is required during the Baseline Risk and Vulnerability Assessment (BRAVA) stage.

The assessments are designed to span the key aspects of a wastewater company's responsibilities: from the network, to the treatment works, to its interaction with the environment. Examples of the assessments considered are internal sewer flooding, storm overflow performance, and pollution incidents. The assessments typically used three to five years of historical data.

Additional assessments termed 'horizon scanning' were undertaken to understand wider exogenous factors and opportunities that could inform future investment e.g. major infrastructure projects, private septic tank locations and potential major infrastructure projects (HS2 etc). Areas with potential future developments were also considered and further information on projected growth areas can be found within the associated Local Plans.

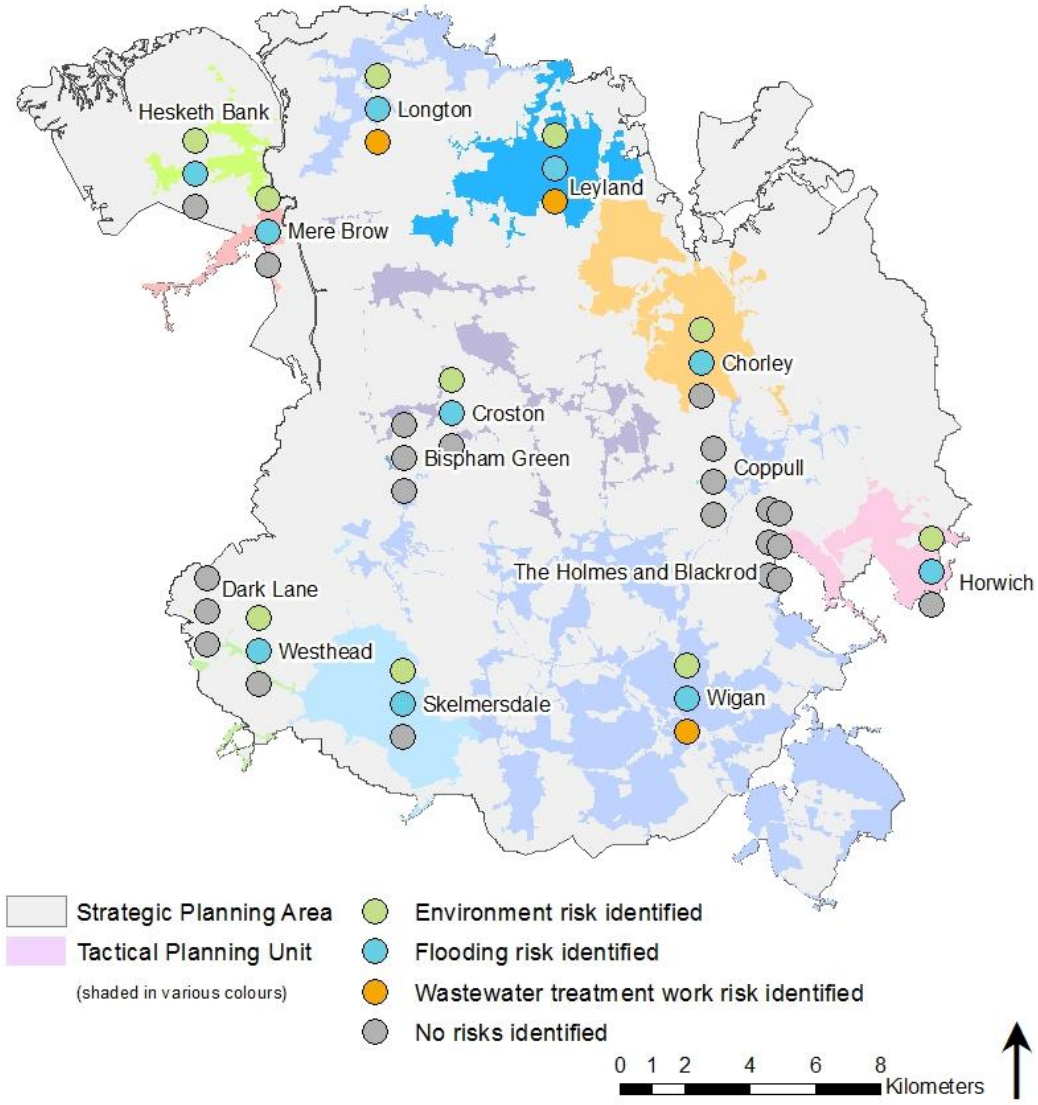
Within the Douglas SPA, the RBCS stage identified 10 out of 15 TPUs that required further investigation and therefore passed onto the BRAVA stage (outlined in Section 3.2).

Figure 5 indicates which of the RBCS categories (environmental, flooding and wastewater treatment works capacity) have triggered within each TPU. Environmental and flooding categories are the most common within the Douglas SPA, which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (10/15) – Environment; and
- External Sewer Flooding - (10/15) – Flooding.

Further detail on the approaches and assessment results can be found in TA4.

Figure 5 Map of the RBCS results for the Douglas SPA. Risk categories indicate areas triggering further investigation following RBCS



3.2 Baseline Risk and Vulnerability Assessment (BRAVA) and Resilience

The TPUs that were identified during RBCS were then taken forward into BRAVA, which aims to assess the baseline and future position of system performance against the DWMP planning objectives, to understand where there may be issues. It is also to understand wider resilience issues that could also impact upon the DWMP planning objectives. This stage considers risk at 2020, 2030 and 2050 design horizons.

In addition to BRAVA, a range of resilience assessments were undertaken and will have been incorporated throughout the plan to allow us to expand our understanding of wider core risks, such as how the water quality of rivers may change as a result of climate change. We have also assessed risks such as fluvial and/or coastal flooding and fluvial and/or coastal erosion and land stability.

Further detail on the approaches and assessment results can be found in TA5 and Technical Appendix 6 – Resilience (TA6).

The BRAVA and resilience results for the Douglas catchment are outlined in Table 2 to Table 5.

Table 2 Environmental BRAVA results

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Chorley						
Croston						
Hesketh Bank						
Horwich						
Leyland						
Longton						
Mere Brow						
Skelmersdale						
Westhead						
Wigan						

BRAVA	
	No concern (forecast)
	Potential area of focus (forecast)
	Area of focus (forecast)
	Not assessed / not applicable

Table 3 Flooding BRAVA results

Key

No concern (forecast)

Potential area of focus (forecast)

Area of focus (forecast)

Not assessed

	Flooding												
Tactical Planning Unit	Internal Flooding Risk			External Flooding Risk			Sewer Collapse Risk	Risk of Flooding in a Storm (1:50yr)		Flooding of Open Spaces			Blockage Assessment
	2020	**2030**	**2050**	**2020**	**2030**	**2050**	**2020**	**2020**	**2050**	**2020**	**2030**	**2050**	**2020**
Chorley													
Croston													
Hesketh Bank													
Horwich													
Leyland													
Longton													
Mere Brow													
Skelmersdale													
Westhead													
Wigan													

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater Treatment Works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Chorley			
Croston			
Hesketh Bank			
Horwich			
Leyland			
Longton			
Mere Brow			
Skelmersdale			
Wigan			

BRAVA	
	No concern (forecast)
	Potential area of focus (forecast)
	Area of focus (forecast)
	Not assessed

Table 5 Environmental and flooding resilience results

Tactical Planning Unit	Resilience Assessment		
	Environmental		Flooding
	Potential for changes in the water quality of rivers as a result of climate change	Potential for changes in catchment contributions as a result of climate change	Outfall locking
	2050	2050	2020
Chorley			
Coppull			
Croston			
Dark Lane			
Hesketh Bank			
Horwich			
Leyland			
Longton			
Mere Brow			
Skelmersdale			
The Holmes			
Westhead			
Wigan			

Resilience	
	More resilient
	Less resilient
	Not assessed

3.3 Problem characterisation

3.3.1 Complex catchments

Complex catchments were determined through problem characterisation using a combination of a complex and strategic catchment scores based on strategic need (largely derived from growth and climate forecast models) and modelled risks in each of the TPU (largely based on BRAVA). Within the Douglas, no TPUs were identified to be 'complex' based on problem characterisation.

3.3.2 Strategic growth catchments

Through the various risk identification assessments, a number of locations were identified through opportunity workshops that require more strategic analysis. These are areas with high growth, a high number of risks and multiple potential scenarios. Different bespoke scenarios are applied to strategic catchments based on the needs and drivers of the catchments to understand the variability of risk as a first step for optioneering, so that the range of options developed can mitigate a range of different scenarios.

As a result of this assessment the following TPUs in the Douglas catchment have been identified as having 'strategic growth':

- Wigan TPU

Note: Water Industry National Environment Programme (WINEP) and storm overflows guidance are still being developed. This could lead to significant changes in preferred options and could result in large-scale, short and long-term investment needs. This will be fully reviewed between draft and final DWMP publication, in addition to other aspects such as nutrient neutrality, bathing waters and shellfish water expectations. Between draft and final DWMPs the impact of storm overflow requirements will also require optimising against the other needs and opportunities.

3.3.3 Wigan

The Wigan TPU (Figure 6) is in the south east of the Douglas SPA, with a mix of industrial, residential and mixed purpose land use. The drainage area covers approx. 82,500 properties, with a residential population of over 200,000 people, with a complex sewerage network that drains to Wigan wastewater treatment works in the west. Watercourses are classified as 'moderate' under the Water Framework Directive (WFD), and includes the Upper, Mid and Lower Douglas river.

The Wigan TPU has several challenges that require a more strategic focus. The population of the area is expected to increase by 17% by 2050. This could drive a significant amount of development and an associated increase in wastewater being sent to the wastewater treatment works. The majority of the 2,400km sewer network is a combined system where surface water and wastewater are not separated, so surface water run-off from properties and paved surfaces could increase pressure on the drainage network. This increased surface run off, and the decrease in permeable surfaces, may contribute to the significant risks identified for internal (property) flooding, external flooding, flooding from 1-in-50-year storm events, and flooding of open spaces. Figure 6 shows the TPUs, and the areas highlighted in blue in Figure 7 are key areas that models indicate are worth further investigation and planning to mitigate these risks. Our vision for an adaptive plan for the area is shown in Figure 8 and Figure 9.

Figure 6 A map of the Wigan TPU

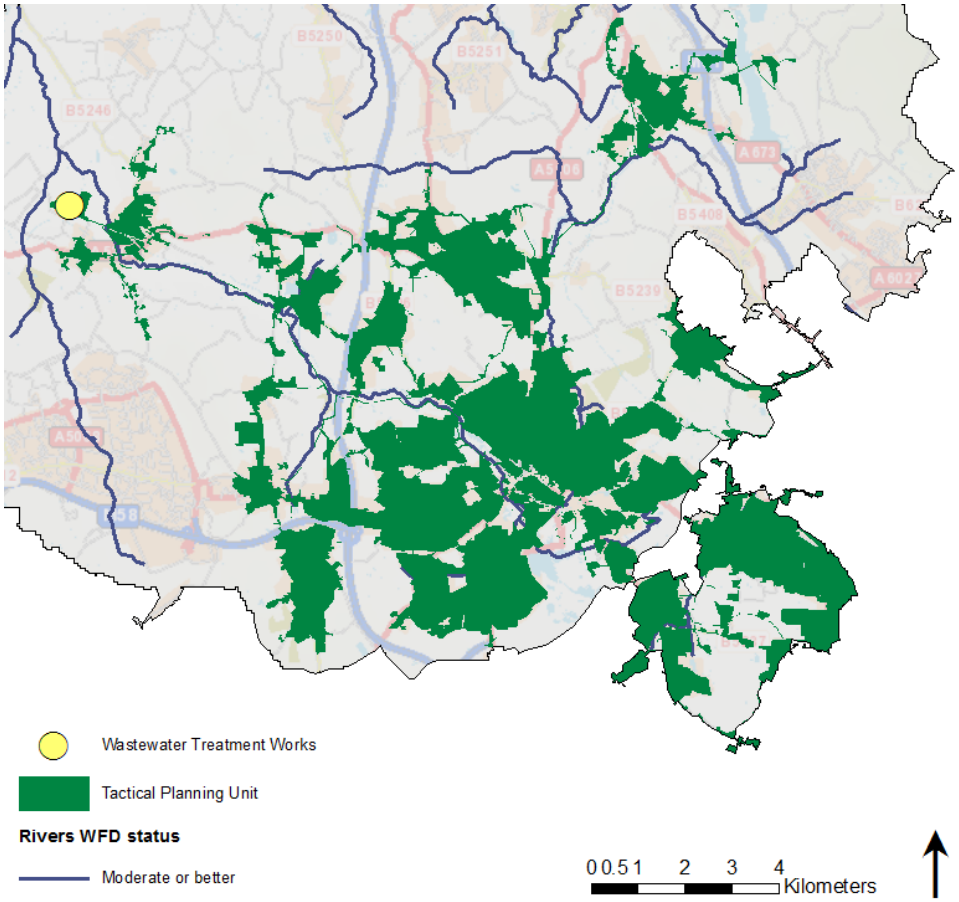
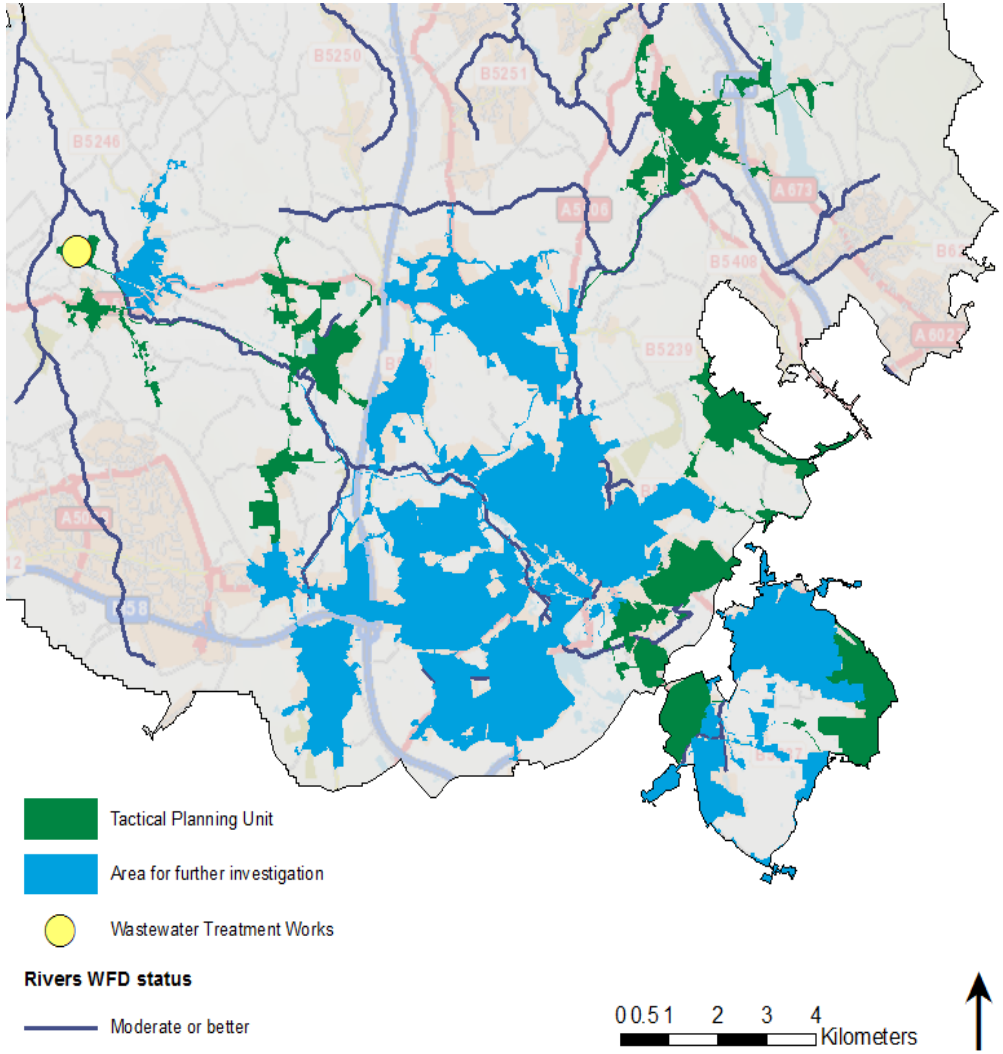


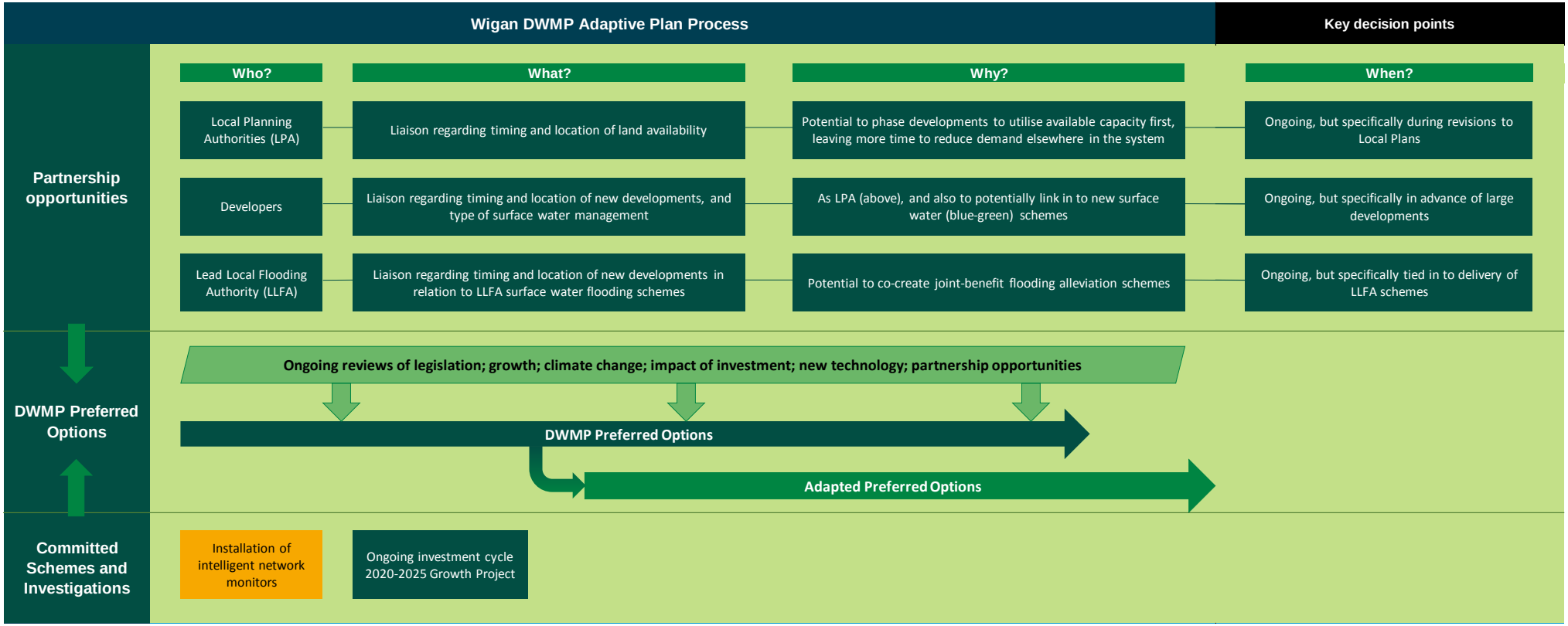
Figure 7 Map of the Wigan TPU highlighting areas for further investigation (blue)



3.3.3.1 Wigan adaptive plan

The first part of the Wigan adaptive plan process (Figure 8) highlights the importance of partnership working and regular data reviews.

Figure 8 Wigan adaptive planning process



Partnership working

In a catchment where growth is a significant factor in future performance, it is key to maintain regular conversations with those stakeholders that have knowledge about future developments and can potentially influence their impact. Key organisations include:

- Local Planning Authority;
- The Environment Agency;
- Lead Local Flood Authorities; and
- Housing developers.

The DWMP plan for each TPU is developed based on a number of data sources. Some of these are prone to change over time, which means that original assessments can become out of date. As data from these sources change, it makes sense to re-evaluate the DWMP plan to check the impact on the plan. Examples of data that change over time are shown in Table 6.

Table 6 Examples of data that change over time and can impact upon the plan

Type of data or information	Possible impacts of changes
Government legislation	More or less stringent requirements or regulations, which may require different levels of investment, and policy changes that may drive better or worse incentives on demand.
Development growth projections	These will vary with time in line with economic conditions, changing demographics, or government policy. This can result in the number of new houses and businesses growing at a different rate than originally forecast.
Climate change projections	As more climate data becomes available, climate projections are modified, which may indicate changes to temperature and rainfall patterns.
Impact of investment	As new drainage schemes or new strategies are implemented, we will continue to evaluate their performance. If they turn out to be more or less successful than anticipated, this may allow the extent of another option type to be reduced or increased accordingly.
Development of new technology	Over time, new technology provides opportunities to address and resolve risks differently, or more efficiently.
Partnership opportunities	We will work closely with key stakeholders to address risks jointly. Over time, these stakeholders may see changes in their own risks and funding levels, which may present opportunities for greater collaboration.

Figure 9 shows the second part of the Wigan adaptive plan, reflecting the different option types identified as being appropriate for Wigan. Each line represents a different option type – e.g. schools education programme. The plan shows that each option type will be regularly reviewed in line with the method described in part one. This allows new information and opportunities to be used to adapt the plan by either increasing or reducing the extent of some option types.

Within Wigan, there are opportunities to carry out investigations before making final decisions on the final strategy. This means that we can properly evaluate options before committing to significant investment. These investigations will take into account things such as:

- Technical feasibility;
- Benefit of the work;
- Customer impact;
- Environmental impact; and
- Cost.

Decentralisation

A study will be undertaken to investigate whether a new wastewater treatment works should be built allowing the drainage area to be decentralised. The purpose of this would be to reduce pressure on the sewer network and wastewater treatment works, potentially resulting is less flooding and environmental incidents. It would also release treatment capacity at Wigan Wastewater Treatment Works.

Transfer of flows from Skelmersdale to Wigan

If undertaking wastewater treatment work upgrades at Wigan Wastewater Treatment Works explore feasibility of transfer flows from Skelmersdale Wastewater Treatment Works to Wigan Wastewater Treatment Works. The two wastewater treatment works are located in close proximity to one another and are have been identified as requiring investment over the next 25 years to deal with growth, climate change and tighter permits. Consequently there could be solution efficiencies in transferring both flows to one site. Additionally, there would be potential cost and energy savings in treating flows from the two catchments at one treatment works. Decentralisation of Wigan to take pressure off the sewer network, as described above, could result in additional capacity to treat the flow from Skelmersdale. An investigation will be undertaken to assess engineering feasibility, environmental impacts and any additional requirements to ensure permit compliance over the long term.

Large-scale separation

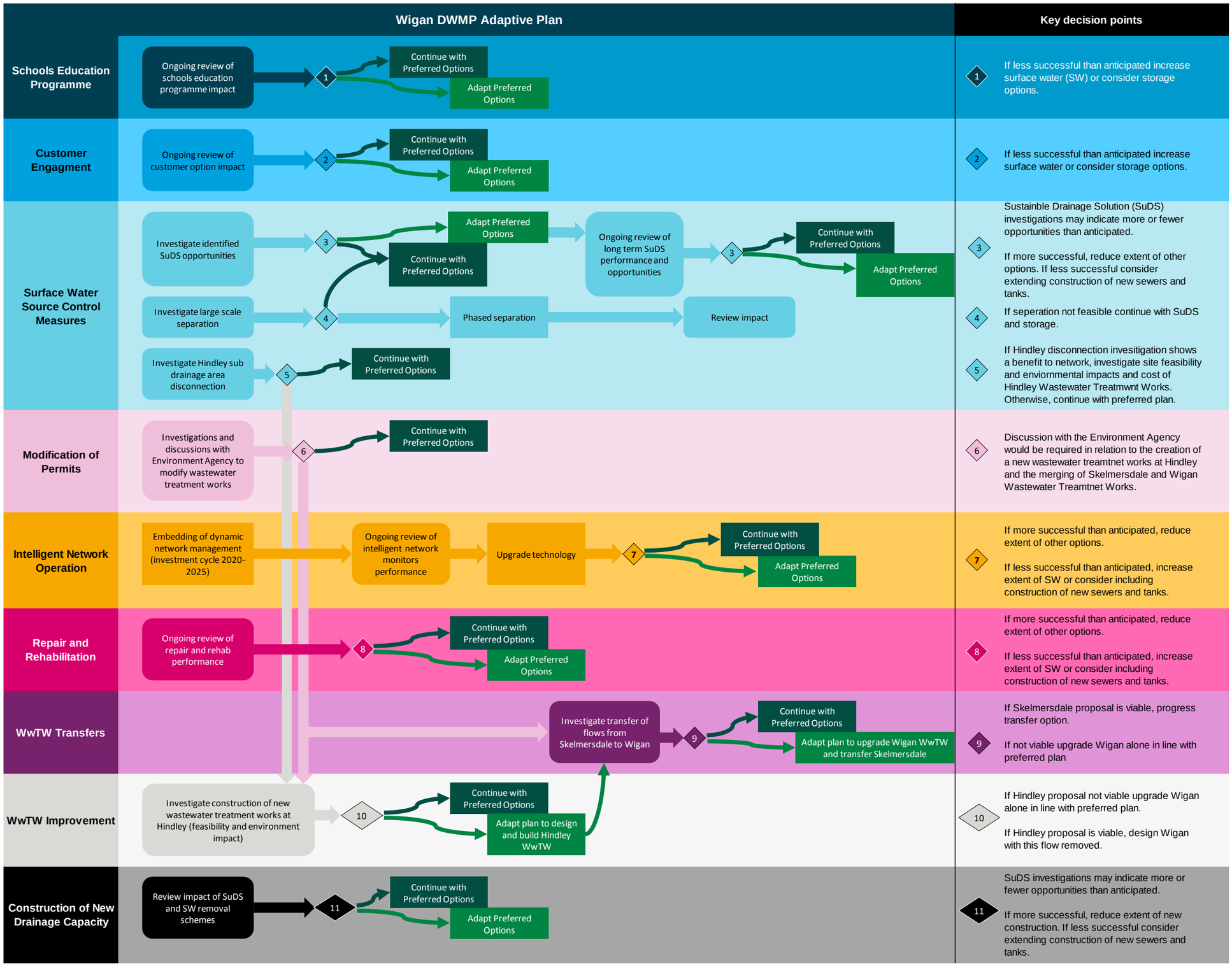
The final study is to investigate the feasibility of a wide-scale separation of combined drainage systems into separate foul and surface water sewers. A significant proportion of the sewer network in Wigan is made up of combined sewers, which means all foul water and rainwater are drained by a single system. The combined system drains to the wastewater treatment works, meaning a mixture of foul and rainwater is treated. If the two elements of flow can be separated out so the rainwater is infiltrated into the ground or sent directly to rivers, then this has multiple benefits, such as reduced flooding, reduced usage of storm overflows spilling to river and reduced energy costs. However, there are considerable construction challenges in implementing wide-scale separation, because new sewers need to be built over large areas of the catchment.

An investigation to identify areas of the SPA which would have high certainty of delivering benefit could be undertaken and developed ahead of our next investment cycle (2025 – 2030). An investigation would also indicate areas where separation is not feasible or is too expensive in relation to other option types. Either way, the results of the study will allow us to adapt the plan accordingly.

The adaptive plan below demonstrates multiple potential scenarios and pathways, and should be read in conjunction with the optimised DWMP plan for the relevant TPU (refer to Section 5.3).

The adaptive plan should be reviewed regularly in order to incorporate potential changes in key factors such as legislation, population growth and climate change, which could impact standards or targets, as highlighted above in Figure 8. The adaptive plan may contain potential investigations which are currently excluded from the optimised DWMP plan (refer to Section 5.3) until there is more certainty. It is therefore important that both the adaptive plan and the optimised plan are developed together.

Figure 9 Wigan adaptive plan – Possible adaptive pathways as knowledge and opportunities change over time



4. Options development

The approach for options development is an iterative screening process to identify most appropriate solutions for issues in each TPU. These solutions were taken forward for a best value assessment which will select the preferred option (Figure 10).

An options hierarchy was then used which has been endorsed by customers and stakeholders from across the North West to select preferred solutions (Figure 11). The hierarchy covers a range of option types from behavioural, to blue-green solutions e.g. SuDS and traditional grey solutions e.g. storage tanks across benefits such as reducing demand, better system management and creating capacity.

A key element to this has been built around co-development, co-funding and co-delivery through partnerships and third parties (for instances where a specific skill set is required).

Figure 10 Options development process

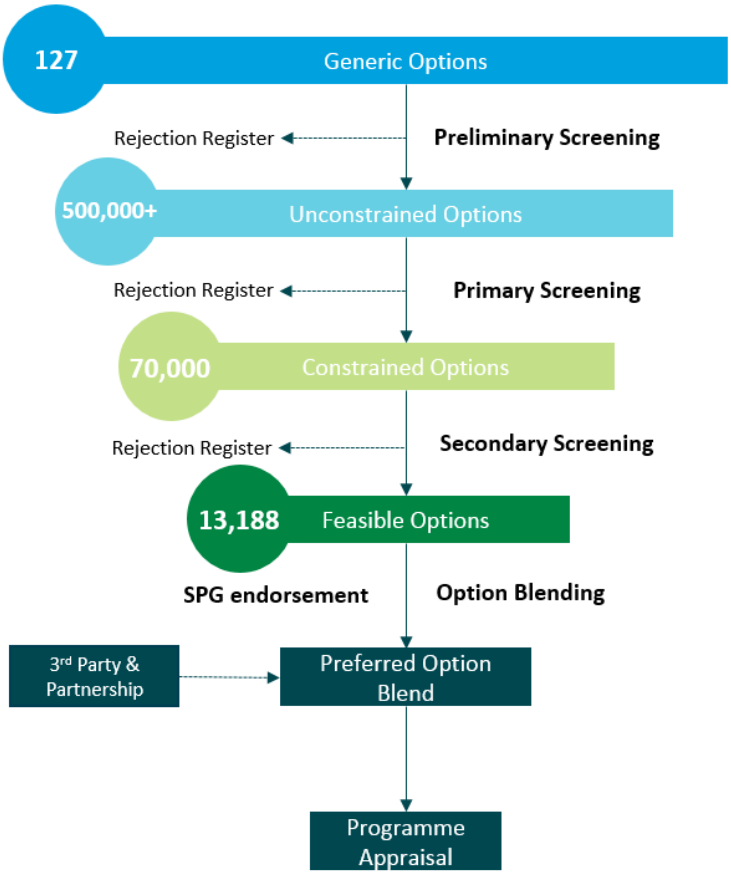
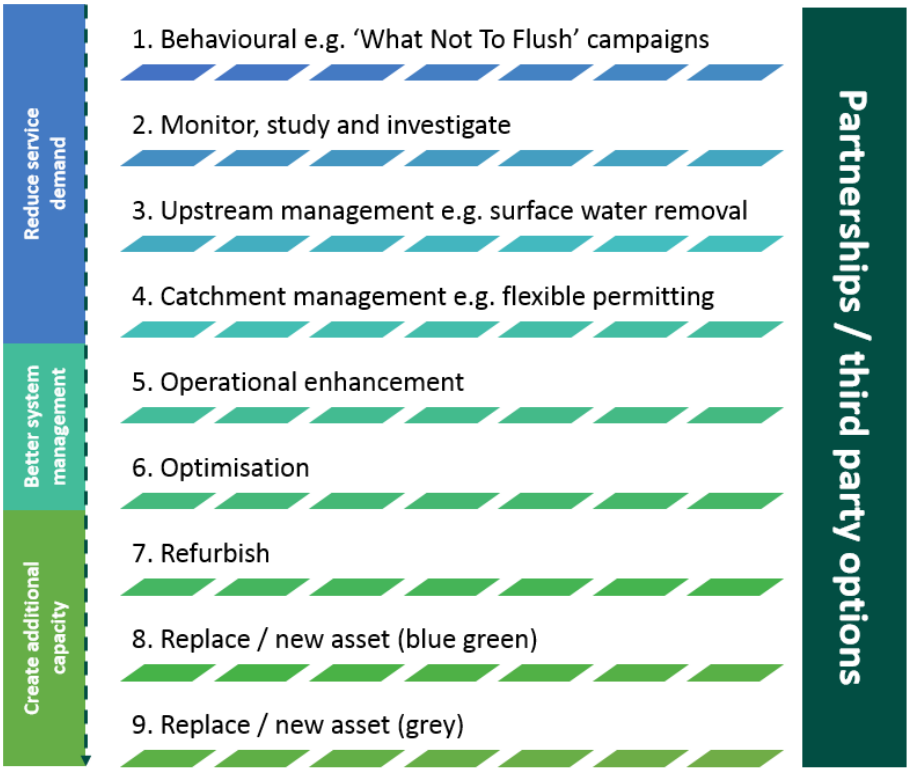


Figure 11 Options hierarchy



4.1 Douglas partnership options

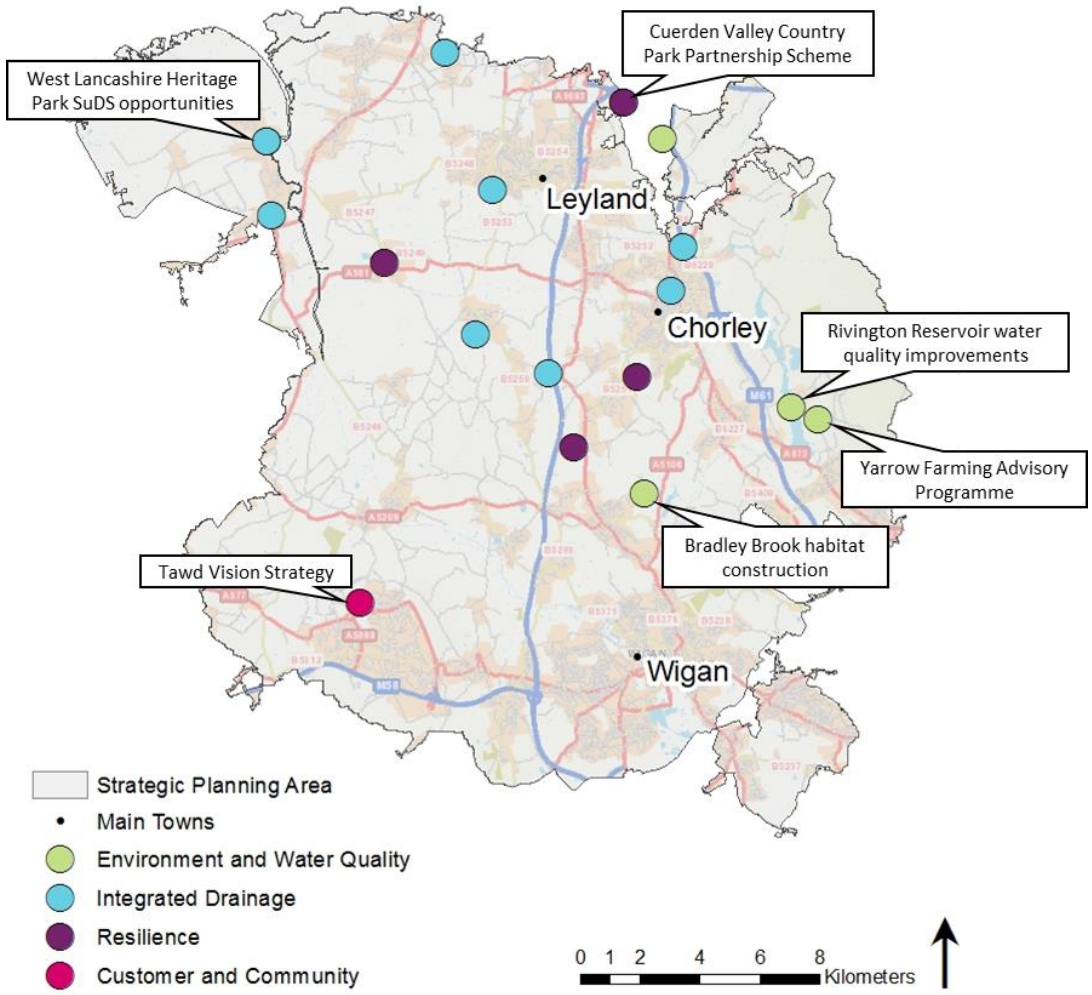
In order to identify and develop potential partnership options in the Douglas SPA, through the SPG we have shared the results from the risk identification stages such as BRAVA. This was done through a series of workshops and the purpose was to identify areas of shared risk and partnership opportunities which have been reviewed against the wider DWMP options development process (refer to Section 5.2).

The options shared were reviewed by the DWMP team and a second SPG workshop was held to gather additional information regarding potential partnership opportunities. This allowed us to understand timescales, likelihood of investment and potential organisations involved. An opportunities pipeline was consequently created using the outputs of this engagement. The pipeline includes opportunities at a range of different levels of maturity and confidence in development, as such these are not confirmed or necessarily funded schemes. However, they provide an indication of areas where we may be able to work collaboratively with partners in the future when more certainty is ascertained about need and funding. Examples of potential partnership locations are shown in Figure 12.

We have actively engaged with our SPGs to ensure that this is a collaborative process. Moving forwards, we are currently developing our Partnership Framework for the investment cycle 2025 – 2030 and beyond. The DWMP partnership opportunities pipeline will feed into this, forming an initial view of partners and opportunities. When developing the business plan, further engagement will be undertaken to where an opportunity is aligned to a 2025 – 2030 investment need. In addition to scheme specific collaboration opportunities, we recognise the need for more strategic partnerships and we will build on successes from historic partnerships in the North West.

For further information on our approach to partnership working, refer to TA2.

Figure 12 Overview of the potential partnership opportunities in the Douglas SPA



5. Options for the Douglas

5.1 Options considered

Following a number of iterative screening processes outlined in Section 4, a list of feasible options was developed for each TPU within the Douglas catchment. Options can be categorised into a number of categories:

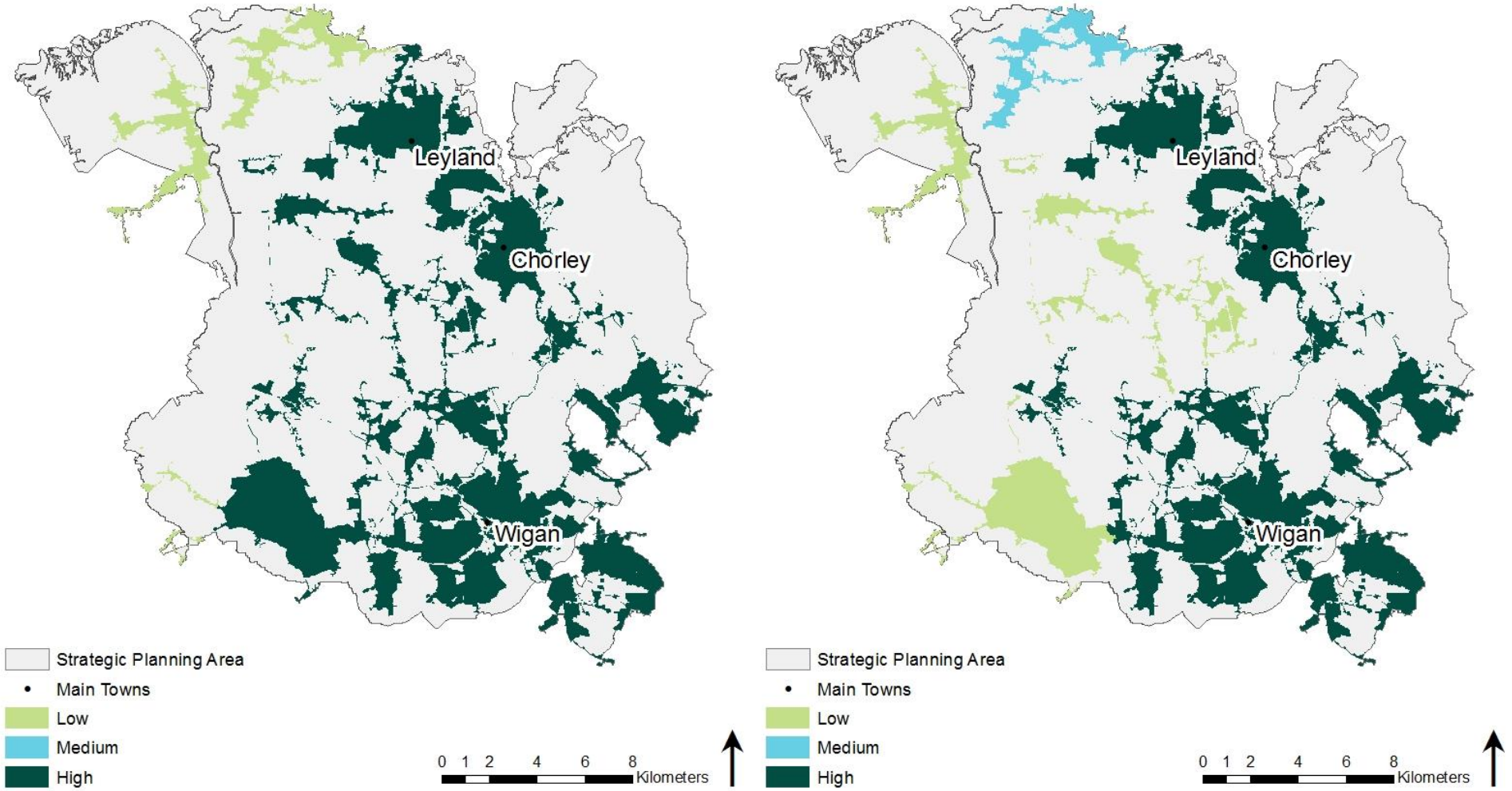
- Customer engagement;
- Monitor and investigate;
- Upstream management;
- Catchment management;
- Operational enhancement;
- Optimisation;
- Refurb/New asset (blue/green); and
- Refurb/New asset (grey).

Of these options a number can be considered regional options – those which could be implemented across the North West but may bring tangible benefits in some areas more than others. These can be investigated further ahead of investment cycle 2025 – 2030 where viable.

Across the Douglas SPA customer engagement options (Figure 13) comprising of options to work with customers to reduce demand and increase awareness of 'what not to flush' have been identified as having the potential to deliver the highest benefit in Leyland, Wigan and Chorley TPUs.

Sustainable Drainage System (SuDS) options have been assessed, these form a key part of the strategy to manage rainwater from entering the sewer system and can be investigated further in Wigan, Chorley and Leyland TPUs (Figure 13).

Figure 13 Maps show the benefit of implementing regional customer engagement (left) and sustainable drainage solutions (right) options across the Douglas SPA



5.2 Preferred options

Note: Water Industry National Environment Programme (WINEP) and storm overflows guidance are still being developed. This could lead to significant changes in preferred options and could result in large-scale, short and long term investment needs. This will be fully reviewed between draft and final DWMP publication, in addition to other aspects such as nutrient neutrality, bathing waters and shellfish water expectations. Between draft and final DWMPs the impact of storm overflow requirements will also require optimising against the other needs and opportunities detailed in this section to assess synergy/conflict and best value.

The data below do not include planned investment in addressing storm overflows. The future standards for overflows are currently the subject of the Government's Storm Overflow Discharge Reduction Plan Consultation, and the outcome is not yet determined, so it has not been possible to include these in the screening process described below.

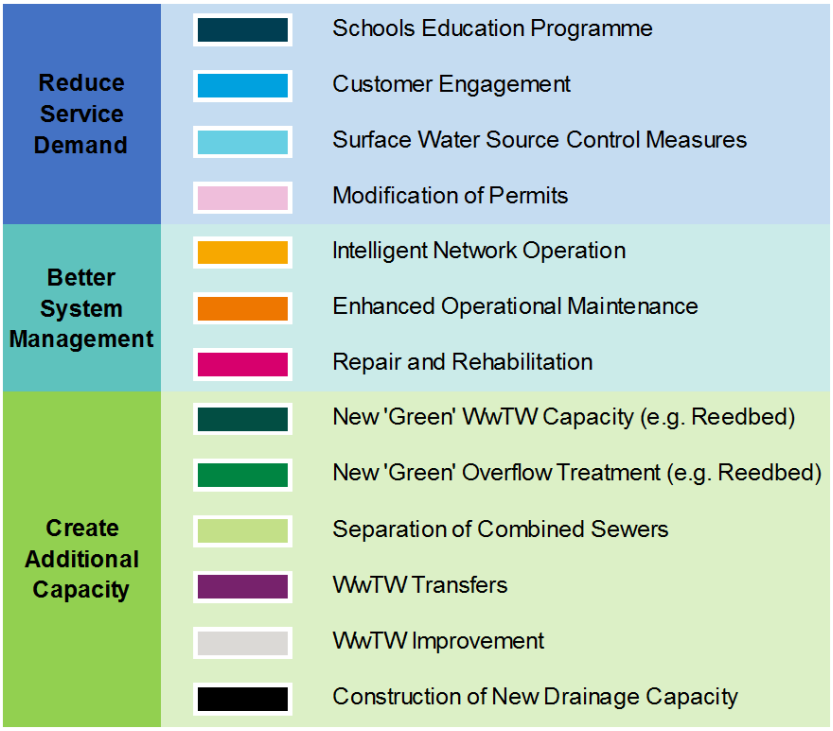
A high-level regional assessment has been carried out to estimate the likely investment requirements to address all overflow risks, but due to the uncertainty described above, this has not been broken down by Strategic Planning Areas. This information can be found in the DWMP main document.

Utilising data collected at the various stages of developing the DWMP (BRAVA, partnership opportunities and the data in Figure 13), preferred options were selected using a decision support tool and following the hierarchy principles. We have also included in this plan high confidence schemes that we believe are likely to have secured investment.

In addition the partnership opportunities highlighted in Section 4.1 are considered key for delivery of the options set out below. These will be investigated in detail in preparation for the investment plan for the period 2025-2030.

The following colour schemes are used for all charts and graphs in this section to represent each option type (Figure 14).

Figure 14 Option types



The first four options types are all grouped under the strategic heading of 'Reduce Service Demand', and are options that focus on either reducing the amount of wastewater that is produced, or preventing it from reaching the sewer network.

The second strategic group is 'Better System Management' and looks to try and manage and operate the existing assets in a more efficient or effective manner.

The final group is 'Create Additional Capacity'. This is about building new assets, for example storage tanks or new treatment work process units, where it is not possible or economical to reduce demand or improve operations any further.

Across the Douglas SPA, the outcomes seen as a result of potential investment and benefit in each option type are shown in Figures 15, 16 and 17.

Figures 15 and 16 show how potential investment could be split between the three high-level option strategies – reduce demand, system management and new capacity – and then further sub-divides these into the individual option types.

Figure 15 shows potential options to address environmental planning objectives, which incorporate:

- Wastewater treatment work permit compliance;
- WINEP compliance; and
- Pollution of watercourses.

Figure 16 shows potential options to address flooding planning objectives, which incorporate:

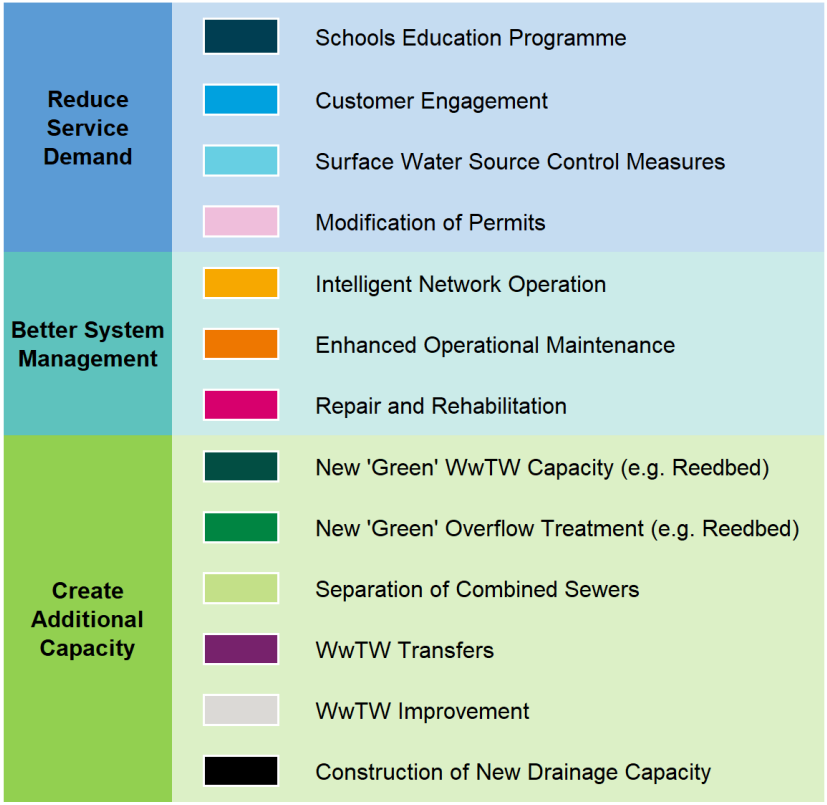
- Internal flooding;
- External flooding;
- Highway and open space flooding; and
- 1 in 50-year flooding.

Note that the percentages shown in Figures 15 and 16 are the proportions of investment within each planning objective type (flooding and environmental), but the total values of flooding and environmental investment are not equal. This split can be seen in more detail for each TPU in Section 5.3.

Figure 17 shows how these options could contribute to addressing the planning objectives – environmental and flooding.

Figure 15 Douglas Strategic Planning Area: Distribution of environmental investment by option type

This is an example of how investment in different options types may be used to address the environmental planning objectives. The vast majority of potential investment could be through improvements in wastewater treatment works. This chart does not show planned investment in improving overflow performance as these are not based on cost beneficial assessments.



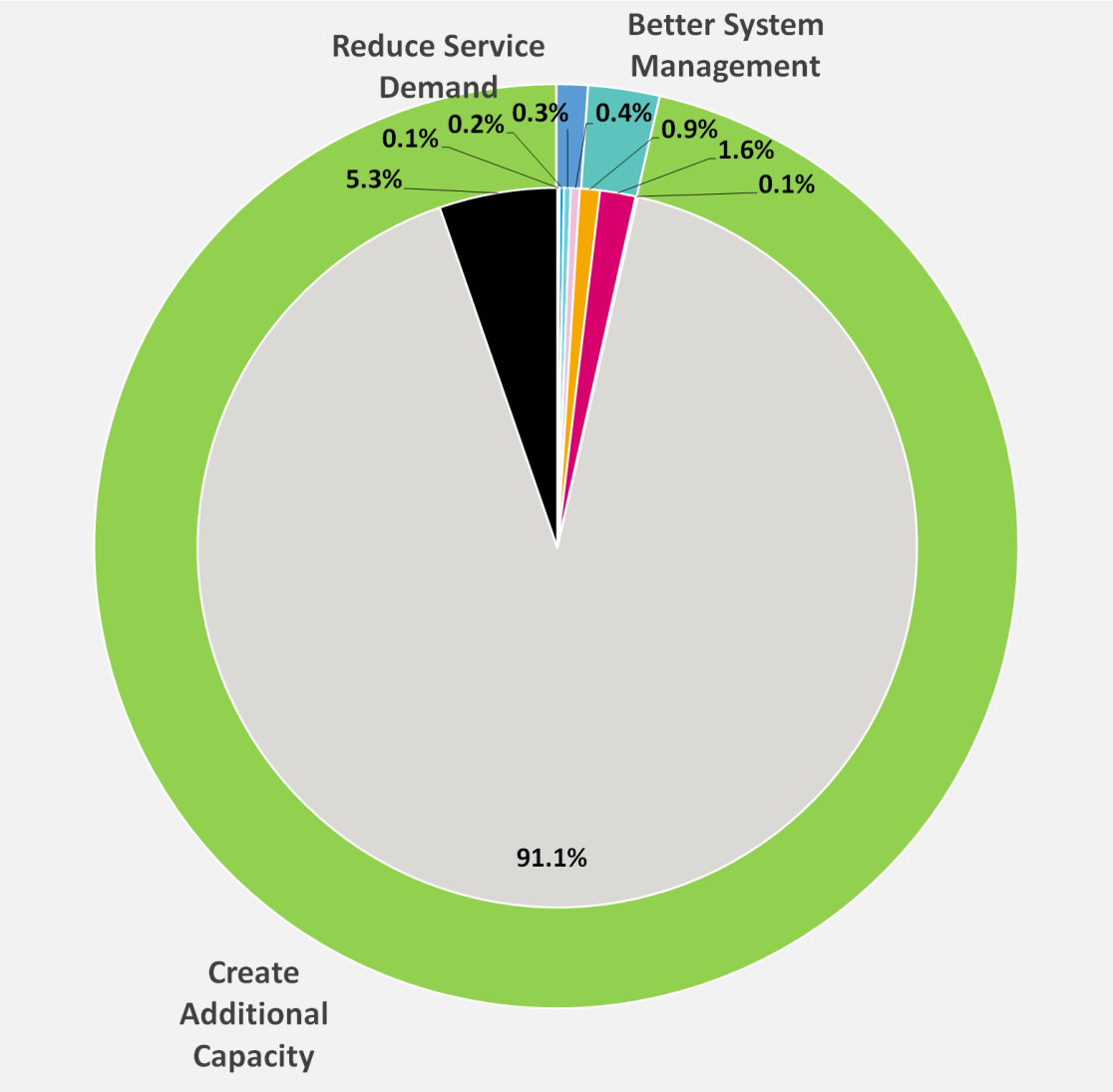


Figure 16 Douglas Strategic Planning Area: Distribution of flooding investment by option type

This is an example of how different options types may be used to address flooding planning objectives. Almost two thirds of the investment could be through a stratgey to reduce demand on the sewer system, seen here through surface water source control measures such as SuDS, and schools and customer engagement programmes.

Around 12% of investment could be in improving existing system management, and 18% of the investment could be in the construction of new stormwater storage capacity, including the separation of combined sewers.

Reduce Service Demand	Schools Education Programme
	Customer Engagement
	Surface Water Source Control Measures
	Modification of Permits
Better System Management	Intelligent Network Operation
	Enhanced Operational Maintenance
	Repair and Rehabilitation
Create Additional Capacity	New 'Green' WwTW Capacity (e.g. Reedbed)
	New 'Green' Overflow Treatment (e.g. Reedbed)
	Separation of Combined Sewers
	WwTW Transfers
	WwTW Improvement
	Construction of New Drainage Capacity

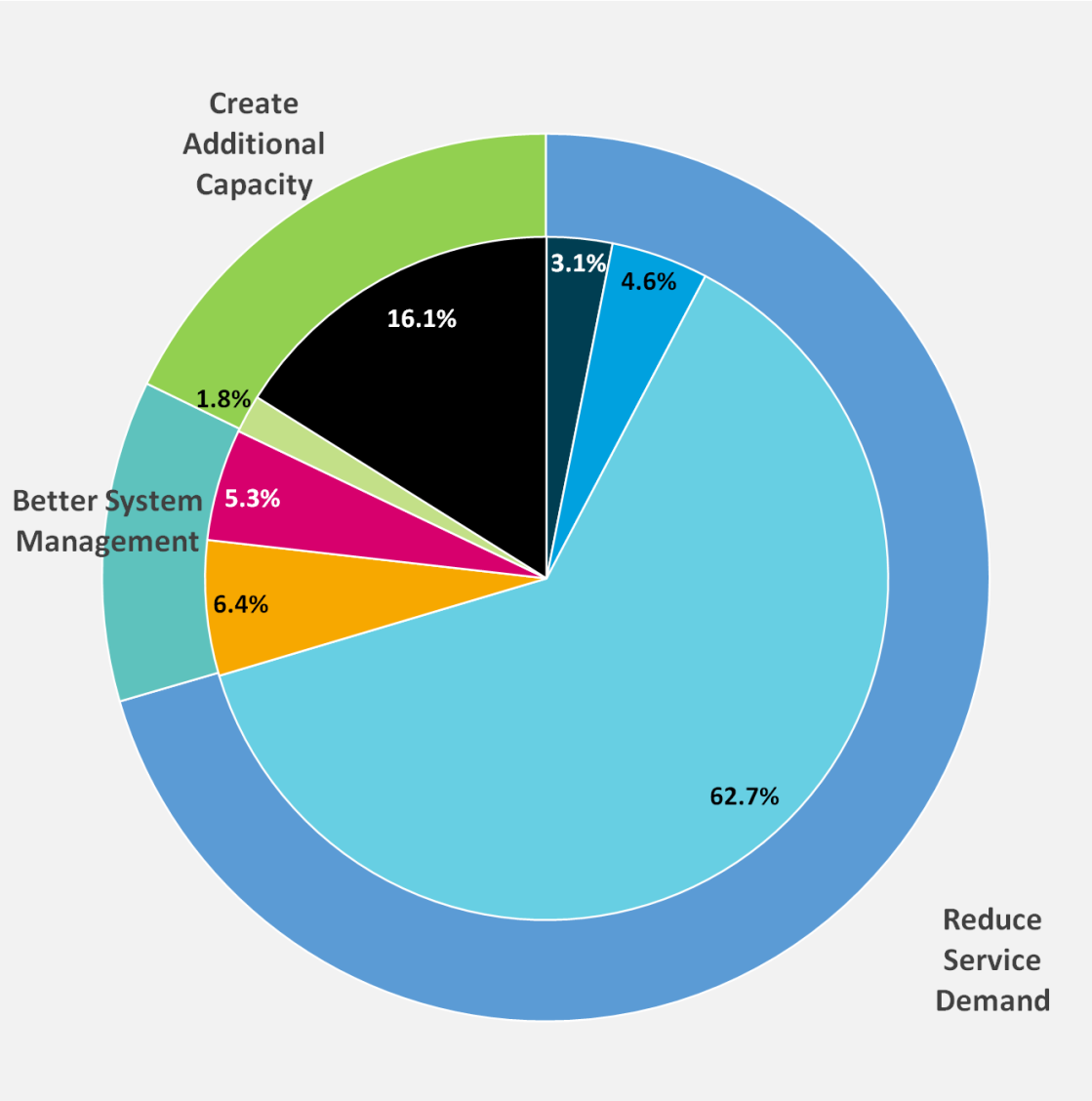
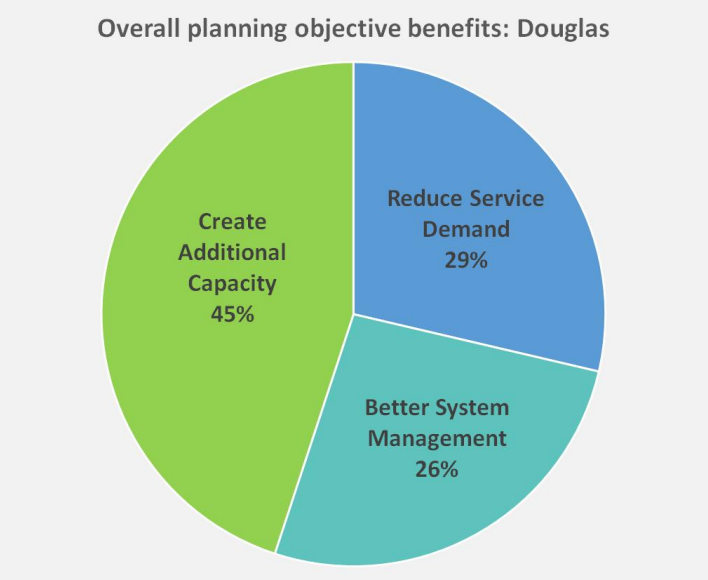


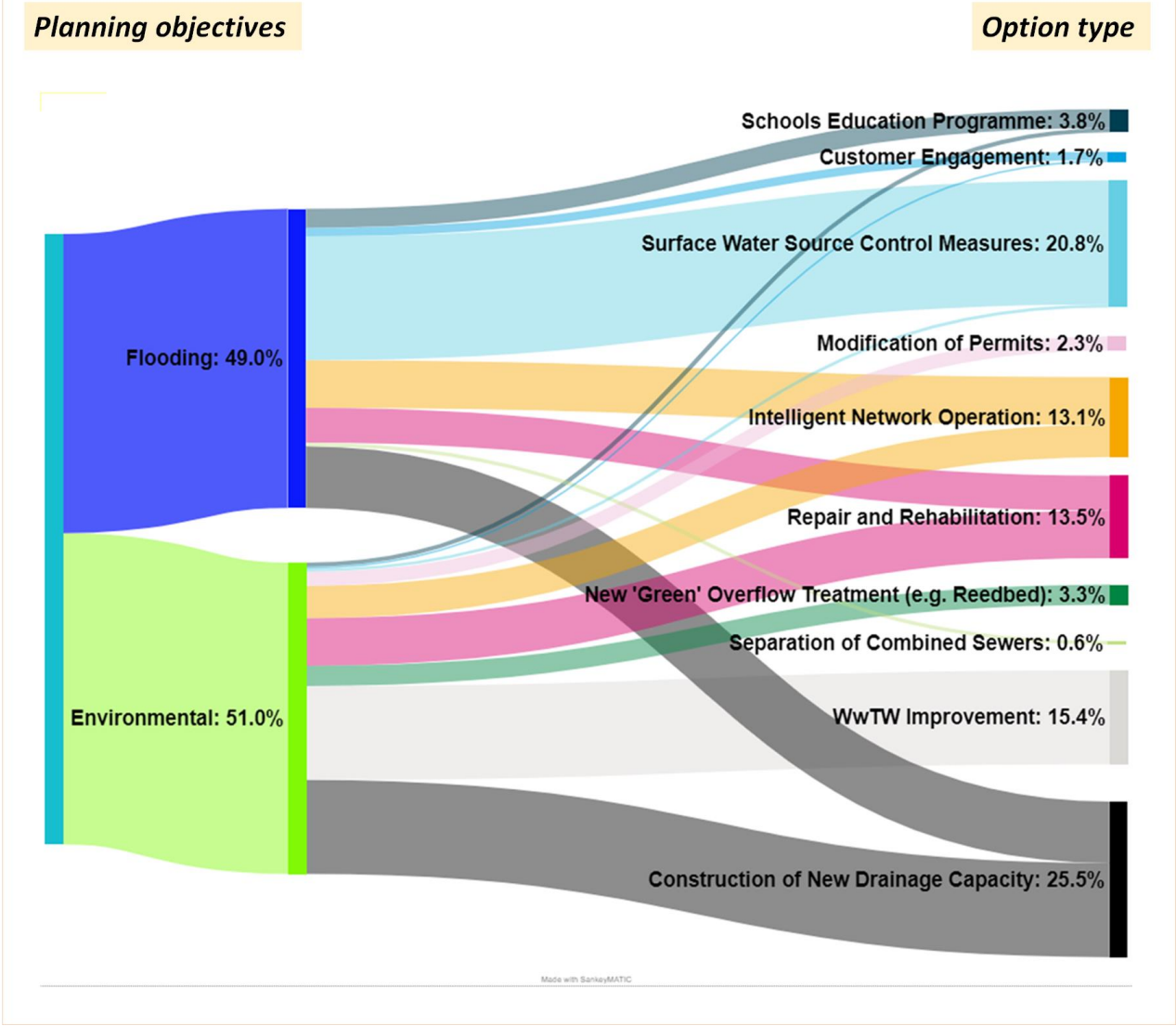
Figure 17 Distribution of benefit by option type within Douglas SPA

This is an example of how different option types may be used to demonstrate potential benefits against different planning objectives within the Douglas SPA.

United Utilities Water (UUW) commitments to improving flooding performance could be met through the reduction of surface water flows, construction of new stormwater drainage capacity, and the installation of intelligent network and repair and rehabilitation of existing network, supported by schools and customer engagement programmes.

Environmental planning objectives could be met mainly through improvements to wastewater treatment works, repair and rehabilitation of existing network, construction of new drainage capacity, new 'green' overflow treatment, modification of permits, installation of intelligent network and the separation of combined sewers.





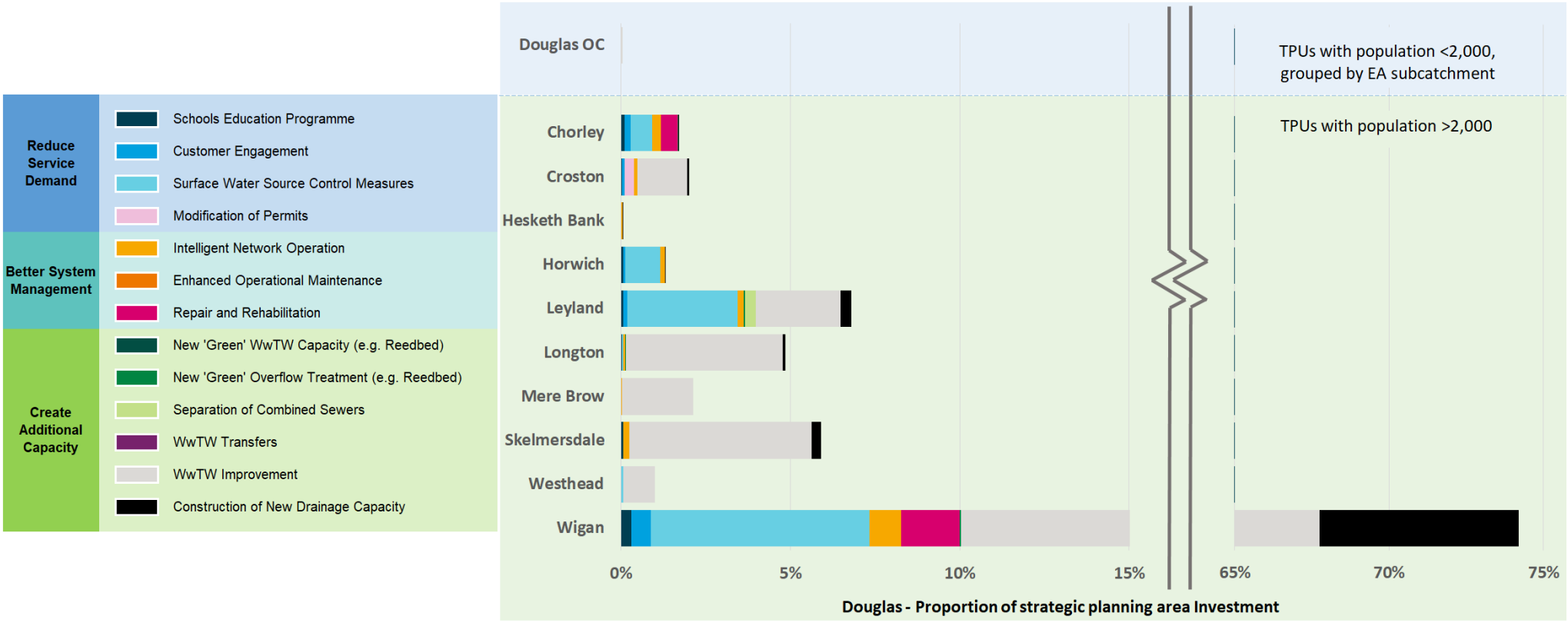
5.3 Overview of preferred options in each TPU

Figure 18 shows the proportion of Douglas SPA potential investment in each TPU, split up by option type. This includes all 'must do' activities that are mandated by legislation leading to tightening permits/standards and all optimised outputs of the non-mandated aspects of the plan. It does not include investment associated with uncertain regulatory guidance e.g. objectives around overflows.

Note that the smaller TPUs within the catchment (those with less than 2,000 population) have been reported together at the top of the chart, grouped by SPA sub catchment (Environment Agency Operational Catchment boundaries).

It can be seen that in the Douglas SPA, the largest TPUs see the largest potential investment, which is dominated by wastewater treatment work improvements and supported with surface water control, improved system management, and the construction of new drainage capacity, e.g. new sewers or storm water storage tank

Figure 18 Proportion of investment seen in each TPU within the Douglas SPA



The following sub-sections show how investment could be split between different types of options to bring benefits to each TPU over the short, medium and long term. Some options, such as construction of new storm water storage tanks, occur at a single point in time; however the benefit of reduced flooding could be seen long into the future. Other options such as schools education, are continual programmes that could help to encourage long-term sustainable behaviours, such as reduction in water use.

5.3.1 Chorley

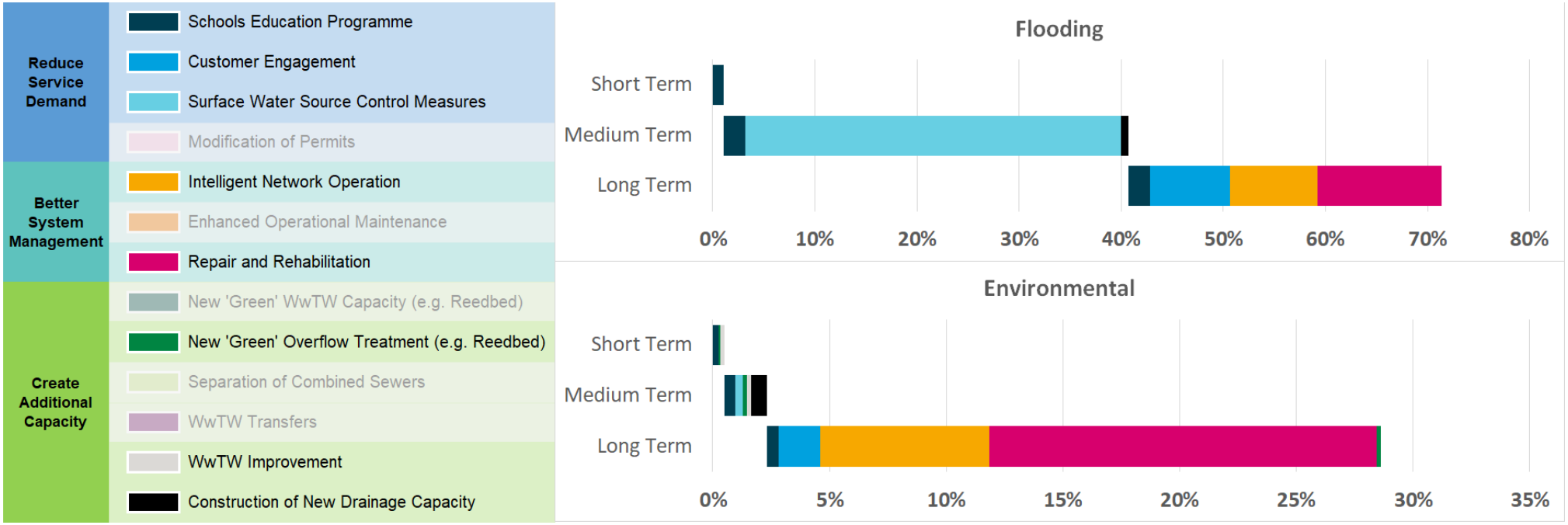
The results from the DWMP show that if we were to invest in Chorley over the next 25 years, around 71% of the investment could be to address flooding risks, and around 29% of investment could be to address environmental risks (Figure 19).

In the short term, investments could be through schools education programmes with a small amount of wastewater treatment works improvements.

In the medium term, school programmes could continue and there could be significant investment in surface water source control measures, such as SuDS.

In the longer term, existing intelligent network monitoring systems that are already in place could be replace or updated, and maintain existing sewers through repair and rehabilitation programmes. School education programmes could continue and be supplemented by customer engagement programmes.

Figure 19 Short, medium and long-term investment in the Chorley TPU, distributed by option type



5.3.2 Croston

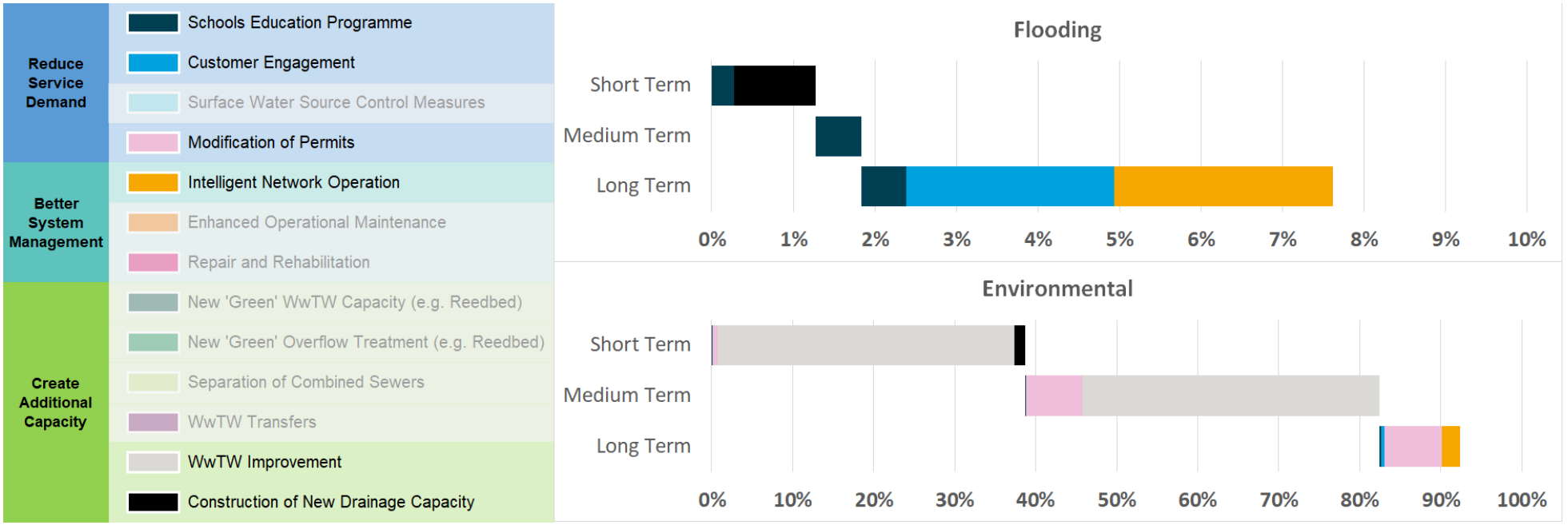
The results from the DWMP show that if we were to invest in Croston over the next 25 years, around 8% of the investment could be to address flooding risks, and around 92% of investment could be to address environmental risks (Figure 20).

In the short term, investments could be through wastewater treatment works improvements to ensure permit compliance, including the modification of environmental permits. Flooding risk could start to be addressed through schools education programmes and the construction of new sewers and storage tanks.

In the medium term, school education programmes could continue, and wastewater treatment works improvements could also continue.

In the longer term, existing intelligent network monitoring systems that are already in place could be replaced or updated. Schools education and customer engagement programmes could continue.

Figure 20 Short, medium and long-term investment in the Croston TPU, distributed by option type



5.3.3 Hesketh Bank

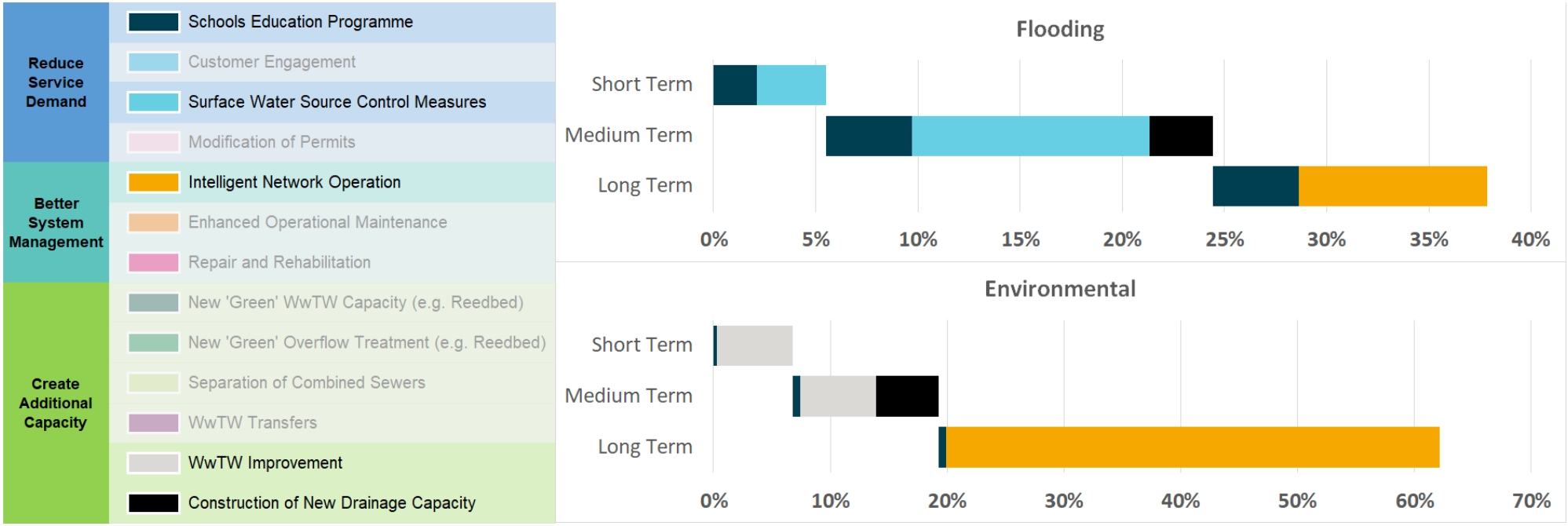
The results from the DWMP show that if we were to invest in Hesketh Bank over the next 25 years, around 38% of the investment could be to address flooding risks, and around 62% of investment could be to address environmental risks (Figure 21).

In the short term, investments could be through wastewater treatment works improvements to ensure permit compliance. Flooding risk could start to be addressed through school education programmes and the creation of new surface water source control measures.

In the medium term, schools education programmes could continue, and further wastewater treatment works improvements.

In the longer term, there could be investment in intelligent network monitoring systems. School education and customer engagement programmes could continue.

Figure 21 Short, medium and long-term investment in the Hesketh Bank TPU, distributed by option type



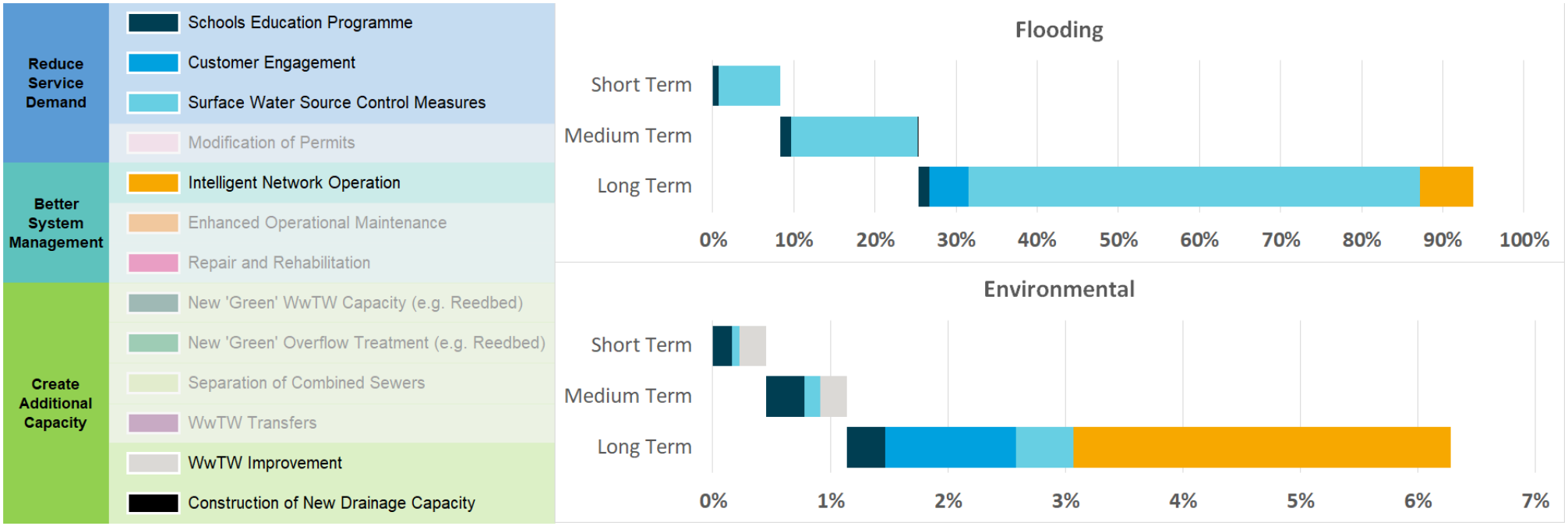
5.3.4 Horwich

The results from the DWMP show that if we were to invest in Horwich over the next 25 years, around 94% of the investment could be to address flooding risks, and around 6% of investment could be to address environmental risks (Figure 22).

In the short and medium term, investments could be through the creation of new surface water source control measures, school education programmes, and the wastewater treatment works improvements to ensure permit compliance.

In the longer term, existing intelligent network monitoring systems that are already in place could be replaced or updated. Surface water source control measures, and school education and customer engagement programmes could continue.

Figure 22 Short, medium and long-term investment in the Horwich TPU, distributed by option type



5.3.5 Leyland

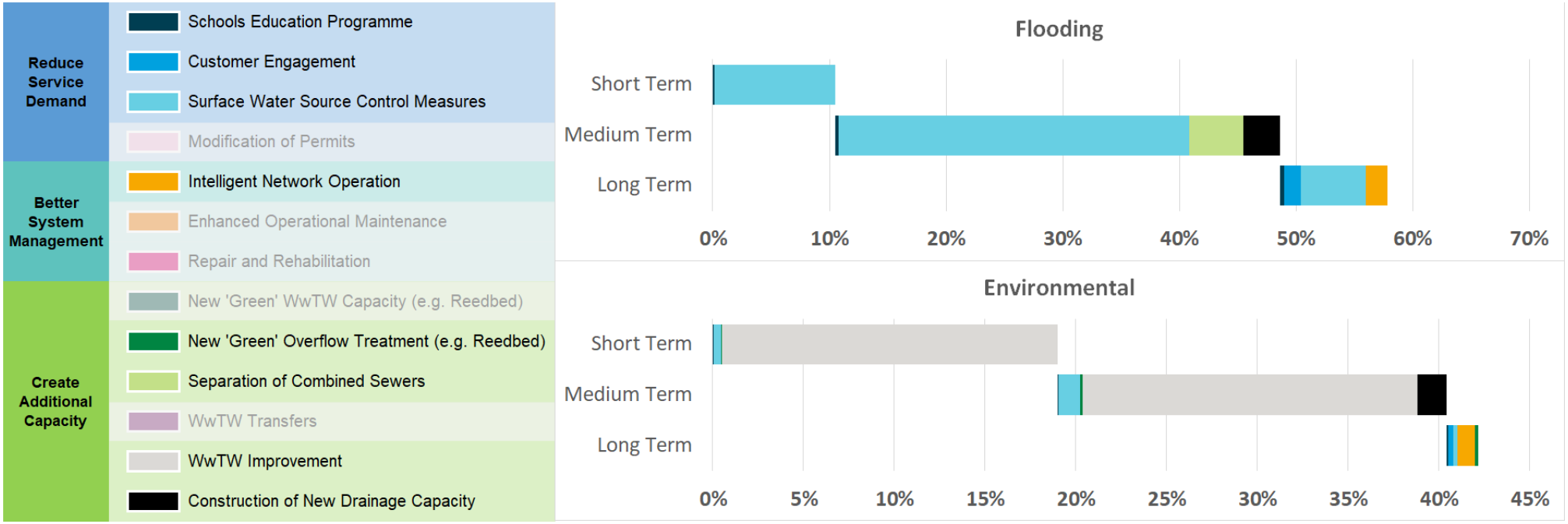
The results from the DWMP show that if we were to invest in Leyland over the next 25 years, around 58% of the investment could be to address flooding risks, and around 42% of investment could be to address environmental risks (Figure 23).

In the short term, investments to address flooding risks could be through the creation of new surface water source control measures, with some additional investment in school education programmes. Environmental risks could be addressed primarily through investment in wastewater treatment works improvements to ensure permit compliance.

In the medium term, the above investment could continue, and be supplemented by the separation of combined sewers and the construction of new network capacity (e.g. new sewers or storage tanks).

In the longer term, there could be additional investment in intelligent network monitoring systems and customer engagement programmes.

Figure 23 Short, medium and long-term investment in the Leyland TPU, distributed by option type



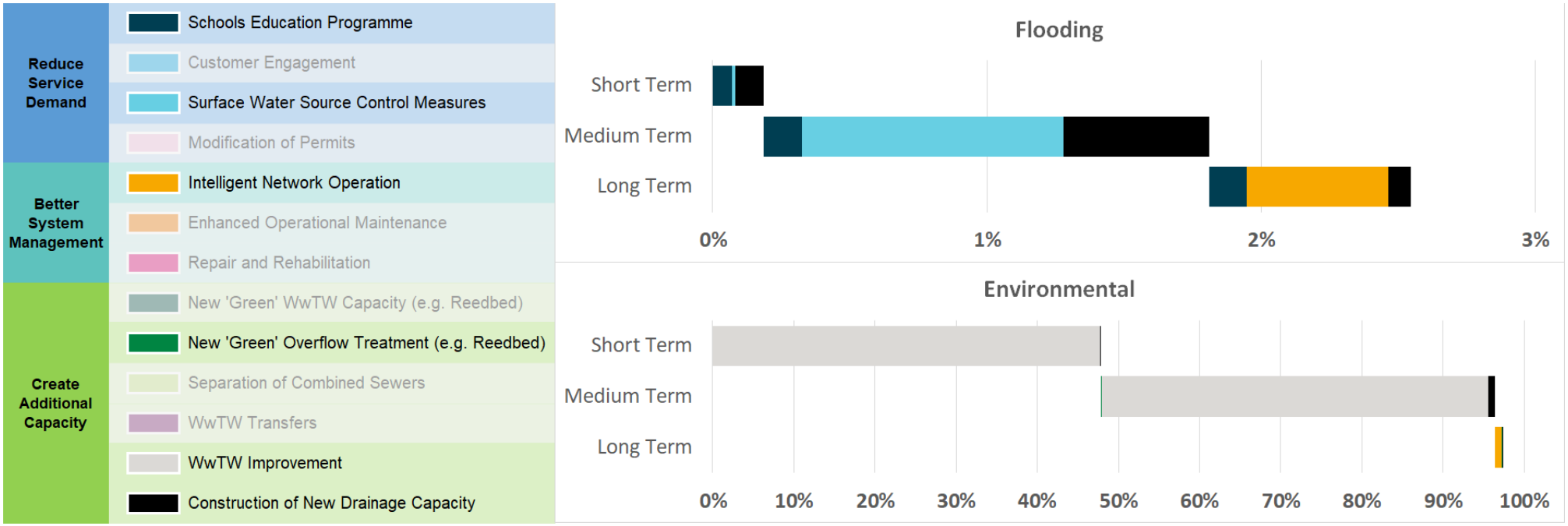
5.3.6 Longton

The results from the DWMP show that if we were to invest in Longton over the next 25 years, around 3% of the investment could be to address flooding risks, and around 97% of investment could be to address environmental risks (Figure 24).

In the short and medium term, investments to address flooding risks could be through the creation of new surface water source control measures, construction of new network capacity and investment in school education programmes. Environmental risks could be addressed primarily through the wastewater treatment works improvements to ensure permit compliance.

In the longer term, there could be additional investment in intelligent network monitoring systems.

Figure 24 Short, medium and long-term investment in the Longton TPU, distributed by option type



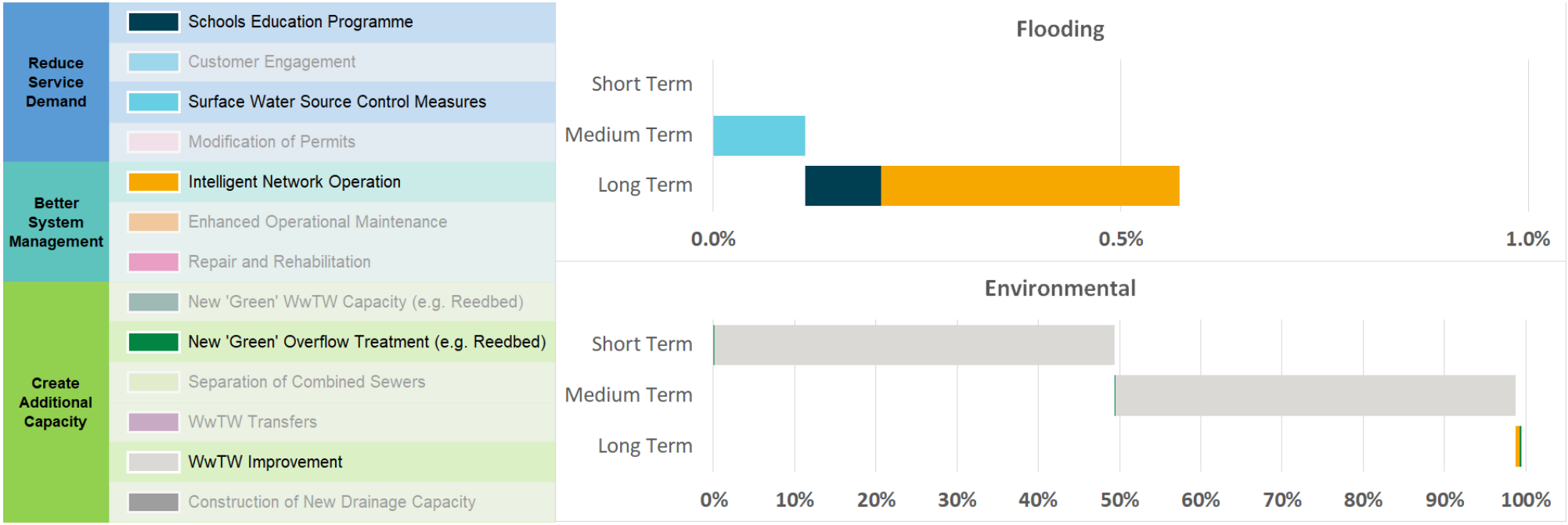
5.3.7 Mere Brow

The results from the DWMP show that if we were to invest in Mere Brow over the next 25 years, around 0.5% of the investment could be to address flooding risks, and around 99.5% of investment could be to address environmental risks (Figure 25).

In the short and medium term, investments to address flooding risks could be through the creation of new surface water source control measures. Environmental risks could be addressed primarily through wastewater treatment works improvements to ensure permit compliance.

In the longer term, there could be additional investment in intelligent network monitoring systems.

Figure 25 Short, medium and long-term investment in the Mere Brow TPU, distributed by option type



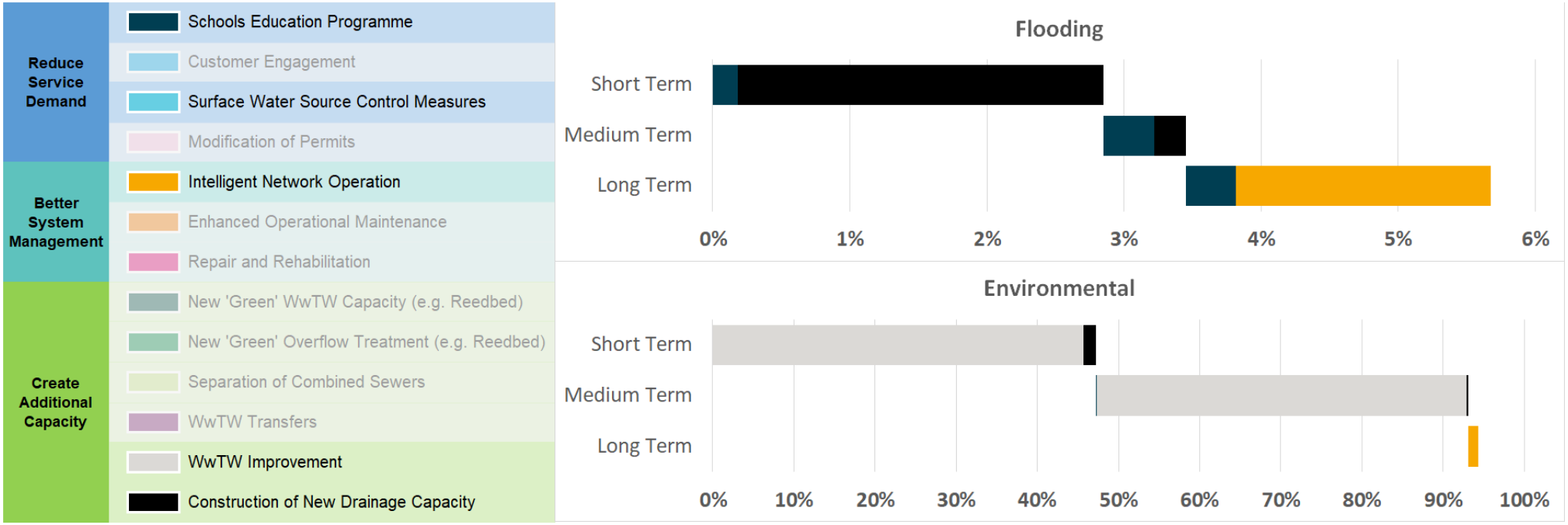
5.3.8 Skelmersdale

The results from the DWMP show that if we were to invest in Skelmersdale over the next 25 years, around 6% of the investment could be to address flooding risks, and around 94% of investment could be to address environmental risks (Figure 26).

In the short and medium term, investments to address flooding risks could be through the construction of new network capacity (e.g. new sewers and storage tanks) and school education programmes. Environmental risks could be addressed primarily through wastewater treatment works improvements to ensure permit compliance.

In the longer term, there could be additional investment in intelligent network monitoring systems.

Figure 26 Short, medium and long-term investment in the Skelmersdale TPU, distributed by option type



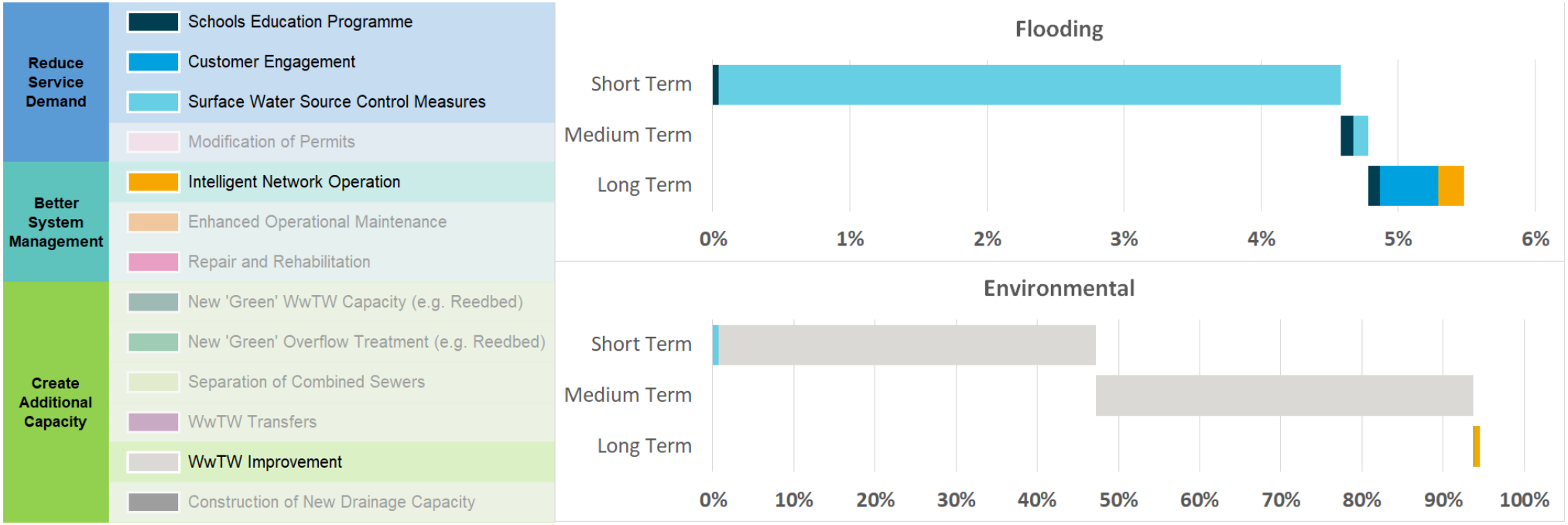
5.3.9 Westhead

The results from the DWMP show that if we were to invest in Westhead over the next 25 years, around 5% of the investment could be to address flooding risks, and around 95% of investment could be to address environmental risks (Figure 27).

In the short and medium term, investments to address flooding risks could be through the creation of new surface water source control measures and also through school education programmes. Environmental risks could be addressed through wastewater treatment works improvements to ensure permit compliance.

In the longer term, there could be additional investment in intelligent network monitoring systems and customer engagement programmes.

Figure 27 Short, medium and long-term investment in the Westhead TPU, distributed by option type



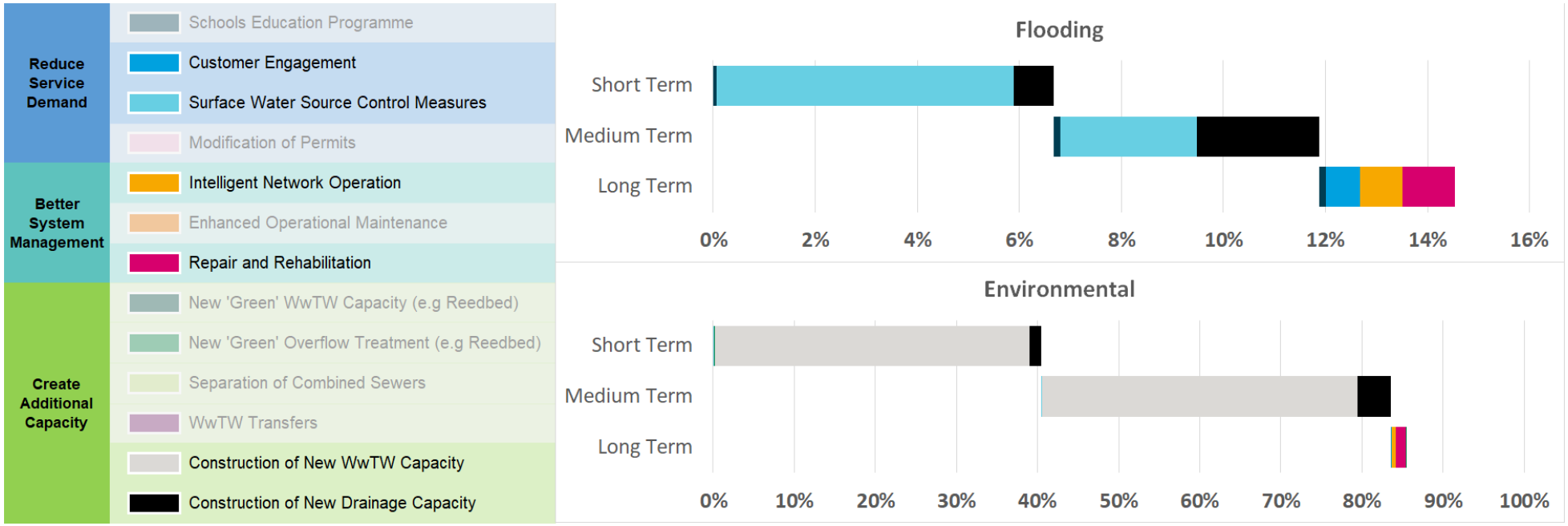
5.3.10 Wigan

The results from the DWMP show that if we were to invest in Wigan over the next 25 years, around 15% of the investment could be to address flooding risks, and around 85% of investment could be to address environmental risks (Figure 28).

In the short and medium term, investments to address flooding risks could be through the creation of new surface water source control measures, construction of new sewers and storage tanks, and through school education programmes. Environmental risks could be addressed through wastewater treatment works improvements to ensure permit compliance, with some construction of new sewers and storage tanks.

In the longer term, existing intelligent network monitoring systems that are already in place could be replaced or updated. Maintaining existing sewers through repair and rehabilitation programmes, and the implementation of customer engagement programmes could be introduced.

Figure 28 Short, medium and long-term investment in the Wigan TPU, distributed by option type



5.3.11 TPUs with population less than 2,000: *Douglas OC* sub catchment

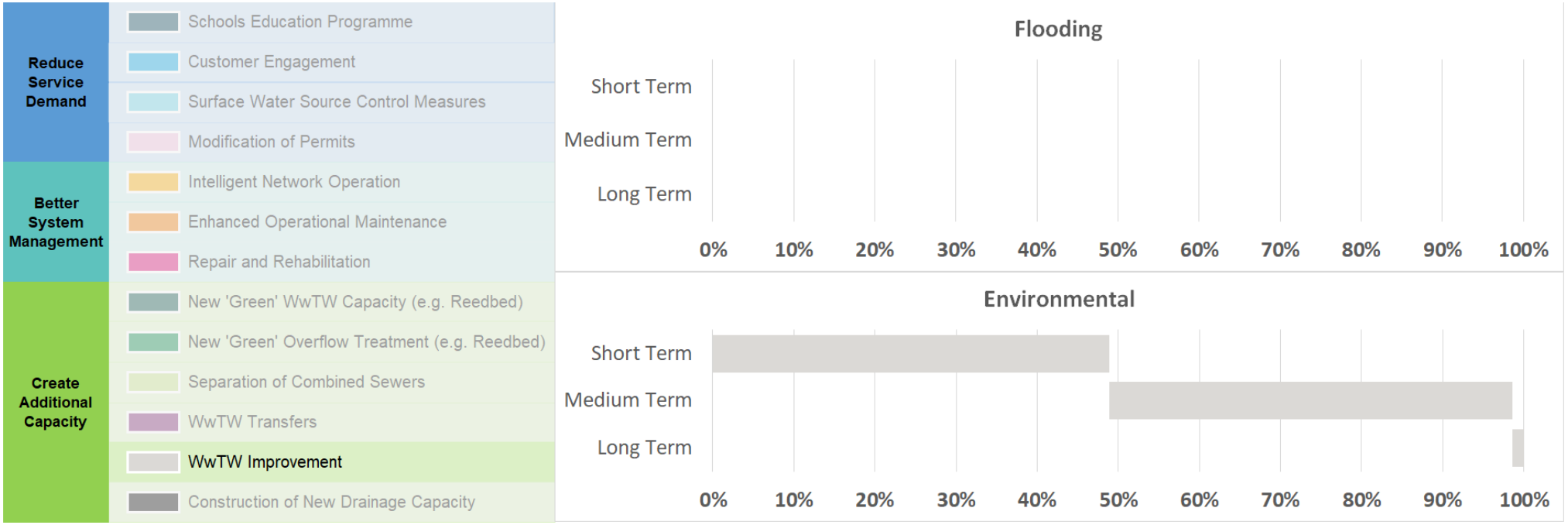
The following TPUs each have a population of less than 2,000, and have therefore been grouped together:

- Bispham Green;
- Blackrod;
- Coppull;
- Dark Lane; and
- The Holmes.

All of the potential investment in these small TPUs could be to address environmental risks (Figure 29).

All short, medium and long term investment in these small TPUs could be in wastewater treatment works improvements to ensure permit compliance.

Figure 29 Short, medium and long-term investment in TPUs with population less than 2,000 (Douglas OC sub catchment) distributed by option type

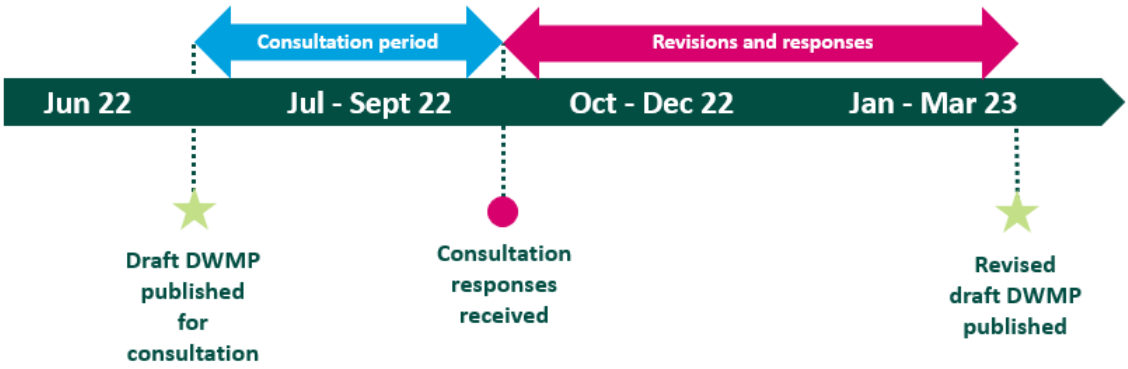


6. Next steps

The DWMP is inherently not a static plan so we will continue to work with stakeholders to develop partnership options and strategies which will make a difference within the Douglas SPA.

We are currently at draft publication (Figure 30) and between now and final publication in March 2023, we will reflect on updated guidance such as WINEP and storm overflows, and incorporate the feedback that we receive to ensure that the DWMP can build the best foundation to allow the North West to thrive in years to come.

Figure 30 Timeline between draft and final publication



We welcome your feedback on our draft publication of our first DWMP. Please get in touch using our mailbox:

DWMPConsultation@uuplc.co.uk

7. References

[1] River Douglas Catchment Partnership (arcgis.com)

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/507122/LIT_10210_NORTH_WEST_FRMP_PART_B.pdf

[3] https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/CatchmentPartnership/WEIF2001

[4] https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/RiverBasinDistrict/12

[5] https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance)

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