

United Utilities Water

Drainage and Wastewater Management Plan 2023

Ribble DWMP

Document Reference: SPA_09

May 2023

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Glossary

For the glossary, refer to document C003.

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. Whilst long term planning for wastewater has always been undertaken, this is the first time that we are developing a region wide plan in this format, and we have taken a comprehensive approach as we recognise the importance of long-term planning and the increasing need for partnership solutions.

The heart of the plan will be built around collaborative and innovative working, while 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.

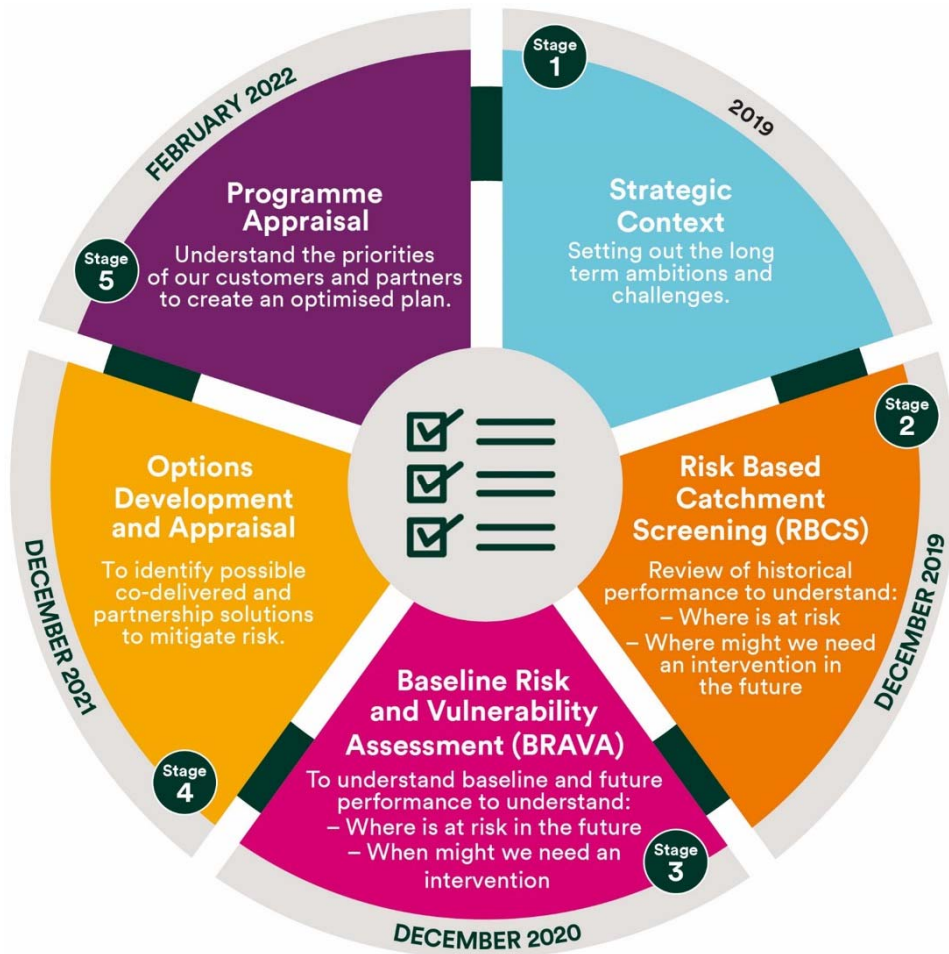
The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

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 Ribble SPA.

2. Background to the Ribble catchment

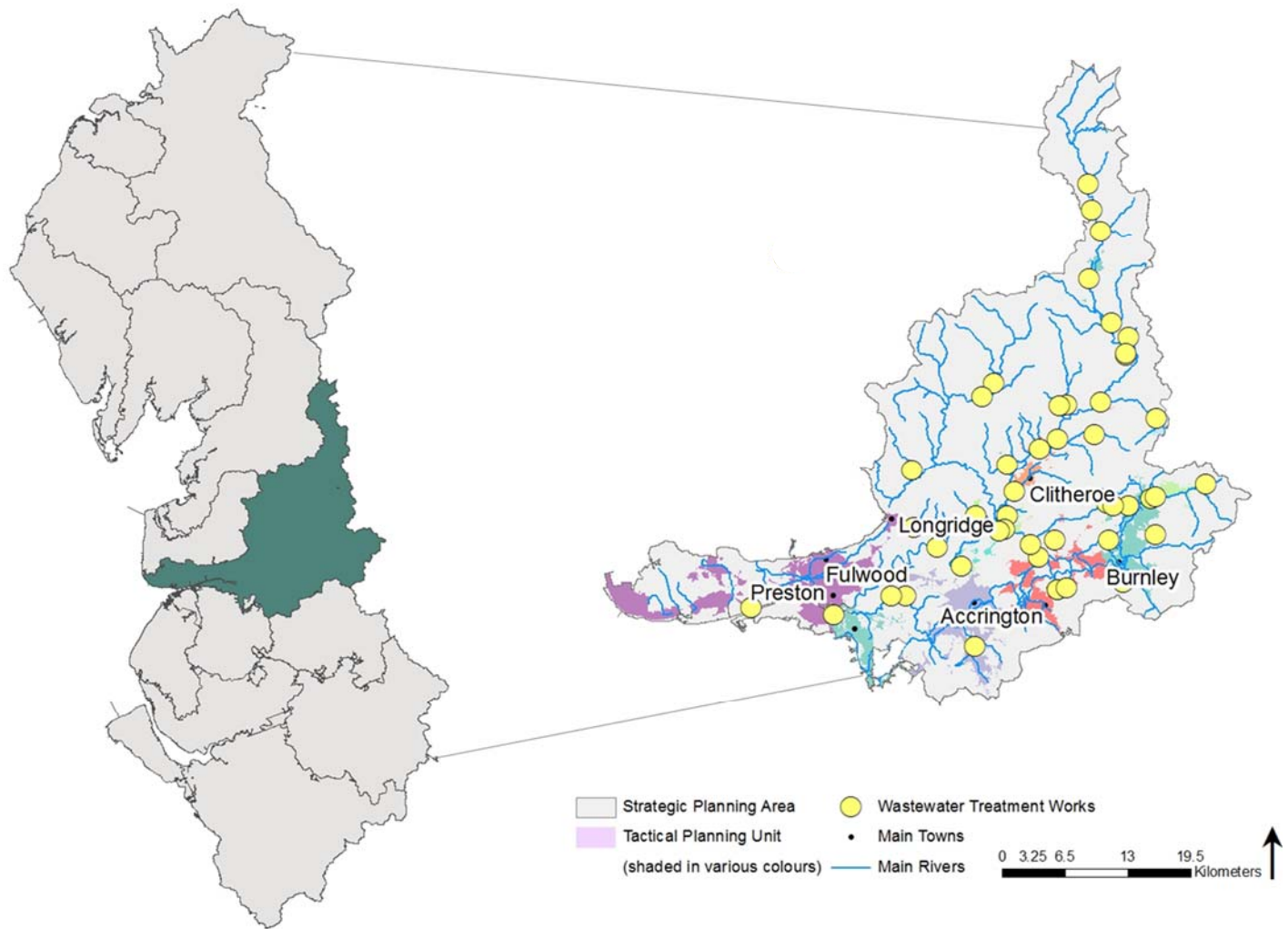
The Ribble catchment area covers approximately 1477.7km² and it is located through the Bowland Forest which is a popular tourist destination. This catchment consists of the Ribble Estuary which is classed as a Special Protection Area and is one of the largest estuaries in the United Kingdom ^[1].

There are eight main sub catchments:

- The Big Ribble – Located downstream of the Calder, this sub catchment is a mostly urbanised and industrial area ^[2].
- Calder – This sub catchment includes the River Calder that is located in the surroundings of Nelson, Burnley, Colne and Accrington and it joins onto the Ribble below Whalley. This area is mainly a combination of urban and industrial ^[3].
- Colne Water – Located partially in the Forest of Bowland, this sub catchment is a heavily farmed and urbanised area ^[4].
- Darwen – This sub catchment includes the River Darwen that flows through Darwen and the urban areas located in Blackburn. It is a heavy industrialised area ^[5].
- Hodder and Loud – This area is located south east of the Forest of Bowland and it is responsible for the drainage ^[6].
- Limestone Ribble – Located to the west of the Yorkshire Dales National Park, this catchment is dominated by agriculture ^[7].
- Ribble Middle – Settle to Calder – Located south of the Yorkshire Dales National Park and east of the Forest of Bowland, this catchment is mostly urbanised with numerous market towns such as Settle, Clitheroe and Barnoldswick on Stock Beck ^[8].
- Savick Brook and Fylde South Drains – Located south west of the catchment area, this sub catchment mainly consists of rural areas with a focus of dairy farming. Savick Brook was canalised in 2002 and it now provides a link between the Lancaster canal and the Leeds Liverpool canal ^[9].

There are 47 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Ribble SPA. A TPU is the drainage area including all the sewers and wastewater assets e.g. pumping stations, which drain to the associated wastewater treatment works. The TPUs within the SPA vary in size from larger catchments such as Preston and Blackburn to smaller, rural catchments such as Barnside and Holden. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Ribble SPA



There are numerous strategic management plans within the Ribble that are owned by various other organisations. Within the Ribble 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 catchment. 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 Ribble catchment
<p>River Basin Management Plan (RBMP) ^[10]</p> <p>Owner: Environment Agency</p>	<p>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.</p>	<p>The main reasons for not achieving good ecological status are physical modifications and pollution from abandoned mines, rural areas, towns, cities, transport and wastewater.</p> <p>Future challenges predicted by the Environment Agency include physical modifications, invasive non-native species and pollution from a range of sources such as wastewater, agriculture and rural areas.</p> <p>Future challenges predicted by partnerships include physical modifications, pollution from wastewater, agriculture and rural areas.</p>
<p>Flood Risk Management Plan (FRMP) ^[11]</p> <p>Owner: Environment Agency</p>	<p>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.</p>	<p>The catchment is within the North West River Basin District (RBD). The area covers approximately 13,200km² and is occupied by close to seven million people. More than 370,000 of these people being at risk from flooding by rivers and the sea with a further 600,000 people at risk of surface water flooding.</p> <p>Around 35,000 people are thought to be living in areas that are deemed high risk of flooding from surface water with a further 97,500 at a moderate risk. 31,000 people are living in areas at are high risk of flooding due to rivers and the sea with a further 46,500 at a moderate risk. Areas of significant flood risk across the North West include Ambleside, Ashton under Lyne, Atherton, Blackburn, Burnley, Ellesmere Port, Formby, High Folds, Kendal and Liverpool.</p> <p>Blackburn currently has 12,217 people living in areas at risk of flooding from surface water with 2,159 non-residential properties at risk. Blackburn was recently affected by flash flooding events occurring in 2020 in which both roads and properties were flooded.</p> <p>Burnley currently has approximately 4,408 people living in areas at risk of flooding from surface water which covers around 1,837 residential properties and 746 non-residential properties.</p> <p>The North West has a total of 800km of highly dynamic coastline demonstrated through areas such as Sefton which coastline is eroding by up to 4m per year.</p> <p>The North West has a large amount of reservoirs credited to its industrial history, there are currently approximately 290 in the region that are classed as large raised reservoirs. 300,000 people are at risk of flooding from reservoirs in the North West.</p>

Management plan	Overview	Key aspects for the Ribble catchment
<p>Surface Water Management Plan (SWMP) ^[12]</p> <p>Owner: Lead Local Flood Authority (LLFA)</p>	<p>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.</p> <p>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.</p> <p>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. UUW continues to work closely with LLFAs and supports the development of SWMPs where required, and the delivery of SWMPs where they are published.</p>	
<p>Catchment Based Approach (CaBA) Catchment Plan ^[13]</p> <p>Owner: Ribble Life Catchment Partnership</p>	<p>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.</p>	<p>The vision of the catchment partnership to collaboratively create a thriving land and water environment within the Ribble Catchment that will bring economic, health and social benefits for all. Which will be achieved through the following goals:</p> <ul style="list-style-type: none"> • Supporting a vibrant and resilient economy and creating a great place to live by improving the rivers, estuary and other water bodies in the Ribble catchment. • Deliver greater impact through collaborative projects. • Enhance the amenity value of the water environment within Ribble catchment. • Work collaboratively to mitigate the causes of climate change and ensure that the natural capital of the catchment are valued and protected. <p>Challenges in the Ribble catchment include pollution from a variety of sources, invasive non-native species and physical modifications.</p>

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 Ribble catchment we have engaged with stakeholders such as:

- The Environment Agency;
- Lancashire County Council;
- Fylde Council;
- Blackburn Council; and
- Ribble Rivers Trust (host of the Ribble 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 Ribble catchment are outlined in section 4.1.

Figure 4 DWMP framework for engagement

A framework for engagement in the North West



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 Ribble catchment, the RBCS stage identified 35 out of 47 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. The list of corresponding TPU names can be found in Table A.1 in the Appendix.

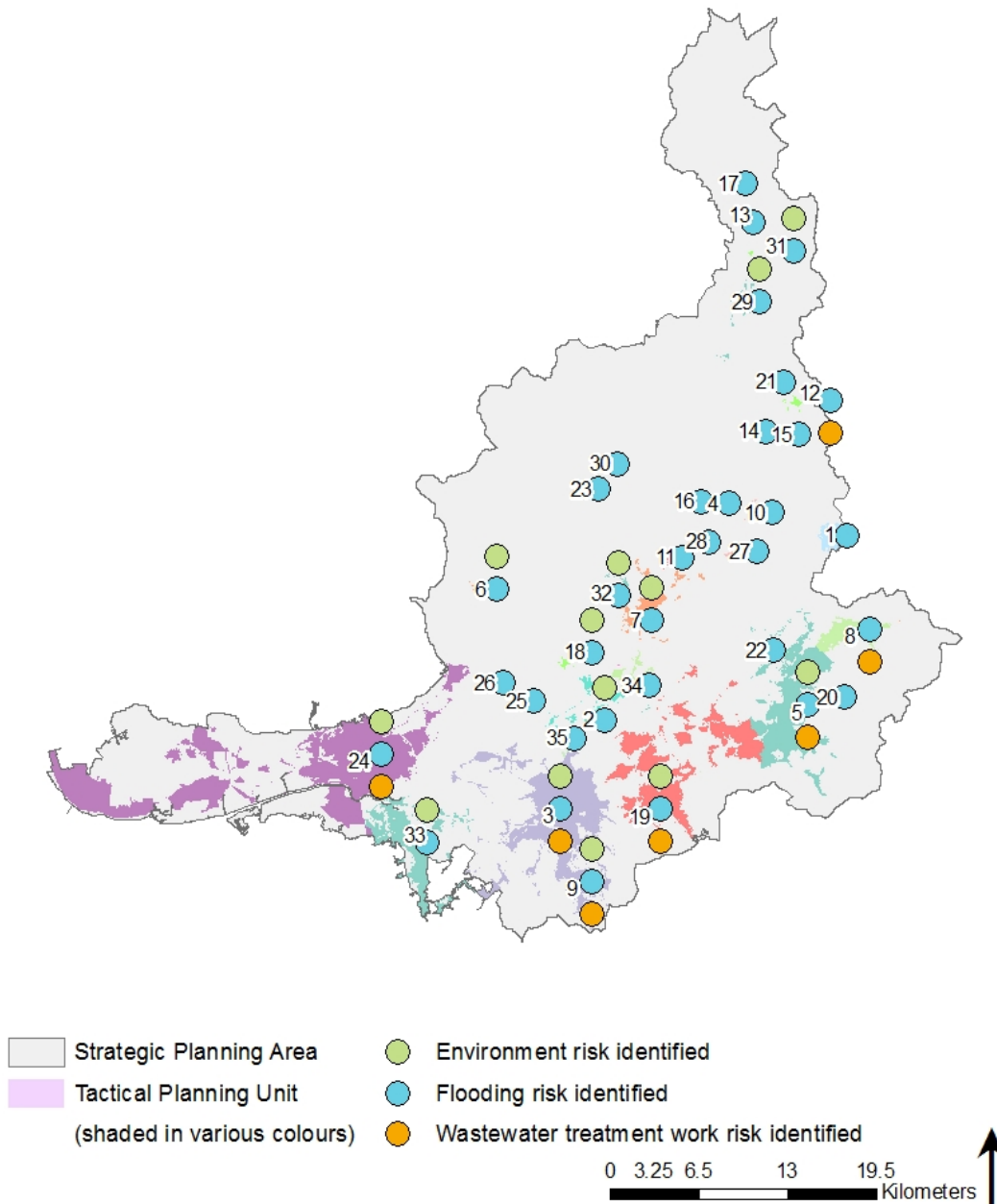
There are numerous TPUs which did not trigger for RBCS across any of the categories and are therefore not shown in Figure 5. A list of these TPU's can be found in Table A.2 in the Appendix. Environmental and flooding categories are the most common within the Ribble, which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (13/47) – Environment; and
- External Sewer Flooding - (35/47) – Flooding.

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

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

The TPU names corresponding to the numbers in the map can be found in Table A.1 in the Appendix. Those not triggered in RBCS can be found in Table A.2 in the Appendix.



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 Ribble 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
Barnoldswick						
Billington						
Blackburn						
Bolton-By-Bowland						
Burnley						
Chipping						
Clitheroe						
Colne						
Darwen						
Gisburn						
Grindleton						
Halton Place						
Halton West Ribble						
Hellifield						
Helwith Bridge						
Holden						
Horton-In-Ribblesdale						
Hurst Green						
Hyndburn						
Lanebottom						
Long Preston						
Newchurch-In-Pendle						
Newton-In-Bowland						
Preston						

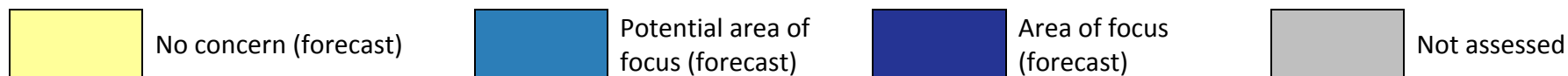
BRAVA	
	No concern (forecast)
	Potential area of focus (forecast)
	Area of focus (forecast)
	Not assessed/not applicable

Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Ribchester						
Ribchester Hospital						
Rimington						
Sawley						
Settle						
Slaidburn						
Stainforth						
Waddington						
Walton-Le-Dale						
Whalley						
Wilpshire						

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

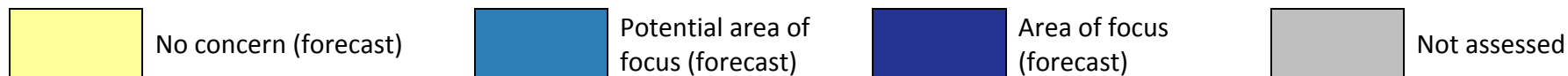
Table 3 Flooding BRAVA results

Key



Tactical Planning Unit	Flooding													
	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	
Barnoldswick	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
Billington	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	
Blackburn	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Blue	Blue	Blue	
Bolton-By-Bowland	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Blue	
Burnley	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Blue	Yellow	
Chipping	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Blue	Blue	Blue	Yellow	
Clitheroe	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Blue	
Colne	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	
Darwen	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Blue	
Gisburn	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Blue	Blue	Blue	Blue	
Grindleton	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	
Halton Place	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
Halton West Ribble	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	Blue	Blue	
Hellifield	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	Blue	Blue	Yellow	Yellow	Yellow	Yellow	
Helwith Bridge	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Grey	Grey	Grey	Grey	Grey	Yellow	
Holden	Grey	Grey	Grey	Grey	Grey	Grey	Blue	Grey	Grey	Grey	Grey	Grey	Blue	
Horton-In-Ribblesdale	Blue	Blue	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Blue	Blue	Blue	Yellow	

Key



Tactical Planning Unit	Flooding												
	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
Hurst Green	Dark Blue	Dark Blue	Dark Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Hyndburn	Dark Blue	Dark Blue	Dark Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Light Blue
Lanebottom	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Dark Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue
Long Preston	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Yellow	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Yellow
Newchurch-In-Pendle	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	Yellow	Dark Blue	Dark Blue	Dark Blue	Light Blue
Newton-In-Bowland	Light Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue
Preston	Dark Blue	Dark Blue	Dark Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Dark Blue	Light Blue
Ribchester	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Dark Blue
Ribchester Hospital	Light Blue	Light Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Rimington	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Light Blue
Sawley	Light Blue	Light Blue	Light Blue	Yellow	Yellow	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Settle	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Slaidburn	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Stainforth	Yellow	Yellow	Light Blue	Yellow	Yellow	Yellow	Yellow	Light Blue	Dark Blue	Light Blue	Dark Blue	Dark Blue	Yellow
Waddington	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Walton-Le-Dale	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Whalley	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Wilpshire	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Dark Blue	Dark Blue	Yellow

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater treatment works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Barnoldswick			
Billington			
Blackburn			
Burnley			
Chipping			
Clitheroe			
Colne			
Gisburn			
Hellifield			
Hurst Green			
Hyndburn			
Long Preston			
Newchurch-In-Pendle			
Preston			
Ribchester			
Sawley			
Settle			
Stainforth			
Waddington			
Walton-Le-Dale			
Whalley			
Wilpshire			

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
Barnoldswick			
Barnside			
Billington			
Blackburn			
Bolton-By-Bowland			
Burnley			
Chipping			
Clitheroe			
Colne			
Colne Greenfield House Farm			
Darwen			
Gisburn			
Grindleton			
Halton Place			
Hellifield			
Helwith Bridge			
Holden			
Horton-In-Ribblesdale			
Hurst Green			

Resilience	
	More resilient
	Less resilient
	Not assessed

Tactical Planning Unit	Resilience Assessment		
	Environmental	Flooding	Outfall locking
	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	
2050	2050	2020	
Hyndburn	More resilient	More resilient	Less resilient
Kingsmill	Less resilient	More resilient	Not assessed
Lanebottom	More resilient	More resilient	Not assessed
Laund farm	Less resilient	More resilient	Not assessed
Long Preston	Less resilient	Less resilient	Not assessed
Newchurch-In-Pendle	More resilient	More resilient	Not assessed
Newton-In-Bowland	More resilient	More resilient	Not assessed
Portfield Bar	More resilient	More resilient	Not assessed
Preston	Not assessed	Not assessed	Less resilient
Ribchester	Less resilient	Less resilient	Less resilient
Rimington	More resilient	More resilient	Not assessed
Sawley	Less resilient	Less resilient	More resilient
Settle	Less resilient	Less resilient	Less resilient
Slaidburn	More resilient	More resilient	Not assessed
Stainforth	Less resilient	More resilient	Not assessed
Waddington	More resilient	More resilient	Not assessed
Walton-Le-Dale	Not assessed	Not assessed	Less resilient
Whalley	More resilient	More resilient	Less resilient
Wilpshire	Less resilient	More resilient	Not assessed
Wood Cottages	More resilient	More resilient	Not assessed

Resilience	
More resilient	More resilient
Less resilient	Less resilient
Not assessed	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 TPUs (largely based on BRAVA). Within the Ribble catchment, two TPUs were identified to be 'complex' based on problem characterisation, these were:

- Preston; and
- Blackburn.

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 different range of scenarios.

As a result of this assessment the Preston TPU has also been identified as having 'strategic growth'.

3.3.3 Preston

The Preston TPU is to the south west of the Ribble (Figure 6). The sewer network is over 2,600km long, and serves over 105,000 properties and a residential population of approximately 240,000 people. The watercourses in the area are all classed as 'moderate' under the Water Framework Directive (WFD) 2019.

The TPU is considered both a strategic and complex catchment. It is of strategic interest due to both its unusual network design with five distinct drainage areas, and also population growth, with a projected 13% increase in residential population by 2050. This could drive a significant amount of further development to meet housing need, and increase pressure on the network and wastewater treatment works.

Preston is a complex catchment as there are a number of storm overflows within the area, and uncertainty around medium and long term performance, particularly with regards to meeting future new targets. Alongside this the BRAVA process identified risks for internal flooding, external flooding, flooding of open spaces, pollution, sewer collapse, and blockages by 2050, with areas for further investigation highlighted in Figure 7.

The Government's Storm Overflow Discharge Reduction Plan (SODRP) was published in August 2022, which we have aligned with through both the Water Industry National Environment Programme (WINEP) and DWMP development. This could lead to significant changes and investment to both wastewater treatment works and the drainage network, to ensure protection of the environment and water quality.

Note: At the time of DWMP publication, the WINEP was not confirmed by regulators so is likely to change.

Figure 6 Map of the Preston TPU

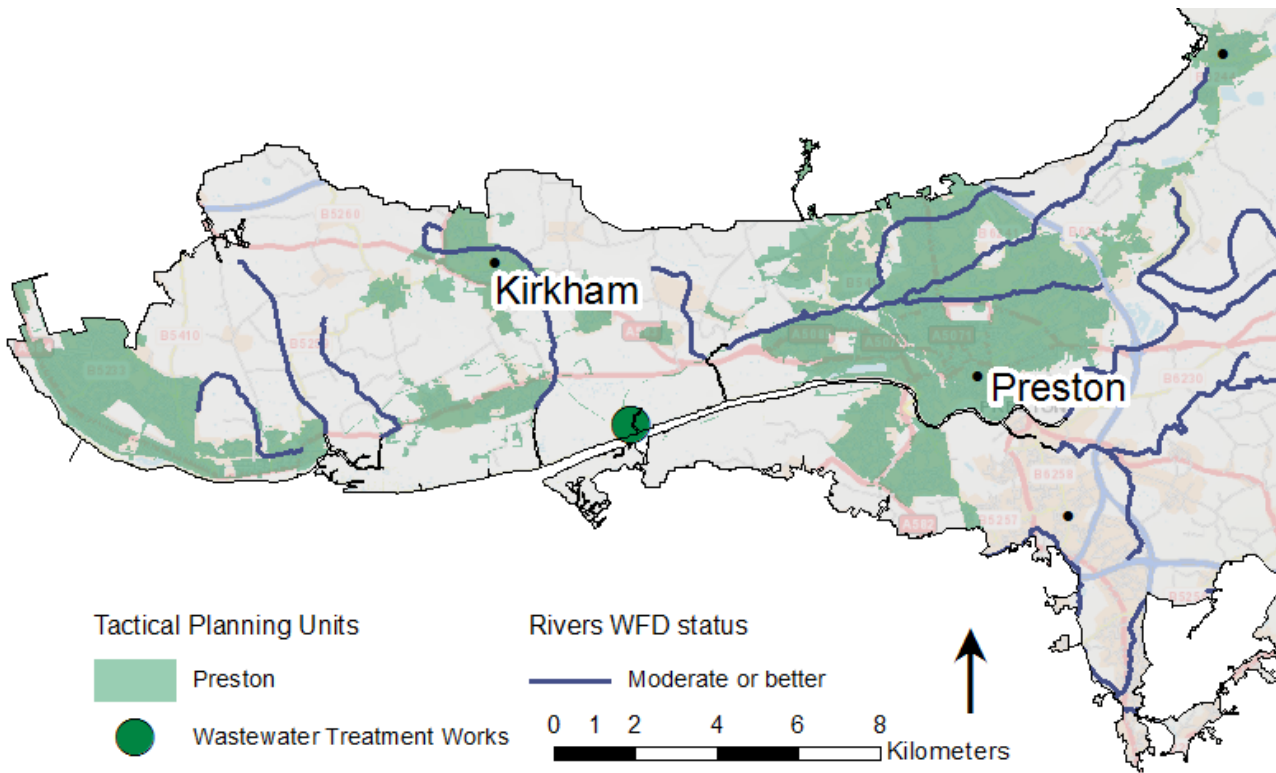
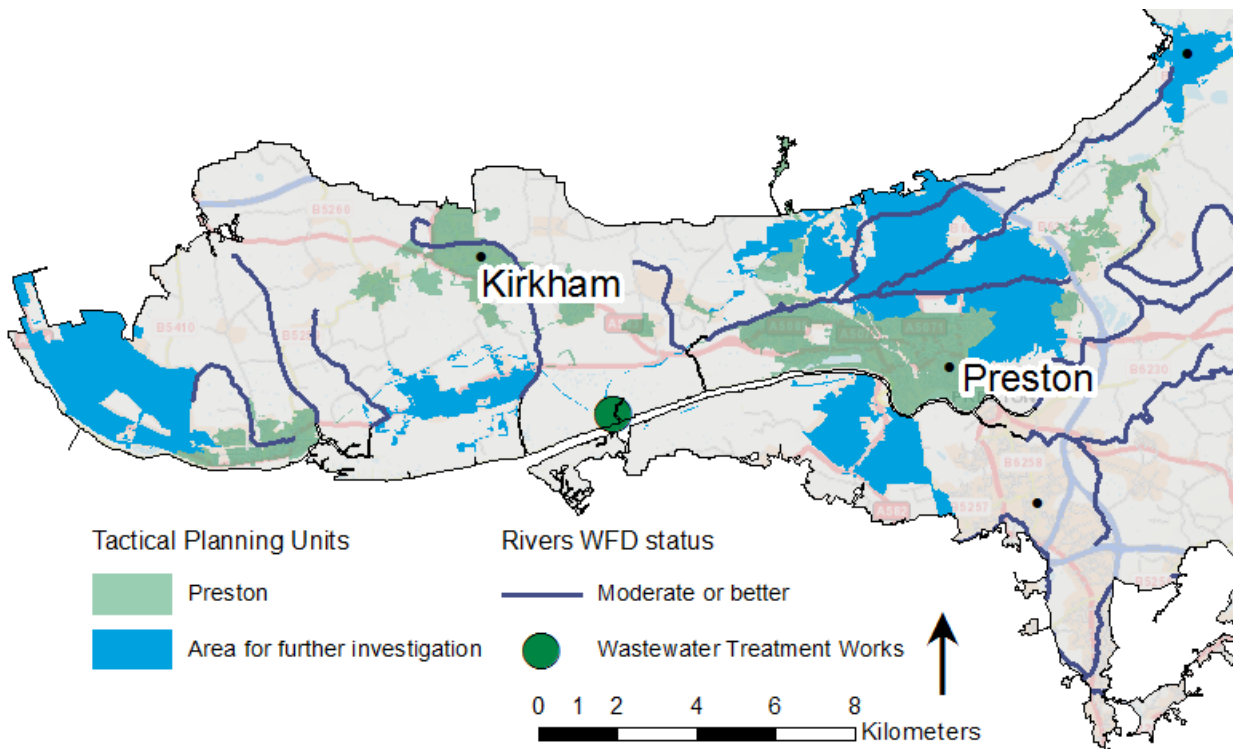


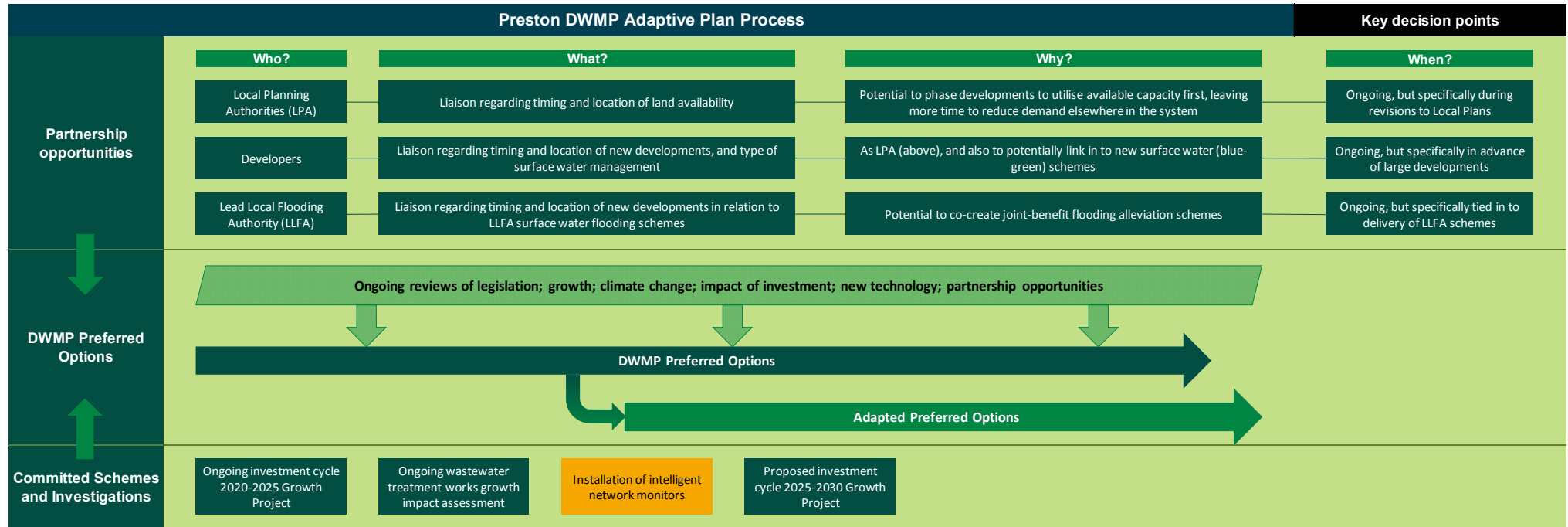
Figure 7 Map of the Preston TPU with areas for further investigation highlighted in blue



3.3.3.1 Preston adaptive plan

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

Figure 8 Preston adaptive planning process



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 Preston adaptive plan, reflecting the different option types identified as being appropriate for Preston. 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 Preston, 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:

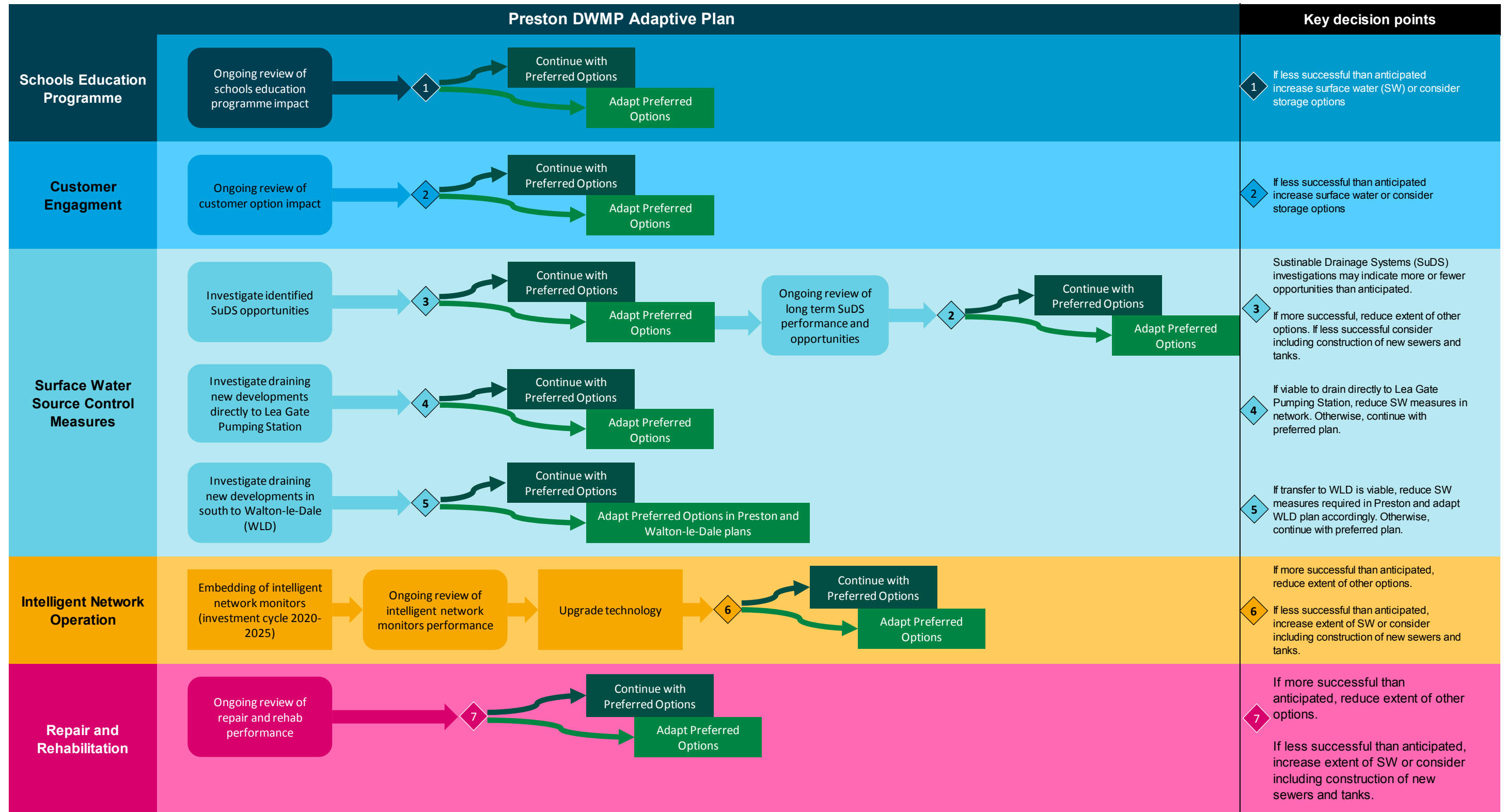
- Technical feasibility;
- Benefit of the work;
- Customer impact;

- Environmental impact; and
- Cost.

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 5.2).

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 5.2) until there is more certainty. It is, therefore, important that both the adaptive plan and the optimised plan are developed together.

Figure 9 Preston Adaptive Plan – Possible adaptive pathways as knowledge and opportunities change over time



3.3.4 Blackburn

The Blackburn TPU is to the south of the Ribble catchment (Figure 10). The sewer network is over 1,300km long, and serves over 50,000 properties and a residential population of approximately 128,000 people. The watercourses in the area are all classed as 'moderate' under the WFD 2019, apart from a section of the Darwen (between its confluence with Blakewater and its confluence with Roddlesworth).

The TPU is a complex catchment, with a number of storm overflows within the area, and uncertainty around medium and long term performance, particularly with regards to meeting future new targets. Alongside this the BRAVA process identified risks for internal flooding, external flooding, flooding of open spaces, flooding from 1-in-50-year storm events, pollution, sewer collapse, and blockages by 2050, with areas for further investigation highlighted in Figure 11. This is against a backdrop of a projected residential population increase of 12% by 2050, which could drive a significant amount of further development to meet housing need, and increase pressure on the network and wastewater treatment works.

The Government's Storm Overflow Discharge Reduction Plan (SODRP) was published in August 2022, which we have aligned with through both the Water Industry National Environment Programme (WINEP) and DWMP development. This could lead to significant changes and investment to both wastewater treatment works and the drainage network, to ensure protection of the environment and water quality.

Note: At the time of DWMP publication, the WINEP was not confirmed by regulators so is likely to change.

Figure 10 Map of Blackburn TPU

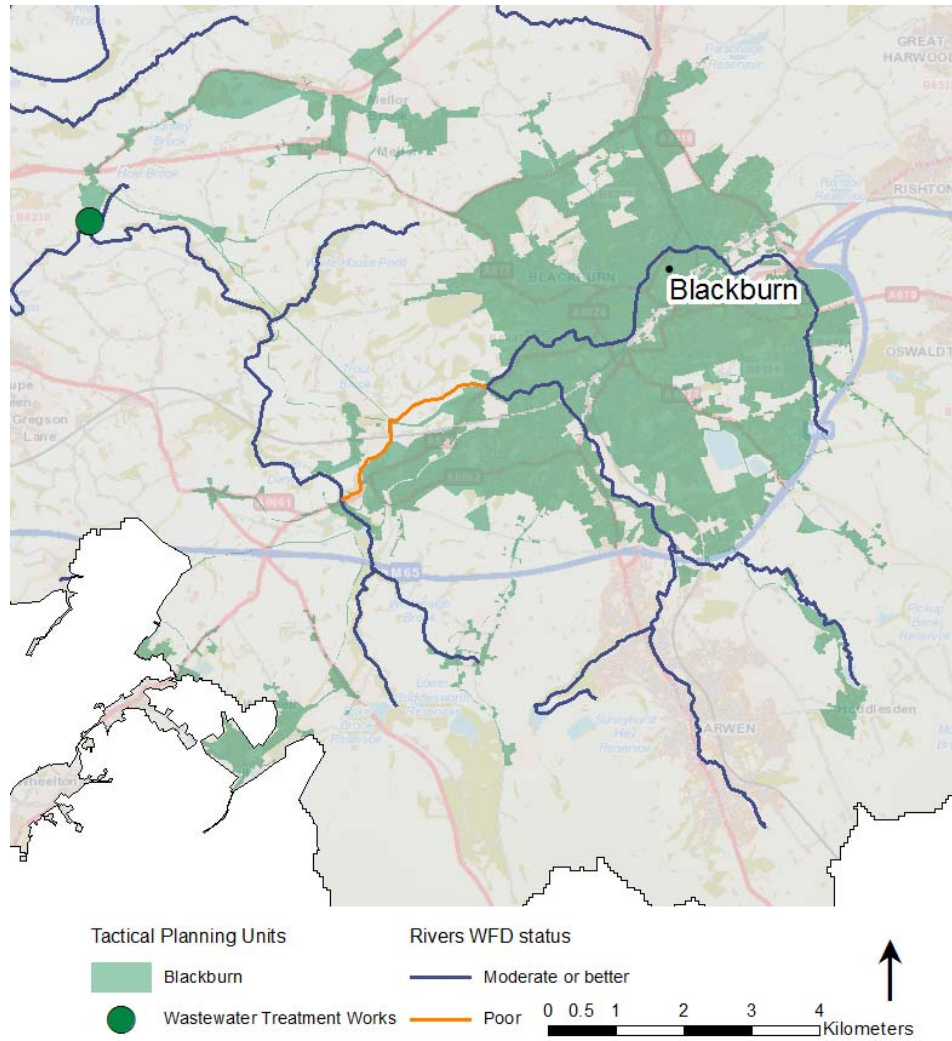
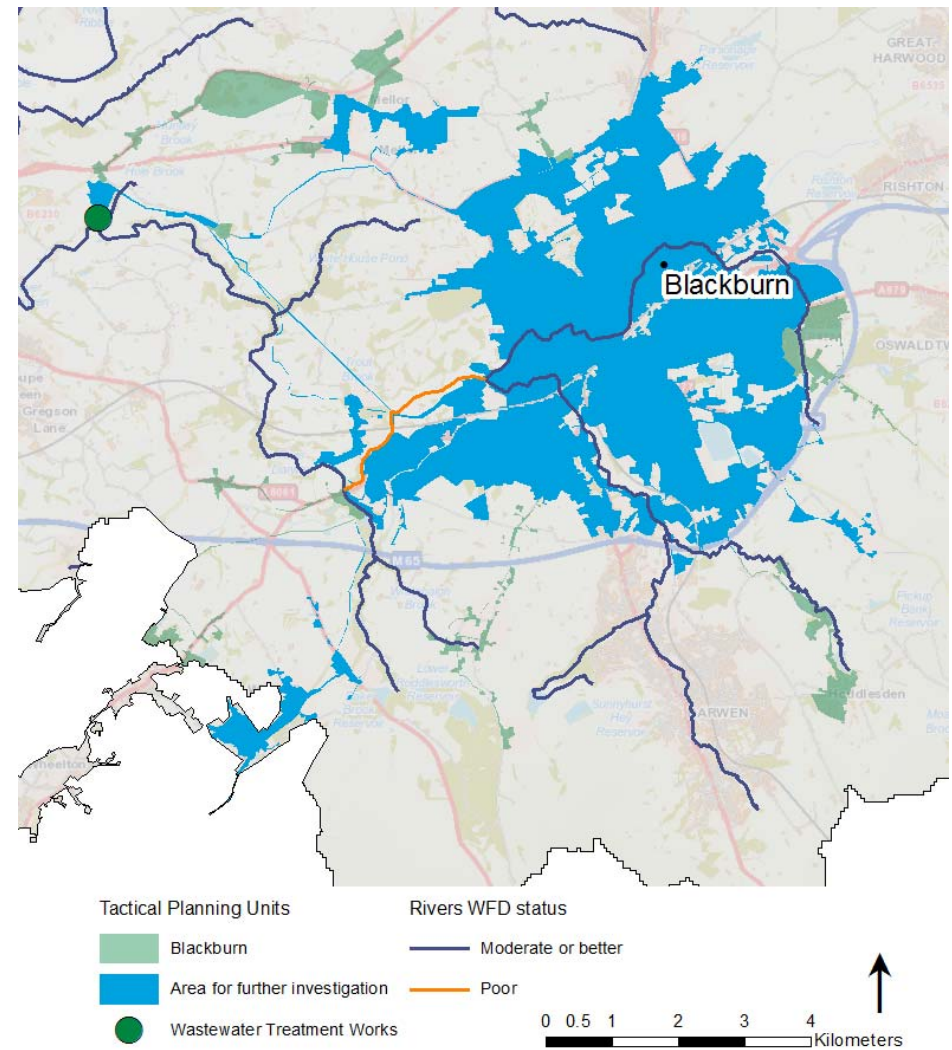


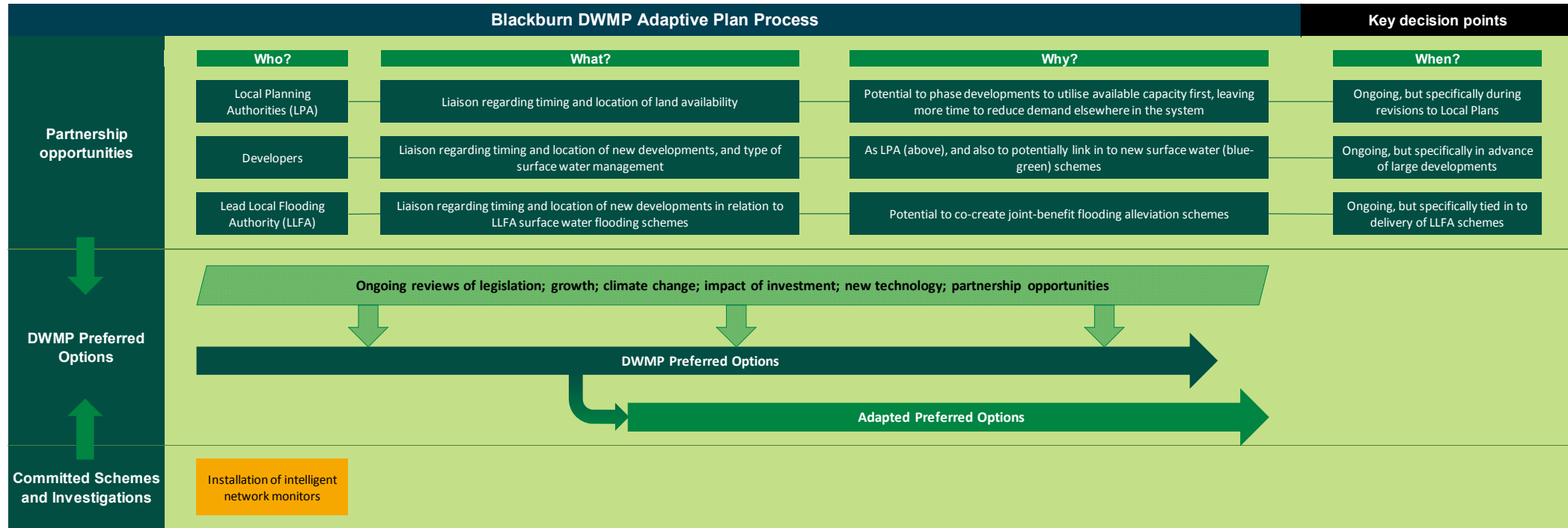
Figure 11 Map of the Blackburn TPU with areas for further investigation highlighted in blue



3.3.4.1 Blackburn adaptive plan

The first part of the adaptive plan process (Figure 12) highlights the importance of partnership working and regular data reviews.

Figure 12 Blackburn adaptive planning process



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 7.

Table 7 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 13 shows the second part of the Blackburn adaptive plan, reflecting the different option types identified as being appropriate for Blackburn. 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 Blackburn, 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:

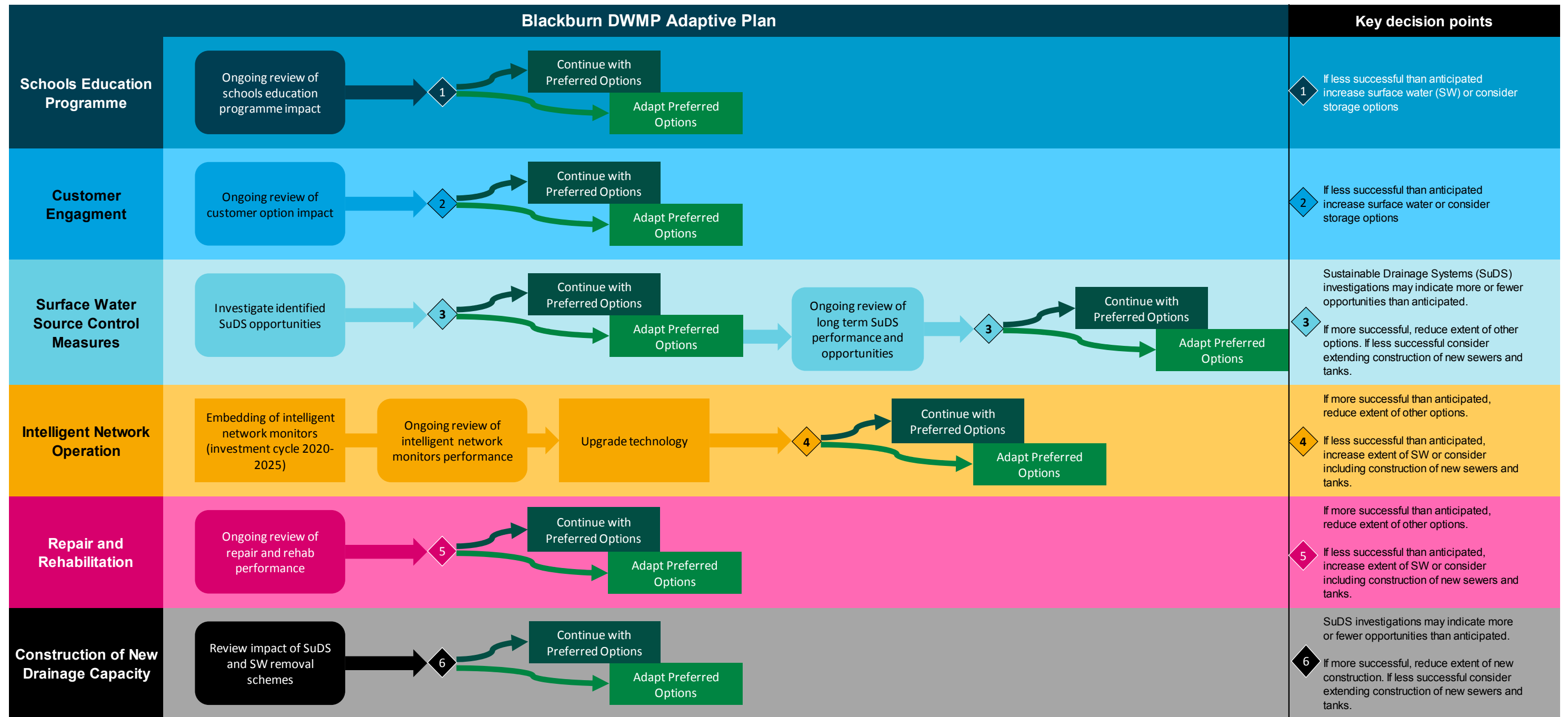
- Technical feasibility;
- Benefit of the work;
- Customer impact;

- Environmental impact; and
- Cost.

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 5.2).

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 12. The adaptive plan may contain potential investigations, which are currently excluded from the optimised DWMP plan (refer to section 5.2) until there is more certainty. It is, therefore, important that both the adaptive plan and the optimised plan are developed together.

Figure 13 Blackburn 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 14).

An options hierarchy was then used, which has been endorsed by customers and stakeholders from across the North West to select preferred solutions (Figure 15). 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 14 Options development process

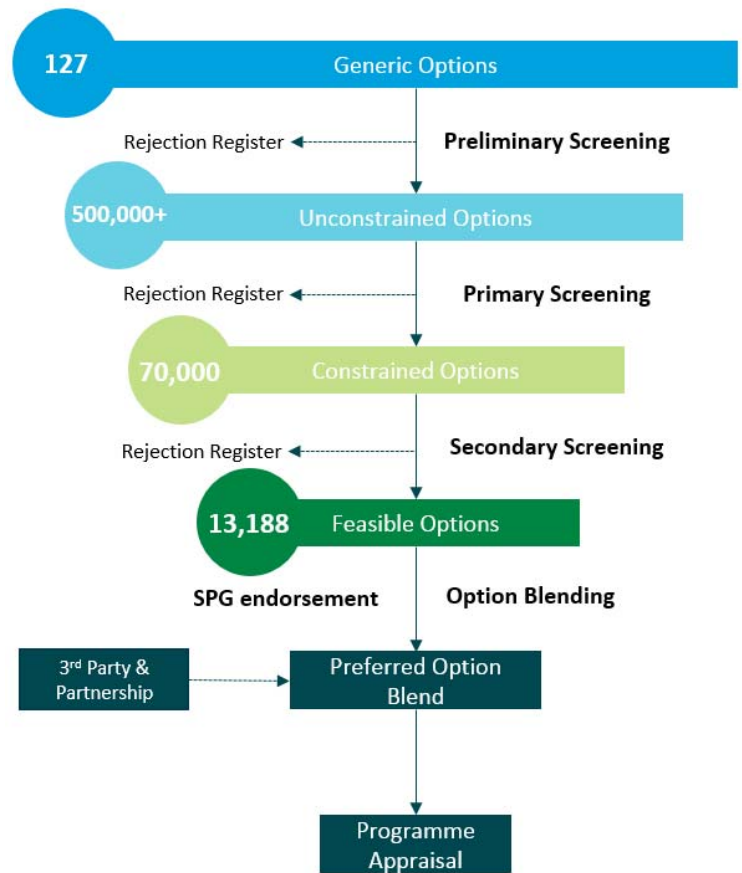
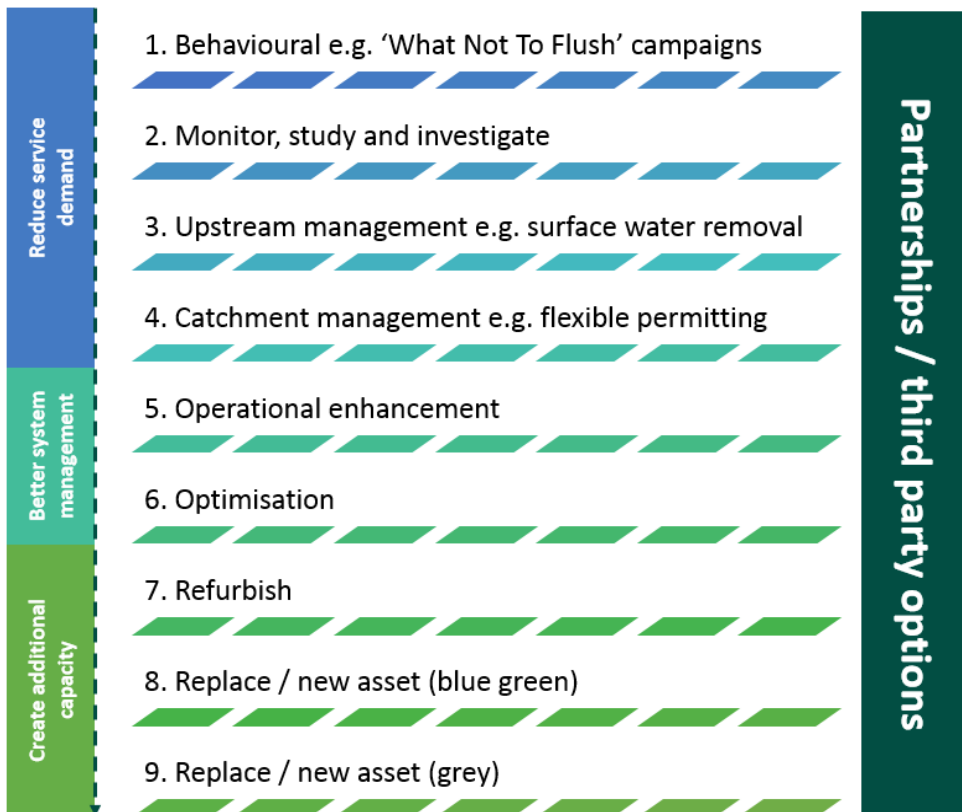


Figure 15 Options hierarchy



4.1 Ribble partnerships options

In order to identify and develop potential partnership options in the Ribble, 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.

The DWMP Partnership Opportunities Pipeline (PoP) 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 funded schemes at this time. However, they provide an indication of areas where we may be able to work collaboratively with stakeholders in the future when more certainty is available on need and funding.

From the initial suggestions made during the SPG workshops, the DWMP PoP has undergone various refinements as summarised below:

- Where possible, the potential partnership opportunities were mapped and this created over 1,000 opportunities for further investigation. The suggestions were screened depending on the opportunities timescales, proximity to UUW assets and the level of detail. This allowed UUW to refine the opportunities, which were believed to have the most potential;
- This refined list was presented back to the SPGs for updates, review and discussion. This further discussion allowed additional benefits to be identified and better mapping. This was particularly important for potential integrated drainage partnership opportunities as it helps to understand the holistic picture of the flooding mechanism. This refined the list further to approximately 500 potential partnership opportunities;
- Following the SPG events, we mapped the updated DWMP partnership opportunities against asset locations and UUW areas of interest e.g. flooding clusters and mutual natural flood management, to identify those most suited to the DWMP. This produced the list of key DWMP partnership opportunities; and
- The key list of opportunities have been reviewed against the wider DWMP options development process.

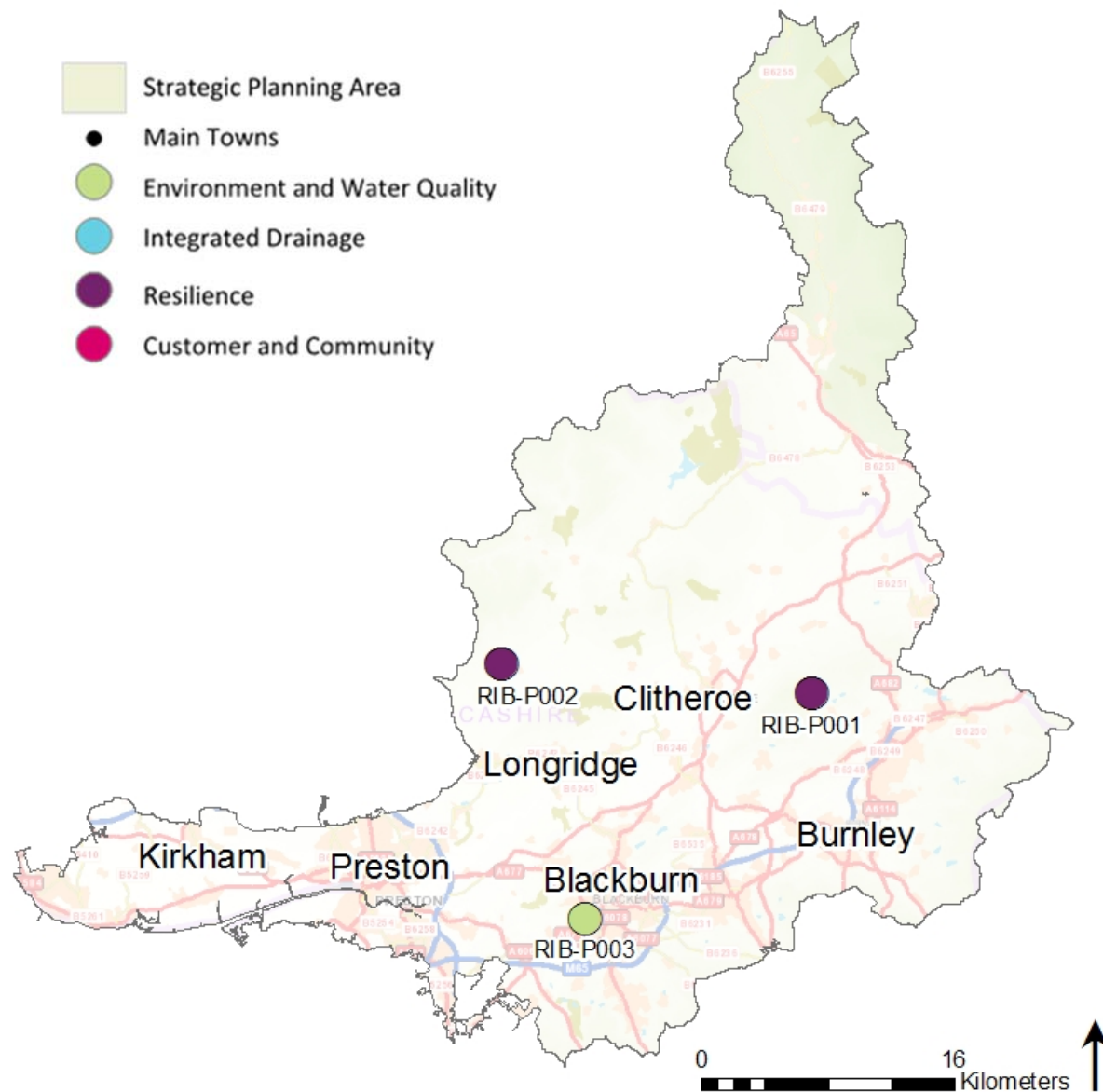
The remaining opportunities that did not make it into the key DWMP PoP, for example in areas with no wastewater assets, were captured in our organisation-wide partnership opportunity pipeline where they are considered alongside all other partnership opportunities. Another key reasons for opportunities not being included in the DWMP PoP is where projects may be more imminent as the DWMP is a longer-term plan.

Examples of potential partnership opportunities that were shared during the Ribble SPG workshops are shown in Figure 16.

We are further developing the organisation-wide partnership opportunity pipeline and are developing a central partnership prioritisation process which comprises of two elements; the partnership solution identification stage and a specific partnership assessment activity which aims to support decision making for partnership schemes against a set of specific criteria. This will allow UUW to harness scheme specific collaboration opportunities as 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 16 Overview of the potential partnership opportunities in the Ribble



ID	Partnership Opportunity	Theme	Organisation Type
RIB-P001	Natural flood management opportunities project	Resilience	Public Bodies
RIB-P002	Upstream Natural flood management opportunities project	Resilience	Non-Governmental Organisations
RIB-P003	Water quality improvement project	Environment and Water Quality	Public Bodies

Note: The above are suggestions made by stakeholders but not all of them meet DWMP criteria for potential partnership working. Suggestions made that do not meet DWMP criteria have been added to UUW companywide partnership pipeline for further consideration.

4.1.1 Wider partnerships within the Ribble catchment

Within the Ribble catchment, there are numerous challenges such as flood risk, water quality, climate change and population growth. In order to mitigate the risks and to protect both communities and the environment, there is an opportunity for partnership working. This is something that we have strongly supported in the past and will continue to support moving forwards both through the DWMP and other avenues within the business.

Figure 17 is an example of partnerships that we are proud to have been involved in, and an opportunity which is currently being developed in the Ribble catchment.

Figure 17 Chipping Natural Flood Risk Management case study

Chipping Natural Flood Risk Management

Background

Chipping Brook is a tributary of the River Loud, which in turn is a tributary of the River Hodder. The Hodder sub-catchment, located within the larger Ribble catchment, is an Area of Outstanding Natural Beauty with Sites of Special Scientific Interest (SSSI) dominating the North-West portion of the catchment (Bowland Fells).

We have carried out a catchment investigation into Chipping Brook and the River Loud (under the previous Water Framework Directive – WFD both were failing for phosphate) that sought to identify the fate of phosphorus loads in the catchment, and to identify the required measures for phosphorus management.

Project Details

The proposed project seeks to develop a catchment action plan, which is farmer owned, that will deliver Natural Flood Risk Management (NFM) and reduce diffuse pollution from Agriculture. It is separated into two stages a planning and development stage (with some demonstration delivery), before moving to a full delivery phase under AMP7.



Outcome

This would fulfil the Water Industry Natural Environment Programme (WINEP) requirements, as well as the objectives of RRT and the Catchment Based Approach (CaBA) partnership – Ribble Life.

5. Options for the Ribble

The DWMP's purpose is to provide a long-term view of potential interventions and opportunities up to 2050. We acknowledge that planning this far in the future can be uncertain. This is why it is important that the DWMP is also aligned with nearer term activities which could influence and change the trajectory of future risks and opportunities.

The success of the DWMP through investment across the North West will depend on continued and new partnership working which is at the heart of both the DWMP, and the development of the business plan for investment cycle 2025 – 2030 (also known as AMP8). We are aligned to ensure that decisions made support the continued growth of the North West for customers and communities, and allow the environment to thrive for future generations.

This section provides a high level overview of the potential benefits and investment that can be delivered across the North West through key activities such as the Water Industry National Environment Programme (WINEP) for investment cycle 2025 – 2030, longer-term measures identified through the DWMP, and other projects such as Better Rivers: Better North West which is our commitment to improving river health.

5.1 WINEP development

Note: At the time of DWMP publication, the WINEP was not confirmed by regulators so is likely to change. The WINEP data presented below aligns to the formal submission from U UW in January 2023.

The WINEP is a programme of works that is jointly developed between water companies and regulators to meet statutory requirements and deliver environmental improvements to customers and communities. It sets out how the water industry will contribute to improving the natural environment.

The water industry has undertaken significant investment in the last three decades to improve the water environment and thus aquatic life. The WINEP drives the largest investment programme in the water environment nationally. For investment cycle 2020 to 2025, it includes activities such as asset improvements, investigations, monitoring and catchment interventions.

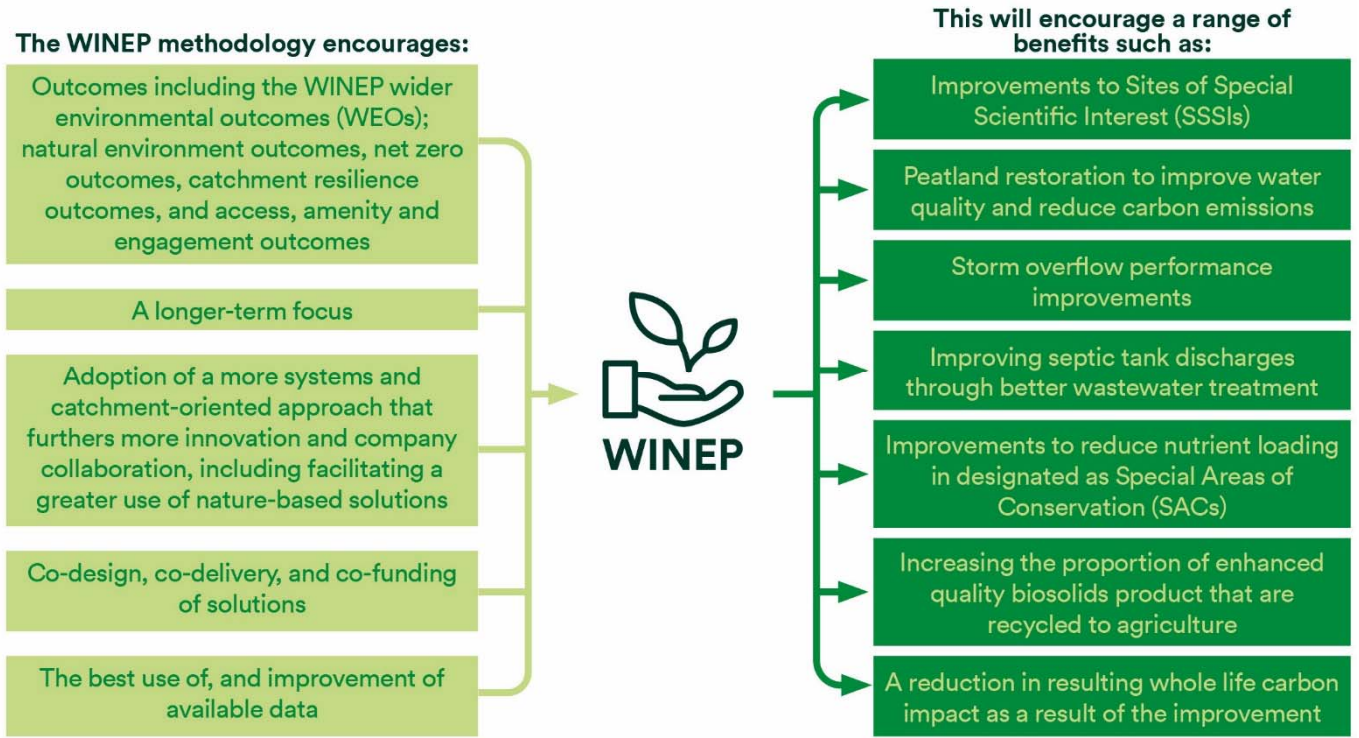
The next WINEP for investment cycle 2025 - 2030 (AMP8) is still to be confirmed (after the publication of the DWMP) and you will be able to find out more about what this means for the Ribble when we publish our AMP8 submission in autumn 2023.

Moving forwards, there is a collective ambition for the WINEP to deliver even more for the environment, for customers and for communities. This reflects society's high expectations and the UK government's ambition to leave the environment in a better state for the next generation.

As part of this, a large portion of the WINEP for the next investment cycle (2025 – 2030) aims to improve storm overflow performance. The programme has been designed to meet the Government's Storm Overflow Discharge Reduction Plan (SODRP) trajectory targets, address proven harm where we have been able to identify the best value solution and then the remainder includes action at the most cost effective overflows to achieve a reduction in spill frequency to around 20 spills per annum average by 2030. Subsequent investment periods will see further reductions in line with the Government requirements. The scale of transition required to meet the SODRP targets means that U UW will be delivering substantial WINEP investment programmes for the next 25 years.

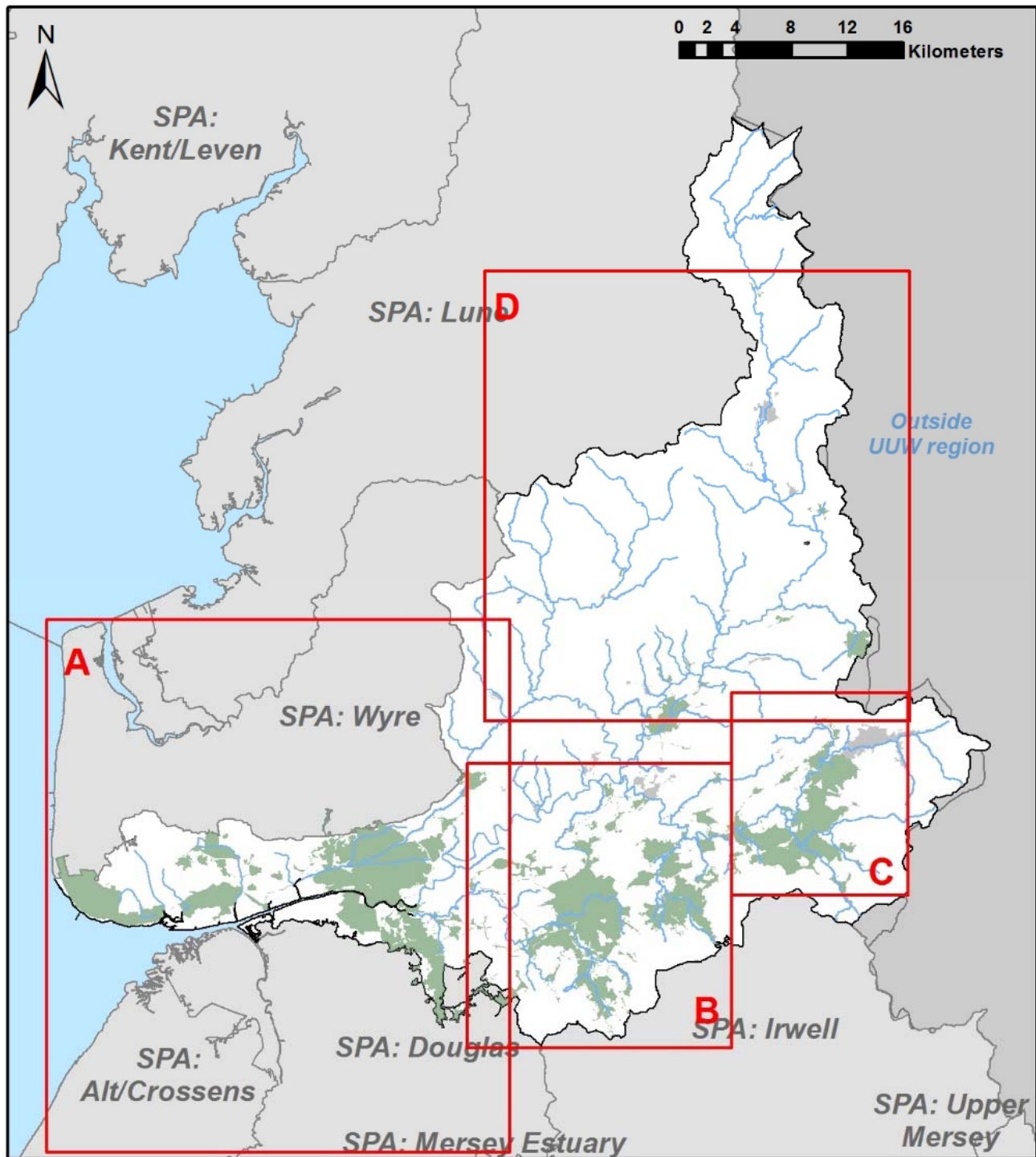
Figure 18 highlights some of the potential benefits as a result of the WINEP.

Figure 18 Potential benefits to the North West as a result of the WINEP



The WINEP will provide great opportunities to drive and deliver benefits across the North West region, and Figure 19 shows which locations within the Ribble have the potential for investment cycle 2025 – 2030 WINEP schemes, based on the January 2023 WINEP submission.

Figure 19 Potential WINEP investment in the Ribble for investment cycle 2025-2030



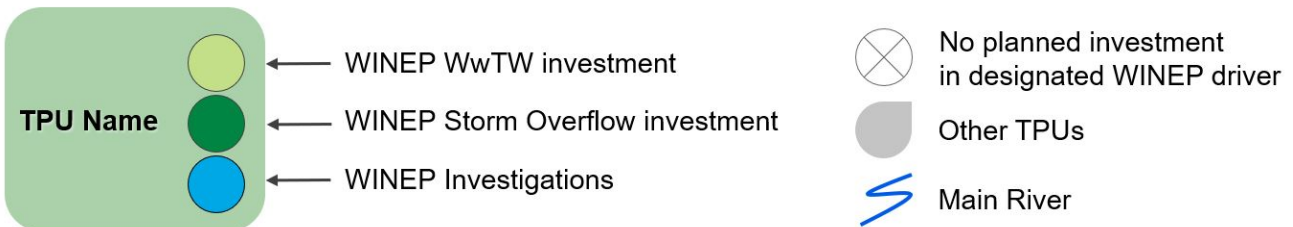
All potential WINEP interventions are subject to a regulatory decision making process that is ongoing at time of DWMP publication.

The inset box references in Figure 19 above refer to Figures 20 to 23 on the following pages.

Figure 20 Potential WINEP investment in the Ribble for investment cycle 2025-2030

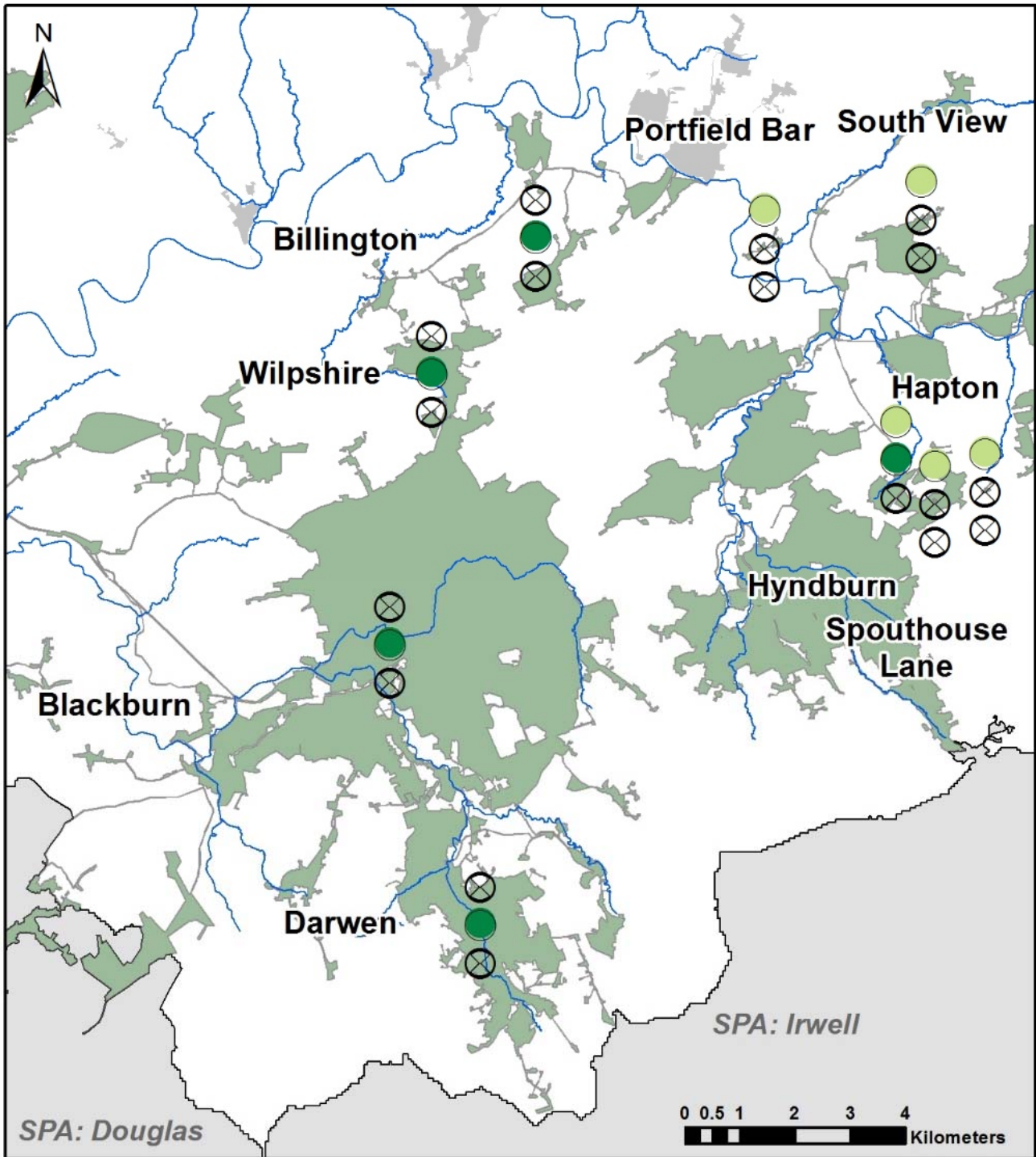


TPUs with WINEP driver investment



All potential WINEP interventions are subject to a regulatory decision making process that is ongoing at time of DWMP publication.

Figure 21 Potential WINEP investment in the Ribble for investment cycle 2025-2030

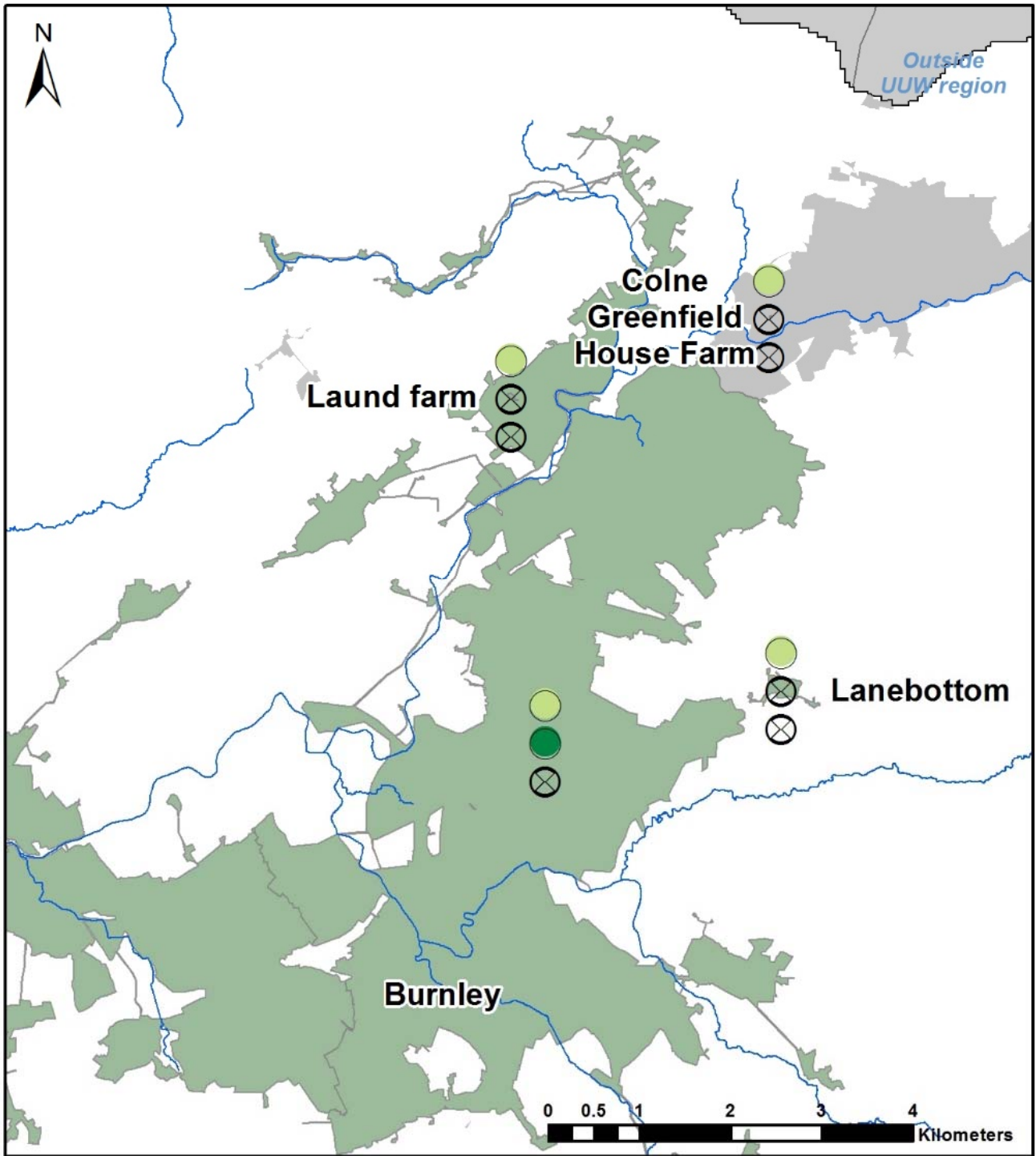


TPUs with WINEP driver investment

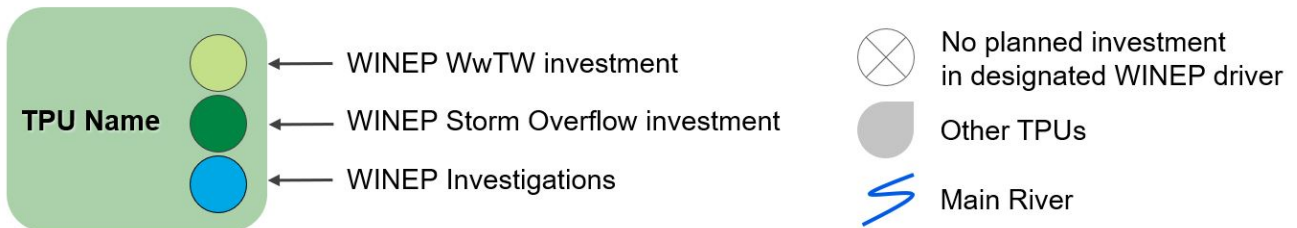
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<div style="display: flex; align-items: center; gap: 10px;"> <div style="width: 15px; height: 15px; background-color: #bdbdbd; border-radius: 50%;"></div> <div style="font-size: 10px;">Other TPUs</div> </div>		<div style="display: flex; align-items: center; gap: 10px;"> <div style="width: 15px; height: 15px; border-bottom: 2px solid #0070c0; border-left: 2px solid #0070c0; border-right: 2px solid #0070c0; margin-left: 5px;"></div> <div style="font-size: 10px;">Main River</div> </div>	

All potential WINEP interventions are subject to a regulatory decision making process that is ongoing at time of DWMP publication.

Figure 22 Potential WINEP investment in the Ribble for investment cycle 2025-2030

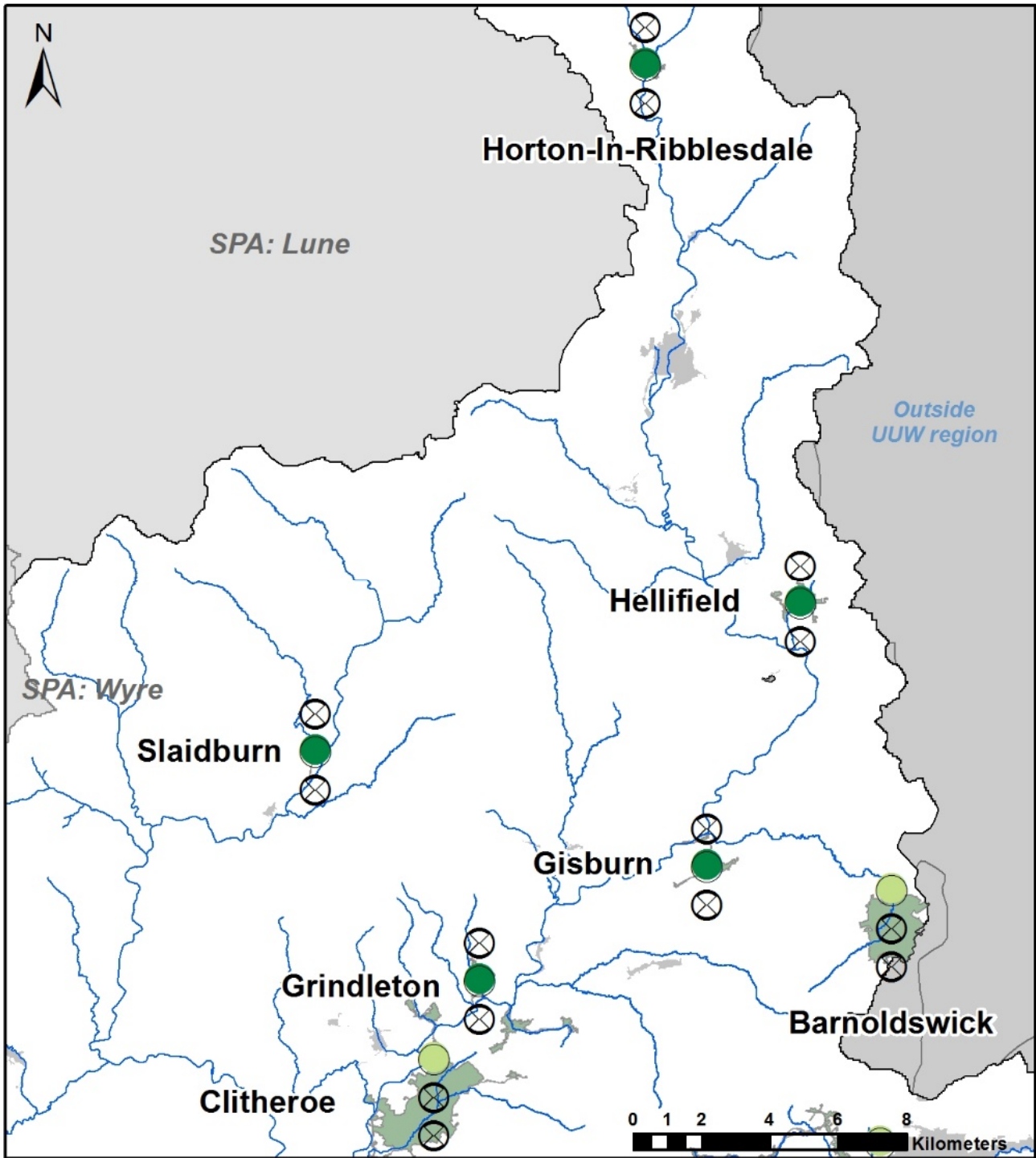


TPUs with WINEP driver investment

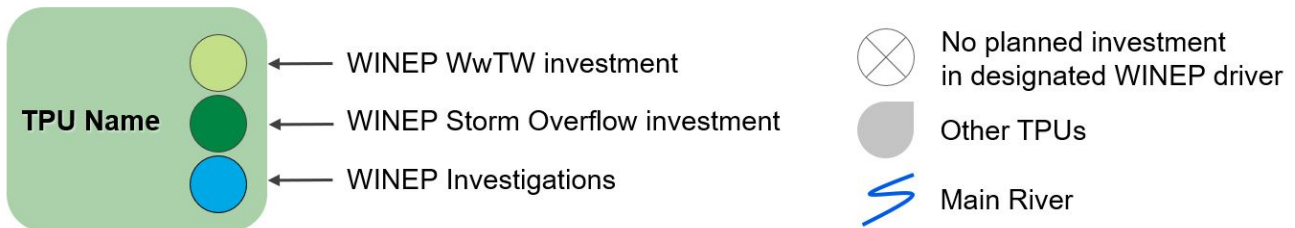


All potential WINEP interventions are subject to a regulatory decision making process that is ongoing at time of DWMP publication.

Figure 23 Potential WINEP investment in the Ribble for investment cycle 2025-2030



TPUs with WINEP driver investment



All potential WINEP interventions are subject to a regulatory decision making process that is ongoing at time of DWMP publication.

5.2 Options considered within the DWMP

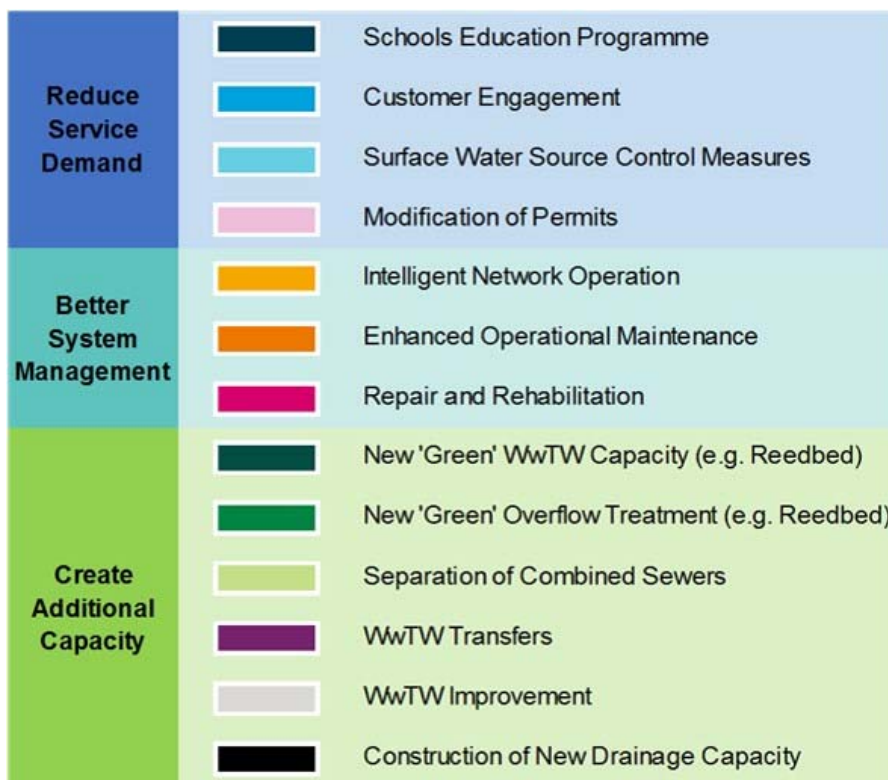
As highlighted above, the delivery of the WINEP will drive improvements and deliver benefits across the North West in the nearer-term. The DWMP is closely aligned with the ambitions and targets included within the WINEP, and included below are potential further enhancement schemes to be delivered over the next 25-years as part of the DWMP.

The development of the DWMP has utilised various data sources across the different stages of the plan, such as risk identification and BRAVA, partnership opportunities, and option development. This has allowed us to understand what options and interventions could be introduced to mitigate shared risks and harness opportunities for collaboration. This aspect of the DWMP is known as preferred options and has been developed using a decision support tool and by following the option hierarchy. The preferred options are high-level potential interventions up to 2050.

The development of the DWMP preferred options followed an iterative screening processes (outlined in section 4) which have been grouped into option types as shown in Figure 24. There are three main categories which are:

- ‘Reducing Service Demand’ which focusses on either reducing the amount of wastewater that is produced, or preventing it from reaching the sewer network;
- ‘Better System Management’ which focusses on managing and operating the existing assets in a more efficient or effective manner; and
- ‘Create Additional Capacity’ which focusses on 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.

Figure 24 Option types



Potential opportunities for investment as part of the DWMP can be summarised as:

- Level 1: Regional measures (section 5.2.1);
- Level 2: Options for the Ribble (section 5.2.2); and
- Level 3: Options for each location within the Ribble (section 5.2.3).

Across these three levels, there are numerous opportunities over the next 25 years for continued and new partnerships in addition to new innovative technology.

The following sections provides an overview of the outputs from the DWMP. This includes all potential interventions that could be undertaken over the next 25-years to deliver benefit to the North West under the assumption of unconstrained funding. Therefore, it is likely that the interventions implemented will vary.

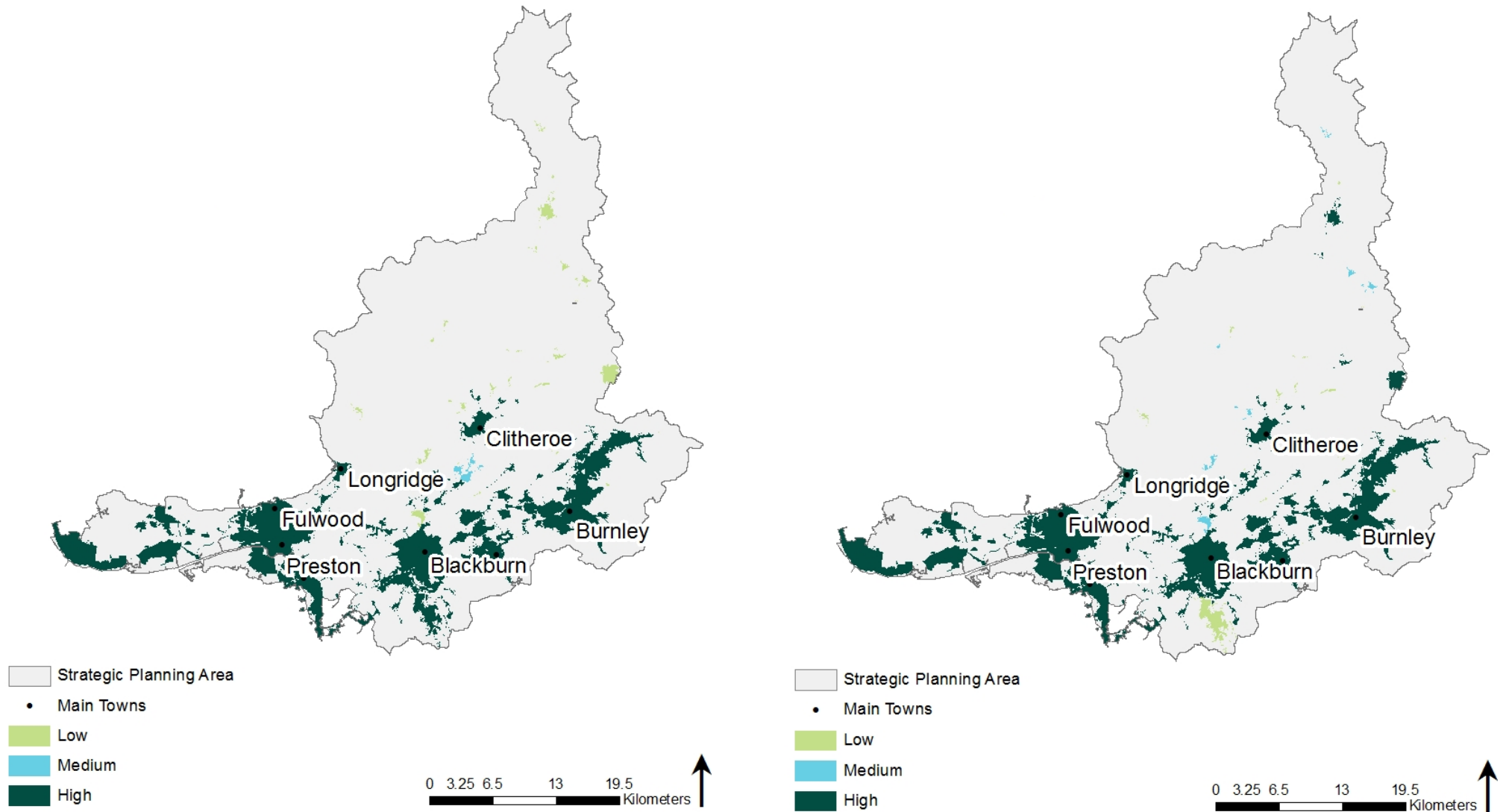
5.2.1 Level 1: Regional measures

Across the option types, 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 Ribble, customer engagement options (Figure 25) 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 Preston and Blackburn 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 in Blackburn, Walton-le-Dale and Burnley TPUs (Figure 25).

Figure 25 Maps showing the benefit of implementing regional customer engagement (left) and sustainable drainage solutions (right) options across the Ribble



5.2.2 Level 2: Options for the Ribble

The DWMP preferred options can also be summarised as the potential investment and associated benefits across the Ribble. These can be demonstrated by:

- The potential options to address environmental planning objectives as shown in Figure 26. This incorporates elements such as wastewater treatment work permit compliance, WINEP compliance and pollution of watercourses;
- The potential options to address flooding planning objectives as shown in Figure 27. This incorporates elements such as internal flooding, external flooding, highway and open space flooding and 1 in 50-year flooding; and
- The distribution of the potential options that could contribute to addressing the above planning objectives as shown in Figure 28.

Figure 26 Distribution of environmental investment by option type within the Ribble

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 surface water source control measures (e.g. SUDS), improvements in wastewater treatment works, and construction of new drainage capacity.

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

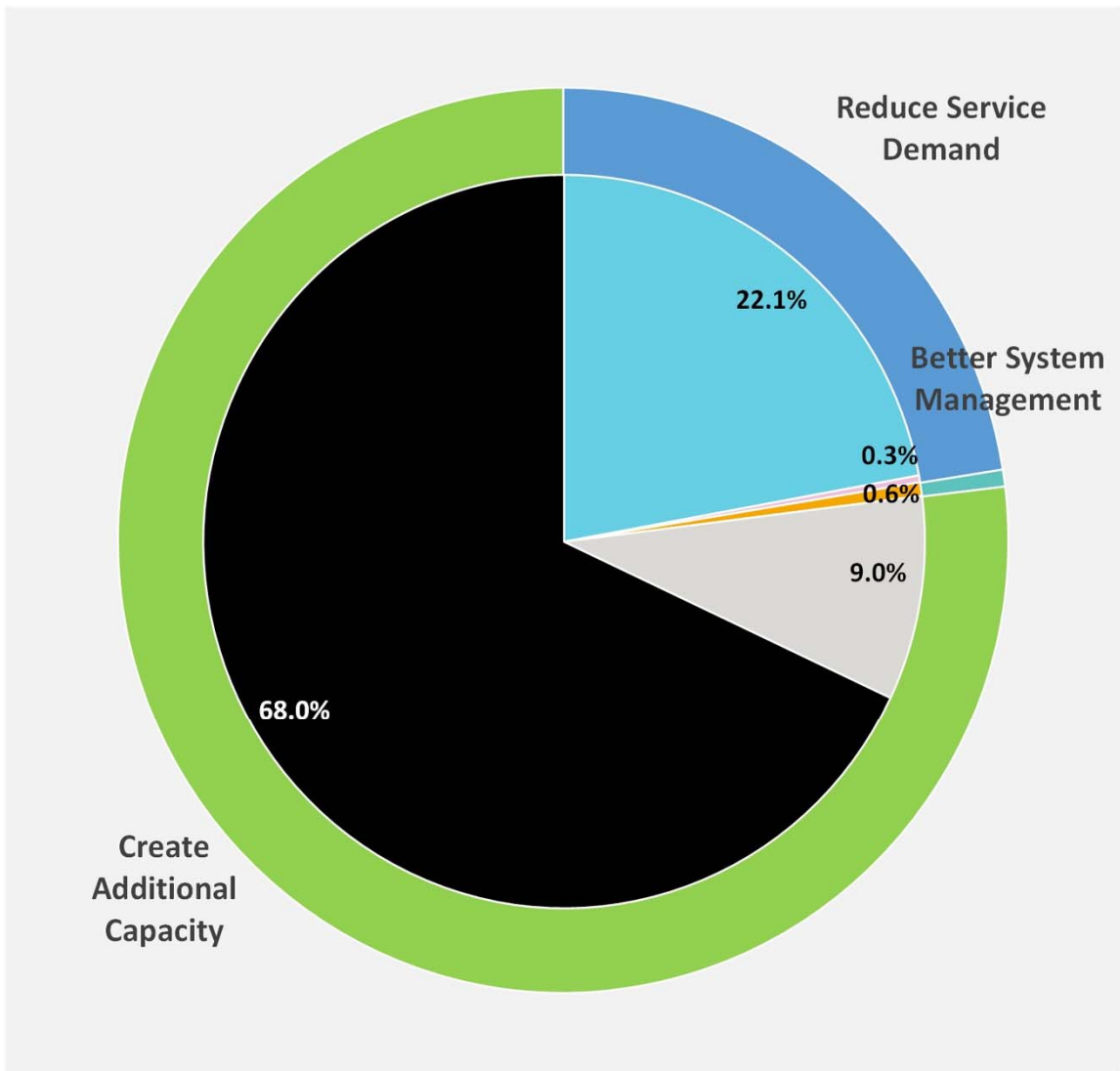


Figure 27 Distribution of flooding investment by option type within the Ribble

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

Around 10% of the investment could be in improving existing system management, with the remaining third targetted at the construction of new stormwater storage capacity, including the separation of existing 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
		

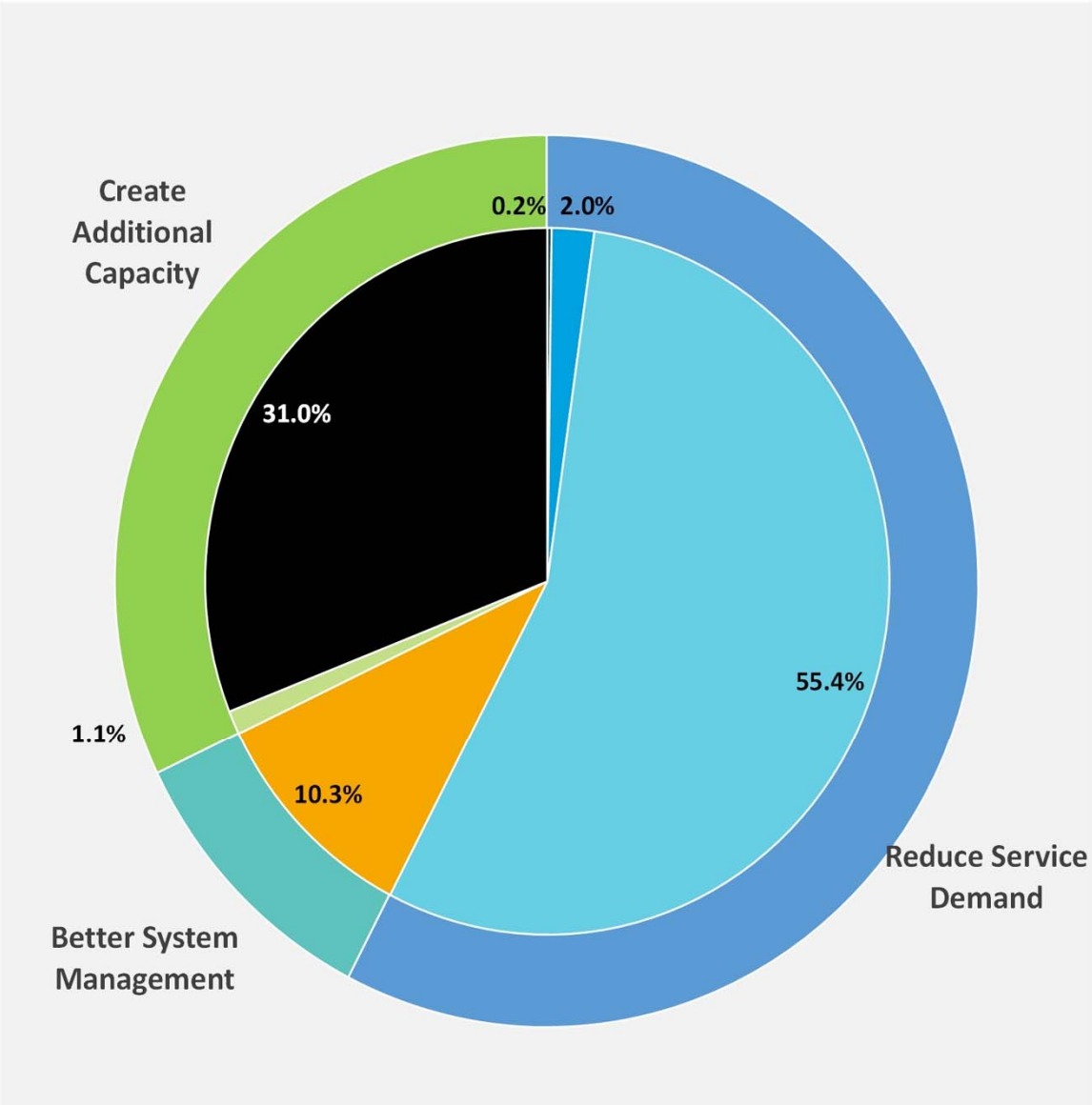
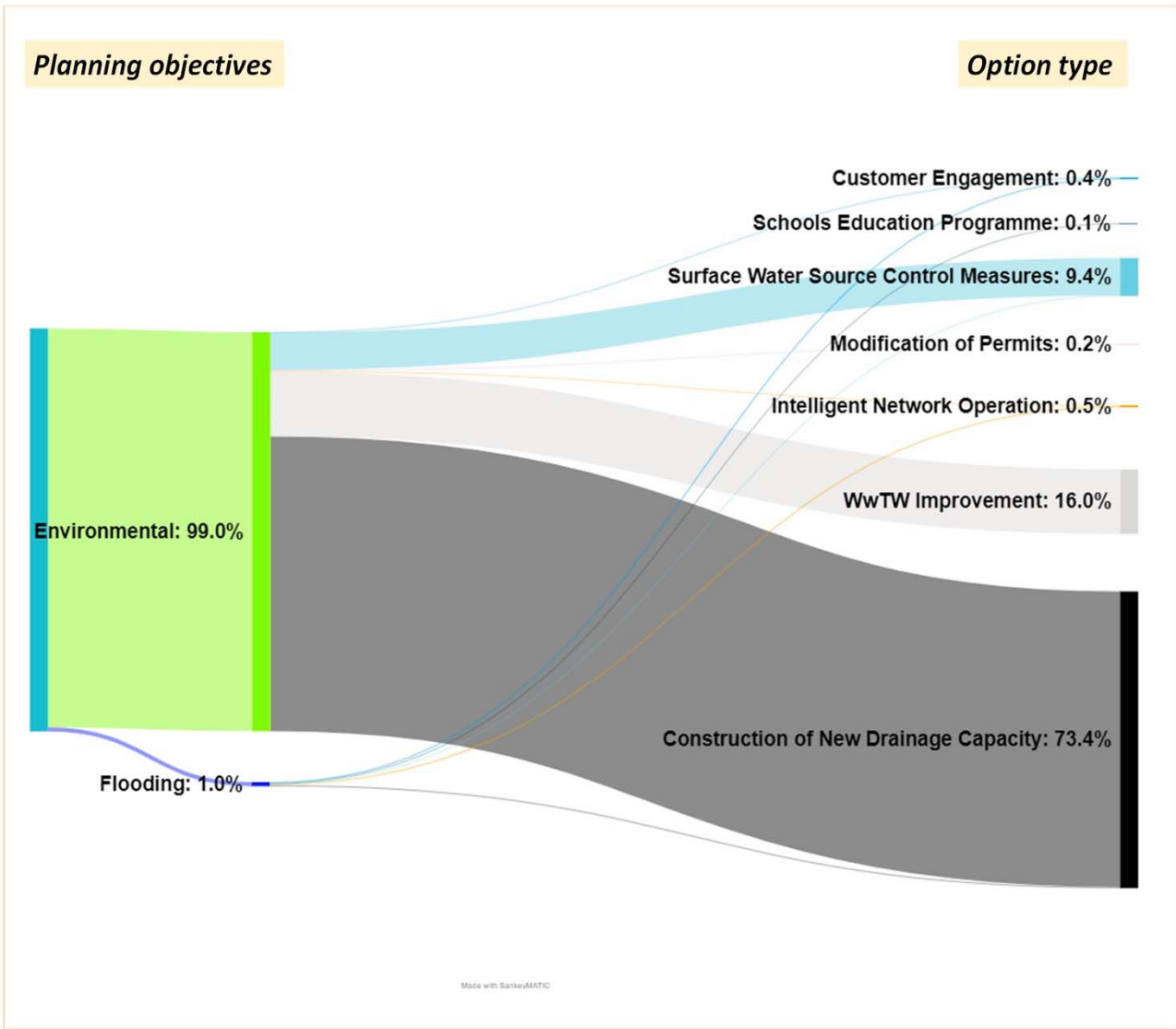
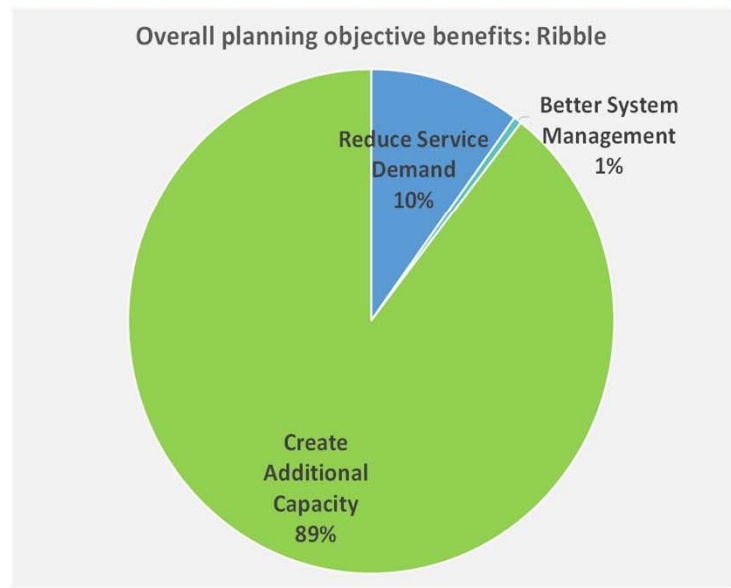


Figure 28 Distribution of benefit by option type within the Ribble

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

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

Environmental planning objectives could be met mainly through improvements to wastewater treatment works, stormwater storage capacity, and surface water source control measures (e.g. SUDS),

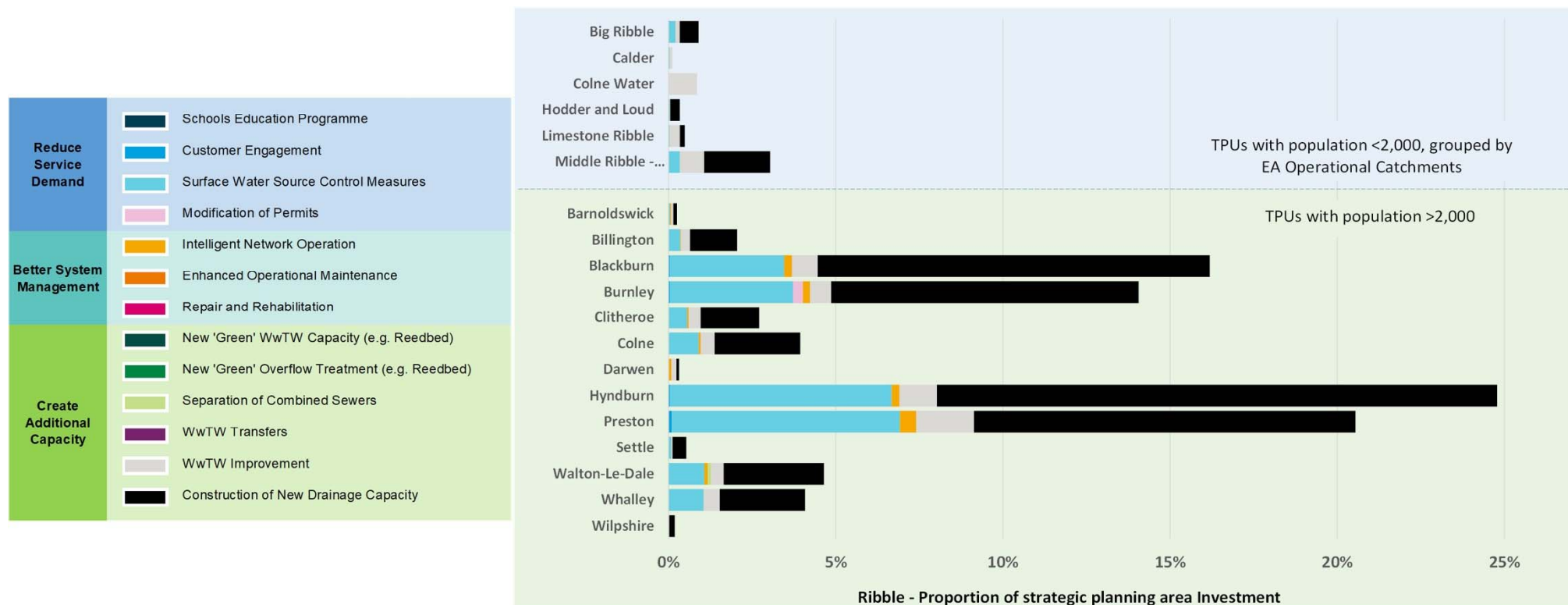


5.2.3 Level 3: Local options for each TPU within the Ribble

The proportion of the Ribble’s potential investment in each TPU, split up by option type, is shown in Figure 29. 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 sub catchment (Environment Agency Operational Catchment boundaries).

It can be seen that in the Ribble, the largest TPUs see the largest potential investment, which is split predominantly between surface water control, improved system management, and construction of new storm water storage tanks.

Figure 29 Proportion of investment seen in each TPU within the Ribble



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 will be seen long into the future. Other options such as school education, are continual programmes that will help to encourage long-term sustainable behaviours, such as reduction in water use.

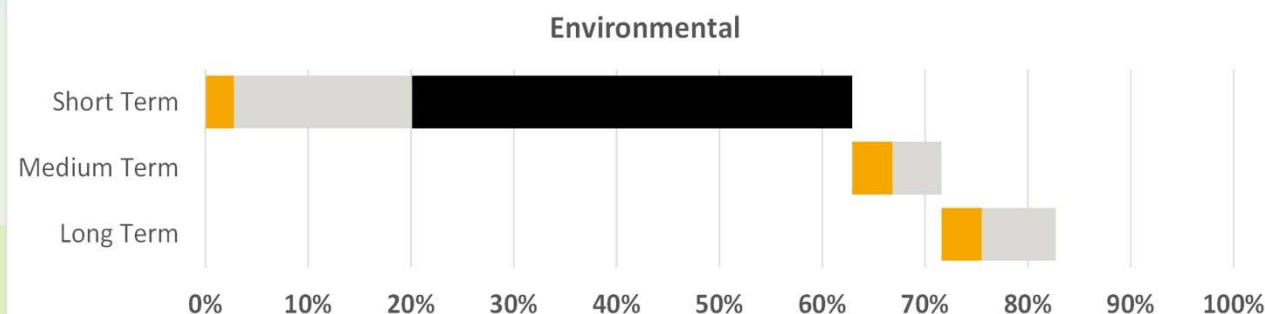
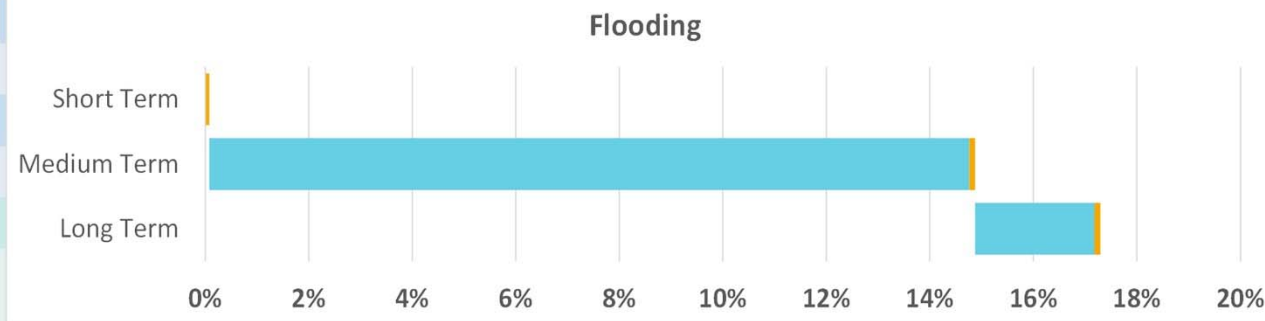
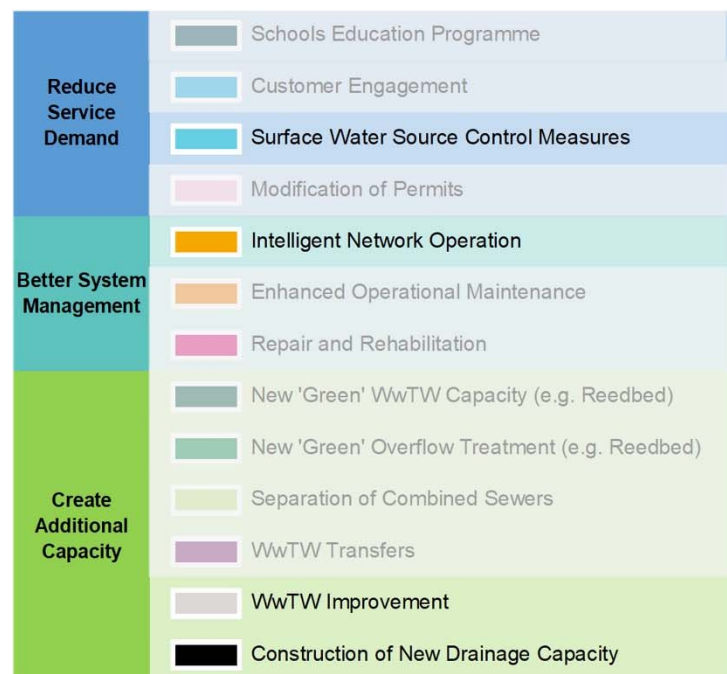
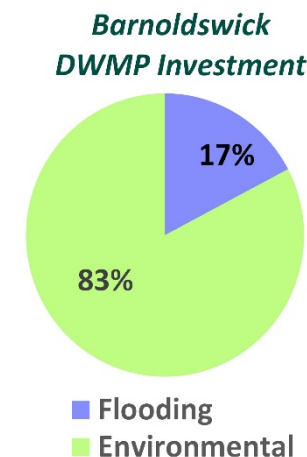
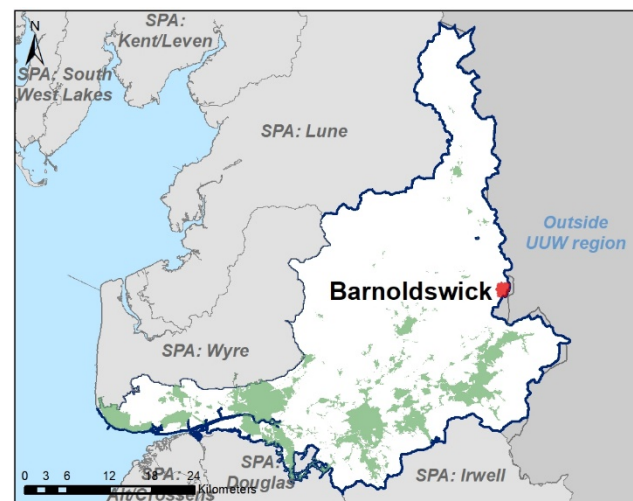
5.2.3.1 Barnoldswick

Figure 30 Details of the DWMP investment plan for Barnoldswick

The data on this page gives details of the investment plan for Barnoldswick TPU. The plan shows the geographic location of Barnoldswick within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



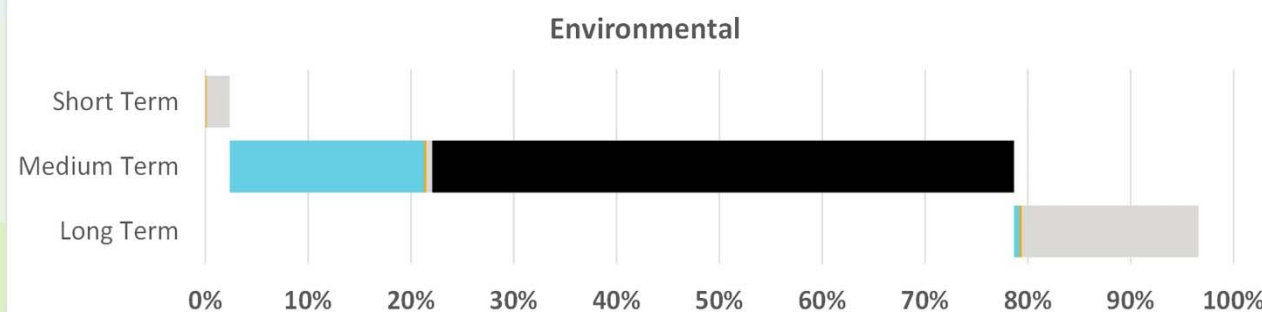
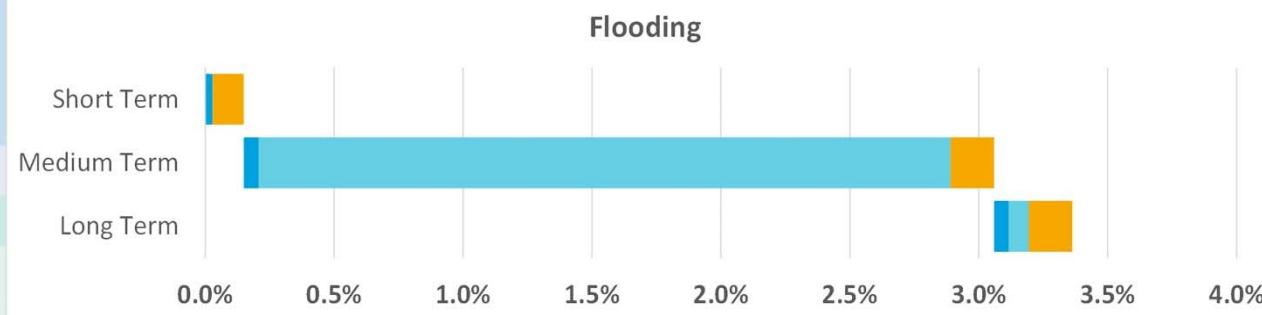
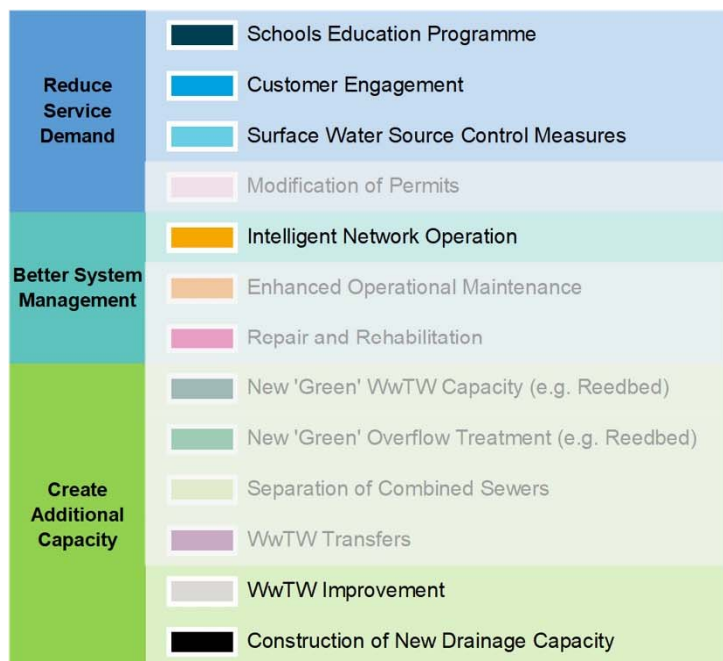
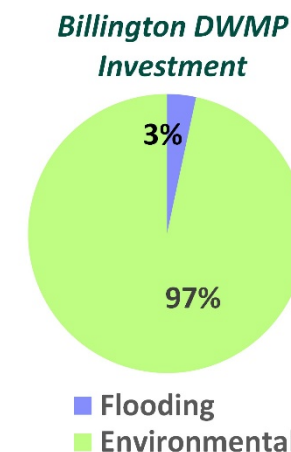
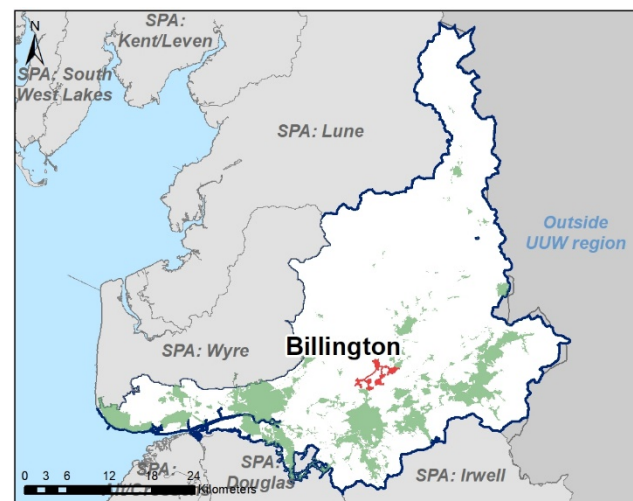
5.2.3.2 Billington

Figure 31 Details of the DWMP investment plan for Billington

The data on this page gives details of the investment plan for Billington TPU. The plan shows the geographic location of Billington within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



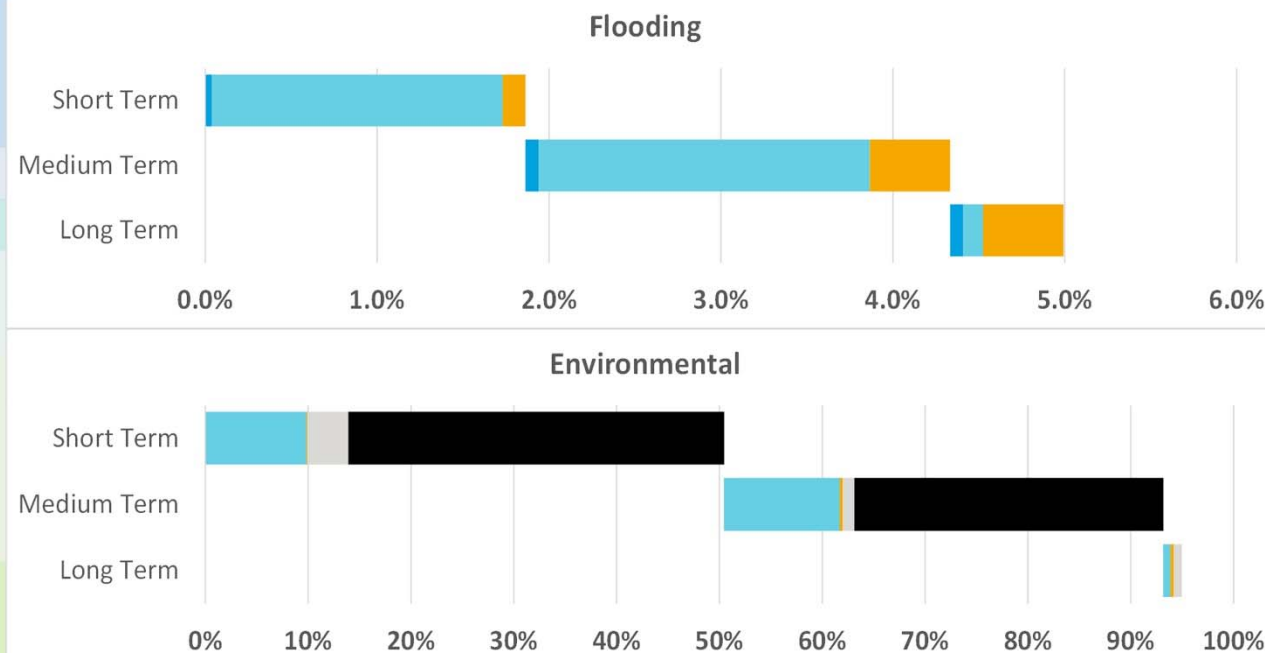
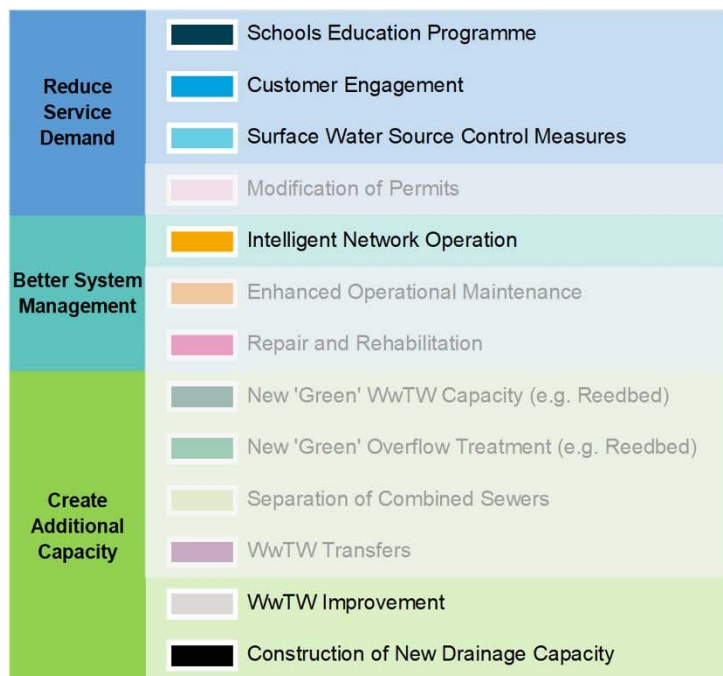
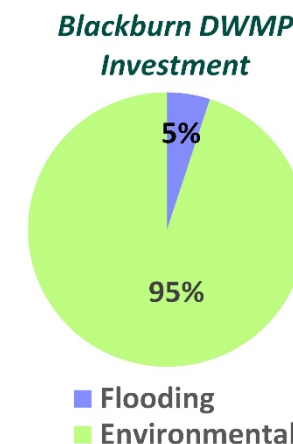
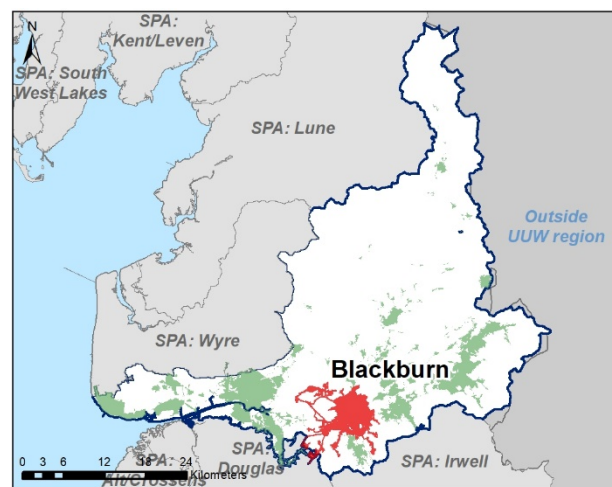
5.2.3.3 Blackburn

Figure 32 Details of the DWMP investment plan for Blackburn

The data on this page gives details of the investment plan for Blackburn TPU. The plan shows the geographic location of Blackburn within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



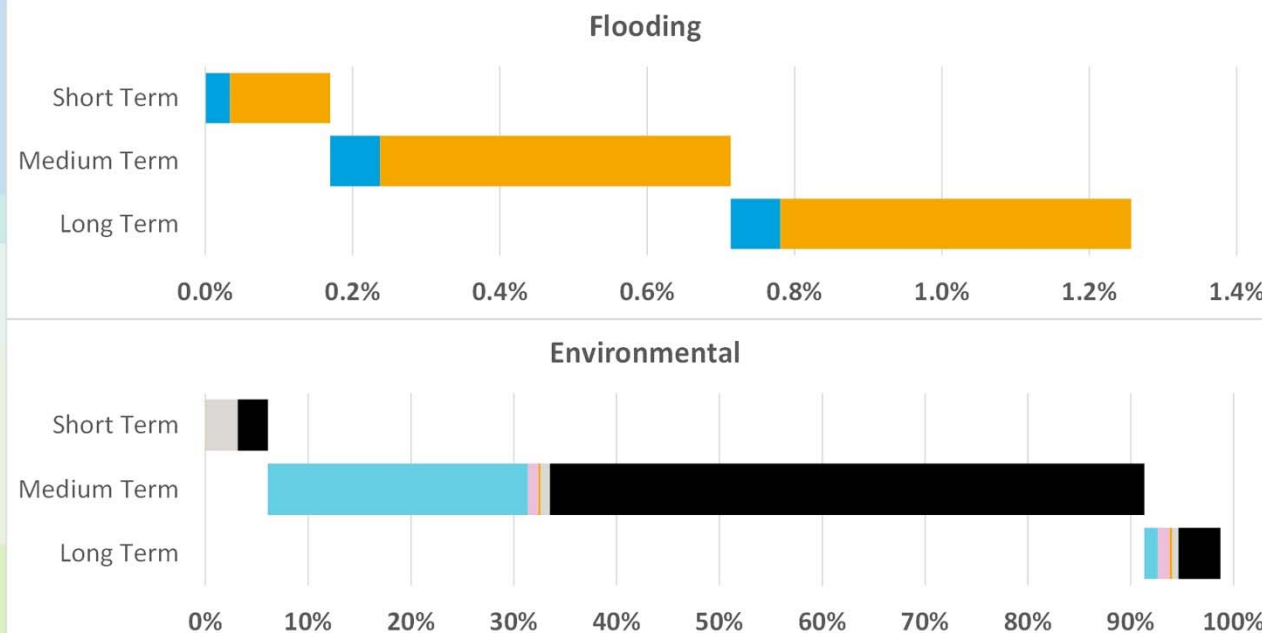
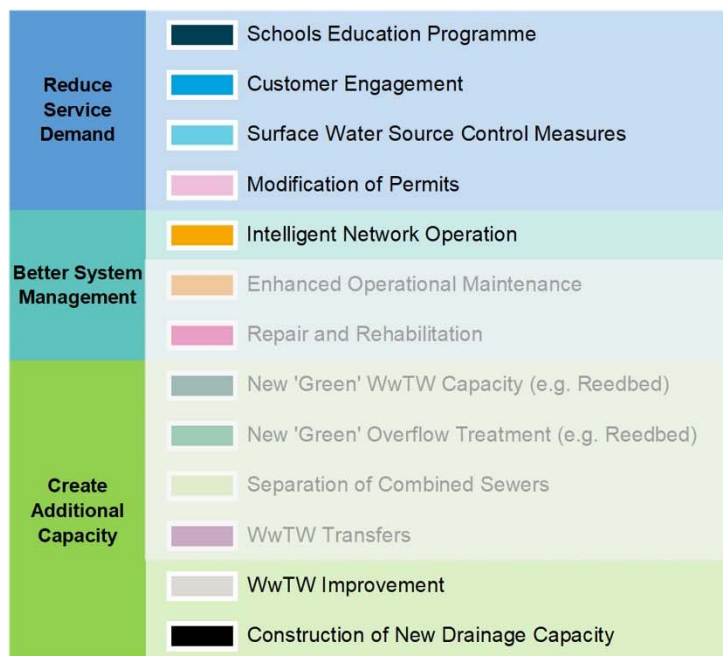
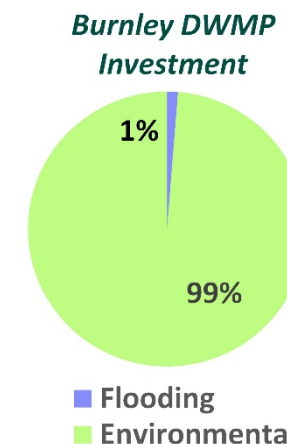
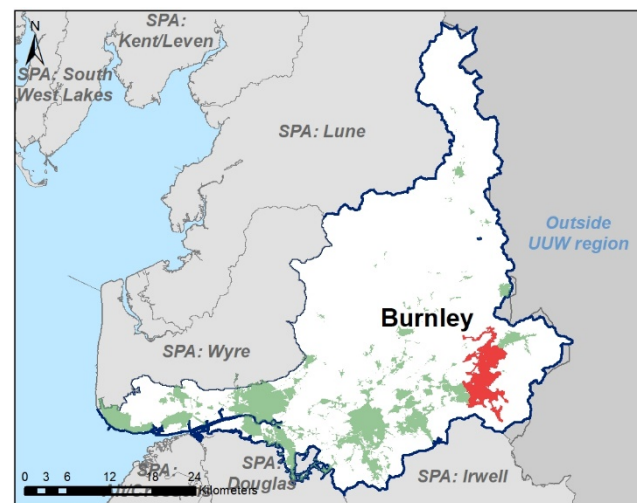
5.2.3.4 Burnley

Figure 33 Details of the DWMP investment plan for Burnley

The data on this page gives details of the investment plan for Burnley TPU. The plan shows the geographic location of Burnley within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



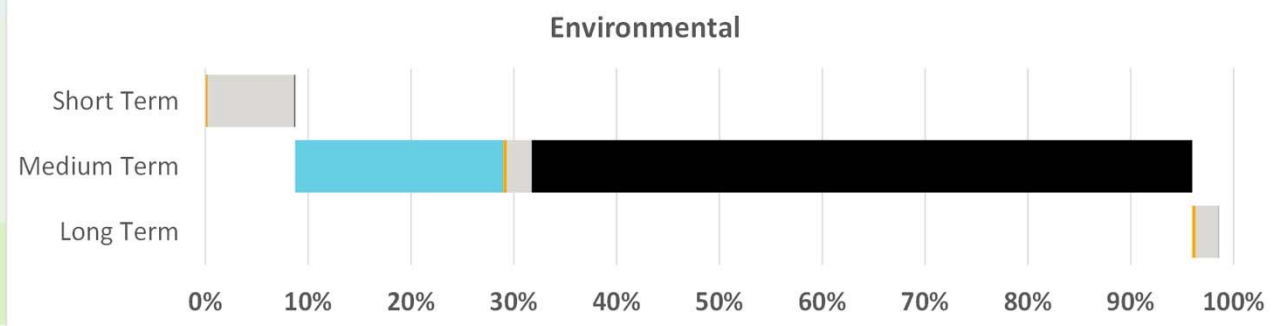
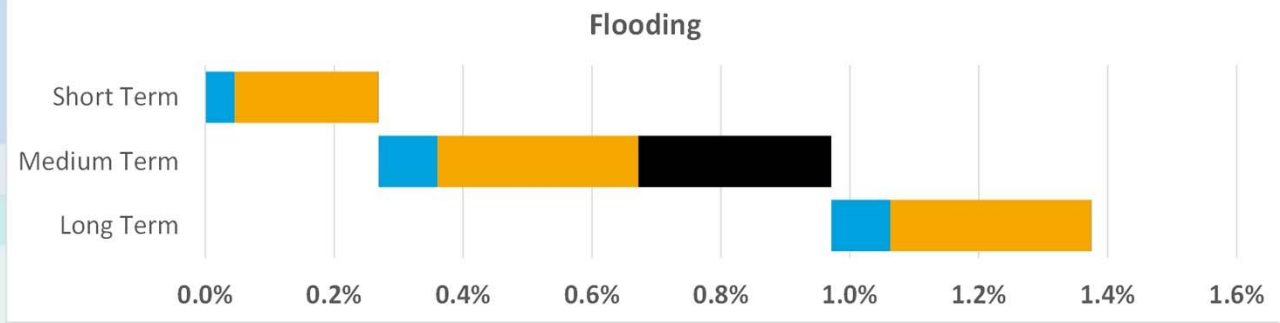
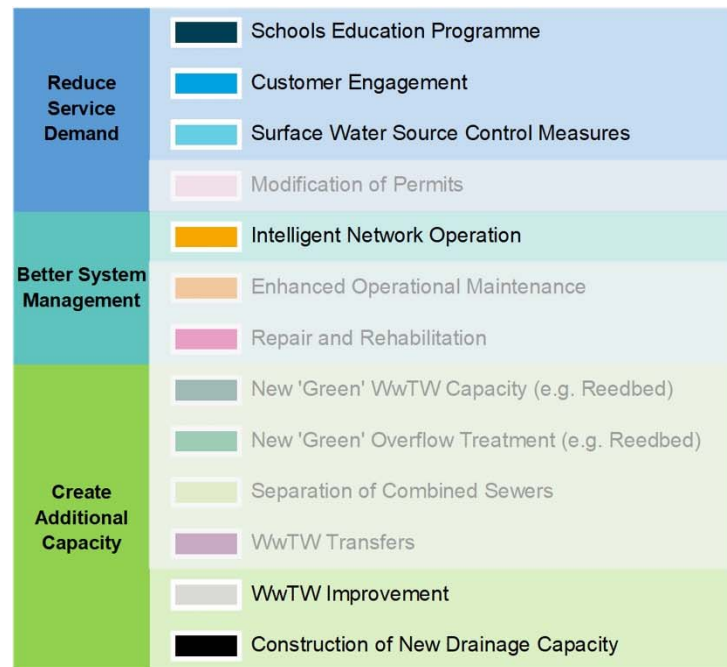
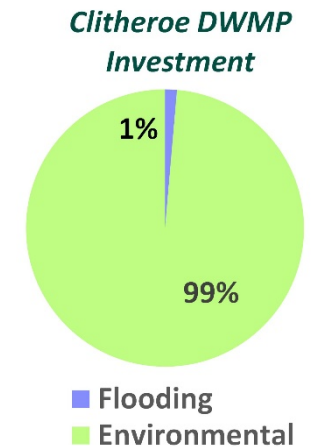
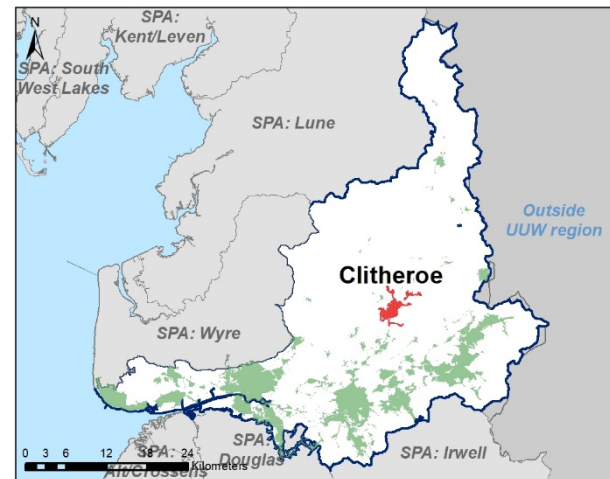
5.2.3.5 Clitheroe

Figure 34 Details of the DWMP investment plan for Clitheroe

The data on this page gives details of the investment plan for Clitheroe TPU. The plan shows the geographic location of Clitheroe within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



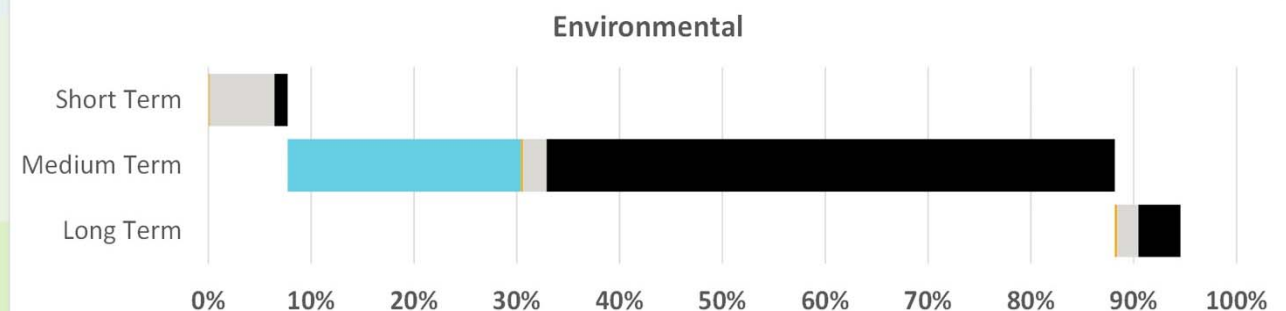
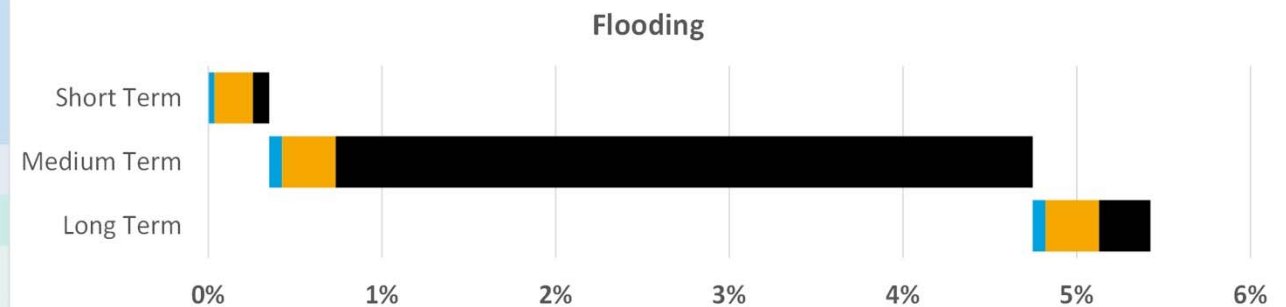
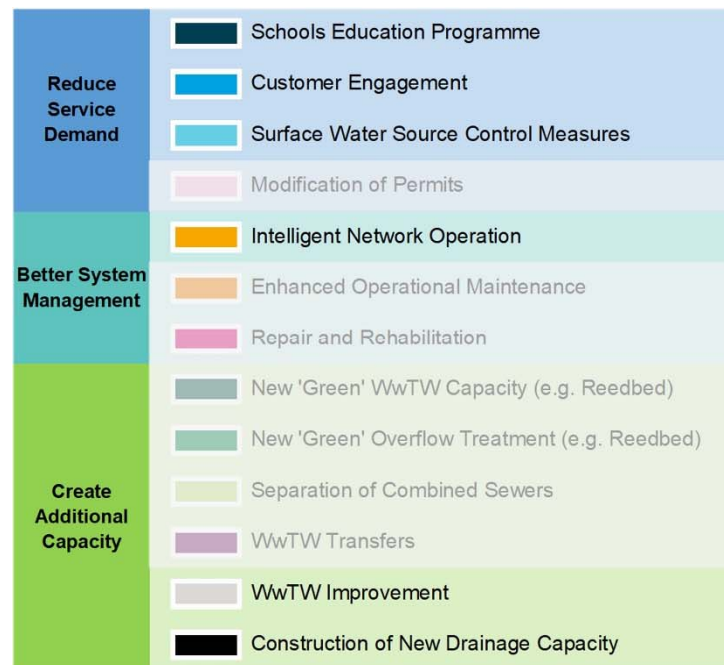
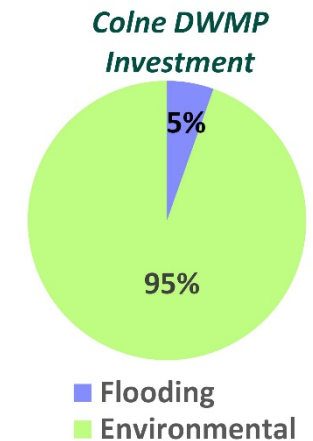
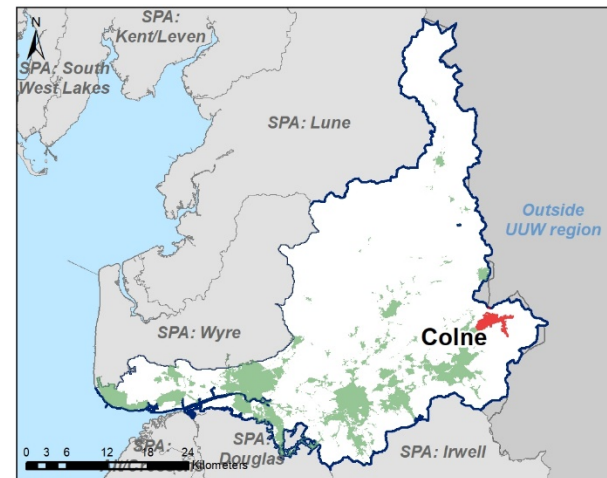
5.2.3.6 Colne

Figure 35 Details of the DWMP investment plan for Colne

The data on this page gives details of the investment plan for Colne TPU. The plan shows the geographic location of Colne within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



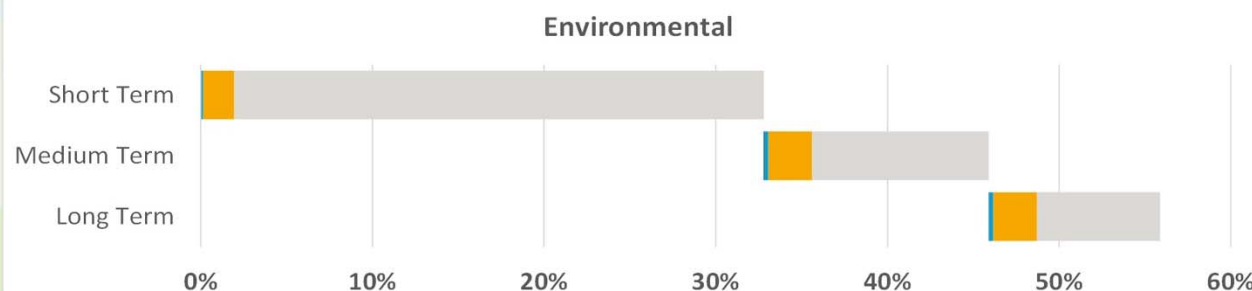
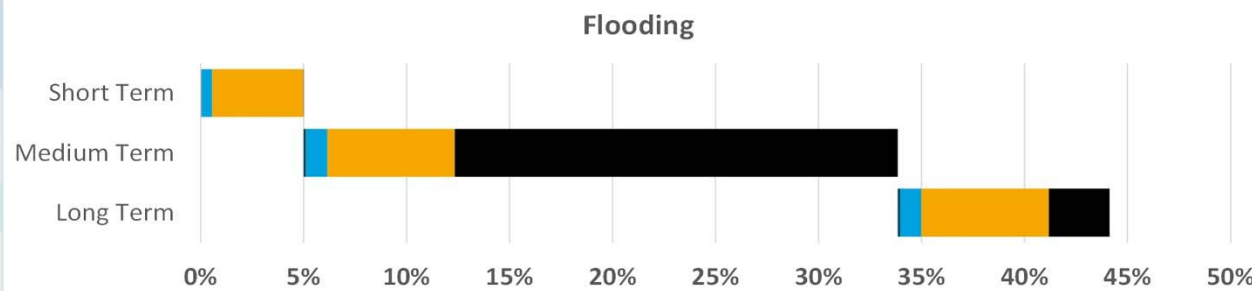
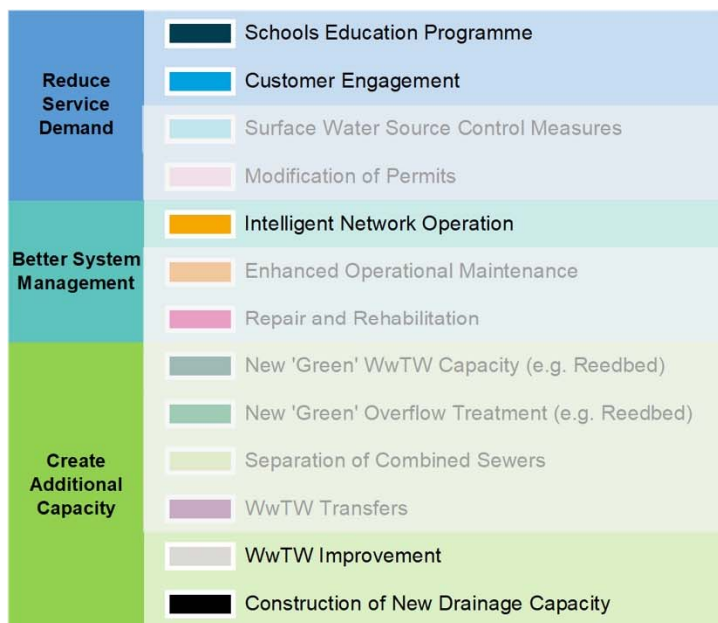
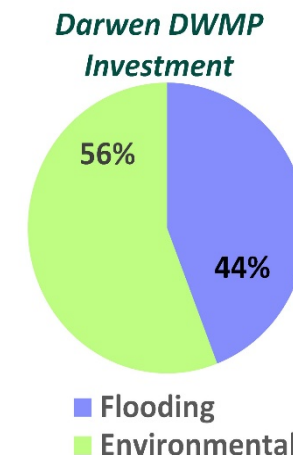
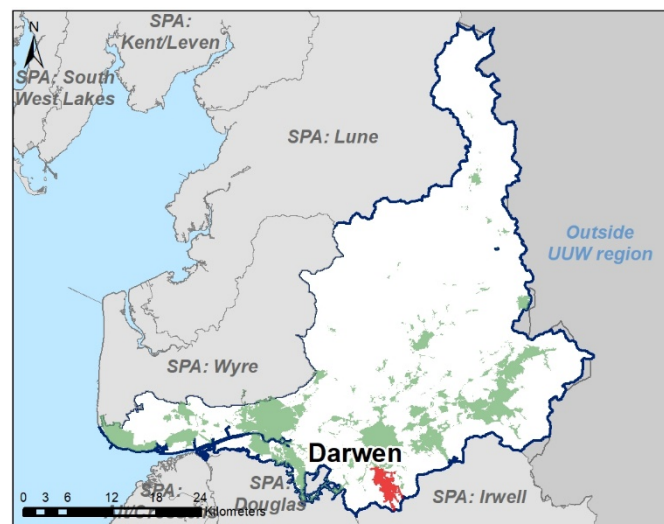
5.2.3.7 Darwen

Figure 36 Details of the DWMP investment plan for Darwen

The data on this page gives details of the investment plan for Darwen TPU. The plan shows the geographic location of Darwen within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



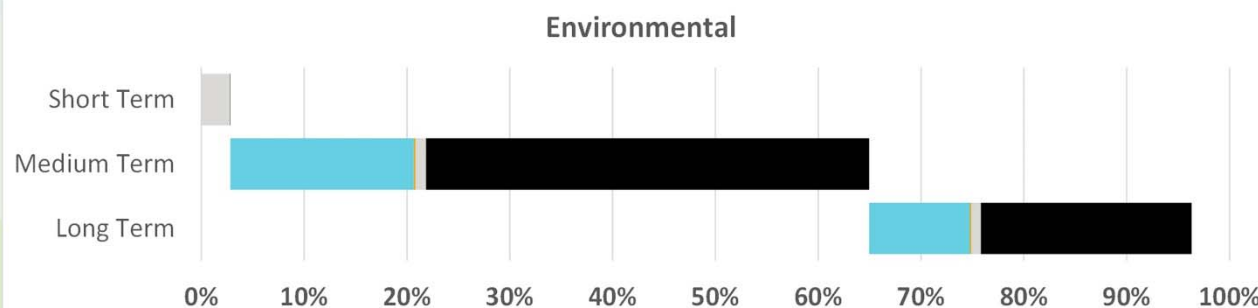
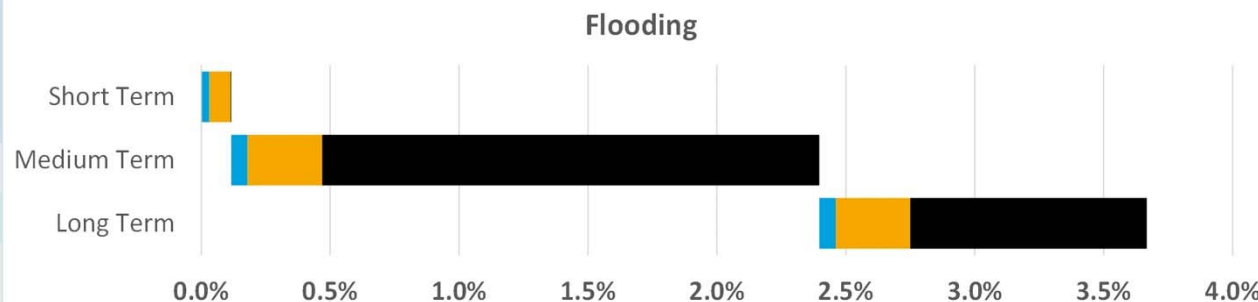
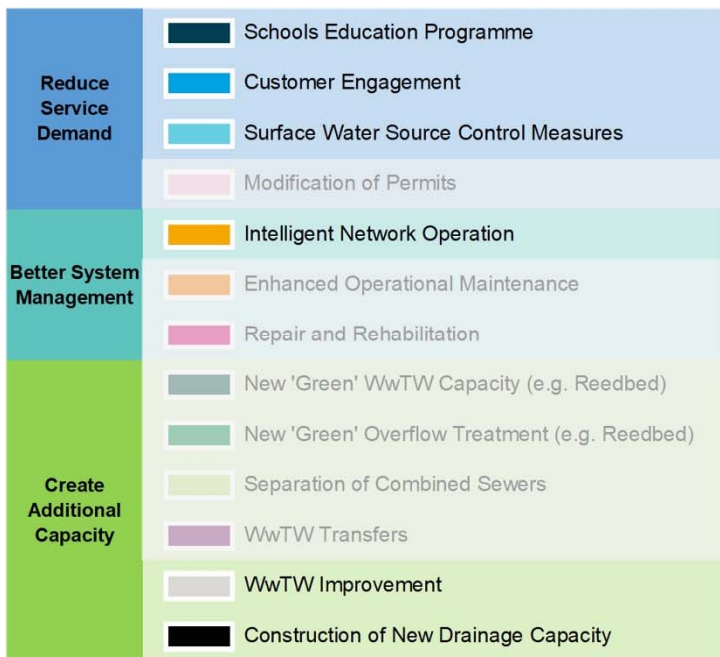
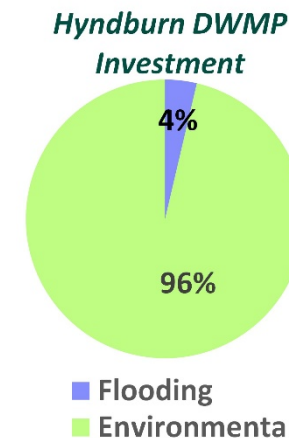
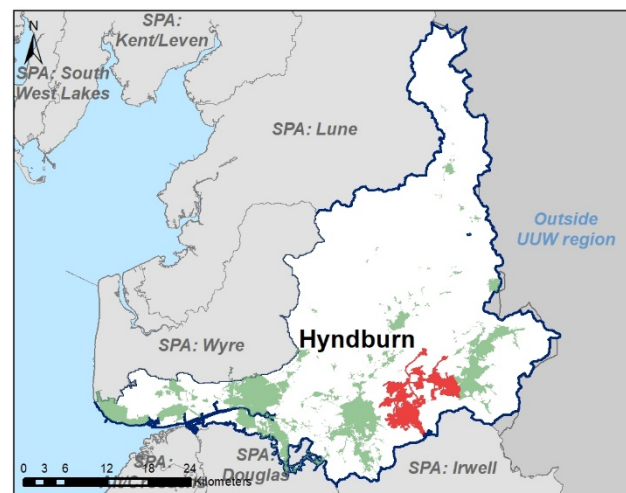
5.2.3.8 Hyndburn

Figure 37 Details of the DWMP investment plan for Hyndburn

The data on this page gives details of the investment plan for Hyndburn TPU. The plan shows the geographic location of Hyndburn within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



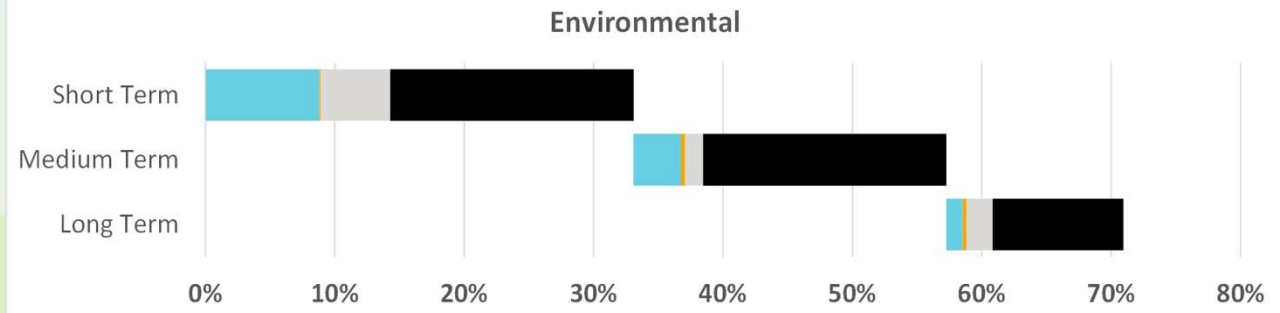
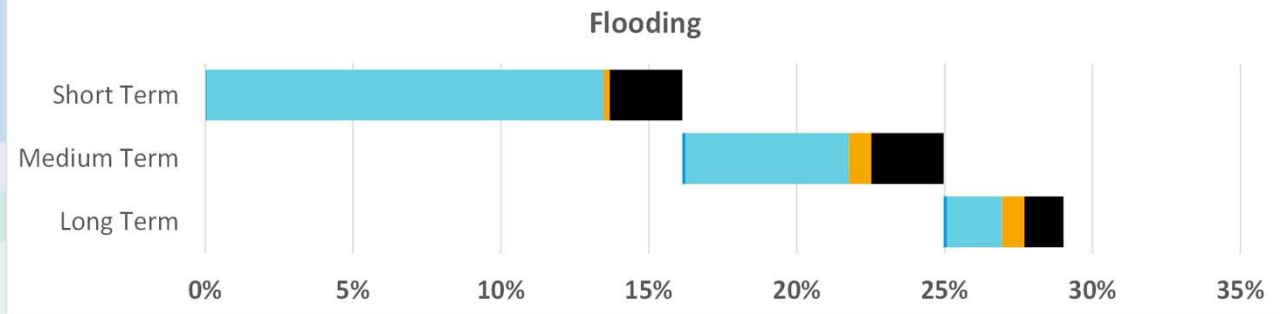
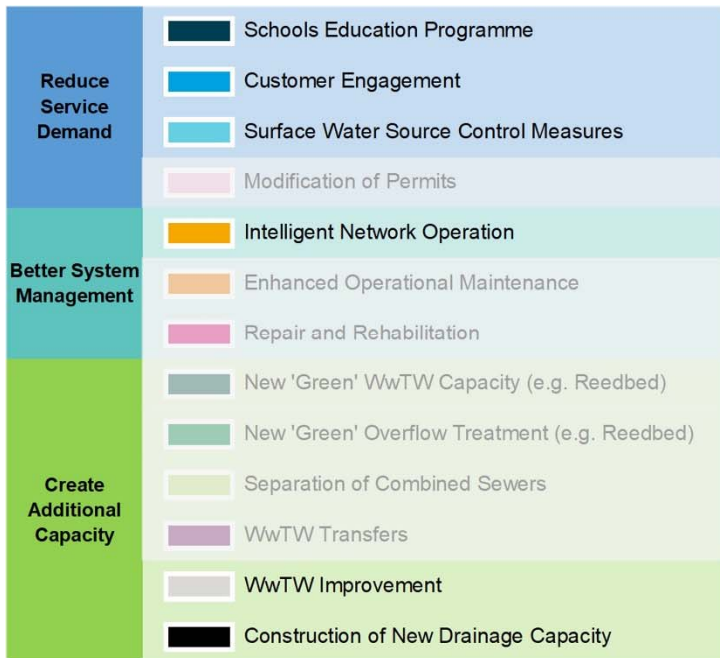
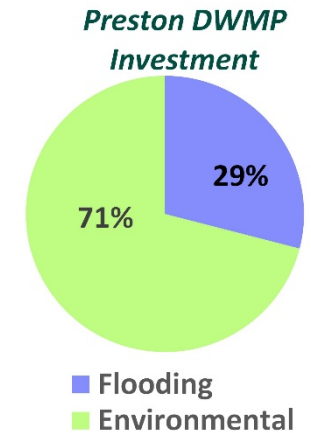
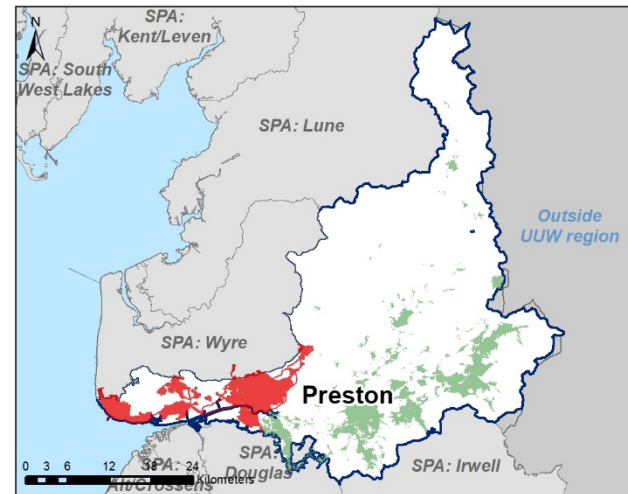
5.2.3.9 Preston

Figure 38 Details of the DWMP investment plan for Preston

The data on this page gives details of the investment plan for Preston TPU. The plan shows the geographic location of Preston within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



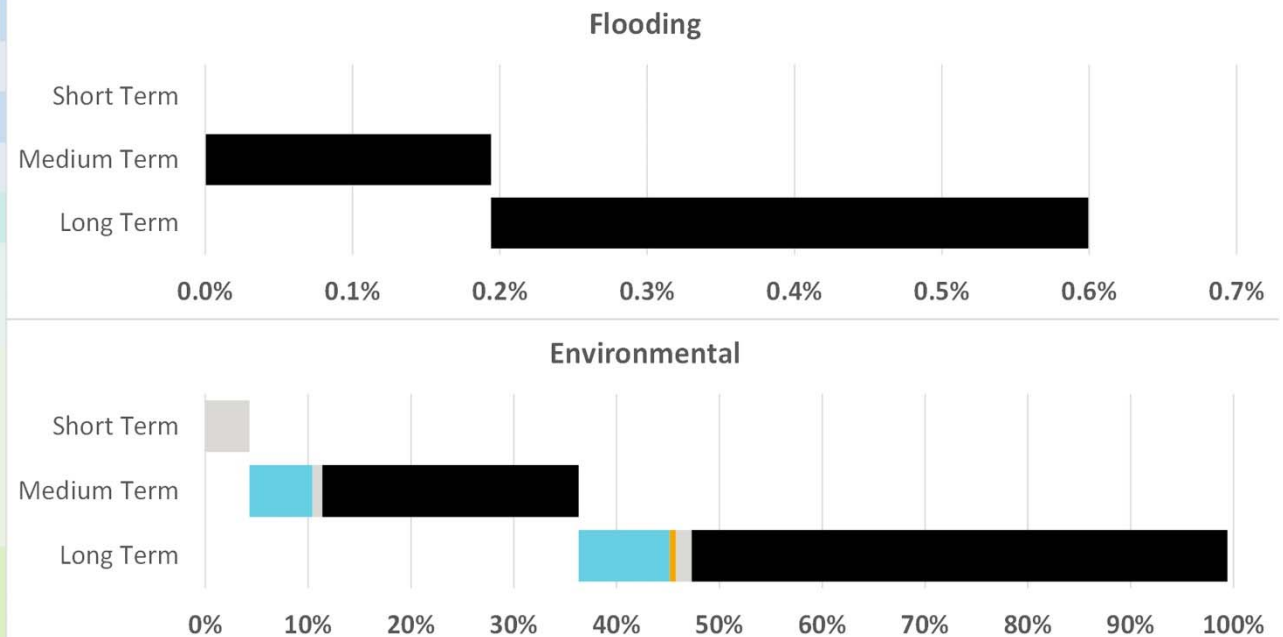
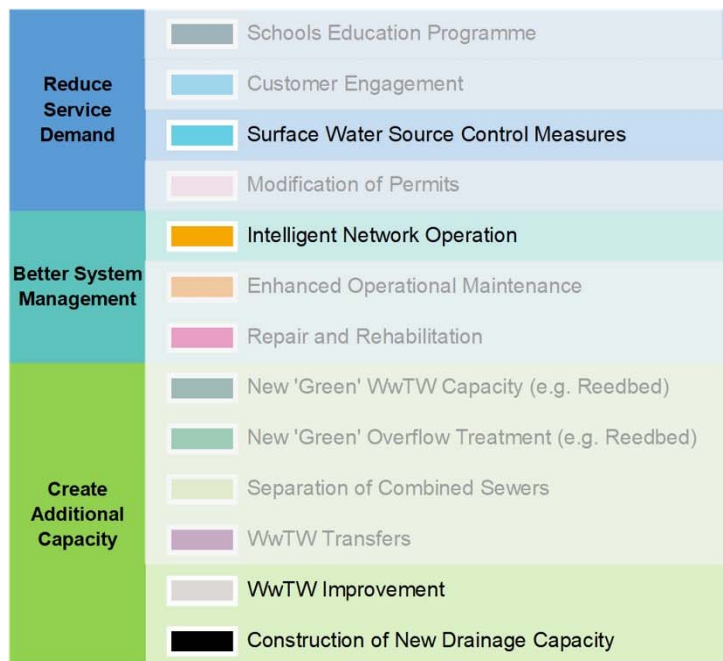
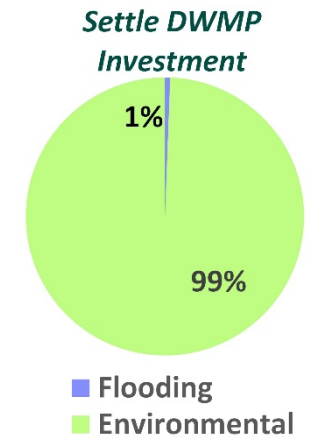
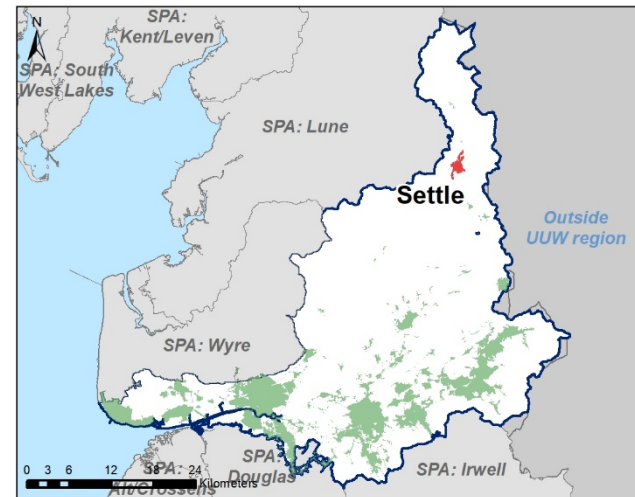
5.2.3.10 Settle

Figure 39 Details of the DWMP investment plan for Settle

The data on this page gives details of the investment plan for Settle TPU. The plan shows the geographic location of Settle within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



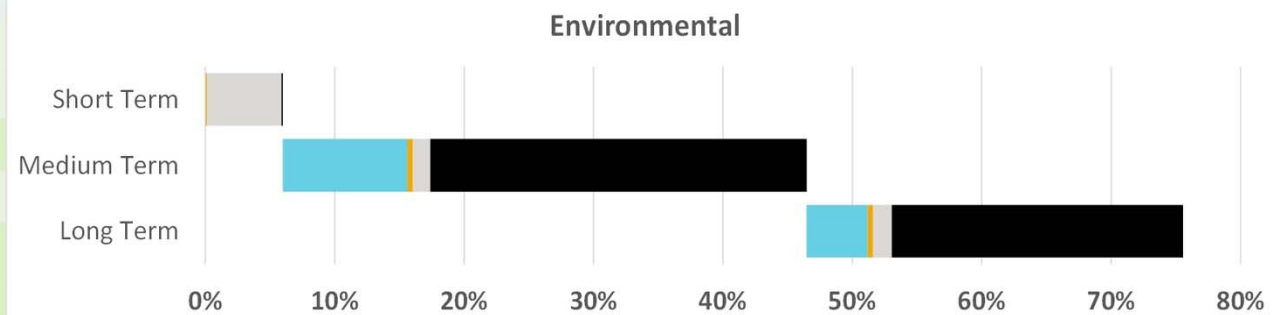
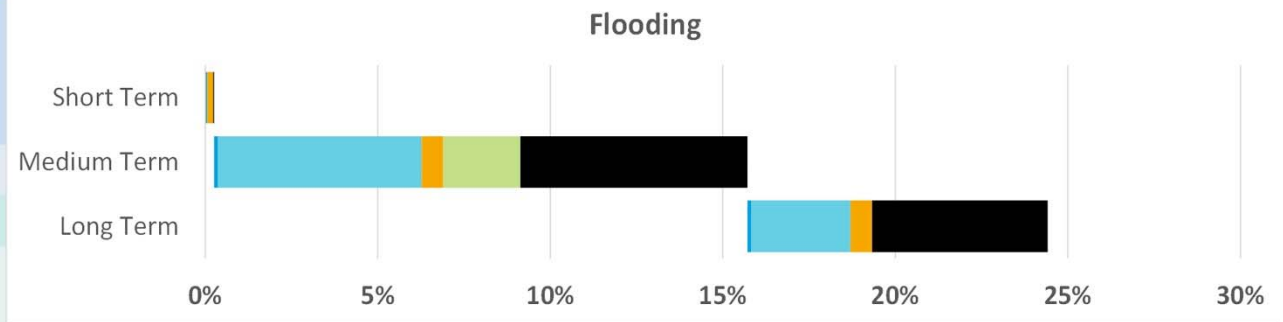
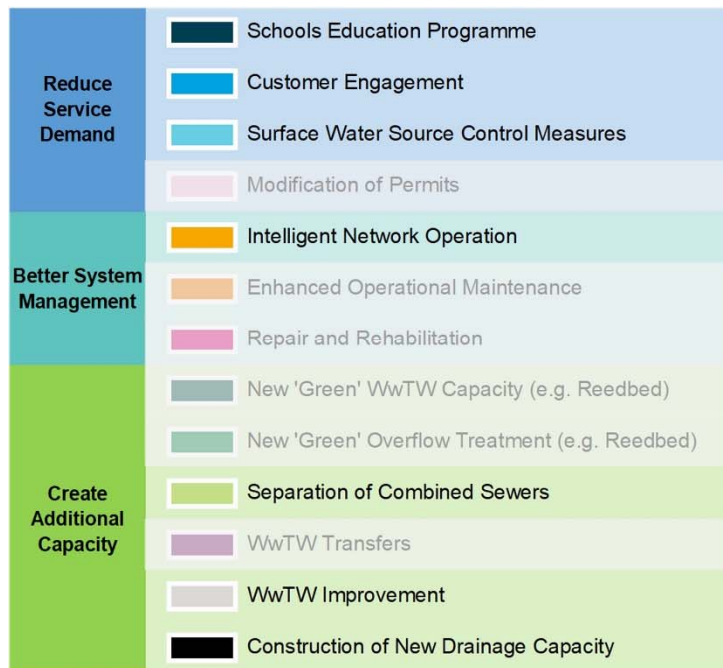
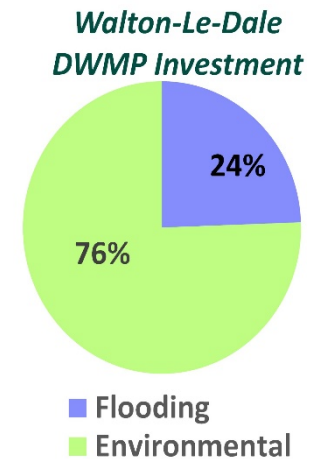
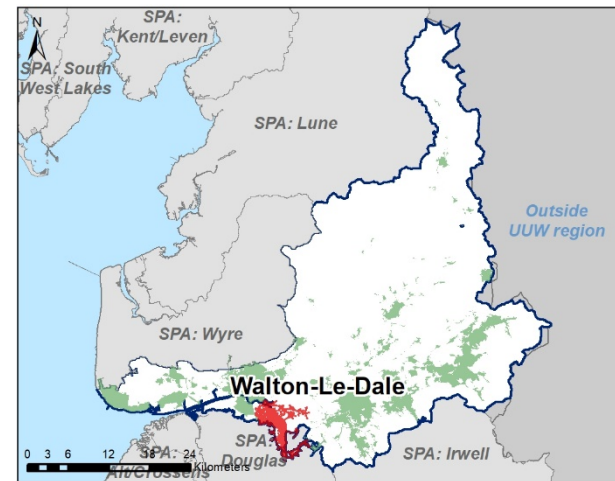
5.2.3.11 Walton-le-Dale

Figure 40 Details of the DWMP investment plan for Walton-le-Dale

The data on this page gives details of the investment plan for Walton-le-Dale TPU. The plan shows the geographic location of Walton-le-Dale within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



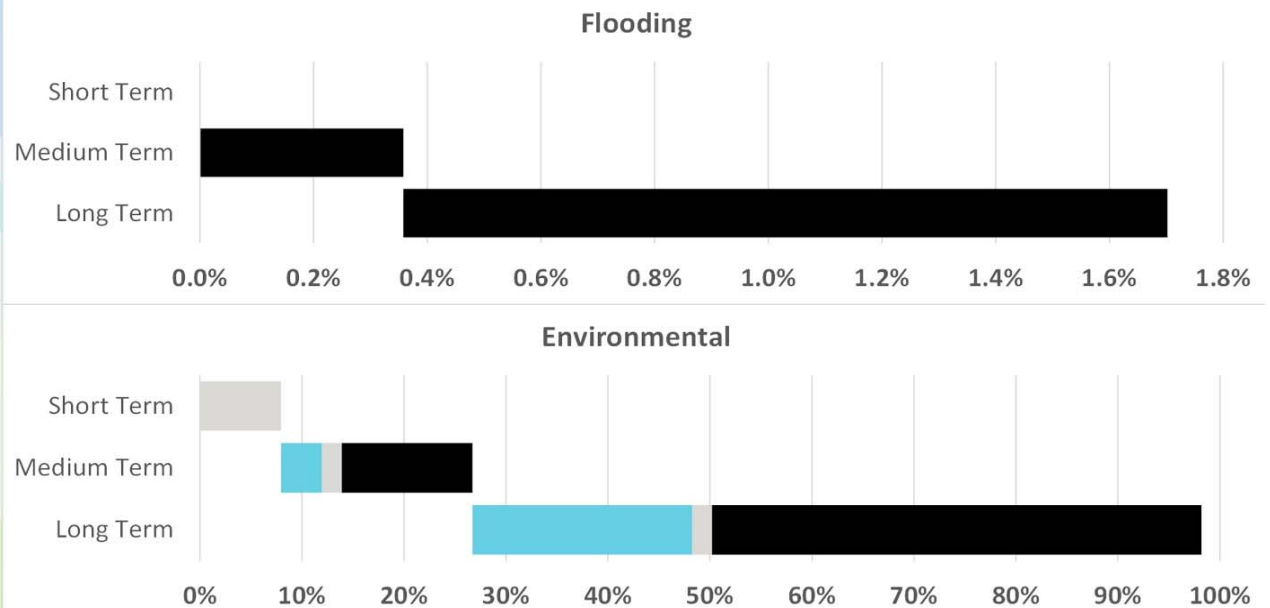
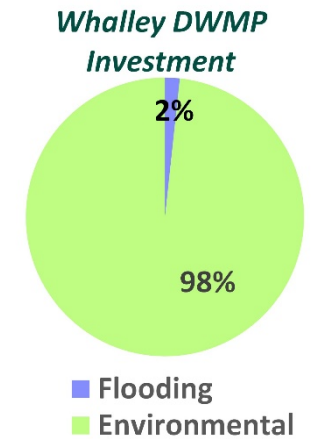
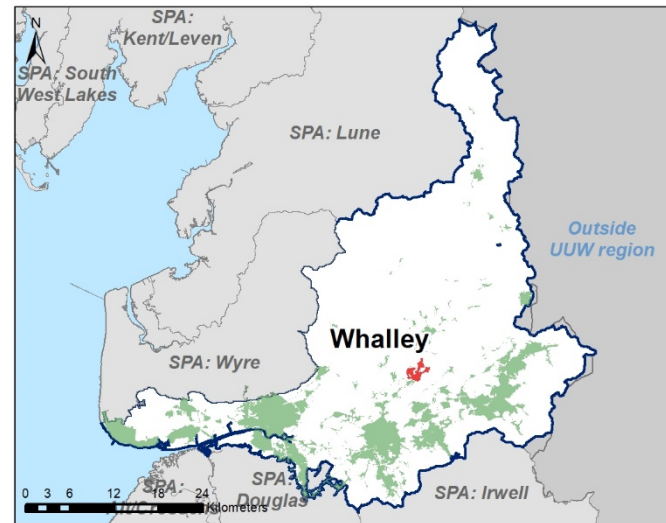
5.2.3.12 Whalley

Figure 41 Details of the DWMP investment plan for Whalley

The data on this page gives details of the investment plan for Whalley TPU. The plan shows the geographic location of Whalley within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



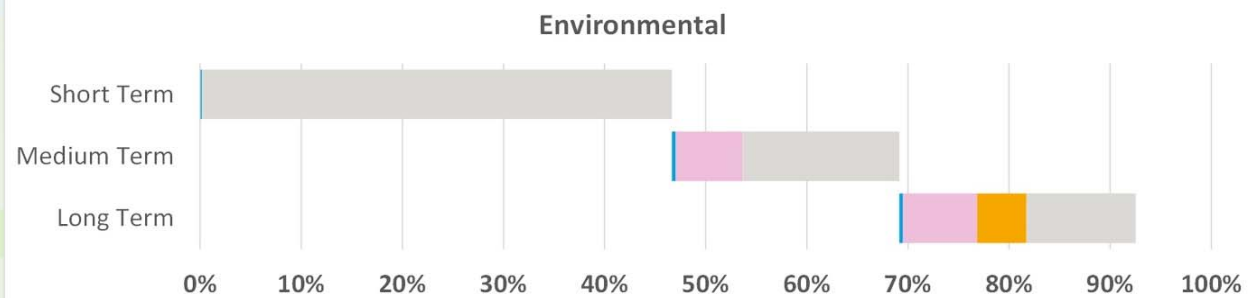
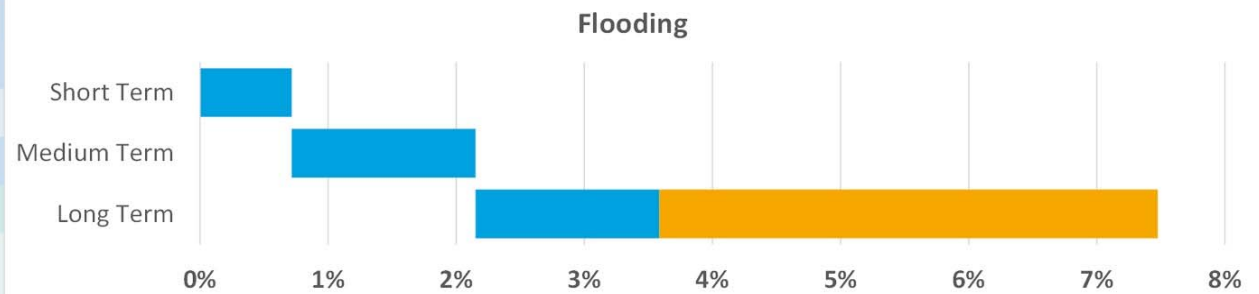
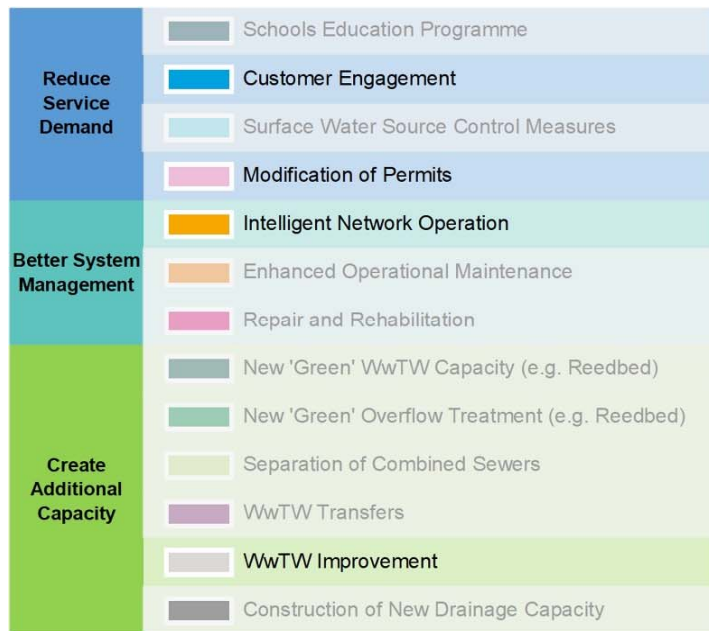
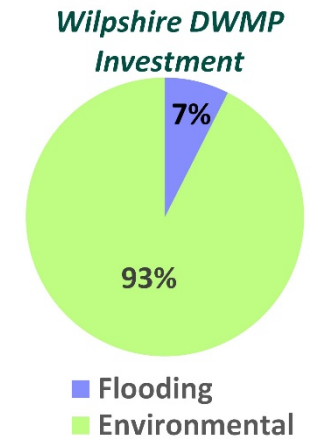
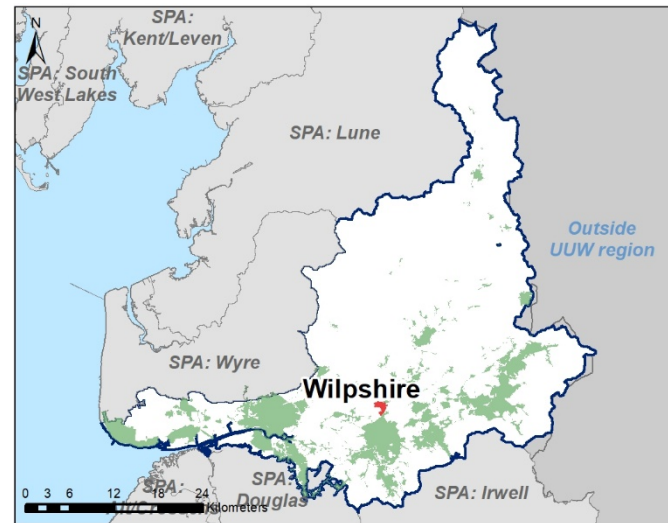
5.2.3.13 Wilpshire

Figure 42 Details of the DWMP investment plan for Wilpshire

The data on this page gives details of the investment plan for Wilpshire TPU. The plan shows the geographic location of Wilpshire within the Ribble catchment.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

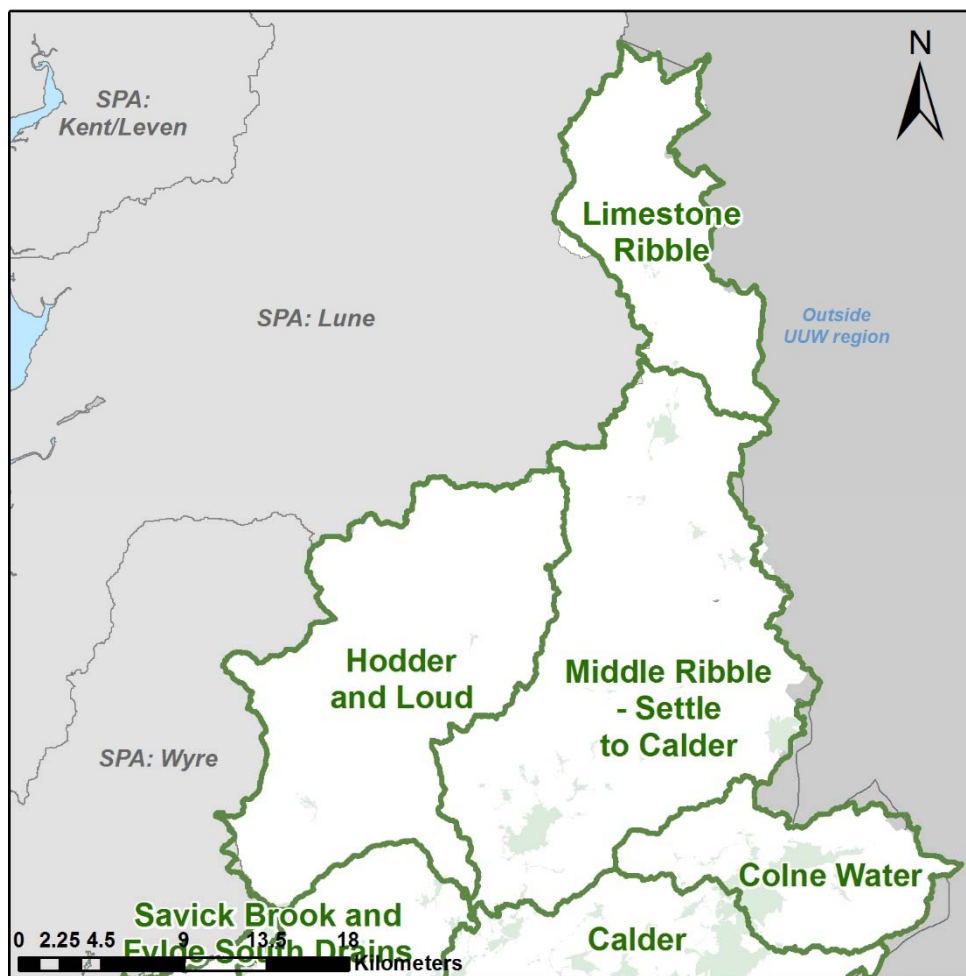
The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



5.2.4 TPUs with population less than 2,000

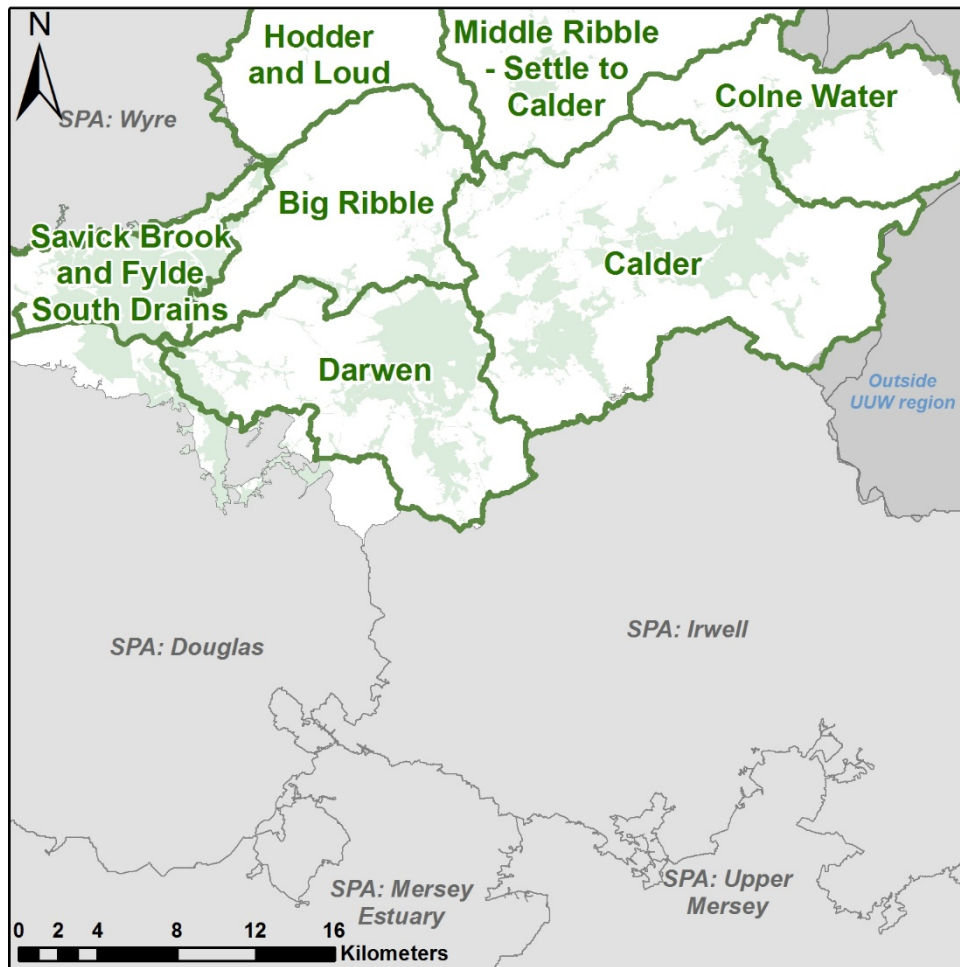
Within the Ribble catchment, there are a number of small TPUs, each with a population of less than 2,000. For the purpose of reporting, these have been grouped together within Environment Agency operational catchment (OC) boundaries, which are sub-divisions of the overall SPA, aligned to local river systems. Within the Ribble SPA, there are six Environment Agency operational catchment areas, which can be seen in Figure 43 and Figure 44.

Figure 43 Location of Environment Agency operational catchments within Ribble North SPA



Environment Agency Operational Catchment	TPUs
Colne Water	Newchurch-In-Pendle Laund Farm Lanebottom Colne Greenfield House Farm Barnside
Middle Ribble- Settle to Calder	Waddington Hellifield Sawley Halton West Ribble Rimington Halton Place Long Preston Grindleton Kingsmill Gisburn Holden Bolton-By-Bowland
Limestone Ribble	Stainforth Horton-In-Ribblesdale Helwith Bridge
Hodder and Loud	Slaidburn Newton-In-Bowland Chipping

Figure 44 Location of Environment Agency operational catchments within Ribble South SPA



EA Operational Catchment	TPUs
Calder	Wood Cottages South View Portfield Bar Ouzel Rock Hapton Burnley Higher Timberhill
Big Ribble	Ribchester Hospital Ribchester Hurst Green
Darwen	None

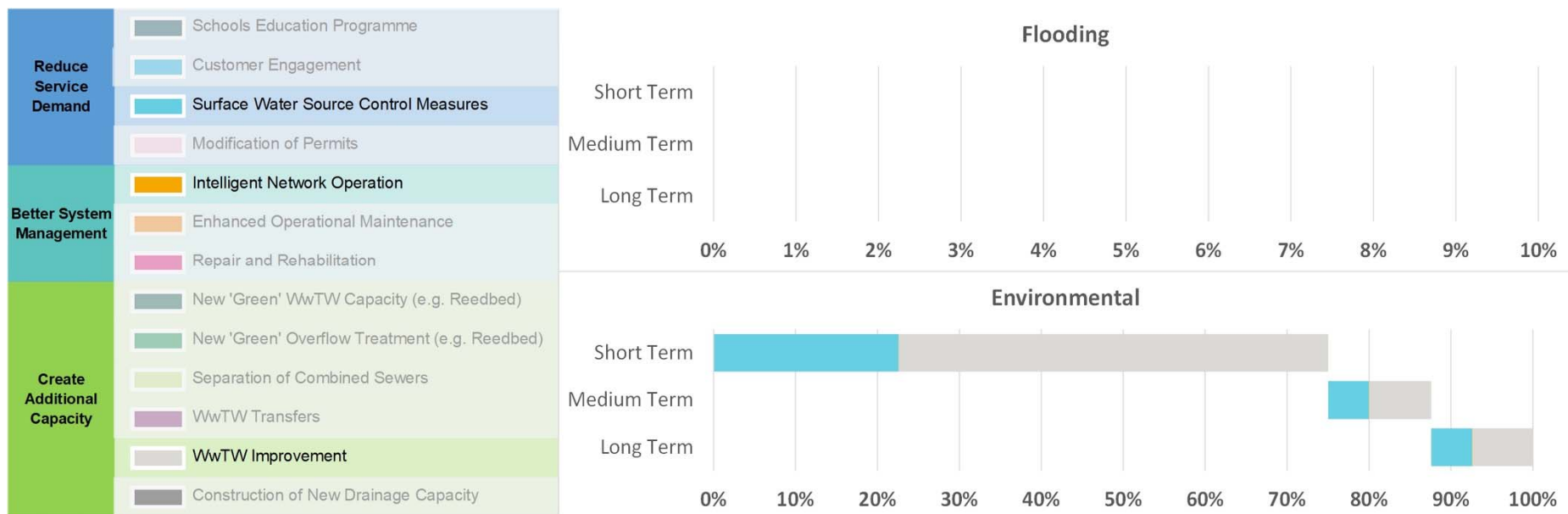
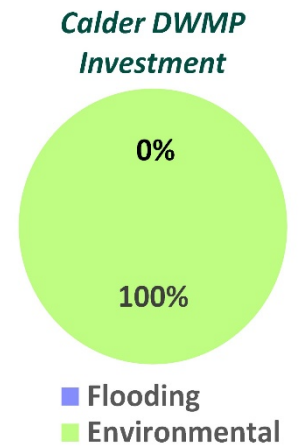
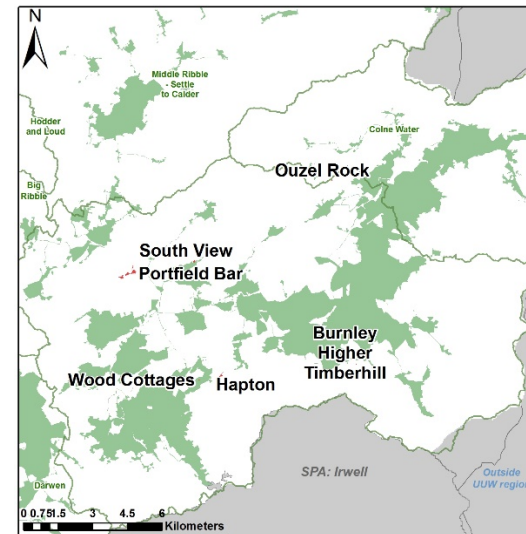
5.2.4.1 TPUs with population less than 2,000: Calder Operational Catchment (OC)

Figure 45 Details of the DWMP investment plan for the Calder OC

The data on this page gives details of the investment plan for the TPUs within the Calder OC. The plan shows the geographic location of these TPUs within the Calder OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



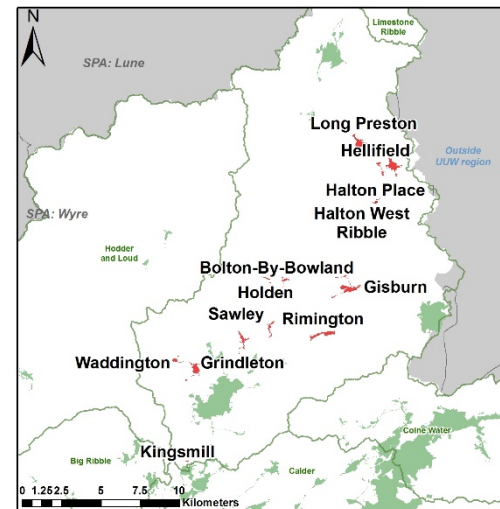
5.2.4.2 TPUs with population less than 2,000: Middle Ribble - Settle to Calder Operational Catchment (OC)

Figure 46 Details of the DWMP investment plan for the Middle Ribble OC

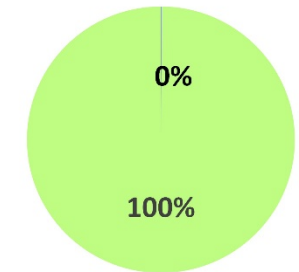
The data on this page gives details of the investment plan for the TPUs within the Middle Ribble OC. The plan shows the geographic location of these TPUs within the Middle Ribble OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

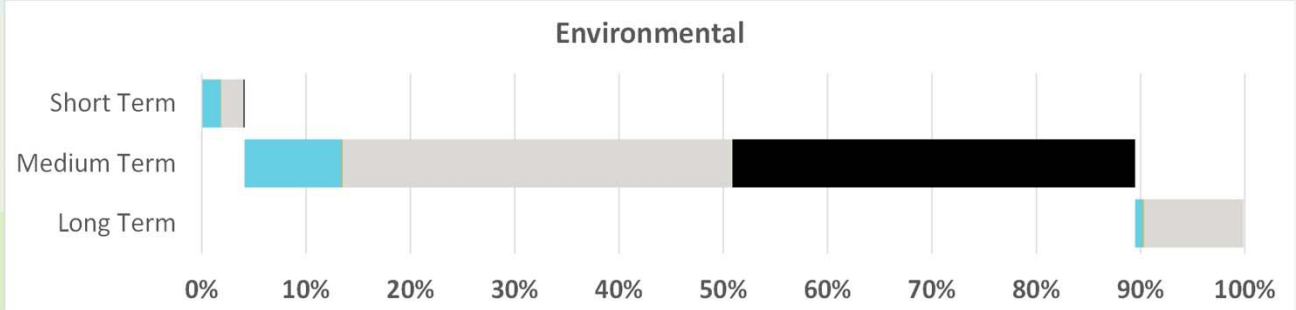
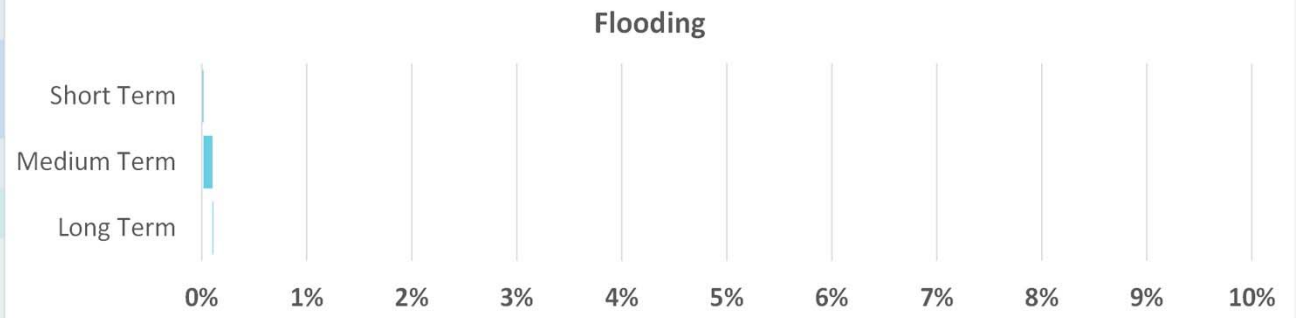
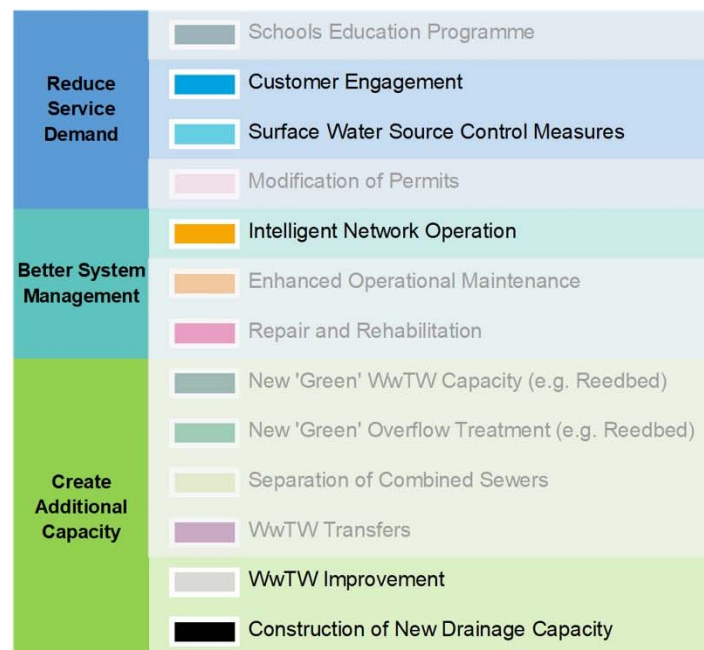
The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



Middle Ribble - Settle to Calder DWMP Investment



■ Flooding
■ Environmental



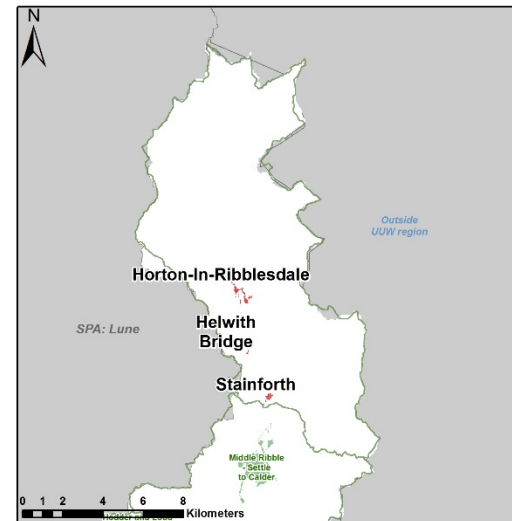
5.2.4.3 TPUs with population less than 2,000: Limestone Ribble Operational Catchment (OC)

Figure 47 Details of the DWMP investment plan for the Limestone Ribble OC

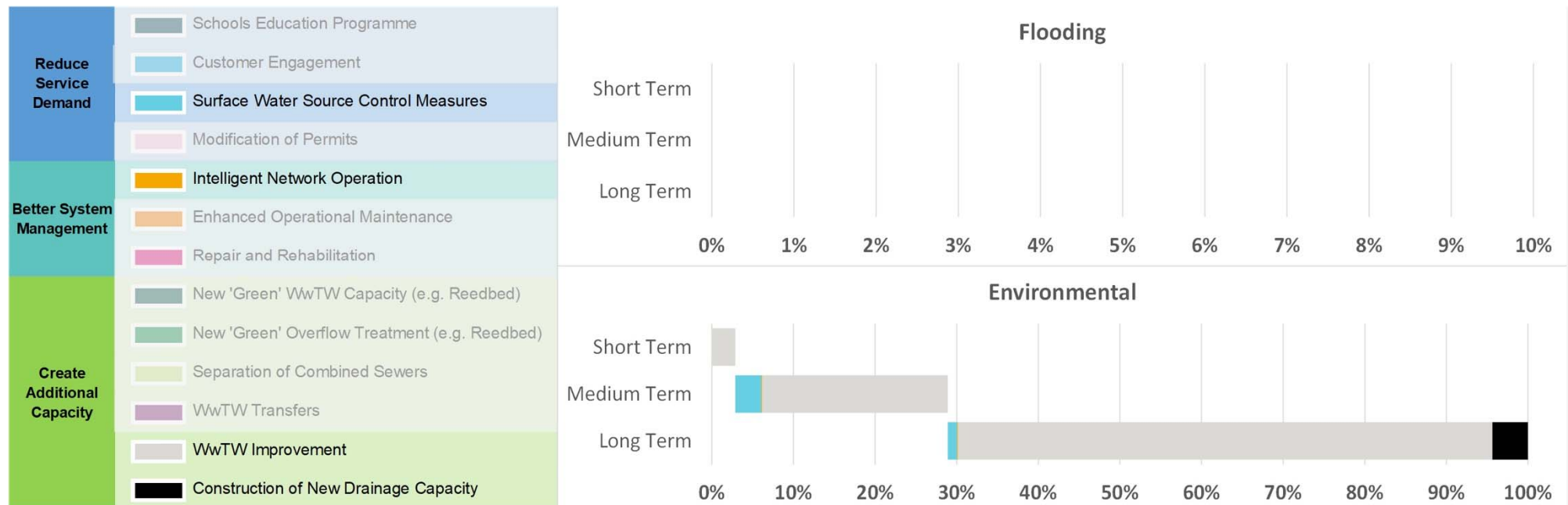
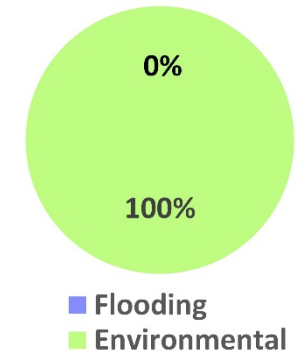
The data on this page gives details of the investment plan for the TPUs within the Limestone Ribble OC. The plan shows the geographic location of these TPUs within the Limestone Ribble OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



Limestone Ribble DWMP Investment



5.2.4.4 TPUs with population less than 2,000: Hodder and Loud Operational Catchment (OC)

Figure 48 Details of the DWMP investment plan for the Hodder and Loud OC

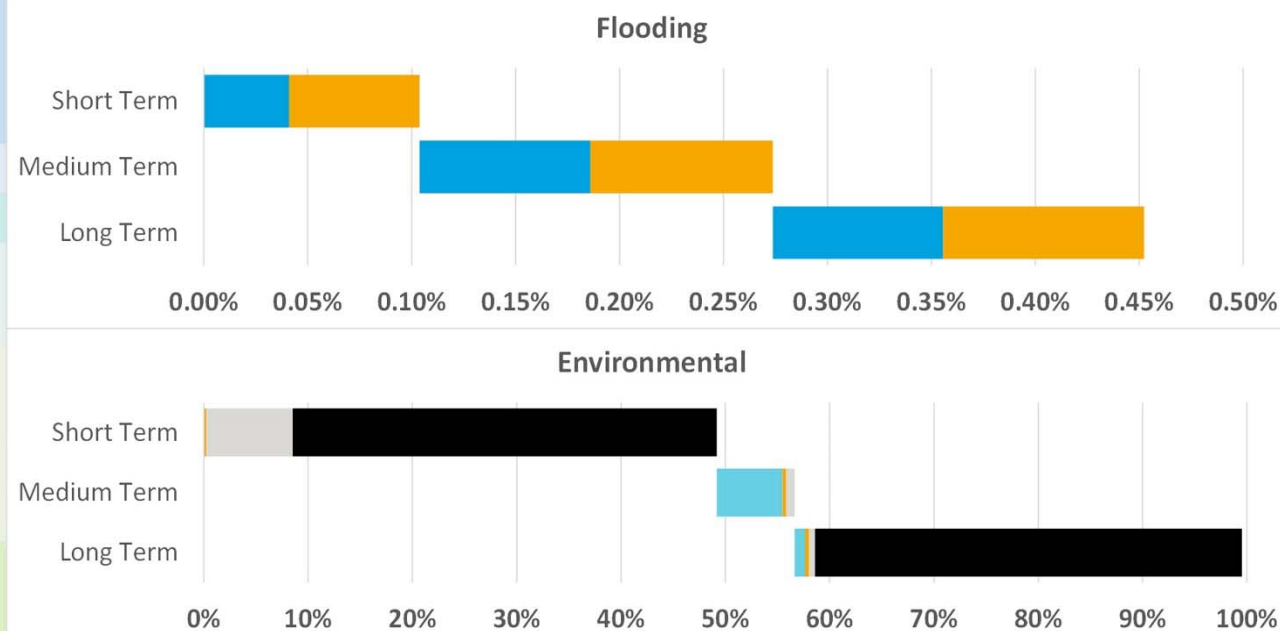
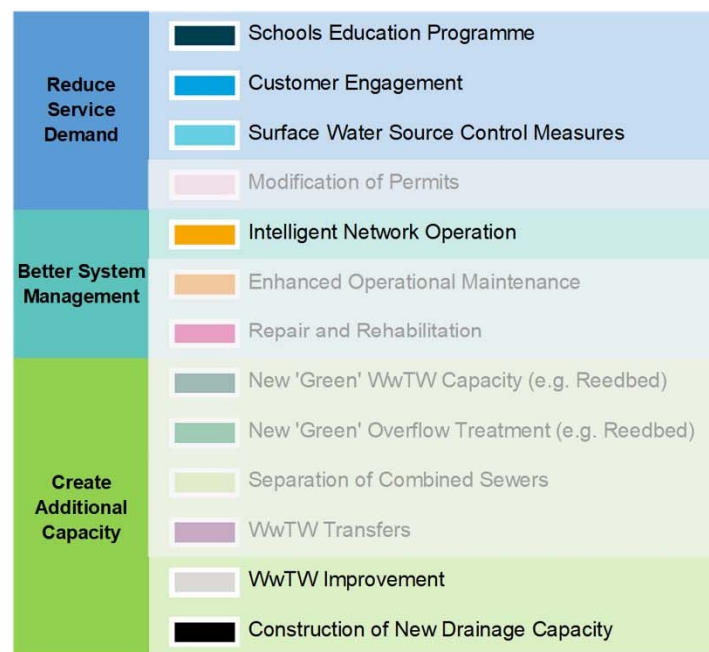
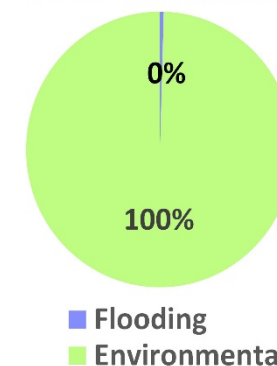
The data on this page gives details of the investment plan for the TPUs within the Hodder and Loud OC. The plan shows the geographic location of these TPUs within the Hodder and Loud OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



Hodder and Loud DWMP Investment



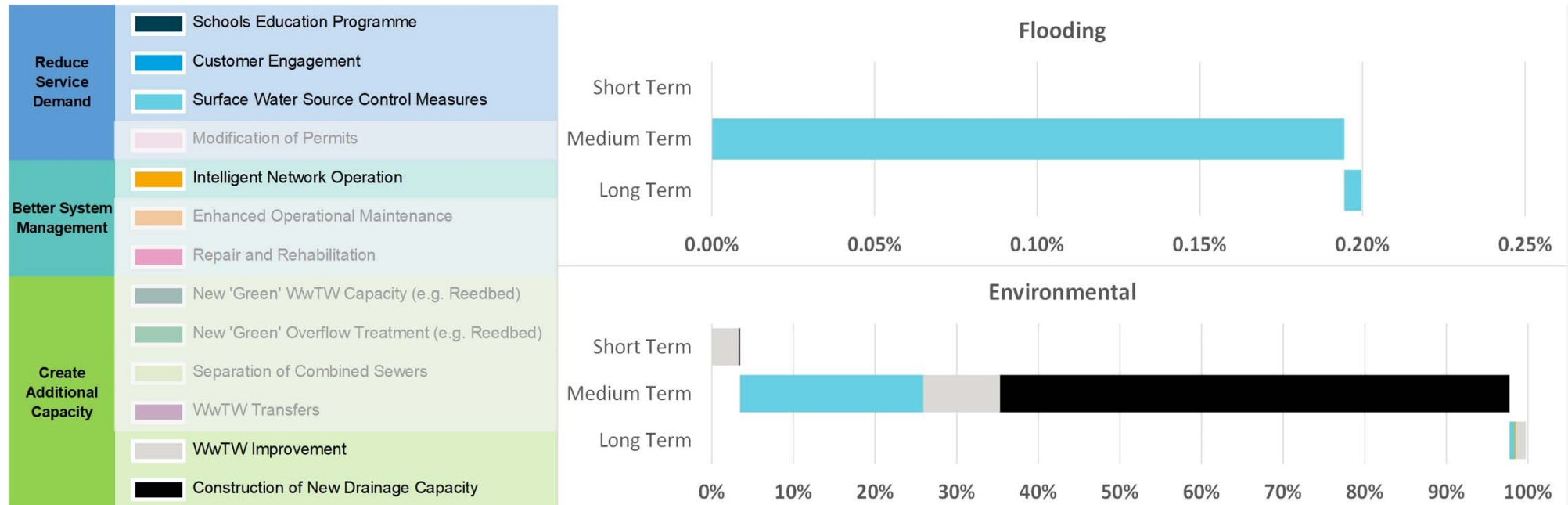
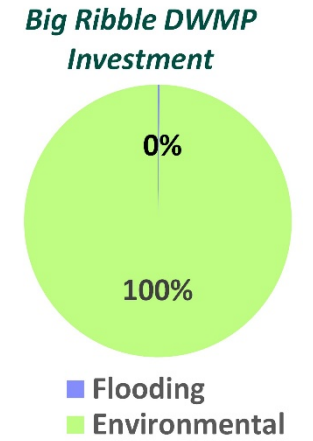
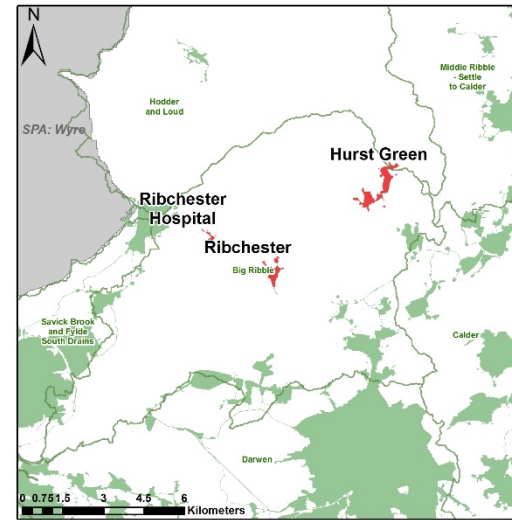
5.2.4.5 TPUs with population less than 2,000: Big Ribble Operational Catchment (OC)

Figure 49 Details of the DWMP investment plan for the Big Ribble OC

The data on this page gives details of the investment plan for the TPUs within the Big Ribble OC. The plan shows the geographic location of these TPUs within the Big Ribble OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



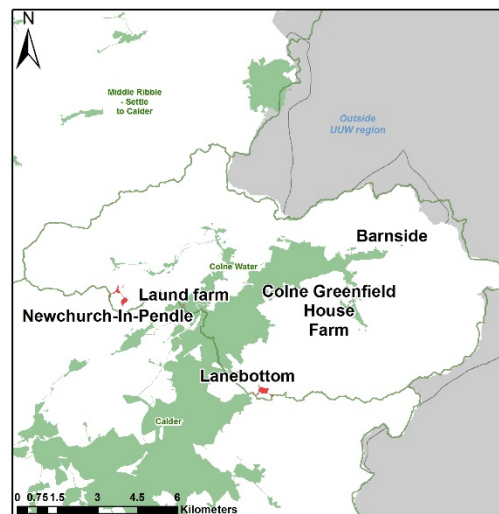
5.2.4.6 TPUs with population less than 2,000: Colne Water Operational Catchment (OC)

Figure 50 Details of the DWMP investment plan for the Colne Water OC

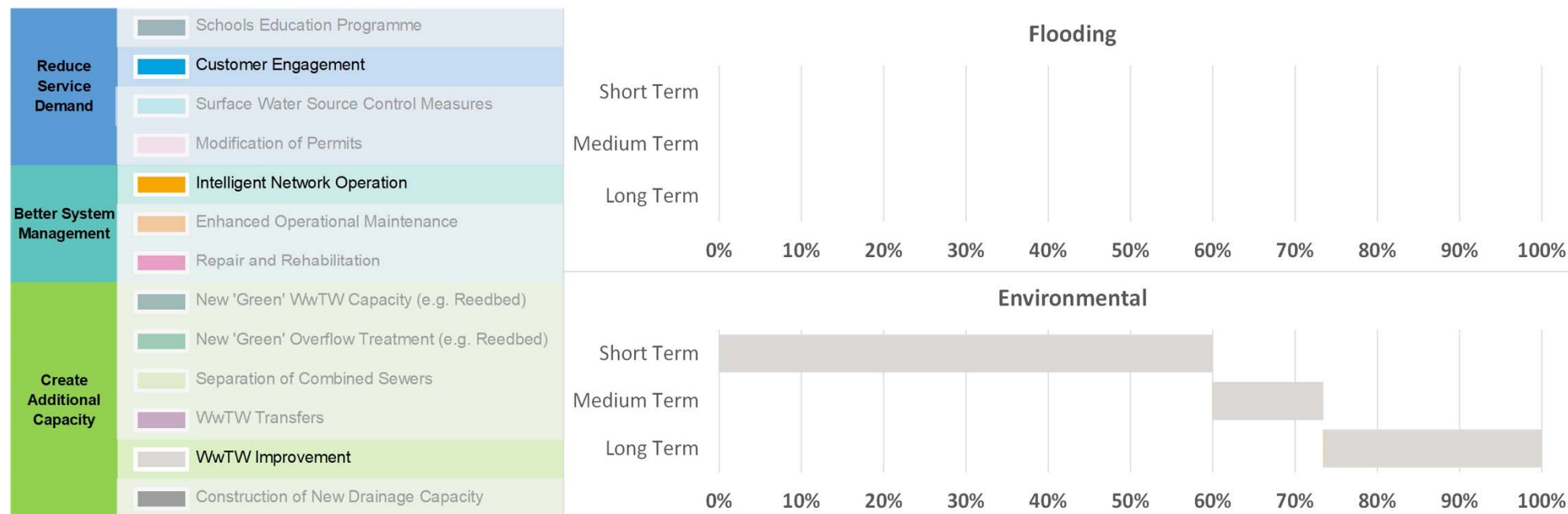
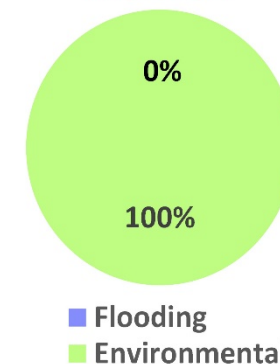
The data on this page gives details of the investment plan for the TPUs within the Colne Water OC. The plan shows the geographic location of these TPUs within the Colne Water OC.

The pie chart to the right of the plan indicates the percentage split of proposed flooding and environmental investment. Environmental investment includes work to address storm overflows, wastewater treatment works and pollution of watercourses.

The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in the short, medium or long term.



Colne Water DWMP Investment



5.3 Other projects and investment

In addition to the improvements and benefits that the WINEP and the DWMP will drive in the years to come, there are also other projects that will help to achieve our ambitions. One of which is our Better Rivers: Better North West project which aims to improve the region’s river water quality.

5.3.1 Better Rivers: Better North West

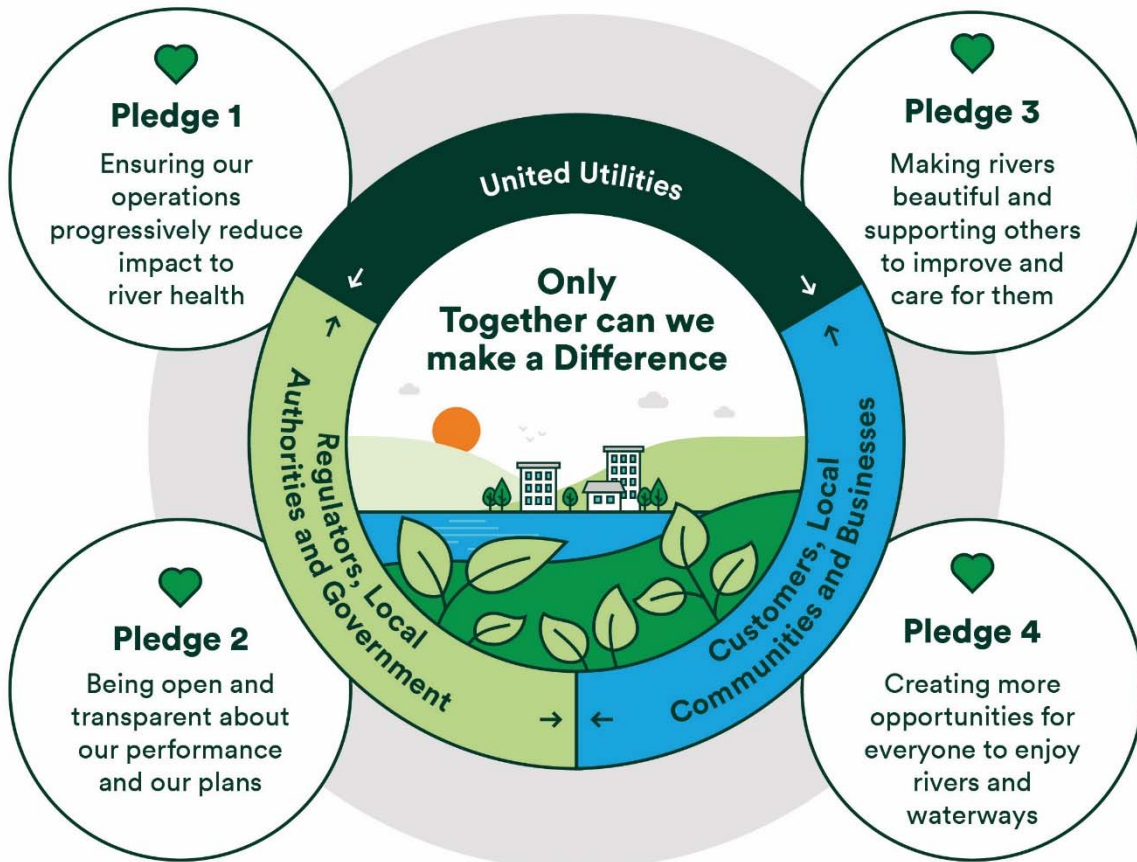
The North West is home to some of the most beautiful natural landscapes. We take our role in protecting them very seriously so they can be enjoyed by all. We are investing significantly to reduce the impact that wastewater has on the natural environment and our long-term ambition is to eliminate pollution incidents.

We want to demonstrate how we are addressing concerns regarding storm overflows and making our contribution to improving river health. Through our Better Rivers: Better North West plan, we have made four pledges which will include improving our wastewater network and treatment assets, collecting more data and sharing it, greater innovation and more use of nature-based solutions (Figure 51).

We are determined to build a coalition of the willing to improve the region’s river water quality and catalyse action from many parties. At the heart of this will be addressing surface water management at scale and securing continued investment in effective end-to-end wastewater management is necessary to improve river water quality. This programme sets out our ambitions for the next three years and beyond.

You can find out more about the Better Rivers: Better North West plan on our website (<https://www.unitedutilities.com/corporate/responsibility/environment/reducing-pollution/storm-overflows/our-commitments-to-river-health/>).

Figure 51 Overview of the Better Rivers: Better North West project



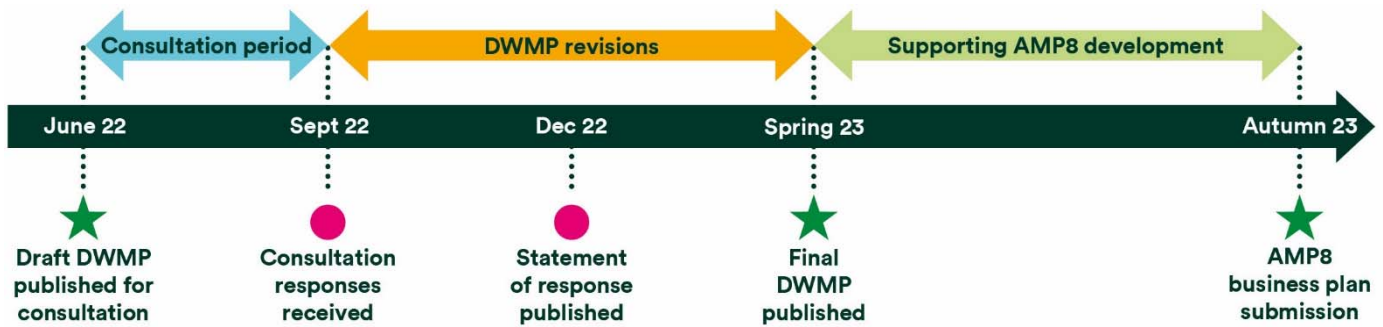
6. Embedding the DWMP

Since we began our DWMP journey when the framework was published in 2018, we have now produced our first ever plan. We have done this with the support from customers and stakeholders where we have listened to, reflected upon and made changes to different views, priorities and ambitions that we have for the North West, now and in the future.

The DWMP encompasses a host of documents covering different topic areas from assessing risks to identifying opportunities, and the SPA documents like this one for the Ribble catchment. The DWMP is not a static programme and will continue to work with stakeholders to develop partnership options and strategies, which will make a difference within the Ribble catchment.

Moving forwards, the DWMP will be a key component in the development of our business plan for investment cycle 2025 – 2030 (AMP8, Figure 52). Here, we will be able to continue to work in partnership to identify joint opportunities to mitigate risk, to improve the environment and create spaces for communities to enjoy.

Figure 52 Timeline of key milestones



7. References

- [1] <https://environment.data.gov.uk/catchment-planning/ManagementCatchment/3070>
- [2] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3033>
- [3] <https://ribbletrust.org.uk/river-calder/>
- [4] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3099>
- [5] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3124>
- [6] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3223>
- [7] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3254>
- [8] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3316>
- [9] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3392>
- [10] <https://environment.data.gov.uk/catchment-planning/v/c3-plan/CatchmentPartnership/WEIF5601>
- [11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120229/North-West-FRMP-2021-2027.pdf
- [12] <https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance>
- [13] <https://ribblelifetogether.org/ribble-life-together-partnership/>

Appendix A

Table A.1 List of TPUs which triggered for RBCS across environment, flooding or wastewater treatment works categories

1	Barnoldswick	11	Grindleton	21	Long Preston	31	Stainforth
2	Billington	12	Hellifield	22	Newchurch-In-Pendle	32	Waddington
3	Blackburn	13	Helwith Bridge	23	Newton-In-Bowland	33	Walton-Le-Dale
4	Bolton-By-Bowland	14	Halton Place	24	Preston	34	Whalley
5	Burnley	15	Halton West Ribble	25	Ribchester	35	Wilpshire
6	Chipping	16	Holden	26	Ribchester Hospital		
7	Clitheroe	17	Horton-In-Ribblesdale	27	Rimington		
8	Colne	18	Hurst Green	28	Sawley		
9	Darwen	19	Hyndburn	29	Settle		
10	Gisburn	20	Lanebottom	30	Slaidburn		

Table A.2 List of TPUs which did not trigger for RBCS across environment, flooding or wastewater treatment works categories

TPU Name	Environment	Flooding	Wastewater Treatment Works
Barnside	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Burnley Higher Timberhill	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Colne Greenfield House Farm	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Hapton	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Kingsmill	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Laund Farm	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Mill Lane Hyndburn	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Ouzel Rock	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Portfield Bar	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
South View	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
Spouthouse Lane	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS

Wood Cottages	Not triggered in RBCS	Not triggered in RBCS	Not triggered in RBCS
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Haweswater House
Lingley Mere Business Park
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Warrington
WA5 3LP
unitedutilities.com



Water for the North West