

United Utilities Water

Drainage and Wastewater Management Plan 2023

Lune DWMP

Document Reference: SPA_07

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.

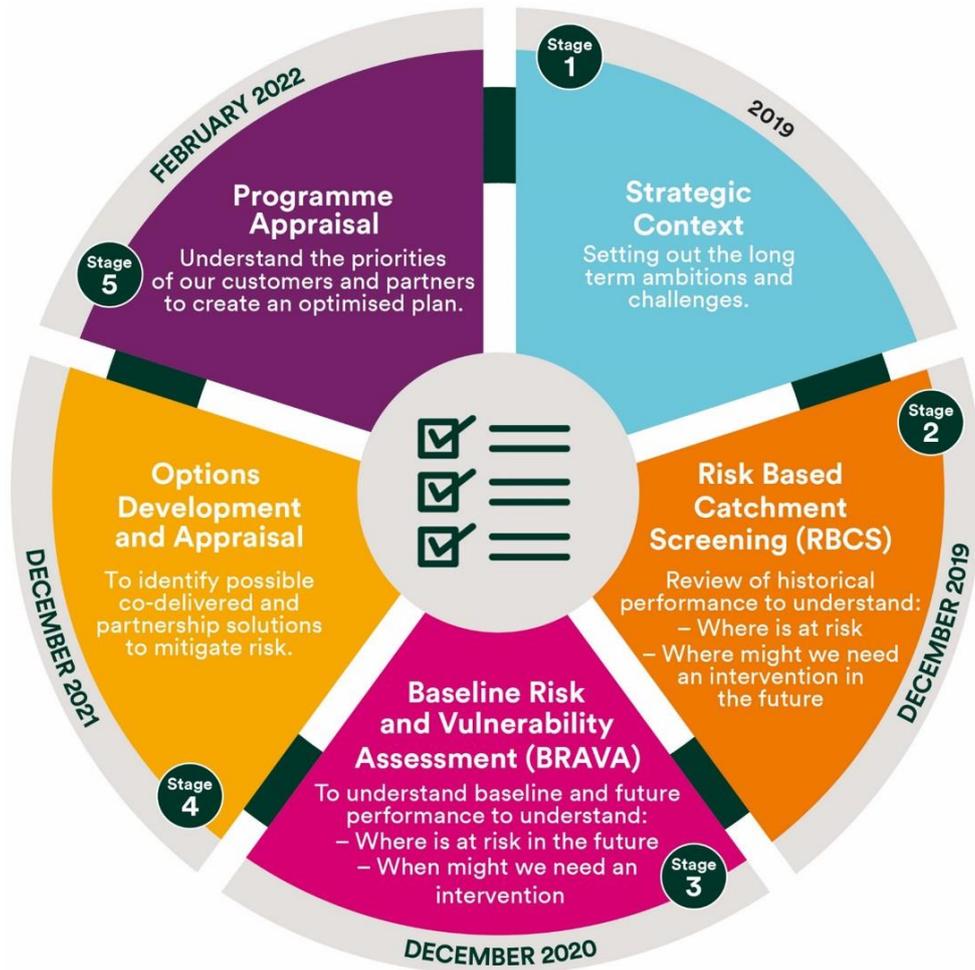
The plan will be set out at three levels (Figure 1) to maximise the potential for partnership working and for effective engagement between regulators and stakeholders at both company-wide level and more locally.

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 Lune SPA.

2. Background to the Lune catchment

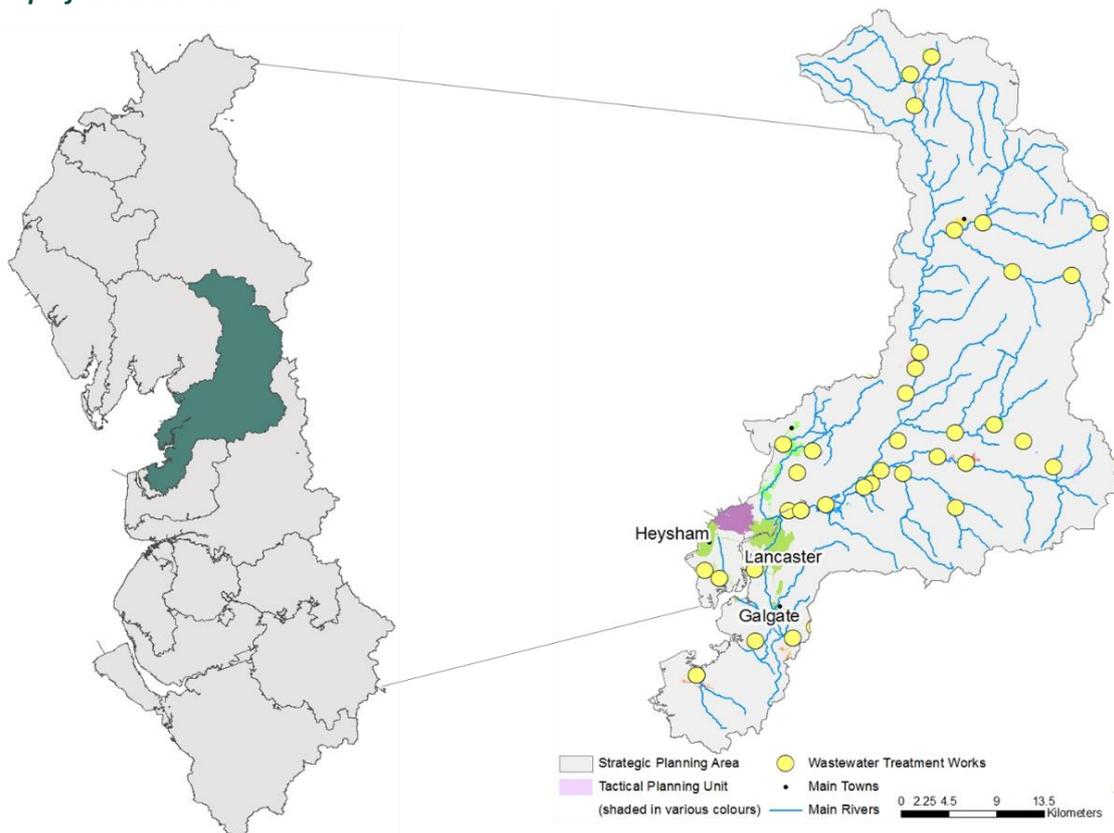
The Lune catchment area covers 1308.7km², from Tebay located in the North down to Clapham and Austwick in the south. It also stretches across to the coastal towns of Morecombe and Heysham ^[1]. The area mainly consists of rural areas located on the edges of the Yorkshire Dales National Park and the Forest of Bowland AONB, it does also have a number of urbanised areas such as Lancaster, Morecombe and Heysham found in the south west.

There are six main sub catchments:

- Greta and Rawthey – East of the catchment, this area mostly consists of the rural parts of the Yorkshire Dales National Park ^[2].
- Keer – West of the catchment, this is a smaller sub catchment that is located along the border between Lancashire and Cumbria. Within this area there are towns such as Carnforth and Bolton-le-Sands ^[3].
- Lune – Centre of the catchment, this sub catchment runs from the confluence of the river Rawthey and the river Lune that is south of Sedburgh near Lancaster ^[4].
- Lune Upper – North of the catchment, this area covers from between the Lake District National Park and the Yorkshire Dales National Park. Tebay can be found within the centre of this ^[5].
- Pilling Ridgy Cocker and Conder – South west of the catchment, incorporating both the Morecombe and Heysham coast along with the North West coast of Garstang ^[6].
- Wenning – South east of the catchment, includes the towns of High Bentham, Clapham and Wray ^[7].

There are 33 wastewater tactical planning units (TPU, also known as wastewater treatment work (WwTW) drainage catchments) within the Lune 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 Lancaster to smaller, rural catchments such as Caton. The TPUs are highlighted in Figure 3.

Figure 3 Map of the Lune SPA



There are numerous strategic management plans within the Lune that are owned by various other organisations. Within the Lune 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);
- North West and North Wales Coastal Group Shoreline Management Plan (SMP); 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 Lune catchment
<p>River Basin Management Plan (RBMP) ^[8]</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 rural areas.</p> <p>Future challenges predicted by the Environment Agency include invasive non-native species, physical modifications and pollution from a range of sources including wastewater, agriculture and rural areas.</p> <p>Future challenges predicted by partnerships include changes to natural flow and water levels, physical modifications and pollution from agriculture and rural areas.</p>
<p>Flood Risk Management Plan (FRMP) ^[9]</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>Within the North West RBD, 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.</p> <p>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. 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 RBD 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 Lune catchment
<p>Shoreline Management Plan (SMP) ^[10]</p> <p>Owner: North West and North Wales Coastal Group</p>	<p>The SMP is a non-statutory, high level policy document for coastal flood and erosion risk management planning that was formally adopted in August 2016. It provides a large-scale assessment of the risks associated with coastal processes and helps to reduce these risks to people and the environment by identifying the most sustainable policies for managing flood and coastal erosion risks in the short term (0–20 years), medium term (20–50 years) and long term (50–100 years).</p>	<p>The Wyre Estuary in terms of the SMP falls into the Lune SPA. The recommended policy is for managed realignment to allow realignment back to high land but in a more protective and managed way which would also be more conducive for potential habitat creation purposes.</p> <p>For the open coast section between Knott End-on-Sea, the long term plan is to continue providing protection against flood and erosion to property and infrastructure, however, as with other locations along the SMP2 frontage, it is going to become increasingly difficult to justify the long term affordability of the maintenance and improvements to current defences that would be required to continue to hold the line. Managed realignment was assessed as an alternative more sustainable policy to hold the line in some locations along the frontage.</p> <p>The long term plan for the Lune is to continue to protect infrastructure and the historic city of Lancaster, but other areas would not be defended, allowing occasional inundation and natural evolution.</p> <p>The section of coastline between Husham and Arnside includes the large port and nuclear power stations at Husham and the tourist town of Morecambe which will all justify continued protection into the long term.</p>
<p>Surface Water Management Plan (SWMP) ^[11]</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. Uuw continues to work closely with LLFAs and support the development of SWMP where required, and the delivery of SWMP where they are published.</p>	

Management plan	Overview	Key aspects for the Lune catchment
<p>Catchment Based Approach (CaBA) Catchment Plan ^[8] ^[12]</p> <p>Owner: Living Lune 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 Living Lune catchment partnership is to create a healthy water environment within the Lune Catchment that will bring social and economic benefits for all.</p> <p>With the aim to:</p> <ul style="list-style-type: none"> • Conserve, protect, rehabilitate and improve the rivers, streams, watercourses and water impoundments of the catchments comprising the River Lune throughout its entire course and all its associated tributaries in Cumbria, Yorkshire and North Lancashire. • Advance education across the understanding of rivers, river corridors and catchments including economic or social activity, and the benefits of conservation, protection, rehabilitation and improvement of aquatic environments. <p>The catchment partnership focusses on key themes such as water quality, flooding, habitat and wildlife, and non-native species. Current challenges identified by the partnership include pollution from rural areas, agriculture, towns, cities and transport, and physical modifications. Future challenges include physical modifications, changes to the natural flow and water levels and pollution from agriculture.</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 Lune catchment we have engaged with stakeholders such as:

- The Environment Agency;
- Lancashire County Council; and
- The Lune Rivers Trust (host of the Lune 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 Lune 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.

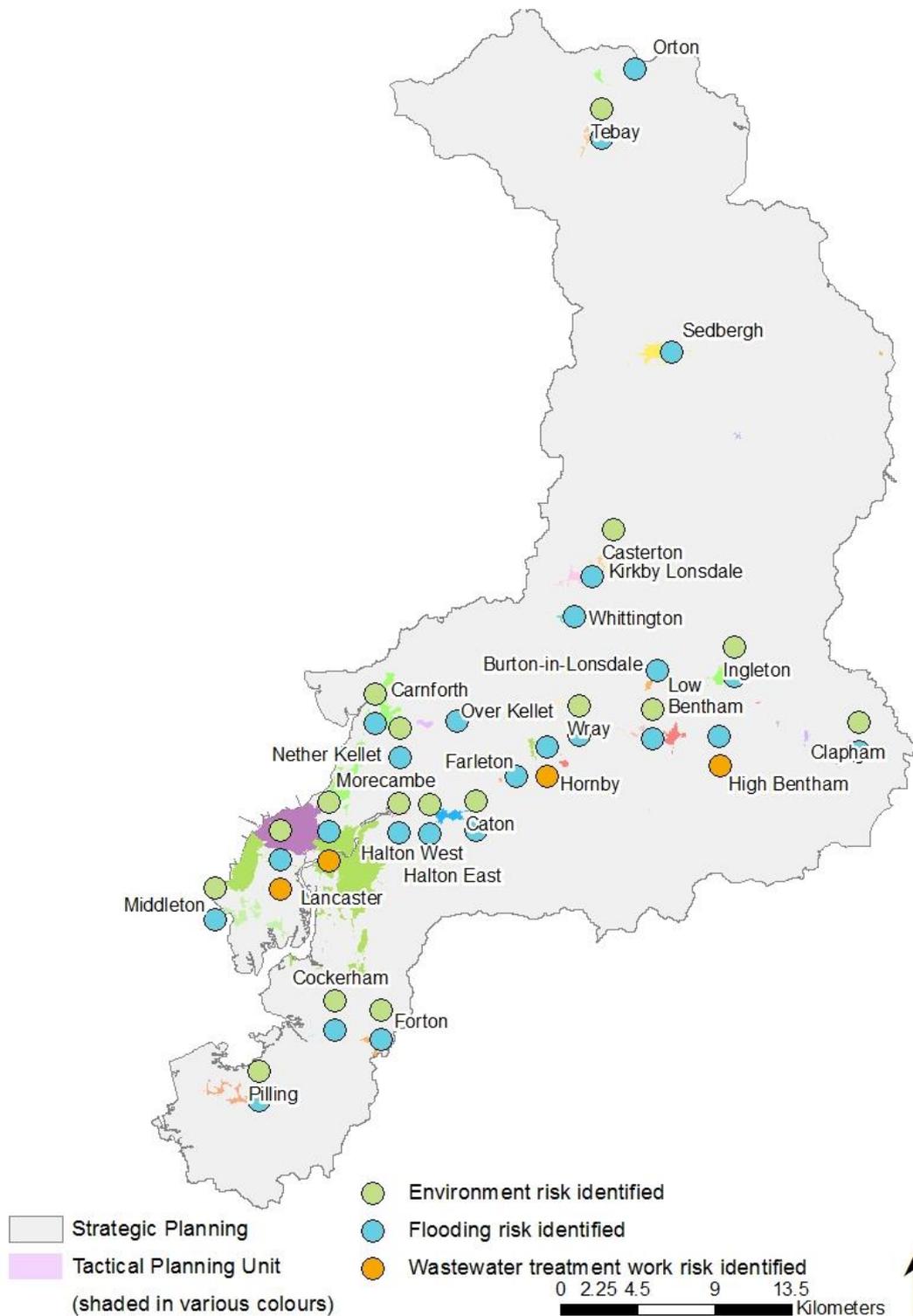
Within the Lune, the RBCS stage identified 28 out of 33 TPUs that required further investigation and therefore passed onto the BRAVA stage (outlined in section 3.2).

Figure 5 indicates which of the RBCS categories (environmental, flooding and wastewater treatment works capacity) have triggered within each TPU. 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 TPUs can be found in Table A.1 in the Appendix. Environmental and flooding categories are the most common within the Lune, which is supported by the highest triggered RBCS assessments which are:

- Storm Overflow Assessment Framework - (17/33) – Environment; and
- External Sewer Flooding – (25/33) – Flooding.

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

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



3.2 Baseline Risk and Vulnerability Assessment (BRAVA) and Resilience

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

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

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

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

Table 2 Environmental BRAVA results

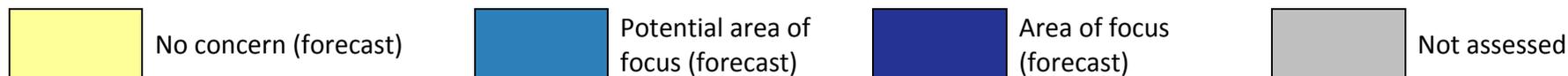
Tactical Planning Unit	Environmental					
	Pollution Assessment	Storm Overflow Performance		Bathing and Shellfish Spill Assessment		
	2020	2020	2050	2020	2030	2050
Burton-In-Lonsdale						
Carnforth						
Casterton						
Caton						
Clapham						
Cloughton						
Cockerham						
Dent						
Farleton						
Forton						
Halton East						
Halton West Lune						
High Bentham						
Hornby						
Ingleton						
Kirkby Lonsdale						
Lancaster						
Low Bentham						
Middleton						

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
Morecambe						
Nether Kellet						
Orton						
Over Kellet						
Pilling						
Sedbergh						
Tebay						
Whittington						
Wray						

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
Burton-In-Lonsdale	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow
Carnforth	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Casterton	Light Blue	Light Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Light Blue
Caton	Light Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Light Blue
Clapham	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Cloughton	Grey	Grey	Grey	Grey	Grey	Grey	Dark Blue	Grey	Grey	Grey	Grey	Grey	Dark Blue
Cockerham	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Dent	Grey	Grey	Grey	Grey	Grey	Grey	Dark Blue	Grey	Grey	Grey	Grey	Grey	Light Blue
Farleton	Yellow	Yellow	Yellow	Yellow	Yellow	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Dark Blue
Forton	Light Blue	Light Blue	Light Blue	Yellow	Yellow	Dark Blue	Yellow	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Yellow
Halton East	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Dark Blue	Dark Blue	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow
Halton West Lune	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
High Bentham	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Hornby	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow
Ingleton	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow
Kirkby Lonsdale	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Dark Blue	Yellow	Yellow	Yellow	Light Blue
Lancaster	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Dark Blue
Low Bentham	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Yellow	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Yellow
Middleton	Light Blue	Light Blue	Light Blue	Dark Blue	Dark Blue	Dark Blue	Yellow	Yellow	Yellow	Light Blue	Dark Blue	Dark Blue	Yellow

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
Morecambe													
Nether Kellet													
Orton													
Over Kellet													
Pilling													
Sedbergh													
Tebay													
Whittington													
Wray													

Table 4 Wastewater treatment works BRAVA results

Tactical Planning Unit	Wastewater Treatment Works		
	Risk to wastewater treatment works (WwTW) capacity		
	2020	2030	2050
Burton-In-Lonsdale			
Carnforth			
Caton			
Cockerham			
Farleton			
Forton			
Halton East			
Halton West Lune			
High Bentham			
Hornby			
Ingleton			
Kirkby Lonsdale			
Lancaster			
Low Bentham			
Middleton			
Morecambe			
Nether Kellet			
Over Kellet			
Pilling			
Sedbergh			
Tebay			
Whittington			
Wray			

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
Burton-In-Lonsdale			
Carnforth			
Casterton			
Caton			
Cloughton			
Cold Cotes			
Dent			
Farleton			
Forton			
Garsdale Head			
Halton East			
Halton West Lune			
High Bentham			
Hornby			
Ingleton			
Kirkby Lonsdale			
Lancaster			

Resilience	
	More resilient
	Less resilient
	Not assessed

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
Lea Yeat			
Low Bentham			
Orton			
Pilling			
Sedbergh			
Tebay			
Wray			

3.3 Problem characterisation

3.3.1 Complex catchments

Complex catchments were determined through problem characterisation using a combination of a complex and strategic catchment scores based on strategic need (largely derived from growth and climate forecast models) and modelled risks in each of the TPU (largely based on BRAVA). Within the Lune, two TPUs were identified to be 'complex' based on problem characterisation, these were:

- Lancaster; and
- Carnforth.

3.3.2 Strategic growth catchments

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

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

- Lancaster.

3.3.3 Lancaster

The Lancaster TPU is to the south west of the Lune (Figure 6). The sewer network is over 600km long, and serves over 31,000 properties and a residential population of approximately 78,000 people. The watercourses in the area are all classed as 'moderate' under the Water Framework Directive (WFD) 2019.

The Lancaster TPU is considered both a strategic and complex catchment. It is of strategic interest due to significant growth, with a projected 21% increase in residential population by 2050. This could drive a significant amount of further development to meet housing need, and likely increase pressure on the network and wastewater treatment works. The Bailrigg garden village development to the south of Lancaster (Figure 6) could include up to 3,500 new residential properties^[13], driving a high number of new connections and increase the amount of wastewater needing treatment. Part of the challenge is determining if the TPU will be expanded to include the development with significant upgrades to the wastewater treatment works, or if a new wastewater treatment works and network will be built to serve the area. Regardless, this could lead to significant investment in both the network and wastewater treatment works to ensure protection of the environment and water quality.

Lancaster is also 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, 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.

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

Figure 6 Map of the Lancaster TPU, including the Bailrigg Garden Village development

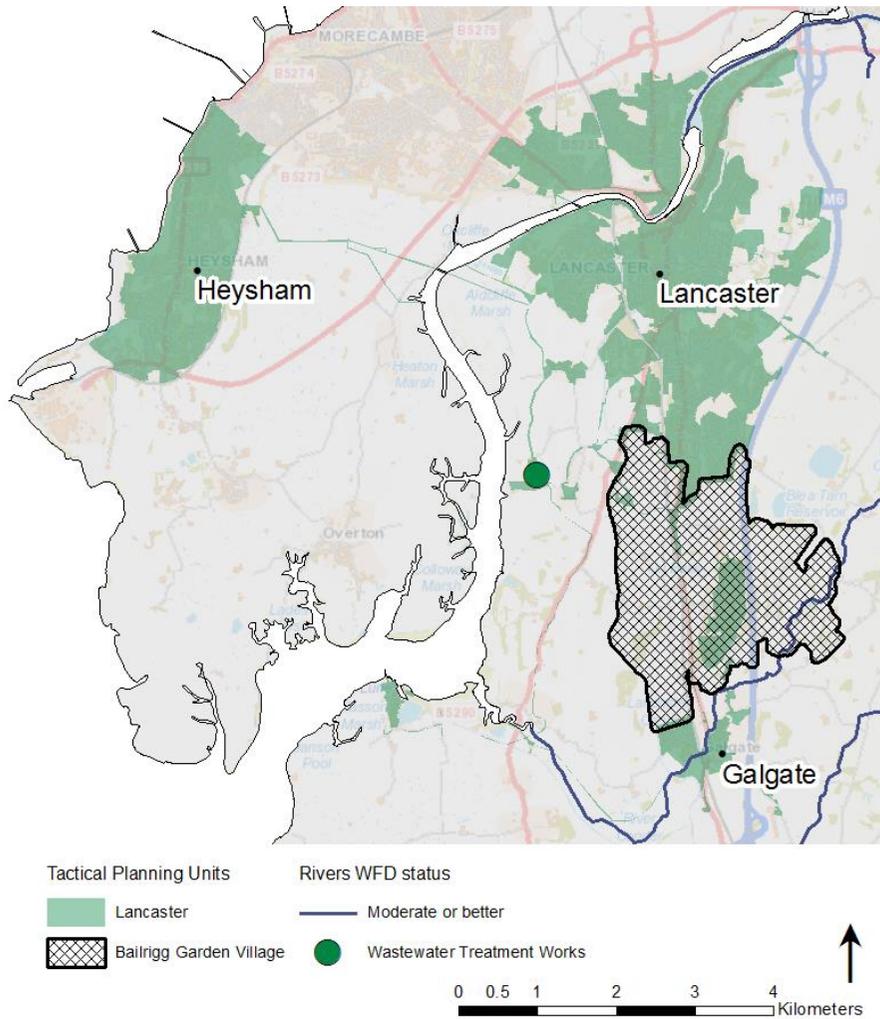
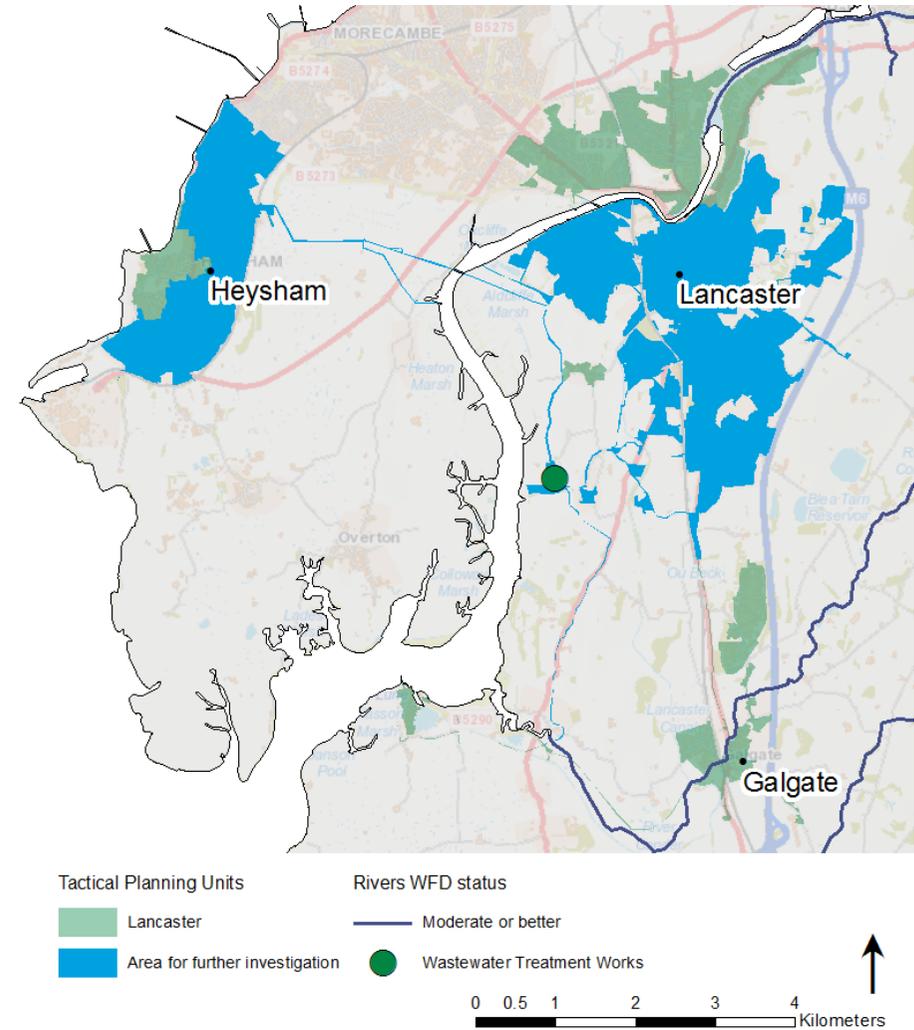


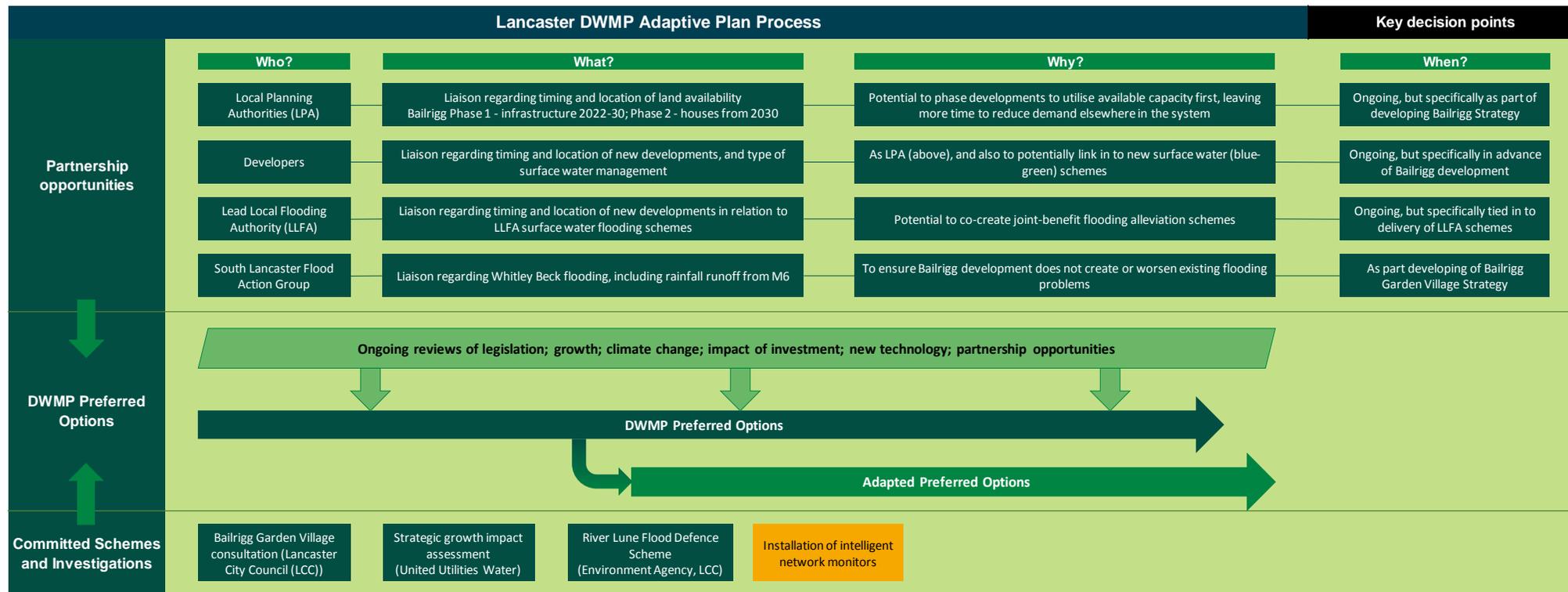
Figure 7 Map of the Lancaster TPU with areas for further investigation highlighted in blue



3.3.3.1 Lancaster adaptive plan

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

Figure 8 Lancaster 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 Lancaster adaptive plan, reflecting the different option types identified as being appropriate for Lancaster. 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 Lancaster, 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:

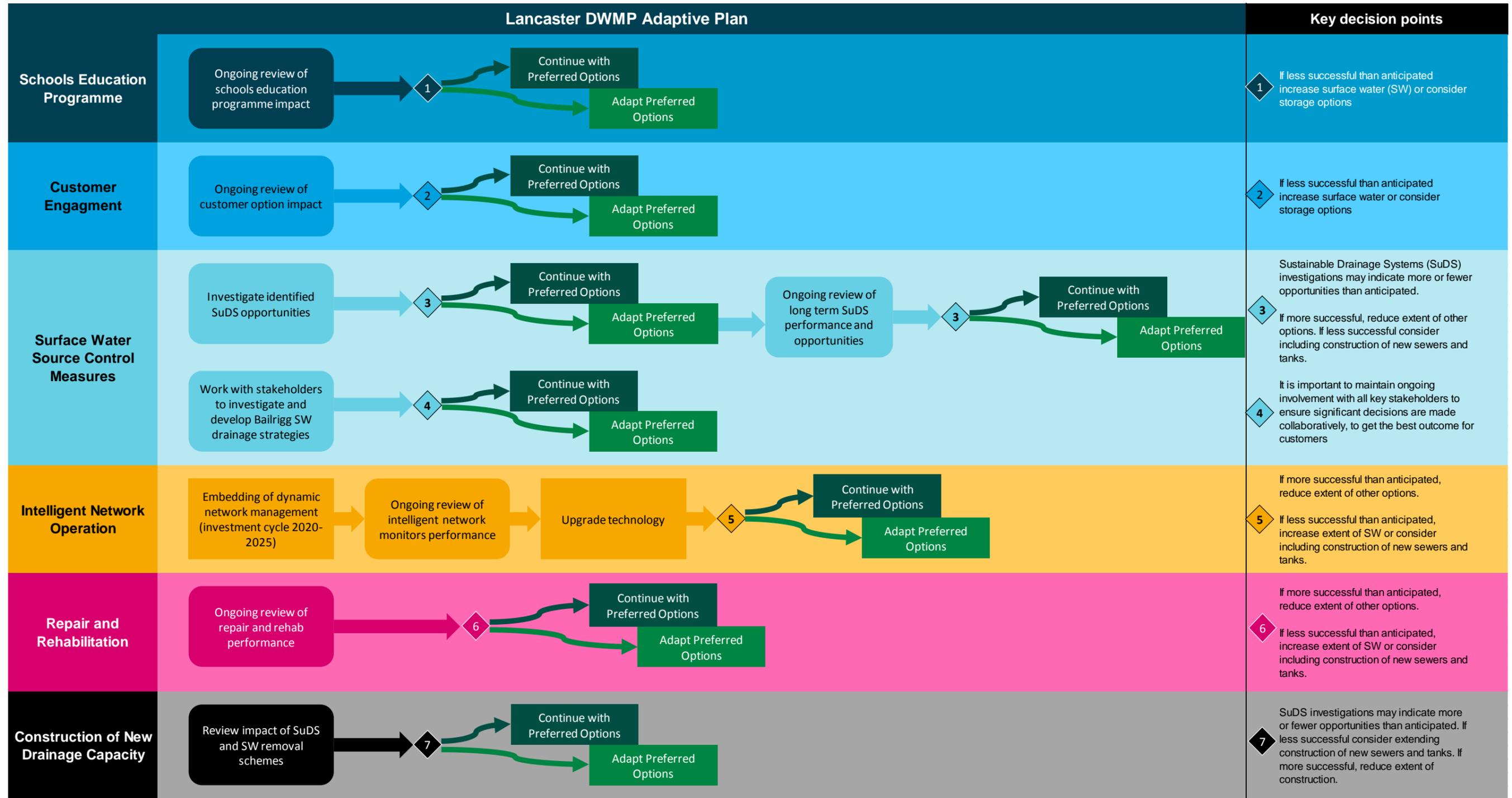
- Technical feasibility;
- Benefit of the work;
- Customer impact;

- 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 Lancaster Adaptive Plan – Possible adaptive pathways as knowledge and opportunities change over time



3.3.4 Carnforth

The Carnforth TPU is to the west of the Lune (Figure 10). The watercourses in the area are all classed as 'moderate' under the WFD 2019. The sewer network is approximately 180km long, and serves over 6,000 properties and a residential population of just under 15,000 people, which is projected to increase approximately 25% by 2050. This could drive further development to meet housing need, and possibly increase pressure on the network and wastewater treatment works.

The Carnforth 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, pollution, sewer collapse, and blockages by 2050, with areas for further investigation highlighted in Figure 11.

The Government's SODRP was published in August 2022, which we have aligned with through both the WINEP and DWMP development. Against a backdrop of significant growth, it is anticipated that 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 the Carnforth TPU

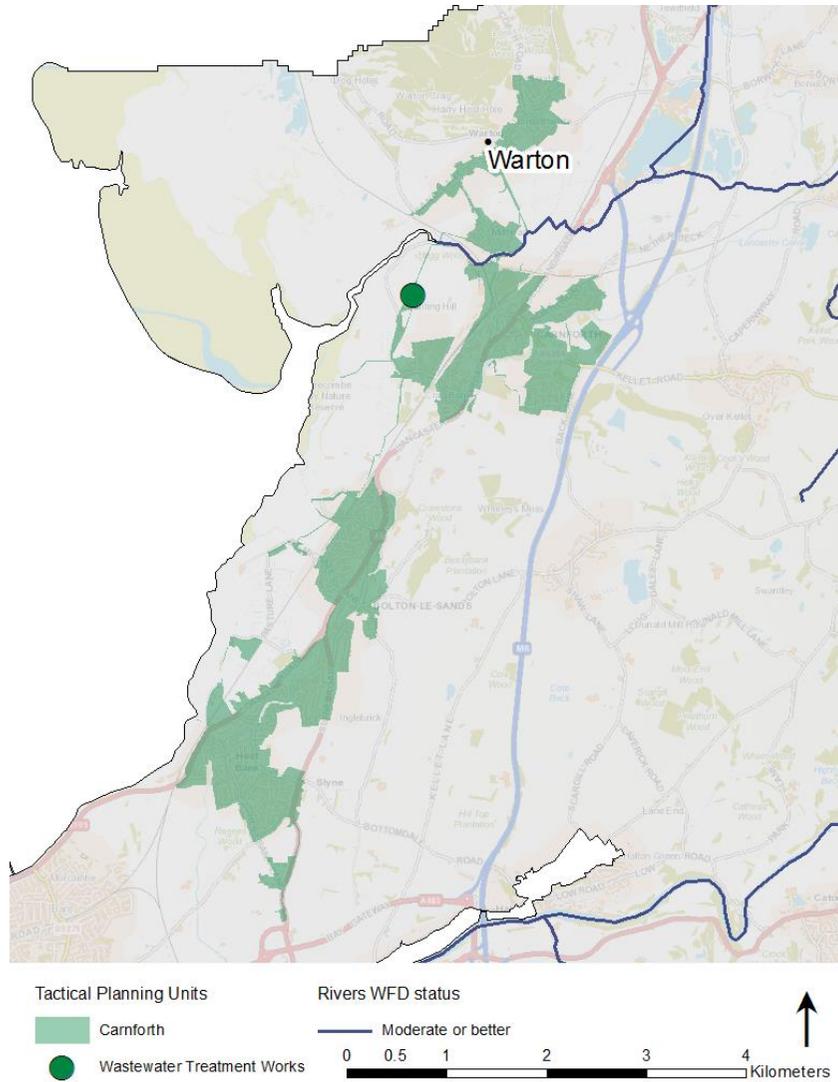
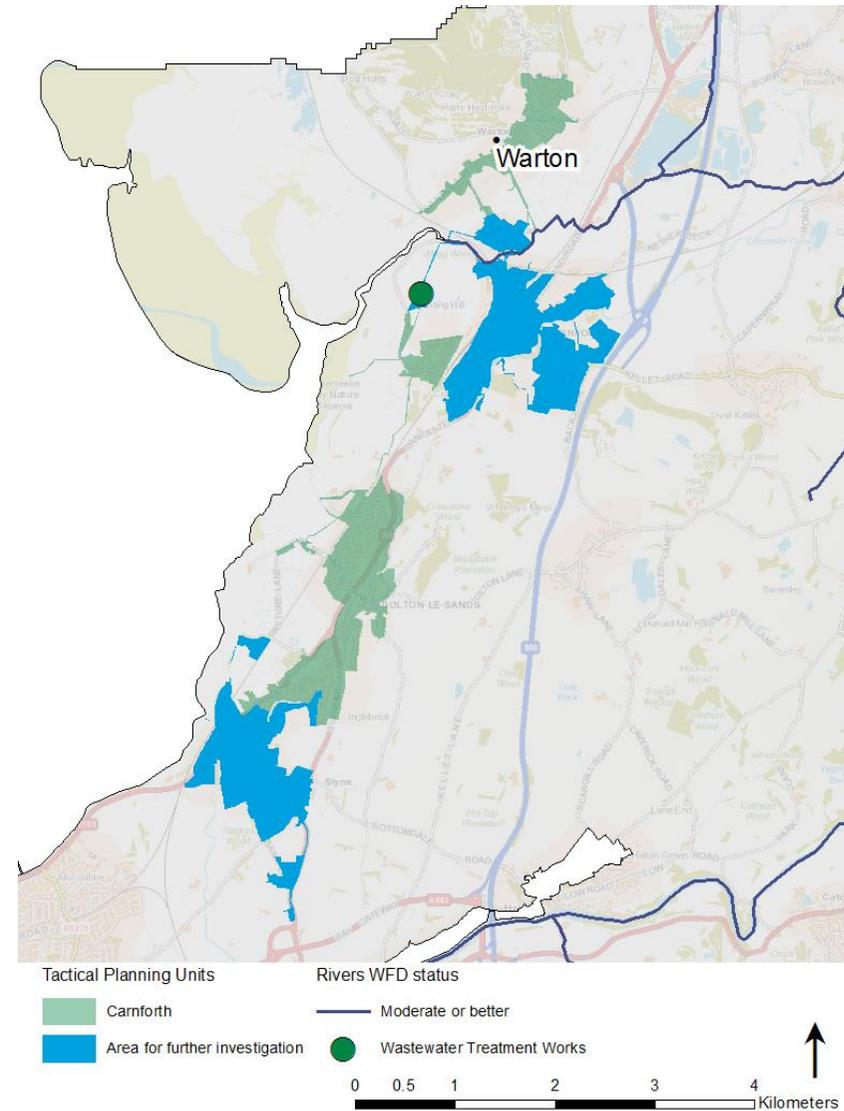


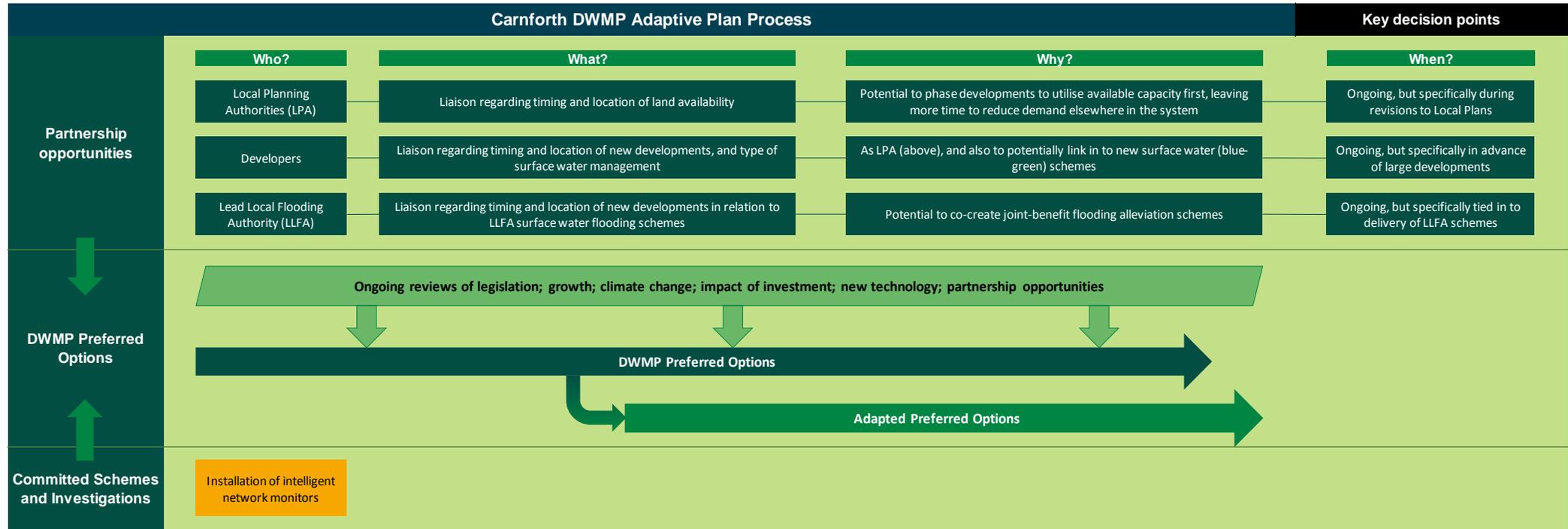
Figure 11 Map of the Carnforth TPU with areas for further investigation highlighted in blue



3.3.4.1 Carnforth adaptive plan

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

Figure 12 Carnforth 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 Carnforth adaptive plan, reflecting the different option types identified as being appropriate for Carnforth. 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 Carnforth, 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:

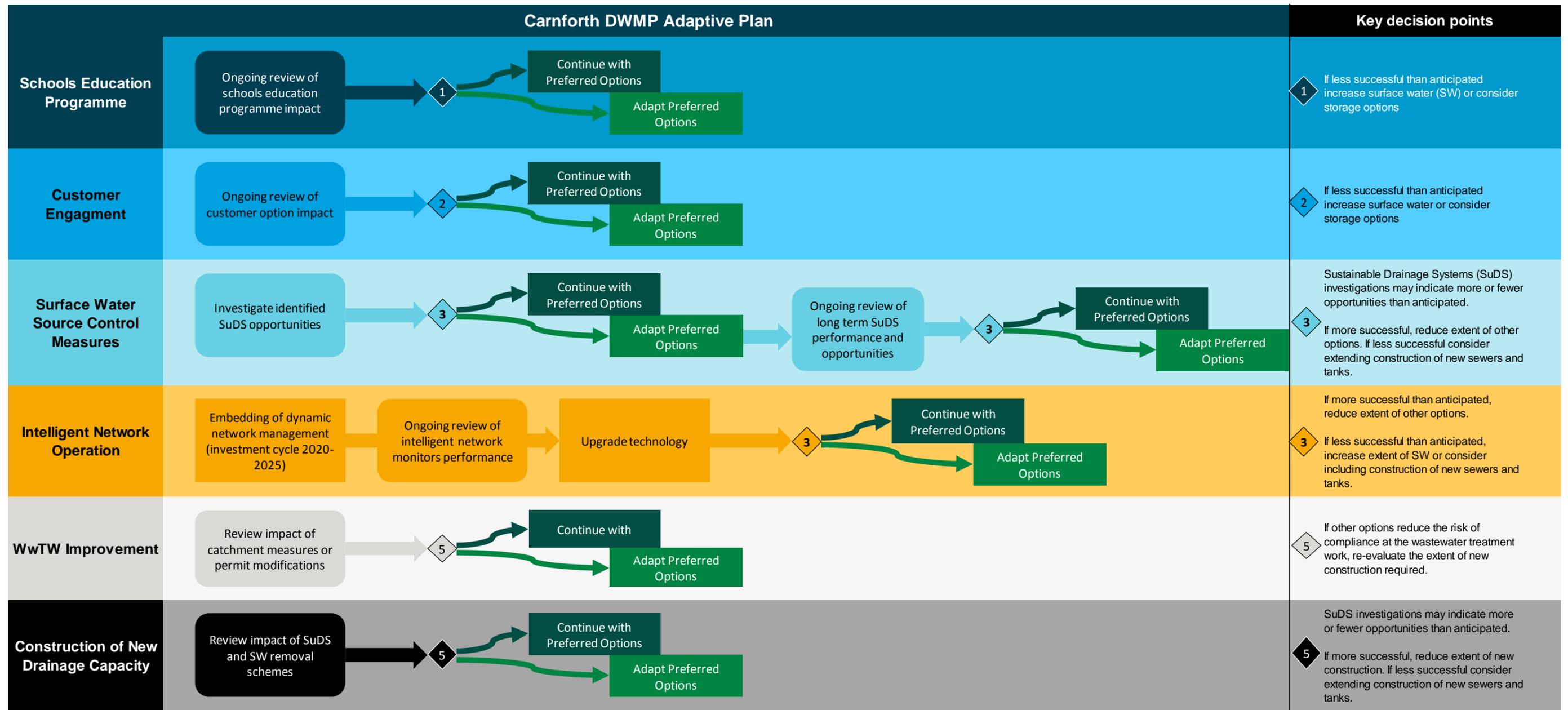
- Technical feasibility;
- Benefit of the work;
- Customer impact;

- 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 Carnforth 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

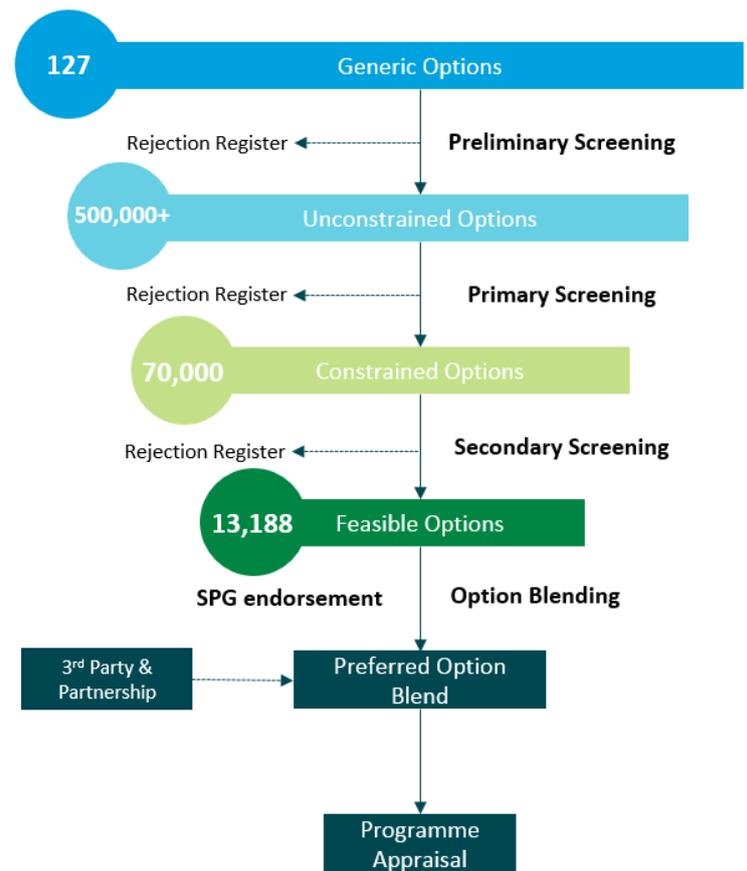
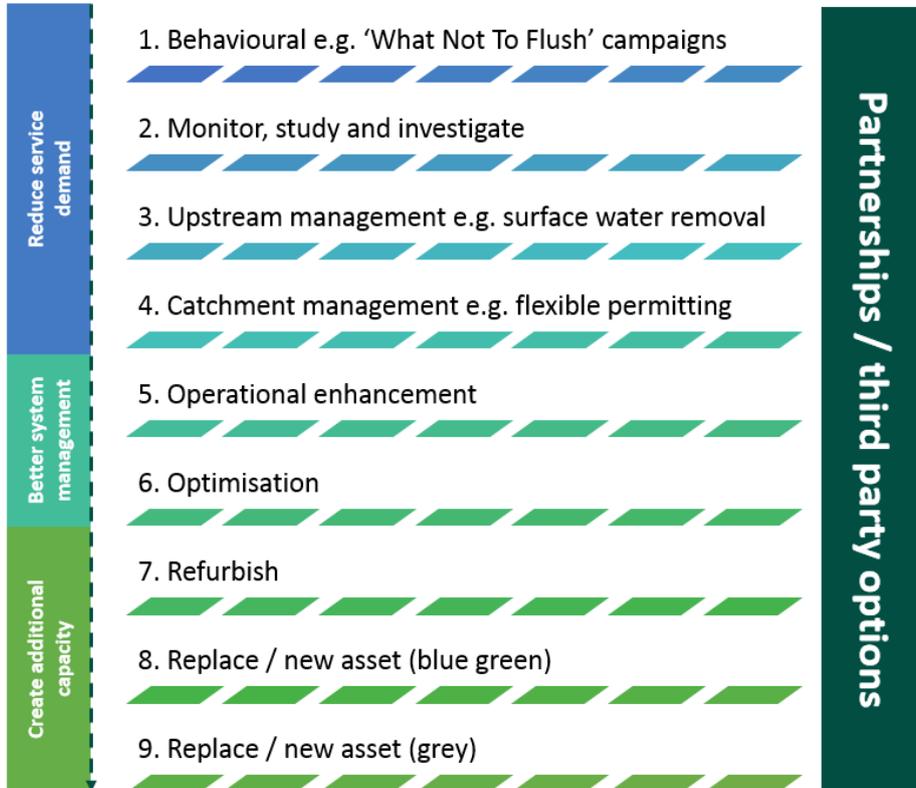


Figure 15 Options hierarchy



4.1 Lune partnerships options

In order to identify and develop potential partnership options in the Lune, 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 Lune SPG workshops are shown in Figure 16 and Table 8.

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 partnership opportunities in the Lune

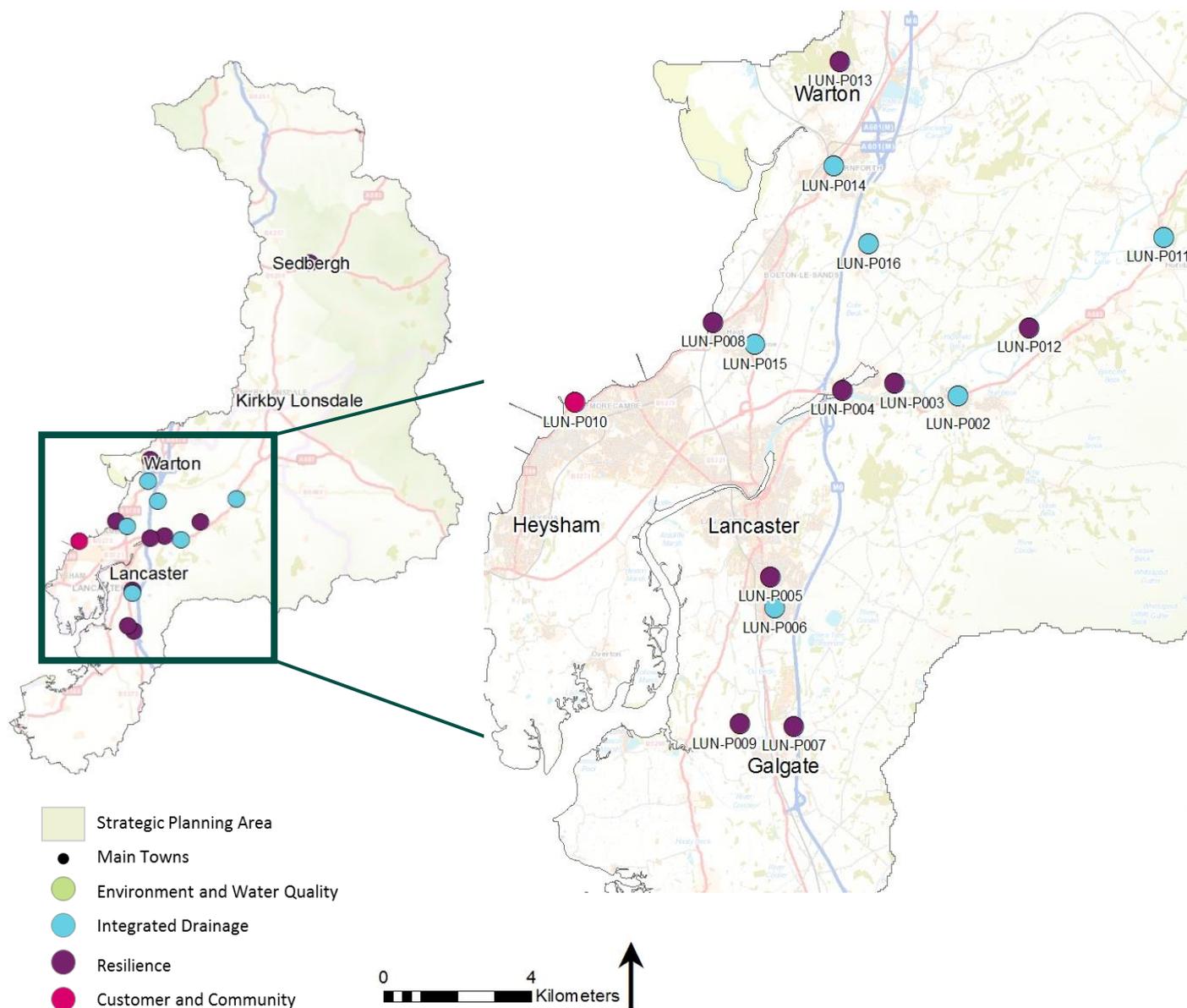


Table 8 Partnership opportunities identified in the Lune

ID	Partnership Opportunity	Theme	Organisation Type
LUN-P001	Natural flood management opportunities project	Resilience	Non-Governmental Organisations
LUN-P002	Flood risk management project	Integrated Drainage	Public Bodies
LUN-P003	Potential for highway drainage networks and natural flood management project	Resilience	Local Councils and Planning Authorities
LUN-P004	Surface water management project	Resilience	Public Bodies
LUN-P005	Potential for natural flood management options project	Resilience	Local Councils and Planning Authorities
LUN-P006	Potential for highway drainage management and natural flood management options project	Integrated Drainage	Local Councils and Planning Authorities
LUN-P007	Natural flood management opportunities project	Resilience	Non-Governmental Organisations
LUN-P008	Potential for upstream natural flood management and sustainable drainage solutions options to be explored	Resilience	Local Councils and Planning Authorities
LUN-P009	Sustainable drainage solutions and Natural flood management opportunities project	Resilience	Public Bodies
LUN-P010	Opportunities for partners to come together for community education	Customer and Community	Local Councils and Planning Authorities
LUN-P011	Opportunities for flood risk management	Integrated Drainage	Public Bodies
LUN-P012	Opportunities for Natural flood management in the wider upstream areas	Resilience	Non-Governmental Organisations
LUN-P013	Improve resilience to power loss project	Resilience	Local Councils and Planning Authorities
LUN-P014	Surface water management project	Integrated Drainage	Local Councils and Planning Authorities
LUN-P015	Surface water management project	Integrated Drainage	Local Councils and Planning Authorities
LUN-P016	Improvement to highway drainage project	Integrated Drainage	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.

5. Options for the Lune

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.

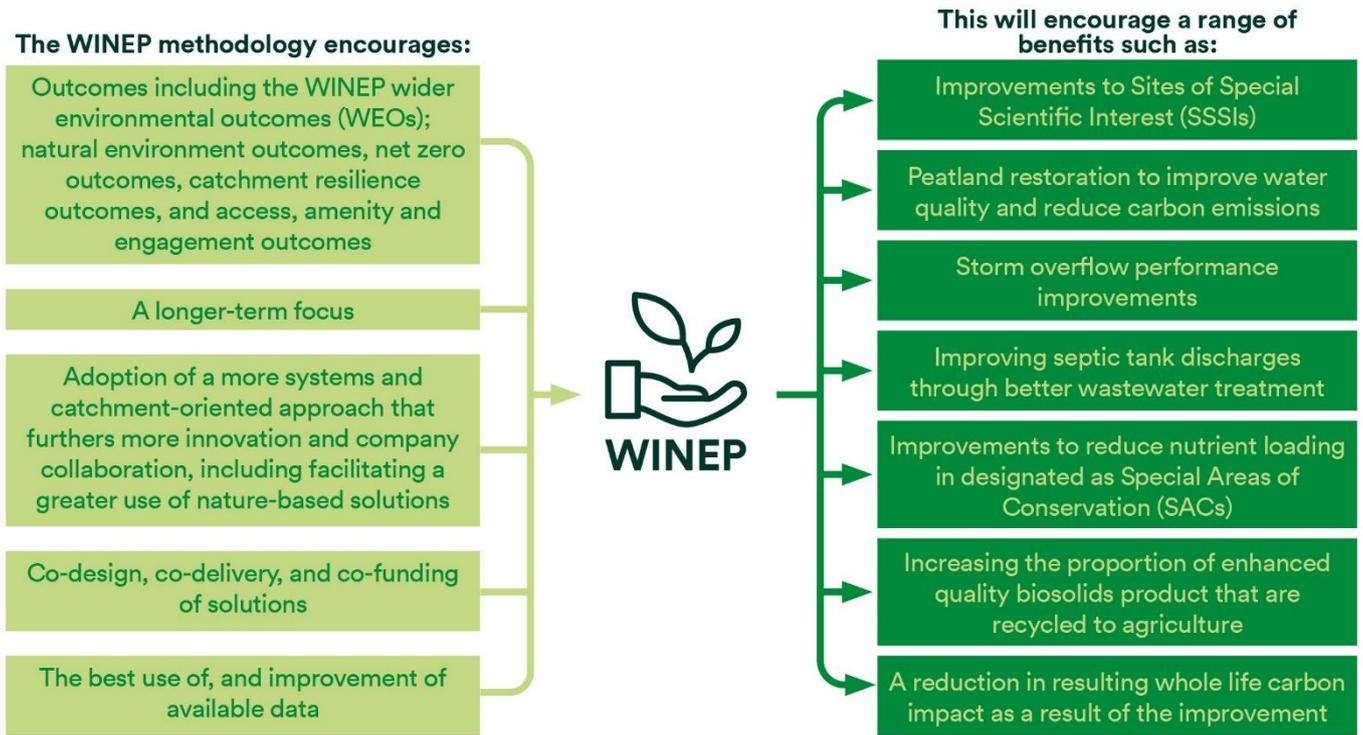
The next WINEP for investment cycle 2025 – 2030 (AMP8) is still to be confirmed (after the publication of the DWMP) and you will be able to find out more about what this means for the Lune when we publish our AMP8 submission in autumn 2023.

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.

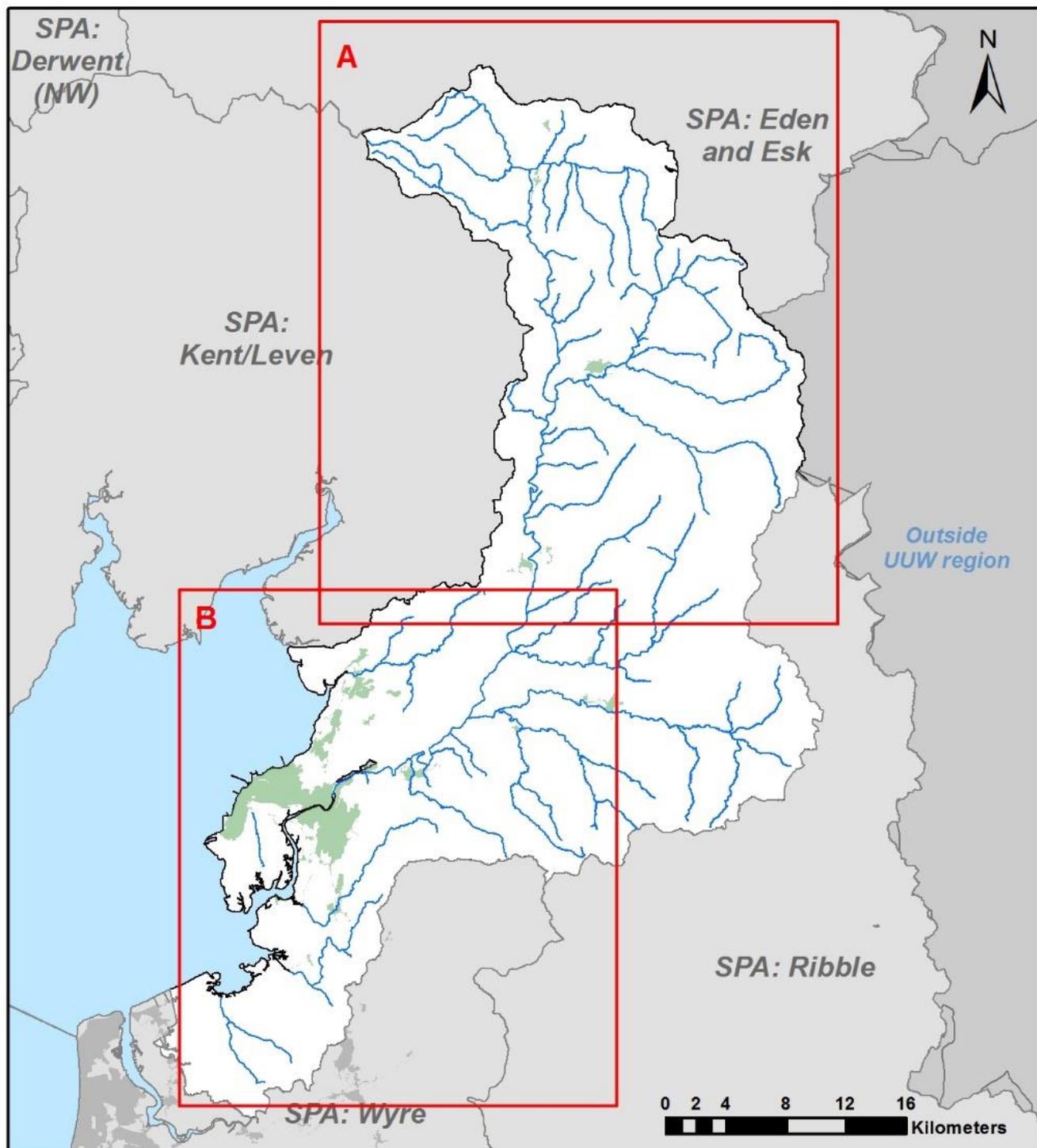
Figure 17 highlights some of the potential benefits as a result of the WINEP.

Figure 17 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 18 shows which locations within the Lune have the potential for investment cycle 2025 – 2030 WINEP schemes, based on the January 2023 WINEP submission.

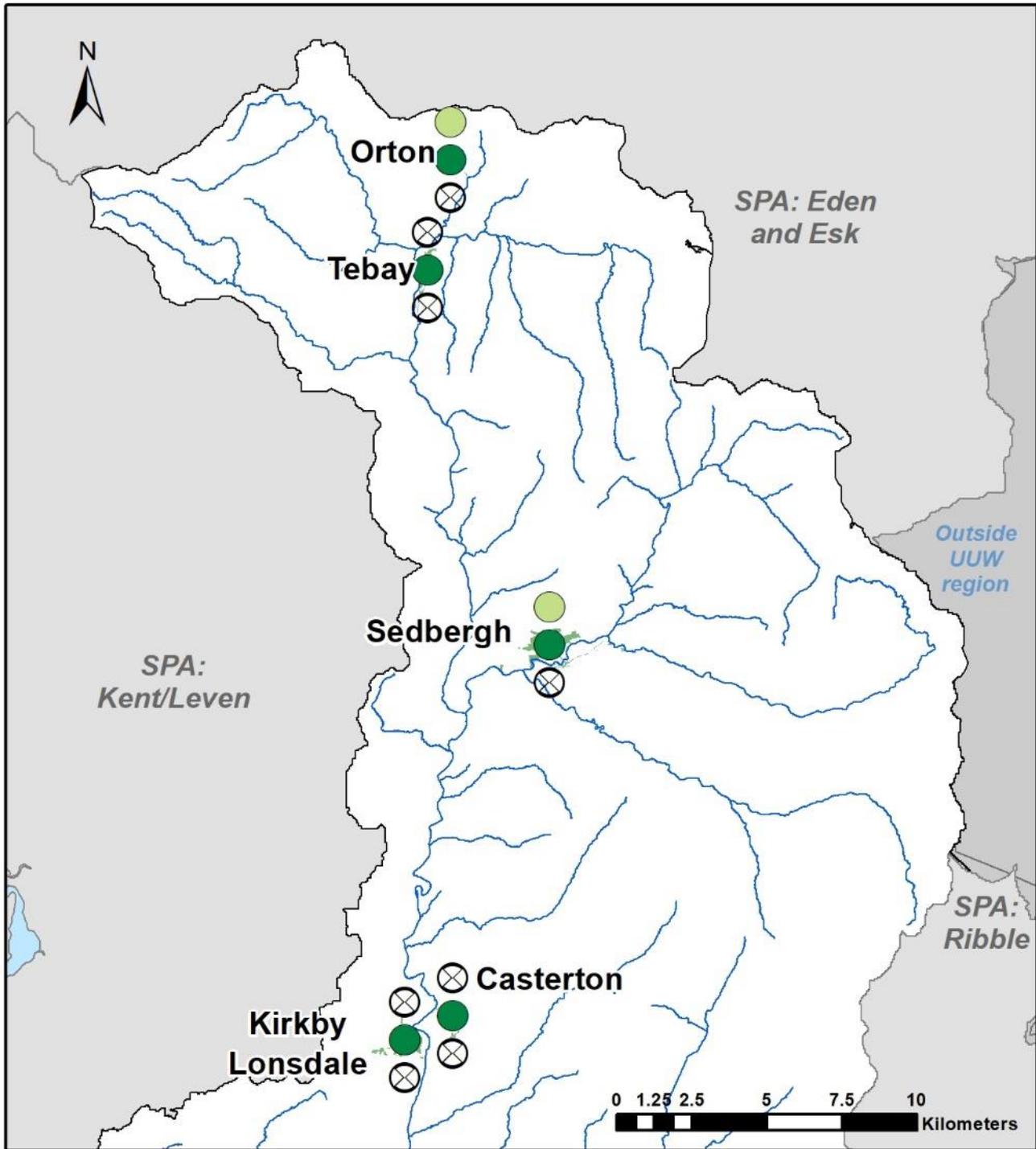
Figure 18 Potential WINEP investment in the Lune for investment cycle 2025-2030



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 18 above refer to Figures 19 and 20 on the following pages.

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

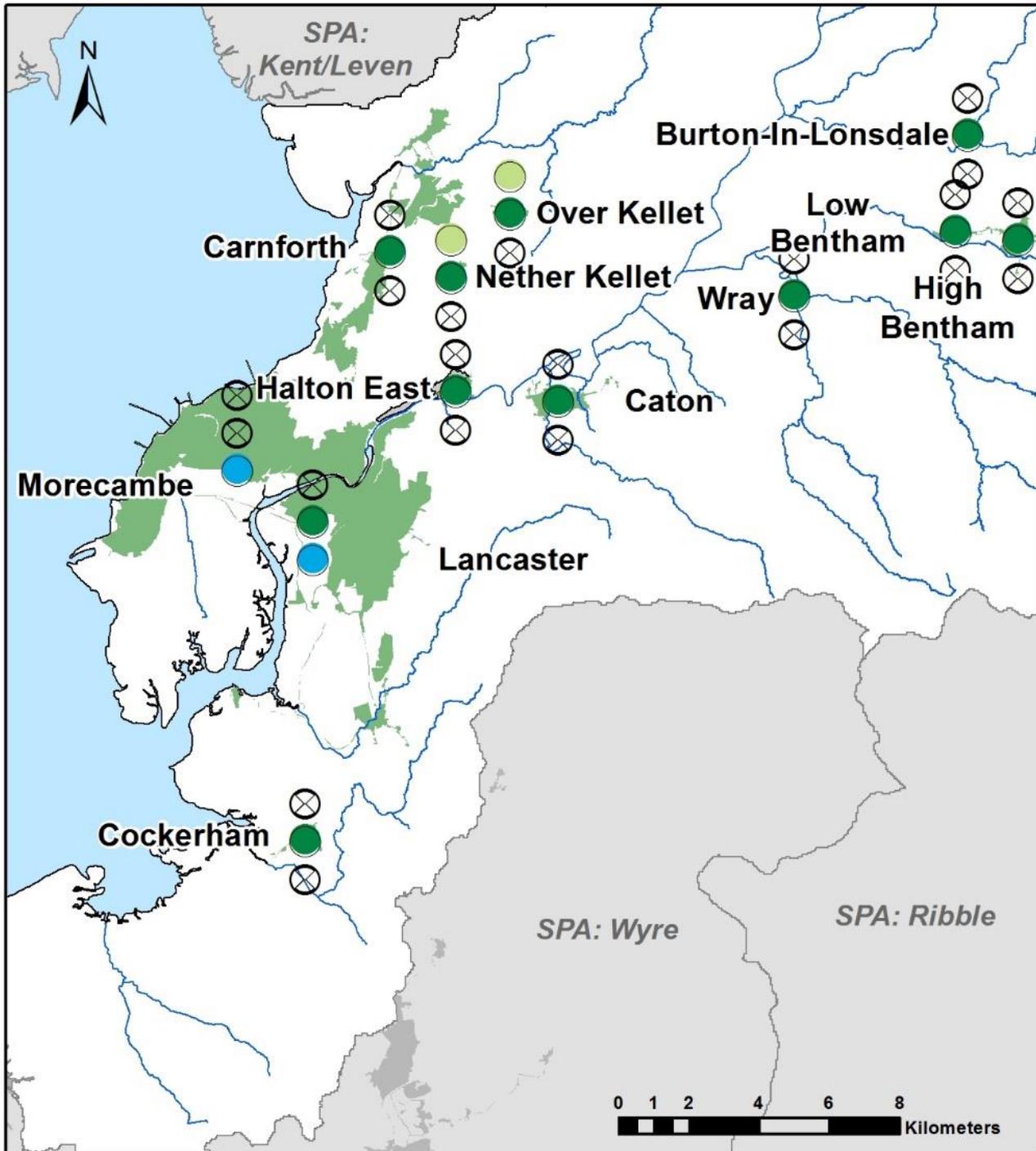


TPUs with WINEP driver investment

TPU Name		← WINEP WwTW investment		No planned investment in designated WINEP driver
		← WINEP Storm Overflow investment		Other TPUs
		← WINEP Investigations		Main River

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

Figure 20 Potential WINEP investment in the Lune 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

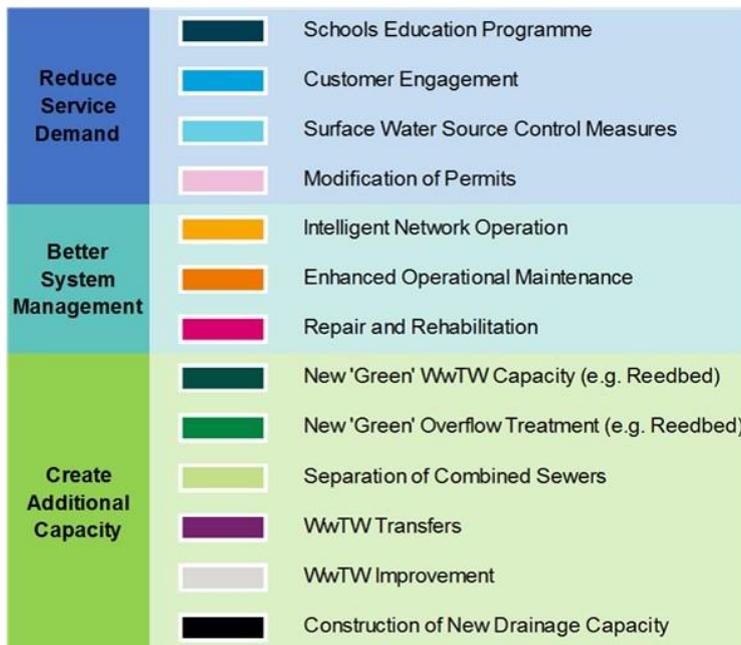
As highlighted above, the delivery of the WINEP will drive improvements and deliver benefits across the North West in the nearer-term. The DWMP is closely aligned with the ambitions and targets included within the WINEP, and included below are potential further enhancement schemes to be delivered over 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 21. 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 21 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 Lune (section 5.2.2); and
- Level 3: Options for each location within the Lune (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.

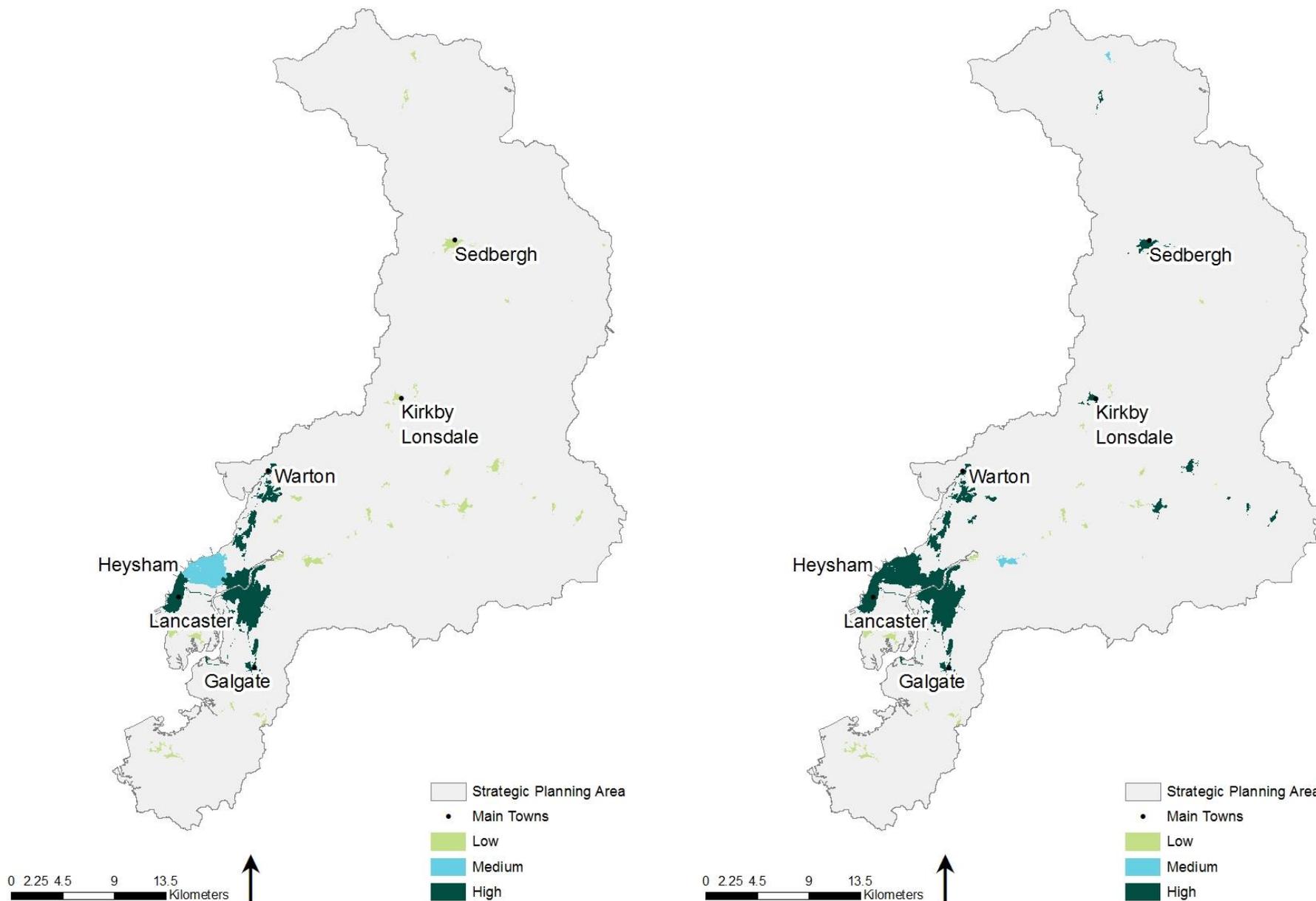
5.2.1 Level 1: Regional measures

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 Lune catchment customer engagement options (Figure 22) 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 Morecambe, Carnforth and Lancaster 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 Lancaster, Sedbergh and Tebay TPUs (Figure 22).

Figure 22 Maps showing the benefit of implementing regional customer engagement (left) and sustainable drainage solutions (right) options across the Lune



5.2.2 Level 2: Options for the Lune

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

- The potential options to address environmental planning objectives as shown in Figure 23. 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 24. 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 25.

Figure 23 Distribution of environmental investment by option type within the Lune

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.

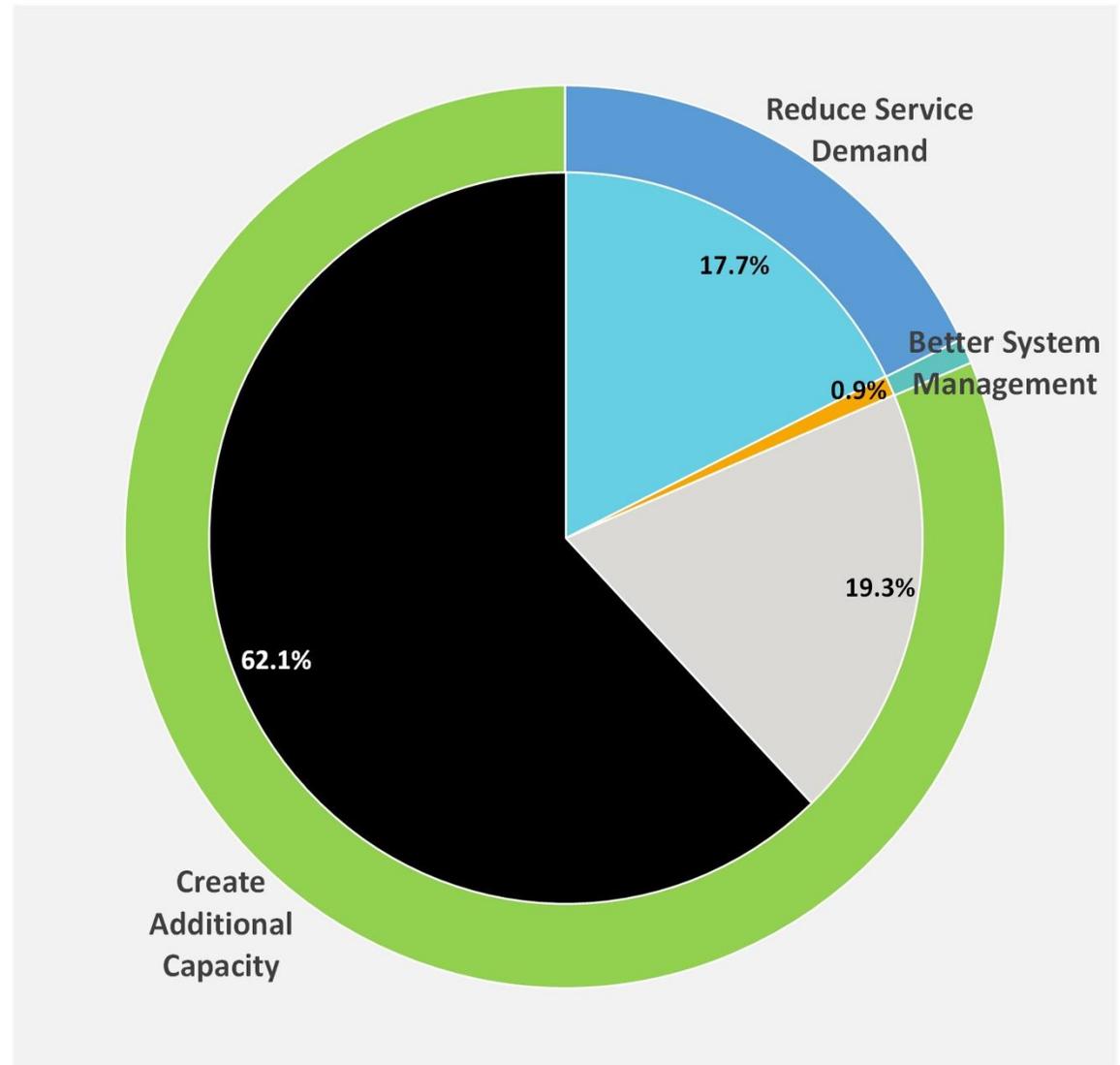


Figure 24 Distribution of flooding investment by option type within the Lune

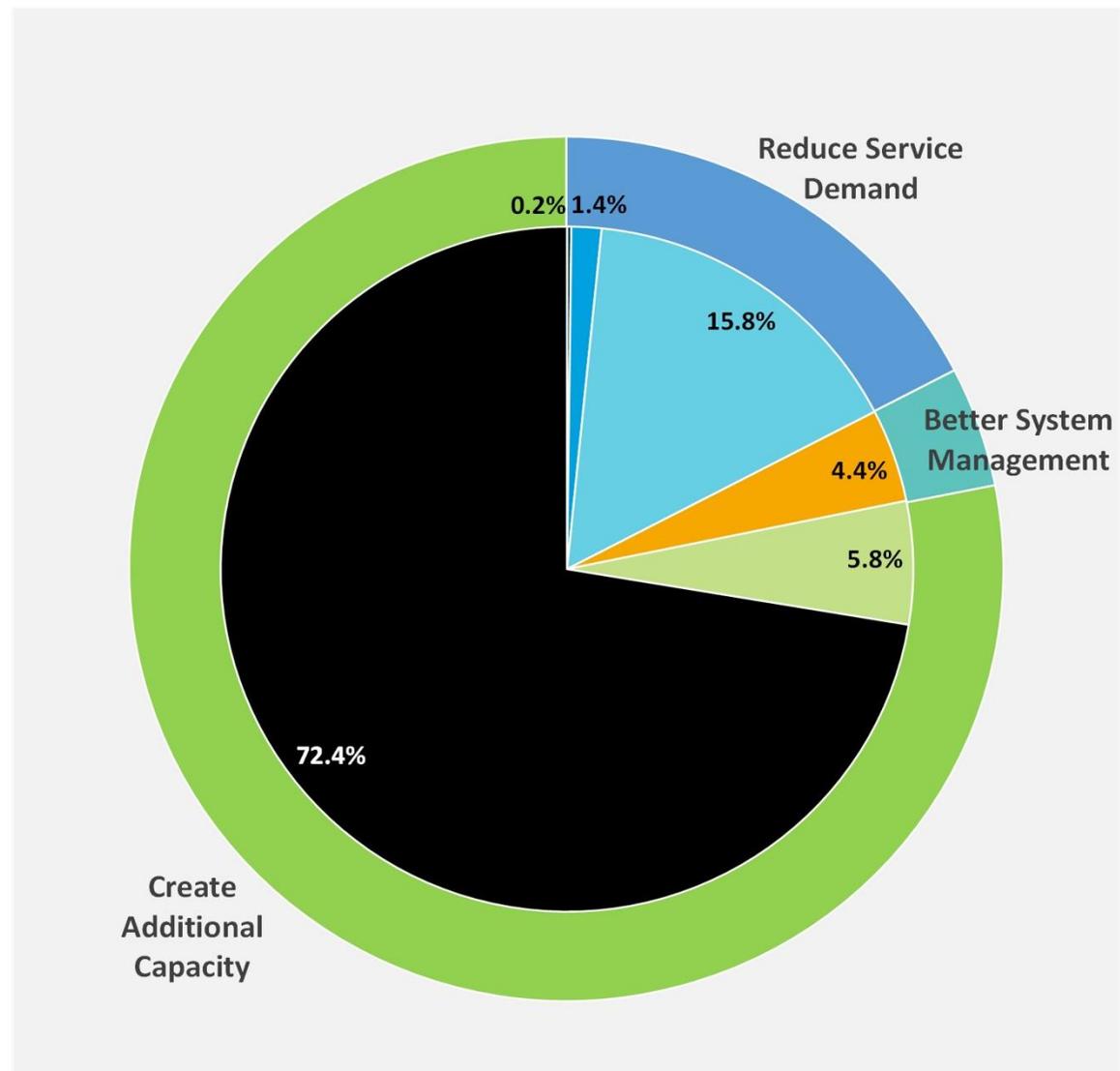
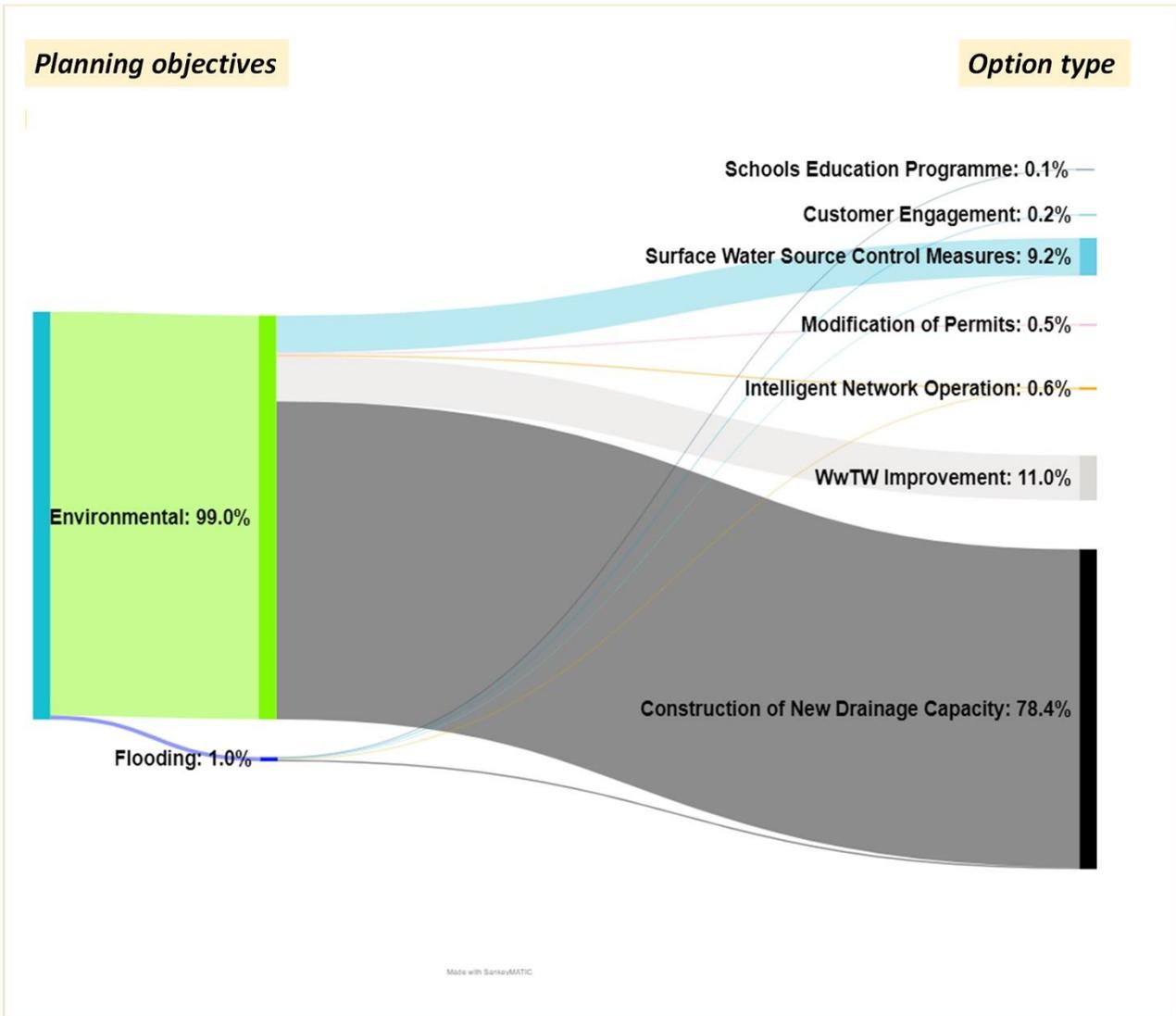
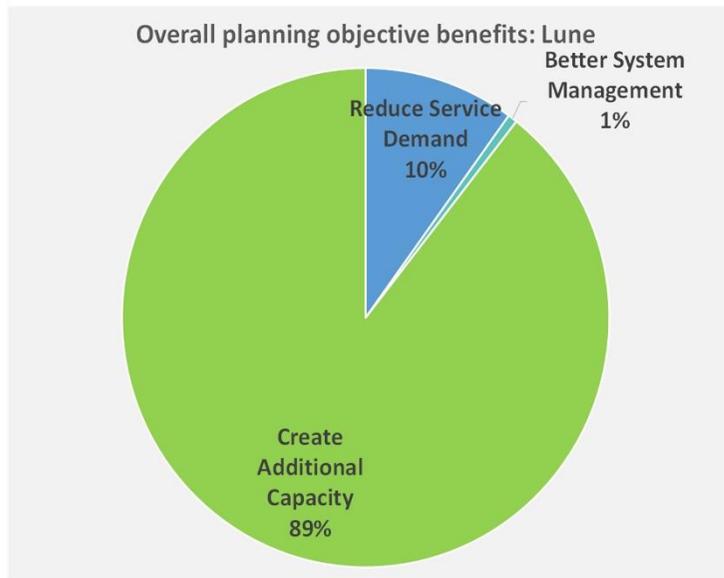


Figure 25 Distribution of benefit by option type within the Lune

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

United Utilities Water (UW) commitments to improving flooding performance could 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 and stormwater storage capacity, including the modification of permits, supported by improved operation maintenance.

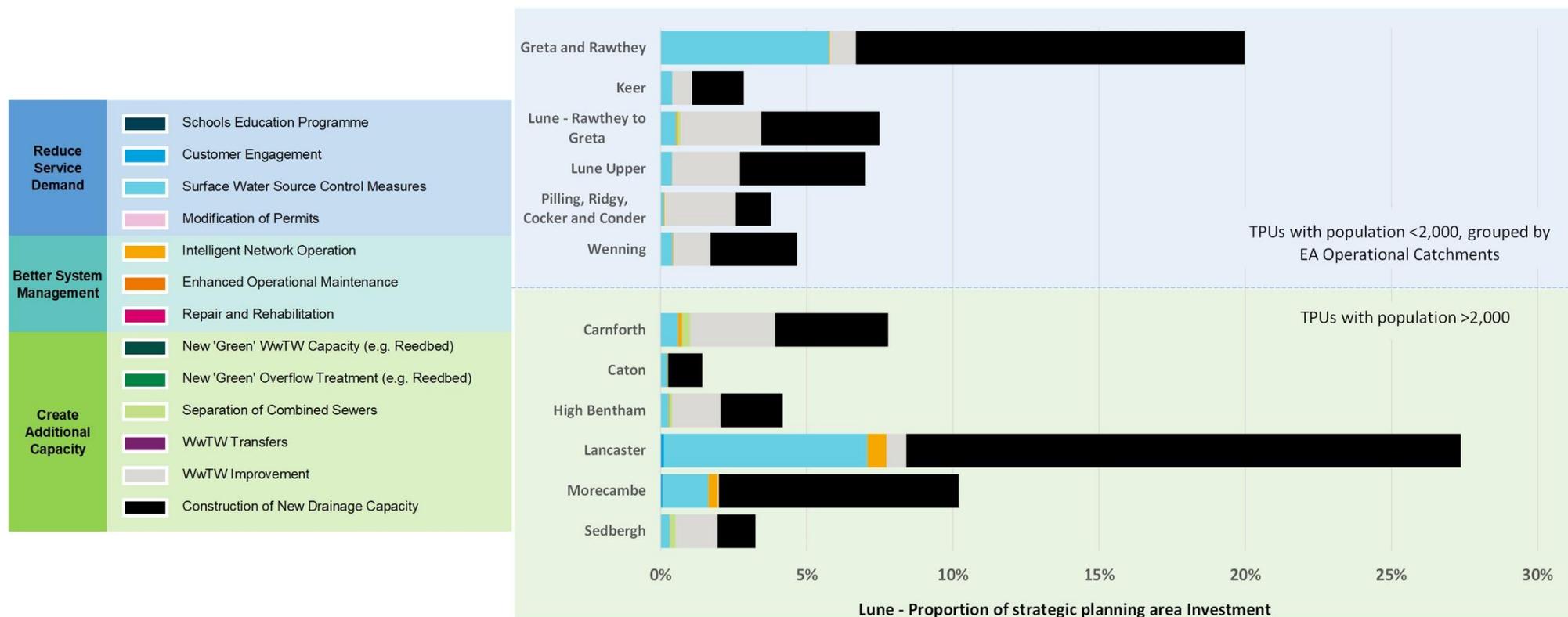


5.2.3 Level 3: Local options for each TPU within the Lune

The proportion of the Lune’s potential investment in each TPU, split up by option type, is shown in Figure 26. 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 Lune, the largest TPUs see the largest potential investment, which is split predominantly between surface water control, improved system management, improvement at wastewater treatment works and construction of new storm water storage capacity.

Figure 26 Proportion of investment seen in each TPU within the Lune



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.

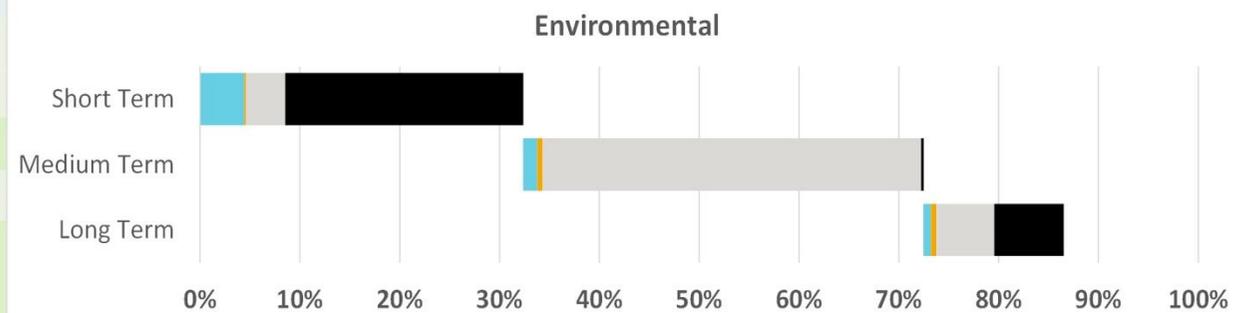
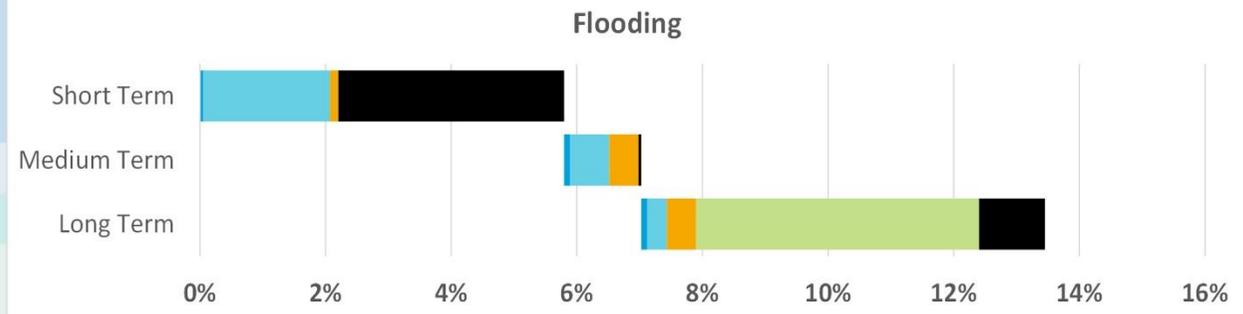
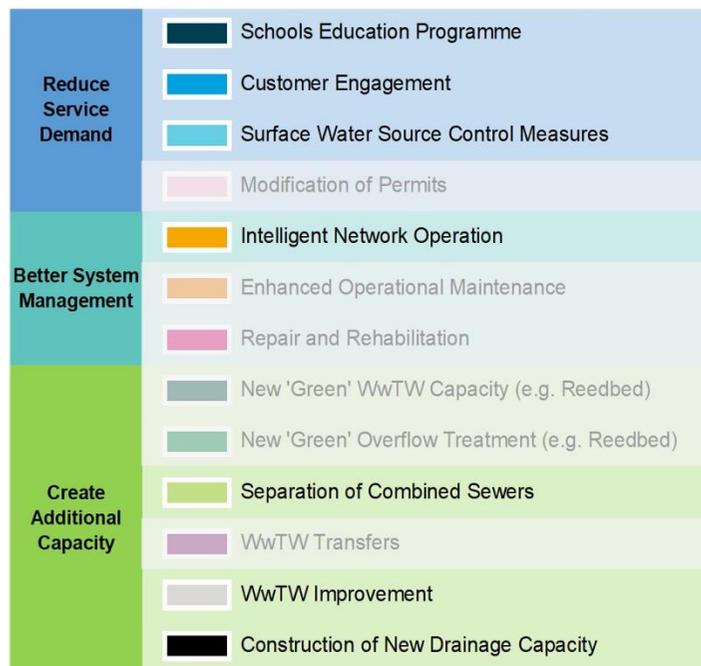
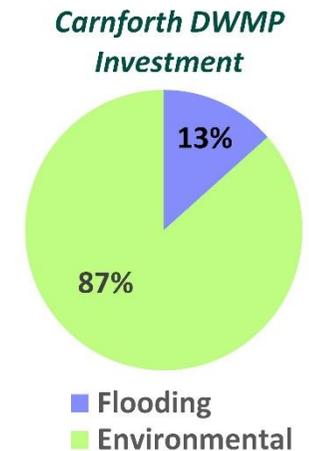
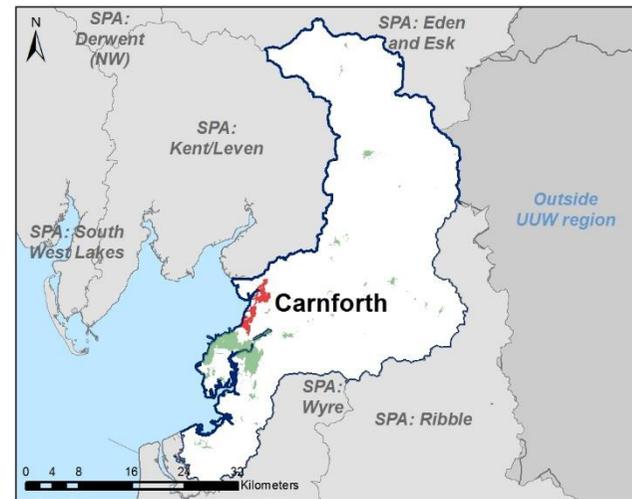
5.2.3.1 Carnforth

Figure 27 Details of the DWMP investment plan for Carnforth

The data on this page gives details of the investment plan for Carnforth TPU. The plan shows the geographic location of Carnforth within the Lune 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.



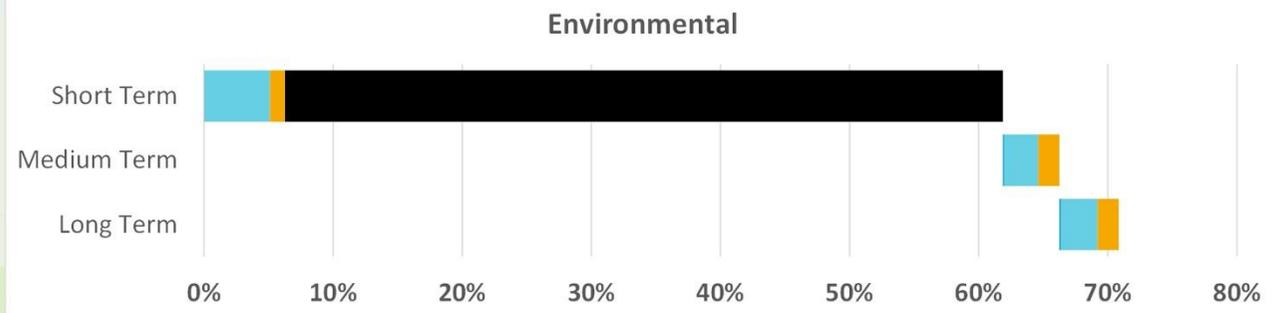
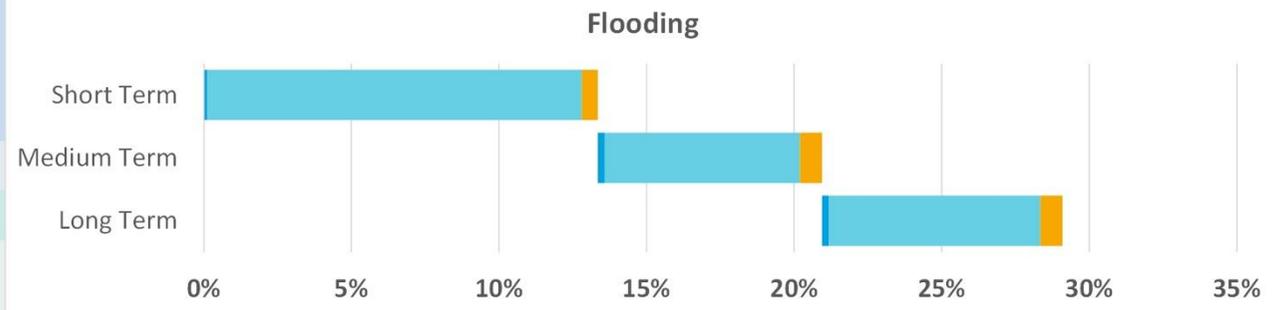
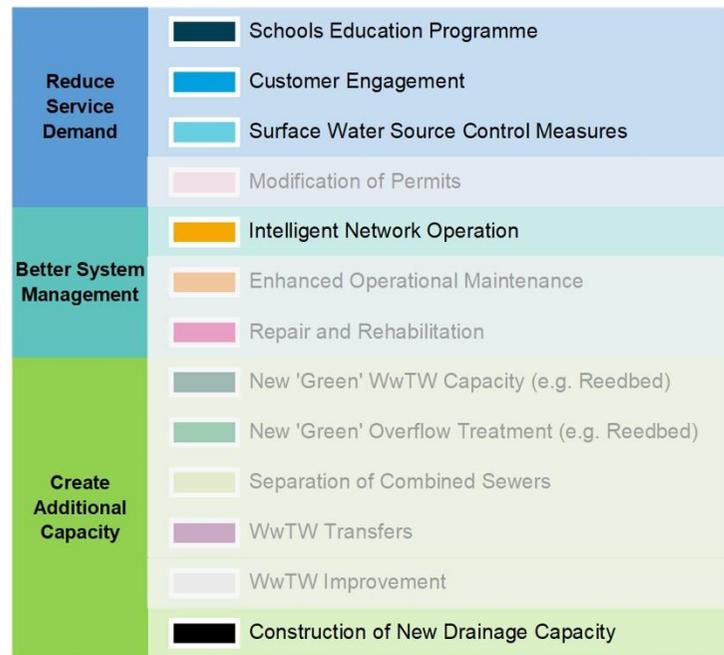
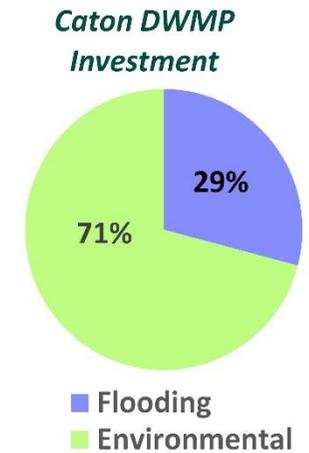
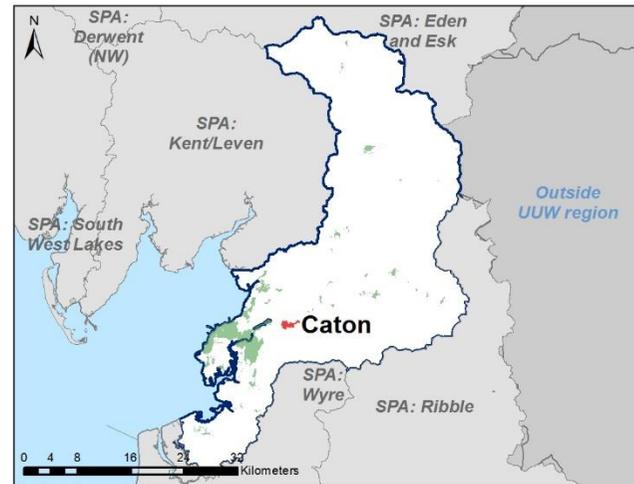
5.2.3.2 Caton

Figure 28 Details of the DWMP investment plan for Caton

The data on this page gives details of the investment plan for Caton TPU. The plan shows the geographic location of Caton within the Lune 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.



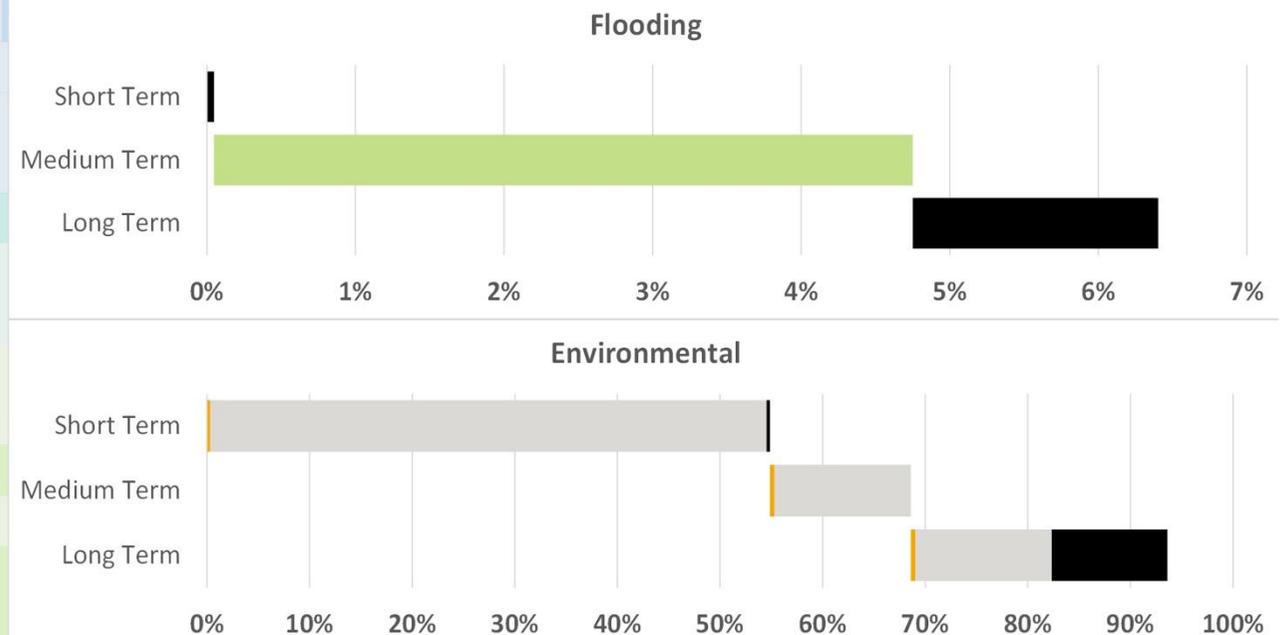
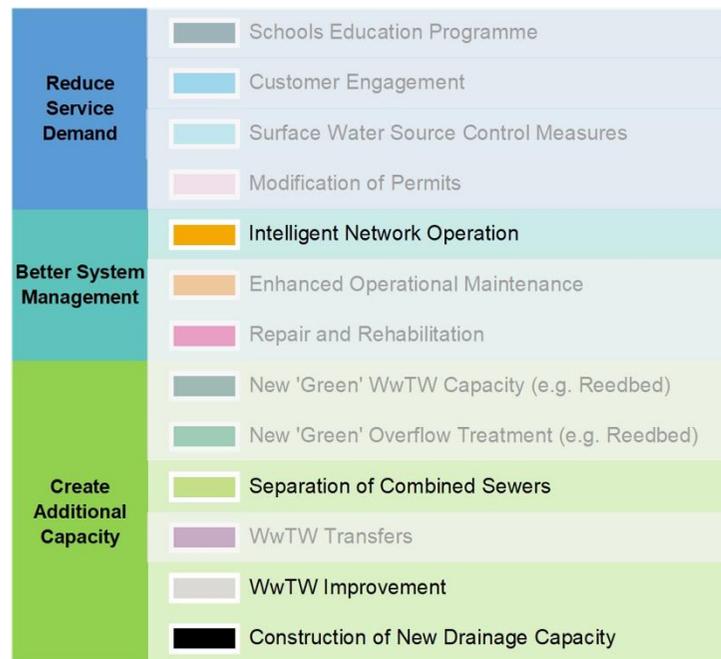
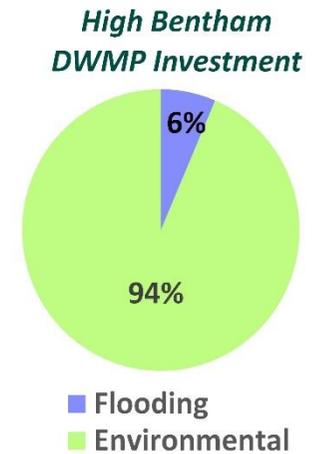
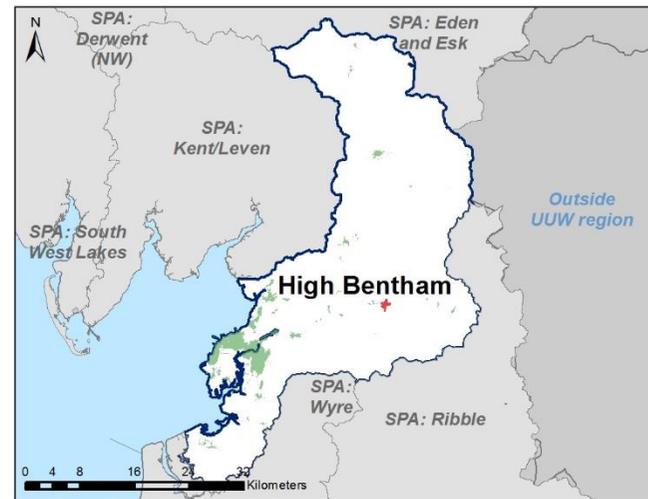
5.2.3.3 High Bentham

Figure 29 Details of the DWMP investment plan for High Bentham

The data on this page gives details of the investment plan for High Bentham TPU. The plan shows the geographic location of Bentham within the Lune 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.



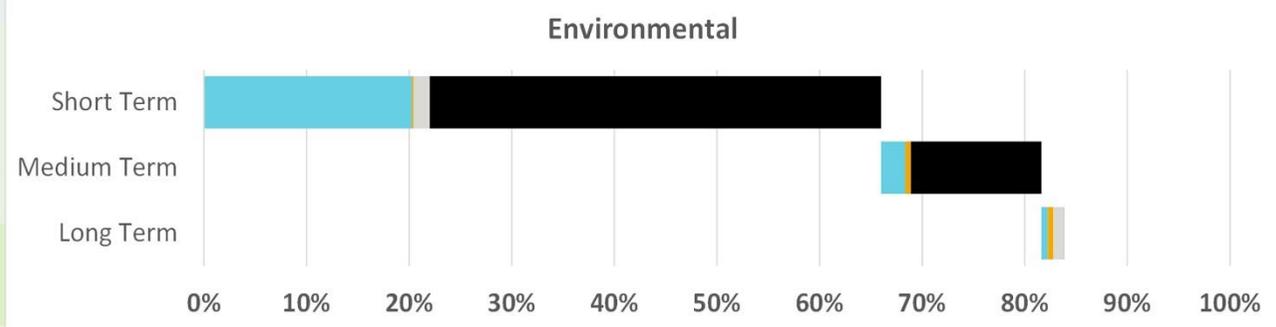
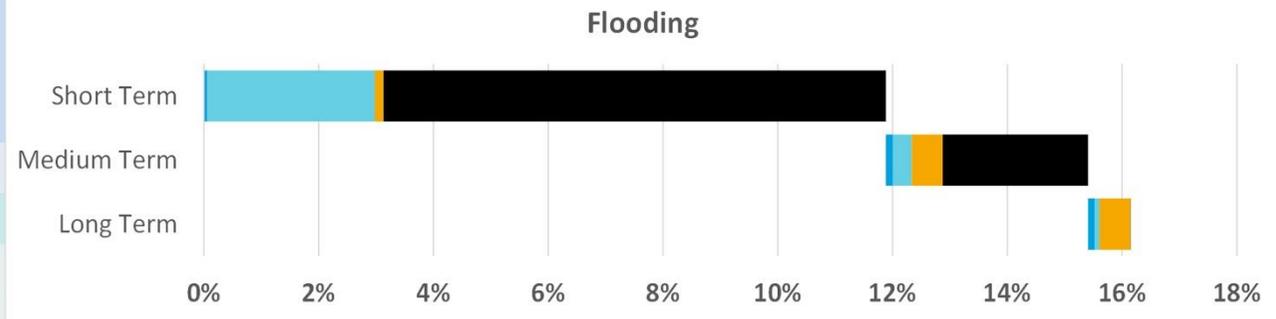
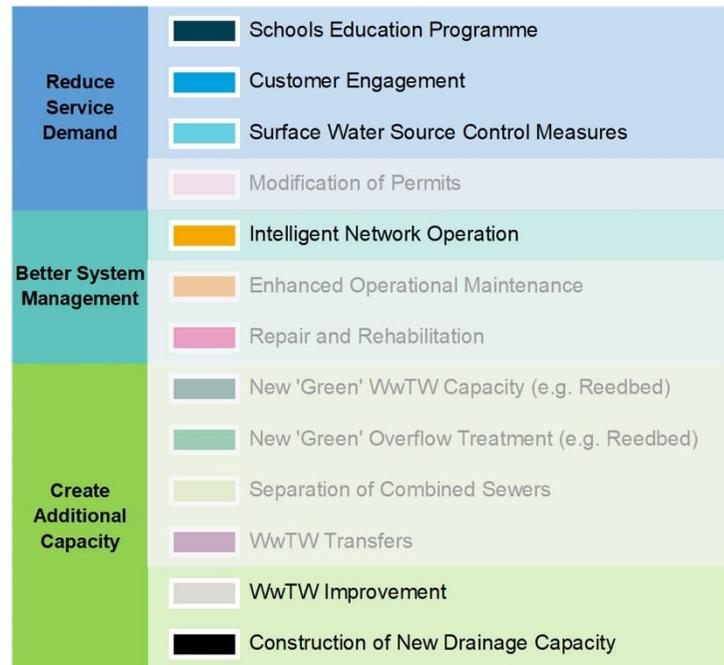
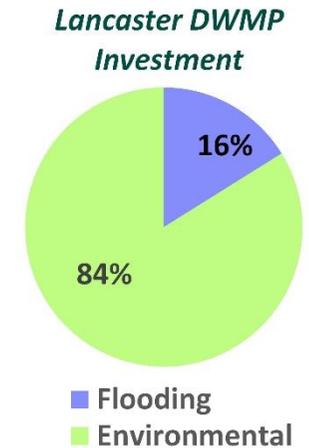
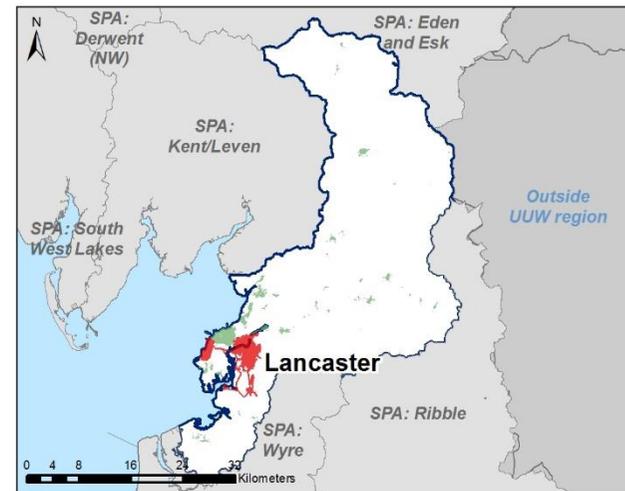
5.2.3.4 Lancaster

Figure 30 Details of the DWMP investment plan for Lancaster

The data on this page gives details of the investment plan for Lancaster TPU. The plan shows the geographic location of Lancaster within the Lune 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.



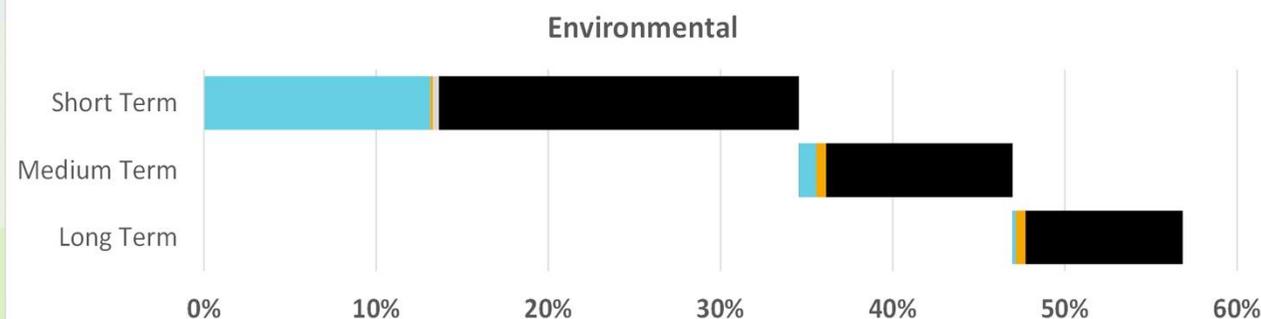
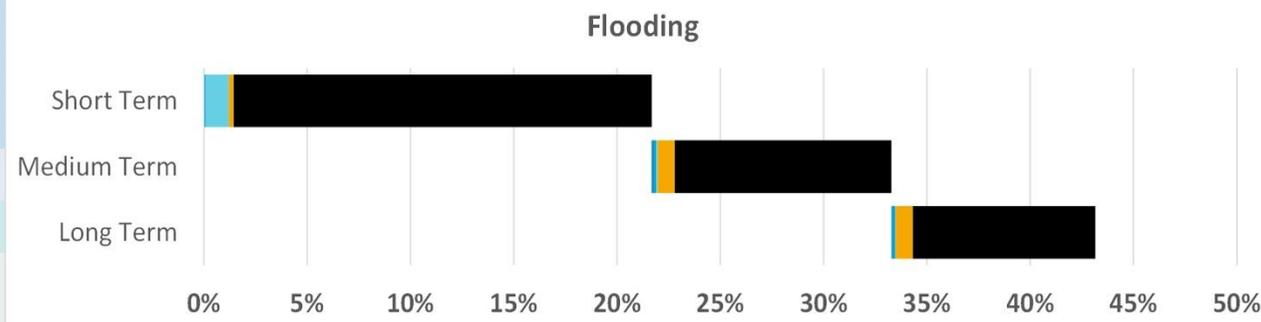
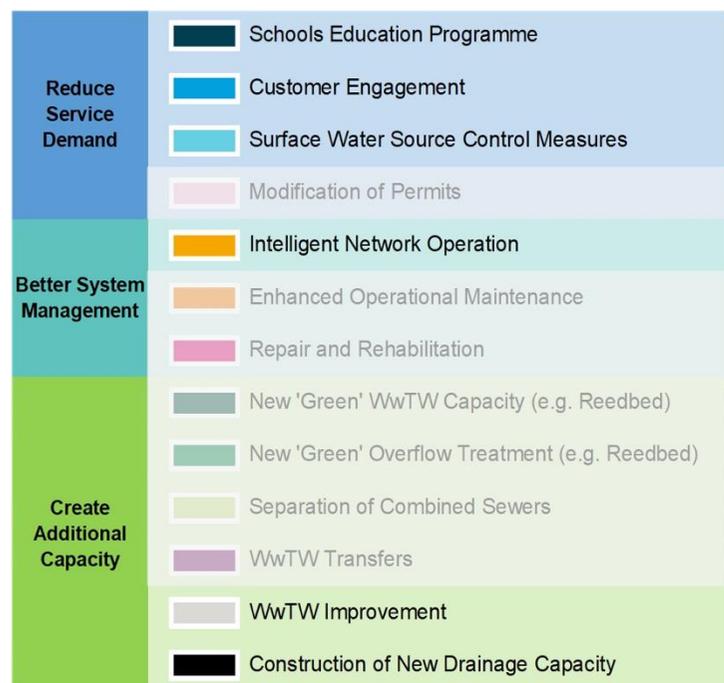
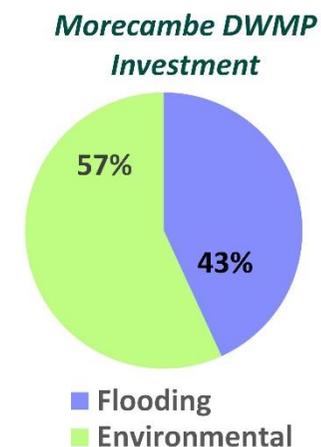
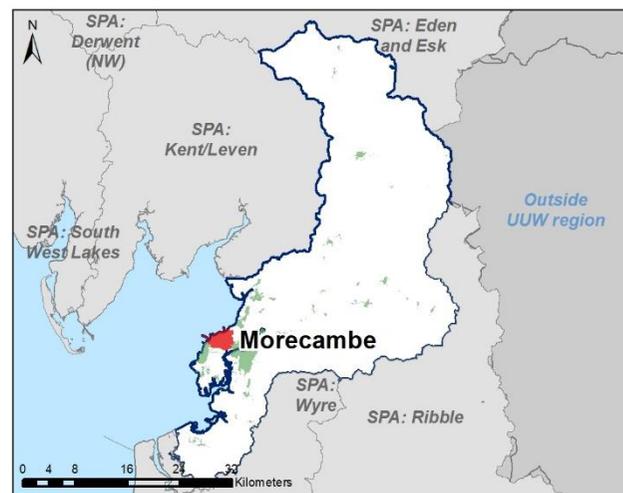
5.2.3.5 Morecambe

Figure 31 Details of the DWMP investment plan for Morecambe

The data on this page gives details of the investment plan for Morecambe TPU. The plan shows the geographic location of Morecambe within the Lune 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.



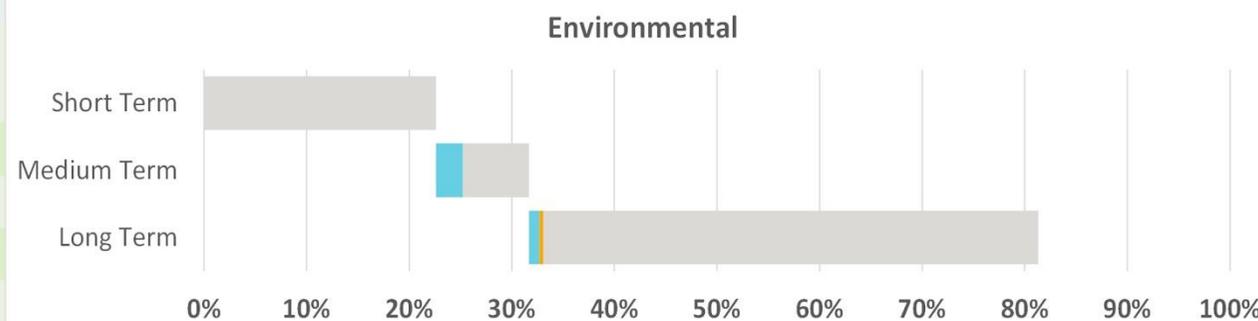
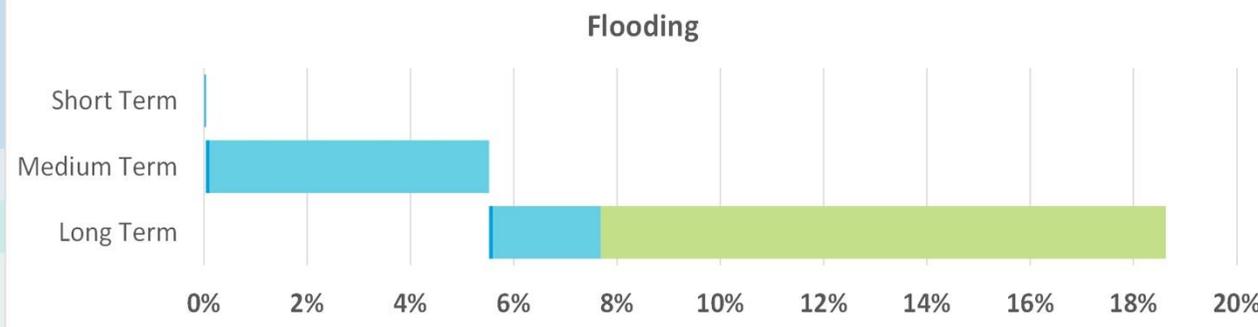
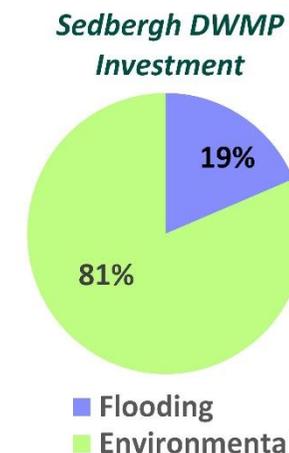
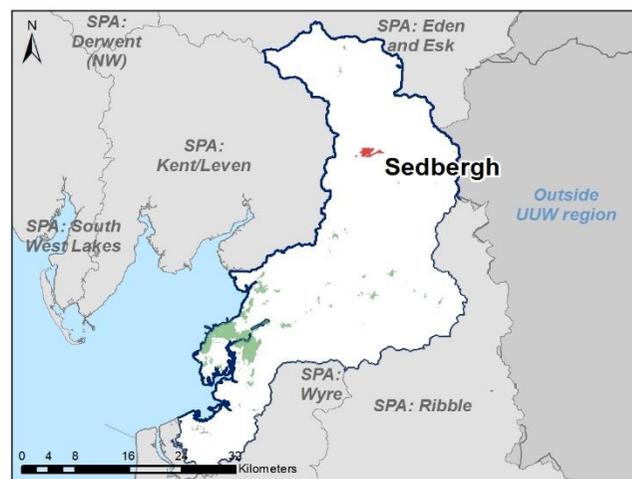
5.2.3.6 Sedburgh

Figure 32 Details of the DWMP investment plan for Sedburgh

The data on this page gives details of the investment plan for Sedburgh TPU. The plan shows the geographic location of Sedburgh within the Lune 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.

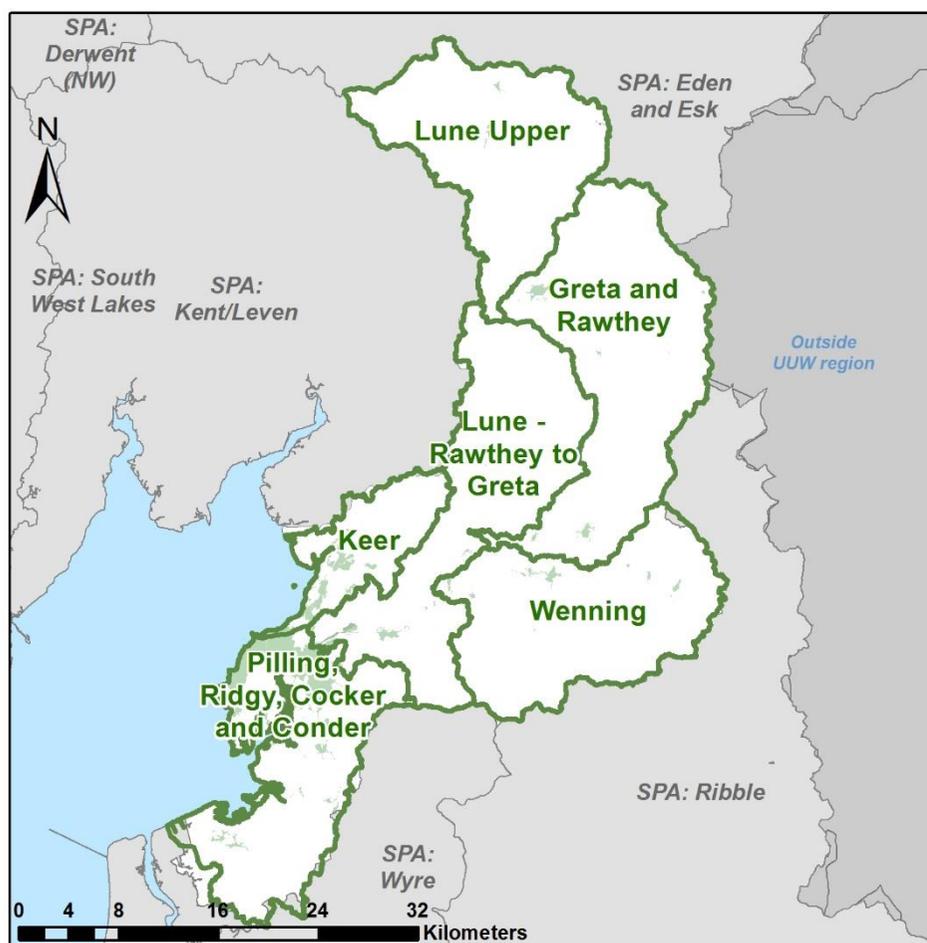
The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in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



5.2.4 TPUs with population less than 2,000

Within the Lune 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 Lune, there are six Environment Agency operational catchment areas, which can be seen in Figure 31.

Figure 33 Location of Environment Agency operational catchments within Lune SPA



Environment Agency Operational Catchment	TPUs
Wenning	Wray Low Gill Low Bentham Hornby Clapham
Pilling, Ridgy, Cocker and Conder	Pilling Middleton Forton Cockerham
Lune Upper	Tebay Orton
Lune - Rawthey to Greta	Whittington Kirkby Lonsdale Halton West Lune Halton East Casterton
Keer	Over Kellet Nether Kellet
Greta and Rawthey	Lea Yeat Ingleton Garsdale Head Dent Cold Cotes Burton-In-Lonsdale

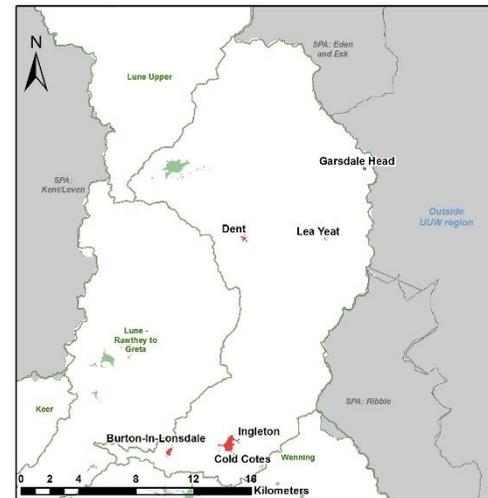
5.2.4.1 TPUs with population less than 2,000: Greta and Rawthey Operational Catchment (OC)

Figure 34 Details of the DWMP investment plan for the Greta and Rawthey OC

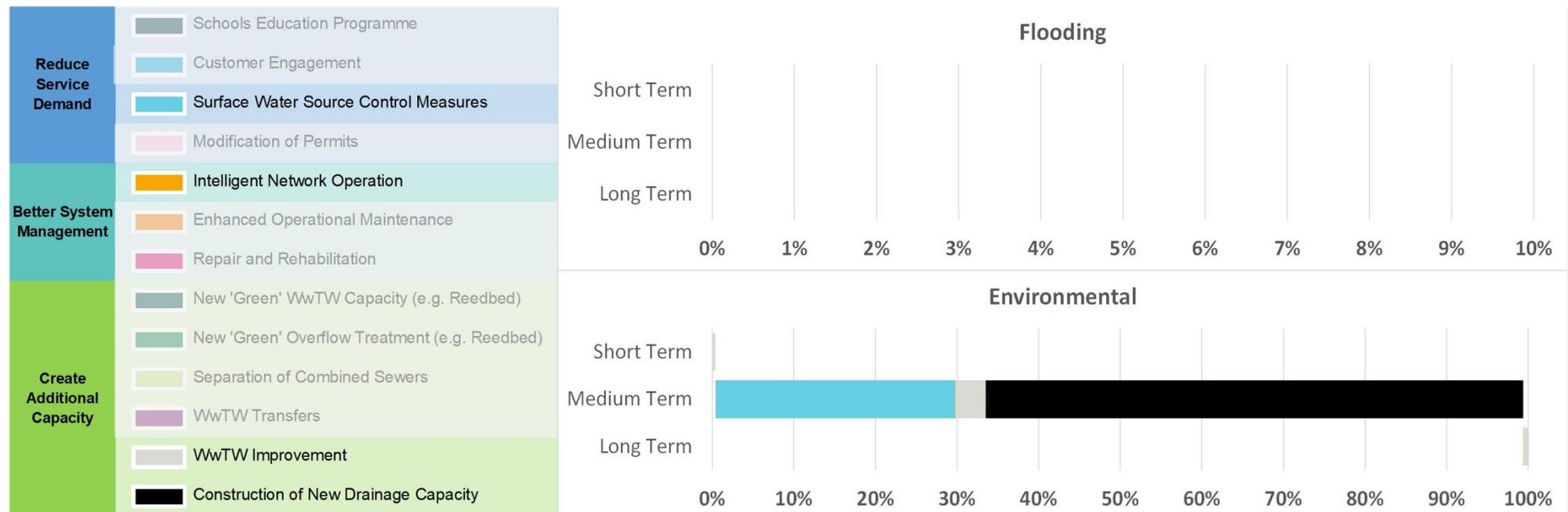
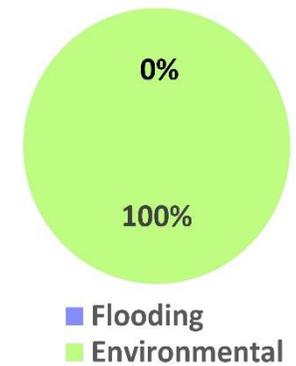
The data on this page gives details of the investment plan for the TPUs within the Greta and Rawthey OC. The plan shows the geographic location of these TPUs within the Greta and Rawthey OC.

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.



Greta and Rawthey DWMP Investment



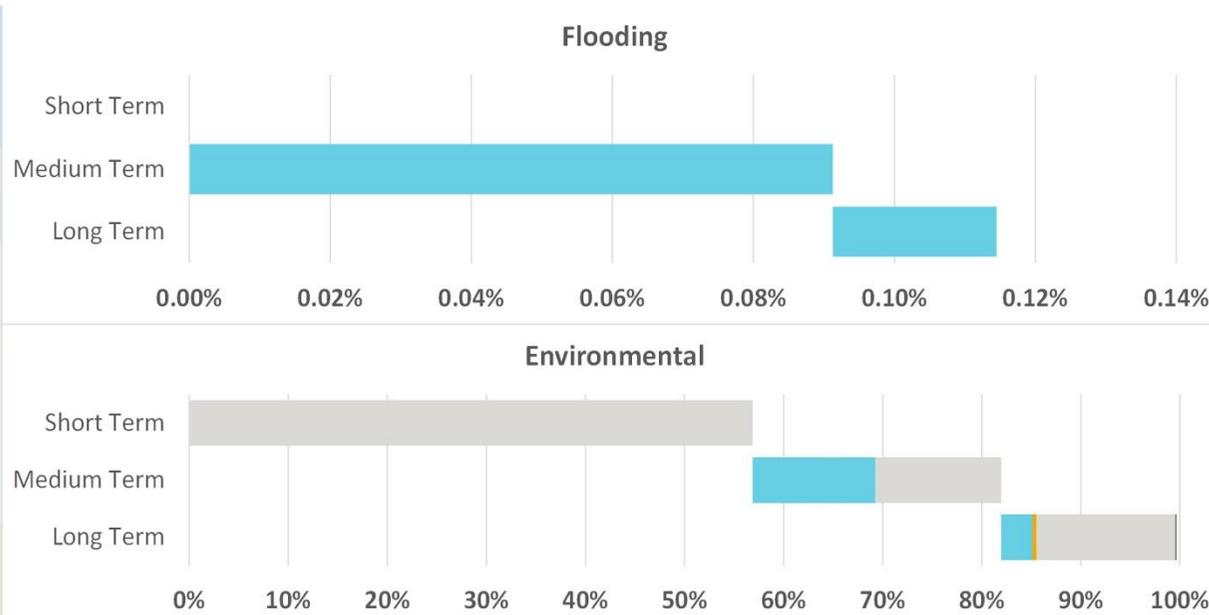
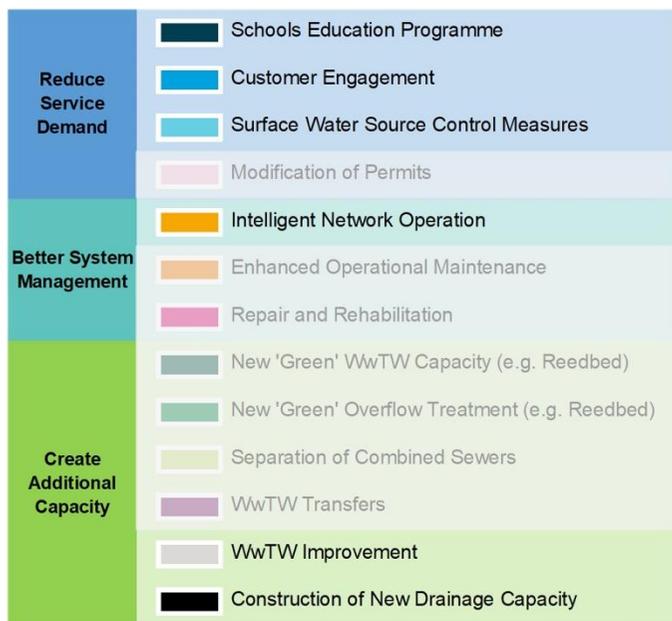
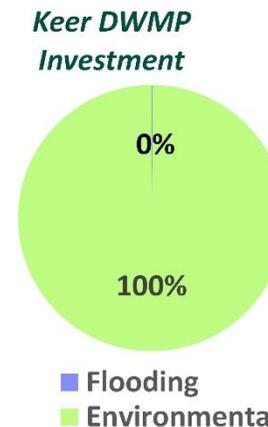
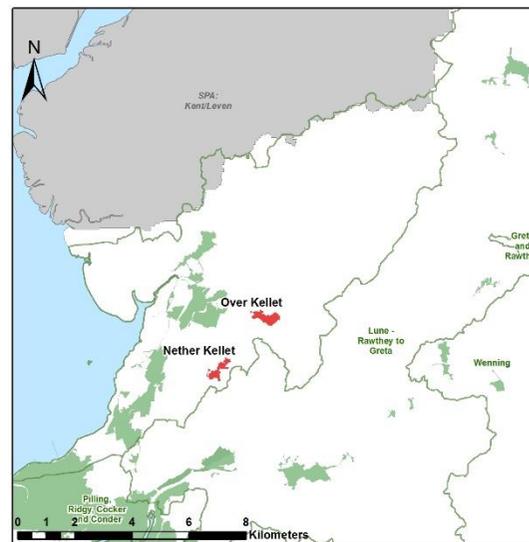
5.2.4.2 TPUs with population less than 2,000: Keer Operational Catchment (OC)

Figure 35 Details of the DWMP investment plan for the Keer OC

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



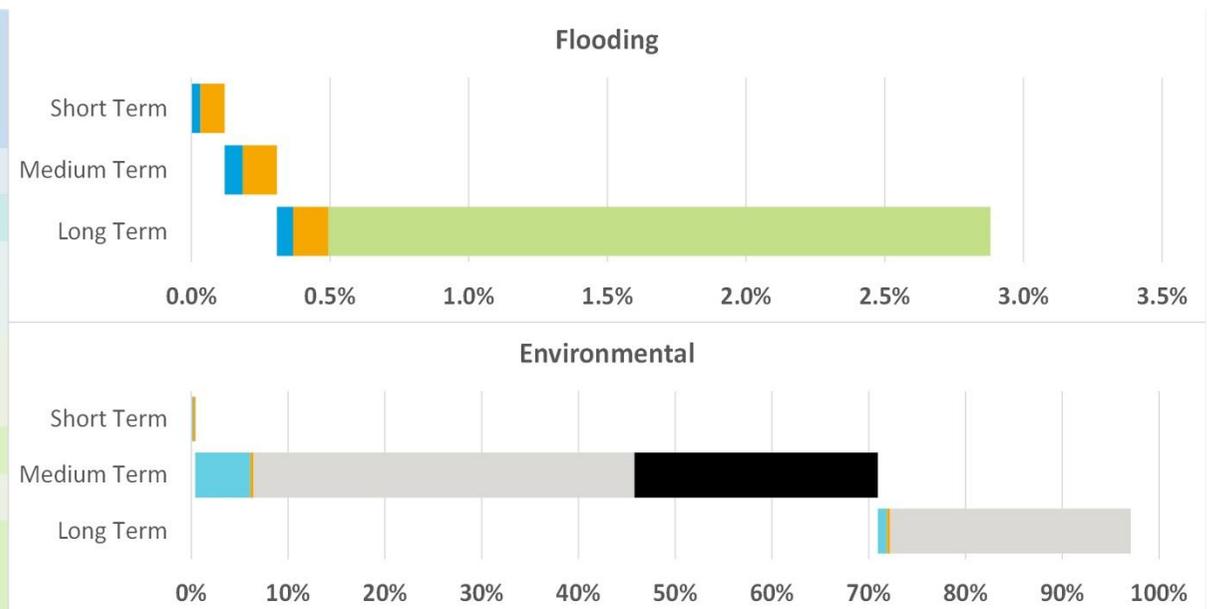
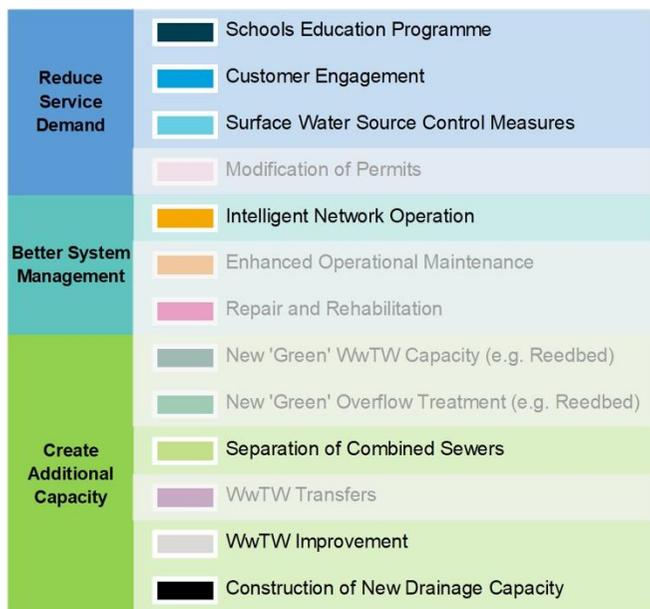
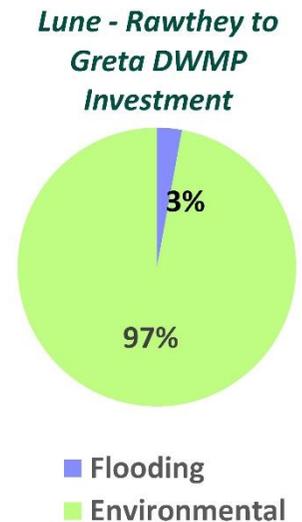
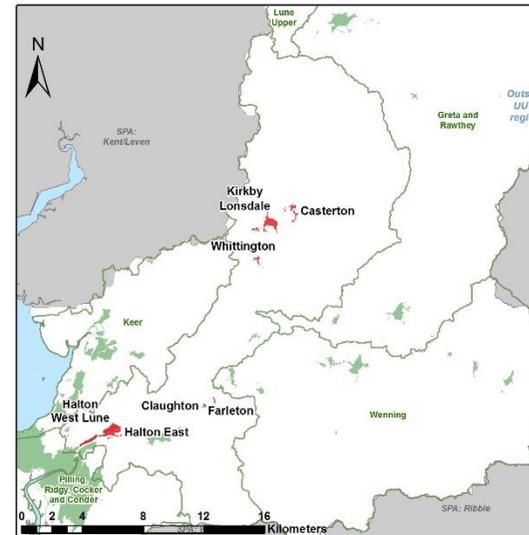
5.2.4.3 TPUs with population less than 2,000: Lune - Rawthey to Greta Operational Catchment (OC)

Figure 36 Details of the DWMP investment plan for the Lune - Rawthey OC

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



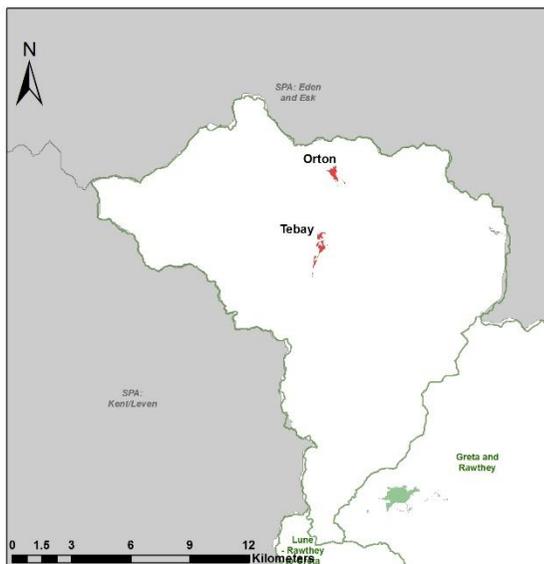
5.2.4.4 TPUs with population less than 2,000: Lune Upper Operational Catchment (OC)

Figure 37 Details of the DWMP investment plan for the Lune Upper OC

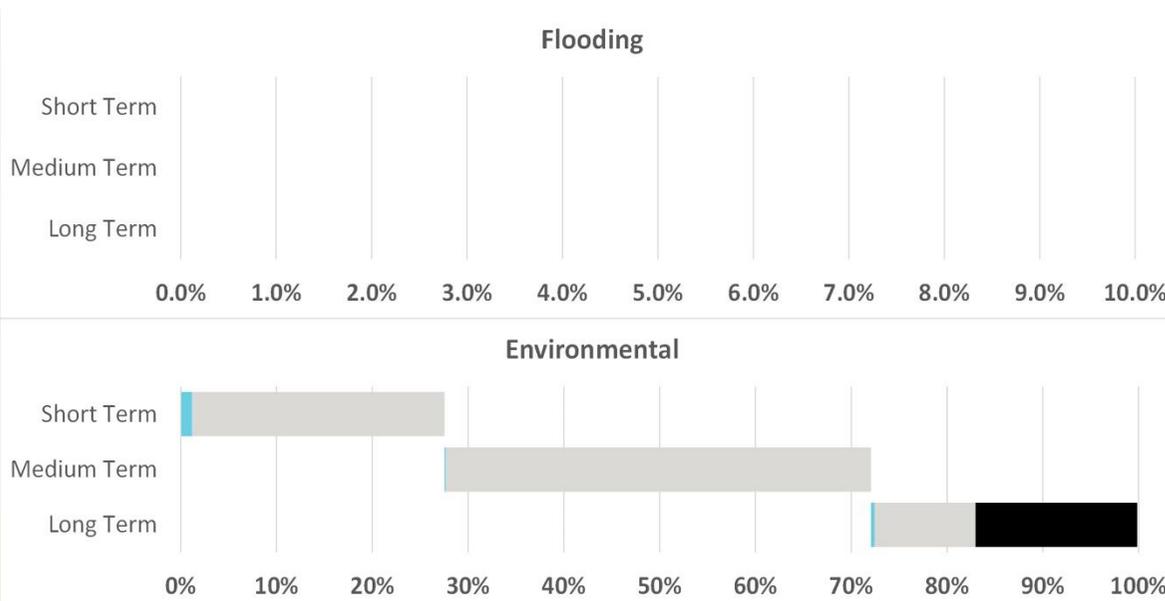
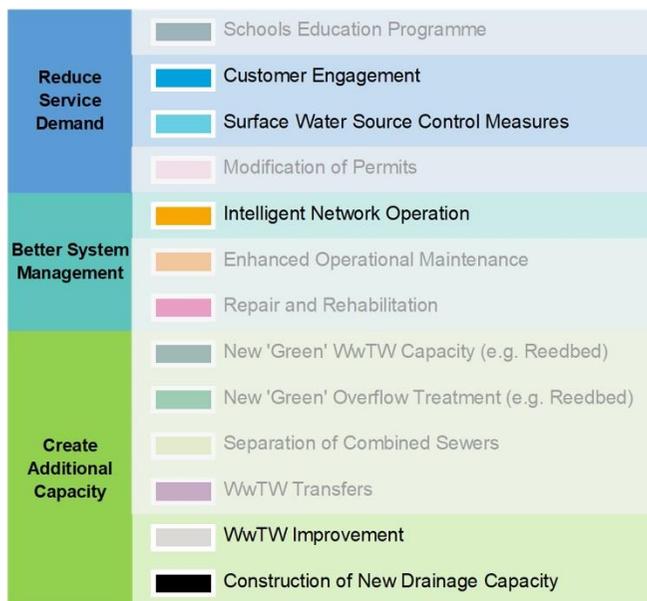
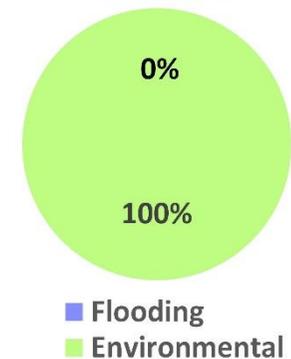
The data on this page gives details of the investment plan for the TPUs within the Lune Upper OC. The plan shows the geographic location of these TPUs within the Lune Upper OC.

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.



Lune Upper DWMP Investment



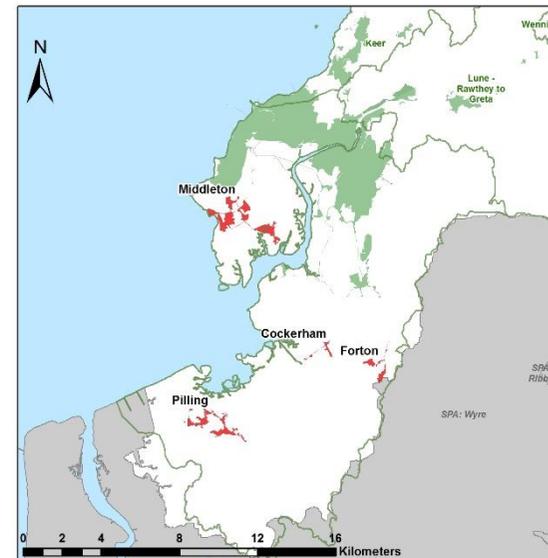
5.2.4.5 TPUs with population less than 2,000: Piling, Ridgy, Cocker and Conder Operation Catchment (OC)

Figure 38 Details of the DWMP investment plan for the Piling, Ridgy, Cocker and Conder OC

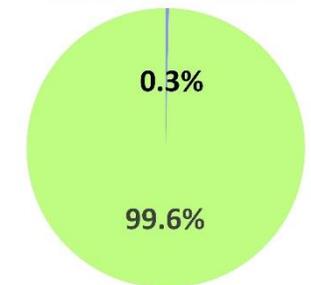
The data on this page gives details of the investment plan for the TPUs within the Piling, Ridgy, Cocker and Conder OC. The plan shows the geographic location of these TPUs within the Piling, Ridgy, Cocker and Conder OC.

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.

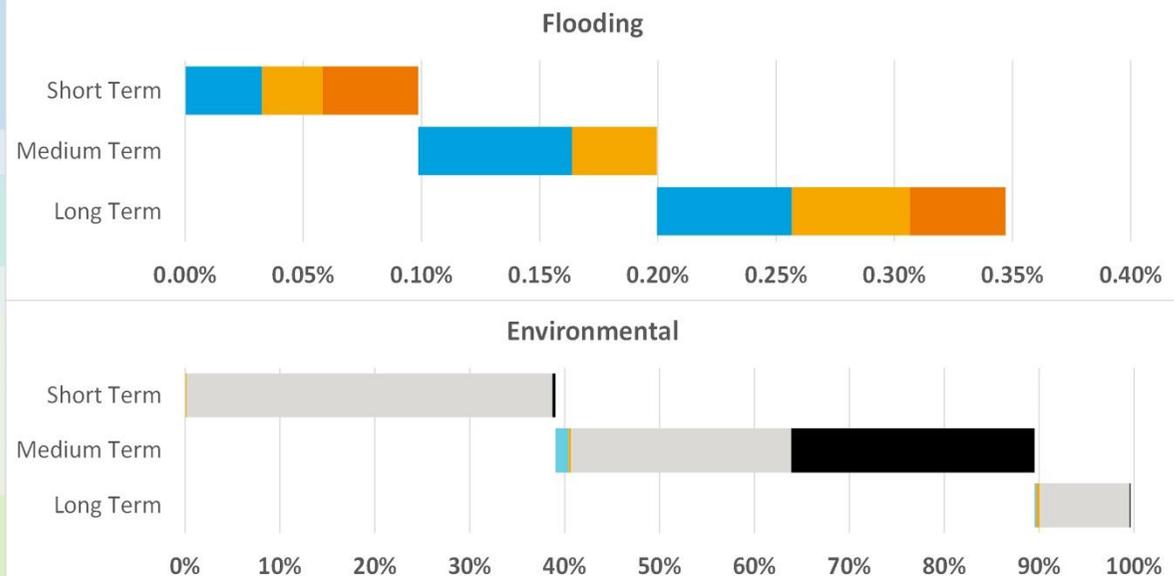
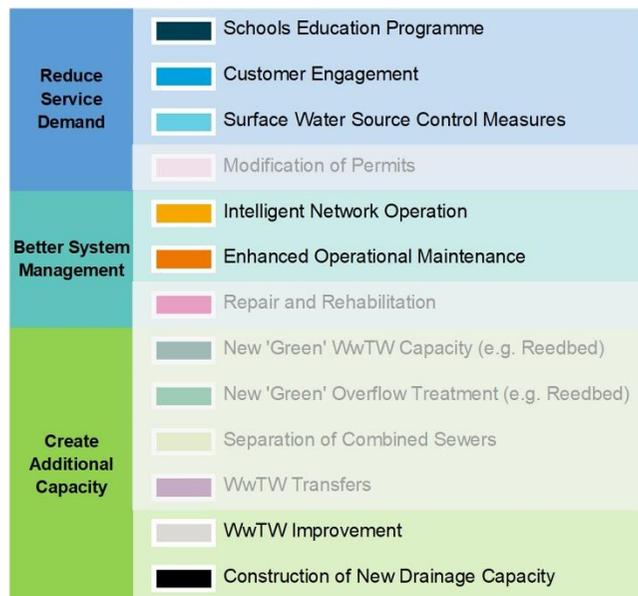
The bar charts below show a more detailed breakdown of the potential option types that make up the flooding and environmental investment. The key to the left of the bar charts show the colours used for the 13 different option types. Additionally, the charts indicate whether investments are proposed in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



Piling, Ridgy, Cocker and Conder DWMP Investment



■ Flooding
■ Environmental



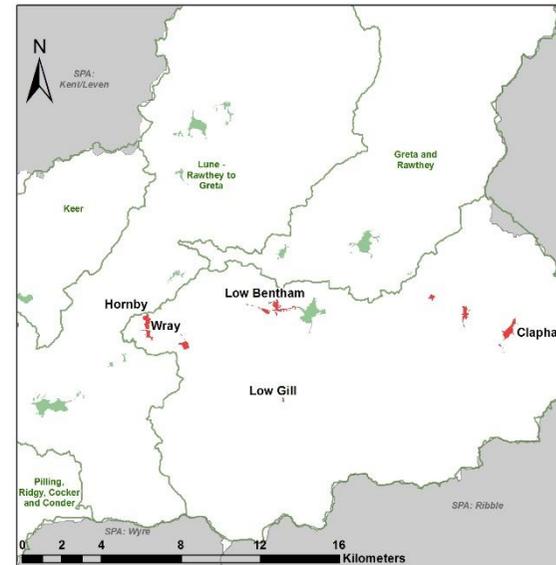
5.2.4.6 TPUs with population less than 2,000: Wenning Operational Catchment (OC)

Figure 39 Details of the DWMP investment plan for the Wenning OC

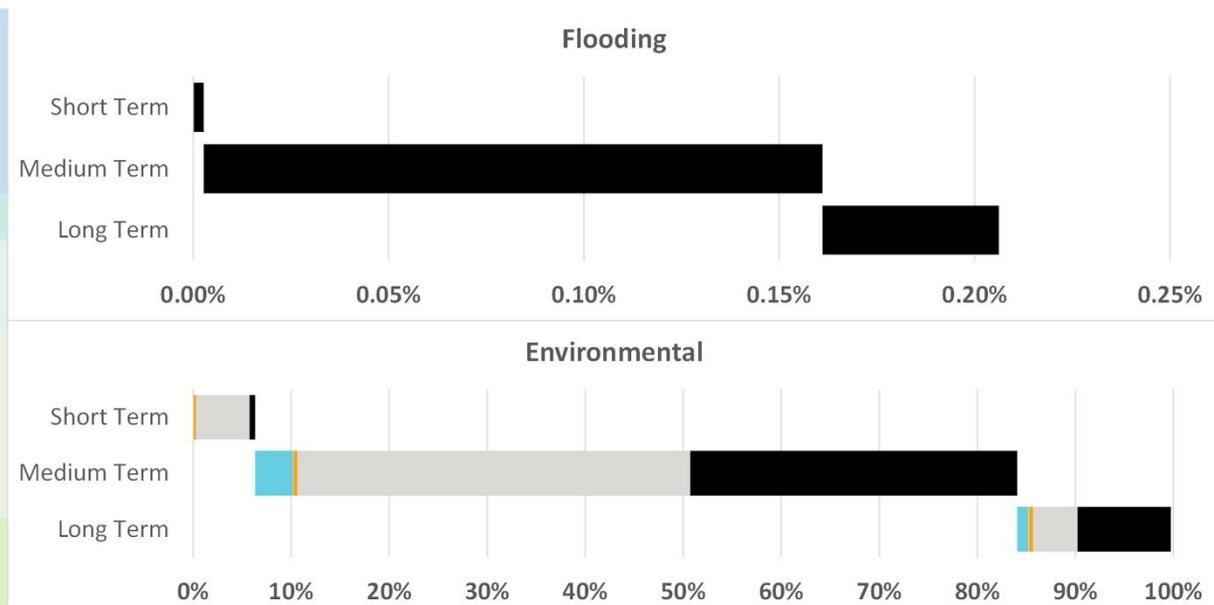
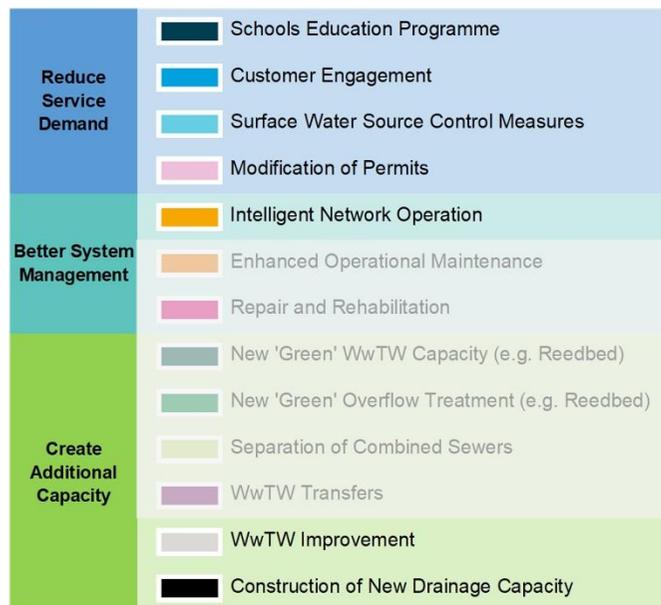
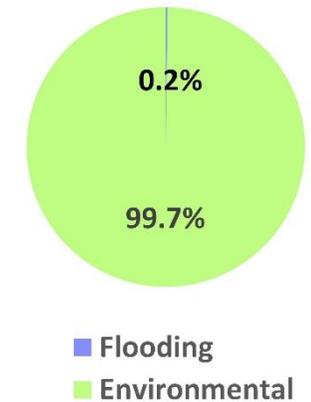
The data on this page gives details of the investment plan for the TPUs within the Wenning OC. The plan shows the geographic location of these TPUs within the Wenning OC.

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.



Wenning 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

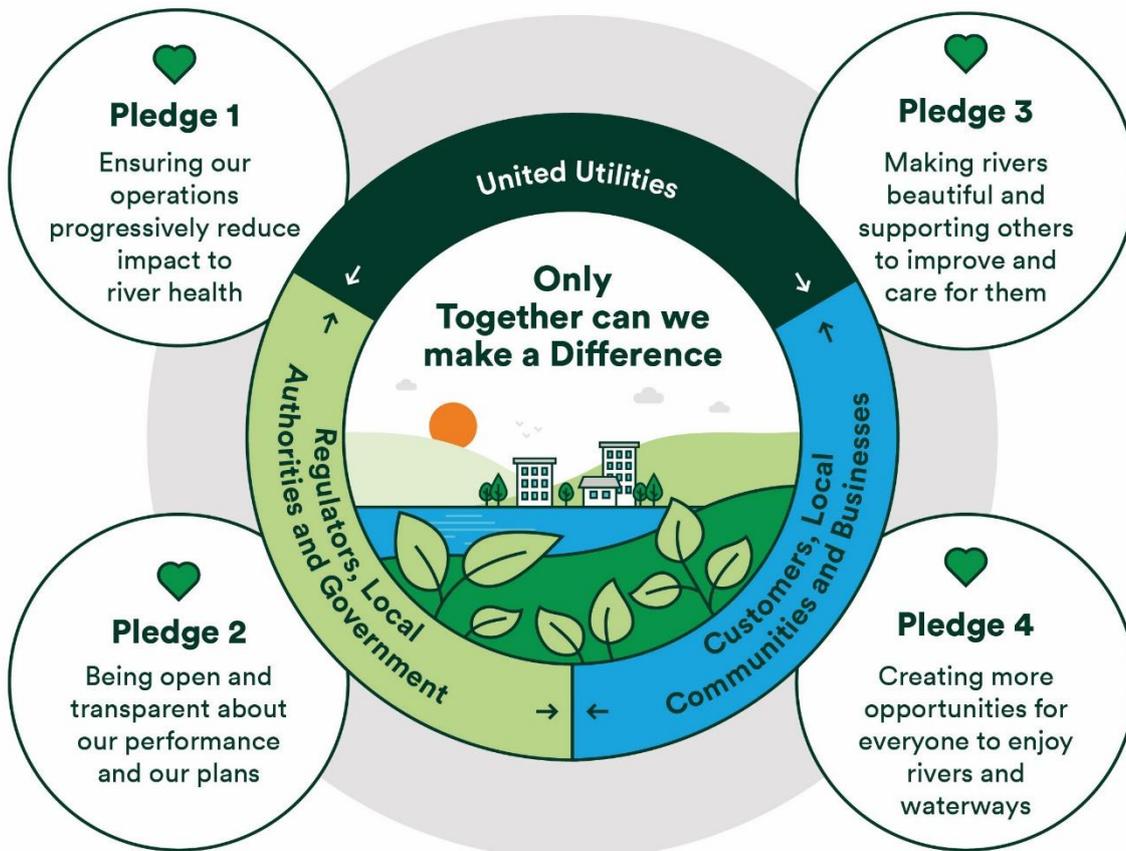
The North West is home to some of the most beautiful natural landscapes. We take our role in protecting them very seriously so they can be enjoyed by all. We are investing significantly to reduce the impact that wastewater has on the natural environment and our long-term ambition is to eliminate pollution 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 40).

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 40 Overview of the Better Rivers: Better North West project



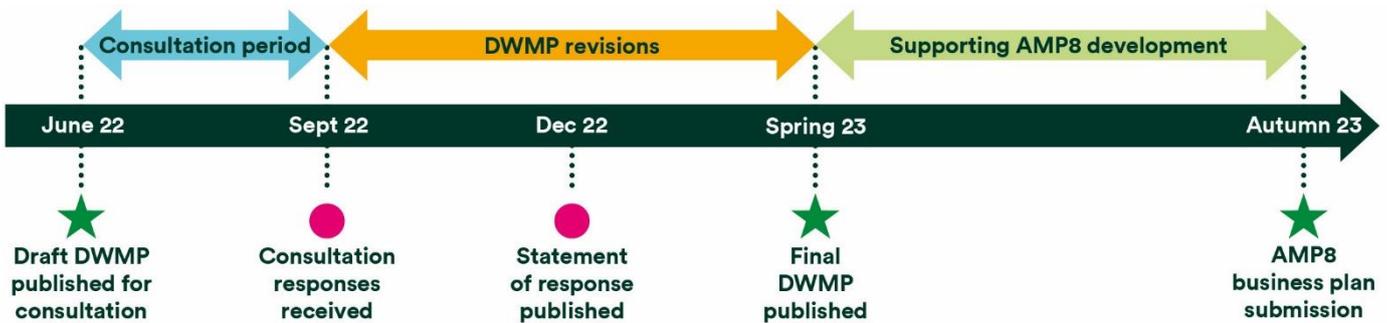
6. Embedding the DWMP

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 Lune 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 Lune catchment.

Moving forwards, the DWMP will be a key component in the development of our business plan for investment cycle 2025 – 2030 (AMP8, Figure 41). 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 41 Timeline of key milestones



7. References

- [1] <https://environment.data.gov.uk/catchment-planning/ManagementCatchment/3053>
- [2] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3209>
- [3] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3240>
- [4] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3290>
- [5] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3291>
- [6] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3363>
- [7] <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3526>
- [8] <https://environment.data.gov.uk/catchment-planning/v/c3-plan/CatchmentPartnership/WEIF3901>
- [9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120229/North-West-FRMP-2021-2027.pdf
- [10] <https://www.mycoastline.org.uk/shoreline-management-plans/>
- [11] <https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance>
- [12] <https://luneriverstrust.org.uk/>
- [13] <https://bailrigggardenvillage.co.uk/downloads/Spatial%20Masterplan%20Framework.pdf>

Appendix A

Table A.1 List of TPUs which did not trigger for RBCS across environment, flooding or wastewater treatment works categories

Tactical Planning Unit	Environment	Flooding	Wastewater Treatment Works
Cold Cotes	Did not proceed through RBCS	Did not proceed through RBCS	Did not proceed through RBCS
Garsdale Head	Did not proceed through RBCS	Did not proceed through RBCS	Did not proceed through RBCS
Lea Yeat	Did not proceed through RBCS	Did not proceed through RBCS	Did not proceed through RBCS
Low Gill	Did not proceed through RBCS	Did not proceed through RBCS	Did not proceed through RBCS
Yew Tree Cottage (Melling)	Did not proceed through RBCS	Did not proceed through RBCS	Did not proceed through RBCS

United Utilities Water Limited
Haweswater House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP
unitedutilities.com



Water for the North West