

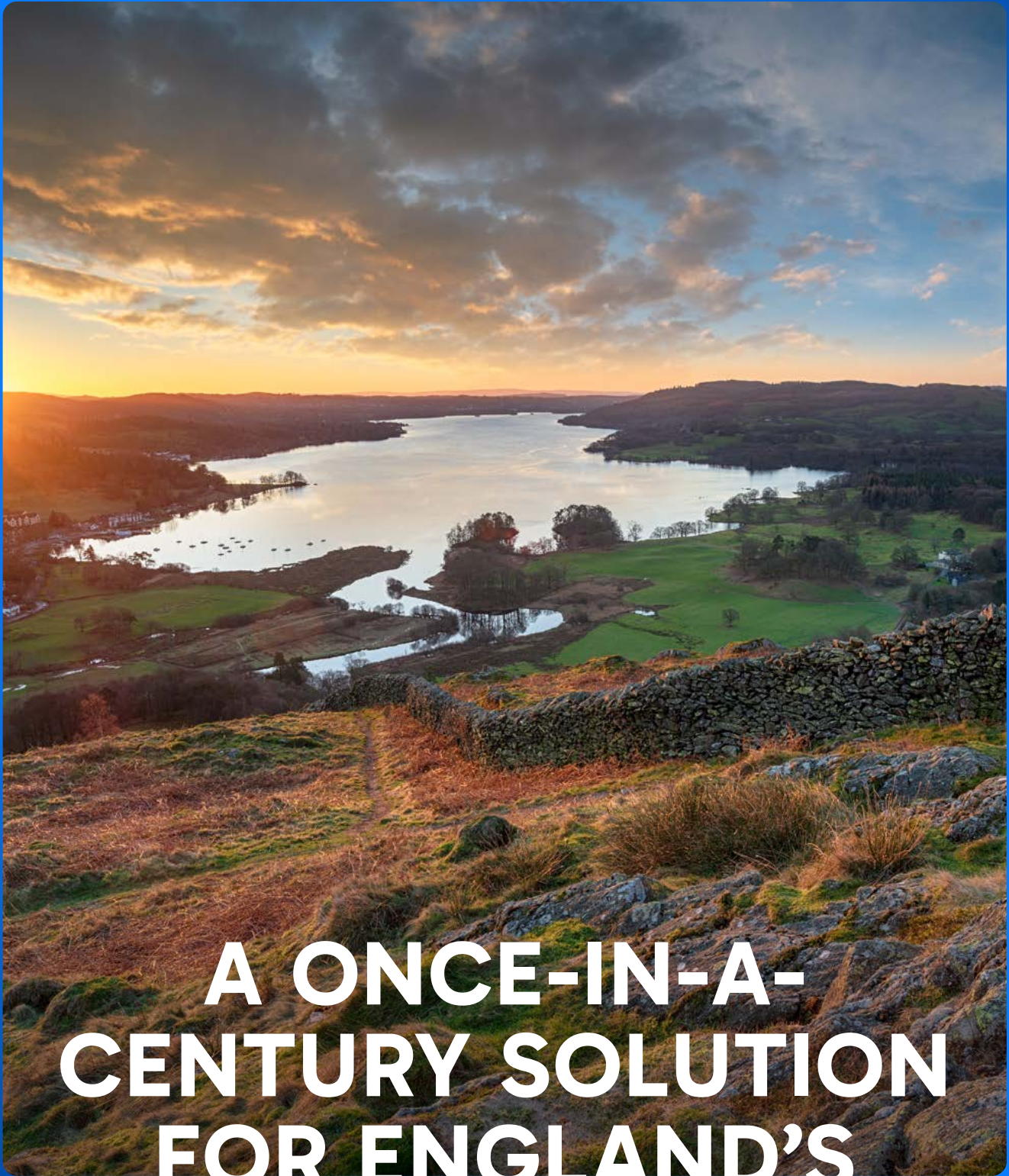
ONLY RAINWATER INTO WINDERMERE FEASIBILITY REPORT



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SECTION 1 | FOREWORD



A ONCE-IN-A-CENTURY SOLUTION FOR ENGLAND’S GREATEST LAKE

SECTION 1 | FOREWORD



Edward Twiddy

Independent Convener for ORiW

Windermere is England's largest natural body of fresh water. It is home to cherished and protected species and ecosystems fed by lakes and streams that flow from some of the highest peaks, through woodland and pastures tended by centuries of human stewardship.

This astonishing lake is at the heart of a UNESCO World Heritage Site, the inspiration for poets, storytellers and lyricists, and a daily pleasure for a resident community that is swelled by the 17.7 million visitors who visit the Lake District every year to sail, swim, fish, paddle, walk or simply gaze in wonder.

But this essential and widely-loved place is changing as the climate warms and rainfall events become more intense. In addition to these new pressures, the lake's chemistry has shifted over the last century. Nutrient inputs remain a pressure against a backdrop of increasing population and visitor numbers, compounded further by climate change. Water entering the lake can take upwards of nine months to make its way into the River Leven for the short dash to Morecambe Bay; whatever comes into the lake either stays there or has plenty of time to affect the chemistry and biology of this UNESCO World Heritage Site.

Significant and vital investment is already being made to protect against the combined effect of a warming lake and nutrient loads. This is critical to help meet the challenges that are present in the lake today. However, the latest research into Windermere's

future demonstrates that only a new and transformational approach – stopping all wastewater from private, public and highways systems from entering Windermere – will eliminate harmful blue-green algae, remove the risk of storms overwhelming wastewater networks and secure the lake's future for the rest of this century and into the next.

A commitment to the world that Windermere will remain a perfect place for everyone forever.

A future vision of Windermere free from these threats, and a lake that is fed only by the rivers, streams and springs that flow off the land, is the goal of the Only Rainwater into Windermere (ORiW) project. As a lifelong lover of the Lake District, it has been a true honour to serve as convener of the Steering Group which

has been exploring transformational solutions for Windermere over the past year.

The coalition has brought together local authorities, regulators, business leaders, stakeholder groups, campaigners and the region's water company to examine engineering options to secure the economic and ecological future of this internationally renowned natural asset.

Supported by independent leading engineers and construction experts who have considered the lake in detail and harvested best practice from transformational projects in the UK and around the world, the Only Rainwater project team has considered dozens of alternative approaches to realising this ambitious vision. Together, we have narrowed these down over the course of a year of systematic analysis and shared choices. We believe that our study has demonstrated that a future for Windermere with no more harmful algal blooms and no more direct flows of wastewater into the lake is not only feasible, but also great value for money, creating around £1.90 of benefit for every £1 invested, even after adding significant buffers for contingencies.

As expected for a feasibility study of this scale and complexity, and which started with over 70 different options, final conclusions cannot be reached on all aspects, and detailed design and modelling will be needed to answer the remaining questions. However, after extended consideration and following detailed review, this study does provide benefits and costs for two lead options selected for further assessment that return high-quality treated wastewater to the environment. One option is at the River Leven; the second is at Ulverston. Business cases for these options are in line with the expectations set out in the government's Green Book methodology for project appraisal.

Common to both options is a new, fully integrated wastewater network, increasing infrastructure by up to 75% and connecting around 12,800 people with public sewerage services for the first time. This will reach up to Grasmere, the Langdales and along both sides of the lake itself and is linked to a deep tunnel that starts near Ambleside and stretches the length of the lake.

The preferred final option chosen as part of detailed design, the extent of the tunnel, and the exact location for

an extended and enhanced wastewater treatment works, are the choices that will need to be finalised through the next stage of this project.

By setting out more than one option, and requiring further analysis and engagement, we are not shirking responsibility for the choices we have made to date or those which need to follow. We are certain of the need to extend and integrate the sewer network around the north, west and east sides of the lake catchment, and that a tunnel is the most effective and least disruptive means to remove wastewater from entering the lake. We are also clear that any transfer of wastewater or intercepted rainwater from one community to another must be examined for potential detrimental effects on either community, or any community along the route of the new network. Wherever possible, any detrimental effects must be avoided. However, the team feels a deep responsibility for not over-specifying the final answers given the volume of water quantity and quality analysis, ground investigations and community and stakeholder engagement that is needed before conclusions on this element of the project can be properly reached. We are equally determined that the project goes ahead as speedily

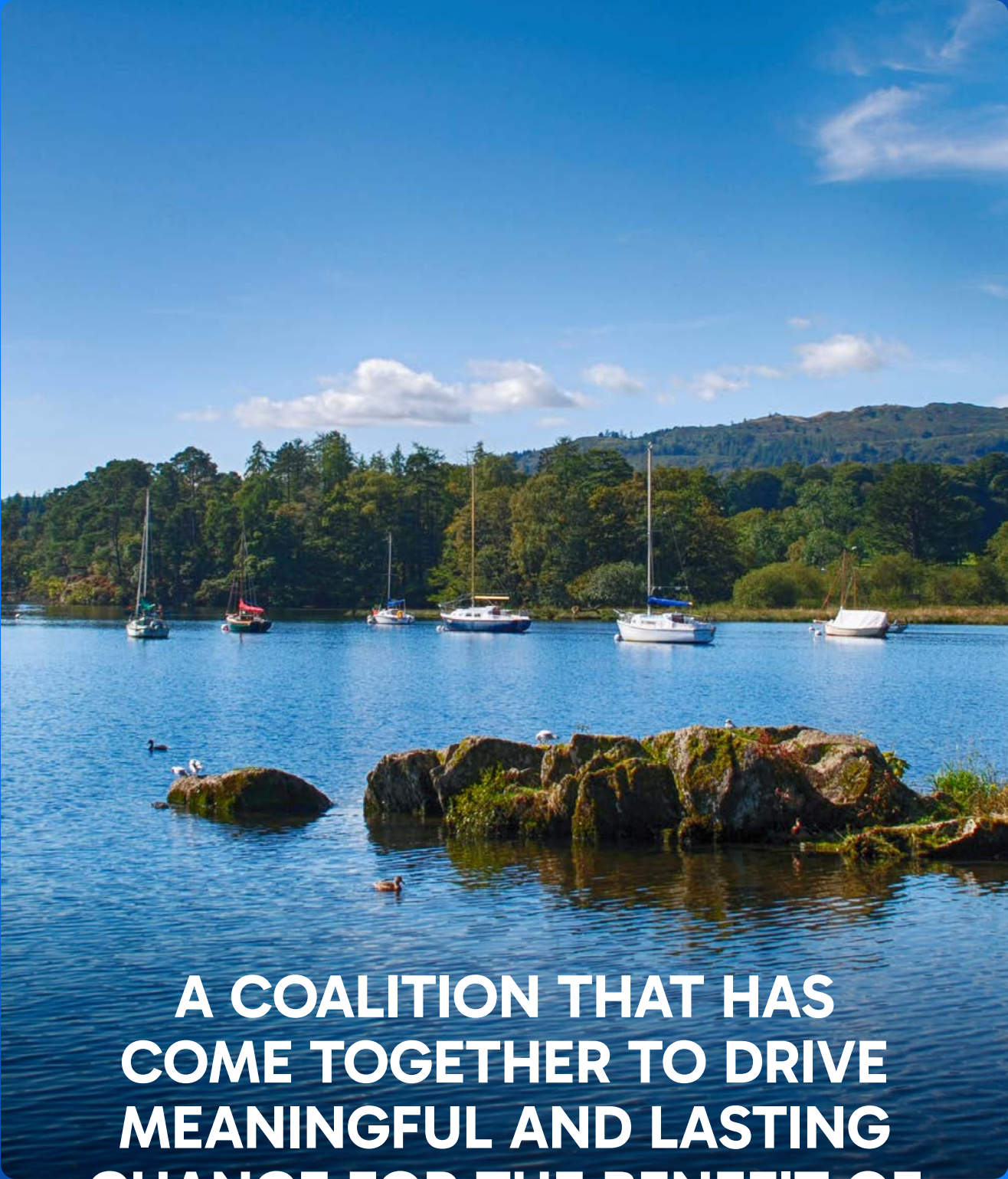
and with the level of ambition that we know is needed to deliver lasting change, and so the next steps for the project are clearly set out in the study's concluding section for detailed decision and the desire to get approved.

It is time to move on from the incremental approach to investment in this most iconic critical natural asset. Windermere still delights and excites, and an investment to protect the lake for the century to come is an investment not only in the economy of South Cumbria and the Lake District but a commitment to the world that Windermere will remain a perfect place for everyone forever.

I want to issue my wholehearted thanks to the Steering Group members and deputies, the teams at Jacobs and Mott MacDonald, and all those who have engaged in assuring and reviewing this document for their contributions and challenge over the last year. The project is better for each and every one who has been involved, and hopefully many of them and many more will now take this piece of critical natural infrastructure forwards through design and into delivery over the next very few years.

A future vision for Windermere that is fed only by the rivers, streams and springs that flow off the land is the goal of the Only Rainwater into Windermere project.

SECTION 2 | THE ORiW COALITION



A COALITION THAT HAS
COME TOGETHER TO DRIVE
MEANINGFUL AND LASTING
CHANGE FOR THE BENEFIT OF
WINDERMERE.



Edward Twiddy
Independent Convener
for ORiW

Coalition of organisations
collaborating on a future
where only rainwater
enters Windermere.



Carol Holt
Area Director
Environment Agency

Official public body that
protects and improves
the natural environment
across England.



Stephen Ratcliffe
Director of Sustainable
Development
Lake District National
Park Authority

Local government
body that conserves
and manages England's
largest national park.



Nigel Wilkinson MBE
Chair
Love Windermere

Partnership committed
to delivering
improvements and
protecting Windermere's
water quality.



Matt Staniek
Founder
Save Windermere

Independent,
evidence-led campaign
group working to
eliminate sewage
pollution entering
Windermere.



Louise Beardmore
Chief Executive
United Utilities

Regulated water and
wastewater company
serving eight million
people across the North
West of England.



Claire Gould
Director of Waste,
Environment, Climate
and Ecology
Westmorland and
Furness Council

Unitary authority for
the South and East of
Cumbria.

Supported
by:



Engineering, environmental and economic analysis
for the ORiW feasibility study has been carried out
by Jacobs and Mott MacDonald.

SECTION 3 | A BACKGROUND INTO WINDERMERE



Windermere is England’s largest freshwater lake, situated in the heart of the Lake District National Park and UNESCO World Heritage Site.

Windermere is home to rare and protected species, sustains thousands of jobs and is the jewel in the crown of the Lake District National Park, which generates around £2.4 billion in annual tourism revenue and attracts millions of visitors every year from across the UK and beyond.

The lake stretches over 10.5 miles and sits within a 220km² (85 square miles) catchment of interconnected lakes, tarns and rivers, including many nationally and internationally significant water bodies such as Esthwaite Water, Blelham Tarn, Elterwater and Grasmere.

Residents and visitors to Windermere are served by a range of wastewater infrastructure broadly categorised as public and private. Public refers to the ten wastewater treatment works (WwTW), six storm overflows and

network owned and operated by United Utilities. Private infrastructure typically refers to the estimated 1,800 septic tanks and around 90 permitted package treatment plants across the catchment used by properties and businesses.

Windermere remains one of the most environmentally, culturally and economically important landscapes in England, and underpins the Lake District National Park’s visitor appeal, which attracts around 17.7 million visitors each year, both nationally and internationally.

The Lake District has played a defining role in shaping environmental consciousness, from the Thirlmere campaign of 1876, where the principle of protecting nature for the nation was first widely argued, to its ongoing influence on global approaches to landscape conservation.

The area has inspired generations of artists, poets and writers, figures such as William Wordsworth and Beatrix Potter, while local scientific institutions continue to advance international understanding of lake ecosystems.

Windermere not only attracts and inspires but supports quality of life for residents and the experience of millions of visitors from around the world. Its health is critical not only to those who live and work here, but to the national landscape it defines.

This unique combination of environmental, cultural, scientific and economic significance places a responsibility on current generations to ensure Windermere is protected and restored for the future.

An iconic natural asset



Windermere is at the heart of the Lake District National Park’s visitor economy, which generates **around £2.4 billion** in annual tourism revenue and attracts approximately **17.7 million visitors** annually.



The lake sits within a glacially formed landscape of **steep valleys and ancient rock formations**.



Windermere is England’s largest natural lake, and holds around **300 billion litres** of water, enough to fill **120,000** Olympic swimming pools.



Windermere supports **nationally and internationally important** protected freshwater species. These include Arctic charr, Atlantic salmon, sea trout, European eel, white-clawed crayfish and European otter, alongside brook lamprey, river lamprey and bullhead.



The Lake District experiences some of the highest levels of rainfall in England, with some areas averaging **over 2.5 metres** each year, alongside a trend towards wetter winters and drier summers. Extreme rainfall events could be **four times as frequent** by 2080 compared to the 1980s.



The catchment supports **over 20 Sites of Special Scientific Interest**, a Special Area of Conservation and an internationally important wetland site.



The catchment supports **over 60 bird species**. Many of them are sensitive to water quality changes, which can impact their populations and habitats.

.....

.....

.....

17.7 million

annual national and international visitors drawn to the Lake District National Park

.....

10.5 miles

long, making it England’s largest freshwater lake

.....

2.5 metres

of annual rainfall – one of the highest levels in England

.....

SECTION 4 | AN OVERVIEW OF THE WINDERMERE CATCHMENT

The Windermere catchment is
24,350
hectares

(or over 34,000 football pitches)



Windermere catchment comprises several connected water bodies including Grasmere, Rydal Water, Elterwater and Esthwaite Water – all of which benefit from ORiW.



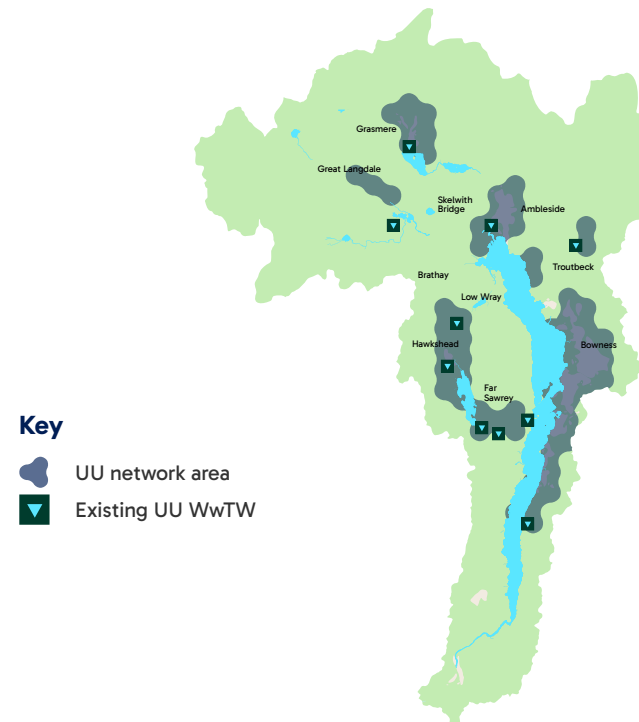
Windermere is one of the best studied lakes in the world with records dating back to the 1920s, with organisations continuing to monitor the lake today.



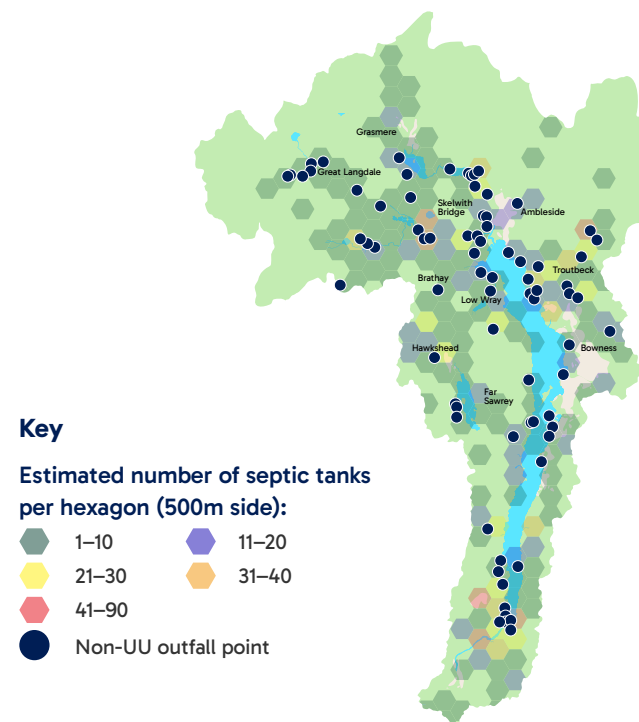
Alongside animal species, the Lake District National Park is home to over 1,300 plant species, helping to support rare insects.

Existing infrastructure in Windermere

United Utilities (UU) wastewater network



Privately owned wastewater assets



How the coalition is supporting the catchment now



Environment Agency

The Environment Agency helps people, nature and businesses prosper together by protecting the environment and supporting sustainable growth. As an environmental regulator, it ensures water companies and others meet their commitments and comply with the law. As an asset manager, it builds and maintains flood defences and nature-based solutions that strengthen climate resilience, protecting homes and habitats.



Love Windermere

The Love Windermere partnership is working to bring about a healthier future for the lake and the surrounding area, balancing the needs of nature, the community and the local economy. Its science-led, collaborative action plan brings together businesses, communities and regulators in the delivery of practical, catchment-wide initiatives to improve Windermere's water quality by focusing on sewage, land management, public engagement and advocacy.



United Utilities

United Utilities serves 8 million customers across the North West, including the Windermere catchment, where it operates public water and wastewater infrastructure. Over the next five years, it is investing £13.5 billion to improve services for communities and the environment, ensuring that it supports growth and resilience in all five North West counties. It has supported and funded the ORiW study to champion a new future for the lake.



Lake District National Park

The Lake District National Park Authority is the planning authority for Windermere and the Lake District. Through the National Park Partnership and Management Plan, it works with landowners, farmers, communities and partners to improve water quality through habitat restoration, nature-based solutions and sustainable land management, helping secure clean, plentiful water for people and nature.



Save Windermere

Save Windermere is an independent, evidence-led organisation that has helped drive greater investment and transparency, stronger regulatory oversight, reviews of discharge permits and scrutiny of wastewater treatment assets. It also undertakes practical work to help private properties connect to the public sewer network. Its work has made sewage pollution and its impact on Windermere's water quality a priority issue locally and nationally, centred on its call to end sewage pollution in the lake.



Westmorland and Furness Council

Westmorland and Furness Council acts as the Lead Local Flood Authority (LLFA) responsible for managing local flood risks, including surface water, groundwater and ordinary watercourses. Through this role, Westmorland and Furness manage the Cumbria Innovative Flood Resilience project, slowing the flow around Grasmere, funded through the Environment Agency's Flood and Coastal Innovation Programme.

SECTION 5 | THE AMBITION OF ORiW



WINDERMERE: JEWEL IN THE CROWN OF THE LAKE DISTRICT

At the heart of a UNESCO World Heritage Site, within the Lake District National Park, Windermere is one of the most environmentally, culturally and economically important landscapes in England.

Windermere has increasingly found itself at the centre of a national and international debate about how we protect our natural environment for future generations from pollution. Previously, the question was whether Windermere had a problem. Today, the conversation is about delivering one of the most ambitious freshwater restoration projects anywhere in Europe.

The ambition

The ambition is clear: make Windermere one of the cleanest lakes in England by eliminating treated and untreated wastewater from public and private sources, alongside managing highway run-off, from the lake once and for all. This is not an incremental upgrade. It is a generational commitment to protect Windermere from the pressures it faces today and the pressures it will face over the next century.

The project offers the chance to create a lasting legacy: resilient wastewater infrastructure that protects nature, supports communities, sustains businesses and secures the future of one of England's most cherished landscapes.

The end state is uncompromising: Only Rainwater into Windermere. The ambition is to return Windermere as close to its natural condition as possible by eliminating point-source pollution inputs and harmful algal blooms. This will protect the health, appearance and ecology of the lake for generations to come, securing Windermere in its rightful place at the heart of a thriving National Park.

As England's largest natural lake and a landscape of international importance, Windermere demands a level of ambition equal to its significance. By achieving this project, Windermere can become a national blueprint for restoring and protecting our most treasured freshwater environments.

What?

The feasibility study brings together international expertise and leading engineering capability to test over 70 options for achieving the vision. It sets out a disciplined, evidence-led route from today's fragmented legacy system towards a future-ready approach to wastewater management across the catchment, eliminating all point source inputs into Windermere.

From that assessment, the study recommends preferred ways forward designed to deliver the end state of Only Rainwater into Windermere while maximising environmental benefit and minimising disruption to communities through the latest engineering and tunnelling techniques.

Once detailed design, approvals and mobilisation are complete, construction, to ensure only rainwater enters the lake, could take seven years. A new state-of-the-art treatment works downstream would deliver some of the highest wastewater treatment standards in England.

For a place of
Windermere's
ecological, cultural
and economic
importance,
continuing as usual
is not enough.



SECTION 5 | THE AMBITION OF ORiW

Why?

Evidence shows that Windermere is already experiencing ecological pressures such as increasing algal biomass, nutrient enrichment and impacts on sensitive freshwater habitats and species. Modelling undertaken for the Environment Agency's Nutrient Futures for Windermere study indicates that climate change is likely to exacerbate these challenges. Rising temperatures, changing rainfall patterns, more intense storm events and longer periods of thermal stratification are expected to place additional pressure on the lake, as well as wastewater infrastructure – requiring a new approach to meet long-term climate resilience, outlined further in Section 5. While incremental investment will keep pace with this change, ORiW provides both a 'one and done' approach, avoiding ongoing disruption from repeated investment, and removes significant nutrient inputs from Windermere – something that can't be achieved through investment in existing infrastructure. Windermere needs a different solution to benefit the environment and communities – also outlined in Section 5.

How?

The study confirms that it is technically possible to intercept, transfer and treat public and private wastewater away from Windermere, minimising rainwater getting into the network and keeping it in the natural environment. It also identifies opportunities to manage highway run-off, ensuring all controllable wastewater pollution pathways are addressed.

Delivery requires a catchment-wide investment programme that stops pollution at source, captures wastewater before it reaches the lake and transfers it for advanced treatment.

The preferred ways forward are taking the wastewater away from the lake to a wastewater treatment works where it will be treated to some of the highest standards in England. The solutions offer the strongest balance of deliverability, environmental benefit, community impact and long-term resilience. The ambition can be delivered, creating enduring value for communities, businesses, customers and the environment over the next century. Infrastructure on this scale needs a clear regulatory framework, long-term certainty and access

to investment at pace. A solution designed for the next century allows investment to be considered over the long term, spreading costs over time and seeking to minimise the impact on customer bills.

Who?

The ORiW coalition brings together the organisations needed to turn ambition into delivery: the Environment Agency, Lake District National Park, Love Windermere, Save Windermere, United Utilities and Westmorland and Furness Council.

Achieving this ambition has required unprecedented, system-wide collaboration. In pursuit of this vision, regulators, the water company, environmental organisations, activists, local authorities, the Lake District National Park Authority and local stakeholder groups have come together, aligning investment, decision making and delivery to achieve an end to wastewater inputs into Windermere and its surrounding catchment.

The coalition's ambition is simple, visible and measurable:
Only Rainwater into Windermere.

**This is Windermere's
once-in-a-generation opportunity:
to protect and restore one of the
UK's most iconic lakes.**



SECTION 6 | WHY WINDERMERE NEEDS A DIFFERENT SOLUTION



WHY ‘ONLY RAINWATER INTO WINDERMERE’?

For decades, investment in Windermere has sought to address growing environmental pressures through improvements to wastewater infrastructure.

Building on those lessons, ORiW represents a transformational step forward: a once-in-a-generation opportunity to protect and restore one of England’s most iconic lakes. Inspired by internationally recognised success stories such as Lake Annecy and Lake Washington, ORiW takes a bold, catchment-wide approach, redesigning the wastewater system to deliver lasting environmental benefits.

By removing treated and untreated wastewater inputs from Windermere, ORiW addresses the lake’s most significant controllable pressure while creating modern, resilient infrastructure capable of adapting to future environmental and regulatory challenges. Unlike the traditional model of successive five-year investment cycles, ORiW has been designed to deliver benefits not just for the next regulatory period, but for the next century.

The choice is clear. Without ORiW, we will continue making incremental upgrades every five years to keep pace with increasing rainfall and flooding, rising lake temperatures and evolving treatment standards – resulting in repeated construction, ongoing disruption and a continual cycle of investment. ORiW breaks that cycle. Through innovative tunnelling techniques and a single, coordinated programme of works, it will deliver meaningful environmental improvements while minimising disruption to local communities and the landscape. Constructable within seven years, it is a genuine ‘one and done’ solution that will create immediate impact, strengthen resilience and lay the foundations for the ecological restoration of Windermere for generations to come.

Current and planned investment to 2030 represents important progress and will deliver further improvements in wastewater-treatment performance and storm-overflow operation. However, achieving regulatory compliance alone does not equate to achieving ecological recovery. ORiW has therefore been established to identify and deliver the pathway required to eliminate point-source pollution discharges to Windermere and its hydrologically connected waters, creating a step change in freshwater protection.

ORiW has been designed to deliver benefits not just for the next regulatory period, but for the next century.

Achieving this ambition will require coordinated action across the catchment, including public wastewater infrastructure, privately owned and operated treatment systems, properties not connected to the public sewer network and highways drainage.

ORiW represents a fundamental shift away from managing pressures through incremental improvements towards a coordinated catchment-scale restoration programme that addresses the controllable wastewater drivers of nutrient enrichment and builds long-term ecological resilience.

The opportunity is not simply to slow decline, but to redefine what success looks like for freshwater recovery in England, restoring ecological health, protecting an internationally important landscape and securing Windermere’s environmental, economic and cultural value for future generations.

This study demonstrates the engineering pathways available, the investment mechanisms required, and the collective commitment to deliver a nationally and internationally significant approach to freshwater restoration.



SECTION 6 | WHY WINDERMERE NEEDS A DIFFERENT SOLUTION

Resilience for the next century

The Windermere catchment experiences some of the highest rainfall levels in the UK, receiving up to 2.5 metres annually. Climate change is expected to bring rising temperatures, more intense rainfall events and increased flood risk, placing further pressure on wastewater infrastructure. These risks are already evident, with wastewater treatment works within the catchment having experienced severe flooding, including the submergence of some facilities.

ORiW presents an opportunity to address these pressures through a long-term, catchment-wide approach to infrastructure planning. Rather than continuing to adapt existing assets incrementally, the project provides an opportunity to consolidate and relocate vulnerable wastewater infrastructure, reducing exposure to future flood risks while accommodating evolving treatment standards, emerging contaminants and future demand.

By designing infrastructure with the next century in mind, ORiW could deliver a more resilient wastewater system, strengthen environmental protection and minimise the need for repeated investment and disruption.

The legacy

Significant investment will be needed in any scenario to respond to environmental decline, ageing infrastructure, population growth and climate change. The choice is not whether to invest. The real choice is whether that investment continues in repeated cycles of partial improvements that cannot restore Windermere to its natural condition, or whether it is brought together behind a single long-term solution, supported by significant new wastewater infrastructure, capable of changing Windermere's future forever and doing so at pace.

The environmental legacy will be a step change in water quality, restoring ecological balance by eliminating the drivers of harmful algal growth from wastewater inputs, strengthening resilience to future climate pressures and restoring Windermere to a pre-industrialised state of no wastewater inputs.

The societal legacy will be the protection and enhancement of Windermere as a nationally and internationally significant natural asset, strengthening its role as a world-class venue for national and international sport while improving amenity, wellbeing and cultural value

for communities, visitors and future generations who depend on and cherish the lake.

The economic legacy will be safeguarding and strengthening Windermere's tourism-dependent economy, supporting regional employment and delivering long-term value to society through sustained environmental recovery.

Most importantly, this project would redefine what is possible in freshwater restoration: eliminating harmful inputs into England's largest lake and setting a new benchmark for environmental conservation in England.

Delivering this once-in-a-generation opportunity would require a step change in infrastructure provision across the catchment. By increasing the wastewater network servicing Windermere by up to approximately 75%, this will create a system capable of supporting communities and the environment for the next century. This demands bold leadership, accelerated investment and collective resolve. This is Windermere's opportunity: to move from managing decline to securing lasting restoration.

**Eliminating harmful inputs into
England's largest lake would
redefine what is possible in
freshwater restoration.**



SECTION 6 | WHY WINDERMERE NEEDS A DIFFERENT SOLUTION

SOLUTION FOR THE ENVIRONMENT

Due to its long-standing ecological significance, Windermere is one of the most extensively studied lakes in the world, with scientific monitoring records dating back to the 1920s. This unique evidence base tells a clear story: against a backdrop of a changing climate, more needs to be done to protect the lake and its wider catchment from significant environmental pressure.

Long-term monitoring shows declining deep-water oxygen concentrations and increasing algal biomass across large parts of Windermere and neighbouring lakes. Nutrient enrichment is altering ecological conditions within the lake, creating conditions in which harmful algal blooms can develop and leaving the freshwater system with less capacity to withstand further stress. Declines in species abundance, habitat condition and spawning success across parts of the catchment provide further warning that the health of the ecosystem is being eroded.

The pressures come from pollutant inputs compounded by wider environment, such as temperature increase and rainfall, as well as across the catchment. Wastewater infrastructure includes public assets and private wastewater treatment systems serving properties and businesses that are not connected to the public sewerage network. Urban run-off adds further pressure. Agricultural run-off is also recognised as an important catchment pressure. While outside the scope of this study, it will need to be understood and

addressed as part of a catchment-wide approach to improving Windermere's water quality.

The current situation

Across the catchment, United Utilities owns and operates ten WwTWs and six storm overflows. These assets represent the largest regulated wastewater discharges in the catchment and account for the majority of monitored wastewater flows contributing nutrient inputs to Windermere and its connected watercourses. Much of the public wastewater infrastructure was constructed between the 1960s and 1980s, with upgrades continuing over recent decades in response to tighter environment regulation and advances in treatment technology.

The largest wastewater treatment works in the catchment, which discharges directly to Windermere, operates to some of the most stringent phosphorus permit standards in the water sector in England and Wales, including treatment to the current Technically Achievable Limits (TAL) and ultraviolet disinfection, for example.

Alongside the public system, around 1,800 properties are estimated to be outside the public sewer network and there are around 90 permitted privately owned and operated wastewater treatment facilities, often linked to commercial enterprises.

Their discharge pathways and environmental effects vary from site to site, depending on whether effluent is discharged to drainage fields or directly into watercourses. Compared with large public works operating to advanced tertiary treatment standards, private systems are inherently more limited in nutrient removal and ongoing performance monitoring.

Only a 'no sewage' scenario will reduce harmful algal bloom exceedance days to zero.

However, ecological impact is not determined by regulatory compliance and treatment concentration alone. The total volume of wastewater discharged, nutrient load, operational performance under varying flow conditions and the cumulative effect of discharges over time all influence water quality in a lake where pollutants can remain within its system.

Looking to the future

Long-term monitoring and modelling evidence indicates that regulated public wastewater infrastructure remains the most significant and controllable source of nutrient inputs. The relative impact of other sources varies depending on discharge pathways, hydrological connectivity, nutrient loading, and seasonal conditions.

Modelling undertaken for the Environment Agency's Nutrient Futures for Windermere study (2026) indicates that climate change will intensify existing challenges. It highlights that, even though continued investment to 2030 will improve water quality in the short term, residual algal bloom risk remains, with up to 24 cyanobacteria exceedance days per year forecast in

the North Basin by 2079 – whereas a 'no sewage' 2079 scenario reduces exceedance days to zero. Surface water temperatures have risen by approximately 1.7°C over the past 70 years and are expected to continue rising. Future climate scenarios point to higher temperatures, altered rainfall patterns, more intense storms and longer periods of thermal stratification. By the 2070s, climate-driven change could increase nutrient loading to the lake by up to 7%, while mean temperatures could rise by 2.5°C. Without a substantial reduction in controllable nutrient inputs, the lake will become increasingly vulnerable to ecological instability and decline. These changing conditions are expected to increase ecological instability and create conditions in which harmful algal blooms become more frequent and persistent.

Planned investment to 2030 will deliver important improvements to wastewater treatment and reduce storm overflows, driving necessary improvements to water quality, and delivery of this investment has informed the baseline of ORiW solutions. Taking a longer-term view, modelling indicates that it will not provide the long-term climate resilience the lake requires. The risk of harmful algal blooms will remain, particularly in the North Basin, while treated and untreated wastewater will continue to place nutrient pressure on an already stressed lake.

Beyond reducing nutrient inputs from wastewater sources, ORiW also provides an opportunity to reduce other present and emerging contaminants from the lake. This includes, for example, PFAS, bacteria and other emerging inputs. ORiW provides long-term resilience through removing and centrally treating a significant proportion of wastewater inputs.

The value of having wastewater in a central treatment location, with discharge of treated effluent away from Windermere, is also relevant when considering emerging contaminants such as forever chemicals. Not only does ORiW remove this challenge now, as understanding of these contaminants develops so too will treatment requirements and standards. The ORiW approach enables this to evolve at a single treatment site, as opposed to incrementally across multiple disparate wastewater systems.

Windermere is already showing the consequences of cumulative impacts and a changing climate. Nutrient Futures demonstrates that achieving regulatory compliance and continuing repeated cycles of incremental investment are unlikely, on their own, to restore Windermere's ecological health. This approach would leave the lake dependent on sustained treatment performance, future regulatory intervention, and further investment as climate pressures intensify. Removing treated and untreated wastewater inputs will provide the step change needed to address the lake's most significant and controllable source of nutrient enrichment, create the conditions for long-term recovery and build resilience for the next century.



SECTION 6 | WHY WINDERMERE NEEDS A DIFFERENT SOLUTION



SOLUTION FOR THE ECONOMY

Windermere underpins the Lake District National Park's visitor appeal, which generates around £2.4 billion in annual tourism revenue and attracts approximately 17.7 million visitors annually.

Over 60% of employment in the Lake District National Park is linked to tourism. Windermere's environmental condition and reputation are therefore directly connected to regional prosperity, employment and community resilience.

Research across 14 European countries has demonstrated that perceptions of declining water quality at recreational blue spaces can significantly influence visitor

behaviour, with reduced perceived quality associated with fewer visits and improved perceptions associated with increased visitation. Continued water quality concerns therefore represent a long-term risk to Windermere's visitor economy, with modelling indicating that deterioration could result in annual economic losses of up to £122.5 million.

£2.4 billion

annual revenue generated from tourism in the Lake District National Park

.....

Over 60%

of local jobs directly linked to tourism

SOLUTION FOR THE PUBLIC

Strong public engagement and sustained local and national campaigning has raised awareness of the challenges facing Windermere and its catchment.

This collective action has amplified public scrutiny and expectation, helping to shape the narrative around the ambition for Windermere's future and contributing to increased recognition of the need for enhanced protection measures.

Alongside this, citizen science initiatives demonstrate the scale of public engagement and societal demand for action. The Big Windermere Survey formed one of the country's largest citizen science endeavours. This growing awareness reflects a clear public

demand for a step change in how Windermere is protected and restored. Protecting and restoring the lake, and the wider network of connected water bodies, will safeguard not only economic outcomes, but a nationally significant natural asset with long-term social and cultural value.

A clear public demand for a step change in how Windermere is protected and restored back to its natural state.



SECTION 7 | POLICY AND REGULATORY CONTEXT FOR CHANGE

ORiW aligns with the direction of UK policy, demonstrating how environmental investment can move beyond regulatory compliance to deliver integrated improvements in water quality, climate resilience and ecological recovery, while supporting economic growth.

Key national drivers include:

- **Water Framework Directive:** The European Union's main law for protecting and improving rivers, lakes, groundwater, estuaries and coastal waters which has been transposed into UK law and remains central to the protection of UK freshwaters.
- **Storm Overflows Discharge Reduction Plan (2023):** Targets elimination of ecological harm from storm overflows by 2050 and a 70% reduction in discharges to bathing waters by 2035.
- **Environmental Improvement Plan (2025):** Sets statutory targets to restore nature and reduce pollution. ORiW aligns directly with Goal 3 (clean, resilient and plentiful English waters).
- **The Environment Agency's EA2030: Change for a better environment strategy (2025):** Contribution to the Environmental Improvement Plan. ORiW aligns to delivery of EA2030 objectives relating to healthier water and place-based catchment management with local partners.
- **New Vision for Water White Paper (2026):** Sets out a major plan for water-sector reform and signals a move toward joined-up local planning. This is the governance model ORiW is already developing, and it is well-positioned as an early demonstration of the kind of place-based, multi-stakeholder programme the vision is designed to enable.
- **Regulators' Alliance for Progressing Infrastructure Development:** A partnership between Ofwat, the Environment Agency and the Drinking Water Inspectorate to accelerate delivery of strategically important infrastructure.
- **The Third UK Climate Change Risk Assessment (2022):** Identifies risks to freshwater habitats and species as a national priority and explicitly references Windermere as a freshwater body already showing climate-driven ecological change, consistent with this approach.
- **UNESCO World Heritage Site status:** Reinforces the national and international importance of protecting and enhancing Windermere's water quality.



SECTION 8 | LEARNING FROM OTHERS
AROUND THE WORLD

1

Development
of Critical Success
Factors

A series of Critical Success Factors (CSFs) were developed by the coalition to define the requirements that any shortlisted option must satisfy. The CSFs reflect the environmental, technical, social and delivery outcomes sought by ORiW and provide a consistent basis for developing, refining and assessing potential solutions. They help focus a broad range of ideas into a robust shortlist of options for further appraisal. The CSFs used in this study are presented below.

2

Longlisting
of interventions

A broad longlist of potential interventions was identified, spanning policy, behavioural, regulatory and engineering measures to ensure all viable approaches were considered. Interventions outside programme scope or delivery control were subsequently filtered out, with those retained focusing on reducing nutrients and bacteria entering the lake, alongside opportunities to address a wider range of emerging contaminants associated with wastewater discharges and urban run-off.

3

Shortlisting
of interventions

The longlist was then assessed against the CSFs, so that the list could be refined further into a shortlist of interventions, with less suitable or non-viable interventions removed.

4

Option
development

The remaining interventions were then grouped into a smaller number of coherent options each representing a different way of meeting the programme objective. A high-level engineering solution was then scoped and developed in preparation for assessment through a international engineering review.

5

International
engineering review

The shortlisted options were independently challenged through a global workshop, bringing together leading wastewater, engineering and infrastructure specialists from the UK and overseas. Drawing on experience from major programmes around the world, participants tested assumptions, scrutinised evidence, explored alternative approaches and shared lessons learned from comparable schemes.

Critical Success Factors		What this means in practice
①	Run-off and discharges eliminated	Design and implement feasible solutions to achieve zero identified point-source sewage and highway-run-off entry into the lake and its tributaries, with robust monitoring to verify success.
②	Minimal construction impact	Maintain access for businesses and visitors during works. Reduce noise, disruption and visual impact.
③	Maintain water supply	Safeguard both the capacity and quality of drinking-water abstraction from the lake throughout delivery and beyond.
④	Stakeholder alignment	Secure and maintain documented support from key stakeholders, incorporating their requirements into design and delivery decisions.
⑤	Environmental protection and enhancement	Prevent avoidable harm, mitigate unavoidable impacts, and leave biodiversity and habitat in a better state than before.
⑥	Long-term resilience	Solutions remain effective to 2100 under a range of plausible future scenarios.
⑦	Early intervention	Deliver at least one interim intervention by 2028 to demonstrate early progress and maintain stakeholder confidence.



SECTION 8 | LEARNING FROM OTHERS AROUND THE WORLD

GLOBAL WORKSHOP CASE STUDY

LAKE ANNECY

The project team also considered the transformation of Lake Annecy in France, widely recognised as one of Europe's cleanest lakes and an important international precedent for the ORiW vision.

By intercepting and transferring wastewater away from the lake for treatment, Annecy demonstrated how long-term investment in strategic wastewater infrastructure can help protect a nationally important freshwater environment while delivering environmental betterment and supporting local communities.

The experience of Annecy provides confidence that the long-term protection and recovery of sensitive lake environments can be achieved through a coordinated catchment-wide approach, helping to safeguard these nationally important natural assets for future generations.

GLOBAL WORKSHOP CASE STUDY

PITTSBURGH REGIONAL WET-WEATHER INTERCEPTOR

As part of a global challenge workshop, which brought together an international panel of practitioners and subject matter experts, the project team reviewed the Pittsburgh Regional Wet-Weather Interceptor Programme in the United States. The scheme comprises the Ohio River Tunnel, Allegheny River Tunnel and Monongahela River Tunnel, providing approximately 24.6km of tunnel infrastructure with up to 5.5-metre internal diameter.

PHOTO: The Ohio River Tunnel.

The project was considered particularly relevant to ORiW because it demonstrates how large-scale conveyance tunnels can be used to reduce combined and sanitary-sewer overflows, transfer wastewater flows across catchments, and manage multiple flow inputs within a complex network. The example provided valuable international insight into the potential role of strategic tunnelling as part of an integrated approach to reducing wastewater discharges and improving environmental outcomes.



GLOBAL WORKSHOP CASE STUDY

NEW YORK CITY GREEN INFRASTRUCTURE PROGRAM

During the global challenge workshop, the team reviewed the New York City Green Infrastructure Program, which has been delivering sustainable drainage solutions since 2011.

The programme has implemented more than 16,000 green infrastructure assets, managing run-off across over 1,000 hectares and aims to reduce combined sewer overflow (CSO) discharges by approximately 2.5 million m³ annually.

The programme demonstrated the potential for large-scale deployment of nature-based

and sustainable drainage measures to reduce pressures on wastewater networks and improve receiving water quality. Key lessons for the ORiW study included approaches to prioritising catchment interventions, scaling up sustainable drainage systems (SuDS) delivery, and establishing effective catchment partnerships to coordinate action across multiple stakeholders.

The example highlighted how sustained, collaborative investment in green infrastructure can contribute to long-term reductions in wastewater discharges and environmental improvement.



SECTION 9 | IDENTIFYING A SOLUTION

DEVELOPING THE PREFERRED WAYS FORWARD

The ORiW coalition needed to identify a solution that could be delivered in practice, achieve significant environmental improvement, and avoid placing unacceptable impacts on local communities. To support this, all options were assessed through a rigorous appraisal process.

Following a year of comprehensive assessment working with independent leading engineers and international expertise, over 70 options were considered to achieve the ORiW ambition that have now been shortlisted to two preferred ways forward for further detailed assessment. These include options to discharge treated wastewater to either the River Leven or from Ulverston, with costs and benefits appraisal completed for each.

Best value cannot be demonstrated through a single headline figure. An option may appear favourable on cost or benefits in isolation but still represent poor value overall if it is difficult to deliver, creates unacceptable impacts for communities, or fails to meet public expectations for environmental improvement.

To identify the best overall solution, the appraisal looked at a wide range of factors. This includes benefits that can be measured financially, benefits that cannot easily be given a monetary value, how practical each option is to deliver, and who is affected by it. This helps ensure the preferred ways forward provide the greatest overall value from the investment.

The findings of this feasibility report are supported by a robust evidence base consisting of over 75 engineering reports and five HM Treasury Green Book-aligned business case chapters. These documents were created collaboratively with input from the Steering Group, global engineering expertise and subject matter experts who have delivered large

water infrastructure programmes. Combined, these documents give a clear assessment of the technical, environmental and delivery considerations appropriate to this stage of the programme. This analysis has informed the identification, appraisal and refinement of options, providing a strong foundation for the preferred options presented in this report.



1
Development of
Critical Success Factors

2
Longlisting of
interventions

3
Shortlisting of
interventions

4
Option development

5
International
engineering review

6
Final shortlist

7
Costing the options

8
Benefits appraisal

9
The preferred
ways forward

**Only
Rainwater
into
Windermere**

SECTION 10 | FINAL SHORTLIST

6

The final shortlist – common elements for all strategic options

A key finding of this approach is that all shortlisted options share a substantial common foundation of infrastructure and catchment-wide interventions. These measures, outlined in the table below, are designed to reduce pollutant inputs at source, improve wastewater system performance and strengthen long-term resilience across the catchment. As a result, a significant proportion of the environmental, operational and resilience benefits are common to all shortlisted options irrespective of where wastewater is ultimately treated and discharged.

Common elements

Each shortlisted option incorporates a common package of wastewater, surface-water, highway-run-off and catchment-management interventions. Together, these measures provide the foundation of the ORiW solutions and are designed to work alongside the major transfer infrastructure.

All options assume a step change in treatment performance through new, state-of-the-art wastewater treatment works. These are located close to existing sites, making use of United Utilities-owned land to minimise development on greenfield land and reduce costs. Where possible, existing wastewater treatment works around the lake would be converted into pumping or transfer

assets, with treatment processes decommissioned to reduce the long-term infrastructure footprint in sensitive locations. The options also include first-time sewerage for rural properties and businesses reliant on privately owned and operated wastewater systems, together with a Rainwater Management Framework that uses SuDS, surface water separation and nature-based solutions to reduce polluted run-off, improve urban amenity and support a greener drainage system.

By reducing surface water entering the sewerage system, these interventions also help limit the scale of downstream transfer and treatment infrastructure required, with associated benefits for pumped volumes, whole-life cost, carbon and operational resilience.

While the study is grounded in engineering practicality and deliverability, its conclusions draw on a wider multi-disciplinary evidence base, including environmental constraints, consenting risk, operational resilience, community and visitor-economy impacts, ecology and wider economic considerations. For example, all options were assessed for their potential impact on Windermere’s lake levels, including implications for water resource management, navigation and recreational use, and the ability to maintain operational and business continuity. This broader perspective ensures the preferred ways forward are evaluated not only for technical credibility, but also for their overall deliverability, value and ability to achieve the ORiW objectives.



Common elements of the preferred two final solutions vs key variables

Common elements are:

- Catchment-wide interception of wastewater before it reaches Windermere
- Rationalisation and optimisation of existing wastewater assets
- New enhanced wastewater-treatment capability
- Surface-water separation
- First-time sewerage for currently unsewered properties and businesses
- Improved management of private wastewater systems
- Highway-run-off management and treatment
- Nature-based drainage measures
- Sustainable Drainage Systems (SuDS)

Variables are:

- The location of the enhanced wastewater treatment works to treat all flows
- The location of the final discharge point
- The method used to transfer flows, comprising a tunnel, a rising main, or an optimised combination of both

Options for transferring wastewater



Rising main

A rising main is a pressurised pipe system that uses pumping stations to move water, allowing it to travel uphill or across varied terrain. It is typically installed by digging trenches along roads or through fields. Once constructed, surface sites are needed at intervals to house the pumping equipment and associated infrastructure.



Tunnel

A tunnel is a deep underground structure that allows water to flow using gravity. It is constructed using trenchless methods, either by pushing pipes through the ground in short sections or by using a large tunnelling machine that bores through the ground and installs a concrete lining as it progresses. These approaches minimise surface disruption compared to other methods. Once constructed, small surface sites are required for access via shafts.



Hybrid

A solution which incorporates both rising main and tunnel sections to optimise costs and benefits.

SECTION 11 | THE COST OF DELIVERING THE SOLUTIONS

7

Costing the options

Costs were estimated on a whole-life basis using consistent, like-for-like assumptions across options. Options were compared not only on upfront cost, but also on the cost of operating, maintaining and renewing assets over time.

Assurance of costs

An assurance exercise provided added confidence in the cost estimates. Costs were compared against Ofwat econometric models and where a direct comparison was not possible, wider strategic benchmarking was applied to align estimates with established Ofwat positions.

Drawing on experience from major programmes such as the Haweswater Aqueduct Resilience Programme, West Cumbria Pipeline Project and Thames Tideway, lessons learned, risks and deliverability considerations can be used to optimise the preferred approach.

The build up of costs



Capital costs (Capex)

Capital costs represent the investment required to deliver the project, including construction, equipment, materials, and associated project delivery activities.

Cost estimates were developed using a combination of benchmark data from comparable projects and detailed assessments of project requirements. The estimates were prepared in accordance with recognised industry guidance to provide an appropriate level of accuracy and confidence for this stage of project development.



Operational costs (Opex)

Operational costs were calculated for all new assets and include power, chemicals, labour and sustainable drainage maintenance activities.



Repair and maintenance costs

Repair and maintenance costs were assessed over a 100-year period and split across six asset types, each with an appropriate asset life and maintenance profile.



SECTION 12 | THE BENEFITS

8

Benefits appraisal

All options assessed in this report would deliver significant improvement for Windermere. However, the key consideration is the scale of benefit each option provides, and the cost at which it can be achieved. To support fair comparison, the appraisal uses a common reference point: how the lake would respond if wastewater inputs were removed, while other pollution sources remain unchanged?

The appraisal should therefore test not only value for money, but the extent to which each option delivers the ORiW end state and long-term ecological recovery.

Options were assessed across four core pillars: the value they create, the cost of delivery, how impacts are distributed across people and places, and their practicality and deliverability.

Considering these together provides a balanced view of overall public value and supports identification of the preferred ways forward.

All shortlisted options were presented with their net present values and benefit-cost ratios for discussion at a workshop with the ORiW coalition. The workshop considered the evidence across the four-pillar appraisal framework and used that evidence to inform a collective view against the project objectives. The appraisal found preferred ways forward, outlined on the following pages.

Assessment four pillars



Whole-life cost and efficiency

This reflects the core cost-benefit and value-for-money analysis at the heart of the Green Book, assessed on a whole-life basis. It considers not only the cost of delivery, but how efficiently each option converts investment into outcomes over time.



Environmental and social value

This looks at the wider value an option could create for people, communities and the environment. It includes benefits that may not show up in financial measures alone, such as improvements to natural capital and broader public value.



Distributional and place-based effects

This looks at how the costs and benefits of an option would be shared across different places and communities. It helps show whether the impacts are fair and whether the option fits local needs and circumstances.



Risk and deliverability

This reflects the Green Book's treatment of uncertainty, optimism bias and risk, together with the deliverability and delivery-confidence considerations. It tests whether an option is credible, manageable and capable of being delivered successfully.

SECTION 13 | THE WAY FORWARD

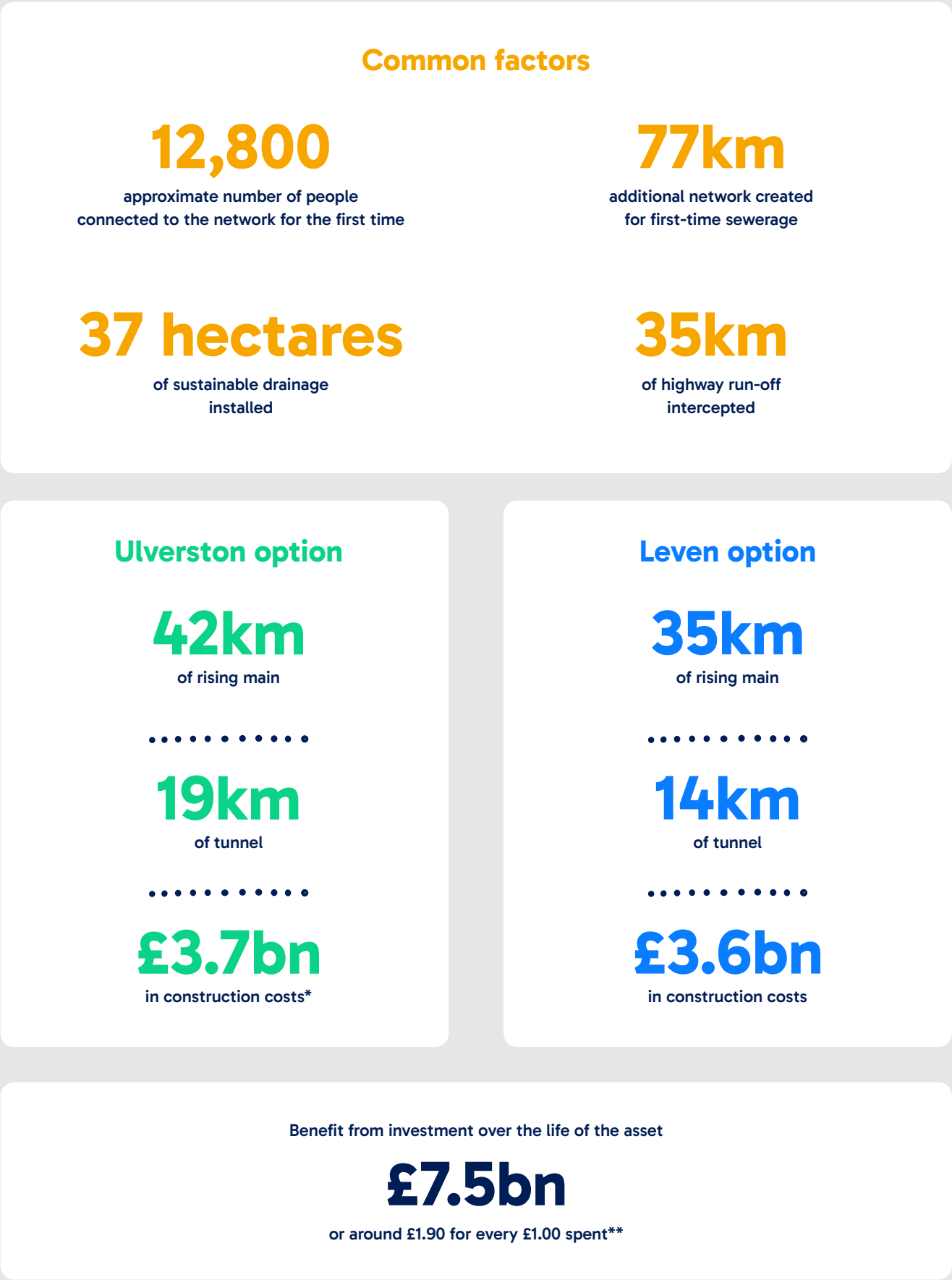
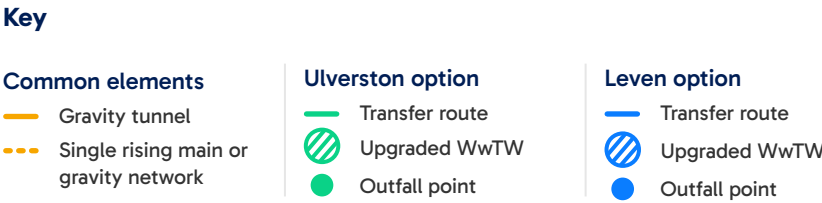
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The preferred ways forward

The year-long, multidisciplinary study has revealed that there are several feasible solutions that meet the vision of Only Rainwater into Windermere; transferring to either Ulverston or the River Leven.

Both preferred ways forward assume a step change in treatment performance through the provision of state-of-the-art wastewater treatment facilities. These facilities are upgrades of existing treatment sites, making use of United Utilities-owned land to minimise development on greenfield land and reduce overall delivery costs. Existing wastewater treatment works around Windermere could, where appropriate, be repurposed as transfer, storage or pumping assets, enabling treatment activities to be consolidated and potentially reducing the long-term operational footprint within environmentally sensitive locations.

The principal distinction between the preferred ways forward therefore relates to the location of treatment and final discharge, and the extent of transfer infrastructure required to convey flows to those locations. Both approaches require the transfer of wastewater at an unprecedented scale and would represent some of the most significant wastewater transfer infrastructure ever proposed in England, reflecting the transformational nature of the Only Rainwater into Windermere ambition. Future stages of work will focus on refining the treatment, transfer and discharge strategy to determine the preferred location for the wastewater treatment works and final discharge location.



*Although the Ulverston solution is further down the catchment and requires additional piped infrastructure, the cost of building the enhanced treatment is less as United Utilities has an existing site with the capacity for significant expansion.

**Benefits would continue to exceed costs even at double current construction cost estimates. Whilst costs have been assured they are indicative at this point and will be matured through detailed design.

SECTION 14 | CONSTRUCTING WITH CARE

MINIMISING THE IMPACT ON COMMUNITIES

The Windermere catchment is environmentally sensitive, containing internationally important landscapes, protected sites and communities that rely heavily on the lake and visitor economy. Environmental impacts, stakeholder considerations and consenting requirements are therefore central to the development and delivery of the preferred ways forward.

The preferred ways forward make extensive use of tunnelling, which has the potential to significantly reduce the extent of surface works required across the catchment. By using tunnelling techniques that happen underground, disruption to communities, businesses, visitors, transport networks and environmentally sensitive areas can be reduced. The delivery approach would build upon lessons learned from major United Utilities infrastructure programmes, including the Haweswater Aqueduct Resilience Programme and West Cumbria Pipeline Project, where minimising community impacts and maintaining stakeholder confidence have been key considerations throughout project delivery.



The project seeks to deliver long-term environmental improvements while minimising disruption to local communities, businesses and visitors during construction.

Planning and consenting will be a key consideration throughout subsequent design stages, particularly where works may interact with protected habitats, highways, watercourses, public rights of way and local communities. Further environmental assessment, stakeholder engagement and design refinement will be undertaken to identify opportunities to avoid, minimise or mitigate impacts wherever practicable and to secure the appropriate consents and approvals.

Recognising the importance of Windermere to residents, visitors and local businesses, delivery of the preferred ways forward would be guided by Constructing with Care principles. This means designing and delivering the project in a way that respects the local environment and communities, with a clear focus on minimising disruption wherever reasonably practicable.

Construction activities would, where reasonably practicable, be phased and programmed to minimise disruption during peak visitor periods and other important local events. Opportunities to reduce traffic movements, maintain access to businesses and attractions, and minimise the duration of local disruption would be explored as part of future design development. These construction logistics would draw upon proven approaches developed on previous major infrastructure schemes across the United Kingdom.

While every effort would be made to avoid or minimise impacts, the project also recognises that some temporary disruption may be unavoidable given the scale of infrastructure required to deliver the ambition. Ongoing engagement with businesses, landowners and local communities would therefore be a key part of project development. Where impacts cannot reasonably be avoided, appropriate mitigation measures would be considered, including supporting business continuity and, where applicable, compensation arrangements.

The project will also support local employment in Cumbria through job creation, as well as provide long-lasting training and skills – leaving a lasting legacy for the area.

Through this approach, the project seeks to deliver long-term environmental improvements while minimising disruption to local communities, businesses and visitors during construction.

Construction programme

The programme outlined below provides an indicative delivery schedule for the proposed scheme following the completion of planning, consenting and detailed design activities. It focuses on the principal construction works and should be viewed as a high-level representation of the overall delivery programme. Subject to approvals and detailed design, the ambition of ORiW is to complete construction and enable delivery of benefits in the next ten years.

Opportunities may exist to undertake common infrastructure elements, enabling works and other programme activities in parallel or prior to major elements in order to optimise delivery. Following completion of construction, a period of testing, commissioning and asset handover would be required to ensure the infrastructure performs as intended before becoming fully operational.

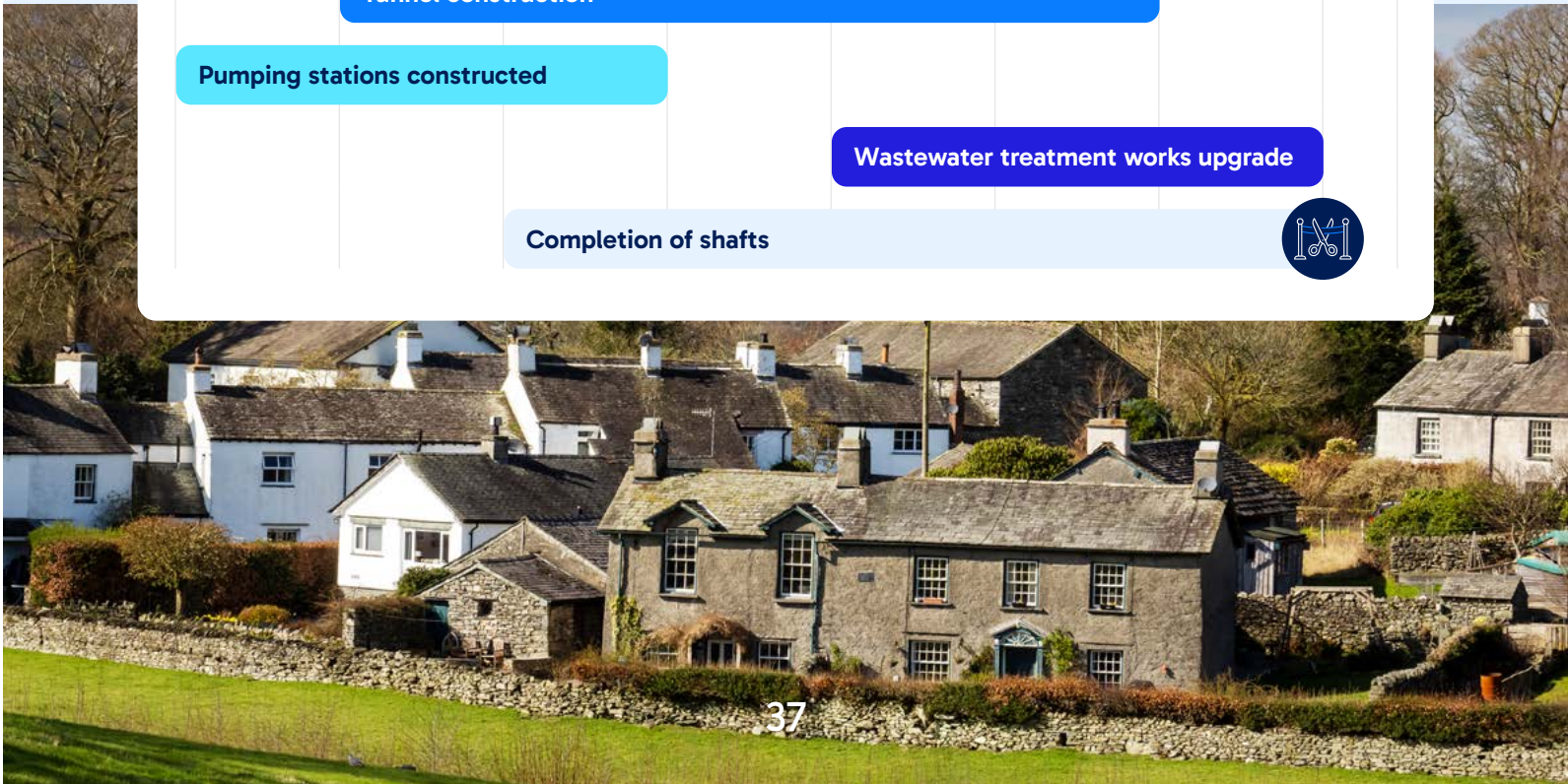
Supply chain capability

The region is supported by a mature and capable supply chain, including major contractors, engineering consultants, tunnelling specialists and environmental advisors. This provides

a strong foundation for delivery, with access to the specialist skills, resources and expertise required to develop and implement infrastructure at this scale.

Many of the technologies and construction approaches considered within the shortlisted options are well established and have been successfully applied on comparable projects in the UK and internationally. This provides confidence that the expertise needed to support design, consenting, procurement and construction activities is readily available, reducing delivery risk and strengthening confidence in the overall deliverability of the programme.

Indicative construction timeline from contract award



SECTION 15 | PAYING FOR THE SOLUTION

Paying for the solution

Windermere is a unique landscape and ORiW presents a once-in-a-generation opportunity to deliver environmental improvements for a nationally significant water body. Applying high-level assumptions derived from Ofwat’s PR24 final determination, bill impacts are estimated to provide an early-stage view of water bill recovery. The programme could add up to £3.17 per month to North West water bills in 2035.

Given the national significance of Windermere, Government could choose to implement a national charging scheme for water customers to fund infrastructure. Should Government choose to implement such a scheme, the indicative bill impacts for each household in England could be an increase of up to 35 pence per month over the same period. All bill impacts are stated in real terms Q3 2025 prices.

Ulverston option

All England customers’ bill impact
31p
per month (in 2035)

..... or

United Utilities customers’ bill impact
£2.85
per month (in 2035)

Leven option

All England customers’ bill impact
35p
per month (in 2035)

..... or

United Utilities customers’ bill impact
£3.17
per month (in 2035)

This assumes that costs are funded through water bills. As the project progresses through detailed design, exploration of alternative funding sources will be considered.

SECTION 16 | LONG-TERM IMPACTS, BENEFITS AND ASSUMPTIONS

ORiW represents a once-in-a-generation opportunity to deliver a resilient, catchment-wide wastewater solution that addresses the environmental pressures facing Windermere while generating significant social and economic benefits. The engineering feasibility study has established a seven-year construction programme, providing a defined pathway towards eliminating sewage discharges into Windermere and its wider catchment.

A whole catchment solution

The benefits of ORiW extend well beyond Windermere by removing wastewater from Grasmere, Esthwaite Water, Elterwater, Rydal Water and other critical connected lakes, rivers

and tarns, such as Blelham Tarn, across the catchment. Several of these have protected status under the Ramsar Convention, or are designated as sites of special scientific interest, or National Nature Reserves. The catchment-wide approach of ORiW will help protect some of the Lake District’s most valued freshwater environments for generations to come.

Resilient to emerging challenges

Consolidating wastewater infrastructure into a single treatment location would create a more adaptable system capable of responding to evolving environmental standards, future demand and emerging contaminants, including PFAS. It would also provide opportunities to relocate

assets vulnerable to flooding and reduce the complexity of upgrading multiple treatment facilities across the catchment.

Rather than making repeated upgrades across a fragmented asset base, ORiW enables investment to be delivered once for the whole catchment, accelerating environmental improvements while removing harmful inputs from the lake. Delivered through a single programme of works over seven years, it will minimise disruption to communities, strengthen long-term resilience and provide a lasting solution that supports Windermere for the next century and beyond.

The benefits of ORiW

- 

Better for the environment
Delivers a step change in the management of wastewater impacts on Windermere, supporting a cleaner and healthier lake for people and wildlife.
- 

Better for water quality
Delivers a lasting improvement in the management of wastewater across the catchment.
- 

Better for communities and visitors
For the first time, approximately 12,800 people across the catchment could benefit from connection to a modern wastewater system designed to support long-term environmental improvement and resilience. It will also strengthen Windermere’s position as a venue for both national and international sport, including a potential future Olympics bid.

- 

Better prepared for the future
Creates a more resilient wastewater system capable of responding to future environmental, population and climate pressures.
- 

Better for the local economy
Supports and protects the future visitor economy and regional prosperity.
- 

Better for flood-risk management
Increases sewer capacity and uses surface-water separation and sustainable drainage measures to better manage rainfall and reduce flood risk.

SECTION 16 | LONG-TERM IMPACTS, BENEFITS AND ASSUMPTIONS

Doing nothing is not an option

Based on initial assessments, meeting future environmental and regulatory requirements through successive investment cycles could require approximately £2.5 billion of upgrades to existing public wastewater infrastructure. While these investments would deliver continued improvements, they would not achieve the fundamental transformation needed to eliminate wastewater discharges into Windermere and safeguard England's largest natural lake for future generations.

Furthermore, this approach would account for more than two-thirds of the long-term bill impacts associated with ORiW, without delivering its environmental, economic and cultural benefits.

ORiW offers an alternative: a coordinated programme of investment designed to eliminate sewage discharges, strengthen infrastructure resilience and deliver lasting environmental improvements, rather than continuing the cycle of upgrading a fragmented wastewater network.

A lasting legacy

With the ambition to commence delivery from 2030 and a construction

programme of seven years, ORiW can deliver a catchment-wide solution, offering an opportunity to accelerate environmental recovery and generate long-term social and economic benefits for communities and businesses across the North West and beyond.

The programme will also establish a dedicated technical training centre, creating opportunities for skills development, employment and career progression across Cumbria. Designed to serve the community beyond the construction programme, the centre will help develop the workforce needed to support the region's long-term infrastructure and environmental ambitions.



Key assumptions of ORiW

The following assumptions underpin the project and its potential to deliver long-term benefits for communities, the environment and the wider region. They will be refined and tested as the project progresses.



Energy resilience

The ORiW programme assumes the infrastructure upgrades underway across Cumbria are delivered to time to enable the solution to operate effectively.



First-time sewerage connections

The proposed solution is assumed to create opportunities for residents, businesses and community wastewater facilities, that are not currently connected to the public sewerage network, to connect for the first time. Enabling these connections will support the overall ambition of ORiW. Realising this opportunity will require an assessment of the legislative and regulatory mechanisms available to facilitate new connections, ensuring that the widest possible environmental and community benefits can be achieved.



Nationally Significant Infrastructure Project (NSIP)

The project is assumed to have the potential to be recognised as nationally significant infrastructure due to its scale, complexity and the environmental, social and economic benefits it is expected to deliver. As the programme develops, the suitability of pursuing a Direction under Section 35 of the Planning Act 2008 will be assessed to determine whether the project could benefit from being considered within the NSIP planning regime. Securing this status could provide a more streamlined and coordinated consenting process, helping to support timely delivery, reduce planning risk and increase confidence in the programme's long-term objectives and outcomes.



Regulatory support

It is assumed that the project will receive the necessary support, engagement and approvals from relevant regulatory bodies throughout its development and delivery. Given the project's potential to deliver significant environmental improvements, enhance water quality, strengthen infrastructure resilience and provide long-term benefits for communities and the wider region, collaborative working with project partners and regulators would help identify the most effective pathways for implementation.



Costs and benefits

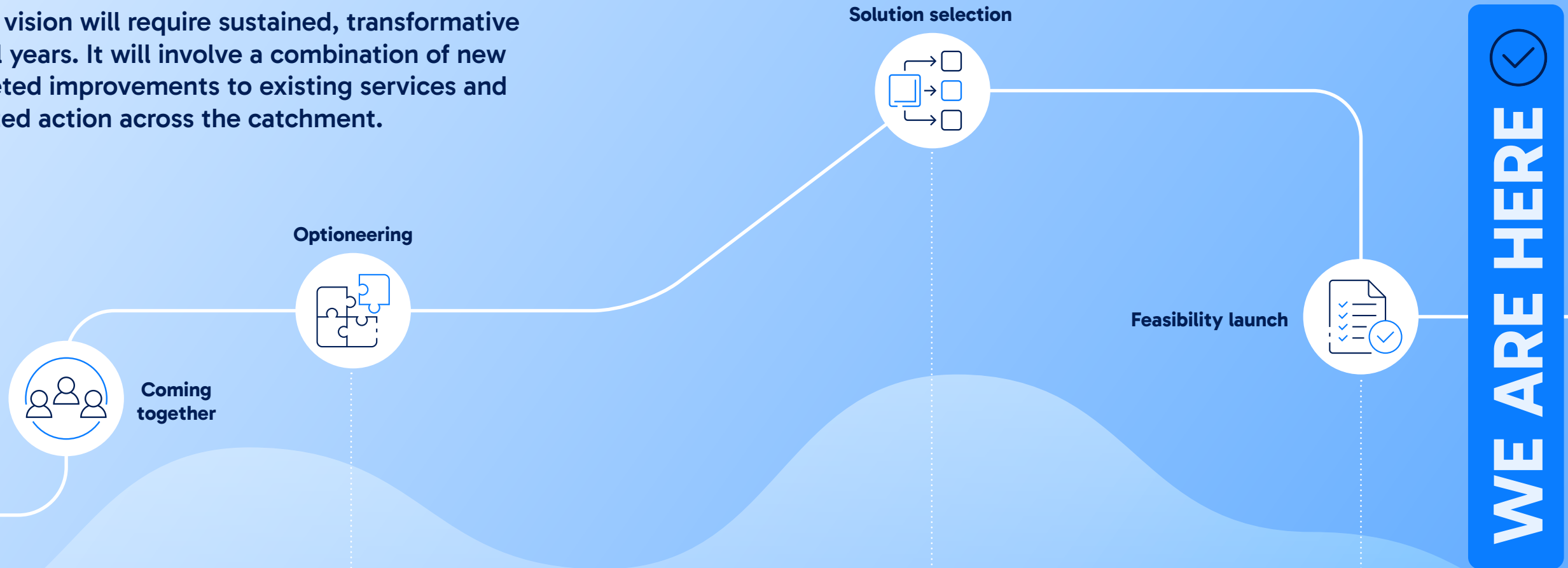
Costs and benefits are underpinned by a robust methodology appropriate to this stage of development of the project. Costs and benefits will be further refined and appropriately assured as the project continues and options are refined as further information becomes available. Costs, benefits, risks and uncertainties will be subject to ongoing challenge, testing and assurance through detailed design.

SECTION 17 | THE JOURNEY SO FAR

Delivering the ORiW vision will require sustained, transformative change over several years. It will involve a combination of new infrastructure, targeted improvements to existing services and coordinated action across the catchment.

Together, these interventions will drive Windermere's long-term recovery and create a lasting legacy. This ambition can be delivered through a clear, phased route from early design and planning through to construction and long-term operation. The roadmap below sets out this journey and highlights the key milestones at each stage.

THE JOURNEY SO FAR



Coming together

Creating a coalition of stakeholders aligned around a single vision to protect the future of the lake. The coalition has worked together to:

- Established the vision for ORiW
- Scoped the feasibility study
- Appointed Jacobs and Mott MacDonald as independent engineering and construction experts to lead the feasibility study that will provide a blueprint for change

Optioneering

Establishing the facts, understanding the problem and opportunities and drawing on international expertise, ensuring solutions are transformative and designed for the next century and not just today.

This includes:

- Initial catchment and water quality assessments undertaken
- Over 70 engineering options evaluated and high-level design developed for shortlisted options
- Costing and implementation feasibility conducted

Preferred ways forward

Critically evaluating options to establish the preferred solutions that deliver the greatest environmental, social and economic value to safeguard the future of the Windermere.

This includes:

- Refinement of solutions
- Green Book economic appraisal
- Completion of detailed benefits assessment
- Selection of the preferred ways forward
- Quality assurance and independent review of the preferred ways forward

The feasibility launch

The launch of the feasibility report to deliver the ORiW ambition, clearly setting out:

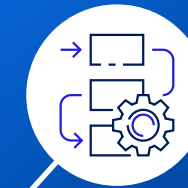
- The reasons for change and the need for transformative long-term action
- The preferred ways forward
- The costs (including bill impacts to customers)
- The benefits
- A roadmap to enable delivery

SECTION 18 | THE PATH TO DELIVERY

WHAT'S NEXT?

...GO/NO GO
DECISION...Agreement
to proceed to
next stage...MAKING IT
HAPPEN...Detailed development,
planning and approvals

Mobilisation

...GETTING
IT DONE...

Delivery

Only
Rainwater
into
Windermere**Agreement to proceed
to the next stage**

Securing a shared commitment to progress the ORiW ambition into the next stage. This milestone confirms partner alignment, governance support, funding confidence and strategic agreement to advance the preferred ways forward. It establishes the basis for detailed design, planning, consenting and further regulatory approvals needed to develop a deliverable solution.

The project is committed to public engagement before decisions are made.

**Detailed development,
planning and approvals**

Advancing the preferred ways forward into a fully defined and deliverable scheme.

This stage includes:

- Detailed design development including water quality and network modelling
- Technical and environmental assessments, surveys and investigations
- Planning and consenting activities, including exploring a NSIP application
- Stakeholder engagement
- Regulatory approvals

Costs, benefits and delivery plans are refined to confirm deliverability and readiness for construction.

Mobilisation

Once approvals are secured, the programme will move into procurement and mobilisation. This includes engaging the supply chain and appointing delivery partners based on technical capability, cost, quality and a shared ambition to achieve the ORiW vision.

Enabling works, detailed community engagement and construction planning will also begin during this phase.

Delivery

Constructing the infrastructure required to achieve the ORiW ambition. Delivery will need to be coordinated, innovative and sensitive to the importance of working within a nationally significant landscape. The programme will be implemented through a carefully planned and phased approach, working with communities, partners and stakeholders to minimise disruption while delivering long-term environmental improvements.

Thank you

The ORIw coalition and project team would like to thank the organisations and individuals who have supported the development and review of this feasibility report. This includes a broad range of sectors spanning academia, charities, non-governmental organisations and professional bodies and institutions. The support and commitment of these organisations has enabled this report to be realised.

Contact us

This feasibility report can be found online at oriw.co.uk

Alongside the feasibility report, project documentation includes five HM Treasury Green Book-aligned business case chapters. For further information on these reports or for any general enquiries, please email windermere@uuplc.co.uk



Find out more at
oriw.co.uk



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