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# Irish Water

## Pathway to Wastewater Compliance

# DRAFT





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## 1. Introduction

The purpose of this document is to provide an overview of Irish Water's journey to wastewater compliance, the 'Pathway to Wastewater Compliance'. It draws on a high level gap analysis which assesses the indicative scale and timeframe to address wastewater needs, above and below ground, projected to arise by 2035. It also sets out proposed Irish Water measures for the third cycle RBMP.

The Pathway to Wastewater Compliance relates to all wastewater assets, above ground and below ground. That includes wastewater treatment plants, collection networks and pumping stations, overflows and other infrastructure associated with the collection, treatment and return of treated wastewater to the environment.

Compliance in this context includes meeting obligations that are required by law, policy and / or national plans, as described in Appendix A – Policy and Legislative Context. In practice this means:

- Providing collection and treatment systems in line with the requirements of the Urban Waste Water Treatment Directive (UWWTD);
- Addressing priority areas to meet environmental objectives and regulatory standards as identified in the EPA's Priority Areas List (PAL);
- Tackling urban wastewater significant pressures as identified in Ireland's River Basin Management Plans (RBMPs);
- Ensuring adequate safeguards for water bodies with water-related protected area objectives; and
- Fulfilling conditions of Waste Water Discharge Authorisations (WWDAs).

WWDAs set conditions to address all above aspects of wastewater discharges, and are the ultimate compliance objective and measure.

Improving compliance levels requires the following elements to be considered:

- Maintaining good compliance levels by investing in timely repair and replacement of assets to ensure sustained performance;
- Optimising operation of existing assets including enhanced procedures, management systems, and training;
- Investing in upgrading or replacing non-compliant assets;
- Building new assets;
- Preventing future non-compliance by making timely investments, having regard to realistic growth projections and asset deterioration;

- Improving knowledge of data, processes and environmental impacts to validate, and where appropriate, seek to adjust compliance standards.

Broadly speaking ‘compliance’ is encapsulated by Irish Water’s responsibilities under the Water Framework Directive, associated directives and River Basin Management Plans, to play our part in protecting and restoring water bodies. Irish Water aims to support the actions and ambition of Ireland’s draft third River Basin Management Plan.

The key points contained within this report are summarised as follows:

- It is expected that Irish Water will achieve 96% of overall wastewater capability to comply by 2024 (on an agglomeration basis) and full capability to comply with the UWWTD treatment standards by 2027.
- Based on the current projected work schedule, Irish Water estimates that approximately 50 of the 217 UWW significant pressures (impacting on 208 water bodies) will be addressed in the third cycle RBMP.
- The estimated time required to resolve all current WWTP significant pressures is up to the 2030s.
- The estimated timeframe for addressing the remaining wastewater above ground (WWAG)<sup>1</sup> needs is to the 2040s, and a significantly longer time period for wastewater below ground (WWBG)<sup>2</sup> needs.
- Significant investment is needed just to maintain existing compliance, including a steady increase in maintenance budgets to protect assets that are performing well and sustained investment in new assets and asset upgrades.
- Preparation and submission of Waste Water Discharge Licence applications, in response to the EPA’s licence review programme, will continue to be a focus for Irish Water in the immediate period ahead.
- Irish Water will be proposing a research and innovation programme for nature-based wastewater treatment systems, to include solutions such as integrated constructed wetlands and polishing reed beds. Such innovative design will improve the viability of environmentally sustainable nature-

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<sup>1</sup> Wastewater above ground assets are Wastewater Treatment Plants (WWTPs)

<sup>2</sup> Wastewater below ground assets are sewer networks which includes storm water overflows

based solutions with multiple benefits such as for water quality, biodiversity, amenity value, climate change mitigation and lower operating and future capital costs.

- Irish Water will support further development of environmental risk assessment methodologies, such as the Environmental Capacity Calculator tool and catchment simulation models.
- Irish Water will develop a Value Framework which will enable us to put sustainability at the core of our investment planning.

## 2. Irish Water's Journey so Far

When Irish Water took over responsibility for water services in 2014, we took over an asset base with many challenges. Despite the good work of local authorities over many decades, under investment combined with a lack of planned asset management and maintenance programmes had led to a legacy of deficiencies in our treatment plants and networks. It was a challenge to even know where our assets were as GIS records for wastewater networks were far from complete or accurate. A national asset management system and capability had to be built from scratch so that we could systematically start to improve service provision and management of service risk.

The European Commission brought a case against Ireland for non-compliance with the Urban Waste Water Treatment Directive (UWWTD) and in 2019, the European Court of Justice found Ireland to be non-compliant in 28 agglomerations.

In 2013, capital investment in water services had fallen to a particularly low level due to the preceding economic crash. Irish Water took over this “in-flight” investment programme and since then we have steadily ramped up the investment in wastewater assets with approximately €2bn invested between 2014 and 2021. Our investment planning capability has also progressively improved with each revenue control period for which we have prepared Investment Plans. This has been complemented by an improving national capability for river basin management planning as led by the Department of Housing, Local Government and Heritage (DHLGH) and the Environmental Protection Agency (EPA). Through this we now have a better understanding of the pressures on water bodies than we have ever had and we know where the significant urban waste water pressures are which Irish Water must address.

Since 2014, we have established an asset management IT system and we are progressively improving the coverage and quality of asset data in the system including GIS records for the 26,000km of wastewater network across the country. We have also made a significant investment in Drainage Area Plans in order to get a good understanding of the performance of our wastewater networks. This has delivered verified hydraulic models for collecting systems for

more than 30% of the connected population. We have also for the first time published national wastewater treatment capacity registers and we are rolling out Standard Operating Procedures to improve the operation and maintenance of our assets.

In terms of compliance improvements achieved we have made strong progress in relation to the UWWTD with upgrades for 19 out of the 28 agglomerations listed in the ECJ case completed to date. We are on track to achieve UWWTD treatment capability for 96% of agglomerations in the current Investment Plan period. We have made steady progress with achieving waste water discharge licence standards and removal of 149 sites from the EPA's Priority Areas List (PAL). Between the second cycle River Basin Management Plan and the third cycle draft Plan, we have achieved a reduction in the number of water bodies for which Urban Waste Water is a significant pressure from 291 down to 208. This is the biggest reduction achieved across the various pressures impacting on water bodies and so Irish Water is leading the way amongst the pressure owners towards ultimate achievement of the Water Framework Directive goals.



Shanbally WWTP, Cork Lower Harbour

### 3. Scale of the Challenge

#### 3.1 Draft Third Cycle River Basin Management Plan (2022 – 2027)

Ireland's draft third River Basin Management Plan 2022 – 2027 (draft RBMP) was published for public consultation in September 2021. Overall, 53% of surface waters are at good or high ecological status, with 47% at unsatisfactory ecological status (based on the monitoring period, 2013-2018). It highlights that the number of water bodies impacted by urban wastewater (UWW) has reduced over the course of the second cycle by the largest margin of any pressure category. This reflects the significant investment by Irish Water in upgrading wastewater infrastructure and optimising operations at WWTPs. There are 217 UWW significant pressures impacting on 208 water bodies (WBs). This equates to 4% of water bodies nationally, where UWW improvement measures are required to achieve WFD objectives. The types of water body impacted by UWW are shown in Table 1 below.

Impacts from UWW on protected areas, such as shellfish waters and bathing waters, are captured within the list of significant pressures.

*Table 1 Number of water bodies in each water body type in the urban wastewater significant pressure category*

Significant pressure category	Water body Type						Total
	River	Canal	Lake	Transitional	Coastal	Groundwater	
<b>Urban Wastewater</b>	172	1	10	22	3	208	

## 3.2 Environmental Protection Agency's Priority Areas List

The Environmental Protection Agency (EPA) has identified the following five key issues<sup>3</sup>, which Irish Water is required to address as a priority, to protect Ireland's environment from the harmful effects of wastewater discharges:

- Ensure treatment at all large urban areas complies with European Union standards
- Eliminate discharges of raw sewage from publicly operated networks
- Upgrade collection systems found to be non-compliant with European Union requirements
- Improve treatment where wastewater is the main pressure on water bodies at risk of pollution
- Improve treatment where needed to protect freshwater pearl mussels

The priority issues are reflected in the 'Priority Areas List' (PAL), which is produced and updated by the EPA and on which Irish Water provides regular progress reports. The PAL contained 138 areas in 2018. Following significant updates that included areas being added and removed, there were 101 areas listed in the PAL at the end of 2021. This is a net reduction of 26%. The current PAL includes projects which will address 43 of the remaining UWW significant pressures.

Irish Water is committed to maintaining this progress in addressing agglomerations on the PAL and most of the projects are already underway or complete. The full breakdown of Priority Areas status is provided in Figure 1. The 7 areas where no corrective action plans are in place are subject to on-going investigative assessments, which will identify the appropriate course to achieving resolution of the priority issues. The 17 areas where work has not started have been scheduled for assessment and planning and will have Feasibility Study Reports carried out during the current investment period. Once complete, most projects require a validation period before removal from the PAL.

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<sup>3</sup> Urban Waste Water Treatment in 2020; EPA

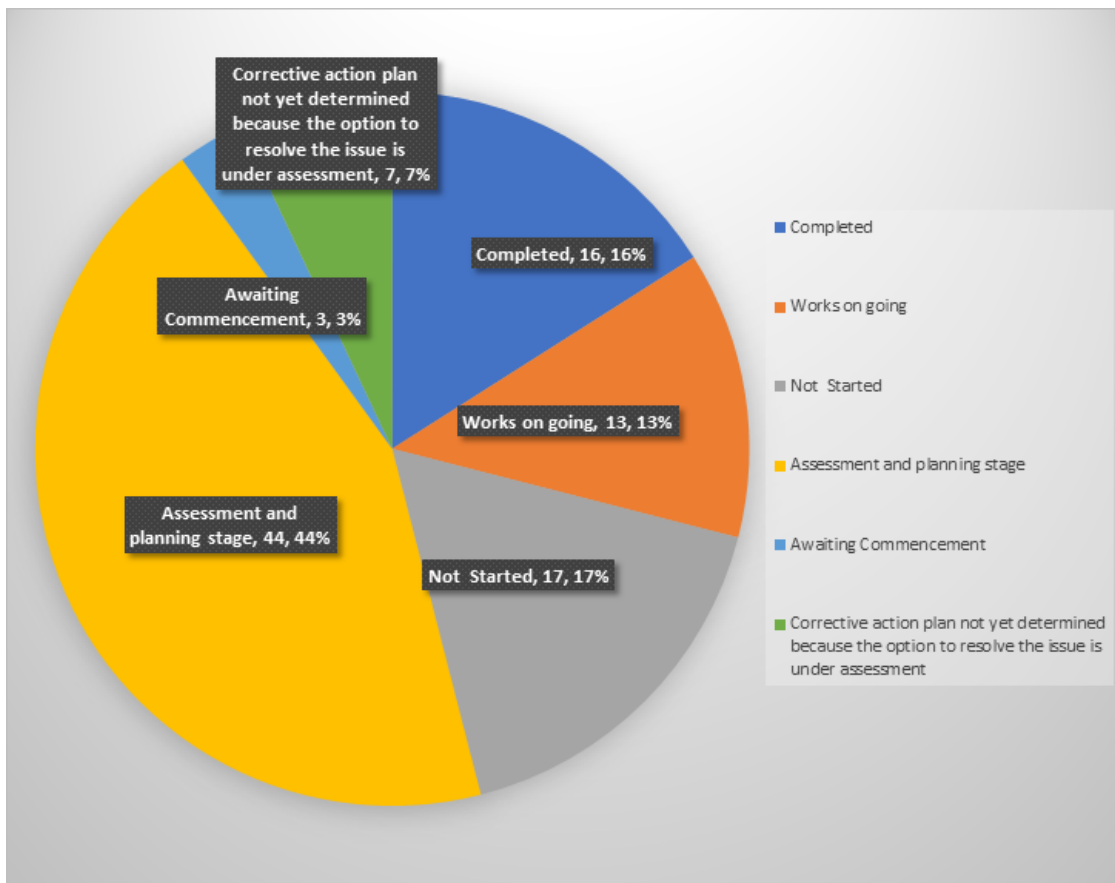


Figure 1 Breakdown of areas status from the Q4 PAL report

### 3.3 Waste Water Discharge Authorisations

Irish Water operates over 1000 Wastewater Treatment Plants (WWTPs) and is responsible for 512 Waste Water Discharge Licences and 553 Certificates of Authorisation. In 2019, the compliance rate was 44% for licence discharge standards.

The draft RBMP notes that the EPA review of Waste Water Discharge Licences (WWDLs) will contribute to reaching and maintaining compliance with the UWWTD and WFD. This will require significant work by Irish Water including data collection and analysis, environmental impact assessment, and water quality modelling. so as to ensure that WWDL applications are up to the required standard. This work will continue to be a focus for Irish Water in the immediate period ahead.

### 3.4 Irish Water's RBMP Gap Analysis

Irish Water undertook a gap analysis, or needs assessment, in late 2020 to assist the Department of Housing, Local Government and Heritage (DHLGH) with preparation of Ireland's draft third River Basin Management Plan (draft RBMP). The third river basin planning cycle (2022-2027) overlaps with Irish Water's third and fourth investment plan cycles, RC3 (2020-2024) and RC4 (2025-2029).

The gap analysis aimed to identify the overall improvements needed to address known current and future needs with respect to wastewater treatment and wastewater networks. It aimed to estimate costs associated with delivering the required works and the approximate timeframe involved. The gap analysis was also required for National Development Plan (NDP) purposes, and so aligned with the NDP period up to 2030 and looked further to growth needs up to 2035, to allow for timely investment.

The gap analysis can be summarised as a needs assessment for:

- Statutory compliance;
- Capital maintenance;
- Future proofing plants and networks.

Having an overview of wastewater asset investment needs, which considers the asset lifecycle, is essential for a water utility. The quality of such an overview is highly dependent on the completeness and accuracy of asset data. Where there is a paucity of data, there will be increased risks for the water utility due to data uncertainty. The gap analysis includes needs regarding maintenance and repair of assets, which if not funded sufficiently, will result in non-compliances due to asset failures. It considers the issues Irish Water is aware of currently, but there will also be emerging needs that have not been captured.

The gap analysis is not intended to set out any programme for when individual interventions would occur in the future, its objective is to assess the overall scale of the known investment need (projected to 2035) and estimate the overall timeframe required to deliver the required capital interventions (based on assumed annual investment rates). This gap analysis should be considered a snapshot in time with available data that will undoubtedly change as the understanding of needs develops.

There is more certainty around projects, which are in Irish Water's current investment planning period, and these are the projects that will be delivered during the third cycle. There is less certainty around projects included in the gap analysis for future cycles.

There are also uncertainties around future costs and inflation, technological and environmental change.

The gap analysis generally gives us the scale of the work to be delivered, roughly how long it will take and an overall estimate of how much it will cost. The order in which works will be prioritised is subject to further prioritisation and portfolio balancing, which will happen through the investment planning process.

### 3.4.1 Gap Analysis Assumptions

The following assumptions were made in Irish Water's RBMP gap analysis, or needs assessment:

- No new needs arising beyond 2035 (apart from capital maintenance) were included
- Assessment of compliance (current and future) is based on current legislation, with no account for potential future changes.
- Existing emission limit values (ELVs) for WWTPs
- Procedures and Criteria for Storm Water Overflows for networks
- Future overloading (based on population growth rates) would mean WWTP becomes non-compliant
- UWW significant pressures would be removed by achieving WWDA requirements

#### Assumptions on budgets post 2024

- Capital investment across all active Wastewater Above Ground (WWAG) projects and Wastewater Below Ground (WWBG) projects within the period based on the assumed funding scenario within the National Development Plan 2021 – 2030 (NDP), and a continuation at the same level of investment into the future.
- Maintenance and repair across the entire WWAG and WWBG asset base based on (i) the 2020-2024 allocation, (ii) the assumed allocation within the NDP period, and (iii) an assumed provision per annum thereafter.
- The model presents capital maintenance spend increasing between RC3 and RC4. The current rate of asset replacement (i.e. replacement of a failed or failing asset on a like-for-like basis) is not at the level needed to maintain the current level of service. Modelling work completed by Irish Water has shown that if the level of spend is not increased in capital maintenance, it will not be possible to maintain the current level of service.
- Capital Maintenance Costs beyond 2025 associated with collection systems are based on numbers of assets and standard pipe replacement rates.

### 3.5 Wastewater Above Ground Asset Needs

The wastewater above ground needs were based on growth projections to 2035 costing an estimated €8 billion.

It is estimated that by 2024 there will be 96% capability to comply<sup>4</sup> (in terms of numbers of agglomerations) with the Urban Wastewater Treatment Directive for treatment, increasing to 100% by 2027. Third cycle significant pressures from wastewater treatment plants are projected to be resolved by 2039 (RC6). Treating to discharge standards in the majority of remaining WWDAs is projected to be achieved by 2044 and all by 2049.

Projected progress in addressing WWAG current needs is illustrated in Figure 2 and future needs (to 2035) is illustrated in Figure 3.

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<sup>4</sup> 'Capability to comply' indicates that the infrastructure will be designed to reliably achieve compliance with ELVs under the projected load conditions. Non-compliances can and will occur even where infrastructural capacity exists, due to unforeseen events, such as excessive discharge from industry, mechanical breakdown or interruption to power supply.

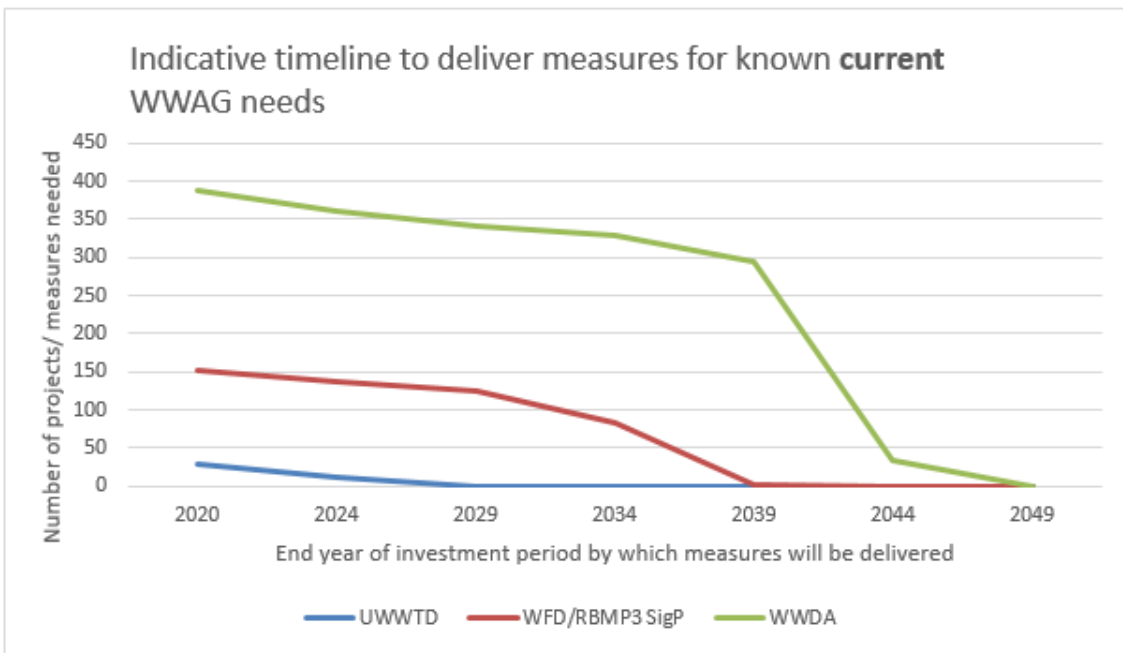


Figure 2 Indicative timeline to deliver measures for known current WWAG needs by main project driver (snapshot Jan 2021, subject to change)

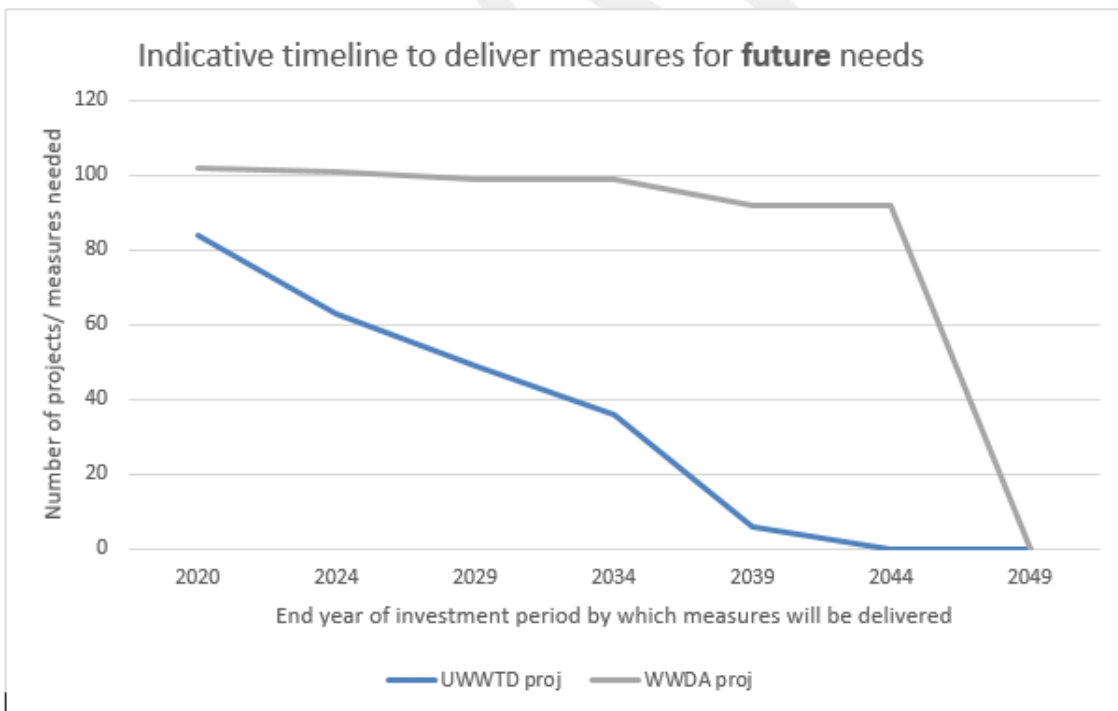


Figure 3 Indicative timeline to deliver measures for future WWAG needs (up to 2035) by main project driver (snapshot Jan 2021 and subject to change)

As can be seen in Figure 2 and Figure 3, out of a total ~770 WWAG needs identified, approximately 70% are known current needs and 30% are based on projections of future needs up to 2035.

Regarding the future needs, these are projected out to 2035 with no accounting for new needs arising beyond that. As indicated in Figure 3, based on the assumptions built into the gap analysis snapshot of January 2021, it would take until the mid 2040's to build infrastructure needed by 2035.

### 3.6 Wastewater Below Ground Asset Needs

The wastewater below ground needs were based on growth projections to 2035, costing an estimated €15 billion.

The projections for the wastewater below ground work required shows that a traditional engineering approach would take a significantly longer timescale to complete than above ground works. This demonstrates that the current approach cannot deliver the required outcomes in an acceptable timeframe. This supports the move towards blue-green infrastructure and working with nature to provide innovative solutions to manage surface water in urban areas. There is further discussion on this in Section 4.3.

The gap analysis output is based on current measures of compliance with existing regulatory obligations. Changes to how compliance is defined could significantly impact timescales and costs.

The long timescales and high costs indicated by the gap analysis demonstrate the substantial challenge ahead. Irish Water will work with the DHLGH, EPA, Commission for Regulation of Utilities (CRU), Local Authorities and other agencies and partners to innovate where possible and deliver better outcomes for Ireland.

## 4. Delivering Improvements for Third Cycle RBMP

There is clearly a challenge to deliver improvements in wastewater infrastructure and services, as outlined in Section 3 above. Irish Water is committed to addressing that challenge and to 'closing the gaps' in the most effective manner, within budgetary and technical constraints. Irish Water aims to support the actions and ambition of Ireland's third River Basin Management Plan.

### 4.1 Investment in Infrastructure

The majority of measures to be delivered by 2027 are included in Irish Water's current Investment Plan RC3 (2020 – 2024), with many projects already complete or underway. Some will start during the RC3 investment period but will carryover for completion in the next investment period (RC4). Some projects will be delivered through Irish Water's programmes, such as the RBMP Enhanced Ambition Programme under the National Recovery and Resilience Plan, the Small Towns and Villages Growth Programme and the National Certificates of Authorisation Programme.

New plants and upgrades will be designed to contribute to the achievement of WFD objectives. In some cases, this will be accommodated within existing licence conditions and in other cases there will be an associated licence review application.

Steady progress in removing sites from the Priority Areas List (PAL) will continue. RC3 projects are, for example, providing treatment for untreated agglomerations, enhancing treatment to protect nutrient sensitive areas, removing significant pressures from water bodies at risk of not meeting environmental objectives, improving bathing water quality, improving water quality for the endangered freshwater pearl mussel, and improving networks. It is expected that Irish Water will achieve 96% capability to comply by 2024 (on an agglomeration basis) and full capability to comply with the UWWTD treatment standards by 2027.

Irish Water's on-going shellfish waters assessment programme involves complex water quality modelling to assess multiple sources of pollutants that may be impacting on shellfish waters. On completion of the assessments, the next stages would be identification and undertaking of any improvement works. Works at 14 sites are underway or planned as part of the current investment period.

Irish Water is progressing approximately 200 projects which are expected to complete within the 2022-2027 period. At the current viewpoint, Irish Water estimates that approximately 50 UWW significant pressures will be addressed in the third cycle RBMP. It would take significant further analysis to confirm with confidence the number of pressures that will be fully resolved. A list of projects that are currently expected to be complete within the third cycle RBMP is included

in Appendix B. The dates set out are subject to funding and statutory consenting processes.

## 4.2 Nature-based Solutions for Small Wastewater Treatment Plants

The gap analysis shows that we will have a major challenge to upgrade small WWTPs (<2,000 population equivalent) in the coming decades, with upgrades required at more than 500 such plants. To help in addressing this challenge, Irish Water will be proposing a research and innovation programme for nature-based wastewater treatment systems, to include solutions such as integrated constructed wetlands and polishing reed beds. This will look at the interaction of the treatment systems with the environment. The objective will be to establish how we can harness knowledge of the dynamic characteristics and interrelationship of the treatment flows and performance, and water quality and flows in the receiving environment, to facilitate optimum application of nature-based solutions (NBS). Such optimum design will improve the viability of environmentally sustainable NBS with multiple benefits such as for water quality, biodiversity, amenity value, climate change mitigation and lower operating and future capital costs. The programme is also intended to look at the potential for tailored design and implementation of add-on NBS to improve performance of existing conventional plants, to meet required compliance standards.

Like all natural systems, nature-based solutions for wastewater treatment can be very seasonal in their performance, typically with very high performance in summer time and much lower performance in winter time. This can often align with what is needed for environmental protection; for example, high performance in summer when receiving water river flows and available dilutions are at their lowest. In order to maximise the viability and cost effectiveness of NBS for wastewater treatment, “nature-based consenting” such as seasonal ELVs, for example, would ideally be required. Irish Water would welcome engagement with the EPA on this, as the responsible authority on Waste Water Discharge Authorisations. We propose to explore the potential for such innovative licensing approaches further, based on robust evidence generated through the research and innovation programme.



*Nature based system for wastewater treatment at Clonaslee, Co.Laois*

### 4.3 Developing Smarter Solutions for Wastewater Networks

The gap analysis for wastewater below ground assets shows that it would cost an estimated €15bn to bring our wastewater networks into compliance based on current policies and approaches. This demonstrates that the current approach would take an unacceptably long time to deliver and is not affordable in a shorter timeframe.

When climate change and the future likelihood of more extreme rainfall is taken into account, this reinforces the case that the current approach is not sustainable. There is a need for innovation and the development of smarter solutions for our wastewater networks, which can deliver positive environmental outcomes, climate resilience and capacity for growth while also not entailing disproportionate cost.

The key enabler of smarter solutions for our wastewater networks is the development of good quality hydraulic models of the networks that are integrated with water quality models for the receiving waters. We are building good quality hydraulic models through the Drainage Area Plan (DAP) Programme that are giving us a good understanding of current network performance.

Irish Water is committed to delivering at least 50 such DAP models during the third cycle RBMP. We also have a programme underway for the development of water quality models that gives us a good understanding of the impact of our assets on the receiving water environment. Integrated hydraulic and water quality models for a particular agglomeration allow a range of upgrade options to be costed and their associated environmental benefits to be assessed.

This then allows optimal solutions to be determined, which deliver positive environmental outcomes, climate resilience and capacity for growth, while also not entailing disproportionate cost. This approach will need to be underpinned by

new national policy, which in turn will need to align with the requirements of the revised Urban Waste Water Treatment Directive.

The European Commission is expected to publish a proposal for a revised directive later this year. The action to ensure development of any new standards for Combined Sewer Overflows emerging from an update to the Urban Waste Water Treatment Directive under the Urban Waste Water section of the draft River Basin Management Plan could enable this approach.

While the above approach should result in a significant reduction in the cost of upgrading of wastewater networks, significant investment in infrastructure including trunk sewers, stormwater storage and pumping stations will still be required. To optimise the performance of upgraded networks, we expect that the development of innovative smart network controls will be required for the larger more complex networks. This will involve real time control of networks based on weather forecasts in order to minimise storm water overflow spill frequency and volume.

In addition to the above new approaches, we will also need to see a transformational shift to nature based sustainable urban drainage solutions (SUDS) as advocated in the Urban Run-off Pressures section of the draft RBMP.

Widespread adoption of nature-based SUDS in new developments and through public realm and transport projects should result in a reduction in rainfall getting into combined sewer systems and consequently also a reduction in storm water overflows.

Finally in relation to smarter solutions for wastewater networks, in order to deliver climate resilient infrastructure for our cities, we would advocate the adoption of integrated drainage planning. Integrated drainage plans are plans which would include the combined sewer system owned by Irish Water, as well as the storm sewer system owned by the Local Authority.

We believe that this should be prioritised initially for the cities due to the scale and complexity of their drainage networks and the complex interactions between the combined and storm sewer systems. This would require Irish Water and the City Local Authorities to work together to develop such integrated drainage plans and should enable optimal climate resilient solutions to be determined. It would also enable Irish Water and the Local Authorities to work together to ensure that nature-based SUDS are a key element of solutions for both the combined sewer and storm sewer systems.

Such collaboration between Irish Water and the City Local Authorities could develop into Strategic Drainage Partnerships over time, such as those that have been established in Scotland for Glasgow and other cities. Strategic Drainage Studies in Cork and Galway are expected to progress during the third cycle.

The action to oversee the preparation of integrated urban drainage management plans in the Urban Run-off Pressures section of the draft River Basin Management Plan could enable the above collaborative approach between Irish Water and Local Authorities.



*Blanchardstown 9c sewer storm tanks, Co. Dublin*

#### **4.4 Environmental Capacity Calculator Tool**

Irish Water recognises the need to use available data in the best way to support evidence-based decision making around wastewater treatment and the safe return of effluent to the water environment. Irish Water is developing the Environmental Capacity Calculator Tool (ECC Tool), as part of the RBMP Enhanced Ambition Programme.

The ECC Tool will have the capability of simulating the effect of urban wastewater continuous discharges on downstream concentrations of ammonia, biochemical oxygen demand (BOD) and orthophosphate in receiving waters. The tool will utilise both mass balance and Monte-Carlo simulation techniques, as determined by the quantity and quality of data available. The tool will also have the capability of identifying appropriate emission limits to ensure that the discharges do not

affect the ability of receiving water bodies to achieve their environmental objectives (informed by ongoing work within Irish Water looking at approaches to available assimilative capacity). Irish Water will engage on this with the EPA as the agency responsible for Waste Water Discharge Authorisations.

ECC Tool outputs will inform multiple workstreams for Irish Water, including licence reviews, project scoping and feasibility studies, and investment planning.

## 5. Future Direction and Decision Support Tools

Irish Water is committed to supporting the achievement of WFD objectives and supports the ambitions in the draft third River Basin Management Plan. This Pathway to Wastewater Compliance document is mainly focused on overall investment need and priorities for the third cycle RBMP. The ultimate aim is full compliance on all assets; i.e. compliance with WWDAs while maintaining capability to accommodate growth. Ongoing planning will be required, having regard for growth and resource constraints, to ensure that available funding is expended in an effective way to meet objectives in a timely and prioritised way. For the extensive work that needs to follow the third cycle RBMP, it is important that we ensure now that we have the correct data and tools in place to make these decisions.

Principles for guiding future investment planning (RC4 and beyond) are currently being reviewed by Irish Water and will be finalised through the investment planning process, including statutory consultation with key stakeholders. Prioritised investment could be targeted to:

- Maximise environmental benefit;
- Ensure sufficient maintenance;
- Provide a balance of project types and sizes;
- Reduce the risk of future non-compliance and cater for growing populations;
- Develop decision support tools using a robust, continually improving, evidence base;
- Innovate and deliver best value for public spend.

With the climate and biodiversity emergency that we now have, it will be vital that we put sustainability at the core of our future investment planning. Sustainable solutions, such as constructed wetlands for wastewater treatment in small

settlements, are not always the most cost-effective solution due to the additional land area that can be required compared to more conventional solutions. To address this issue, Irish Water is developing a Value Framework which we propose to incorporate in the investment planning process. The Value Framework will include a set of Value Measures which represent the different ways in which Irish Water interventions can provide benefits to water customers, the environment and the wider society. This will allow the investment decision-making process to take account of a broader set of measures to define success including reduction in carbon footprint and positive impact on biodiversity.

Irish Water will continue to improve data quality around assets and potential impacts of our activities on the environment, to support decisions that are evidence based. The aim is to have confidence in the right measure in the right place but also at the right time and at the right value. Irish Water will support further development of environmental risk assessment methodologies, such as the ECC tool and catchment simulation models, to identify where measures should be targeted and how likely these measures are to result in water body improvements. Tools are required that can adapt to changing targets and calculate the associated reduction in nutrient or pathogen loading that would result from interventions such as higher standards of wastewater treatment.

## 6. Summary and Conclusions

Irish Water's RBMP gap analysis provides an overview of wastewater infrastructural needs (based on current and future compliance up to 2035) and an estimate of the cost and timeframe required to deliver on those needs. The estimated time required is to the 2030s to resolve all WWTP significant pressures, to the 2040s for the remaining wastewater above ground assets and a considerably longer timeframe for the below ground assets.

Irish Water will need significant investment just to maintain existing compliance, which requires a steady increase in maintenance budgets to protect assets which are performing well, in addition to investment for new assets and asset upgrades.

The gap analysis for wastewater below ground assets shows that a traditional approach to providing wastewater infrastructure would take an unacceptably long time and be unaffordable. A smarter approach is needed, including innovation and collaboration, to achieve better outcomes.

Irish Water expects to continue making good progress and has set out a level of ambition to support Ireland's third RBMP and help achieve WFD environmental objectives. This includes:

- Wastewater improvement projects in areas with approximately 50 UWW significant pressures resolved;
- A research and innovation programme on nature-based solutions for small wastewater treatment plants, including seasonal variations and inter-relationships with receiving water environments;
- Smarter approaches for wastewater networks, using integrated hydraulic and water quality models to deliver positive environmental outcomes, climate resilience and capacity for growth without entailing disproportionate cost.
- Irish Water will support further development of environmental risk assessment methodologies, such as the Environmental Capacity Calculator tool and catchment simulation models.
- Irish Water will develop a Value Framework which will enable us to put sustainability at the core of our investment planning.

# Appendices

## APPENDIX A – Legislative and Policy context

### Water Services Policy Statement 2018-2025

The Minister for Housing, Planning and Local Government published a Water Services Policy Statement (WSPS) in 2018, which was the first WSPS to be required under the relatively new Water Services Act 2017. The Minister’s WSPS identified high level objectives and priorities for the delivery of water and wastewater services over the period to 2025. A series of water service policy objectives were set across the three thematic areas of Quality, Conservation and Future Proofing.

The WSPS stated that, ‘Over the period of this policy statement, wastewater discharges should meet the requirements of the Urban Wastewater Treatment Directive, support the water quality improvements identified in the RBMP 2018-2021 and show progressive improvement towards meeting the ultimate objectives of the Water Framework Directive, through on-going river basin management planning.’

### Water Services Strategic Plan 2015 - 2040

Irish Water’s vision as set out in the Water Services Strategic Plan (WSSP) October 2015 is:

“Through responsible stewardship, efficient management and strong partnerships, Ireland has a world-class water infrastructure that ensures secure and sustainable water services, essential for our health, our communities, the economy and the environment.”

Strategic priorities set out in the WSSP included:

- Provide Effective Management of Wastewater;
- Protect and Enhance the Environment;
- Support Social and Economic Growth; and
- Invest in Our Future

The WSSP aim WW1, to ‘Manage the operation of wastewater facilities in a manner that protects environmental quality,’ would include the preparation and

implementation of a Waste Water Compliance Strategy. The stated intention at the time was to 'Meet the Urban Wastewater Treatment Directive and work towards meeting the requirements of the Water Framework Directive River Basin Management Plans.'

### Links to other Irish Water policies and strategies

The Pathway to Compliance is in line with the following of Irish Water's Level 1 policies:

- Asset Management policy which advocates 'effective management of wastewater while protecting and enhancing the environment and supporting economic growth.'
- Growth and Development Strategy which has a key objective "To support social and economic growth" and commits us to 'fulfil regulatory obligations within technical, environmental and budgetary constraints taking sustainability policy into account.'
- Sustainability policy which places IW as 'guardians of assets' with responsibility to show stewardship and 'underpin social and economic progress now and into the future', with ambitions to be climate resilient, decoupled from resource use and with natural ecosystems protected.
- Wastewater Treatment and Networks which aims to achieve 'a sustainable balance between customer standards, protecting the environment and supporting growth.'

### Urban Waste Water Treatment Directive, Directive No. 91/271/EEC

The UWWTD requires that at least secondary treatment must be provided at all larger urban areas (i.e., all areas with a population equivalent (PE) of greater than 10,000 discharging to coastal and areas with a PE between 2,000 and 10,000 discharging to freshwater or estuaries). The UWWTD sets the permissible concentration in effluent discharges for a number of parameters, including nutrients (nitrogen and phosphorus) where effluent is discharged to designated nutrient sensitive areas (NSAs). For discharges from agglomerations less than 2,000 PE, the UWWTD requires 'appropriate treatment' such as primary treatment, depending on the environmental setting.

## Urban Waste Water Treatment Regulations, 2010 as amended

The requirements of the UWWTD were transposed into Irish law by the Urban Waste Water Treatment Regulations (SI/254/2001) later amended (S.I. No. 440 of 2004) and (S.I. No. 48 of 2010)

## Water Framework Directive, Directive No. 2000/60/EC

The Water Framework Directive (WFD) requires member states to protect or restore water bodies to achieve at least good ecological status by 2027. The key principles are:

- No deterioration (protect)
- Progressive improvements to at least good status (restore)
- For Heavily Modified Water Bodies, achievement of good ecological potential
- Removal of priority substances
- Water dependent protected areas

WFD requires that environmental objectives for water bodies take into consideration other directives including:

- Birds and Habitats Directive
- Groundwater Directive
- Shellfish Directive
- Bathing Water Directive
- Dangerous substances directive

Environmental quality objectives to be met under the WFD were made Irish law with the European Union Environmental Objectives (Surface Water) Regulations (SI/272/2009) (as amended) and European Union Environmental Objectives (Groundwater) Regulations (SI/9/2010) (as amended).

## European (Waste Water Discharge) Regulations 2007 to 2020 (the principle regulations being S.I. No. 684 of 2007).

Wastewater Discharge Authorisations (WWDAs) are the statutory approvals issued by the Environmental Protection Agency (the Agency) to regulate waste water discharges to rivers, lakes, groundwater, transitional and coastal waters in Ireland. Waste water discharges from a population equivalent (PE) of 500 or less can be authorised by a Certificate of Authorisation (CoA). Waste water discharges from a PE of over 500 require authorisation by a Waste Water Discharge Licence (WWDL). Irish Water is required to have a WWDA in order to operate a Waste Water Treatment Plant (WWTP).

These regulations require a 'combined approach' to licensing, which applies the requirements of the Urban Waste Water Treatment Directive (UWWTD) and the Water Framework Directive (WFD). In practice this means that ELVs are set to provide the level of treatment as required by UWWTD and in addition, to protect and restore water bodies ecological status in line with environmental objectives that are set for that water body.

