C1 – Public

DRAFT NATIONAL BIORESOURCES STRATEGY

SEA Environmental Report

IE000883
F01
May 2026

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NON-TECHNICAL SUMMARY

Introduction

This Strategic Environmental Assessment (SEA) Environmental Report has been prepared by RPS Tetratech with the support of Egis on behalf of Uisce Éireann (UÉ) as part of the SEA of the draft National Bioresources Strategy (hereafter referred to as the 'draft Strategy' or 'draft NBioS') which is an update of the National Wastewater Sludge Management Plan (NWSMP) published in 2016. The purpose of this SEA Environmental Report is to:

- Inform the development of the draft Strategy;
- Identify, describe and evaluate the likely significant effects of the draft Strategy and its reasonable alternatives; and
- Provide an early opportunity for statutory authorities and the public to offer views on any aspect of this Environmental Report and the accompanying draft Strategy documentation through consultation.

Background and Contents of the Draft Strategy

The existing National Wastewater Sludge Management Plan (NWSMP), published in 2016, outlined a 25-year strategy to standardise the sustainable management of wastewater sludge nationally. Following a review, Uisce Éireann has renamed the update to the NWSMP as the draft National Bioresource Strategy (hereafter referred to as the draft Strategy or draft NBioS) to align with the principles of circular economy, net zero carbon, and sustainability. This strategy provides an overview of how wastewater sludge and bioresources will be managed by Uisce Éireann going forward within the context of circular economy, net zero carbon, and sustainability.

In line with the recast Urban Wastewater Directive (rUWWTD) that was adopted in November 2024, the draft Strategy aims to meet all the new legislative requirements in relation to wastewater sludge and bioresources such as enhanced monitoring, energy neutrality, and circular economy over the coming years. The key bioresources covered in the draft Strategy include treated and stabilised wastewater sludges (biosolids) and associated by-products like biogas/biomethane. The draft Strategy's recommendations will also influence future capital and operational activities for sustainable bioresources management in Ireland.

Key sections of the draft Strategy include:

- Executive summary and 25-year vision (Future Vision 2050).
- Chapter on what wastewater sludge and bioresources are, current quantities and outlets (currently all applied to agricultural land).
- Strategic objectives and actions addressing sustainable management, environmental protection, community and bioeconomy support, and efficient operations. The chapter includes an illustration outlining the wastewater and bioresource services provided by UÉ.
- Treatment technologies and process descriptions (Anaerobic Digestion (AD) Advanced Anaerobic Digestion (AAD), thermal drying, composting, lime stabilisation, Sludge Reed Beds).
- Advanced Thermal Conversion (ATC) technology review (pyrolysis, gasification, hydrothermal carbonisation, , etc.) and plans for trials and demonstration plants.
- Transport strategy and Decision Support Tool (DST) to optimise logistics, carbon, and costs.
- Infrastructure planning: prioritised regional Bioresource Centres, and prioritised Satellite Dewatering Centres.
- Monitoring, reporting and a proposed Biosolids Assurance Scheme (BAS) for independent quality assurance.
- Research and Innovation programme listing national and international collaborations and trial projects.

- Implementation approach, governance, review cycle (at least every five years), and integration into regulatory funding cycles.

Strategic Environmental Assessment Methodology

The SEA Directive is European legislation (which has been applied in Irish law) that requires certain plans and programmes, which are likely to have a significant impact on the environment, be subject to the SEA process. The SEA process is broadly comprised of the following stages outlined in **Table 1.**

Table 1: Stages in the SEA Process

SEA Step/Stage	Purpose	Status
Screening	The purpose of this stage of the process was to reach a decision, on whether or not an SEA of the draft Strategy is required.	This stage is finished and it was decided an SEA was needed.
Scoping and statutory consultation	To explain what would be covered in the environmental assessment and to talk to statutory groups which included the EPA.	This stage was completed in August 2024.
Environmental assessment and consultation	To assess the impacts of the draft Strategy on the environment and listen to the public on what they think about the draft strategy and assessment.	This is where we are now.
SEA Statement	To explain how the issues people were concerned about have been dealt with and how the environmental assessment helped to change the draft Strategy for the better.	This will take place as part of the finalisation of the Strategy

Team members from both the environment and the strategy teams worked together at every stage. They helped: check the current situation, come up with and compare different options, review proposed actions, and suggest ways to reduce any possible environmental harm.

During the scoping stage (the early phase that sets the focus of the SEA), official environmental authorities in the Republic of Ireland and Northern Ireland were asked for input. A Scoping Report was written and an SEA Scoping workshop was held on 14 August 2024 to discuss the scope of the environmental assessments.

All of the environmental topics listed in the SEA Directive were scoped in for the assessment of the draft Strategy. These are: Population and Human Health; Biodiversity, Flora and Fauna; Land and Soil; Water; Air Quality; Climatic Factors; Material Assets; Cultural Heritage; Landscape and Seascape.

The draft Strategy is an update to a national plan and as such the assessment has been focussed on the strategic national level. Based on the requirements of the legislation and guidance, the information provided in the Environmental Report is outlined in **Table 2**.

Table 2: Requirements of the SEA Directive and relevant section in the Environmental Report

Requirement of SEA Directive (Article 5(1) Annex I)	Chapter of Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes.	Chapter 2: Background and Content of the draft Strategy Chapter 4: Review of Relevant Plans, Policies and Programmes
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme.	Chapter 5: Relevant Aspects of the Current State of the Environment (Baseline)
The environmental characteristics of areas likely to be significantly affected.	Chapter 5: Relevant Aspects of the Current State of the Environment (Baseline)

Requirement of SEA Directive (Article 5(1) Annex I)	Chapter of Environmental Report
Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive.	Chapter 5: Relevant Aspects of the Current State of the Environment (Baseline)
The environmental protection objectives, established at international, European Union or national level, which are relevant to the plan or programme, or modification to a plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation.	Chapter 4: Review of Relevant Plans, Policies and Programmes
The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.	Chapter 8: Assessment of Preferred Scenario
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme, or modification to a plan or programme.	Chapter 9: Mitigation and Monitoring
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.	Chapter 7: Consideration of Alternatives
A description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan or programme, or modification to a plan or programme.	Chapter 9: Mitigation and Monitoring
A non-technical summary of the information provided under the above headings.	Non-technical Summary

In addition to this SEA, the EU Habitats Directive (92/43/EC) requires plan-makers to assess the potential to impact negatively on European sites. These sites include areas designated for the protection and conservation of habitats and of wild flora and fauna and include Special Protection Areas (SPAs) and Special Areas of Conservation (SACs).

In acknowledgement of this, early consideration has been given to the need for AA and a report in support of AA screening was prepared in parallel to the SEA Scoping. Uisce Éireann determined, that *it cannot be excluded*, on the basis of objective scientific information following a screening under this Regulation that the proposed draft Strategy, individually or in combination with other plans or projects, will have a significant effect on European Sites and an Appropriate Assessment is required. Therefore, an NIS has been prepared in parallel with the SEA Environmental Report and draft Strategy. The findings of the NIS have been considered as part of the SEA and also feeds directly into the assessment of biodiversity, flora and fauna in this SEA. A determination with respect to AA will be made by Uisce Éireann as the competent authority before the draft Strategy is adopted.

Relevant Plans and Programmes

In line with the SEA Directive, the report identifies and considers the environmental protection objectives from other relevant plans, programmes and policies in relation to the draft Strategy. As the draft Strategy is an update to a national strategic plan, the review of such key plans/ programmes has both focused on the European level, national and transboundary level relating to wastewater sludge management, water quality, circular economy and energy efficiency. Plans and programmes from other keys sectors and topics are also discussed. In order to set a framework for exploring the relationship between the draft Strategy and key plans/ programmes the following two questions were borne in mind:

- Does the draft Strategy contribute to the fulfilment of environmental protection objectives set in other key plans/ programmes; and

- To what degree are the environmental protection objectives/ measures set in these other key plans/ programmes impacted by the draft Strategy?

International Level

Internationally, countries work together on the United Nations Sustainable Development Goals (SDGs). Several of these goals—covering health, clean water, industry and infrastructure, responsible consumption, climate action, and life on land—are important for the draft Strategy. The Strategy must help deliver those shared global aims.

Global bodies also call for more sustainable food and farming systems and stronger action to protect biodiversity. The Strategy should ensure wastewater sludge handling does not harm ecosystems and instead support conservation where possible.

Scientific reports show our climate is warming because of human activities. This makes it important that wastewater services reduce emissions where they can, recover useful resources (like nutrients and energy), and become more resilient as weather patterns change.

European Level

The European Union has a number of laws and programmes meant to protect water, soil, air, nature and people's health. Key EU laws include:

- Stronger rules on urban wastewater treatment and limits on what can be released to protect rivers, lakes and seas.
- Rules on managing wastewater sludge safely, especially when it is used in agriculture so it does not contaminate soil or water.
- The Water Framework Directive, which sets overall goals for clean and healthy water bodies.
- Directives to protect groundwater, reduce nitrates from farming, and limit harmful industrial emissions.
- Newer EU measures aim to monitor and improve soil health and to restore nature across land and sea.

The European Green Deal and related programmes set broad targets for cutting greenhouse gases, using renewable energy, preventing pollution and restoring nature. The draft Strategy is expected to support these aims by improving how sludge is treated, encouraging reuse and reducing pollution.

The EU also supports projects that help the environment and promote a circular economy—turning waste into valuable products. The draft Strategy should look for ways to safely recover nutrients and energy from wastewater sludge while protecting health and nature.

National Level

Ireland has its own laws and guidance for using treated wastewater sludge in agriculture to protect soil, water and public health. There are codes of practice that explain how to apply biosolids safely although the most relevant code of practice is in need of review and update. This review and update is in progress with the DCEE with other stakeholders such as UÉ supporting the review.

The Water Services Act, along with UÉ long-term plans set out how water and wastewater services should be managed, including goals for safe drinking water, protecting the environment, and making services resilient into the future.

National climate law and strategies set strong targets for cutting greenhouse gases. The draft Strategy is expected to help meet those targets by supporting energy recovery and lowering emissions from the wastewater sector.

Other national plans cover biodiversity, air quality, landscape, and waste. The Strategy must align with those plans so it does not undermine nature or people's health.

Health, pollution and monitoring

- International treaties require Ireland to control persistent toxic substances that harm health and the environment.
- Both EU and Irish rules stress careful monitoring for contaminants in biosolids and the environment. Regular testing and clear controls on how sludge is treated and used are essential to protect water, soil and public health.
- The draft Strategy has incorporated strong monitoring so that reuse of biosolids is safe and does not result in environmental harm.

Climate and resilience

- Climate change is already affecting rainfall patterns and extreme weather. This can reduce safe windows for reusing biosolids on land and increase the need for storage and resilient treatment options.
- The draft Strategy will consider options like diversifying where treated outputs are used, increasing storage capacity, and using technologies that recover energy or reduce emissions—while ensuring these technologies meet strict emissions rules.

Planning and cross-border cooperation

- National planning frameworks and regional plans guide where infrastructure should go. The draft Strategy will align with these to avoid land-use conflicts and ensure facilities are sited sensibly.
- Water bodies cross the border with Northern Ireland. Authorities on both sides coordinate on river basin plans and water protection measures.

What this means for the draft Strategy

The draft Strategy will meet legal requirements and support national and EU goals for cleaner water, healthier soils, reduced pollution, biodiversity protection and lower greenhouse gas emissions. It will prioritise safe management, strong monitoring, and practical steps to recover resources (like nutrients and energy) only where this is safe and compliant with rules. The draft Strategy will be flexible to respond to climate change, support investment plans, and work with broader policies on farming, nature restoration and the circular economy. Overall, the aim is to protect public health and the environment while making better use of resources—turning a waste problem into opportunities, but only where safety and nature protection are guaranteed.

Relevant Aspects of the Current Baseline of the Environment (Baseline)

Ireland's natural environment represents one of the country's most essential national assets (EPA, 2012[1], 2016[2], 2020[3] and 2024[4]). However, it is acknowledged that under increasing pressure, the quality of the environment is not considered to be good. In the most recent, state of the environment review Ireland's State of the Environment Report 2024 (SoER, 2024)[4], the EPA outlines a summary scorecard for the progress being made across key environmental policy areas as well as the general trend/outlook. The scorecard shows that the improvements being made are not of appropriate scale and are therefore insufficient to meet the national long-term environment protection objectives and targets. **Table 3** presents the scorecard from the EPA SOER 2024 report and highlights the relevance to the draft Strategy.

[1] Ireland's Environment 2012 - An Assessment | Environmental Protection Agency

[2] Ireland's Environment 2016 - An Assessment | Environmental Protection Agency

[3] Ireland's Environment 2020 - An Assessment - Report | Environmental Protection Agency

[4] EPA (2024) Ireland's State of the Environment Report 2024. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/state-of-the-environment/irelands-state-of-the-environment-report-2024.php

Table 3: Summary Assessment and Future Outlook for Selected Environmental Policy Areas and Relevance to the draft Strategy

Policy Area	Summary Assessment & Outlook Scorecard taken from EPA SOER 2024	Relationship to the measures outlined in the draft Strategy
Climate	***"Assessment:*** ***Poor – environmental and/or compliance challenges to address*** ***Outlook:*** ***Largely not on track to meet policy objectives and targets. Significant challenges to achieving full compliance remain. Systemic and transformative change needed*** *While there has been progress in terms of beginning to reduce greenhouse gas emissions and in strengthening adaptation governance structures and support services, overall current assessment for climate is 'poor' (a slight improvement from 'very poor' in 2020). Full implementation of actions set out in the Climate Action Plan and additional actions are needed if Ireland is to meet its 2030 and 2050 climate targets."*	The agriculture sector overall is the largest contributor to Ireland's GHG emissions. Research has indicated that reducing nitrogen (N) fertiliser inputs for agriculture and/or using efficient application mechanisms (such as LESS), has resultant co-benefits for reduction in N losses to water and reduction in N_2O generation (a greenhouse gas, 93.0% of which is derived from use of synthetic fertilisers and animal manure). N_2O accounted for 8.8% of Ireland's GHG emissions in 2023, so is a significant source of emissions for action. The draft Strategy contains actions related to nutrient circularity and use of biosolids in agriculture to improve soil quality leading to reduction in synthetic fertiliser use and can therefore, play a role in contributing towards the reduction of GHG emissions from agriculture sector.
Air Quality & Emissions	***"Assessment:*** ***Moderate – on track generally/local or occasional challenges*** ***Outlook:*** ***Partially on track to achieving full compliance or measures in place or planned that will improve the situation. Outlook is dependent on existing and planned actions, measures and plans being fully implemented and effective*** *The overall current assessment for air is 'moderate' (the same as in 2020). Ireland is compliant with current air quality standards for many air pollutants. However, Ireland is not meeting the guidelines set by WHO for multiple pollutants, including PM2.5, and Ireland is non-compliant with the EU reduction target for ammonia. Achieving the ambitions of the Clean Air Strategy and complying with the limit values of the proposed EU Air Quality Directive from 2030 onwards will be challenging but will have a significant and positive impact on health."*	The draft Strategy has limited impact on local and ambient air quality. Biosolids applied to soils accounts for 0.2% of the total agriculture emissions.[5] The draft Strategy will contribute positively towards national air quality by utilising alternative outlets to land spreading with efficient use of decision support tool with regard to the transport of biosolids. Transport related emissions are addressed through a National Bioresources Strategic Decision Support Tool (DST) which optimises transport strategies and ensure lower carbon transport. .
Water	***"Assessment:*** ***Poor – environmental and/or compliance challenges to address*** ***Outlook:*** ***Partially on track to achieving full compliance or measures in place or planned that will improve the situation. Outlook is dependent on existing and planned actions, measures and plans being fully implemented and effective*** *Overall current assessment for water is 'poor' (the same as in 2020). Trends remain mixed, with no net improvement in river or lake water quality in recent years, a sharp decline in the number of monitored estuaries in satisfactory ecological condition and continued direct discharges of raw or inadequately treated sewage to water from 19 agglomerations. Significant challenges remain for achieving full*	Building on the existing NWSMP, the primary purpose of the draft Strategy is to ensure that bioresouce management occurs sustainably as a part of wastewater treatment processes. This in turn also ensures protection of surface water and groundwater quality. Whilst the overall assessment in the SOER, 2024 scorecard provides a national outlook and is focused on wastewater discharges as a significant pressure, it should be noted that the report also states that there is a decrease in the number of waterbodies impacted by wastewater as a result of increasing investment and upgrades to wastewater treatment plants. It also highlights that agriculture is the most significant pressure on waterbodies due to nutrient loss.

[5] EPA (2024). Ireland's UNECE Submissions 2024. Available at: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-unece-submissions-2024

Policy Area	Summary Assessment & Outlook Scorecard taken from EPA SOER 2024	Relationship to the measures outlined in the draft Strategy
	compliance with relevant EU obligations and national policy objectives."	Furthermore, recent EPA data indicates that nearly half (44%) of our rivers had mean nitrate concentrations above 8 mg/l NO_3 in 2024 and 20% of estuarine and coastal water bodies were too high for dissolvedinorganic nitrogen (EPA, 2025[6]). Majority of the river sites with higher nitrate concentrations are located in the south and south-east of the country. It has been reported that one of the main causes impacting water quality is the run-off of nutrients, sediments and pesticide from agricultural lands and farmyards. While sludge accounts for a small fraction of total amount of fertilisers spread, there is scope for greater action and water protection within the draft Strategy to support reversal of this trend in line with the WFD and WSSP objectives.
Nature	***"Assessment: Very poor / significant environmental and/or compliance challenges to address*** ***Outlook: Largely not on track to meet policy objectives and targets. Significant challenges to achieving full compliance remain. Systemic and transformative change needed***	One of the aims of the draft Strategy is to incorporate nature based solutions into wastewater treatment sites to reap benefits for biodiversity. It also commits to carry out the bioresource management processes in compliance with the obligations under the Birds and Natural Habitats Regulations 2011, as amended in recognition of wider biodiversity issues.
	The overall current assessment for nature is 'very poor' (the same as in 2020). Deteriorating trends dominate, especially for protected habitats and bird populations, and Ireland is not on track to achieve policy objectives for nature. While the recent expansion of marine protected areas is welcome, additional far-reaching measures are needed to address the declines in nature and biodiversity."	
Waste & Circular Economy	***"Assessment: Poor – environmental and/or compliance challenges to address*** ***Outlook: Partially on track to achieving full compliance or measures in place or planned that will improve the situation. Outlook is dependent on existing and planned actions, measures and plans being fully implemented and effective***	The draft Strategy provides for improvement in the circularity of scarce nutrients such as phosphorus and in this regard, the draft Strategy aims to contribute towards circular economy and achievement of net zero carbon in the wastewater treatment sector.
	The overall current assessment for the circular economy and waste is poor (the same as in 2020) but progress is being made in a number of areas to improve performance. Waste generation continues to grow, in absolute and per capita terms, and Ireland remains overly reliant on export markets for recycling and for treating municipal residual waste. Recycling rates for municipal and plastic packaging waste streams are at risk and need to increase urgently to achieve 2025 targets. Recent interventions, such as the Deposit Return Scheme, statutory roll-out of the organic waste collection service, recovery levy and national end-of waste and by-product decisions, are positive developments but the effects of these remain to be seen. The circular material use rates remains very low by comparison to the European average and Ireland needs to	

[6] EPA, 2025. Water Quality in 2029-2024. Environmental Protection Agency. https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA-Water-Quality-in-Ireland-Report.pdf

Policy Area	Summary Assessment & Outlook Scorecard taken from EPA SOER 2024	Relationship to the measures outlined in the draft Strategy
	address specific sectoral challenges to accelerate moving from a linear to a circular economy."	

Baseline Summary

Ireland's environment is generally in good shape, but there are important problems that need action now. These include damage to habitats, pollution of water and air, climate change, and the impacts of new development (homes, farms and businesses).

Ireland's population is approximately 5.1 million. More people and more activity mean greater pressure on water, land and nature, and a higher risk that pollutants reach our wastewater systems Many of Ireland's natural habitats are in poor condition. Roughly four in ten habitats are below an adequate conservation standard and almost half are in bad condition. Climate change and continuing loss or damage of habitats make the outlook for nature concerning. Protecting biodiversity is important because healthy nature supports clean water, good soils and general wellbeing.

Overall soil quality is reasonably good, but there are growing pressures. These include soil being covered over (sealing), being compacted, losing organic matter and biodiversity, erosion, and some contamination. Research shows gaps in Irish soil studies and suggests better monitoring is needed. There are currently no national limits in Ireland for organic pollutants in wastewater sludge, and some other countries have stopped the use of wastewater sludge in agriculture and diverted its utilisation for energy generation and nutrient recovery. Studies have found that treated biosolids can be a source of microplastics in soils, however further research and evidence is required to assess impact on soil chemistry and the environment.

About 48% of Ireland's surface waters (rivers, lakes, estuaries and coastal waters) are not in a satisfactory condition. Nutrients (mainly from farming and other sources) are a key cause of poorer water quality. Some improvements have been seen in particular areas, but they are offset by declines elsewhere. Groundwater is in better shape: about 92% of groundwater bodies have good chemical and quantity status in recent assessments

Ireland's air quality is generally good and meets the EU limits for most monitored pollutants, including small particles, sulphur dioxide and others. Human activity is increasing greenhouse gases in the atmosphere, mainly from burning fossil fuels and from agriculture. Ireland has set strong national climate goals. Recent reporting shows Ireland's total greenhouse gas emissions fell by about 6.8% from 2022 to 2023, to around 54.9 million tonnes of CO_2 equivalent. Still, greater and faster reductions are needed to meet legal carbon budgets and national targets.

There is growing awareness that pollutants—from households, businesses, farms and medicines—can enter wastewater and end up in biosolids (the treated organic material left after wastewater is processed). The Environmental Protection Agency (EPA) has recommended a national assessment of wastewater sludge use on farms to collect better data and improve how these materials are tracked and managed.

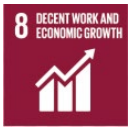
New EU rules (the recast Urban Wastewater Treatment Directive adopted in late 2024) introduce higher expectations. They require more monitoring (including for microplastics and greenhouse gas emissions), greater recycling and energy recovery, and targets for energy or climate neutrality in wastewater systems (20% by 2030 and 70% by 2040). The draft Strategy will need to reflect these new obligations.

Framework for Assessment

SEA uses a system of objectives, targets and indicators to set a framework for assessment of the plan. This report has used broad themes, based on the environmental topics listed in the SEA Directive, to group large environmental datasets, e.g. human health, soil, air quality, etc. Assigned to each of these themes is at least one high-level Strategic Environmental Objective (SEO) that specifies a desired direction for change, e.g. reduce soil contamination, against which the future impacts of the plans can be measured. These high-level SEOs are then paired with specific targets. The progress towards achieving these specific targets is monitored using Indicators. Each of the draft Strategy alternatives and the draft actions have been assessed against the SEOs as shown in **Table 4** to establish where they will contribute (or not) to achieving the desired outcomes. Interlinkages with relevant UN Sustainable Development Goals (SDGs) is also outlined, to show how the draft Strategy can contribute more generally to the national policy effort on achieving the SDGs through the implementation of its actions.

Table 4: Strategic Environmental Objectives

Related to SEA Topic(s)	SEA Objective(s)	Assessment Criteria (to what extent will the draft Strategy Actions/Measures…)	Relevant UN SDGs
Population and Human Health (PHH)	**Objective 1:** (a)To protect and reduce risk to human health from wastewater processes and products. (b) Ensure food safety from the reuse or deposition of wastewater sludge products on agricultural lands.	• Ensure the quality standards for wastewater treatment can be achieved; • Ensure the quality standards for wastewater sludge products can be achieved; • Undertake appropriate, sustainable and safe reuse of wastewater sludge products. • Promote awareness of the sustainable and safe reuse of wastewater sludge products.	 GOAL 3: Ensure healthy lives and promote well-being for all at all ages.
Biodiversity, Flora and Fauna (BFF)	**Objective 2:** Preserve and protect terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species from the reuse or deposition of wastewater sludge products in or on sensitive receptors.	• Contribute to achieving environmental protection objectives under the Water Framework Directive, Habitats Directive, and the Birds Directive? • Contribute to integrated climate, biodiversity, soil and water benefits.	 GOAL 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
Land and Soil (LS)	**Objective 3:** Safeguard soil quality, fertility and quantity from the application or deposition of wastewater sludge products on lands and soil.	• Protect the national soil resource. • Protect soils against pollution and prevent degradation of the soil resource. • Support sustainable development and land use management.	 GOAL 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
Water (W)	**Objective 4 (a):** Protect water quality (surface waters, groundwaters and marine waters) from wastewater management processes and sludge products. **(b)** Contribute to achieving the objectives under the WFD, i.e. achievement or maintenance of at least Good Environmental Status (GES) and Good Ecological Status (GEcS).	• Support the protection of water quality and status using appropriate treatment and reuse processes and application methods for wastewater sludges.	 GOAL 6: Ensure availability and sustainable management of water and sanitation for all.  GOAL 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
Air Quality (AQ)	**Objective 5:** Minimise emissions to air from sludge management processes.	• Avoid adversely impacting on air quality. • Minimise transboundary atmospheric depositions on sensitive receptors.	 GOAL 11: Make cities and human settlements inclusive, safe, resilient and sustainable.
Climatic Factors (CF)	**Objective 6:** (a) Reduce GHG from sludge management processes. (ii) Ensure resilience of wastewater treatment infrastructure and	• Reduce GHG emissions within the wastewater management sector. • Adopt methods or technologies to increase resilience towards climate change impacts. • Deliver on circular economy and net zero principles.	 GOAL 13: Take urgent action to combat climate change and its impacts

Related to SEA Topic(s)	SEA Objective(s)	Assessment Criteria (to what extent will the draft Strategy Actions/Measures…)	Relevant UN SDGs
	processes to the effects of climate change.		
Material Assets (MA)	**Objective 7:** Ensure resilience and sustainability of new and upgraded wastewater facilities and processes.	• Ensure effective use of investment for sustainable wastewater infrastructure and processes. • Support continued investment and promotion of new innovations and research.	 GOAL 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.  GOAL 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.  GOAL 12: Ensure sustainable consumption and production patterns.
Cultural Heritage (CH)	**Objective 8:** Protect places, features, buildings and landscapes of cultural, historical archaeological or architectural heritage from wastewater infrastructure developments or processes.	• Protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage. • Ensure wastewater management processes and developments are appropriately sited and managed.	 GOAL 11: Make cities and human settlements inclusive, safe, resilient and sustainable.
Landscape (LandS)	**Objective 9:** Protect landscape character and visual amenity from wastewater infrastructural development.	• Avoid damage to designated landscapes and/or seascapes as a result of implementing final Strategy.	

Consideration of Alternatives

Both the draft Strategy the SEA team have been conscious that consideration of alternatives is an iterative process and have therefore engaged on this matter from the early stages, first discussing it in relation to SEA scoping and undertaking further consideration and analysis on alternatives throughout the SEA process. The basis for alternatives discussions was the 2015 EPA Guidance: *Developing & Assessing Alternatives in SEA*[7]. This guidance points to four key criteria for identification of alternatives and broad categories of alternatives that are realistic, reasonable, viable and implementable.

Key points discussed at alternatives workshops are summarised below:

- Issue of emerging contaminants and associated monitoring and traceability in biosolids;
- High levels of contaminants in leachate from landfills and recycling centres;
- Need for quality certification for biosolids;
- Land availability issues and alternative outlets to land spreading;
- EU requirement of spatial mapping for land spreading;
- Efficient and sustainable technologies for thermal drying and other treatment technologies;

[7] Developing and Assessing Alternatives in SEA, EPA 2015

- Increasing number of facilities and associated logistics and carbon footprint;
- Increased reduction in sludge volume and introduction of new centres to reduce the need of transport; and
- Pilot studies on the effects of land spreading biosolids on agricultural lands.

Having regard to the high level nature of the strategy, the issues raised in workshops between the Strategy and SEA teams and scoping feedback received during scoping consultation, the alternatives considered for the draft Strategy are presented in **Table 5**.

Table 5: Alternatives Considered

Category	Scope of Alternatives Considered	Outline of Alternatives
Source	Acceptance of Leachate	**Leachate 01** – Business as usual where UÉ facilities accept leachate from Landfill and Recycling Centres **Leachate 02 –** UÉ will work with the waste operators and Local Authorities to agree an exit road map which results in self-sufficiency for the sector in relation to the byproduct.
Quality Assurance	Certifications schemes	**Quality 01** - Business as usual relying on mandated risk management without any supplementary certification schemes in place. **Quality 02** – Introduce a certification scheme to increase transparency of land spreading.
	Reporting	**Reporting 01** - Deliver on reporting as per the requirements of the European Union (EU); or **Reporting 02** – Supplement requirements of the European Union (EU) reporting with sensitivity mapping and analysis.
Treatment	Sludge Treatment	**Sludge Treatment 1** –Focus on lime stabilisation and anaerobic digestion (AD) as the main methods for sludge treatment. **Sludge Treatment 2** – Expand the use of advanced anaerobic digestion (Advanced AD) for sludge treatment to increase energy recovery potential and volume reduction. **Sludge Treatment 3** – Introduce advanced thermal conversion (ATC) for energy and nutrient recovery and volume reduction.
Transport	Transport	**Transport 01 -** Business as usual; or **Transport 02** - Reduce / minimise distance and quantities of sludge.
Reuse	Landspreading	**Landspreading 01** – Continue to land spread biosolids as usual. **Landspreading 02** – Produce a robust monitoring programme that establishes an evidence base in the short term to support landspreading and identifying other suitable locations, where required.

Preferred Scenario

The above-mentioned alternatives have been further assessed through an objectives-led assessment approach in Chapter 7 of the SEA ER. The environmentally preferred alternatives are *Leachate 02, Quality 02, Reporting 02, Sludge Treatment 01,02 and 03, Transport 02 and Landspreading 02* in the wider context of circular economy, net zero carbon, and sustainability.

Assessment of Preferred Scenario & Mitigation

Strategic Objective Reference	Summary of Actions and Assessment	Mitigation (✓/×)
Sustainable Management of Wastewater	*Actions 1.1-1.10* proposed under this Strategic Objective aim to transform wastewater sludge and bioresource management from waste disposal into a circular, low-carbon system by maximising energy recovery	✓

Strategic Objective Reference	Summary of Actions and Assessment	Mitigation (✓/×)
Sludge and Bioresources	(biogas/biomethane, heat), recovering valuable nutrients and materials, testing Advanced Thermal Conversion technologies, and strengthening research and long-term investment planning. If correctly implemented, these actions can deliver clear national and regional benefits in the form of reduced greenhouse-gas emissions, greater energy security, improved resource recovery and new economic opportunities. However, localised impacts are anticipated when implementing these actions (odour and air emissions, potential contamination of soil and water from digestate/recovered products, and site impacts from new infrastructure (construction, visual/landscape effects, habitat disturbance). Important uncertainties remain around scale-up of ATC/pyrolysis, co-digestion feedstocks and market readiness for recovered products; therefore outcomes will depend heavily on staged pilots, strict feedstock/product specifications, robust monitoring, careful siting of infrastructure, and transparent governance.	
Protect and Restore our Environment	*Actions 2.1-2.15* proposed under this Strategic Objective aim to protect and restore the natural environment while keeping safe, sustainable options for re-using wastewater sludge and bioresources. These relate to deploying nature-based solutions (e.g., sludge reed beds), delivering biodiversity net-gain, strengthening monitoring and regulatory compliance, developing a Biosolids Assurance Scheme, managing emerging contaminants, improving source control and industrial effluent risk assessment, and providing alternative outlets and strategic storage. These actions can have positive impacts for biodiversity, soil and water quality, public health and the circular economy. Notwithstanding that, significant remaining risks include contaminant transfer, construction impacts for required infrastructure and transportation impacts, and market/timing uncertainties for alternative outlets. Addressing these through revised operational standards, robust monitoring, pilot projects for new technologies and clear governance is therefore essential to realise the stated environmental benefits.	✓
Support our Communities Growth and the Bioeconomy	*Actions 3.1–3.4* proposed under this Strategic Objective aim to create the social, policy and planning foundations needed to scale safe, circular uses of biosolids and bioresources. The proposed actions relate to building community acceptance and awareness of quality assurance, engaging with EU and national regulators on circular economy rules, embedding robust demand and growth forecasting to guide investment, and aligning activity with local, regional and national planning. These actions are considered to be broadly enabling and are indirectly positive for public health, water and soil quality, biodiversity and greenhouse-gas reduction by encouraging safer, evidence-based reuse and investment in low-carbon technologies. Continued engagement with regulators, planning authorities and other stakeholders will help reduce conflicts with respect to bioresource infrastructure, land-use needs and environmental safeguards.	×
Efficient Operation of Wastewater Sludge and Bioresources Centres	*Actions 4.1–4.6* proposed under this Strategic Objective aim to make the operational side of sludge and bioresource management more efficient, lower-risk and lower-carbon by removing harmful inputs (e.g., landfill leachate), tightening transport and contractor controls, improving dewatering performance, updating Standard Operating Procedures (SOPs), optimising low-carbon transport through a decision-support tool, and deploying efficient pre-treatment drying alongside ATC to maximise resource recovery. As leachate may contain contaminants, its removal from the wastewater process would have direct and indirect positive effects for the receiving environment.	×

Strategic Objective Reference	Summary of Actions and Assessment	Mitigation (✓/×)
	However, these positive effects are dependent on the sustainable treatment and disposal of the leachates elsewhere. Similarly, the remaining actions if implemented in a coordinated, well-funded and evidence-led way, these measures can contribute towards improvements in water and soil quality, reduction in transport emissions and operating costs, and better recovery of energy and materials.	

Monitoring

Member States are required to monitor the significant environmental effects of the implementation of plans so that any unforeseen adverse effects can be identified, and appropriate action can be taken. A monitoring programme is developed based on the indicators selected to track progress towards reaching the targets paired with each SEO, thereby enabling positive and negative impacts on the environment to be measured.

Proposed monitoring measures focus on the aspects of the environment that are likely to be significantly impacted by the draft NBioS and from the identification of the key trends and issue areas. Where possible, indicators have been chosen based on the availability of data/information and to show changes that would be attributable to the implementation of the NBioS. Chapter 9 of the Environmental Report presents the proposed Environmental Monitoring Programme.

Next Steps

Written submissions or observations on the draft Strategy and / or associated environmental reports (SEA and AA) can be made up to 5 pm on the Tuesday 21st July 2026 via:

https://www.water.ie/projects/strategic-plans/bioresources

It should be noted that in the interests of transparency, all submissions and observations received during this public consultation will be taken into consideration and will be documented in the Public Consultation Report.