



**Memorandum of Understanding
between
the Environmental Protection Agency
and
Met Éireann**

Version 3.0

This Memorandum of Understanding (MoU) describes areas of mutual responsibility and shared interest between the Environmental Protection Agency (EPA) and Met Éireann.

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1 Introduction

This Memorandum of Understanding (MoU) between the Environmental Protection Agency (EPA) and Met Éireann provides a framework for enhanced cooperation in areas of mutual interest, leading to greater efficiency and effectiveness in the delivery of the work programmes of both organisations. Both organisations may be referred to as Parties to the MoU.

1.1 Environmental Protection Agency

The EPA is an independent public body established under the Environmental Protection Agency Act, 1992. The other main instruments from which the EPA derives its mandate are the Waste Management Act, 1996, and the Protection of the Environment Act, 2003 and the Radiological Protection (Miscellaneous Provisions) Act 2014.

Vision

The EPA's vision is to live sustainably in a healthy environment that is valued and protected by all.

Purpose

The EPA's purpose is to protect, improve and restore Ireland's environment through regulation, scientific knowledge and working with others. The EPA's vision for Ireland is that we live sustainably in a healthy environment that is valued and protected by all.

The EPA's purpose reflects the three core roles – as an environmental regulator, as a key source of trusted scientific evidence and knowledge, and as a voice for the environment through leadership and advocacy and a commitment to collaborating and partnering with others to deliver better environmental outcomes.

The EPA's responsibilities include:

- Climate Science C Climate Change
- Radiological Protection and Regulation
- Environmental Monitoring, Assessment and Reporting
- Water Management
- Environmental Research Development
- Industrial and Waste Licensing
- Environmental Enforcement
- Circular Economy and Chemicals in the Environment
- Guidance, Awareness Raising, and Accessible Information

1.2 Met Éireann

Met Éireann is Ireland's National Meteorological Service, a division of the Department of Housing, Local Government and Heritage. Met Éireann is maintained by the State under the Convention of the World Meteorological Organisation.

It is the public-service scientific organisation responsible to the Irish State for:

- the collection and production of high-quality meteorological data.
- the communication of authoritative weather, climate services and flood forecasting to protect life and property, and to promote wider societal and economic wellbeing.

- conducting research into weather, hydrology, oceanography, and climate, to improve customer services and inform decision-making, as part of the broader research community.
- representing Ireland to the WMO (World Meteorological Organisation), ECMWF (European Centre for Medium- Range Weather Forecasts), EUMETSAT (European Organisation for the Exploitation of Meteorological Satellite, Euro GOOS (European Global Ocean Observing System), EFAS (European Flood Awareness System), and EUMETNET (European National Meteorological Services Network).

Mission

Met Éireann, the national meteorological service, monitors, analyses and predicts Ireland's weather, climate and flooding. Met Éireann does this to provide Irish society and decision-makers with world-class weather, climate and flood services to protect life and property, and to promote wider societal and economic well-being.

Vision

Ready for Change - preparing Ireland for changing weather and climate.

Goals

- Goal 1 - Support multi-hazard, impact-based decision making for weather and flooding events.
- Goal 2 - Deliver user-oriented climate services to support national response and resilience to climate change impacts.
- Goal 3 - Provide an effective authoritative voice and strategic leadership on weather and climate in Ireland.
- Goal 4 - Enhance scientific excellence and innovation to provide the most reliable services for society and to support an enterprise environment for weather, flood and climate services.
- Goal 5 - Augment our science-based technology and infrastructure to enable the provision of highest quality weather, flood and climate services.
- Goal 6 - Retain and grow a professional, highly skilled, and expert workforce with sustainability at the heart of how we work.

2 Purpose

The purpose of this MoU is to record the agreement that has been reached by the Parties. In recognising each other's respective responsibilities and obligations and recognising constraints that may apply, the EPA and Met Éireann shall endeavour to liaise closely, particularly in relation to the issues set out below.

The adoption of this memorandum will:

- facilitate work in areas of shared interest and cooperation.
- facilitate the free and timely exchange of available information and data, with regard to relevant data policies in each organisation.
- promote best practice in areas of common interest.
- promote a focus on improved quality of services and making the most effective use of resources; and
- further improve the service delivery to members of the public from both organisations.

The implementation of this MoU will be without prejudice to the statutory responsibilities and obligations of both organisations. Cooperation should also lead to efficiencies for both organisations, as well as for third parties, in relation to the potential to maximise the use of available information, and avoidance of duplication of effort.

3 Areas of cooperation

This MoU provides a framework for cooperation and assistance between the EPA and Met Éireann in areas of common interest concerning air quality, ecosystems quality, radiological protection, emergency preparedness and response, climate services, earth system monitoring (Land use and GHG Inventory Development), modelling and assessment, as well as related research activities.

This MoU will facilitate cooperation between the EPA and Met Éireann in discharging their respective responsibilities in these areas and so enhance the actions of both and avoid duplication of effort and conflicting requirements.

3.1 National Emergency Preparedness and Response

3.1.1 Radiological Events

The National Plan for Nuclear and Radiological Emergency Exposures ('the National Plan') provides a framework for the national response to a large-scale radiation emergency. It is intended specifically to cater for an emergency or incident involving widely dispersed radioactive material such as that arising from a major accident at a nuclear installation abroad resulting in radioactive contamination reaching Ireland. The National Plan is one of a number of complementary national and major emergency plans designed to cater for different types of emergency situations. All national authorities/agencies having responsibilities within the National Plan are required to have written sub-plans showing how they will carry out their responsibilities. Lead responsibility for the National Plan lies with the Department of Climate, Energy and the Environment.

The EPA has been assigned particular functions under the National Plan covering early warning, technical assessment of the incident, provision of technical advice on protective actions and monitoring of the environment and the food chain. The role of Met Éireann is to facilitate the use of the EPA's established dispersion modelling capability by making available the most up-to-date local and global numerical weather prediction (NWP) data; to provide expert advice aimed at assisting in the interpretation of dispersion model outputs, and also in the interpretation of outputs from relevant Regional Specialised Meteorological Centres (RSMCs), and to assist in the operation of the EPA's National Radiation Monitoring Network (NRMN). Primary responsibility for the provision of technical advice during a radiological event rests with the EPA.

Arrangements in the EPA and Met Éireann to support a technical assessment in the event of a nuclear or radiological emergency are described in Annex 1.

3.1.2 Air Pollution Events

The EPA and Met Éireann will continue to jointly operate a system to inform the public if an air quality information or alert threshold is exceeded in accordance with Air Quality Standards Regulations, or if any operational air quality forecast model of the EPA predicts such threshold exceedance. Upon receipt of monitoring data and/or advice from the EPA, Met Éireann will

publicise, through weather broadcasts, social media accounts, and otherwise, any exceedance or predicted exceedance of the air quality information or alert thresholds specified in the Air Quality Index for Health or the Ambient Air Directive (2024/2881/EU), respectively. A mutually satisfactory system to fulfil this requirement will be maintained by both organisations.

As part of an incident response function, the EPA may require meteorological forecast information from Met Éireann (via phone/email) or via the Met Éireann duty forecaster.

3.1.3 Modelling

The EPA can use dispersion models and monitoring data to support the investigation of air quality incidents such as fires which have the potential to impact on air quality at a local/regional/national/transboundary level. The NWP data used for radiation incidents can also be used for air quality incidents and to inform models used on airquality.ie. The modelling is also used for modelling emergency and non-emergency releases to the atmosphere. Met Éireann notes the ongoing work within the EPA on the development of ambient air quality analyses and the provision of air quality forecasts. Met Éireann will support, on a best-efforts basis, this initiative through the provision of available meteorological data as required, and expert advice for matters within its competence. The necessary interactions between EPA and Met Éireann in response to modelled forecast exceedance of thresholds as laid out in EU regulation will be defined in a protocol to be agreed between both Parties.

Met Éireann will support the EPA by providing a dispersion modelling capability linked to an operational database of atmospheric analyses and up-to-date meteorological forecasts, to enable the EPA to track the movement of air pollutants in the atmosphere both for routine work and in emergency response situations.

3.2 Environmental Monitoring

3.2.1 National Radiation Monitoring Network

The EPA is the competent authority in Ireland for monitoring levels of radioactivity in air, water and soil and reporting this data to the EC under Articles 35 and 36 of the Euratom Treaty. With support from Met Éireann, the Defence Forces, Third Level Institutions, and Local Authorities, the EPA operates the National Radiation Monitoring Network (NRMN) of permanent monitoring stations. The purpose of the NRMN is to continuously monitor ambient levels of radioactivity in Ireland and to collect air and rainwater samples for analysis in the EPA's Radiation Monitoring laboratory in Dublin. In the event of an unplanned atmospheric release of radionuclides from a nuclear installation abroad, the NRMN will act as an early warning system by alerting the EPA of any increase in radioactivity levels. A list of NRMN monitoring sites hosted by Met Éireann for the EPA along with the equipment at each of these sites can be found in Annex 2.

3.2.2 Air Quality Monitoring

The EPA currently interacts with Met Éireann through the Air Quality Health Information Working Group, which also includes the HSE and the Department of Climate, Energy and the Environment, in relation to issues such as air quality forecasting, developing an air quality index for Ireland and emergency response modelling. The EPA and Met Éireann will support this group and continue to work together on these areas of mutual interest.

The EPA in agreement with partners from the Air Quality Health Information Working Group publish hourly ratings of air quality via its website and associated social media platforms. On

occasions when air quality is 'poor' or 'very poor' or where an operational forecast model predicts a 'poor' or 'very poor' status, additional publication on Met Éireann social media and website platforms may be sought to engage a wider public audience. Adaption of the existing air quality index for health to the proposed hourly European Environment Agency Air Quality Index will be reviewed by the Air Quality Health Information Working Group, during the period of this Memorandum.

Met Éireann will continue to operate a ground-level ozone monitor at Met Éireann's Valentia Observatory, Cahersiveen, in accordance with the requirements of the national ambient air quality network including QA/QC and real-time reporting. As manager of the network, the EPA will include the station in all relevant national QA/QC procedures and will include the results in national reporting.

Met Éireann will continue to measure nitrate and ammonium from precipitation samples collected at Valentia Observatory and report the results along with rainfall measurements to the EPA before 31st July each year. Met Éireann will collect monthly deposition samples and despatch them to the EPA. The EPA will also analyse these samples for metals and report all results to the OSPAR- Comprehensive Atmospheric Monitoring Programme (CAMP) programme annually.

The EPA will continue their partnership with Met Éireann on the Transboundary Air Quality Monitoring Network which is Ireland's contribution to the European Monitoring and Evaluation Programme (EMEP) under the Convention on Long Range Transboundary Air Pollution (CLRTAP).

Met Éireann will continue to provide equipment and analytical support, as outlined in Annex 3.

3.2.3 National Ecosystems Monitoring

The EPA has a coordination role on the oversight and implementation of the National Ecosystems Monitoring Network, under the National Emission reduction Commitments (NEC) Directive, that seeks to gather robust intelligence on the long-term impacts of air pollution on sensitive habitats in Ireland, with a view to identifying trends in impacts and informing future policy measures to control and reduce impacts where needed. Met Éireann will support, on a best-efforts basis, this activity. This support has been set out in the Statement of Intent in Annex 4.

3.2.4 Water Quality Monitoring

Precipitation is an important component in hydrological assessments. Under the Water Framework Directive, data are required for reporting water availability to the EU on a River Basin District basis at monthly and annual time scales and as Long Term Annual Averages for Areal Precipitation and Potential Evapotranspiration. Hydro-meteorological data are also a key component of water resource models and are used for catchment analysis and integrated assessment of catchments. The EPA receives the following data sets in digital format:

- Hourly rainfall data at synoptic stations;
- Rainfall data at specific rainfall stations, at the highest available temporal resolution, if requested;
- Daily grided rainfall (currently publicly accessible from this location <http://www.met.ie/daily-rainfall-and-temperature-grids>);
- The standardised and biased rainfall and temperature data that are used in TRANSLATE;
- Evaporation and evapotranspiration data
- Soil moisture deficient data; and

- Anion and cation data from Irish precipitation samples (currently shared at this location <https://ebas.nilu.no/>).

Under the annual WISE-SOE Reporting: Water Quality dataset request, Ireland is required to provide water balance data. The hydro-meteorological parameters required to support this request are presented in Annex 5. Extreme weather events (particularly periods of elevated or prolonged rainfall) can also impact on EPA work areas such as drinking water quality and bathing water quality. Met Éireann and the EPA will investigate future exchange of forecast information to assist in preparing for such incidents. Met Éireann and the EPA may also cooperate in the siting of rain gauges in specific areas or catchments to provide real-time information.

The EPA's www.beaches.ie website provides the public with bathing water quality information and other information related to bathing waters. It has a national overview home page and the main information is provided at bathing water level. The site links to Met Éireann's weather information.

3.2.5 Hydrometrics

Met Éireann's Flood Forecast Centre (FFC) will use EPA hydrometric data (flows and levels) to develop fluvial predictive modelling systems for Ireland. The acquisition of near-real-time data will prove beneficial to the FFC, before, during and after fluvial flood events. The data will also be an important input to any new fluvial flood forecast models and the verification of existing models.

The EPA will aim to provide the hydrometric data in real time, where that is practical and feasible, and will continue to work with Met Éireann on the national flood forecasting hydrometric review (Annex 5).

Daily rainfall values are useful for calculating material fluxes in rivers e.g. nutrient loading to lakes when combined with water chemistry results. Combining rainfall with evapotranspiration estimates (or soil moisture deficit) and observed flow measurements can allow for modelling of flows in rivers especially in rivers where continuous flow measurements are not available. Modelled river flow data can also be used to estimate lake residence time if the volume of the lake is known.

In support of the above activities Met Éireann will supply a full suite of hourly weather data (in addition to the information provided in Annex 5, tables 2 to 4) for each of the 25 synoptic stations including:

- Temperature including degree days;
- Rainfall;
- Wind;
- Solar radiation;
- Humidity; and
- Pressure.

3.2.6 Land Use and GHG Inventory Development

Data may be required for process-based modelling of GHG emissions from soils associated with sectoral practices and land use management. In general, process-based soil models require:

- daily min, max and mean temperature; and

- daily rainfall.

Research in this area is on-going regarding the specific data requirements and other data needs may be identified. It is envisaged that fully QA/QC data, in digital format for synoptic stations and for the previous year, would be delivered by Met Éireann to the EPA (Annex 6, Table 6).

3.3 Climate Services

Both Parties agree to cooperate on the development of climate services for Ireland to avoid duplication, in the context of national requirements. Enhancing existing collaborations and exploring opportunities in relevant areas is a priority for both Parties to ensure climate services provided for the Irish citizen are of the highest quality. Existing areas of collaboration include:

- the provision of fundamental knowledge with respect to climate change and standardised future climate scenarios for Ireland;
- continued engagement in the operational National Framework for Climate Services to provide a nationally coordinated approach to climate services;
- continuing and expanding linkages to EU initiatives in this area e.g. under Copernicus, JPI Climate and Horizon Europe;
- engaging with the work of UN bodies as appropriate; and
- supporting an operational Climate Ireland information platform designed to improve data access and assist adaptation planning and actions.
- supporting the Climate Ireland Adaptation Network development
- supporting the National Climate Change Risk Assessment

3.4 Data Exchange

The EPA and Met Éireann agree to continue their cooperation on development of climate related observations. The EPA along with other participating organisations, as a member of the national Global Climate Observation System (GCOS) committee, chaired by Met Éireann, supports the committee's aims and goals including the ongoing analysis of trends and changes in essential climate variables as well as sustaining and developing systems that support the provision of these data for Ireland.

EPA's requirements for meteorological datasets may arise on an ad-hoc basis due to the EPA's core work areas or due to involvement in a research project requiring access to data. Where such data requests are not covered under pre-existing agreements within this MoU (ref: Annex 1) a request will be made through the relevant contact on the contact list held by both organisations. Should this data request become a recurring request, consideration of its inclusion in the MoU will be undertaken in the annual MoU meeting.

Met Éireann recognises that observational data from a diverse range of external sources can complement and supplement existing Met Éireann observational networks. Through the framework of the WMO Integrated Global Observation System (WIGOS) Met Éireann is committed to developing partnerships with external data providers.

Met Éireann will work in partnership with the EPA (i) to identify EPA data sources to complement Met Éireann's existing networks, (ii) to ingest EPA data into Met Éireann systems, subject to data quality controls and (iii) to share data through the WIGOS framework and the WMO Information System (WIS) both nationally and internationally.

3.5 Research

The EPA Research Programme is structured around a ten-year high-level framework, EPA Research 2030. It is an engaged research programme, with a focus on delivering impactful research and evidence to support policy and decision making, enhancing the national environmental research capacity and supporting the EPA's assessment, knowledge and regulatory functions. Its thematic structure comprises four interconnected hubs spanning climate change, the natural environment, the environment and health, and the green and circular economy. The EPA Research Programme is agile, responsive and flexible, delivering targeted research actions such as annual research calls, fast-track to policy funding and our national and international partnerships.

The EPA is responsible for coordinating environmental research in Ireland and facilitates this through the National Environmental Research Coordination Group (NERCG). The main purpose of the NERCG is to provide a cross-sectoral, national forum for the strategic coordination of environmental research in Ireland. It comprises relevant Public Organisations, including research funding organisations, policy making actors and policy implementation actors. Met Éireann is a member of the NERCG.

The EPA Research Programme represents Ireland as a partner/funding organisation on a number of European research initiatives, including CASRI, PARC, PianoForte, JPI Climate, Biodiversa+ and Water4All, supporting access to these initiatives for Irish researchers, and hosts a National Contact Point for Horizon Europe Cluster 6.

Met Éireann engages in focussed meteorological and climatological research with a particular emphasis on the transfer from research into operations. Research priorities include the development of weather and climate services, short range NWP systems for Ireland, global climate modelling (under the Coupled Model Intercomparison Project, CMIP) and dynamical downscaling of regional climate.

Met Éireann plays a crucial role in advancing the scientific understanding of weather, climate, and environmental systems in Ireland. Met Éireann's in-house research spans a variety of critical areas, including climate modelling (research on regional climate models and the Atlantic Meridional Overturning Circulation – AMOC for example), climate services (coordinating the National Framework for Climate Services – NFCS – and supporting the development of Sectoral Adaptation Plans for example), weather forecasting models for storm impacts, radar optimisation for weather predictions, and the use of AI in climate and weather forecasting. Additionally, Met Éireann's Weather and Climate Research Programme supports national research capacity through competitive research funding calls, fellowships, and co-funding collaborations (including Research Ireland's Government of Ireland Postgraduate Scholarship and Pathway Programmes and EPA's Research Call Programme).

Met Éireann coordinates the Irish Global Climate Observing System (GCOS), the Irish Soil Moisture Observation Network (ISMON) and contributes to the national Integrated Carbon Observation System (ICOS) network.

Met Éireann is actively involved in several European and international initiatives to advance climate and weather research, including: EU's Destination Earth activity and EUMETSAT, EUMETNET and WMO programmes.

Both Parties agree to continue to cooperate on the development of research projects. Where relevant, opportunities for co-funding research projects will be explored in areas and topics of common and shared interests. Specific co-funding agreements will be drawn up on a project basis. Met Éireann is a member of the National Environmental Research Coordination Group, coordinated by the EPA.

Each organisation will seek to coordinate their support and funding of activities and will support each other's pre-award and post award processes, including research strategy consultation, research topics selection project evaluation process, participation on project steering groups where appropriate and reviewing final reports.

The EPA and Met Éireann will support research assessment processes in Ireland and internationally, particularly the work of the Intergovernmental Panel on Climate Change (IPCC) and will continue to support expert engagement with such processes.

3.6 Communications & Outreach

Each organisation will support each other in their communication activities, in particular around climate and research, and regularly update each other on planned activities and public engagement.

Each organisation will inform the other of education and outreach projects they are involved in that may be of mutual interest. Where appropriate both organisations may plan and implement joint projects.

4 Confidentiality

Each Party possesses valuable information, technical knowledge, experience and data of a confidential nature that it regards as assets of considerable value. Each Party may disclose such information to the other Party on the condition that the recipient of the information does not disclose it to any third party or make use of it in any manner except insofar as is necessary to achieve the purposes of this Agreement.

This MOU does not provide for the transfer of personal data. Where any processing of personal data arises in connection with this MOU, the Parties shall comply with all applicable data protection legislation, including the General Data Protection Regulation (EU) 2016/679 (GDPR), the Data Protection Act 2018.

Notwithstanding the expiry or early termination of this Memorandum of Understanding for any cause, the provisions of confidentiality shall survive such expiry or early termination.

5 Operational Liaison

An up-to-date list of the contact details and areas of responsibility of key personnel involved in the work covered by this Memorandum of Understanding shall be maintained and held by both organisations.

An MoU liaison group will be set up to include representatives from Met Éireann and EPA. Staff from each organisation will through their representatives on the liaison group make contributions and liaise with their relevant counterparts and maintain an effective exchange of information.

Items for implementation can be addressed by the person(s) responsible in each organisation on an informal basis between both Parties.

An annual MoU meeting between staff, including senior representatives of both organisations will be held where activities in the areas of shared responsibility and practical cooperative measures as set out in the MoU will be reviewed. This review shall encompass suggestions for improvements in these areas as systems and expertise develop. Minutes of these meetings will be agreed and held by both organisations.

The EPA and Met Éireann may agree to establish working groups or make other arrangements to examine matters of common interest. Such groups may examine matters of a technical, legal or administrative nature where co-operation may provide opportunities for more effective operations between both organisations. Such working groups as may be established from time to time will operate as may be necessary under agreed Terms of Reference and report to the MoU liaison group. Such agreements will be included as appendices to the Memorandum of Understanding.

6 Review

The Term of this Memorandum is five years from the date of signing and may be reviewed by agreement of both Parties from time to time during the term to ensure the greatest efficacy of its implementation. The memorandum shall in any event be reviewed on an annual basis by agreed representatives of both organisations.

7 Costs

An agreed financial contribution from the EPA to Met Éireann towards energy costs incurred for the National Radiation Monitoring Network support is in place: energy costs incurred by Met Éireann at sites due to increased demands by NRMN equipment will be monitored and recouped as appropriate by Met Éireann. These costs may be reviewed annually and any amendments to be jointly agreed by the relevant budget holder.

Each Party shall be responsible for any other costs incurred by it in connection with this Memorandum of Understanding.

Annex 1 - Technical Assessment in a Radiation Emergency

Technical Assessment

The EPA is responsible for making technical assessments of potential nuclear/radiological accidents that may impact Ireland. EPA employs specialised decision support systems that incorporate atmospheric dispersion models as their primary tools for emergency preparedness and predicting the radiological consequences on the Irish public and environment.

Numerical Weather Prediction Data

Met Éireann, Ireland's national Meteorological Service, is a member of a new European weather forecasting consortium called the United Weather Centers West (UWC-West) that provides an opportunity for national meteorological services from Denmark, Iceland, Netherlands and Ireland (DINI) to operate a common numerical weather prediction (NWP) model. The DINI NWP supercomputer, which is based in Iceland, enables the consortium to provide the best short-range weather forecasts for the geographical areas of interest. For Ireland, this means a region covering Ireland, the UK and the north Atlantic Ocean (roughly corresponding to Ireland's Maritime Area). The operational configuration consists of 1920 x 1620 grid points in the horizontal at 2.0 km resolution, with 90 levels in the vertical. A 60-hour forecast is produced every hour. The DINI model may be run with up to 30 members in its ensemble configuration. Thus, it increases the temporal and spatial resolution of the previous HARMONIE NWP model, and it runs more frequently. Met Éireann is also the official conduit for medium range NWP data from the European Centre for Medium Range Weather Forecasting (ECMWF). The ECMWF NWP data, which is produced by its Integrated Forecasting System, has a horizontal resolution of 9km covering most of the northern hemisphere across Europe, and is provided as a 10-day forecast every six hours. The NWP data available via DINI and ECMWF, as well as additional data supplied by Met Éireann, shall provide the meteorological basis for relevant EPA applications.

Atmospheric dispersion modelling is carried out by the EPA to predict the transport, dispersal and deposition of radioactive material after its release to the atmosphere. Atmospheric dispersion models available to the EPA, such as RIMPUFF and HYSPLIT, are driven by NWP data, which is usually provided in the World Meteorological Organization's standard GRIB2 format for transmission of gridded meteorological data.

To facilitate the operation of atmospheric dispersion modelling by the EPA, Met Éireann shall extract a subset of the full operational DINI NWP forecast after completion of each NWP model run, convert the data to the text format required for input to the EPA's models and arrange for the NWP data to be sent to the EPA's FTP server each day at pre-arranged intervals.

The ECMWF's NWP data (converted for use by HYSPLIT) shall be made available on the ECMWF's ATOS FTP server using the 'nuk2' account provided by Met Éireann to the EPA. Access to the ATOS FTP server shall be made possible using a public-private key on EPA staff laptops and one-time passwords. The EPA may request Met Éireann to obtain archive weather data or data from specific geographical areas via the ECMWF. This data shall also be made available on the ECMWF's ATOS FTP server for downloading by the EPA.

An alternative method for the transmission of NWP data via the Government's microwave communication network shall be used in parallel to the normal means of transmission via the internet. The microwave network is considered a secure means of data transmission if the internet is unavailable. The EPA shall be responsible for maintaining a Network Access Storage device for the storage of DINI NWP data received every day by Met Éireann. Consultation between Met Éireann, the EPA and third-party vendors may be required to resolve any unforeseen connection issues with the NAS Box.

The latest DINI NWP data shall be made available by Met Éireann. The EPA is responsible for managing the transfer and storage of the NWP data on its internal servers. Usage of the data by EPA will be strictly in pursuance of its stated objectives. The EPA undertakes not to release the data to any other party without the prior consent of Met Éireann.

Met Éireann will support the EPA in developmental work to incorporate the possible use of ensemble NWP data into nuclear emergency decision support systems.

HYSPLIT Dispersion Model

The EPA uses a local installation of the HYSPLIT dispersion model to predict the spatial and temporal evolution of a radioactive release to the atmosphere. The EPA is responsible for the use of its version of HYSPLIT and outputs produced. In parallel, Met Éireann has installed a version of the HYSPLIT model on its servers that has been set up to automatically produce outputs (for example: time or arrival) once a day. Met Éireann has also installed a version of HYSPLIT at the ECMWF, which can use the latest ECMWF global analyses/forecasts to track the movement of radioactive material in the atmosphere over the global scale. Met Éireann is responsible for maintaining the HYSPLIT model at ECMWF. It is possible for the EPA to use HYSPLIT installed at the ECMWF.

Following a nuclear accident abroad, the EPA's Technical Assessment Team will model the dispersion of radioactivity in the atmosphere, using meteorological data supplied by Met Éireann. As a contingency, Met Éireann has developed dispersion modelling capabilities to run the HYSPLIT model using the parameters recommended by the EPA, as a backup to the EPA if, for whatever reason, the EPA are unable to perform a simulation following a nuclear emergency. A protocol has been developed to describe the practical arrangements for providing atmospheric dispersion modelling support to the EPA in the event of a Nuclear Accident or Incident of Radiological Significance.

Both the EPA (since 2018) and Met Éireann (since 2022) have registered their atmospheric dispersion modelling capabilities on behalf of Ireland in the International Atomic Energy Agency's Response and Assistance Network (RANET). RANET provides a means of requesting or offering assistance to IAEA Member States in the event of a nuclear or radiological emergency.

Meteorological Advice

To perform its technical assessment function effectively, the EPA may require the assistance of an expert meteorologist from Met Éireann. Upon request, an assigned meteorologist will be dispatched by Met Éireann to join the EPA's technical assessment team (TAT) in the event of a radiation emergency and/or take part in EPA technical assessment exercises as appropriate (approximately once per year). The Head of the TAT will lead and coordinate the work of the team members. The role of the assigned meteorologist within the TAT shall be clearly documented at the earliest opportunity by Met Éireann's Forecast Division and the EPA's Emergency

Preparedness section. The EPA shall ensure that all appropriate Met Éireann staff, including assigned meteorologist, are kept up to date regarding the EPA's technical assessment capability and information that might be expected from them in the event of a radiation emergency. Following exercises, the role of the assigned meteorologist shall be reviewed and modified if necessary.

In the event of a radiation emergency, the TAT will operate by default at EPA offices in Clonskeagh Square, Dublin, unless remote working is advised. The EPA is responsible for ensuring that appropriate communications infrastructure (for example: internet, Wi-Fi, phone) is available at this location to enable full access to meteorological data by Met Éireann's assigned meteorologist. To support this access if the internet is unavailable, a microwave communication link between the EPA (Clonskeagh Square) and Met Éireann (Glasnevin) offices exists. and that relies on the respective dedicated microwave links to the National Emergency Coordination Centre (NECC) of both agencies. This link shall be tested approximately twice per year using Met Éireann staff (or dedicated) laptops. If EPA offices are not viable, the TAT will operate from the NECC in Agriculture House (Kildare Street, Dublin 2). At this location, each organisation shall be responsible for the provision of required communications infrastructure for its own staff.

Met Éireann shall also make available to the EPA products, interpretation and any other outputs from the World Meteorological Organization's Regional Specialized Meteorological Centre (RSMC) during exercises and in the event of an emergency. The Met Éireann assigned meteorologist shall assist the EPA in their interpretation.

Radar Rainfall Data

In assessing the consequences of a release of radioactive material to the atmosphere, precipitation measurements can help to identify and evaluate areas of enhanced contamination on the ground resulting from wet deposition. Radar rainfall images and data are used by the EPA for this purpose.

Met Éireann shall automatically make available high resolution radar data from its own rainfall radars on the island of Ireland, and also composite rainfall radar data files covering both Ireland and the UK, on a Met Éireann FTP server for download over the internet by the EPA. The files shall be in an agreed format (for example, BUFR). They shall be uploaded without unnecessary delays and remain available for download for a period of at least 48 hours. They shall also be transmitted to the EPA's NAS Box via the microwave communication network.

In order to facilitate visualisation of radar images at the EPA or NECC for use in matters associated with the National Plan, Met Éireann shall provide access to full resolution radar images through its website, www.met.ie and through www.metweb.ie. The latter website may be further configured by Met Éireann so that the EPA can avail of a large suite of observation and forecast products such as satellite images, wind speed and wind direction.

Annex 2 - National Radiation Monitoring Network (NRMN) Support

The equipment in operation at NRMN sites includes online MIRA gamma dose rate monitors that report live data to the EPA and EC websites, online monitors of alpha/beta and radon radioactivity in aerosols, plus offline rainwater and aerosol samplers that are changed manually and posted to the EPA's Radiation Monitoring Laboratory in Dublin for analysis of alpha/beta radioactivity and gamma spectrometry.

To assist the EPA in the operation of the NRMN, Met Éireann:

- hosts NRMN equipment at agreed locations (Table 1); and
- undertakes limited intervention at staffed sites in the event of faults occurring to this equipment.

In the case of aerosol samplers:

- Met Éireann changes air filters and sends them to the EPA Radiation Monitoring Laboratory on a weekly basis (or in the event of an emergency on request from the EPA); and
- Met Éireann will insert charcoal filters for the measurement of radioactive iodine into this equipment on request from the EPA and collect and return these filters to the EPA Radiation Monitoring Laboratory.

In the case of precipitation samplers:

- Met Éireann collects samples monthly. Samples are returned to the EPA at an agreed frequency; and
- In the event of an emergency, Met Éireann will return samples to the EPA Radiation Monitoring Laboratory for analysis with revised frequency depending on the emergency.

The EPA will provide Met Éireann site managers and other personnel as appropriate with all necessary detailed procedures and training for supporting the operation of this equipment. The EPA will ensure that there is an adequate supply of aerosol filters, precipitation bottles and pre-addressed envelopes for their return at each aerosol monitoring site.

Met Éireann and the EPA will keep each other informed of planned changes which may influence or impact monitoring activities or monitoring equipment at the NRMN sites. When new sites are being considered, both organisations shall interact with a view to optimising the use of their respective resources.

The EPA has responsibility for all required maintenance, repairs and upgrades.

Table 1: Met Éireann sites in the National Radiation Monitoring Network

Station Name	Site Address	Staffing	Equipment Installed
Ballyhaise	The Agricultural College, Ballyhaise, Co. Cavan	Unstaffed	Gamma (MIRA) Aerosol (offline) Precipitation
Belmullet	Belmullet, Ballina, Co Mayo	Business Hours	Gamma (MIRA) Aerosol (offline) Precipitation
Claremorris	Claremorris, Co. Mayo	Unstaffed	Gamma (MIRA)
Glasnevin	Met HQ, Glasnevin Hill, Dublin 9	24 hours	Aerosol (offline) Precipitation
Gurteen	Gurteen Agricultural College, Ballingarry, Roscrea, Co. Tipperary	Unstaffed	Gamma (MIRA) Aerosol (offline)* Precipitation*
Malin Head	Malin Head, Co. Donegal	One person Operation	Gamma (MIRA) Aerosol (online) Precipitation*
Mullingar	Met Éireann, Irishtown, Mullingar, Co Westmeath	Unstaffed	Gamma (MIRA)
Shannon Airport	Shannon Airport, Co. Clare	24 hours	Gamma (MIRA) Aerosol (offline) Precipitation
Valentia (Cahirciveen)	Valentia Observatory, Cahirciveen, Co. Kerry	Business Hours	Gamma (MIRA and SARA) Aerosol (offline) Precipitation

* Equipment might change in 2026 or 2027

Annex 3 - European Monitoring and Evaluation Programme (EMEP) Network Support

Equipment maintenance support is provided by Met Éireann Staff for the Eigenbrodt Rainfall Samplers.

In addition, the Met Éireann laboratory based in Glasnevin has provided essential analytical support to the Transboundary Air Quality Monitoring network since its start-up. Rainfall and filter samples are collected daily by instrumentation on sites (EPA EMEP sites plus Met Éireann's site at Valentia). EPA and Met Éireann personnel collect the samples on weekly basis and courier the samples to Met Éireann Glasnevin for analysis for a range of anions and cations. Analytical data is compiled and QA/QC checked by Met Éireann Lab staff. Results of analyses are submitted electronically by Met Éireann to EMEP.

First line troubleshooting support is provided by Met Éireann staff for air and precipitation samplers. All maintenance and replacement of EPA owned instrumentation is the responsibility of the EPA.

Met Éireann collects and analyses air and precipitation samples from Valentia Observatory to fulfil its own WMO GAW (Global Atmospheric Watch) obligations and is therefore not covered by this MoU

The data should be submitted by EPA contract partners.

Annex 4 - National Ecosystems Monitoring Network – Statement of Intent

Context

Under the National Emission Reduction Commitments Directive member states are required to monitor (Article 9) and report (Article 10.4) air pollution pressures and impacts on ecosystems that are representative of each country's freshwater, forest, natural and semi-natural habitats. Impacts include potential acidification and eutrophication of both freshwaters and terrestrial ecosystems (forests, semi-natural grasslands, heathlands, and bogs) from atmospheric deposition of air pollutants. In response to this requirement, Ireland developed the National Ecosystems Monitoring Network (NEMN).

This requirement was transposed into Irish law through the European Union (National Emission Ceilings) Regulations 2018 (S.I. No. 232/2018). Regulation 8 of S.I. No. 232/2018 states;

8(1)(a) The Minister shall ensure the monitoring of negative impacts of air pollution upon ecosystems based on a network of monitoring sites that is representative of Ireland's freshwater, natural and semi-natural habitats and forest ecosystem types, taking a cost-effective and risk-based approach.

8(1)(b) In fulfilling the requirements of sub-paragraph (b) the Minister shall ensure coordination with other monitoring programmes established pursuant to Union legislation including Directive 2008/50/EC, Directive 2000/C0/EC and Council Directive S2/43/EEC and, if appropriate, the LRTAP Convention and, where appropriate, make use of data collected under those programmes.

8(1)(c) The Minister may use the optional monitoring indicators listed in Schedule 5.

8(2) The Agency may use the methodologies laid down in the LRTAP Convention and its Manuals for the International Cooperative Programmes when collecting and reporting the information listed in Schedule 5.

The EPA has a coordination role on the oversight and implementation of the NEMN.

The overall objective of the NEMN is to gather robust intelligence on the long-term impacts of air pollution on sensitive habitats in Ireland, with a view to identifying trends in impacts and informing future policy measures to control and reduce impacts where needed. Details on the monitoring stations and data collected must be reported every four years to the European Commission through standard templates that are submitted to the European Environment Agency.

The network includes sites in freshwater habitats and across a range of terrestrial habitats including woodlands, raised bog, blanket bog, calcareous grasslands and Molinia meadows with a minimum of 15 sites selected for monitoring within each of these habitats, with selection based on the inclusion of sites across a gradient of nitrogen deposition. Most of these terrestrial sites are operated as 'Level 1' sites that will be visited approximately once every four years and will be subject to ecology surveys (i.e. floristic survey covering plants, lichens and moss) as well as soil and moss sampling (for offsite analysis by EPA). A smaller number of sites are designated as 'Level 2' sites which means that in addition to the Level 1 survey they have some permanent air monitoring equipment installed (e.g. ammonia diffusion tube samplers with analysis by the EPA and bulk deposition samplers for rainfall with analysis by both EPA and Met Éireann depending

on the parameter/detection limits). At present the network is in the development stage which means that new air monitoring and deposition sites continue to be added across the country.

There is ongoing engagement between EPA and Met Éireann on this topic and work will continue to finalise the practical arrangements between both parties in relation to the NEMN. Both parties intend to progress this bilaterally in relation to analytical support, laboratory intercalibration requirements and engagement in the NEMN Stakeholder Group.

Role of Met Éireann

Analytical support

Bulk deposition samples of rainfall will be collected at specific sites within the network. It is anticipated that collected samples will be sent for analysis every two weeks. Essential analytical support will be provided by Met Éireann for the analysis of these rainfall samples. Specific parameters to be analysed by Met Éireann and methods to be used shall be agreed between EPA (NEMN) and Met Éireann staff. Analysis of these samples should be carried out as soon as possible following delivery, subject to operational priorities and instrument availability and ensuring samples are appropriately stored. Sample collection and delivery to Met Éireann will be coordinated by the EPA. Results of bulk deposition analysis should be provided to the EPA in an excel spreadsheet. The frequency of provision is flexible, though quarterly may be appropriate, no less than annually. Update meetings should be held as required to ensure any issues/ queries are dealt with in a timely manner.

Laboratory intercalibration requirements

It is recommended that labs participating within National Emission Ceilings monitoring (of which NEMN is a part) take part in ICP Forests “Deposition and soil solution Working Ring Test” 14th Deposition and soil solution Working Ring Test 2026/2027 - ICP Forests (icp-forests.net). The Met Éireann and EPA, subject to working out the details and which parameters are covered by the ring test, will take part in any such relevant intercalibration tests, which can be coordinated by the EPA NEMN team.

Engagement in the NEMN Stakeholder Group

The EPA have established a NEMN stakeholder group. The group is expected to meet at least annually to collaborate and share data on impacts of air pollution on sensitive habitats and discuss how stakeholders can support and engage in the work of NEMN and how the NEMN can support the work of each of the bodies involved in its operation. Met Éireann will consider nominating a representative to this group.

Annex 5 - Hydrometric Monitoring Support

Table 2: Hydrometeorological parameters

Parameter	Definition	Temporal Scale	Spatial Scale	Unit
Areal Precipitation (P)	Total volume of atmospheric wet precipitation (rain, snow, hail etc.).	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Irish National Grid on a 1km resolution	millimetre s (mm)
Potential Evapotranspiration (PET)	The maximum quantity of water capable of being evaporated in a given climate from a continuous stretch of vegetation covering the whole ground and well supplied with water.	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Synoptic stations	millimetre s(mm))
Actual Evapotranspiration (ETa)	Actual evapotranspiration as calculated from the Met Éireann/Teagasc hybrid model.	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Synoptic stations	millimetre s (mm)

^M This field is mandatory.

¹ LTAA = Long Term Annual Average - based on annual values averaged over a period of at least 20 consecutive years. The time period used to calculate the LTAA should also be provided.

Ireland is also required to report stream flow, reservoir inflows and outflows and groundwater levels at specified monitoring points. Included in this data set are data from rain gauge stations as set out in Table 4.

Table 3: Hydrometeorological point measurements

Variable	Definition	Spatial Scale
Rain gauge stations	Only basic information on the characteristics of the rain gauge stations which are located within the reporting unit (e.g. latitude, longitude, period of available record etc.) is requested (precipitation measurements are not requested). It is assumed that these stations were used to calculate the Areal Precipitation requested in the above Water Balance Table	Rain gauge Station ^M RBD ^M RB Sub-units Administrative Region Country ^M

^M This field is mandatory.

The current requested information has been scaled down to each particular RBD and sub-unit. Additionally, the minimum proposed time step is monthly to allow distinguishing seasonal patterns and assessing dry periods within a hydrological year. There is the flexibility to report at different scales: River Basin District (RBD), sub-unit (SU), River Basin (RB), Administrative Region (ADR). The smallest available spatial scale is the default requirement for reporting. There is also flexibility regarding the temporal resolution for which the data can be reported, Monthly, Seasonal, Annual. Again, the lowest available temporal scale possible is required. Data is requested annually in arrears at the end of October.

While the EPA manages the procurement of hydrometric monitoring equipment and seeks annual budgets for their purchase and maintenance, there is a reliance on Local Authorities, such as Cork C Wicklow County Councils to oversee the installation, maintenance, and civil works associated with hydrometric stations.

As part of a 2 year pilot programme, Met Éireann is providing capital funding to Cork and Wicklow County Councils for civil works – Health C Safety (HCS) consultancy, design and construction, to ensure safe access and egress to the local authority hydrometric stations monitored by the EPA, including the upgrade of infrastructure to facilitate flood flow monitoring and real time data transmission and periodic maintenance by the local authority. By funding infrastructure improvements and ensuring data is effectively shared, Met Éireann can play a key role in directing resources and efforts toward the most critical areas, thereby enhancing the overall effectiveness of flood monitoring and forecasting systems.

The Intellectual Property Rights in all hydrometeorological Information provided under this MOU are retained by the EPA and Met Éireann.

With respect to hydrometeorological information which is publicly available, Met Éireann have permission to publish the data as long as the EPA is acknowledged as the data source. This data can be published on Met Éireann's website, app, and social media accounts (e.g. Twitter, Facebook, Instagram, etc.) or presented to external bodies. Where Met Éireann publish or present the EPA data it will be accompanied by the EPA's own disclaimer as quoted below

Whilst every effort is made to ensure the accuracy of the information on this website, it is not possible to guarantee that it is accurate in all cases. Information compiled by third parties is not necessarily correct and is provided as-is. The fact that it is included in this site does not mean that the Environmental Protection Agency (EPA) accepts or agrees with it. Electronic data may

also be modified or corrupted. Accordingly, whenever accuracy is important, it is recommended that you obtain a copy of the original documentation on which the information is based and verify its accuracy.”

EPA will not incur any liability whatsoever for any loss or damage however caused, or for any consequential loss, arising from delays or failures in supplying the hydrometeorological information.

Table 4: existing EPA gauges to be upgraded in Cork – 12 stations

Gauge ID	Name	Waterbody	Hydrometric Area	Classification
20005	Ballyhilty	Ilen	20	Strategic
21004	Inchiclogh	Mealagh	21	Strategic
18009	Riverview	Allow	18	Strategic
18048	Dromcummer	Blackwater Munster	18	Strategic
18125	Longfield S Bridge	Blackwater Munster	18	Strategic
20021	Shannonvale	Argideen	20	Strategic
18016	Duncannon	Blackwater Munster	18	Operational
18050	Duarrigle	Blackwater Munster	18	Strategic
21003	Ballylickey	Owvane	21	Strategic
21002	Coomhola	Coomhola	21	Strategic
21075	L Bofinna	Lough Bofinna	21	Strategic
19020	Ballyedmond	Owennacurra	19	Strategic

Table 5: existing EPA gauges to be upgraded in Wicklow – 5 stations

Gauge ID	Name	Waterbody	Hydrometric Area	Classification
10002	Rathdrum	Avonmore	10	Strategic
10028	Knocknamohill	Aughrim	10	Strategic
10039	Avonmore House	Avonmore	10	Operational
10044	White Bridge	Avoca	10	Operational
12037	Castleruddery	Slaney	12	Operational

Annex 6 - Data requirements for Land Use and Inventory Development

Table 6: Data requirements for Land Use and Inventory Development

Parameter	Definition	Scale
Daily minimum, maximum and mean temperature	Standard Met Éireann values	Synoptic stations
Daily Rainfall	Standard Met Éireann values	Synoptic stations