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ENVIRONMENT, MARINE AND FISHERIES GROUP

Regulation Policy Guidance Note on Consenting Discharges to Transitional and Coastal under the Water Order (NI) 1999

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Purpose:	To set out the operational policy requirements to enable discharges to transitional and coastal waters under the Water Order (NI)
Scope:	To define the approach to be applied when considering proposals for discharges to the marine environment. This document sets out the evidential test to demonstrate proposals will protect and improve water quality or do not have a detrimental impact on the environment.

Document Control

Document Version	Status	Summary	Approved
1	Initial Draft	Internal Consultation (June 2015)	[redacted] (11th June 2015)
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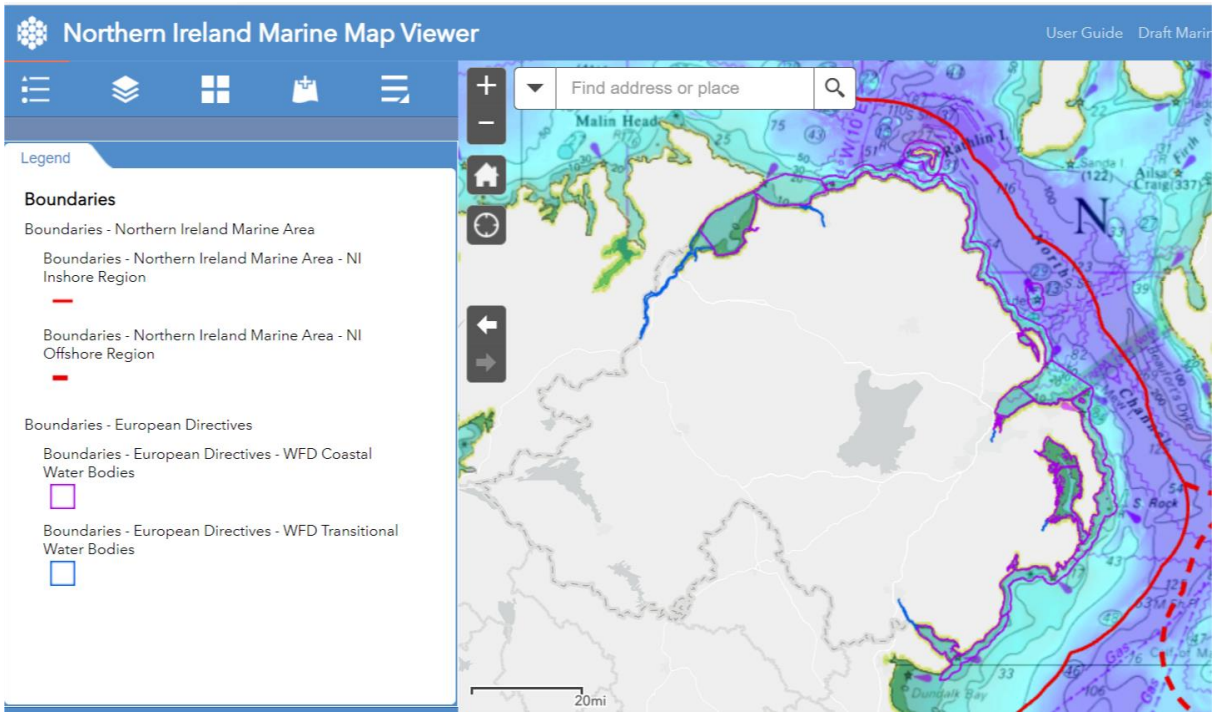
5	Review	Additional Section relating to Pilot Projects (August 2021)	[redacted] (28th August 2021)

1.0 Introduction

This operational policy is intended to achieve consistency of approach by the Environment, Marine and Fisheries Group (EMFG), Department of Agriculture, Environment and Rural Affairs (DAERA) in considering new or modified discharges of sewage and trade effluent to transitional and coastal waters. EMFG encompasses the work of the Northern Ireland Environment Agency (NIEA) and Marine and Fisheries Division, who work closely in setting objectives and standards to protect transitional and coastal waters. The policy refers to the design of complete, discrete, discharge systems and therefore includes necessary consideration of intermittent discharges, such as combined sewer overflows or emergency overflows.

EMFG may apply this policy to any marine discharge for which it has a duty to issue a discharge agreement. However, this policy will apply automatically to all discharges in excess of a population equivalent of 100. Particular local circumstances, such as sensitive receiving waters, may dictate a lower threshold.

The transitional and coastal waters in this policy comprise "relevant territorial waters" i.e. those covered by the Water (Northern Ireland) Order 1999 (up to and including 3 nautical miles from baseline). The baseline is the low water mark along the open coast and a series of bay closing lines across the mouth of the sea loughs including the water within the sea loughs. EMFG has the duty to control polluting discharges under the Water (Northern Ireland) Order 1999. It is likely that all of the discharges that this policy refers to fall within the 1 nautical mile from baseline limit shown on the Marine Map Viewer layers below (Marine Mapviewer | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk). EMFG also controls deposits to the marine environment under Part 4 of the Marine and Coastal Access Act, 2009 within the Northern Ireland Inshore Region.



Design criteria should generally be determined through numerical or other modelling of the proposed discharge and of the receiving environment. The design criteria may include the location of the discharge point, the engineering of the discharge points, the rate and volume of discharge, and the degree and nature of pre-treatment in general terms. Guidance on how to carry out modelling in Transitional and Coastal Waters is found in the NIEA policy document "Requirements in Relation to The Modelling of Discharges to Coastal and Transitional Waters".

Part II, section 4 of the Water (Northern Ireland) Order 1999 states that 'it shall be the duty of DAERA to promote the conservation of the water resources in Northern Ireland and promote the cleanliness of water in waterways and underground strata. DAERA shall, in exercising its functions have regard to the needs of industry and agriculture, the protection of fisheries, the protection of public health, the preservation of the amenity and conservation of flora and fauna or special features.'

In addition to the Water (Northern Ireland) Order 1999, both DAERA, and the Department for Infrastructure (DfI) have a duty to manage the water environment to ensure that the objectives of European Directives are met. EMFG is required to ensure that waters are managed with the aim of meeting 'Good Status' with a river basin planning cycle. Specific objectives for water bodies are laid out in the relevant river basin management plans.

When considering new discharges or modifications to existing discharges, EMFG will not permit the deterioration of water bodies outside an allowable mixing zone. All other policies formulated in respect of transitional and coastal marine waters will be subject to this condition.

2.0 General Considerations

In Northern Ireland, both Northern Ireland Water and some private industries use the marine environment for the disposal of effluents. Most coastal towns and many large commercial plants discharge their wastewater directly to the sea through a sea outfall. As the effluent discharges, it usually forms a buoyant plume which rises to the surface. Sea water becomes entrained and mixing occurs, diluting the plume as it rises to form a surface "boil". The degree to which this occurs varies considerably as the tidal cycle alters both the depth of the outfall below the surface and the ambient velocity of the water past the end of the outfall. The dilution which the plume receives as it rises from the point of discharge is known as the **initial dilution**.

Subsequent, or secondary, mixing with the receiving water occurs away from the boil and is generally slower, the rate depending on hydrographic conditions. If the initial effluent is buoyant then this secondary mixing will normally be restricted to the upper layers of the sea until the relative densities are such that mixing can take place throughout the water column. EMFG may identify an area of sea surface surrounding a surface boil and define it as a **mixing zone**. This zone comprises an early part of the secondary mixing process and is prescribed to ensure that consent conditions are complied with outside of the mixing zone. An individual mixing zone is only defined with respect to an established environmental quality standard (EQS) for a particular polluting substance. The mixing zone is the area of sea surface within which the EQS may be exceeded.

Hypersaline (brine) discharges will form a dense plume and this will need to be reflected in discharge and diffuser design.

The objective of defining mixing zones is to allow a rational and sound scientific basis for the derivation of marine discharge licence conditions which can be related to readily enforceable end of pipe effluent concentrations and design criteria.

2.1 Initial Dilution

EMFG will require new or modified***** sewage discharges with a population equivalent of greater than 100 to be designed and constructed to provide:

- minimum dilution of at least 100 for a screened discharge
- minimum initial dilution of 50 and preferably >100 times for 95 percent of the time for primary treated effluents;
- minimum initial dilution of 10 and preferably >50 times for 95 percent of the time for secondary treated effluent.

These criteria are based on the estimated requirements to reduce to acceptable levels both the visibility of slicks and the occurrence of smell nuisance.

* **Modified covers increases in flows, re-location of discharges but does not include base maintenance.**

- minimum initial dilution of 50 times (95 percentile) is also expected for significant new or modified industrial discharges, although these will be judged on a case by case basis.

A mean rate of flow of effluent will be used when deriving the estimates of initial dilution for chemical determinands. Dry weather flow will be used when deriving estimates of initial dilution for microbiological parameters.

These requirements will be applied uniformly in transitional and coastal waters, but EMFG recognises that these standards may be difficult to achieve for reasons of technical feasibility or disproportionate costs. In these instances, under the Water Framework Regulations, a case can be made for a less stringent objective or a longer time scale to meet the water quality objective, so long as there is no deterioration in the water body and the reasoning and process can be recorded in the river basin management plan. This approach is in line with the retained EU law reflecting Article 4 of the WFD[i].

Careful design of the type and position of the outfall diffuser can maximise the initial dilution that is achieved and hence minimise the environmental impact of the discharge. Modelling is a useful tool in optimising outfall design. The SEPA modelling guidance is useful in this regard. Particular checks should be made that the effluent plume reaches the sea surface after initial dilution for all possible combinations of effluent density and receiving water stratification. If it is found that the effluent cannot always be guaranteed to reach the surface then this extra complication, with all its implications for water quality, must be considered. In these

cases, appropriate standards may have to be met at the point that the plume is stopped by a density barrier after only limited initial dilution.

It must also be noted that the placement of diffusers, pipelines or any other deposits in the sea is subject to licensing under Part 4 of the Marine and Coastal Access Act, 2009. Marine and Fisheries Division is the licensing authority within the Northern Ireland inshore region.

2.2 Mixing Zones

The potential dilution, shape and orientation of any mixing zone under various hydrographic conditions cannot be usefully defined without hydrological surveying of the specific receiving water. These studies should include some temperature and salinity measurements to assess the likelihood of stratification. The identification of a suitable outfall location and derivation of appropriate discharge agreement conditions, based on design requirements, will require an assessment of the total dilution, subject to the conditions listed below.

The mixing zone should meet the following criteria where relevant:

2.2.1 It is expected that the mixing zone around the effluent surface boil would normally be set at a maximum distance of 100m in any direction (that the plume may travel) from the centre of the boil, or from the nearest individual diffuser boil where there is a multiport arrangement. The dilution this allows must be calculated for each site. As outlined above, there may be circumstances in which this cannot be achieved due to technical feasibility or disproportionate cost. In these instances a derogation can be applied for, so long as there is no deterioration within the water body (outside of the mixing zone) and the **reasoning and process can be recorded in the river basin management plan**

2.2.2 The concentration of dispersing effluent must be such that no established relevant UK chemical Environmental Quality Standard is breached outside of the mixing zone. This must take account of the individual standards which may be expressed as annual mean values, or percentile exceedance values, or maximum allowable concentrations. In addition, the Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015 must be observed.

2.2.3 Two or more mixing zones from different neighbouring outfalls must not merge or take up all the diluting capacity of any receiving water body. It is recommended that the edges of the mixing zones be at least 100m apart.

2.2.4 Normally no mixing zone would be expected to impinge on the MLWS shoreline, although EMFG recognises that this may be varied in narrow estuarine locations.

2.2.5 A mixing zone should generally not form a hydrological barrier in an estuary, sea lough or small bay to ensure that the passage of migratory fish is not impeded. It is expected that a mixing zone in such a situation should take up no more than a half of the narrowest dimension.

2.2.6 EMFG has a statutory obligation, under the Conservation (Natural Habitats etc). Regulations 1994, not to issue a consent or discharge agreement for any discharge which has been shown, by an appropriate assessment, to be likely to have an adverse effect on the designated conservation interests of a Special Area of Conservation (SAC, under the European Habitats Directive) or a Special Protection Area (SPA, under the European Wild Birds Directive). Where a mixing zone may impinge on any SAC or SPA, EMFG has a duty to ensure, before issuing a consent, that the integrity of the site will not be adversely affected. EMFG will ensure that no mixing zone will jeopardise the integrity of any designated sites, and will apply the same approach to other sites with statutory conservation designations (e.g. Areas of Special Scientific Interest, ASSIs).

2.2.7 The mixing zone should not give rise to any significant visible slicks or other aesthetic problems.

2.2.8 Where solids are present in the effluent, and where these solids are expected to accumulate on the sea bed, a similar approach to that used for the liquid dispersal will be utilised.

The sea bed sediment must meet standstill clauses for appropriate Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015 must be observed outside the mixing zone (i.e. the concentrations of that substance must not increase over time). Build up of other potentially toxic substances must also be avoided but no formally accepted quantitative standards currently exist.

Where adverse benthic effects can be demonstrated to arise only from non-persistent organic sources then the levels of acceptable change will be as described in 3.3.3 pp9-10 of the Comprehensive Studies Task Team Report, second edition (1997)[1]. The Infaunal Quality Index benthic community indicator, may be used where the organic load is expected to be significant.

EMFG are happy to advise on the use of this tool in specific circumstances.

3.0 Microbiological Considerations

In terms of microbiological quality, the main drivers are from retained EU law and comprise The Quality of Bathing Water Regulations (Northern Ireland) 2008 concerning the management of bathing water quality and The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017, in the context of shellfish water protected areas. This policy will be applied uniformly and even in circumstances where its implementation will not, in isolation, achieve the appropriate microbiological standards in receiving waters. The application of the policy in such circumstances will ensure that there will be no prejudice of eventual achievement of such standards when other related issues are ultimately resolved.

It is accepted that EMFG may agree in specific cases to a phased approach in implementing particular outfall design requirements. Any phasing arrangement will be included in the discharge agreement conditions.

This policy does not commit EMFG to any related microbiological monitoring activity, either of effluents or of receiving waters. Compliance with discharge agreement conditions, which result from the application of this policy will be audited in the normal way.

3.1 Identified Bathing Waters

There are currently 26 identified bathing waters in Northern Ireland, where bathing is explicitly authorised by the competent authorities or where bathing is not prohibited and is traditionally practised by a large number of bathers. .

Identified Bathing Waters

Ballycastle
Ballygally
Ballyholme
Ballyhornan
Ballywalter
Brown's Bay
Carnlough
Castlerock
Cloughey
Cranfield Bay
Crawfordsburn
Groomsport
Helen's Bay
Kilclief
Magilligan (Benone)
Magilligan (Downhill)
Millisle
Murlough

Newcastle
Portballintrae (Salmon Rock)
Portrush (Curran) East
Portrush (Mill)
Portrush (Whiterocks)
Portstewart
Tyrella
Waterfoot

3.1.1 Bathing Water Objectives

When considering new discharges or modifications to existing discharges to coastal waters, all discharges must be modelled to ensure that the 'good or excellent' standard of the Bathing Water Regulations can be met (depending on the current status of the bathing water) as defined in the Quality of Bathing Water Regulations, 2008. In addition, DAERA must take such realistic and proportionate measures to increase the number of bathing waters classified 'good' or 'excellent' and cannot allow deterioration in water quality. In order to demonstrate this, new or modified discharges should be modelled to allow an assessment to be made of what measures would be required to achieve the 'good' or 'excellent' standard along the length of the bathing water.

3.1.2 Bathing Water Standards

The microbiological standards can be found within the Bathing Water Regulation. Assessment for Bathing Waters Directive classification purposes is based on the last four years monitoring results. The microbiological standards required to achieve sufficient, good and excellent are laid out in the table below:

Table 1. Microbiological Standards for Coastal Bathing Waters

Parameter	Excellent	Good	Sufficient
Intestinal Enterococci	100/100ml as a 95%ile	200/100 ml as a 95%ile	185/100 ml as a 90%ile
Escherichia coli	250/100ml as a 95%ile	500/100 ml as a 95%ile	500/100 ml as a 90%ile

3.2 Designated Shellfish Waters

Shellfish waters are protected as a specific protected area for 'economically significant aquatic species' under the The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017. This aims to protect, and where necessary, improve the quality of shellfish waters in order to support shellfish life and growth and thus contribute to the high quality of shellfish products for human consumption.

There are 10 designated shellfish waters in Northern Ireland. These are listed below:
Lough Foyle - Longfield Bank

Lough Foyle - Balls Point
Larne Lough
Belfast Lough
Strangford Lough - Reagh Bay
Strangford Lough - Marlfield Bay
Strangford Lough - Skate Rock
Killough Harbour
Dundrum Bay
Carlingford Lough

All existing shellfish waters are now known as 'shellfish water protected areas'..

3.2.1 Shellfish Water Objectives

Under The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017 , all waters must be managed with the aim of meeting 'Good Status' within the river basin planning cycle. Objectives for individual water bodies are set out in river basin plans. In addition to meeting 'Good Status', shellfish water protected areas must be managed to meet at least Class B of the Food Hygiene Regulations, while making progress towards Class A. This is broadly equivalent to the guideline standard laid out in the Shellfish Waters Directive, and the Water Framework Directive (Priority Substances and (Classification) (Amendment) 2015 Regulations.

3.2.2 Shellfish Water Standards

The Water Framework Directive (Priority Substances and (Classification) (Amendment) 2015 Regulations introduced a guideline standard for *E. coli* in the shellfish flesh of ≤230 in the shellfish flesh and intervalvular liquid in 75% or less of samples. This is to afford the same level of protection as the original Shellfish Waters Directive, which had a guideline standard of ≤300 faecal coliforms in shellfish flesh and intervalvular liquid in 75% or less of samples.

No clear relationship has been established between faecal coliform levels in shellfish tissue and the microbiological quality of the surrounding waters, excepting those waters which are significantly polluted. However, an operational water quality standard that has been used for water quality planning in Northern Ireland is that shellfish waters should meet a target no less stringent than 300 faecal coliforms/100mls in 75% or less of samples. To align with current legislative requirements under the Water Framework Directive (Priority Substances and (Classification) (Amendment) 2015 Regulations and the EU Hygiene Regulations, this operational standard has also been adjusted to equivalent standard of ≤230 *E. coli* in 100mls water in 75% or less of samples. Using this standard in conjunction with modelling has been effective in ensuring that waters meet at least Class B under the Food Hygiene Regulations. This standard should be met throughout the shellfish harvesting area, as defined by DAERA licensed areas.

Parameter	**Guideline (flesh)**	**Sufficient (Water)**
Escherichia coli	**≤230 in 100g flesh and intervalvular liquid in 75% or**	**≤230 in 100mls water in 75% or less of samples**

	less of samples	

4.0 Intermittent Discharges

Details around the regulation of intermittent discharges are outlined in the Urban Waste Water Treatment Directive Guidance Notes[ii] consenting discharges. However, the main aspects of consenting intermittent discharges to transitional and coastal waters are outlined below.

EMFG operates on the basis of a presumption against combined sewer overflows or emergency overflows impinging on bathing or shellfish waters. Dischargers will be required to demonstrate that alternative discharge locations have been considered before pursuing a direct discharge.

4.1 Emergency Overflows

Where a discharge is unavoidable, EMFG requires that applicant to provide storage to minimise any risk of discharge. The NIEA "Summary Guidance document in relation to Intermittent Discharges" states that all EOs shall be monitored through the use of telemetry, provide 2hrs @ 3DWF (or FFT) storage and shall be screened. Screening requirements will be 6mm or less in two dimensions.

4.2 Combined Sewer Overflows

Where unavoidable, EMFG requires a minimum design criteria utilising a 10 to 15 year rainfall record for the spill frequency assessment to ensure that the spill frequency does not exceed:

3 spills per bathing season for discharges within 2-3km***** of bathing water
10 spills per annum for discharges within 2-3km***** of shellfish water

unless the applicant demonstrates compliance with relevant microbiological standards by numerical modelling. Multiple intermittent discharges to the same bathing or shellfish waters must be assessed on aggregate.

The spill frequency requirement may be reviewed where it can be demonstrated that the discharges pose no risk to the bathing or shellfish water.

(*All discharges within 2km will be considered as well as those significant discharges within 3km).

5.0 Pilot Catchment Projects

In recent years, NI Water has been working with partners on new approaches to managing water quality on a catchment basis. This work uses ecosystem modelling in combination with the traditional modelling of outfalls and drainage area plans. Current projects include EU Interreg SWELL project (Shared Water Enhancement and Loughs legacy) in the Foyle and Carlingford catchments, the Living with Water

Programme in Belfast and the Dundrum Bay catchment project. DAERA/NIEA and AFBI are partners within these projects, where the overall objectives include maximising water quality improvements while ensuring best value for money in public spending. Nature-based solutions including both sustainable attenuation techniques and sustainable treatment technologies are also being incorporated where possible, to deal with water quantity issues, biodiversity benefits and climate change mitigation.

This is different to the traditional approach to consenting, but has already been shown to deliver promising results. . In advancing this approach, DAERA/NIEA is committed to working with NI Water and their partners in pilot projects that explore alternative approaches through catchment modelling. The pilots are a mechanism where DAERA/NIEA can examine disproportionate costs and technical feasibility issues more closely.

Where the requirement for upgrade under the traditional consenting mechanisms results in a solution which would be disproportionately expensive or technically unfeasible, NIEA will consider options presented through the pilot projects, or interim upgrades which must result in an improvement to the WFD status but may not achieve the full WFD objective. All alternative or interim solutions must be modelled to demonstrate potential impacts on the receiving water.

Under this arrangement, an alternative option or interim solution must not cause detriment to any associated asset within the sewerage network and receiving WWTW.

6.0 References

[i] Water Framework Directive 2000/60/EC – http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060

[ii] DOE 1995 The Urban Waste Water Treatment Regulations (Northern Ireland), Working Document for Dischargers and Regulator, A Guidance Note Issued by The DOE (Northern Ireland)