



Objection

Objector:	Mr David Hugh-Jones
Organisation Name:	Atlantic Shellfish Ltd
Objector Address:	Rossmore, Carrigtwohill, Cork, Co. Cork.
Objection Title:	Objection #OS006023 - 3rd party objection for Reg No:[P1103-01]
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Application

Applicant:	Dairygold Co-Operative Society Ltd and TINE Ireland Ltd
Reg. No.:	P1103-01

See below for Objection details.

Attachments are displayed on the following page(s).

**Objection to the Proposed Determination of the EPA
of 19th February 2020 in the case of Dairygold/TINE
Ref. No. P1103-01 by Atlantic Shellfish Ltd.**

(David Hugh-Jones, M.A., Dip. Agric. (Cantab.), MMBA, FRGS)

with reference to the

Application for an Industrial Emissions Licence

by

Dairygold Co-Operative Society Ltd. and TINE Ireland Ltd.

of Mogeely, Co. Cork P25Y996

Relevant Inspector: Orla Harrington

**Environmental Licensing Programme
Office of Environmental Sustainability**

EPA Licence Application Reference No: P1103-01

Submitted on 18th March 2020

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Executive Summary

We have been working in Cork Harbour since awarded the Oyster Fishery (Cork Harbour) Order in 1970. We have pioneered the breeding of native oysters in ponds; have bred resistance into them to overcome Bonamia disease and co-authored many scientific papers and participated and been the lead SME in EU CRAFT Projects involving UCC. We are the only people in the world able to breed the Irish native oyster (an endangered species covered by a Species Action Plan in the UK). For many years between 1985-1995, we accounted for between 25-30% of the value of Irish oyster production.

We believe that we have expertise in this field unmatched in Ireland and we expect the Agency to take this into account and not set our concerns aside. In particular, we have raised the possibility of potentially very serious danger to human health through the unique, regular occurrence of toxic algal blooms of the most serious kind – one of the most toxic natural nerve poisons known to man, Paralytic Shellfish Poisoning or PSP. Our beds were closed in 2017 and very regularly before as regards mussels, which, of course are free to all to harvest and eat around the Harbour. The addition of more nutrients into stagnant water, may well cause the blooms to be more toxic and also cause the fishery for oysters to be closed in the summer month, with further danger to the public and economic effects on the oyster fishery.

We look at the 3 EU Directives, which have been implemented in Ireland to protect Habitats, Environmental Impact Studies and Shellfish Waters and assess the protection that should be afforded to the environment of the North Channel and Lower Harbour, also covered by Oyster Fishery Order, in perpetuity. In particular we ask if the test that claims made by the Developer can be substantiated as being complete, precise and definitive findings and

conclusions, capable of removing all reasonable scientific doubt as to the effects of the works proposed on the Harbour waters.

We also show that the 30 year-old discharge at Rathcoursey has already passed its useful life, as it can no longer meet its long-standing discharge permission from the Department of the Marine in May 1992 and can therefore not afford to have a further very substantial mass load and volume added – and into water that is already classified as Potentially Eutrophic. We fear that any extra load that is put through at Rathcoursey will have to be compensated for by allowing more to overflow in the town, where the storage at the pumping stations is so inadequate that Mott MacDonald, Consulting Engineers, found that, if Midleton was to comply with its discharge licence, it would require the extra storage capacity of a 5m high tank covering 5 football pitches.

Of over-riding concern to us is that the pattern of water movements as shown by 4 papers on Cork Harbour coming from the Hydrodynamic Section in NUI Galway and using the concept of flushing and residence times, shows that the water of the North Channel has a residence time of 60-70 days, East Ferry 50 days and Rostellan 48 days. Thus there is no real water exchange to dilute waste discharged at Rathcoursey. We would have hoped that the Agency would understand the relevance of this work, but it appears to have been dismissed without comment.

The source of water exchange data put forward by Irish Hydrodata is searched for in the literature, and our own experience from the formation of natural oyster beds in the past indicates an exchange of no more than 5% per tide, whereas the revised new figure of Irish Hydrodata is 35% (down from ~80% in the first EIS and NIS). The Agency dismisses, not only our knowledge of the literature, but also drogue trials carried out over a month, which produced good evidence of an anti-clockwise, westwards drift of water in the North Channel, which would actually bring any discharge made at Rathcoursey over the oyster beds rather than down to the Main Harbour, and agree well with the NUIG hydrodynamic work.

Central to this is the current data held by Irish Hydrodata from 1993 which points forcefully to this anti-clockwise drift being the case. In a metering in January this year at the same place and depth we find that there is indeed a movement of water of substantial amount in an anti-clockwise direction. We suggest that Irish Hydrodata

This direct evidence is simply dismissed by the Inspector and we analyse her replies and many concerns of ours which are left unanswered. We cannot understand how the Agency can have come to the Proposed Determination that it has and request that our concern, that many of the adverse consequences of this additional daily discharge of up to 4,000m³, not far different from the current volume generated by 16,000 people in Midleton have not been resolved by the removal of all reasonable scientific doubt with complete, precise and definitive findings and conclusions.

We thus request the Oral Hearing that is our right under the various Directives and hope that we may change the Agency's mind. Ireland will not have an oyster industry and the "canaries" for the general public of the state of our waters, if we cannot rely on the EPA.

Our objections to the EPA are made in red after the relevant passages.

1. Objection of Atlantic Shellfish Ltd.

Atlantic Shellfish Ltd. objects to the inadequacy of the EPA Inspector's four reports in this case both in the decisions that she came to and in the long list of unanswered pots that we made. We also object to the Agency's decision to grant a Proposed Determination/Decision to Dairygold/TINE to discharge their waste water at Rathcoursey Point in the North Channel of Cork Harbour, within the overall WWDA licence issued to Cork County Council in 2011, later transferred to Irish Water, and requests the EPA to allow an Oral Hearing of their objections.

This request for an Oral Hearing is being made in the name of Atlantic Shellfish Ltd. of Rossmore, Carrigtwohill, Co. Cork of which David Hugh-Jones is Director. All his six submissions were made on behalf of the Company and on behalf of the Company's ownership of the two Oyster Fishery (Cork Harbour) Orders of 1963 and 1970, which give the Company the rights to farm oysters, in perpetuity, in the Lower Harbour of Cork and in the Great Island North Channel and which were designated as EU Shellfish Waters in 2009.

We shall refer to these six earlier submissions extensively in this request for an Oral Hearing and reserve the right to bring up facts and arguments made in them, which are too numerous for all to be included, or necessarily even listed, in this synopsis of our major objections.

Where we challenge to validity of decisions made, we have put them in red after the relevant text. It is disappointing how little the Inspector has provided any response to individual sections, such as, say, the drifting of a dead body from the pier in the North Channel to the far west end of the North Channel against the supposedly outflowing tide, and then still support the story that all flushes away nicely from the Rathcoursey outfall.

Rather than list every unanswered section, that we have considered to be so relevant as to be included, and to make this objection even more unwieldy, we trust we can reserve the right to raise them at the Hearing and, if necessary, the ensuing Judicial Review.

2. The involvement of Irish Water in this case

We learn from the Inspector's first report of 12 December 2019 in Issue 1 on p.7 that:

*"These discharges are limited under waste water discharge licence (WWDL) register no D0056-01, held by Irish Water. Irish Water, under Section 99E of the EPA Act, as amended, gave its consent for this discharge, specifying ELVs and certain other conditions and restricted periods of emission. Where a discharge is to sewer, it can be taken that, as the waste water discharge has been subject to authorisation by the Agency, the relevant environmental quality standards have been met through the ELVs and conditions associated with that authorisation. In addition, **the WWDL has regard to the water quality standards and objectives for the receiving water and protected areas (including shellfish). It is the responsibility of Irish Water to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL***

on p.21:

“It is Irish Water’s responsibility to ensure that it meets the limits and satisfies the conditions set in their wastewater discharge licence or certificate”.

This is repeated in the Inspector’s second additional report of the same date, but by the third report of 17 December 2019 a further sentence is added:

“It is Irish Water’s responsibility to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL”

This too immediately rings alarm bells as M J O’Sullivan mentions in his report of the D/T WWTP, when large quantities of clean water can disguise a poorer quality discharge. To have the two discharges mixing in the final pipeline and foreshore tank might enable full use to be made of the fact that there is no limit set by the Agency on the combined discharge.

The implications of the heavy involvement of Irish Water (IW) in this discharge, especially since the reversion of the Dairygold/TINE (D/T) proposal to return to the original plan to share the final length of IW pipeline to the foreshore holding tank, prompted the Agency to write to IW on 24 December 2019, including the following:

I would ask you to consider the submissions received by the Agency after 13 December 2019.

In particular, please review any submissions relating to the study carried out by Irish Hydrodata Limited on behalf of Irish Water, entitled ‘Rathcoursey Outfall Investigation of the Impact of Treated Wastewater Discharges arising from the Dairygold Mogeely Plant to Cork Harbour’.

Please consider all concerns expressed by the relevant submitters relating to this report and confirm to the EPA whether or not the issues raised will alter your assessment and the consent granted to the proposed discharge to sewer under Section 99E of the EPA Act, as amended.

You are requested to forward your response within 1 month of the date of this letter.

The submissions lodged by ourselves (amongst others) after 13 December 2019, to which the EPA referred Irish Water (IW) were:

1. Fourth Submission (S005903) of 18.12.19 with evidence as to water movements from the proposed outfall at Rathcoursey Point made over two spring/neap tidal cycles in October/ November 2019.

2. Atlantic Shellfish Ltd. observations (S005963) of 31.01.20 on:

(1) Earlier drogue study evidence as to water movements from the proposed outfall at Rathcoursey Point by M.C. O’Sullivan in 1972 & 1976

(2) New material placed in the public domain by the EPA & DHPLG

Together with an analysis of further current meter measurements made over a full spring/neap tidal cycle of 14 days in January 2020.

3. Atlantic Shellfish Ltd. views (S005964) 31.01.20 on the comments/observations of Dairygold TINE Ltd. on the content of the last two Submissions to the EPA made by David Hugh-Jones and Mark Bentley of JBA Consulting.

These 3 submissions thus covered mainly our observations made of the actual water movements with a drogue and current meter lent by BIM.

IW replied on 28 January 2020,

“Further to the review of relevant submissions, I can confirm Irish Water’s consent granted under Section 99E of the EPA Act, as amended shall remain unchanged”.

By the Inspector’s fourth report of 13 February 2020, she refers to the Agency’s involvement of IW into the D/T application and now gives the Agency’s Response as:

“The emission associated with the Dairygold/TINE application is for a discharge to sewer and there is no direct emission to water from the installation. The control of the combined emissions at the Rathcoursey outfall does not fall within the remit of this application. For IED licence applications with discharges to sewer the Agency must obtain the consent of the sanitary authority in which the sewer is vested or by which the sewer is controlled, in accordance with Section 99E of the EPA Act, as amended. This consent was received from Irish Water. In accordance with the Waste Water Discharge (Authorisation) Regulations, 2007 as amended, the final combined effluent discharge at Rathcoursey is regulated by a WWDL (Ref. No. D0056-01) granted by the EPA to Irish Water for the Middleton agglomeration. The above response from Irish Water indicates they remain satisfied that the consent granted under S99E may remain unchanged.

Where a discharge is to sewer, it can be taken that, as the waste water discharge has been subject to authorisation by the Agency, the relevant environmental quality standards have been met through the emission limit values (ELVs) and conditions associated with that authorisation. It is Irish Water’s responsibility to ensure that it meets the limits and satisfies the conditions set in their waste water discharge licence. Compliance is subject to enforcement by the Office of Environmental Enforcement”.

We need to think this through very clearly.

1. *“there is no direct emission to water from the installation”.*

As far as we understand it, the reason for yet another change of plan, firstly from seeking 5 different holding tank options to comply with the 3hr discharge period, using Mott MacDonald as consulting engineers – which was then given up due to a time constraint only, not on environmental grounds – see below, and now because access to the D/T pipeline was refused by 6 householders that also own the road – again not on environmental considerations, but expediency. Thus we now have, not only the sharing of the same pipe, but also the foreshore tank, which is going to limit its use to hold the town discharge for the required 3hr ebb tide discharge, due to the lack of capacity in the foreshore tank. This is also dealt with later.

2. *“The control of the combined emissions at the Rathcoursey outfall does not fall within the remit of this application.”*

The Agency are now washing their hands of this discharge and allowing both of the above changes, made on purely economic grounds, rather than environmental, altering also the stand they took in their letter of 21 January 2019:

“I am to advise; the High Court and Court of Appeal have both held that a person/company cannot carry on licensable activities under a licence issued to another.”

It is understandable to take in the licensed discharge of a major industry and employer in the town of Midleton such as Irish Distillers Ltd. (IDL), that was there long before any discharge licence was required. It is a different matter to allow huge new factories, not only 10km distant from the town, but in another waterbody catchment altogether, to add to an acknowledged over-loaded town waste system, that already cannot comply with its Department of Marine requirement to discharge only on the 3hr discharge window at the top of the ebb tide – a restriction which has been observed since 1992 (28 years) and reconfirmed to the Agency’s local Inspector as recently as 2012.

However, you will see below that the EPA also have a prior commitment to the well-being of waters that require protection by the Shellfish Waters Directive (SWD) through the requirement since 2009 of the Agency taking on the responsibility of the enforcement of the Pollution Reduction Programmes for our 4 no. Designated Shellfish Waters, which follow from designation. These are within a few km of this discharge, whose water washes directly over them and undoubtedly causes a deterioration in its quality, both environmental, economic and of danger to human health. This is explained below under consideration of the SWD and PRPs in the next section.

3. *“The above response from Irish Water indicates they remain satisfied that the consent granted under S99E may remain unchanged.”*

As IW took on this proposed discharge and then spent a lot of money on consultant’s fees, it is no surprise that they would not change their minds. We refer to some of the reports attached to our first submission – nos. 12, 14 & 15.

4. *It is Irish Water’s responsibility to ensure that it meets the limits and satisfies the conditions set in their waste water discharge licence.*

It was the however, the Agency’s responsibility for not placing any limitation on the mass loading or volume of the discharge and for not reviewing the licence originally made out to Cork County Council (CCC) after 6 years as stipulated in the Regulations and we are glad of the Inspector’s concern in the closing paragraph of her report:

*“The WWDA Licence does not specify a limitation on the mass loading or volume of the discharge; however, **due to the substantial increase in the mass load of nutrients emitted to this water body**, it indicates that a review of WWDL Ref. No. D0056-01 may be required under Regulation 14 of the Waste Water Discharge (Authorisation) Regulation 2007”.*

We also have the lack of clarity in the enforcement actions of the EPA in relation to the number of hours that the ebb tide discharge may be made and this is dealt with in detail in s. 5 below. You will know that we made 16 submissions to the Agency over what we felt were shortcomings in the plans for the new WWTP in Midleton. You will also know that the

Agency put Middleton WWTP top of its National Priority Enforcement List of 7 failing WWTPs in the country seven years ago. It would be a pity if our views were not taken in this case also and people die. Should this come to pass - and we advise how this might happen in s.11 below, we shall refer to this letter.

It is hardly in the expertise of IW to know about PSP and shellfish and yet the Inspector adds to her Agency Response after no. 4 above,

“It is Irish Water’s responsibility to ensure that it meets the limits and satisfies the conditions set in their waste water discharge licence. Compliance is subject to enforcement by the Office of Environmental Enforcement”.

It is still, however, the responsibility of the Agency to determine how to ensure that the SWD’s purpose is ensured This is given in its first Article:

This Directive concerns the quality of shellfish waters and applies to those coastal and brackish waters designated by the Member States as needing protection or improvement in order to support shellfish (bivalve and gasteropod molluscs) life and growth and thus to contribute to the high quality of shellfish products directly edible by man.

and covered in first two iterations of the preamble:

Whereas the protection and improvement of the environment necessitate concrete measures to protect waters, including shellfish waters, against pollution;

Whereas it is necessary to safeguard certain shellfish populations from various harmful consequences, resulting from the discharge of pollutant substances into the sea;

If, for no other reason, we are applying now for an Oral Hearing of this case to sort out the Agency’s priority here. Is it to the PRPs of the 4 designated Shellfish Waters under their protection since designation in 2009, eleven years ago, that the Agency owes its expertise and allegiance, or can it now put this responsibility in the hands of a third party some years later, Irish Water, in this case, arguing all will be well, “if carried out in accordance with this recommended determination”. If it isn’t, and there is a disaster, will it be the fault of IW or D/T – or the Agency responsible for the safety of the Shellfish Water?

3. The law.

It would appear that we have at least 3 layers of protection provided by specific EU Directives that have been transcribed into Irish Law:

- (1) The Habitats Directive
- (2) The EIA Directive
- (3) Shellfish Waters Directive and the Pollution Reduction Plans required.

The proposed Dairygold/TINE discharge will be made into waters that immediately bring into play the protection of all three Directives.

3.1. Appropriate Assessment under the Habitat's Directive.

The EPA required an Appropriate Assessment in respect of this Dairygold Licence request, by their letter of 28 March 2019.

Great Island Channel SAC covers the whole of the North Channel. Although the main land use is stated as being for the production of oysters, the Atlantic salt meadows are included in the qualifying interests for the SAC:

p.1 Introduction:

While ***the main land use within the site is aquaculture (Oyster farming)***, the greatest threats to its conservation significance comes from road works, infilling, sewage outflows and possible marina developments.

The following coastal habitat is included in the qualifying interests for the SAC (* denotes a priority habitat):

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)

If oyster-farming is the chief user of the SAC area and can only survive itself by championing the very special environment that is found, including very high water retention, and reliant on solely sunshine and good quality water (no feeds, no fertilisers – a huge cash crop and very labour intensive) then it is madness to throw this away, because a large factory in another catchment cannot use anaerobic digestion, at least, to deal with its waste problem, rather than jeopardize the safety of the shellfish to consumers in the summer months.

The Rathcoursey discharge is said to be 10-15 metres south of the southern boundary of the SAC, but that clearly is of very little consequence, as when the tide turns, the water in East Ferry floods back into the North Channel (72%) and Owenacurra Estuary (28%) at speeds of up to 3 knots (Admiralty Chart).

The importance of the Habitats Directive is given in:

3.1.1 Preamble on Appropriate Assessment (10th):

Whereas an appropriate assessment must be made of any plan or programme likely to have a significant effect on the conservation objectives of a site which has been designated or is designated in future;

3.1.2 Article 6

*Article 6(3). Any plan or project not directly connected with or necessary to the management of the site but **likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.** In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project **only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.***

3.1.3 Judgements.

There have been many judgements made on the standard to which a Developer must produce his appropriate assessment. As regards Irish cases we can quote these similar judgements.

An important ruling on the recent proposed €500m liquefied natural gas terminal on the River Shannon was made in the High Court on 15th February 2019 on an Appropriate Assessment, because it was held that “*new scientific information leading to the site being declared a ‘critical area’ for the bottle nosed dolphin*”, had been put forward.

The Irish High Court Judge cited various ECJ (Court of Justice of the EU) rulings in s.35, “*The CJEU has considered what is required by an "appropriate assessment" in a number of judgments. In Mechanical Cockle Fishing case (Case C-127/02 Waddenzee), the CJEU stated that an "appropriate assessment" implies that all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field. In Case C 404/09 Commission v. Spain, the CJEU held that **an assessment cannot be regarded as "appropriate" if it contains gaps and lacks complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the site concerned.** This requirement has been restated in more recent judgments, including Case C 258/11 Sweetman, [44] and Case C 521/12 Briels*”.

In the Sweetman Case C-258/11, quoted here, the judgement was much the same:

*“44. So far as concerns the assessment carried out under Article 6(3) of the Habitats Directive, it should be pointed out that it cannot have lacunae **and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned.**”*

The Appropriate Assessment which has to be carried out by a developer after the first stage (screening) in the second stage, is the detailed analysis in the Natura Impact Statement. If the NIS cannot rule out adverse impacts on species protected in the SAC and SPA sites and also the quality of the Designated Shellfish Waters that are affected (see s. 3.3 below), to these

rigorous standards demanded by the Habitats Directive, the analysis should proceed to stage 3, the assessment of alternative solutions. If then no suitable alternatives exist, and only then, can stage 4 consider whether there are “imperative reasons of overriding public interest” for allowing a plan or projects to adversely affect a Natura 2000 site.

An Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC was given by the Commission in 2001 (and brought further up to date in 2012)

https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

3.1.4 Third iteration of the preamble

*“Whereas, the main aim of this Directive being **to promote the maintenance of biodiversity**, taking account of **economic**, social, cultural and regional requirements, this Directive makes a contribution to the general objective of sustainable development; whereas the maintenance of such biodiversity may in certain cases require the maintenance, **or indeed the encouragement, of human activities**”*

*Article 2.3 Measures taken pursuant to this Directive shall take account of **economic, social and cultural requirements and regional and local characteristics**.*

Based on these iterations of the Habitats Directive, we can see that both the biological and social aspects of the Directive are called into play. If the regular summer Paralytic Shellfish Poisoning blooms are augmented by the addition of more nutrients into this protected area, completely disrupting human activities requiring the highest purity of water and the rarest of regional water regimes that can maintain and retain pelagic oyster larvae to form oyster beds.

3.1.4.1 Promotion of biodiversity

Thus our work in providing a breeding-pond system for breeding native flat oysters (*Ostrea edulis*), which in fact in the UK are classified as an endangered species, with a Native Oyster Species Action Plan (NOSAP) under the Rio Convention, can, in any event, be taken as promoting the main aim of the Directive, which is the maintenance of biodiversity. The situation of the native oyster is in such a parlous state at present that the historic 10,000 tons per annum production in France, is now down to about 300 tons per annum, which is only three times what we used to be able to produce in the North Channel – and which we can do again, having bred an oyster that is resistant to Bonamia disease, which has decimated the native oyster all over Europe.

3.1.4.2 Encouragement of human activities and economic requirements and local characteristics.

The thesis of our argument in this objection to the Agency is that more nutrients discharged into stagnant water will cause blooms of the most toxic algae to reach dangerous levels which will totally disrupt the economics of our work severely in the summer.

3.1.4.3 Protection of birds.

As well as these PSP blooms being extremely hazardous to human health, if they get out of hand, they have also been known to kill birds such as terns (McKernan and Scheffer 1942, Coulson et al. 1968, Armstrong et al. 1978 and Nisbet 1983), as PSP can accumulate in such food as sandeels and also effect the breeding of these birds (Coulson et al. 1968, Horobin 1970, Dunn 1972, Bicknell and Walsh 1975, Sasner et al. 1975, Coulson and Horobin 1976 with Terns in the Farne Islands, UK, Kvitek 1990).

Terns are the only birds on the list of breeding species in the Cork Harbour SPA. We enjoy watching them out of our laboratory window and occasionally find a nest on the shore.

Birds, especially shags were also seriously affected by eating the sand-eels in NE England in the 1968 big PSP bloom then (Clark 1968), which also occasioned a paper on two good Irishmen, who should have been killed, but are thought to have survived their meal of mussels, as they were so completely (paralytically) drunk.

3.2. The EIA Directive 2011/92/EU

The EIA Directive does not require these preliminary stages of the Habitats Directive, but cuts straight to a requirement that **alternative solutions must be assessed in Article 5.3(d):**

Note the second iteration of the preamble of the Directive which states its four fundamental principles, which are so important in a case such as this:

3.2.1 Article 191 of the Treaty

(2) Pursuant to Article 191 of the Treaty on the Functioning of the European Union, Union policy on the environment is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay. Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes.

3.2.2 Article 5

1. In the case of projects which, pursuant to Article 4, are to be made subject to an environmental impact assessment in accordance with this Article and Articles 6 to 10, Member States shall adopt the necessary measures to ensure that the developer supplies in an appropriate form the information specified in Annex IV inasmuch as:

3. The information to be provided by the developer in accordance with paragraph 1 shall include at least:

*(d) an outline of the **main alternatives** studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects;*

3.3 The Shellfish Waters Directive

We need also to consider the law regarding the protection of our 4 EU Shellfish Waters designated under the Shellfish. Waters Directive 79/923/EEC (as codified by 2006/113/EEC) and the particular responsibility of the EPA to protect these Designated Shellfish Waters through the Pollution Reduction Programmes (PRPs) required by the Directive. There are now 4 EU Designated Shellfish Waters in Cork Harbour, which were designated in 2009:

Cork Great Island North Channel	(under S.I. No. 55 of 2009 of 10 th February 2009)
Rostellan North	“
Rostellan South, and	“
Rostellan West	(under S.I. No. 464 of 2009 of 26 th November 2009)

These can all be found on the Department of Housing, Planning and Local Government

<https://www.housing.gov.ie/water/water-quality/shellfish-waters/cork>

3.1.1 Pollution Reduction Programmes

Of fundamental importance to the establishment of these areas is the protection that is to be afforded them by the Shellfish Pollution Reduction Programmes (PRPs) that have to be drawn up for each of them, as required by Article 5 of the Shellfish Water Directive (SWD) 2006/113/EC and Section 6 of the Quality of Shellfish Waters Regulations, 2006 (S.I. No. 268 of 2006).

3.1.1.1 The EPA's pivotal role in PRPs

The EPA was given a pivotal role in this protection and should especially be relied upon now under the SWD for these 4 designated shellfish waters.

As we have already seen, above, the Inspector's fourth report of 13 February 2020 (p.6 last para.) admits that the current discharge at Rathcoursey and WWDA Licence,

*“does not specify a limitation on the mass loading or volume of the discharge; however, due to the **substantial** increase in the mass load of nutrients emitted to this water body, it indicates that a review of WWDL Ref. No. D0056-01 may be required under Regulation 14 of the Waste Water Discharge (Authorisation) Regulation 2007”.*

The Agency is clearly at fault here and all discharge licences issued, for instance, by the Environment Agency in the UK carry a maximum allowable limit and this omission should be discussed at an Oral Hearing.

This is discussed further under discussion of the incorrect location of the discharge at Rathcoursey in 1988 and its current inadequacy after 32 years since it was constructed, even before the addition of this further 4,000m³ per day of Dairygold/TINE (D/T) waste water. See s.5

Thus under all these three EU Directives, where we are considering a WWTP discharge, there is the requirement for either a direct assessment of possible alternatives to the development plans (EIA Directive), or one that arises as soon as the developer fails to demonstrate that *“it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public”* (Habitats Dir. Article 6.3) and that it provides *“complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effect of the works proposed on the protected site concerned.”*

3.1.1.2 Priority sites

Not only should the EPA be responsible for protecting the 4 Designated Shellfish Waters that are affected by this discharge, they have taken it upon themselves to do this as their top priority.

3.1.1.3 “Key Pressures” in a PRP - the EPA’s DREAM prioritisation

must be given the top (A1) priority in the EPA Enforcement Programmes (DREAM).

As a tool to prioritising enforcement of Waste Water Discharge Licences, the EPA’s Office of Environmental Enforcement (OEE) developed a Dynamic Risk Enforcement Assessment Methodology (DREAM) to allow it to best allocate and deploy resources with a view to improving compliance with its regulation of WWDs.

*“The principles underlying the methodology reflect those of the OEE’s enforcement policy, i.e. proportionality in the application of environmental law and in securing compliance, consistency of approach, transparency about how the OEE operates, targeting of enforcement action **and implementation of the polluter pays principle**”.*

“The DREAM model is a further evolution of the Risk Based Enforcement Methodology (RBEM) developed by the OEE in 2007 to prioritise enforcement of IPPC and Waste licences”, based on a review which revealed that, “environmental considerations are key in developing enforcement strategies, in prioritising enforcement activities and allocating resources.”

“Similar to the methodology developed for IPPC and Waste licences the DREAM allocates an enforcement category to waste water agglomerations on the basis of five environment based attributes.”

There are 4 categories of Enforcement Score based on these five environmentally based attributes, but the EPA has decided that,

“Where a waste water agglomeration is listed in a Pollution Reduction Programme (PRP) for shellfish waters..... this will cause the agglomeration to default to the highest enforcement category.”

If the EPA has pushed the Key Pressures on a Shellfish Water PRP to the highest enforcement category, which they define as “A1 Very High Enforcement Category”, that sends a powerful message to the Shellfish Industry of the EPA’s commitment to the preservation and improvement of the country’s Shellfish Waters.

In this case, with the particular IED being applied for by Dairygold, a very high enforcement category could be expected for these factors:

1. A cumulative discharge of nutrients, due to the retentive hydrodynamics of the area,
2. Into receiving water that is of “moderate” and therefore of “unsatisfactory” quality by the WFD, into which the Directive is now subsumed, and which is
3. Already potentially eutrophic – and always has been eutrophic or potentially eutrophic since records started over 20 years ago,
4. Which has been designated as a “sensitive water” for 15 years, and
5. Is right in the middle of both an SAC, all the Harbour SPAs, and a pNHA.
6. Where all scientific advice (EPA, Marine Institute, NUIG Hydrography and Ph.D.) points to the danger of fuelling, to full-blown levels, the locally occurring toxic algal blooms,
7. Of the most dangerous kind to consumers of oysters – Paralytic Shellfish Poisoning, the only HAB to be included in the Directive
8. In one of the densest production areas for oysters in the country,
9. With the value of our own Cork production being as much as 25-30% of national sales of oysters from 1980-1995, and with huge demand growing all the time
10. Where these Oyster Fishery Orders, granted by the State, have preceded this IED application by 49 years in the North Channel and 56 years in the Lower Harbour,

We would hope very much that the EPA will regard this new, substantial discharge as a Key Pressure, that should be sorted at source and that the polluter pays principle should hold, and, failing any other alternative solution, that the discharge should be sent all the way to the open sea, giving Irish Water the chance to clean up the east side of the Harbour at the same time.

It is worth considering the strength of the environmental case contained in the Pollution Reduction Programmes for the oyster fisheries, now that they are designated, together with all the essential environmental pre-requisite information, worked out in the Characterisation Report for our area, from which the likelihood of the pressures to impact on the shellfish water quality parameter values in the shellfish areas of Cork have been estimated.

The EPA is charged with fully integrating the requirements of the European Communities (Quality of Shellfish Waters) Regulations, 2006 (as amended) into the EPA licensing process, for which they will then be the enforcing agency, as stated in PRP 5.1 Key Pressures,

3.1.1.4 Overview and EPA role in enforcement.

“The requirements of the European Communities (Quality of Shellfish Waters) Regulations, 2006 (as amended) have been fully integrated into the EPA licensing process. In addition this process takes into account the effect of viruses on the quality of shellfish waters. The licence will require detailed actions including infrastructural works, if required, by the licensee within specified time-frames if the discharge does not comply with the above Regulations.

Each licence granted will be subject to enforcement by the EPA. Full details of each application and licence decision can be viewed online at www.epa.ie.

These PRPs stem from the precursor Characterisation Report (sec. 10.3 below), defining the waters, and the PRPs are then scrutinised with a Strategic Environmental Assessment (sec. 10.4 below), before publication as PRPs (sec. 10.5 below). These first two documents contain many points that are relevant in considering this discharge application and are worthy of scrutiny first.

3.4 Characterisation Report No. 39 Cork Great Island North Channel Area.

<https://www.housing.gov.ie/sites/default/files/migratedfiles/en/Publications/Environment/Water/PublicConsultations-ShellfishWatersDirective2/FileDownload%2C22121%2Cen.pdf>

This lays out the development and purpose of the PRPs.

In s. 1.2 Shellfish water quality parameters

We are told that,

“Compliance with the directive is measured against achievement of shellfish water quality parameter values outlined in Annex I of the Shellfish Waters Directive (2006/113/EC)”

This includes, as the last parameter of the Shellfish Waters Directive:

TABLE 1 - Parameters listed in Annex I of the Shellfish Water Directive (SWD)

Saxitoxin (produced by dinoflagellates)

No limit given

No limit given

Note that it is only the Saxitoxins, which give rise to Paralytic Shellfish Poisoning, of all the many different harmful algal blooms (HABs), that are mentioned specifically in the Directive.

s. 1.4 “The Directive and Regulations require that any non-compliances with the shellfish water quality parameters are identified. The Directive and Regulations further require that the factors responsible for such non-compliances are identified.”

Information on impacts and pressures has therefore been collated in an individual characterisation report for each shellfish site from available inventories. The likelihood of the pressures to impact on shellfish water quality parameter values in the shellfish areas has been estimated.

Section 2.0 describes the area and its catchment and s. 2.1 advises that the North Channel is a Protected Area under an SAC and SPA and Cork Harbour is both an SAC and an SPA, with the North Channel being a proposed NHA (pNHA-1058), and, together with the Owenacurra Estuary, being also designated as a combined nutrient sensitive area.

3.0 Water Quality in the Shellfish Area

The EPA Marine Monitoring and WFD Monitoring Programmes are referred to on p.16 of the Characterisation Report.

The WFD paragraph refers on p.17 to the state of the transitional water body within which the North Channel oyster fishery is situated:

*“The WFD status of the transitional water body, within which the shellfish area is situated, is “moderate” and therefore **unsatisfactory**, reflecting the results of dissolved inorganic nitrogen and dissolved oxygen analysis in some of the samples. The two main transitional waters which discharge into the designated shellfish area are the Owenacurra Estuary and Lough Mahon. Both are considered ‘moderate’, and therefore **unsatisfactory**, also reflecting the results of dissolved inorganic nitrogen and dissolved oxygen analysis and, in the case of the Owenacurra Estuary, the results of biological oxygen demand analysis and the status of fish populations.*

Thus the unsatisfactory nature of the Owenacurra Estuary is flagged up again as failing on the four counts of DIN, DO, BOD and the status of fish populations. Map 12 of the Characterisation Report also shows that the North Channel and Lower Harbour are both only of “moderate status”, and **therefore of unsatisfactory quality**.

3.5 Strategic Environmental Assessment (SEA) of the proposed PRPs for Waters Designated under the EU Shellfish Waters Directive.

SEA Statement - Cork Region January 2010

<https://www.housing.gov.ie/sites/default/files/migratedfiles/en/Publications/Environment/Water/PublicConsultations-ShellfishWatersDirective2/FileDownload%2C22706%2Cen.pdf>

The SEA Directive (2001/42/EC) is based on Article 174 of the Treaty as is the EIA Directive. They are very similar, but the SEA Directive is more applicable to the PRP procedure and the Cork Region is specified here.

p.4 “The SEA Statement includes the following information:

- Summary of how environmental considerations have been integrated into the PRPs;

p.7 “The PRPs will be reviewed at intervals not exceeding three years and, where necessary, at lesser intervals if the monitoring data, either from the Marine Institute monitoring programme or other sources such as monitoring carried out under the WFD, indicates deterioration in water quality status **or a risk that the objectives or standards laid down in the EU Shellfish Waters Directive** (and its associated Regulations) will not be achieved.

p.8 last line, “It should also be noted that the PRPs and their accompanying Characterisation Reports will be dynamic documents reflecting up-to-date legislation, current monitoring and the **outputs from further investigations. It is anticipated at this time**

that further sources of baseline information will be consulted and incorporated, where relevant.

We imagine that if the NUIG hydrodynamic papers had been available in 1984, M C O'Sullivan could not have claimed that the lack of any material difference between continuous and intermittent discharges in his 1977 dye studies (see sec. 5.3 in our first submission) just meant that the tidal holding tank was not needed – when it really showed that neither discharge was leaving the harbour to any marked extent. Even without the advanced computers now available, we believe that by 1993 Irish Hydrodata could have run the Brown Island current meter results for the complete cycle of 12 days that he had collected, to check that the very obvious flood tide current being so much stronger than the ebbs, actually led to the true result of a residual westerly, inland water movement.

This has to be taken into account now as a “further source of baseline information that can be incorporated” and, as in sec. 4.4 in the next paragraphs, “results of further investigations become available” and as the EPA have not taken any notice at all of these latest NUIG hydrodynamic papers of Cork Harbour, nor the corroboration of the drogue and current meter results that we obtained and reported, we insist that they be discussed and that we hear the reason for not taking them into consideration at an Oral Hearing. They are diametrically different to those put forward by IH and D/T and they deserve and will be taken into account.

p.10 s. 4.3 “The functions of particular importance, in light of the objectives of Directive 2006/113/EC and of this PRP, include effluent discharge licences and planning and development, among others.

s. 4.4 “As the monitoring database grows, **results of further investigations become available** and programmes are implemented, incremental changes will be made to the PRPs to ensure compliance with the standards and objectives established. As such, the PRPs and their accompanying Characterisation Reports will be dynamic

p.12 s. 4.6 “**Recommendation:** When the PRPs are reviewed prior to their incorporation in the second cycle RBMPS, it is recommended that review of the Strategic Environmental Objective for Water be carried out, **including consideration of broadening the Objective to assess the extent to which the PRPs will support meeting the relevant wider objectives of the WFD, e.g. support achievement of Good Chemical Status.**

This is also of particular importance in this case, with the undoubted addition of more N and P to water that is already Potentially Eutrophic and already has the highest winter DIN in the country and more exceedances than any other estuary also. As there is no way that the addition of yet more nutrients will not cumulatively drive this water further from Good Chemical Status and more into a sacrificial dumping site, we request the chance to make our case at an Oral Hearing.

3.5.1. (5.2) SUMMARY OF THE SEA ASSESSMENT

5.2.1 Assessment methodology.

“The approach used for the assessment in the SEA is termed an ‘objectives led assessment’. In this case, each of the alternatives considered was tested against defined SEA

Environmental Objectives (Box 6.1), which are separate to the PRP objectives and cover each of the SEA environmental topic issues from the legislation”.

Box 6.1 of Environmental Objectives lists as

“Objective 3 “

“Protect and reduce risks to human health related to consumption of shellfish.”

The recurring risk of PSP blooms and taking these to higher levels of toxicity has not been assessed by either the Developer, or the Agency’s Inspector and must require the Developer to seek alternative solutions at source.

Human health gets a mention in the response to the Inspector’s Issue 5, but it is difficult to argue that more nutrients are not being added to the water, nor that it this is not a shallow, stagnant estuary, with virtually no water exchange and appearing to circulate westwards over the oyster beds, all of which must allow PSP dinoflagellates to take up the increased load of nutrients, with every possibility of increasing cell numbers and raising PSP levels in local wild shellfish and oysters to levels that could cause serious health problems – even death (see our 4th submission s.5 on Seafood Poisoning 2019 and below).

Only concerns over Human Health come before all other considerations in the Habitats Directive (Article 6.4. and PSP is a significant risk here to human health, which has not been answered at all and clearly not to the level required by the Directive. (E.g. see the classic ruling of the ECJ in the German Leybucht Dykes Case C-57/89, which ruled that a threat to human life trumps all other considerations).

3.5.2 (5.2.4) Summary of Cumulative and Synergistic Impacts

The primary cumulative/synergistic impacts that have been identified include cumulative improvements in water quality leading to positive cumulative impacts to aquatic biodiversity, flora and fauna, both within the designated shellfish areas in the Cork region as well as across the coastal areas of the country as a whole due to the implementation of PRPs for all designated shellfish areas. Also, a cumulative positive impact to human health would result from implementation of the PRPs due to an improvement in water quality in the designated shellfish areas.

“A number of alternatives call for the construction of new or upgraded infrastructure. These would contribute to sustainable development in the region.....”

“A number of the physical modifications alternatives have considerable potential to improve the environment individually or cumulatively if implemented correctly:”

“The cost associated with implementation of many of the alternatives could result in potential cumulative negative impacts to both individuals and local authorities, for which no mitigation may be available. However, cumulative positive impacts would be experienced by those economic sectors reliant on good water quality including the commercial aquaculture industry.

3.6 Shellfish Pollution Reduction Programmes for Cork Harbour (2010 & 2012)

There are four of these. This is for Rostellan North PRP as an example:

<https://www.housing.gov.ie/sites/default/files/migratedfiles/en/Publications/Environment/Water/PublicConsultations-ShellfishWatersDirective2/FileDownload%2C22136%2Cen.pdf>

These PRPs were drawn up by the Department of the Environment and are monitored by the SFPA and Marine Institute in consultation with the EPA under S.I. No. 268 of 2006 EC (Quality of Shellfish Waters) Regulations 2006 Sec. 5 (3) – “*The object of these Regulations is to give effect in the State to Directive 79/923/EEC of 30 October 1979 on the quality required of shellfish waters*”.

The PRPs are then **enforced by the EPA** under sec. 5 Action Programme, below.

1.1 Programme Objective

“Compliance with the standards and objectives established by the Quality of Shellfish Waters Regulations 2006 (S.I. No. 268 of 2006) (as amended) for the designated shellfish growing waters at Cork Great Island North Channel and with Article 5 of Directive 2006/113/EC of the European parliament and of the Council on the quality required for shellfish waters.”

1.2 Pollution Reduction Programme

“This pollution reduction programme for the shellfish growing waters at Cork Great Island North Channel has been established by the Minister for the Environment, Community and Local Government in order to protect and improve water quality in the designated shellfish growing areas in the North Channel, Cork Harbour and in particular, to ensure compliance with the standards and objectives for these waters established by the 2006 Quality of Shellfish Waters Regulations (S.I. No. 268 of 2006) and with Article 5 of Directive 2006/113/EC of the European parliament and of the Council on the quality required for shellfish waters.”

1.3 Supporting Characterisation Report and Toolkit of Measures

*“The characterisation report thus provides a prioritised list of pressures/impacts/effects on water quality. The pollution reduction programme or action plan takes **this prioritised list** and addresses each issue with actions to help ensure that compliance with the relevant water quality standards is achieved or ensured.*”

2.0 Status/Impacts

“The results of Shellfish Water monitoring do not indicate any water quality issues within/in the vicinity of this shellfish area. However due to the previous water quality issues with”

dissolved oxygen and dissolved inorganic nitrogen within/in the vicinity of this shellfish area it is prudent to continue with the actions outlined in this Pollution Reduction Programme.

3.0 Key pressures are identified as WWTPs

5.0 Action Programme – Measures

5.1 Key Pressures – UWWTPs, with Potential Secondary Pressures listed in s. 5.2:

“Overview:

A system for the licensing or certification by the EPA of waste water discharges from areas served by local authority sewer networks was established in accordance with the requirements of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007).

“In accordance with these Regulations the EPA is not allowed to grant an authorisation for a waste water discharge, which, in the opinion of the EPA, would:

- **cause a deterioration in the chemical status or ecological status (or ecological potential as the case may be) in the receiving body of surface water,**

- **exclude or compromise the achievement of the objectives established for protected species and natural habitats in the case of European sites where the maintenance or improvement of the status of water is an important factor in their protection or which is inconsistent with the achievement of environmental quality standards established under national Regulations in relation to designated bathing waters, designated shellfish waters, areas designated for the protection of freshwater fish and areas designated for the abstraction of water intended for human consumption.**

“The requirements of the European Communities (Quality of Shellfish Waters) Regulations, 2006 (as amended) have been fully integrated into the EPA licensing process. In addition this process takes into account the effect of viruses on the quality of shellfish waters..... **Each licence granted will be subject to enforcement by the EPA.**

The EPA is in a key position to make the correct decision and in this particular case, as we will show, they have not even considered the advice from experts which they themselves have published in the past. See the papers of Costello (2000) and McGarrigle (2001) referred to in s. 8.1 below.

3.6.1 (5.2) Potential Secondary Pressures.

“Future Development.

Under Article 4 of the European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. No. 286 of 2006) (as amended), every public authority that has functions the performance of which may affect shellfish waters shall perform those functions in a manner that will promote compliance with the objectives of this pollution reduction programme and with the objectives of the Shellfish Waters Directive.

The functions of particular importance – in light of the objectives of Directive 2006/113/EC and of this PRP – include waste water treatment (licensing and operations),....effluent discharge licences.....

“p.14 Annex 2 - Mitigation Recommendations from the SEA process

“The Strategic Environmental Assessment carried out for the Shellfish PRPs has highlighted potential positive and negative environmental impacts (**including cumulative impacts**) associated with implementation of the range of measures outlined in the National Toolkit of Measures, all of which are aimed at controlling pressures which impact on shellfish water quality.

“In most cases, the PRPs identify the need for further investigation to supplement existing information on the types and extent of the pressures which are currently affecting shellfish water quality.

3.6.2 National Toolkit Measure

The subject of the relocation of discharges comes up in the National Toolkit Measure, devised for Waste Water Treatment Plants where the Associated Mitigation Measure is required to be:

WW10 Waste Water Treatment Plants

Associated Mitigation Measure

Relocate the point of discharge.

Habitats Directive Assessment will be required to demonstrate that the relocation will not negatively impact on protected areas

Under the requirements of the PRPs for the 4 no. Designated Shellfish Waters for which this discharge at Rathcoursey Point is a Key Pressure, a Habitats Appropriate Assessment must be carried out and to the extent that *an assessment cannot be regarded as "appropriate" if it contains gaps and lacks complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the site concerned*”.

Note that Protected Areas referred to here are Designated Shellfish Waters and the Directive calls for the rigour of a Habitats Directive Assessment to demonstrate that the location of a discharge will not negatively impact on our 4 Designated Shellfish Waters within 1km upstream and 3km downstream of the discharge.

We understand that the EPA insisted that an Appropriate Assessment be carried out by the Developer (D/T), but should it have been carried out by Irish Water as we now know that “it is the responsibility of Irish Water to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL?

In fact I make the case that Irish Water are themselves already breaking the discharge requirements set by the Department of the Marine, who set and are responsible for the foreshore licence under which the discharge is made. See s. 5.

These are all matters to be put to an Oral Hearing.

4. Details of our objection

Thus we intend to bring to the Hearing's attention:

(1) All those areas where we feel that the Developer has not satisfied us that there will be no adverse effects on both the environment of the North Channel and Lower Harbour areas covered by the Great Island, North Channel SAC, the Cork Harbour SPA, the pNHA in the North Channel and the 4 Designated Shellfish Waters of the North Channel and Rostellan and that that any explanation that has been offered ***“lacks complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the required quality of these waters, especially as regards the potential effects on human health”***.

(2) All those points which we have brought to the Agency's attention, which have been ignored in the Inspector's four Reports and in the Proposed Determination.

4.1 The Inspector's Report dated 12 December 2019

Issues 1 & 2

On p.2 para.3, *The Agency determined that a person/company cannot carry on a licensable activity under a licence issued to another.*

It was held that D/T could not come under the IW licence to discharge at Rathcoursey and that a separate licence must be sought for D/T. The purpose of this was to ensure that there was accountability. Accountability is essential, or the effect on the environment cannot be fully guaranteed.

Thus it was then proposed that D/T would take their pipeline (constructed under IW's rights) and discharge it into the discharge DOWNSTREAM of the foreshore tank. There would thus be two monitored discharges using the same final 110m of pipe to the diffuser on the bottom of the river, but there would be some accountability, should there be a disaster.

However, only on 4th November 2109 and in the Inspector's 12.12.19 Report, do we learn for the first time, that this procedure is NOT to be followed. The D/T discharge is going to arrive into the foreshore tank in a joint pipeline of approx. 3km from Bawnard's Cross (p.18 first para. Insp. Rep.).

This can only be accountable if the two discharges are stopped and started at the same time and to this end the Proposed Licence requires in

s. 6.12 *“Trade effluent”*

“6.12.5 Treated trade effluent shall discharge via Rathcoursey outfall 90 minutes after high tide in Cobh and shall stop discharging from the Rathcoursey outfall 60 minutes prior to low tide time marked for Cobh.”

This thus synchronises the period of the D/T flow with the existing flow from the WWTP.

When Brendan Wall, EPA Inspector, went to inspect the discharge at the Rathcoursey foreshore tank at our request on 08.02.12, he was able to report the regime that was followed for the previous 20 years¹,

“The penstock valve has a lunar clock that is set weekly by the Caretaker. The Council advised that the discharge is on the ebb tide and the “outlet valve opens ½ hour after High Tide and closes after a period of 3 and a ½ hours i.e. 4 hours after High Tide”.

He required the County Council not only to continue this regime, but, in Control and Monitoring (b), he asked that:

“A record should be kept of the daily discharge times from the holding tank at Rathcoursey along with details of the tidal state during these times.”

Both of EPA Inspector Wall’s requirements, following his inspection, have been enforced by putting them into the Proposed Licence, see below.

It is not just Inspector Wall’s Report, Cork CC have never ceased to advise all comers of the required discharge times for the Midleton WWTP e.g. to Prof O’Kane, that his modelling should (in fact) assume a **3hr ebb discharge**. Clearly he had to get this fundamental part of his study absolutely correct and he makes a full account of the discharge regime up to and from 1992 in a footnote (96) on p.214

*“Up to the middle of the 1980’s there was no sewerage scheme in Midleton. Sewage was discharged to the estuary at various points within the town. Between 1986 and 1988, a new collection system was laid; comminuted sewage was now pumped to Rathcoursey and released on a tidal clock. From 1988 to 1992 the comminuted sewage was released 1.5 hours before high water for 3 hours. From 1992 onwards this was altered such that the comminuted sewage was released **30 minutes after high water for 3 hours.**”*

Thus in the EPA’s Proposed Determination these two requirements have been seen as indispensable and, as explained at the bottom of p.8 of the Inspectors Report of 12.12.19:

The final combined effluent discharge at Rathcoursey is regulated by an WWDL (D0056-01) granted by the EPA to Irish Water. Under this authorisation, any discharges from the agglomeration served by the waste water works will not contravene any of the requirements of Regulation 6 of the Waste Water Discharge (Authorisation) Regulations, 2007, which includes the requirement to prevent pollution of waters.

*“In addition to the ELVs, IW also specified operational controls on the period of emission from the installation, in line with Midleton (D0056- 01). The Section 99E consent stated: A discharge shall only occur during an ebb tide and shall cease discharging a minimum of thirty minutes (30 mins) prior to a flow tide. Following consultation with the Agency’s Office of Evidence & Assessment, the RD proposes the following revised wording: **Treated trade effluent shall discharge via Rathcoursey outfall 90 minutes after high tide in Cobh and shall stop discharging from the Rathcoursey outfall 60 minutes prior to low tide time marked for Cobh.**”*

¹ 27.04.12 EPA Waste Water Inspection Report by Brendan Wall for inspection carried out 08.02.12

“This will ensure the discharge will be flushed out of the channel. This is discussed further under section 8 of the report.”

Thus the following was put into the Proposed Licence as Condition 6

6.12 Trade effluent

6.12.5 “Treated trade effluent shall discharge via Rathcoursey outfall 90 minutes after high tide in Cobh and shall stop discharging from the Rathcoursey outfall 60 minutes prior to low tide time marked for Cobh”, and

6.12.6 A log of all times and dates of high and low tides shall be maintained onsite for inspection.

There is further clarification on p.22, which advises that the permitted timing of the discharge has been looked into with great care by the EPA and is,

“based on EPA monitoring (footnote 5) results from East Ferry monitoring station (approximately 980m south of the outfall) and tidal information at Cobh (admiralty tide charts). This is considered the most appropriate timing for emission of treated effluent as the discharge will avoid the slack tide and discharge after high tide (during ebbing), ensuring the discharge will be flushed out of the channel, away from European sites.

The footnote (5) advises that

“Continuous monitoring carried out by OEA during the month of November (2019) with a hydrolab attached to a minibuoy”.

The Inspector tells us on p.8 of her report (in Issue 1)

It is the responsibility of Irish Water to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL. Compliance is subject to enforcement by the Agency’s Office of Environmental Enforcement.

and again on p.21

“It is Irish Water’s responsibility to ensure that it meets the limits and satisfies the conditions set in their wastewater discharge licence or certificate.”

If we are to be sure of the discharge into these thrice EU protected waters, then the discharge must be logged as above and this is covered in the Proposed Licence in C.3.1 (p.36) Control of Emissions to Sewer:

“Control parameter: Period of treated trade emission.

Monitoring: Tide prediction and period of discharge.

Key Equipment: Lunar equipment, pumps, penstock outlet valve, alarms, tidal holding tank.”

A continuous flow monitoring device is in place. This will be discussed below in s.7

5. Flows to foreshore tank and diffuser

5.1 From the town

As well as the discharge from the town, we are now faced with a discharge that is twice as large as the present Irish Distillers Ltd (IDL) flow, coming from another water-catchment area 14km away. This Dairygold/TINE (D/T) flow will grow to 4,000m³/day.

The Inspector states on p. 20, para.3, that,

“the maximum emission volumes from Dairygold/TINE will represent a 26% increase in the discharge volumes from the Rathcoursey outfall”.

IDL has been an important part of Midleton since 1966, on the site of an even older 1825 Old Midleton Distillery. When the WWTP was built, the flow from the distillery had to be taken into account and we have lived with it and know the quality of its water since its IPPC licence was first issued in 1999. The discharge is impeccable.

The IDL do, however, have a licence for a flow of 5,000m³/day, which must be catered for.

When Irish Water (IW) agreed to take the additional flow from D/T, they asked Mott MacDonald² (MM) to calculate the size of holding tanks that would be needed to enable the discharge to comply with the current discharge regime that was insisted upon by the Department of the Marine (DOM) in May 1992 and which has been required to be observed ever since. This was principally aimed at getting the discharge removed as far to the south into the Lower Harbour as possible, by releasing it on the ebb tide.

5.2 Mott Macdonald Preliminary Options Report (Ref. 12 with our first submission)

MM describe the operation of the discharge in s. 2.4.2 of their *Preliminary Options Report, Midleton Sewerage Scheme, Rathcoursey Tidal Holding Tank, Mott MacDonald, March 2016* (Ref. 12, supplied with our first submission):

“The penstock on the discharge from the tank is operated by means of a lunar clock located in a control building at the site. From discussions with local County Council personnel, the penstock on the outlet is opened half an hour after high tide. The penstock is then closed 3.5 hours after high tide. This gives a total discharge time of three hours per tidal cycle”.

Thus this was the basis on which MM undertook their extensive work to incorporate the D/T discharge into the Midleton town and WWTP discharge at Rathcoursey.

The MM report, which we covered very fully in s. 9.1 et seq. in our first submission, assesses the likely flows to be required by 2025 in s. 3 “Flows” on p.13, as going to be 31,836m³/day broken down as:

²Preliminary Options Report, Midleton Sewerage Scheme, Rathcoursey Tidal Holding Tank, Mott MacDonald, March 2016 for Irish Water.

5.2.1 Flows

3.2.1 *"The Midleton LAP – Second Edition – January 2015 sec. 3.2.1 identifies a target population of Midleton in 2020 of 23,735 people..... this would increase the max. flow through the plant to 240 l/s (twice the current capacity). This is equivalent to 20,736m³/day."*

3.2.2 *"An infiltration flow of 2,100m³/day has been adopted".*

3.2.3 The IDL flow, *"could reach 5,000m³/day in the short to medium term."*

3.2.5 *"It is assumed that the infiltration into the Bailick Road Gravity Sewer will be addressed in the short term..... and, as such, is not included...."*

3.2.6 *The Consultants thus estimate the **total future flow, including the Dairygold 4,000m³/day, to be 31,836m³/day by 2025.** They take this as 32,000m³/day in s.4.1.*

In sec. 2 *Existing Infrastructure*, MM give us the maximum flow rates through different parts of the pipework:

2.3.3 The last 1,671m 750mm gravity line from the intermediate high point to the Tidal Holding Tank can take a max 2,762m³ flow/hr.

2.4.1 Tidal Holding Tank and some pipeline has total capacity 2,175m³

5.2.2 Discharge regime

2.4.3 *"The penstock on the discharge from the tank is operated by means of a lunar clock located in a control building at the site. From discussions with local CCC personnel, the penstock on the outlet is opened half an hour after high tide. The penstock is then closed 3.5 hours after high tide. This gives a total discharge time of three hours per tidal cycle."*

Mott MacDonald, who call elsewhere for a proper survey of the final length of pipeline to the diffuser, cover themselves in the following s. 2.5 with,

"It is not possible to carry out a detailed assessment of the outfall capacity without detailed information on e.g. water levels, pipework details, level of the diffuser, flow velocities etc. Nevertheless an approximate assessment of the peak discharge can be made based on the level at the tidal holding tank and the tide levels."

MM were never able to visit the foreshore tank and in 2.4.3 tell us that, *"The penstock was not operational during this period of study"*.

However they continue with s. 2.5 on p.10

*"A headloss of approximately 3.07m will be generated by a flow of 1.297m³/s (or 4,670m³/hr) through the outfall pipe. **The capacity of the outfall pipe (based on the current tidal holding tank) is therefore taken as 4,670m³/hr."***

It is very difficult to understand how a smaller pipe of 610mm dia., (whose cross-sectional area is thus only 66% of the 750mm dia. pipe to the foreshore tank, whose flow is 2,762m³/hr

in 2.3.3 above), for the last section of pipeline to the diffuser, can possibly carry a 69% greater flow? And, indeed, MM say themselves:

“In order to accept the proposed flow from the Customer directly to the existing outfall immediately downstream of the tidal holding tank, the existing capacity and condition of the outfall pipe and diffuser would need to be investigated.”

However, even if we accept this flow, **MM have not been given the correct information by Irish Water on which to make their calculation on the flow to the diffuser, above.**

5.2.3 (2.5) Outfall

They say in this section on p.10,

“There are no drawings of the outfall pipeline available. The as-built drawings for the tidal holding tank suggest the outfall is a 750mm diameter AC pipe. A letter from Cork County Council to the DECLG dated 05/02/2013 states that, “The existing outfall from the Rathcoursey holding tank comprises a 610mm OD steel pipe laid a distance of 110m into the Ballinacurra River. The diffuser unit is a 21m length of the 610mm OD steel pipe fitted with 6 no. 150mm diameter diffuser ports and a 300mm diameter end port.”

Thus their calculation of the flows possible through this last section of pipe to the diffuser is based on the information they had been given recently by Irish Water.

The information given to MM was not correct.

When the DOM required Cork CC to put in secondary treatment for Midleton WWTP on 25.03.92, they also insisted on two alterations to be made to the discharge regime in May 1992, to try and protect the fishery in the intervening years until the plant could be built:

- (1) they insisted on a 3hr discharge on the ebb tide regime to be implemented,
- (2) the diffuser was to be altered, so that the discharge was kept as much as possible to the east side of the river. This was done to supposedly keep the Midleton discharge to the eastern side, so that more of it would return up the Owenacurra than flow to the west and the oyster beds on the returning flood tide. This was the original An Foras Forbartha purpose in 1986 for the foreshore tank.

The very fact that the DOM took this drastic step to control this emission under the powers of the foreshore licence issued in 1986, was that they knew, from all their own work and 80pp. submission to the DOE, that this was the wrong choice of site for the Midleton outfall.

Thus the DOM insisted that the end 300mm port and the end two 150mm ports closest to the western side be closed off and the other 150mm ports at the near, eastern end opened.

This was done by divers on 7th May 1992, and it has not been altered since. Nor has the discharge regime insisted upon been changed, as detailed above, and advised to all and sundry.

Unlike IW and MM, we have a copy of the M.C. O'Sullivan Drawing No.19 of March 1992. This shows the 21m diffuser with an end port of 300mm dia. and 6 no. 150mm ports, spaced 3m apart, with hand-written notes on it that say that,

"Port No.1 (300mm dia. port) was blanked off on 7th May 1992";

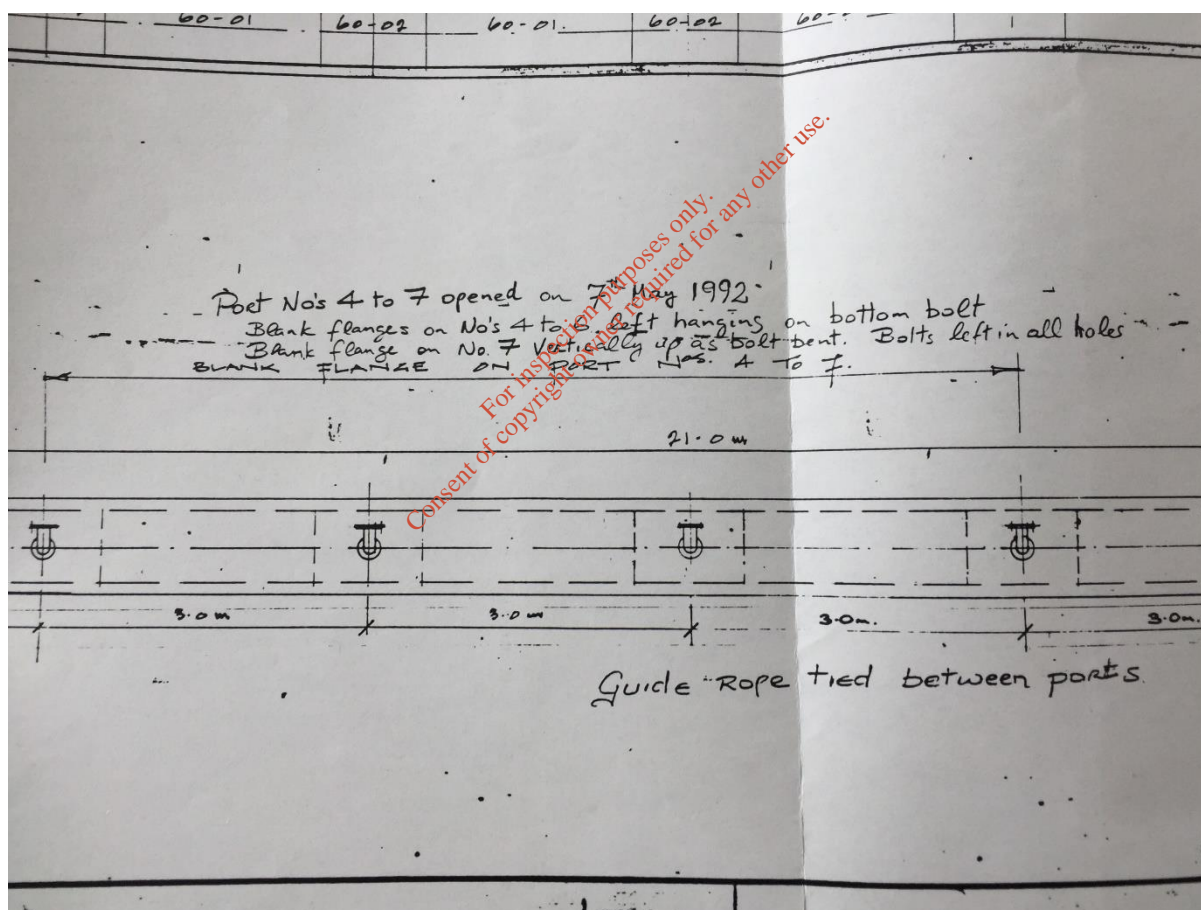
the next two ports Nos. 2 & 3 : *"No blank flanges on Ports No's 2 or 3,"* and that,

"Ports No's 4 to 7 opened on 7th May 1992".

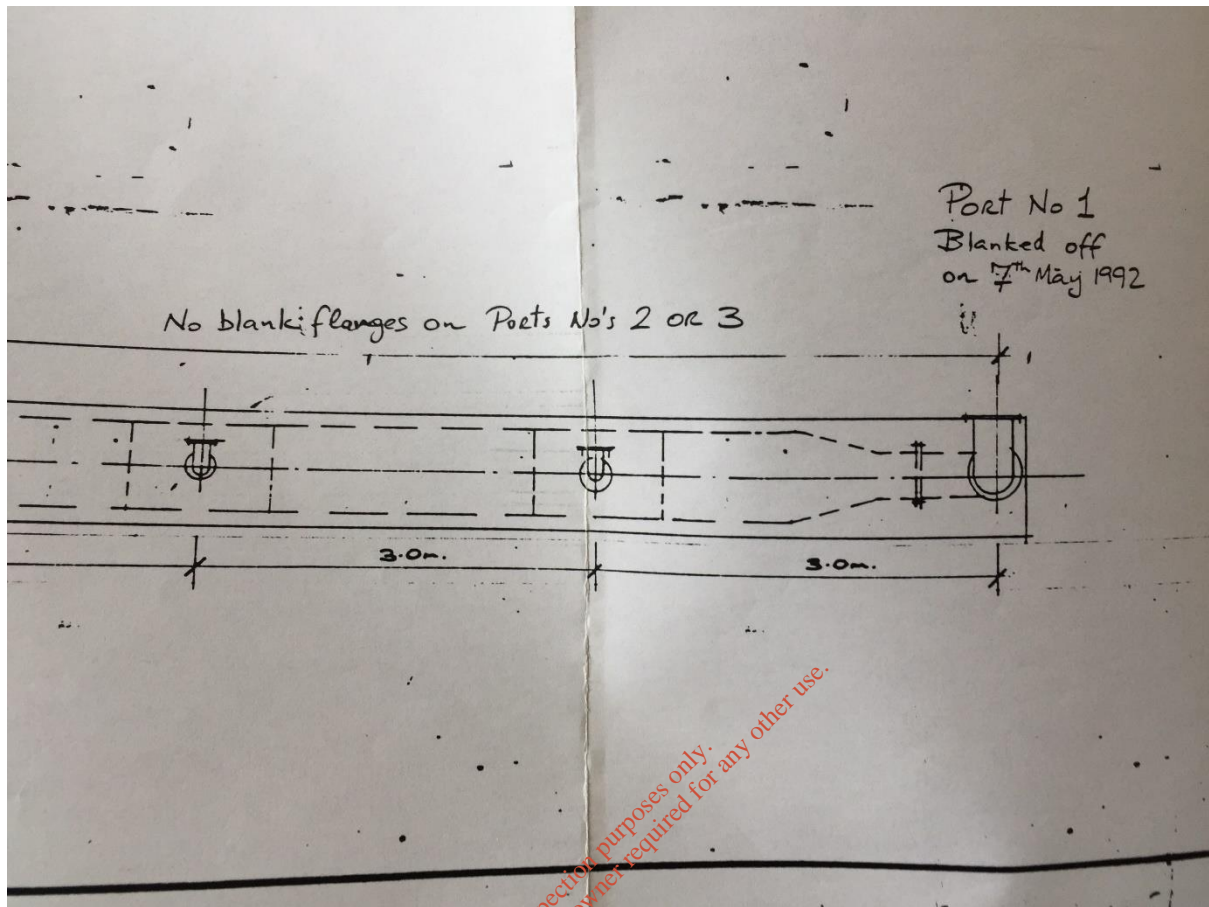
We reproduce the relevant parts of this drawing at a size that the writing can be easily read:

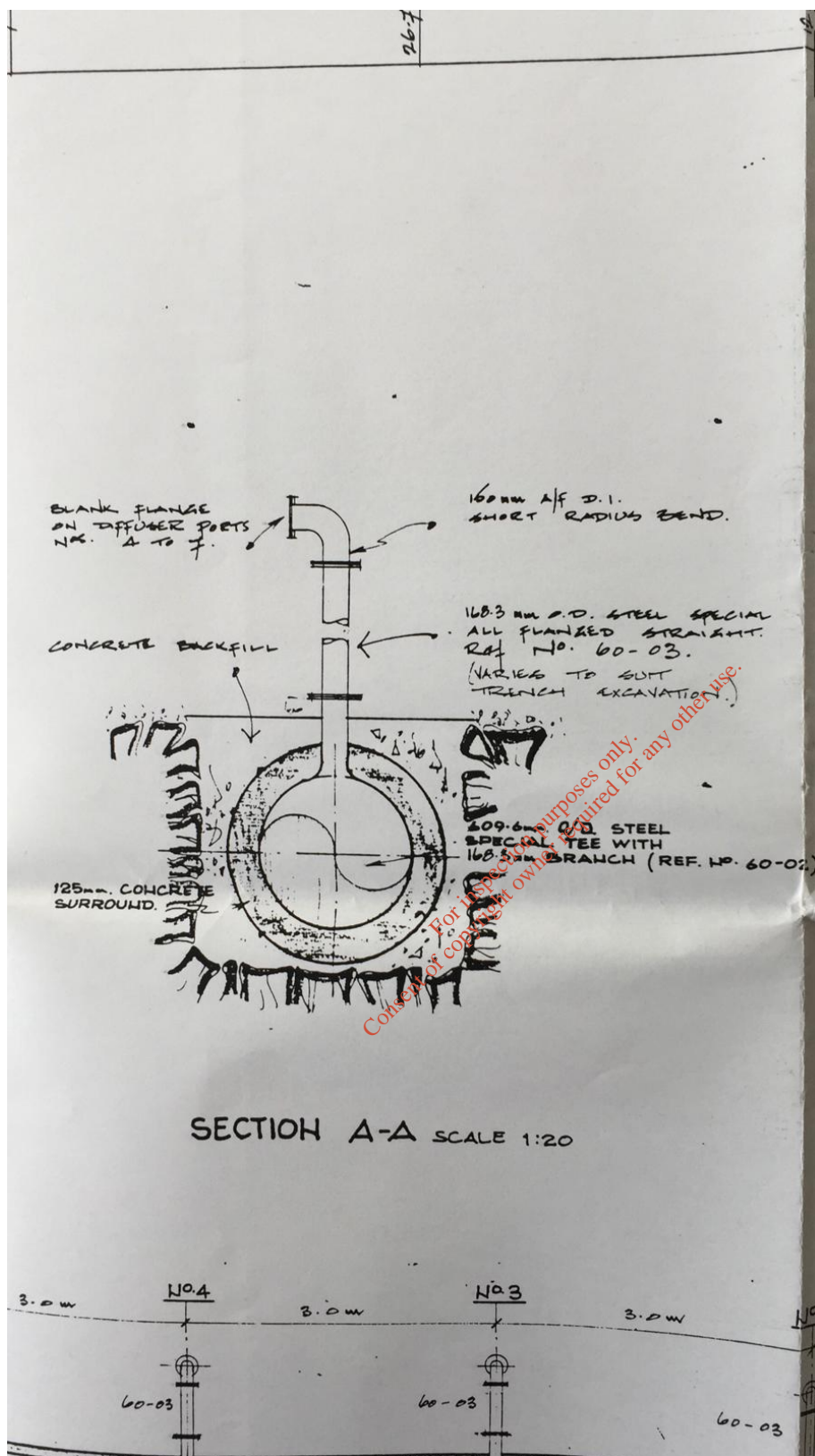
5.2.4 Drawings of the diffuser. M.C. O'Sullivan's Drawing no.19 March 1992

Showing the position of the 150mm ports spaced 3m apart



Showing the end port which was blanked off on 7th May 1992





Cross-section through one of the 6 open 150mm dia. ports in relation to the 600mm diffuser.

Thus it would appear that the end result was that the 2 end 150mm ports had no flanges with which to close them, but that the 300mm end port was closed. The closure of this large port to reduce the effects of flows to the west, would have had the effect of reducing the cross-sectional area of the available openings to the river by 40%, since one 300mm dia. port has the cross-sectional area of 4 no. 150mm ports. Thus as a ball-park figure, the removal of the large end port will have cut down the flow calculated by MM, above, from 4,670m³/hr to 2,800m³/hr.

In the 3½hr discharge period that has been granted in the Proposed Discharge Licence, this will allow the discharge of 9,800m³ of mixed effluent, or **19,600m³ in the two daily ebb tide periods.**

This is only a fraction (60%) of what MM have shown the combined flows to be, above, by 2025 i.e. 32,000m³/day.

How does this projected flow square up to the flows that already exist at Rathcoursey? In an exercise on the total daily flows measured at Ballinacurra final pumphouse 13 years ago, when the population and the WWTP were a third smaller, over the six winter months in 2007/08 we found:

5.2.3.1 Number of significantly large (>12,000m³/d) flows discharged at Rathcoursey in the winter 6 month of 2007-2008

Size of daily flow (m ³ /day)	No. of times in winter 2007/8 that total sewerage flows of this size occurred in Middleton (i.e. incl. the storm overflows in the town).	m ³ /hr	hrs to fill tank
>12,000	20	500	4.34
>13,000	25	542	4.00
>14,000	24	583	3.72
>15,000	25	625	3.47
>16,000	24	667	3.25
>17,000	17	708	3.06
>18,000	19	750	2.89
>19,000	4	792	2.74
20,000-25,000	12	938	2.31
25,000-30,000	8	1146	1.89
>30,000	5	1250	1.74
Total no. in 182 days	173 i.e. 95% of days >12,000m ³ /day		

(Myth Tab 32)

Thus, if another 4,000m³/day were added by D/T to the above daily flow figures, the number of occasions that the flow could not be accommodated could be estimated from the >16,000m³/day flow per day and greater, which would be 89 days over the six month period or 3.4 times per week.

These figures are the actual flow volumes pumped to the outfall at Rathcoursey, but still do not represent the flow that should be coming from the town, but which now reaches the Owenacurra from the overflows from the pumping stations, which occur on average every other day at an average volume of 1,472m³ per spill (see the table below and s. Section 7.6.1

of our first submission deals with this and the nutrient load that will be associated with these spills).

The plans for the D/T discharge have been changed three times, from 1) delivery to the Ballinacurra 1 pumping station; 2) to a separate discharge line to a point after the foreshore tank; 3) but it was changed again in the “unsolicited information on the discharge operations” made on 4th November 2019 and were thus in time to be in this Inspector’s report, noting that D/T are going to share the IW pipeline from Bawnard to and through the foreshore tank. The Inspector’s report was the first time that we had confirmation from any authority about the route and operation of the pipeline, although the people in the localities through which 11 km of the pipeline has been dug, have been watching in consternation at construction that seems to have progressed without their consultation.

5.2.4 D/T 300mm pipe joins Midleton WWTP flows at Bawnard T- to the foreshore

Thus we were only recently aware that the D/T line has been brought to join the existing WWTP 750mm discharge pipe at Bawnard, at the point where there is also the emergency branch to the foreshore at Rathcoursey East. No one locally, or elsewhere, has been advised of this, or the possibility that there may be emergency discharges onto the foreshore there.

There has not been sufficient transparency over this, nor any calculations made in the hydrodynamic work as to where this emergency overflow water would go when it has to be used in times of extra heavy rainfall or plant failure.

This is an omission and failure of transparency under the requirements of the Habitats Directive.

6. Annual storm overflow data from Midleton

The annual storm overflow data has been given to us under monthly FOI since 2002 and is now reported in the AER’s. As stated above there are spills on average every other day with an average volume of 1,472m³/spill, although spill of over 10,000m³/day are not uncommon. In the winter of 2015/16 there were 15 spills in December and January of 321,330m³ i.e. averaging 21,422m³ spill.

Total overflows from Midleton pumping stations

Year	Rainfall	Total days	Total overflows
	Total mm	Overflows >40m3/d	Total volume of overflows m3 (tonnes)
2002	1,264	146	333,216
2003	908	96	117,954
2004	1,011	212	186,640
2005	1,014	192	314,371
2006	1,140	259	394,796
2007	958	246	277,409
2008	1,076	258	323,886
2009	1,433	225	469,140
2010	967	222	286,911
2011	835	281	479,943
2012	1,055	269	430,692
2013	1,085	103	110,031
2014	1,108	60	312,934
2015	1,266	45	272,248
2016	1,063	107	379,745
2017	1,055	151	61,232
2018	1,176	119	278,073
Average to 2017		201	295,837

Thus the capacity of this discharge is already hugely exceeded and any further volume accepted by Irish Water will only have to be transferred to overflow from the pumping stations in Midleton.

This situation must be known to IW and to the EPA, who also know that Midleton WWTP is so overloaded that last year An Bord Pleanála refused planning permission for more houses to be built until the WWTP was increased in size. The EPA has put Midleton WWTP on it National Priority Enforcement List of a handful of failing WWTPs and the ECJ found that Midleton WWTP had failed on all three Articles 3, 4 and 5 of the UWWTD and the collecting system and overflows were primarily responsible (see secs. 7.9 – 7.11 in our first submission).

6.1 Mott Macdonald “Assessment of Pump Station Overflows”, 2011.

As we also reported in our first submission (s. 8.3.1) MM reported in the study that the EPA had required of them in the WWDL, their “Assessment of Pump Station Overflows”³, that the infiltration problem is so large in Midleton, and the flows that need treating are so much greater than the capacity of the plant, which was actually built in 2000, that, in order to comply with the M. J. O’Sullivan assertion in the 1993 Preliminary Report and the EIS, put forward for the Application for a foreshore licence to discharge at Rathcoursey Point in 1996, that there would be no more than 5/6 spills p.a. and that the total annual overflow

³ Midleton Sewerage Scheme: “Assessment of Pump Station Overflows”. August 2011. Mott MacDonald

volume would be no more than 2,973m³, a **5 metre high holding tank of 5.25 hectares would be needed.**

This is 130-140 times the capacity of the present storm overflow storage - in lay terms, **a 5m high tank covering an area of about 5 football pitches!**

As stated above, the actual annual volume of untreated, nutrient-rich spills from Midleton is thus running at 100 times more than what had been advised, permitted and, we were told, had been designed for.

6.2 Cork CC application to the EPA to increase the number and size of overflows.

The EPA is well aware of this situation because of the Technical Amendment request to the EPA by Cork County Council (CCC) re Midleton WWDL Licence Reg. No. D0056-01, dated 11.11.13 (on the EPA website):

http://www.epa.ie/licences/lic_eDMS/090151b280531704.pdf

CCC requested:

“With regard to the designated storm water overflows, a proposed increase in the Control Limit Value (CLV) from a frequency of six spills/annum to 10 spills/annum”, and

“With regard to the designated storm water overflows, a proposed increase in the 1.5% limit, of total storm water collected in the relevant section of waste water works on the discharge volume for a storm overflow event, to 20%”

The EPA did not allow either of these requests in this Technical Amendment Request.

Knowing all these things and advising that yet another huge discharge, two thirds the size of the WWTP discharge at Rathcoursey, which could only transfer to more overflows from the pumping station storm tanks to the estuary in the town, if the EPA's licence was adhered to, must make a good case for the EPA to review their own PD.

This scenario can only exacerbate and prolong the sorry state of the Owenacurra which is currently Potentially Eutrophic and has the highest winter DIN levels and more exceedances than all other estuaries in the country.

Neither the Developer, nor Irish Water have alerted the EPA or public that the diffuser was reduced in its outfall capacity.

This is a serious failure by the Agency to assess the situation correctly and by IW/CCC to give the wrong information to MM so that they miscalculated something as fundamental as the capacity of the discharge available at Rathcoursey in the period allowed. This inaccurate work and the fact that the proposed discharge cannot be accommodated in the 3½hr ebb discharge allowed, means that the EPA should reassess and forbid any further waste being discharged at Rathcoursey Point and reconsider the adequacy of this outdated discharge point for IW, which has now so greatly exceeded the flows envisaged 32 years ago.

The Inspector's fourth report of 13 February 2020 (p.6 last para.) admits that the current discharge at Rathcoursey and WWDA Licence is over-loaded by a substantial increase in the mass load of nutrients emitted to this waterbody,

“does not specify a limitation on the mass loading or volume of the discharge; however, due to the substantial increase in the mass load of nutrients emitted to this water body, it indicates that a review of WWDL Ref. No. D0056-01 may be required under Regulation 14 of the Waste Water Discharge (Authorisation) Regulation 2007”.

7. Monitoring

We are told that the lunar valve has been repaired and that the timing of the discharge is now being recorded. If the Midleton discharge is already so overloaded that it cannot comply with the EPA's discharge licence for D/T, with which it shares a common line, then we do not believe firstly that this new discharge can possibly be added and, secondly, that the EPA should examine with urgency whether the town, itself, has outgrown this 32 year-old facility, which was designed for half the present population.

In this regard, the Inspector's assessment on p.20 para. 3, was that the effect of the new discharge would be:

“The maximum emission volumes from Dairygold/TANE will represent a 26% increase in the discharge volumes from the Rathcoursey outfall”

It is important that it is ascertained exactly what the position has been as regards the timing of the Midleton WWTP discharges at Rathcoursey and the reliability of the recorder and I shall bring these to the Hearing for scrutiny. From what I have seen to date the 3hr or even the 3½hr time, accepted by everyone for the discharge, is often exceeded, and at times the recorder also reports that it is not “available” – i.e. is not recording.

This does not inspire any confidence.

Control and alarms

A further obvious concern we would naturally have, is that we are told at the top of p.3 of the Inspectors Report that the D/T “installation will operate for 52 weeks per year, 24 hours a day, 7 days per week”. What therefore would be the monitoring arrangements and who would respond to alarms outside of working hours?

The Inspector refers to the advice only given as late as 4th November 2019 by D/T on the website, about these monitoring arrangements and responsibilities on p.22 last para.

I will take the whole of this paragraph in sections and comment on each:

1) *“The period of emission will be controlled by lunar clock, which is a software that predicts the tides, at the onsite tidal holding tank. Based on the discharge restriction, the lunar controlled outlet valve will effectively be closed for half of each tide i.e. ~6.25 hours per 12.5-hour tide.*

As already stated above, this would appear to no longer be adhering to the restriction imposed on the Midleton WWTP by the Department of the Marine in May 1992 and followed ever since, as both we and the EPA, have been assured by CCC over 28 years – in spirit, but very possibly not in fact, because we have been variously advised that the penstock has been leaking, and Brendan Wall of the EPA was even advised that there was no electric power at the control building on the foreshore tank, prior to his visit.

2) (cont) *The estimated travel time along the final gravity section of the pipeline (from the tie-in to the IW main down to the Rathcoursey tidal holding tank) is 60 minutes. According to the applicant, this shall be confirmed during the discharge pumps commissioning phase (condition 6.1 of the RD).*

We do not believe other Environment Protection Agencies would approve of such reliance on operations being carried out 14km away and then reliant on another valve in some other body's overall control. The EPA do make it clear that it is IW's responsibility for the quality of the discharge and satisfies the conditions on p.6 and p.21,

"It is the responsibility of Irish Water to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL".

3) (cont) *All actual and trend information can be transferred to a central location and viewed by EPA inspectors as required. A log of all discharge times, dates and volumes will be retained onsite for inspection. ELVs, monitoring and restricted periods for discharge of the treated effluent will apply at the inlet to the tidal holding tanks (emission point ref no: SEM1) at the onsite WWTP.*

In fact a third layer of responsibility is now being put on, as operatives of CCC at the Midleton WWTP are part of the monitoring operation, as well as operatives of IW and D/T – see below.

4) (cont) *If the valve doesn't open or close as programmed, a text alert (alarm) is sent to the operators from the control system. All events are logged by Cork County Council/Irish Water at the Midleton WWTP.*

And in the 4th Nov. 2019 submission from D/T (Discharge Operations – Rathcoursey Outfall) http://www.epa.ie/licences/lic_eDMS/090151b28071d9d4.pdf

on p.2 System Controls ,

"If the valve doesn't open or close as programmed, a text alert (alarm) is sent to the operators (Cork County Council) from the control room."

and last para.,

"As with the existing system, alarms shall be notified to the operator (Cork County Council) by text message. Any service requirements at Rathcoursey, emergency or scheduled, shall be addressed by Cork Council under the governance of Irish Water."

We have concern here as the Midleton plant is not manned outside of working hours by Cork County Council staff.

We were also advised in this document on p.2 that,

*“Rathcoursey – At Rathcoursey, Dairygold commissioned the installation of a new flowmeter and composite sampler to sample all flow entering the tidal tank. The thermal mass flowmeter will signal the new sampler to commence sampling (1) **when flow to the tank is registered**. The status of the flowmeter ((2) **available**, flow rate, etc) & the sampler (available, sampling) shall be logged and transferred via the existing Irish Water control system back to Midleton Wastewater Treatment Plant.*

Our comments on these two points are:

1. The two discharge regime for Midleton WWTP must clearly be the same as that of the D/T flow.
2. “Available” meaning the state of the thermal mass flowmeter, as on or off

We do not think that there can be any surety of water quality safety, if D/T are using the same pipeline as another operator, unless that operator is working to the same discharge regime. If the pipeline to the diffuser is held open longer than the 3½ hours in the D/T permission, there would be no practical way that we would ever find out. We have never been notified of spills immediately, or at any time, by Midleton staff - as is done in other countries.

5)(cont. from above) Dairygold/TINE have employed suitably qualified consultants to ensure that the Mogeely pumps are co-aligned with the outlet valve at Rathcoursey.

We see difficulties again here if different consultants are used by D/T, IE and CCC and that the ESB supply is in different zones so that local power failures may not be alerted to.

We are not happy with living with a system that has just too many parts that can go wrong; with too many parties and operators; with total reliance on the ESB, which is operating in different zones and may well have different power failures. There is an emergency overflow system in the foreshore tank, which, in fact, did work so continuously that Cork CC advised Inspector Wall as recently as 2012, that there was no ESB at the control building on the foreshore tank.

This would not satisfy the rigours of the Habitats Directive that flows could be kept to what the expert Department in this field, the Department of the Marine, insisted upon in 1992 and upheld ever since and, if an Oral Hearing also decides that this discharge point is outdated, D/T should re-examine alternative solutions to their waste problem of which there are many, including continuing their pipeline to the open sea at Ballycroneen.

8. Addition of nutrients to the water

Even if the addition of Nitrogen and Phosphate are added at the ELVs granted to Midleton WWTP, there is an undeniable addition of N and P.

Until we raised the extraordinary claim made in the original NIS and EIS that,

“Trade effluent will be discharged just south of Natura 2000 sites via diffuser pipe on 6+ hour ebbing tide in a 24 hour period with water undergoing an ~80% exchange so that the subsequent discharge event will occur on new water coming in,”

made no less than 25 times – before being withdrawn and reduced to a single estimate of 35% water exchange - the source of which figure, of such great importance, I discuss later in s.9 below.

If it can be shown that there is virtually no water exchange, or, indeed, if there is any, and that the new water is coming UP from the Lower Harbour, making an anti-clockwise flow around Great Island, then any addition of nutrients, however small, will simply accumulate in the North Channel and be available to be taken up by the phytoplankton, including the toxic algal blooms of PSP that the North Channel has had, uniquely, for decades (see sec. 6 in our first submission and Appendix 1).

In the case of the North Channel SAC and the Appropriate Assessment (AA) made by Dairygold, no mention at all was made of the EPA advice that no further nutrients should be added to this inner part of Cork Harbour because of encouraging significant blooms of PSP dinoflagellates, with, in fact, no mention at all of this threat even though the recognised main land use of the North Channel being oyster farming, in the AA.

8.1 EPA advice not to add further nutrients to the North Channel for fear of toxic algal blooms. The EPA studies of 2001 and 2002.

In the first EPA study on the “Measurement and Modelling of Nutrient Dynamics of Two Estuaries in Ireland – Wexford and Cork Harbours” by Costello et al (12 others) published in 2001 (**Ref.1**), the authors claimed in the Conclusions (p.45) that,

“In this study, the distribution of phytoplankton was quantified in space and time using a two-dimensional integrated nutrient and hydrographic mathematical model. The model was validated using tidal elevation and current measurements, dye releases, airborne remote sensing, and field data. Water samples were collected over different years, months, and state of the tide. At a spatial resolution of 30 x 30m, this was the most detailed water quality model conducted for entire estuaries in Ireland that integrated hydrography and nutrient dynamics.”

The Executive Summary, on p.3, made the point about the algal blooms and “a toxic dinoflagellate, *Alexandrium tamarense*, (which) has contaminated shellfish in Cork Harbour” (Note page nos. used here are for the pdf attached to this submission, rather than the hard copy.)

and on p.4:

“In Cork Harbour, phytoplankton blooms were more limited to the inner estuary, where they coincided with, and probably contributed to, the deoxygenation in deeper waters.

*“While chlorophyll levels were higher in Wexford than Cork Harbour, environmental impacts were greater in the latter. Within estuaries, eutrophication is better characterised by apparent problems than simple chlorophyll levels. **On this basis, the deoxygenation in Cork Harbour estuary and toxicity from dinoflagellates, indicate that the estuary is eutrophic.**”*

*“The study found that point sources (outfalls) of nutrients are contributing to phytoplankton blooms in both estuaries. **Measures to reduce waste inputs into the inner brackish-water part of the estuaries are thus required to reduce the occurrence of harmful algal blooms, especially in Cork Harbour where toxic blooms have occurred and are likely to continue to occur**”.*

In the section on Cork Harbour on p.7, 4 recent sets of reports on the Harbour were referred to,

*“The reports concluded that the water quality **particularly in the upper reaches of the harbour** has deteriorated over time”, and again that,*

“Phytoplankton causing Paralytic Shellfish Poisoning (PSP) have been recorded in Cork Harbour, namely Alexandrium tamarens in 1996 and 1997 (Marine Institute 1999)”.

p.14 *“Cork Harbour has a large native oyster (Ostrea edulis) farm.”*

In the Discussion on Cork Harbour on p.43

“Cork Harbour meets more of the criteria for a eutrophic system than Wexford Harbour does (notably (1), (2) (4) and (7) from the list i.e.:

(1) nitrate concentrations enhanced above the background level;

(2) exceptional algal bloom concentrations;

(4) oxygen deficiency;

(7) occurrence of shellfish poisoning”.

“Direct nutrient inputs to the surface layers may increase the size of toxic algal blooms when conditions are appropriate for growth of PSP-causing species.

It is notable that nutrient loads to Cork Harbour are twelve times more for industrial and four times more for sewage than Wexford Harbour.”

In the Conclusions on p.48, the authors admit:

“A limitation of this project was the absence of sufficient data on water flows and nutrient inputs from sewers, sewage outfalls, and limited information from some industrial outfalls.... It is thus not possible to point to any particular outfall as a main contributor to nutrient enrichment with confidence.

In Cork Harbour, the bloom was more limited to the inner estuary, where it led to deoxygenation in deeper waters. In both estuaries, the blooms moved up and down the

estuary with the tide. The bloom was less dispersed and diluted in Cork than Wexford, due to the narrower shape of the former estuary. This was reflected in the greater abundance of the slow growing dinoflagellates in Cork than Wexford. These species can cause toxicity and contaminate shellfish.

*“Both estuaries receive significant sources of nutrients from catchment run-off and outfalls in the estuary. While chlorophyll levels were higher in Wexford than Cork Harbour, environmental impacts were greater in the latter. Within estuaries, eutrophication is better characterised by apparent problems than simple chlorophyll levels. **On this basis, the deoxygenation in Cork Harbour estuary and toxicity from dinoflagellates, indicate that the estuary is eutrophic.**”*

And the first Recommendation (on p.46 also) is:

“Estuary Management”.

“Measures are required to reduce inputs of point source nutrients in both estuaries, because these are significantly contributing to the phytoplankton blooms. This action is especially important in inner Cork Harbour because potentially-toxic dinoflagellate phytoplankton develop blooms there during the summer.”

“Water Quality in Ireland 1998-2000”, McGarrigle et al (10 others) 128pp. plus c.100 pp. of Appendices (2002)

Perhaps the most comprehensive survey of the country’s estuaries was carried out by the EPA at about the same time and published in “Water Quality in Ireland 1998-2000”, McGarrigle et al (10 others) 128pp. plus c.100 pp. of Appendices (2002)⁴

p.xii. Of 47 estuaries and coastal water bodies examined, 13 were “eutrophic”, including the Lee Estuary and Lough Mahon. The Owenacurra Estuary/North Channel (Great Island) was classified with 3 others as “potentially eutrophic”. However,

“p. xiii **“With the exception of Greater Cork Harbour, which was still under consideration at the time of writing, all of these waterbodies (i.e. 12+3) were designated as Sensitive Areas under the UWW Regulations, S.I. No. 254 of 2001).**”

p.62 **“Primarily as a result of this assessment, each of these waterbodies, with the exception of Lee Estuary/Lough Mahon and the Owenacurra Estuary/North Channel, were classified as Sensitive Areas under the UWW Regulations, S.I. No. 254 of 2001. The Lee Estuary/Lough Mahon and the Owenacurra Estuary/North Channel are currently being assessed in greater detail with a view to making a definitive decision regarding their trophic status”.**

“Several estuaries and bays continued to exhibit serious pollution due to excessive organic enrichment from local waste water discharges, including the upper section of the Lee Estuary and Inner Cork Harbour”

It was surprising, to say the least that a eutrophic water like the Lee Estuary and Lough Mahon were not declared sensitive at that stage. The Owenacurra/North Channel was said by

⁴ “Water Quality in Ireland 1998-2000”, McGarrigle et al 128pp. plus c.100 pp. of Appendices (2002)

the Minister in 1994 not to have had sufficient data collected, but it was also surprising in view of the very definite comments of the EPA in the 1998-2000 Report, such as:

p.78 ***“Significant supersaturation (of oxygen) was only observed in the waters of the Ballinacurra Estuary and the North Channel above Great Island.”***

“With the exception of the River Lee itself, very high oxidised nitrogen concentrations were typical of the tributary rivers which discharge to the Upper Lee Estuary, Lough Mahon and the Ballinacurra Estuary and North Channel (Owenacurra and Dungourney)..... Concentrations in the outer harbour were mostly low, both in absolute terms and relative to ambient salinity, while concentrations in the Ballinacurra Estuary were moderately elevated.”

p.79 ***“The Lee Estuary, Lough Mahon and the Ballinacurra Estuary/North Channel were all strongly phosphorous-limited, but this was particularly pronounced in the Ballinacurra Estuary. Nitrogen availability was lower relative to that of phosphate in the waters of Outer Cork Harbour, though even in this high-salinity waterbody P was indicated to be the limiting nutrient in about quarter of samples from the 1998-2000 period.”***

p.80 ***“The Ballinacurra Estuary and the Great Island North Channel were classified as potentially, rather than formally, eutrophic owing to a lack of sufficient data on this system.”***

S.I. No. 254/2001 – Urban Waste Water Treatment Regulations, 2001 failed to declare the Owenacurra Estuary/Great Island North Channel “sensitive”. I was advised by the EPA that the DOE was in “consultation” with the EU about this omission and S.I. No. 440 of 2004 was issued to designate just these two remaining eutrophic waters in Cork Harbour “sensitive” on 15.07.04 – presumably at the behest of the EU Commission (see section 7.1.1 below)

Thus to make it clear, the Owenacurra Estuary and the Great Island North Channel have both now been designated EU sensitive waters and this includes the East Ferry water down to Marloag at the entrance to the Lower Harbour. This means that their nutrient status has to be taken into account.

p.121 *Discussion and Conclusions.*

*“It should be noted, however, that treatment plants that are overloaded or not operated correctly will cause pollution. The EPA Act defines an overseeing role for the Agency in relation to certain local authority functions, including the operation of sewage treatment works. Proper operation and maintenance of existing plant is important in ensuring the best use is made of these relatively expensive facilities. The recent increase in the extent of serious pollution is attributed in large part to the overloading of municipal sewage works as a result of recent rapid expansion of many Irish towns and a time lag in expanding treatment works to cope with additional loads. **Thus, in some cases “storm overflows” have become continuous flows** allowing poorly treated effluents to reach rivers once again whereas previously the plants were capable of properly treating all effluents received.”*

Of course, Middleton did not have a treatment plant until 2000, but it is no secret that the overflow situation has been very poor and can continue to be described as one of the above “cases” where storm overflows have become continuous flows, with an average of about 200 overflows per annum since 2002, of average spill size of nearly 1.5m litres (see the table in sec. 7.2 on p.50, below).

Thus there has undoubtedly been a large input of extra nutrients into a very small water-body, which, as we have seen above, is not dispersed to the Lower Harbour, but exits 60-70 days later from Belvelly, and this has kept the North Channel on the cusp of having PSP closures for oysters as well as the regular closures for mussels. No account at all is made of this additional and continuing source of nutrients to the North Channel in the Dairygold analysis, but clearly, as the two EPA Reports very forcefully stated nearly 20 years ago, no more nutrients should be added to this backwater of Cork Harbour, for this reason.

There is a synopsis of our long and detailed knowledge on the formation of blooms of Paralytic Shellfish Poisoning dinoflagellates in the North Channel over the last 20 years, as Appendix 1, to our first submission.

There is no mention or discussion of this whole thesis of our concern, which is thus completely ignoring the advice of a combined authorship of 22 environmental and hydrographic scientists (12 authors in Costello and 10 in McGarrigle).

The Developer has not commented on the regular occurrence of PSP blooms in the North Channel, nor has IW or the EPA, and thus we are not satisfied that the PD is justified and, indeed, that not one single body has provided complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the discharge on the likelihood of augmented PSP blooms, or any at all. Blooms which will greatly affect our economic and logistical life, threaten human health and even life and certainly kill fish-eating birds (see s. below)

9. Flushing of the Dairygold discharge out of the channel

(in Issue 2 of the Inspector's first report)

The Inspector summarizes the concerns raised by ourselves very adequately, but appears not to give any weight at all to the arguments put forward, some made even in further publications of the EPA.

“Concern was raised over the impact this proposed discharge will have on oyster beds in the North Channel. Further issues raised in relation to this concern relate to (1) hydrodynamic modelling, (2) phytoplankton growth, (3) trophic status of the North Channel, Midleton WWTP, (4) the lack of alternative discharge locations considered, (5) coastal dispersion modelling, (6) discharge restrictions, and the (7) lack of dilution and controls to meet the discharge requirements. (8) It is suggested that the discharge will not be taken out to sea but will instead circulate within the upper/inner reaches of the Great Island Channel.

Few of these questions are answered by the Inspector, leaving us with the impression that the Agency is simply not prepared to listen to the views of the public, let alone put up sufficient arguments to show that the Developer has put forward data which shows that no scientific doubt remains on many aspects. We deal with some.

9.1 Hydrodynamic modelling (1)

We can start with the advice that was given to IW by the Consulting Engineers, Mott MacDonald (MM), whom they appointed to advise on this particular discharge (Preliminary

Options Report, Midleton Sewerage Scheme, Rathcoursey Tidal Holding Tank, Mott MacDonald, March 2016 for Irish Water. (Ref.12 in our first submission).

MM were asked to examine 5 different holding tank volume and placement combinations and the option of a direct discharge to the open sea at Ballycroneen (as WGG Consultants had done before in 2009, Ref.13 in our first submission)

Under *Sec. 4 Required Infrastructure*

4. *“While the WWDL for Midleton requires that flows are discharged on the ebb tide only, the current operating procedure is compliant, but more restrictive, discharging for just three hours per tidal cycle. Given the location of the outfall at the northern end of the East Passage, it is understandable that the discharge from the holding tank would be completed some time before the tide turns, to prevent the treated effluent being washed back into the tidal reaches of the Ballinacurra River and North Channel on the incoming tide.”*

“A hydrodynamic model of the harbour would be required to determine at what stage of the tide the discharge from the holding tank should be stopped to prevent effluent being washed back into the Ballinacurra River and the North Channel. The modelling is outside the scope of this report and would be completed at a later stage in the project.”

4.3 Table 1 gives the storage shortfall for the relevant flows in 2021 as 6,546m³ and for the 2025 flow of 32,000m³/day as 10,825m³.

(To put this in perspective of what is available at present, the WYG Draft “Alternative Outfall” Report⁵ in sec. 5.4 p.17 actually admits that the present foreshore holding tank is sufficient only for the licensed discharge of IDL:

“The total daily licensed discharge from IDL is 5,000m³/day with a peak discharge of 270m³/hour. On the basis of these figures the required storage volume at Rathcoursey tidal holding tank to accommodate discharges from IDL only is 1,667 – 2,160m³. As a result the existing Rathcoursey tidal holding tank has sufficient capacity to provide the required storage retention time to cater for treated effluent discharges from IDL only.”)

MM continue:

“It would be unwise to alter the current regime of discharging over three hours without completing the necessary studies and hydrodynamic modelling to demonstrate that an increase in the discharge duration will not result in an unacceptable deterioration in receiving water quality”,

The Consultant’s add, however,

“It is unlikely that such modelling would be completed in time to allow the proposed storage to be designed and constructed prior to 2018,”

They go further in the final “Concept Design Report of April 2016” (Ref. 11 with our first submission), in their storage tank calculations, but then come to this conclusion:

Ref. 13 in first submission. Upgrading of Wastewater Treatment Facilities at Midleton, Castlemartyr, Cloyne, Saleen & Ballycotton. **Cost Benefit Analysis for Alternative Outfall for Midleton WWTP.** WYG Engineering (Ireland) Limited July 2009

Sec. 6.6 p.37 *“Having investigated the previous options in detail it was clear that the timeframe for delivering any of these options was not going to meet the Customers requirement to commence discharging in early 2018. Therefore, in consultation with Irish Waters Asset Strategy Department, a direct connection to the outfall downstream of the tidal holding tank was allowed to be considered as a potential option. Allowing this option would result in a reduction of the existing capacity of the outfall which has been accepted by IW Asset Strategy.”*

We thus have the admission from IW’s Consulting Engineers, that IW was no longer interested in an environmental solution, and that the whole storage tank design exercise was to be abandoned in order, “to meet the customer’s requirement to commence discharging in early 2018” – i.e. on purely economic grounds.

Further, we are told above that, “Allowing this option would result in a reduction of the existing capacity of the outfall which has been accepted by IW Asset Strategy.”

Thus all idea of the best possible environmental solution in the constraints of the existing discharge regime, had been abandoned solely because of economic considerations.

This is immediately contrary to the second iteration of the preamble of the EIA Directive:

“(2) Pursuant to Article 191 of the Treaty on the Functioning of the European Union, Union policy on the environment is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay. Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes”.

Understanding the water movement regime is absolutely crucial to using Rathcoursey as a discharge location.

We dwell on this at great length in three whole chapters (3, 4 and 5) of our first submission, covering 17 pages, to which I trust I may refer at the Hearing.

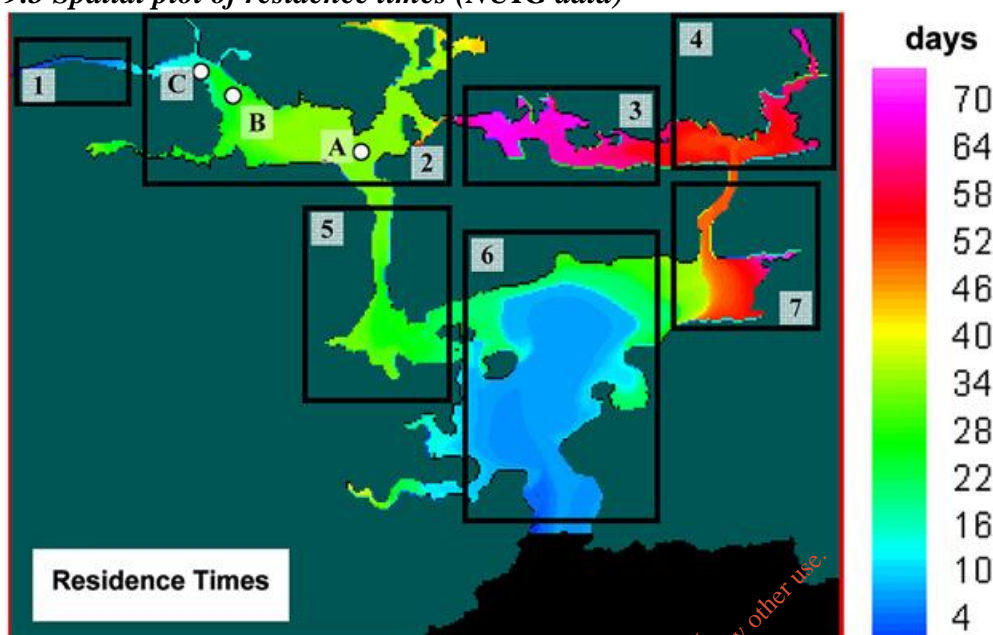
9.2 Work of Prof Hartnett et al at NUI Galway

Crucially I referred the Agency to the work of NUIG, under the direction of Prof. Hartnett, who have produced compelling hydrodynamic work on Cork Harbour, in the greatest detail, and the most sophisticated computer programmes, producing its results almost in real time – i.e. it took as long to calculate the water movement as that particular movement itself.

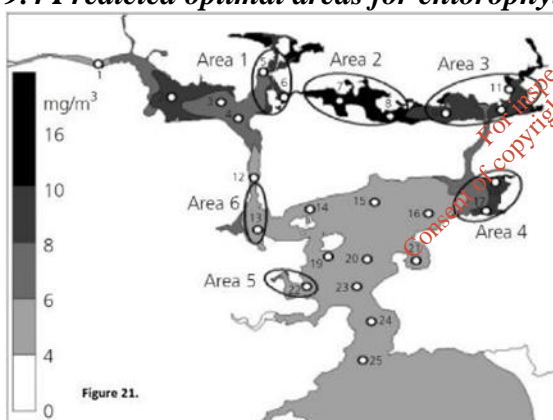
Several papers show the extreme lack of water movements away from this discharge point and the enormously high residence times of the water in the North Channel (60-70 days) , East Ferry (50 days) and at Rostellan(48 days).

This is shown very graphically in this figure from Hartnett (2012). This paper was not included with our first submission, so we include it with this one. This makes 4 papers covering the hydrodynamics of Cork Harbour waters.

9.3 Spatial plot of residence times (NUIG data)



9.4 Predicted optimal areas for chlorophyll-a

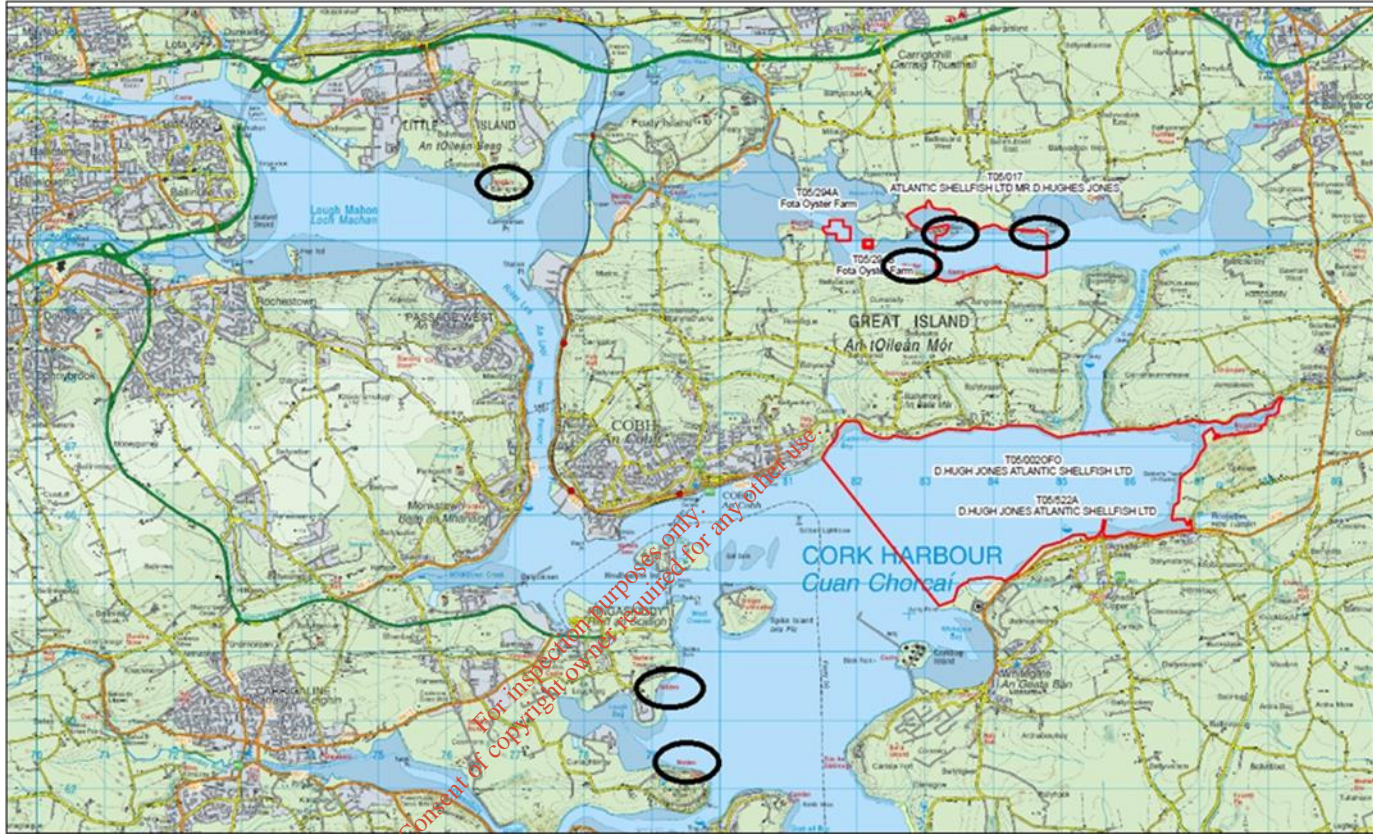


Nash S., Hartnett M. and Dabrowski T., “Modelling phytoplankton dynamics in a complex estuarine system” 2011. Proceedings of the Institution of Civil Engineers, Water Management 164 January 2011 Issue WM1 Pages 35–54 Ref. 3 in our first submission.

Areas of high plankton growth are characterised by areas of warmer water, high nutrient status and especially a high retention of that water (high residence time). These are precisely the requirements for the formation of an oyster bed, which has to retain the free-swimming oyster larvae over 20-24 tides at least. The North Channel has always been an area, which was near perfect for all these three parameters, and has been the site of an important oyster bed since the Iron Age, when kitchen middens of discarded shells are found on the shores. These are shown on the OS maps of Cork Harbour.

Armed with the above figure, a search of the other phytoplankton hot spots shown in the Figure above, found that the position of the historic oyster beds of Cork Harbour, which was the 4th largest oyster fishery in Ireland in 1903, agreed completely with the phytoplankton, and that there were kitchen middens at Lough Beg in the Lower Harbour and at Carrigrennan, as show here:

9.5 OS map of Cork Harbour with kitchen “middens” of oyster shells shown on the shores and circled here. Also shown are the position of the Company’s two Oyster Fishery Orders.



This ground-truthing of the NUIG hydrodynamic work is important in this case as:

- 1) It shows that the water of the North Channel does not exchange with new water
- 2) That nutrients released at Rathcoursey will be into a stagnant water body and simply accumulate
- 3) That this area is ideal for phytoplankton growth and this will include any toxic algae, such as *Alexandrium sp.*, which cause Paralytic Shellfish Poisoning (PSP). These dinoflagellates produce one of the most potent natural nerve poisons known to man – for which only the North Channel of Cork Harbour, in Ireland, has had a consistent summer bloom, for which there have been regular closures of the shellfishery over the years. See our postscript on PSP toxicity in our fourth submission s. 5 and repeated below in section 11, on the protection of human health.

In his 2012 paper (attached with this appeal for an Oral Hearing) Prof. Hartnett states on p.134:

The spatial variation of residence times provided a very good insight into the hydrodynamic circulation patterns of the harbour; for example they enabled easy identification of areas that are well-mixed with a high rate of tidal exchange and other areas such as the North Channel that are quite poorly-mixed and are thus a potential site for eutrophication. A number of areas were identified within which the residence times were quite similar; it was on this basis that the harbour was divided into the seven sub-regions shown in Fig. 9. The names of the sub-regions and their spatially averaged residence times are:

- 1) Lee Estuary - 3.8 days;
- 2) Lough Mahon - 31.4 days;
- 3) **North Channel - 64.4 days;**
- 4) **Owenacurra Estuary - 53.1 days;**
- 5) Harbour (west) - 26.2 days;
- 6) Harbour (central) - 10.7 days;
- 7) **Harbour (east) - 47.1 days.**

In “Modelling phytoplankton dynamics in a complex estuarine system” Nash S., Hartnett M. and Dabrowski T., 2011. *Proceedings of the Institution of Civil Engineers, Water Management* 164 January 2011 Issue WM1 Pages 35–54 (Ref. 3 with our first submission), the authors state on p.47

9.6 s. 3.3 Flushing study:

“The spatial variation of residence times within the harbour provides a very good insight into hydrodynamic circulation patterns and a means of identifying possible hotspots for phytoplankton growth. From the results for region A in Figure 14(b), it is apparent that the harbour can be divided into four separate sub-regions with different flushing characteristics. The Main Channel and central section of the main harbour are well flushed with residence times in the region of 10 days; residence times elsewhere are substantially greater. Those in Passage West and Lough Mahon are in the region of 20-35 days while those in Passage East are in the region of 50-60 days. **Finally residence times in the semi-enclosed North Channel are in excess of 70 days, indicative of a poorly flushed region. The results suggest that Passage East, Passage West, Lough Mahon and North Channel in particular are prime locations for algal growth.**” and in,

9.7 3.4 Phytoplankton modelling results

“Initial conditions were specified to the model for all nine water quality parameters. Figure 15 shows the initial grids for (a) ammoniacal nitrogen, (b) nitrate nitrogen and (c) orthophosphate that were specified for the phytoplankton simulation. The figures show that the highest concentrations of all three nutrients occur in the Lough Mahon area. Elevated levels are also in evidence in the North Channel and, to a lesser extent, in Passage East and Passage West. The reason for this is apparent from the flushing study results of the previous section where residence times were shown to be significantly greater in these areas than in the main harbour.”

p.49 “A rule of thumb for determining the limiting nutrient relates to the nitrogen:phosphorous (N:P) ratio (Chapra,1997), which is approximately 7.2 for biomass. An N:P ratio in the water of less than 7.2 therefore suggests that nitrogen is limiting, while

higher levels imply that phosphorous will limit plant growth (Chapra, 1997). Using the initial grids, the spatial variation of the available N:P ratio was plotted for the harbour (Figure 16). It was found that the ratio of available nitrogen (ammonia and nitrate) to available phosphorous (orthophosphate) was greater than 7.2 in Lough Mahon and the North Channel, suggesting that phytoplankton growth is phosphorous-limited. Generally, nitrogen is the limiting nutrient in coastal marine systems (Howarth and Marino, 2006). However, the EPA report on Irish water quality (McGarrigle et al., 2002) states that both Lough Mahon and the North Channel were found to be phosphorous-limited, thus confirming the above analysis. In the main harbour, the N:P ratio was less than 7.2, implying that nitrogen is the limiting nutrient in this area. Again, this agreed with the EPA findings for the same area where the majority of samples indicated that nitrogen was limiting”.

p.51 “Phytoplankton concentrations predicted by the model and recorded in the field were found to be highest in shallow-water areas with low hydrodynamic activity and, consequently, longer tidal flushing times. This is illustrated by comparing the chlorophyll-a predictions in Figure 21 with Figure 24, which shows the current velocities predicted by the model at mid-flood on a typical spring tide. In addition, most of the areas of high productivity correspond to the locations of domestic and industrial discharges or the mouths of rivers. The combination of long flushing times and continuous nutrient inputs means that these areas are prime locations for elevated phytoplankton production. These same areas were identified during the flushing study as likely areas for increased phytoplankton production. Indeed, upon comparison of the spatial distribution of phytoplankton with that of residence time, a striking similarity can be observed. Figure 25 shows the same chlorophyll-a concentration plot as that in Figure 21, the only difference being an increase in the number of contour intervals. When Figure 25 is compared with the spatial distribution of residence time for region A in Figure 14(b), it can be seen that the areas of elevated chlorophyll-a levels match almost perfectly with the areas of higher residence times. This suggests that water residence time plots such as those shown in Figure 14 may represent a faster, more cost-effective method of identifying potential eutrophic waters in (or without) the development of a full water quality model. It also demonstrates the importance of gaining a full understanding of circulation/flushing patterns within a waterbody, particularly with the intention of identifying sub-regions of similar characteristics.”

p.53 “If a body of water that has become **nutrient enriched** (or even eutrophic) flushes into a second body of water with a high residence time, the nutrients and algae will be retained in the second waterbody resulting in the potential development of eutrophic conditions in that area. This has significant implications for the siting of domestic and industrial outfalls”.

Rather than fill up this paper with figures, the reader can refer to them in the copy of this 2011 paper attached to our first submission.

We trust, however, it is clear just how important water residence time is for retaining both phytoplankton and nutrients together, enabling phytoplankton to form blooms.

The North Channel, together with the other traditional oyster areas, which also require high residence time for larval retention are, therefore, absolutely NOT the place to discharge waste water. The above NUIG papers provide the scientific proof of what I tried to explain to MC O’Sullivan at public gatherings 45 years ago. Neither he nor CCC, had ears to hear.

Neither, unfortunately, has the EPA Inspector. The evidence of all the NUIG papers, of so much greater precision and quality, and ground-truthed superbly with aerial chlorophyll-a photographs, has not been discussed in any way by the Inspector, who merely states that IW engaged Irish Hydrodata (IH) to carry out an assessment, which concluded, *“that the discharge will not impact the water quality of Cork Harbour.”*

If the EPA will not even consider the most up-to-date scientific work that is available in contrast to the work put forward by Irish Hydrodata based on work done mainly from 1977-1993, then we must ask them to review what evidence we can now put forward at an Oral Hearing

Because there has been no assessment of this new scientific work of the highly sophisticated NUIG Hydrodynamic team published in 2005, 2011 and 2012 on the enormously high residence times of 48-70 days, calculated for the waters of the NE Harbour at Rostellan and in the North Channel, by the Inspector or Agency, there is very reasonable scientific doubt that has not been satisfied by the Developer’s *“complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the site concerned”*.

10. Water exchange at the discharge point

This is, of course, crucial.

We have refuted the IH figure, firstly quoted 25 times in the original D/T EIS and NIS as an exchange rate of ~80% (we are told because of a “misunderstanding”) and then repeated in both IH Rathcoursey Outfall Studies as 0.35 (35%)

Clearly all the above NUIG work says that water exchange at Rathcoursey Point is negligible. The residence times of 50-70 days ensures this.

10.1 Evidence of oyster beds

s. 3.2.3 of our first submission looks at tidal exchange in relation to the length of the pelagic life of oyster larvae. We very simply say that a 4% tidal exchange means that 96% of the water will return. On the next tide, 96% of that 96% = $0.96 \times 0.96 = 0.92$ will return and so on for a minimum of 20 tides (we should probably have taken a 12 day larval pelagic life time i.e. 24 tides, based on a new EU paper, which Tristan Hugh-Jones is a minor author). However, the Table produced shows just how delicate is the necessity for obtaining the exchange rate of the water. At the same rate of exchange as the Oosterchelde oyster bed, for which wonderful Dutch historical water movement records are available, at a 3.7% exchange and at 4% exchange, we would be likely to get a spatfall, it becomes marginal at 5% and at 6% it would become unlikely, as there would not be the necessary 30% larvae remaining.

We feel that this is a valid observation and that this and the NUIG work deserve to be looked further into by both the Developer and Agency, and if necessary refuted by them. Both are scientifically based facts that call for care with this discharge and the arguments and methodology put up by D/T and IH *“lack complete, precise and definitive*

findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on our shellfish waters.”

The huge deposits of oyster shells in the Channel could not have occurred with a water exchange of anything over about 6% (an exchange factor of 0.06). This unarguable fact leaves sufficient room for doubt to warrant going to stage 3 of the Habitats Directive, which is invoked for Designated Shellfish Waters under the SEA for PRPs for Cork Harbour – and this should have been demanded by the EPA. See s.3.6 above.

10.2 Exchange factors

When the ~80% exchange rate was challenged, D/T dropped this estimate or even any mention of tidal flushing, or water exchange, let alone putting any figure on it in their updated NIS of April 2018, that the EPA requested be made.

The first IH Rathcoursey Outfall Study ROS) of 19th May 2017 had stated clearly enough on p.7

*“On the basis of the dye studies the calculated exchange factor (effective amount of new water added to the tidal prism) for the waters upstream of Rathcoursey was reported (ref:17) to be **about 0.35**”.*

It also stated on p.42 in the section on Tidal Flushing:

*“A simple tidal prism model when applied to the harbour as a whole **gives a first estimate of the flushing time: $T = (P+V)/P$ where T is tidal cycles, V is the low water volume and P is the tidal prism. Using the values presented in Table 2.4 an average flushing time for the harbour as a whole based on neap tide volumes is $T = (90.6+247)/90.6 = 3.7$ tides or 2 days. The Cork Harbour Study (ref: 17- i.e of 1977) report suggested exchange factors with the open sea waters of about 0.2 - 0.4 representing the amount of ‘new’ water that enters on the flooding tide. Using the average exchange factor of 0.3 the flushing time would increase to about 6 days**”.*

*“The same calculation when applied to the waters upstream of Rathcoursey Point suggest a $T = (10.49 + 8.4)/8.4 = 2.2$ tides = **approx 1 day**. Applying an exchange factor of about 0.35 (ref:17) indicates a flushing time of about 3 days during neap tides. The ‘new’ flushing waters in this case are from the lower harbour and not from the open sea as above. However as the water sample data in Table 4.1 shows the median background values of DIN and PO4 at the Aghada and Roches Point sampling stations are not dissimilar.*

The conclusions drawn here are that:

- 1) The exchange factor at Rathcoursey is about 0.35 (35%) (Ref. 17. MCOS CHPR 1977)
- 2) T (tidal cycles) “when applied to the waters upstream of Rathcoursey Point suggest a T of approx. 1 day”, with a second estimate added showing:

“Applying an exchange factor of about 0.35 (ref:17) indicates a flushing time of about 3 days during neap tides”

10.3 IH estimates of tidal flushing that apply: 1 day and 3 days.

These two passages are repeated in the revised ROS of 11 July 2019.

In both the original and revised IH ROS they quote 3 sources for their exchange factor figure of 0.35 on p.7. These should be scrutinised:

9.3.1. Hydrographic Surveys (ref. 9) (Hydrographic Surveys Ltd, Midleton Outfall Dye Tracing Study 1992). They provide no more than this one fig. which is of no consequence:

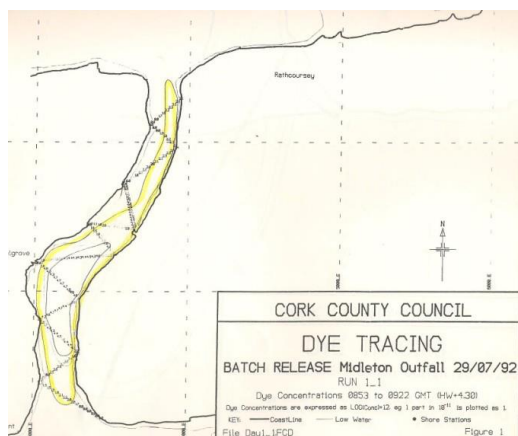


Figure 2.9 –Ebb batch dye release (ref:9)

10.3.2. Irish Hydrodata (ref. 16) (Irish Hydrodata Ltd, Midleton SS Marine Outfall Hydrographic Survey/Numerical Modelling Report 1993) provide:

figs. 2.5; a record of one tidal cycle on one single day (25.08.93) in the East Ferry at Rathcoursey and a record of the directions of flow (which can only be N or S). With all the variables of wind, river flow and atmospheric pressure affecting tides it is far better to look at the full spring/neap cycle – as IH provided in the 1993 EIS for Midleton, which we will look at below and I have copied several times in my submissions.

fig 2.10 Ebb tide batch release down East Ferry which demonstrates nothing much other than the dye goes out with the tide and is not nearly as important as the figures showing how far the return tide takes the dye right up to the far west of the North Channel in both their own and the MCOS dye studies below.

10.3.3. M.C. O’Sullivan (ref.17) (M.C. O Sullivan Ltd, Cork Harbour Pollution Report 1988, which must be taken to be 1977)

fig. 2.6 Current meter data for a single (undated) day which shows that **the flood tide current at all depths is flowing stronger to the north than the ebb tide does to the south.** This is the point we are making in our claim that more water enters the North Channel up East Ferry, than leaves it, indicating a general inland flow and anti-clockwise circulation around Great Island.

This is a fundamental point of disagreement between our own observations and drogue tests and the conclusions of Irish Hydrodata. This is of such overarching importance as

and so affects the opinion in this case, as to whether nutrients build up in the North Channel or, indeed, get carried away and dispersed, that it needs to be aired at Oral Hearing.

The submission that we made with 10 separate runs covering tides over nearly 4 weeks of work with the GPS drogue from 14.10.19 to 12.11.19, was dismissed in the last of the Inspector's reports (13.02.20) as

“To inform these (4) submissions, Mr Hugh-Jones conducted a two-day drogue survey in the Harbour to acquire further information on water movements in October/ November of 2019” and does not discuss our drogue or current meter findings to any extent in any of her reports and certainly does not take any notice of them whatsoever.

This is not what we expect from the EPA and we wish to challenge this refusal to accept this straight-forward field data that cannot point more to what the water movements are doing. This evidence cannot be simply ignored and we will not have it ignored.

We will discuss the current metering further below.

fig. 2.7 HW situation of the intermittent dye release, shows the highest dye concentrations at the west end of the North Channel – also the point we are making – also up the Owenacurra and also at Rostellan.

fig. 2.8 LW situation of the same intermittent dye release shows an even higher level of dye at Rostellan and low levels spread across the Lower Harbour. Dye concentrations are still high in the North Channel.

figs. 2.13 and 2.14 give EPA Owenacurra salinity data for 1,000m downstream and 500m upstream of the discharge point. It is not clear what the point of this is. We do know that the body of water coming out of East Ferry is distinct in salinity and temperature from the water coming down the main channel on the west of the harbour – from the 3 year PhD work on the PSP bloom in the North Channel. No reference is given. No point is made.

10.4 The source of the 0.35 (35%) water exchange factor

IH rely heavily on Ref. 17, the MCOS CHPR 1977), yet if we check it, we cannot find any mention of an exchange factor of 0.35 (or 35%).

We find that MCOS confirms to us on p.106 para. 28,

“It was found that a particle discharged at Rathcoursey would move downstream through the East Passage to south of Marloag Point and upstream with the flooding tide about half way up the North Channel.”

In chapter 14 on Dye Studies, para. 3 on p.172 he states.

“3. The tidal exchange factor (P) at the dye front for a Rathcoursey Point discharge is 0.19 (or 19% - see para 33 p.149)”

p.148 s.33 MCOS gives us a table with respective figures for exchange factors of 0.24 derived from the “Steady State Value” and for the 0.19 by the “Die-Away Value”

s.34 MCOS states inter alia,

“In the case of Rathcoursey Point, 65% of the dye pumped was in the area at the end of pumping”.

This was at the end of the 5-day intermittent pumping he carried out. With 65% of all the dye pumped, still remaining, the IH calculations above, showing that there will be complete tidal flushing of discharges at Rathcoursey in 1-3 days, can be seen very simply not to be correct and certainly cannot be held to be, ***“definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the site concerned.”***

This observation alone throws the IH calculation of tidal flushing in 1-3 days into enough doubt to demonstrate that an Oral Hearing needs to be held and that a stage 3 AA needs to be carried out.

We examined this disagreement between us more fully in the comments made by us on the D/T commentary of our last two submissions, in our Submission No. S005964 of 31.01.20 in Appendix A on p.10 in:

http://www.epa.ie/licences/lic_eDMS/090151b28073/aa0.pdf

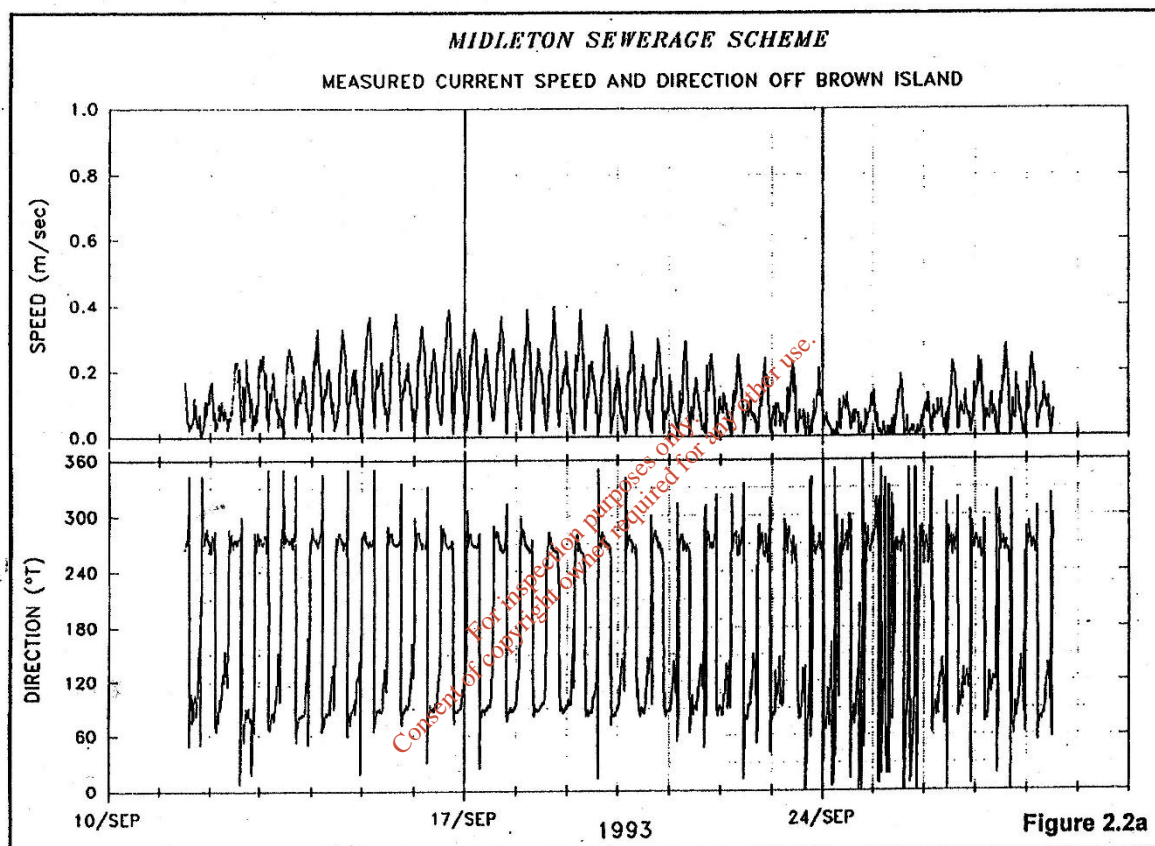
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11. Hydrography

11.1 Current meter readings obtained by Irish Hydrodata in 1993.

I have several times referred to the record of the current meter positioned just to the east of Brick Island in the centre of the North Channel and the west end of our oyster beds, furthest from the Rathcoursey discharge. This was represented by IH as a graph of current speeds with one of the current direction underneath;

11.2 Current speeds and directions at Brick Island. Midleton WWTP 1993. EIS 1996



It is very clear from this data that the flood currents, bringing in water from Rathcoursey and East Ferry, over the oyster beds, are very much greater than the ebb currents (see peaks and corresponding directions below). If the length of flood and ebb are not too different, then there will be much more water coming into the North Channel than leaving it, indicating an anti-clockwise movement of water around Great Island.

This figure is shown with the very same data taken from IH, by Prof. O’Kane in a study which he undertook to satisfy the DOM foreshore licence and published in 2007.

He broke the above fig. into 3 figs. of 4 days each and I reproduce just one, below, to enlarge the scale, which makes it even clearer:

11.3 First 4 days (15.09.93 – 18.09.93) Spring tides. From Prof. O’Kane Modelling the Norovirus in an oyster farm in Cork Harbour. 2007

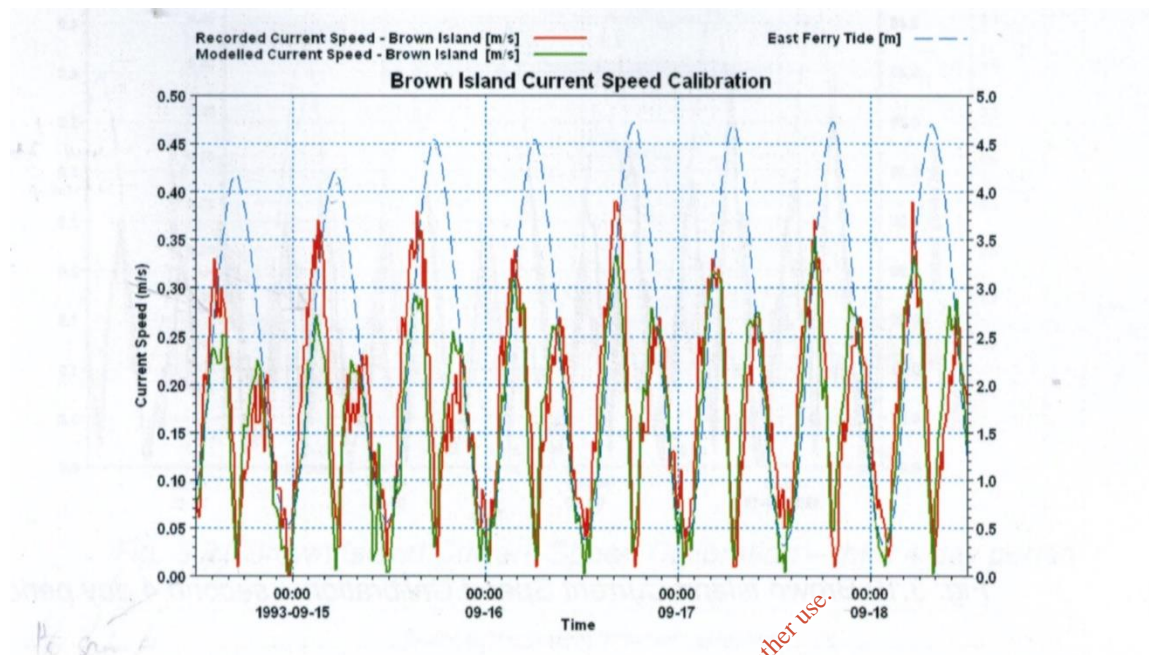


Fig. 3.17 Brown Island Current Speed – first 4 day period

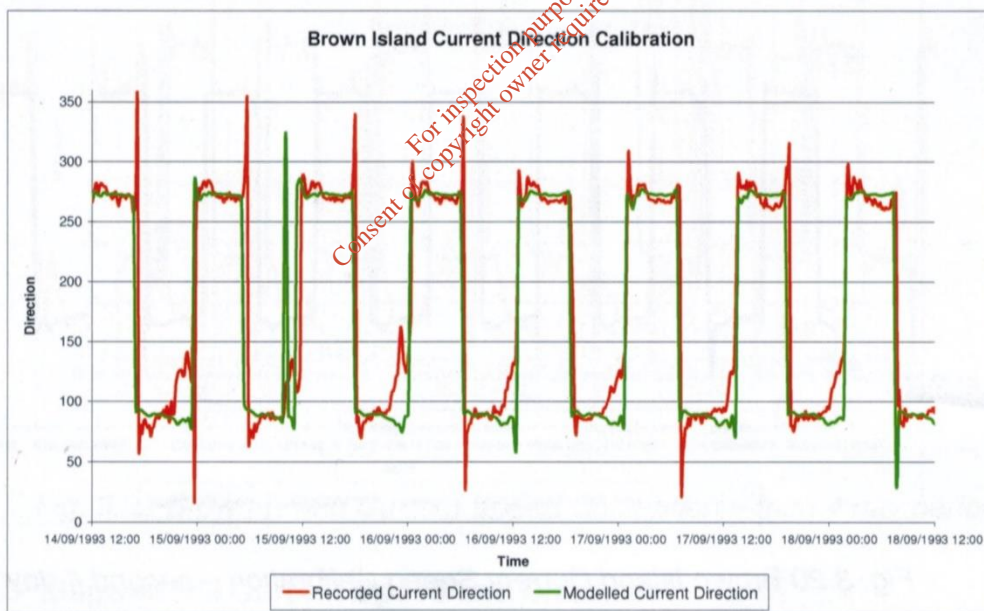


Fig. 3.18 Brown Island Current Speed Calibration – first 4 day period

The difference in current speeds on flood and ebb is shown again in IH’s own summary figs. below, published in the Midleton WWTP EIS of 1993 and 1996, with faster flood tides into the North Channel than ebb tides of water leaving it down towards East Ferry.

MIDLETON POWERAGE SCHEME - OUTFALL SCHEME

SPRING FLOW FIELD
HW - 3hrs
FLOOD TIDE

NORTH

POATY ISLAND

GREAT ISLAND

SPEED BANDS (m/sec)

1.50	> 1.75
1.25	1.50
1.00	1.25
0.75	1.00
0.50	0.75
0.25	0.50
0.00	0.25

Figure 3.3a
Flow Field - Example of Vector Diagram

SPRING FLOW FIELD
HW + 3hrs
EBB TIDE

SPEED BANDS (m/sec)

1.50	> 1.75
1.25	1.50
1.00	1.25
0.75	1.00
0.50	0.75
0.25	0.50
0.00	0.25

Figure 3.3b
Flow Field - Example of Vector Diagram

Irish Hydrodata have this data, which they supplied to Prof. O’Kane in 2006/7.

They can run it on their computer and advise us all whether there is a residual tide to the west, as would seem most obvious from this current meter figure, and, if so, by how great a water movement there is to the west. We have suggested this now several times – and the overall water movements from Rathcoursey upstream rather than downstream to the Lower Harbour, would be clarified once and for all.

If the EPA will not request this, then this matter has not been settled to the extent that we have complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the movements of the water away from the point of discharge and on to the protected site of the North Channel and the effects on our designated Shellfish Waters either side of the outfall. This is another matter for which we now request an Oral Hearing be held.

11.6 Atlantic Shellfish Ltd./BIM drogue and current meter observations

To recap on our last two water movement submissions, BIM loaned us a current meter which we kept in position for a whole tidal cycle of neap and spring tides – as a single tide can be too variable to give a true picture.

We describe this in our fifth submission (No. S005963) section 3.

http://www.epa.ie/licences/lic_eDMS/090151b280737a8d.pdf

IH reported their work for the Midleton SIS of 1993 as:

“Midleton Sewerage Scheme: Marine Outfall: Hydrographic Survey Report Nov. 1993”

2. Field Studies 2.1 Current and tide measurements

2.1.1 Two recording current meter were deployed in the North Channel at the locations shown in figure 2.1, for a 17 day period. The meters were attached to U-moorings and set to record the currents at 1.3m above the seabed every ten minutes.

2.1.2 Data from the current meters are shown in figures 2.2a, 2.2b (the Bagwell’s Hill gyre) . At the site off Brown (actually Brick Island see fig. 2.1) Island the flows were regular and peak flood tide speeds of 0.4m/s were reached during the large spring tides of 17th/19th Sept. Ebb tide values almost reached 0.3m/s. During average spring tides the corresponding values would be approximately 0.35m/s on the flood and 0.26m/s on the ebb. During the average neap tides of the 25th/25th Sept. flood tides fell to 0.2m/s and ebb values to below 0.1m/s.

Apart from noting the height above the seabed at which the currents were measured as 1.3m, it should also be noted that Irish Hydrodata gave us their own appreciation of the relative speeds of the flood and ebb currents in the second paragraph above, which can be tabulated as:

11.7 Irish Hydrodata measurement of flood and ebb tide speeds over the oyster beds at Brick Island.

	Flood tide	Neap tide	% greater flood
Peak	0.35m/s	0.26m/s	35%
Average spring tide	0.4m/s	0.3m/s	33%
Average neap tide	0.2m/s	<0.1m/s	>50%

It is abundantly clear that the flood tides are always considerably greater than the ebbs, which would mean that more water is entering the North Channel from East Ferry and Rathcoursey than is leaving it.

This would account for the long residence time of the water in the North Channel and the build-up of dye that is always found in the dye studies at the west end.

11.8 Data from our own observations

This is shown in the greatest detail in our last two submission, which should be referred to.

4th submission of 18.12.19 on: http://www.epa.ie/licences/lic_eDMS/090151b280728cd0.pdf

5th submission of 31.01.20 on: http://www.epa.ie/licences/lic_eDMS/090151b280737a8d.pdf

We also replied to the replies of the Developer sought by the EPA on 31.01.20, and these can be found on:

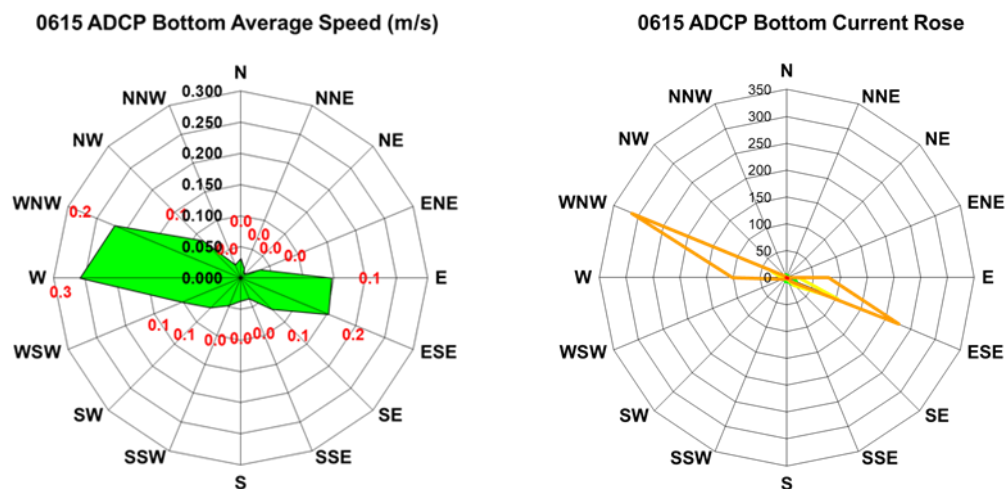
http://www.epa.ie/licences/lic_eDMS/090151b280737aa0.pdf

We did not set the current meters to the same depth as measured in 1993 of 1.3m, but we have measurements at 1.103m and 1.903m, which would give us an average of 1.5m and this comparable data to Irish Hydrodata's, shows a very similar pattern to that found in 1993:

11.9 Data obtained from the January deployment of the current meter at Brick Island

BIM have given us the average current speed and direction rose at the 1.1m from the bottom as:

11.10 BIM current meter flow direction rose showing current speeds and directions



It is easy to see that the peak current speeds are associated with the current flowing virtually due west, in other words with the flood tide and that they are considerably larger than the ebb tides flowing to the east.

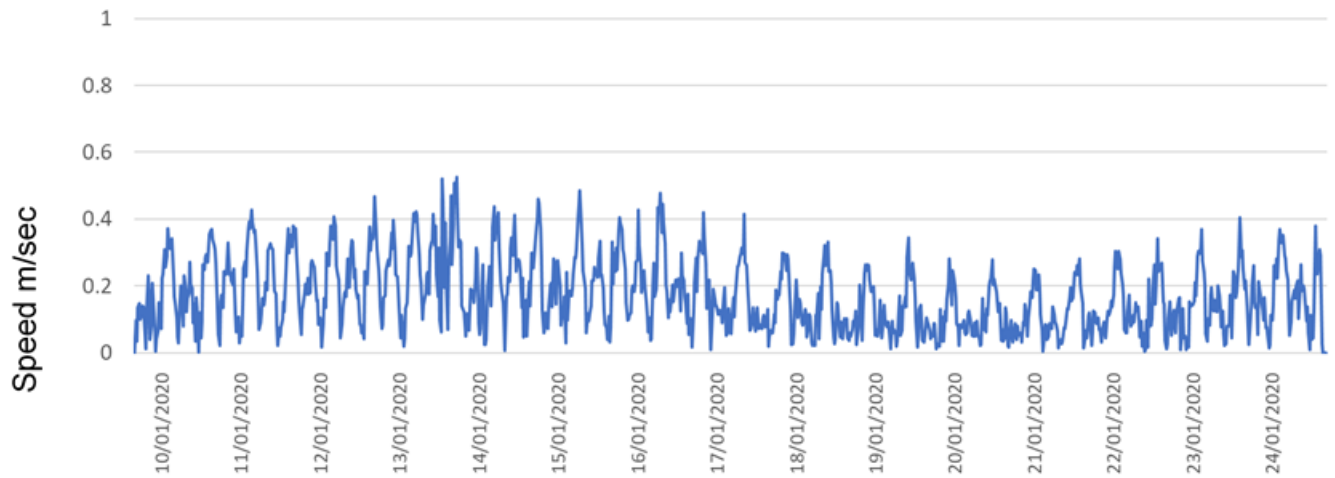
The current meter record at 1.1 and 1.9m gave us an average depth of 1.5m, which was the depth at which the IH meter was recording in 1993 and reported for the EIS.

12.11 Current meter records of January 2020

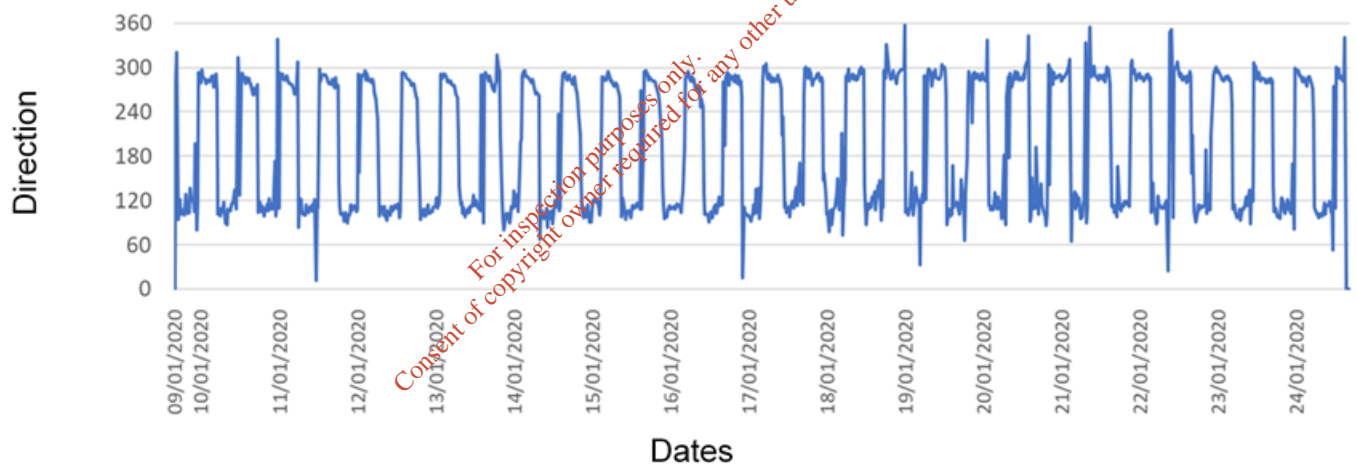
The records that we received back from BIM are shown below and can be seen to be very similar to the IH 1993 Figure above.

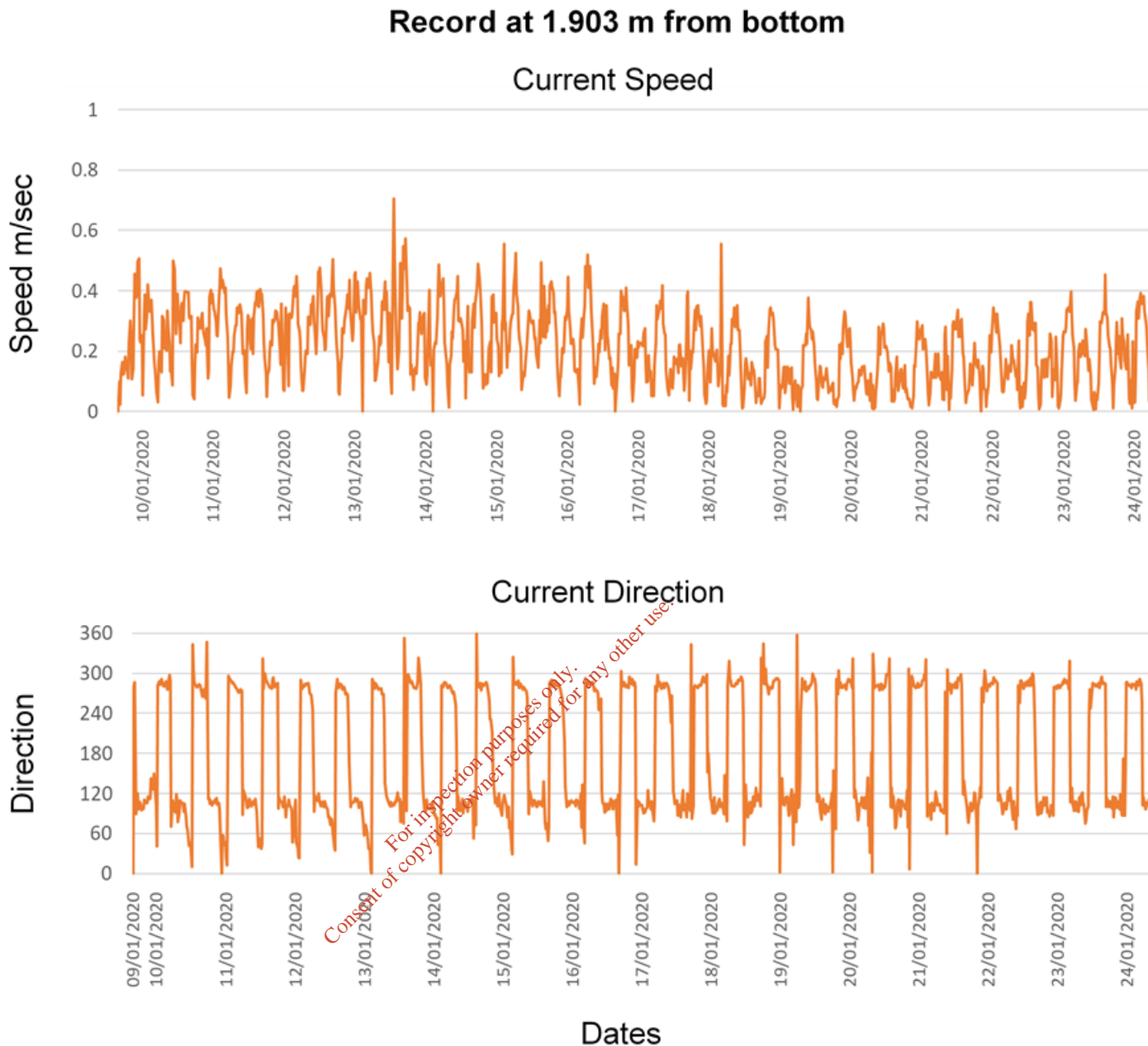
Record at 1.103 m from the bottom

Current Speed



Current Direction





11.12 Results of this metering

At this average depth of 1.5m, the average residual tide to the west is 0.027 m/s, which over the course of a tidal cycle of 12 hours 25 minutes, would represent a tidal movement of 1,200m in a direction of between 275.5° and 317.2°, i.e. between W and WNW as shown in the BIM rose above.

This water movement towards Belvelly and Lough Mahon can be observed in a boat at HW west of Weir Island at the start of the ebb tide, when the boat will follow the flow of water westwards.

The size of this residual movement was similar to the observation we made with the consecutive drogue runs that were made on the 8th and 9th of November (s. 3.1.2 and Table

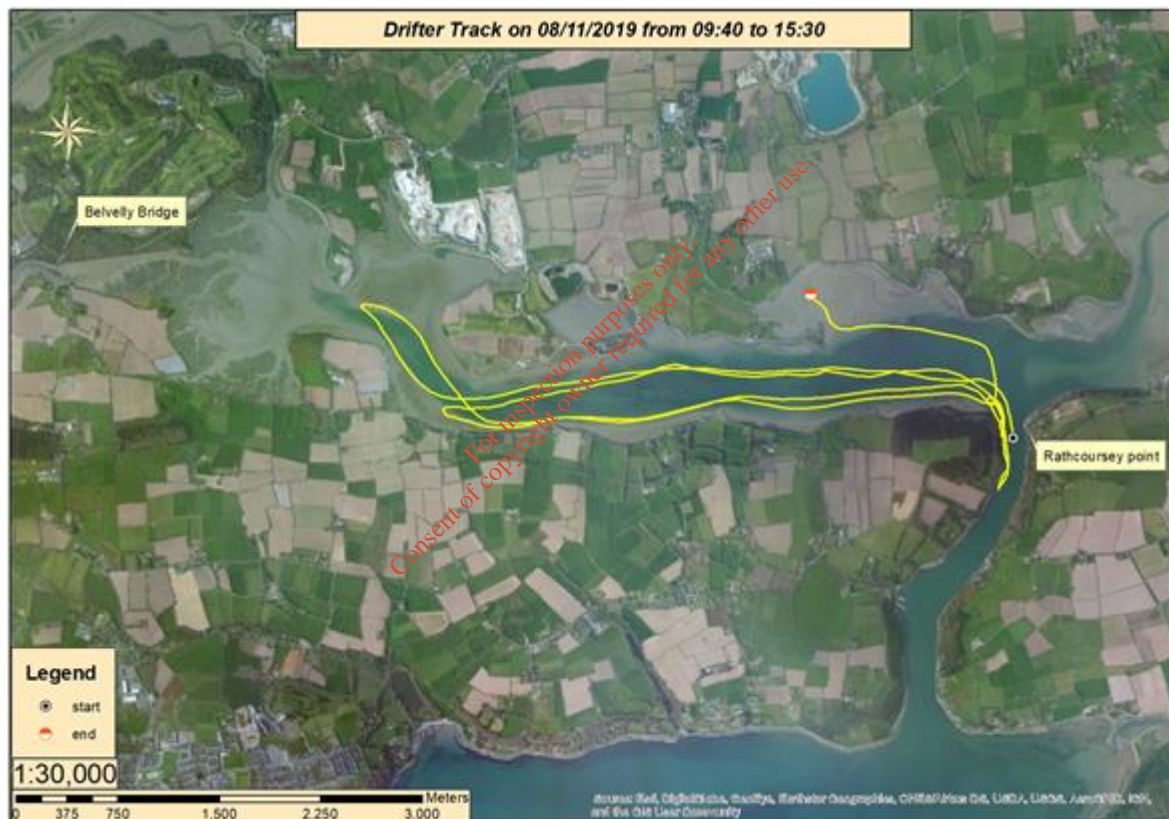
3.1.2.1 on p. 18 of our fourth submission) when I calculated that the westerly drift might be about 900m on the second tide.

11.13 Drogue runs.

BIM kindly made available their Pacific Gyre Microstar GPS Drifting Buoy, designed to track currents at 1 metre below the surface, for a period of a month in October-November 2019.

In our fourth submission we published the records of all these runs. On two occasions we had an unhindered set of two consecutive runs on both a neap tide and on a spring tide. On this occasion a third run regrettably veered north out of the main stream over the oyster beds and was wasted:

11.13.1 Sec. 3.1.2 Neap tide runs on 08.11.19 continuing to 09.11.19



On the second run above, which went furthest to the west (nearly to Weir Island) and right up into the Atlantic sea-meadow areas, the drogue passed the west end of our beds at Brick island, 44 minutes earlier than would have been expected. Using average flood tide speeds discovered from all this tracking, we could calculate that the water body must have moved to the west by some 900m.

The same happened on two consecutive spring tide runs on 12.11.19 and 13.11.19

11.13.2 Sec. 3.2.1 Spring tide run on 12.11.19 to 13.11.19



The drogue could hardly have travelled further west on each of these flood-tide runs – it would almost certainly have reached water shallower than its overall depth of 1.61m and have been prevented from going any further.

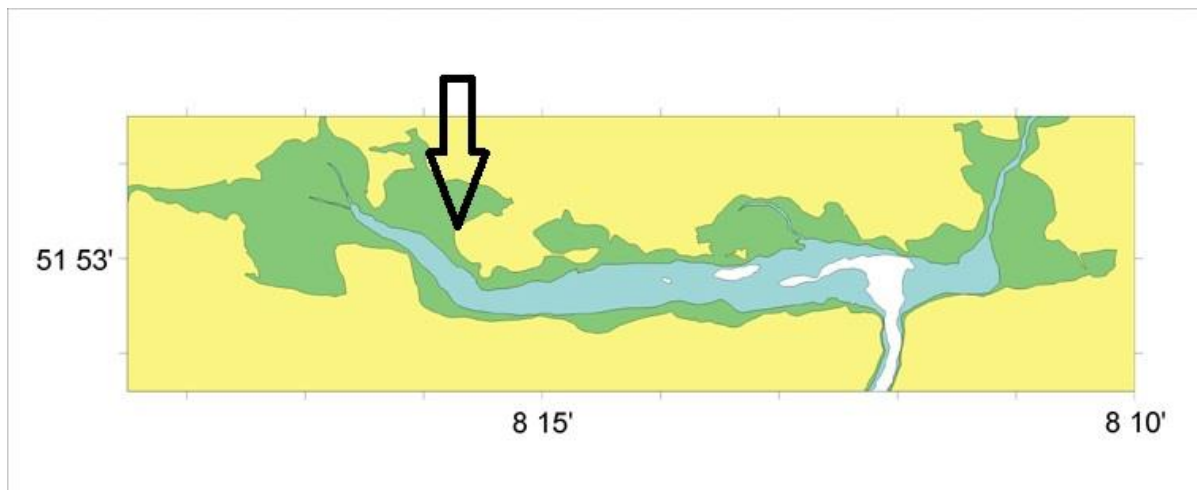
Comparing these 2 flood runs, despite a 30 minute slower run along the south side of the North Channel, the drogue was 13 minutes faster overall than the previous day to the passing of the Fota Oyster Farm sheds. It is possible that if the drogue had flowed on towards the Belvelly Channel, instead of to the east of Weir Island, and, indeed also found the narrow connecting channel through the Spartina grass meadow, it might have reached to the null point of the Lough Mahon/North Channel tides meeting, where the channel comes closest to the straight wall along the Fota Island shore.

If we again look at the times the successive tides pass the ends of the oyster beds, as we did for the neap tides, with the drogue 13 minutes earlier than expected, this converted to a residual drift to the west of some 320m.

11.14 Corroborating observations.

It is common knowledge that boats that break their moorings in East Ferry come up to the North Channel rather than down to the Lower Harbour. It is the same with heavy branches that come up and down the North Channel and are not flushed immediately to the Lower Harbour.

In our first submission s. 5.3.1 we report that we, ourselves, found the body of a man drowned at the pier in East Ferry, which was not recovered by us and the Gardai until many days later. We found it as far as it was possible to go up into the shallow area not far from Fota Island.



11.15 Position of a body recovered from a drowning in 1986 in the middle of East Ferry (6km to the SE and just off this map)

This simply could not have happened if the residual flow had not taken it westwards.

11.16 Confirmation of our current meter readings and drogue run evidence

We suggest, yet again, that the publication of any residual tide that exists in the North Channel, leading to an overall flow in any direction, that must be in the capability of Irish Hydrodata to produce, having all the 1993 data, should now be sought by the Agency. Irish Hydrodata can most readily run their on their computer to give us this, as we have now suggested on several occasions, make it available to us and to the Agency to clear this important matter up.

This can now be requested by the Agency for presentation at the Oral Hearing that we are requesting. It is of over-riding importance to the use of Rathcoursey Point for any discharge, but certainly, if it is shown that water movements are actually coming inland rather than going out to the Lower Harbour, then it certainly stops D/T discharging yet more nutrients into this regime and it will call into doubt the logic of having any discharge at this point.

We believe that we have supplied enough data and direct observational evidence to justify the Agency to question whether the Developer has provided “precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the waters affected by the Rathcoursey discharge,” and we submit that neither the Inspector nor the Agency have taken our submissions on the hydrodynamics into account to any degree, or made any substantive response to them.

We thus continue to request an Oral Hearing to be held so that we may make our case and obtain answers to this most important of all questions, which has not been taken into account sufficiently to have given us the satisfaction that all reasonable scientific doubt has been removed. Far from it, we have seen with our own eyes, and with the records above, that the case which is being agreed to by the Agency is not correct.

We will add further supporting evidence to this from a local skipper, who has never yet seen a boat break its moorings and go into the Lower Harbour, as an appendix. This sort of evidence from people like ourselves who have spent 50 years on this water, must be taken into account.

12. The protection of human health (Issue 5)

12.1 Seafood Poisoning. Vernon Ansdell in *Travel Medecine* (Fourth Edition), Elsevier 2019

We quoted the following extracts from this recently published book in our fourth submission s. 5, but they are worth repeating here to underline the seriousness of this toxin, which is uniquely generated by dinoflagellates every summer in the North Channel.

“PSP is the most common and most serious form of shellfish poisoning and occurs after eating contaminated bivalve molluscs (clams, cockles, mussels, oysters, and scallops), crustaceans containing saxitoxin, and other potent neurotoxins produced by dinoflagellates (e.g. Alexandrium sp.).

Saxitoxin, like CTX and tetrodotoxin, causes paralysis by blocking sodium channels in nerve cell membranes. It is 50 times more potent than curare. Saxitoxin and other toxins that cause PSP are heat stable and are not destroyed by normal cooking procedures, marinating, or freezing. Flaccid paralysis occurs in the most severe cases, with respiratory insufficiency as a result of paralysis of the diaphragm and chest wall muscles.

Deaths are typically caused by respiratory failure and tend to occur within 12 hours of eating toxic shellfish. For patients who survive past 12 hours, the prognosis is good. Recovery usually occurs within a week but may occasionally be prolonged for several weeks.

Case fatality rate averages 6% but may be as high as 44%. Mortality is higher in children, who seem to be particularly sensitive to the effects of the toxin.

There are no antidotes for PSP”.

12.2 UK Incidents.

From “Toxic marine microalgae and shellfish poisoning in the British Isles” Hinder, 2011

<https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-10-54>

Toxic marine microalgae and shellfish poisoning in the British isles: history, review of epidemiology, and future implications. Hinder, S. et al. [Environ Health](#). 2011; 10: 54.

12.3 Epidemiology of shellfish poisoning in the UK, 1960-2009

Although the potential adverse effects of toxic marine microalgae are well documented, there are very few epidemiological studies designed to thoroughly assess these effects [3]. Within the UK, there are few published records of shellfish poisonings, and we suspect that there is a high level of underreporting, as there is no set database which systematically records the number or frequency of incidents.

The relationship between toxic marine microalgae species and climate change has become a high profile and well discussed topic in recent years, with research focusing on the possible future impacts of changing hydrological conditions on Harmful Algal Bloom (HAB) species around the world. However, there is very little literature concerning the epidemiology of these species on marine organisms and human health.

PSP

The first reliably reported case of PSP in the UK was on the East Coast in 1969, where high concentrations of *Alexandrium tamarens* were monitored up to 15 miles offshore [2,25]. This outbreak caused illness in 78 humans and was responsible for the death of numerous birds and other marine mammals in the region [2,26,27] (Table (Table6).6). In the UK, it is thought that PSP is regional in nature, occurring in particular hotspots mainly in Scotland, e.g. Orkney and Shetland Islands [4]. There appear to be, however, few reported cases of PSP affecting fisheries throughout the UK, with the longest closure occurring in Scotland during 2000-2001, with aquaculture and scallop fisheries affected by PSP throughout the year (Table (Table66)).

Table 6

12.4 The history and consequences toxic events of dinoflagellate PSP toxin seafood poisoning within the UK from 1969-2007

Year	Event	Reference
1969	Toxins monitored up to 15 miles offshore on the East Coast of UK. Caused illness to 78 humans and was responsible for the death of numerous birds and marine mammals. Species responsible: <i>Alexandrium tamarens</i> .	[2,25-27]
1990	On the NE English coast in May high levels of toxins detected in mussels and scallops. Commercial fisheries were closed.	[25]
2000	TPO was placed in Falmouth in July, as PSP was above action limit. Species responsible was <i>Alexandrium</i> .	[56]
2000-2001	In Scotland, toxins detected throughout the year in aquaculture sites along the west coast, and in scallop fisheries grounds in Orkney and East coast Scotland. Led to restrictions in Fishing.	[66]

Year	Event	Reference
2001	Toxins found in scallops in the sea adjacent to Northern Ireland. Led to a ban on scallop fishing.	[66]
2002	Warning notices and VCA were places in Salcombe estuary, Devon, from July to November, and Holy Island, Northumberland, in May, when cockles and mussels returned positive results.	[58]
2002	Loch Eishort, in Skye and Lock Hourn, were closed in June and July where toxins were detected in mainly mussels.	[67]
2002-2003	PSP was detected in scallops in Orkney, Morary Firth, and the North Minch from May to September. Fisheries closures were implemented.	[67]
2005	Mussels from Pont Pill, Fowey found PSP toxins above the regularity limit. The site was subjected to temporary harvesting restrictions.	[60]
2006-2007	Toxins were detected in Two areas of the Fal, Cornwall. Temporary harvest restrictions in June and July.	[61]

(TPO = Temporary Prohibition Order. VCA = Voluntary Closure Agreement).

Throughout 1999-2009, the toxin PSP has maintained a low level in routine testing (average 0.73%), affecting between 1-4 sampling locations, within Wales and England (Table 4). The PSP producing species Alexandrium has also maintained a low abundance throughout Wales and England during 2005-2009 (Table 55).

It will seen from the above that the presence of a regular PSP hotspot in these islands is something of a rarity. We are, for instance, the only place in Ireland that has had regular bloom for decades. It can however develop to highly toxic levels, without any particularly visible signs to professionals or to the general public.

The North Channel was closed down for PSP in 2017 and many times before. It is under constant surveillance by the SFPA and Marine Institute, but their findings will almost certainly not reach the general public, nor stop them collecting shellfish, especially mussels, off the foreshore, mooring ropes, jetties etc., with potentially unpleasant health effects or potentially even death.

There has been no consideration of this key fear in our submissions and therefore no attempt made at all to provide “precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the water of the North Channel and Lower Harbour.”

Under the Habitat's and Shellfish Waters Directives, with the latter's PRPs, which call on the Habitat's Directive AA for the location of discharges, we ask to have our concerns taken into account and not just dismissed summarily or not even mentioned in any significant detail

13. Alternative discharge locations (Issue 2)

Alternative discharge locations were mentioned here and are discussed by the Inspector under Section 15 on p.35 of her report. The total sum of the Developer's thoughts is limited to three, one of which was never a starter and the second two were never requested to be specifically investigated by the Hydrogeologist, as far as we can see in his report,.

These were:

1 - discharging further downstream of the River Womanagh/Kilta (insufficient capacity);

CCC/IW have known for so many years that this was never an option i.e. CCC commissioned WYG Ireland Ltd to look into the lack of capacity for any further treated sewage from the Castlemartyr and Ladysbridge WWTPs in the Kiltha River in 2008 and further in 2009 – that is over 10 years ago.

2 - infiltration to groundwater (area liable to flooding);

There must be opportunities of finding higher ground at less than 14km distance. The Hydrogeological Impact Assessment carried out by Peter Conroy Independent Hydrogeologist did NOT look for sites suitable for soakaways, but for groundwater abstraction. There are many different drainage types and groundwater vulnerabilities where a suitable 5-10ha site could be acquired.

3 - constructed wetland (impractical due to the amount of land needed).

There are sites where a constructed wetland could be built with discharge opportunities to the local rivers. We understand from a constructed wetland specialist with over 20 years' experience, that just 5.5 ha would be sufficient for the D/T flow if the majority of treatment is carried out by a standard mechanical aeration unit with additional phosphate removal, and would be sufficient to provide adequate tertiary polishing of effluent to permit discharge into the river at the site.

There are many alternative solutions available, many have been put forward in the public's submissions.

We must remember the second iteration of the preamble of the EIA Directive which is fundamental in this case:

(2) Pursuant to Article 191 of the Treaty on the Functioning of the European Union, Union policy on the environment is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay. Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes.

And in Article 5

1. In the case of projects which, pursuant to Article 4, are to be made subject to an environmental impact assessment in accordance with this Article and Articles 6 to 10, Member States shall adopt the necessary measures to ensure that the developer supplies in an appropriate form the information specified in Annex IV inasmuch as:

3. The information to be provided by the developer in accordance with paragraph 1 shall include at least:

(d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects;

Under the EIA Directive alternatives – and proper alternatives – have to be raised, if only, at this stage, in outline.

These are some of the alternatives that are open to the Developer :

1. Discharge to the open sea as close to source in Ballycotton Bay
2. Discharge to the open sea at Ballycroneen – extending the pipeline that is already laid.
3. Discharge to ground within a 14km radius that is not prone to flooding. The hydrogeologist's report is concerned with water abstraction, not finding a suitable sink that will not affect groundwater. There are many different hydrogeological combinations and groundwater vulnerabilities mapped.

The question of water disposal, rather than simply abstraction, was not put to the D/T Hydrogeologist, so we do not know whether or not this is possible to the extent of the removal of all reasonable scientific doubt as to the effects of any disposal of waste water to ground close to source.

4. We understand that a constructed wetland of no more than 5.5ha would be sufficient with mechanical aeration.

5. We understand that other cheese-making factories are removing waste by anaerobic digestion and that power produced and sold can pay for the plant within 4-5 years.

All these alternatives must now be investigated and, if possible, dealt with at source, as laid on in the Directives.

14. Other concerns listed by the Inspector – and not answered.

Other concerns were listed by the Inspector, mainly in her first report and then added to. Nearly all were noted, but no comment, judgement or decision was made. I list them here, but think there is little point at the moment into going into each one.

1. Hydrodynamic modelling,

This is covered further than in the section devoted to it above in our first submission sections 2, 3 and 4

2. Phytoplankton growth.

I have dealt with this in our first submission in s. 6.1; the fact that PSP is the only HAB specifically mentioned in the SWD;

in 6.2 how we aided the 3-year PhD study into these blooms and the distribution of PSP cyst beds etc; the PSP closure we had in 2017; the effect of nutrients and the retentive nature of the North Channel.

in 6.2.3 I give the EPA's own warnings about adding to point sources of nutrient in the North Channel specifically

In Appendix 1 we list very fully the history of PSP blooms in the North Channel

In our fifth submission, we added a postscript on the toxicity of PSP, taken from a 2019 publication, advising that it is the most serious form of shellfish poisoning with fatality rates averaging 6% but reaching 44%, with no antidote.

3. Trophic status of the North Channel,

This is covered above and in our first submission in sections 7 & 8. We give the position from the start of classifying the trophic status of these waters to the present situation where the Owenacurra Estuary is already Potentially Eutrophic and more nutrient are now planned to be added.

4. Midleton WWTP

5. The lack of alternative discharge locations considered,

6. Coastal dispersion modelling,

7. Discharge restrictions, and

8. The lack of dilution and controls to meet the discharge requirements.

9. It is suggested that the discharge will not be taken out to sea but will instead circulate within the upper/inner reaches of the Great Island Channel

We are not going to answer these in detail any more. It is unproductive. Very few of these points were taken into account by the Inspector and she made no assessments of their validity or came to any conclusion. They were just dismissed.

We hope that we can raise all these unanswered point above at the Oral Hearing we are requesting and do not have to take them further.

15. References

An integrated approach to trophic assessment of coastal waters incorporating measurement, modelling and water quality classification". 2012 M. Hartnett, S. Nash*, I. Olbert
Estuarine, Coastal and Shelf Science 112 (2012) 126-138

College of Engineering & Informatics, National University of Ireland, Galway, Ireland

16. Supporting objections have been received from the following and are attached below.

Mr. Joe Noonan, Solicitor, Noonan, Linchan, Carroll, Coffey LLP, Cork

Paul Whelan, Holm Oak, Jamesbrook, Co. Cork

Tom Doyle, UCC, Cork

Brian Byrne, Loughcarrig House, Midleton, Co. Cork

East Cork Harbour for a Safe Environment c/o AJ Navratil, Ballinacurra House, Midleton, P25 AH3, County Cork.

Climate Aware Midleton, Roisin Cuddihy on behalf of *Climate Aware Midleton*. 21 Blossom Hill, Broomfield East, Midleton, Co.Cork.

Feidhlim Harty, FH Wetland Systems Ltd, 30 Woodlawn, Lahinch Rd., Ennis, Co. Clare, V95 A8D3.

Noonan, Linehan, Carroll, Coffey LLP, Solicitors,
54 North Main Street, Cork

David Hugh-Jones
Atlantic Shellfish Ltd
Rossmore
Carrigtwohill
County Cork

~ By Email - david@oysters.co.uk ~

18th March 2020
Our ref: 11503-20/JN/PW

RE: Applicant: Dairygold Co-Operative Society Limited and TINE Ireland Limited
Application: Industrial Emissions Licence
At: Mogeely, Cork, P25 Y996
EPA Licence Reg. Number: P1103-01

Dear Mr Hugh-Jones,

I set out below some observations on the licence application made by Dairygold Co-Operative Society Limited and TINE Ireland Limited under reference number P1103-01 to the Environmental Protection Agency.

1. EIA Directive

Under the EIA Directive 2014/52/EU an Applicant for permission for development consent is required to submit an Environmental Impact Assessment Report to the decision making body. That has not been done in this case. The Agency takes the view, mistakenly in our opinion, that the application may be assessed under the 2011 version of the EIA Directive.

The Agency has been satisfied to work with the Environmental Impact Statement prepared in November 2016 in the context of an application for planning permission to An Bord Pleanála. That EIS is over three years old.

Two difficulties result from this.

The first is that the information provided almost three and a half years ago cannot be regarded as up to date or best available. It cannot therefore provide a reliable and scientifically robust basis for the Agency to conduct an Environmental Impact Assessment.

Secondly, the legal requirements under the EIA Directive that applied when the application for planning permission was lodged are not the same as the legal requirements that apply now. The Directive changed in several material respects with effect from 16 May 2017.

There are transitional provisions for applications already under consideration prior to that date. The transitional provisions contained in the Directive could not be regarded as authorising reliance on such an old EIS in these circumstances. The Directive requires an assessment which takes account of baseline conditions. The current baseline conditions are unknown to the Agency. Reading the Directive as a whole and in a purposive manner, we submit that an out of date EIS does not fulfil these requirements. The transitional provisions must not be read in a way that undermines the fundamental effect and purpose of the Directive. The Agency should instead require up to date information and should assess that information in accordance with the current EIA Directive.

2017 changes to the EIA Directive

- The term ‘*Environmental Impact Assessment*’ itself has been redefined.
- Environmental Impact Assessment Reports must now be prepared by qualified and competent experts.
- The Board is now obliged to have or have access to sufficient expertise ‘*in order to ensure that the information provided by the developer is complete and of a high level of quality*’.
- Article 3 now requires the Board to pay special attention to population and human health. Impacts on population and human health are the first factors the Board must consider in assessing impacts. This new emphasis is of critical importance when considering the weight to be given to submissions on the potential impacts of the development on water quality in a nationally important area of cultivation of shellfish intended for human consumption.
- Article 5(1) of EIA Directive expressly requires that EIA Report includes at least “(f) *any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected*”.
- Annex IV of the EIA Directive refers to:

“A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.”

Even if the Agency persists in its view that the previous version of the EIA Directive still applies to this application, it should be noted that under Article 5(1) of the 2011 Directive that:

“In the case of projects which... are to be made subject to an environmental impact assessment ...Member States shall adopt the necessary measures to ensure that the developer supplies in an appropriate form the information specified in Annex IV inasmuch as

... the Member States consider that a developer may reasonably be required to compile this information having regard, inter alia, to current knowledge and methods of assessment.”

The original planning application and the EIS submitted with it could not be regarded as containing information based on current knowledge. The Agency therefore is not able to complete an Environmental Impact Assessment. In these circumstances it is precluded from granting a licence.

2. Appropriate Assessment

Under the Habitats and Birds Directives (hereinafter collectively referred to as “the Habitats Directive”) the Agency must satisfy itself that there is no risk of harm to the integrity of the relevant protected areas having regard to their conservation interests.

The best scientific information before the Agency on impacts on water quality so far as shellfish are concerned is we suggest that presented by and on behalf of Atlantic Shellfish Ltd. This company is in a unique position of knowledge in so far as the wellbeing of shellfish in Cork Harbour is concerned. It has successfully cultivated shellfish in the waters for decades. It thus has unique expertise.

Relevant Law

As the Agency is aware, stringent requirements apply under the Habitats Directive in this case. We refer specifically to the following extracts from EU case law:

Case C-127/02 *Waddenvereniging and Vogelbeschermingsvereniging* [2004] ECR I-7405. Judgment of the Grand Chamber dated 7 September 2004:

“59.

*Therefore, pursuant to Article 6(3) of the Habitats Directive, **the competent national authorities**, taking account of the conclusions of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned, in the light of the site’s conservation objectives, **are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects** (see, by analogy, Case C-236/01 *Monsanto Agricoltura Italia and Others* [2003] ECR I-0000, paragraphs 106 and 113).*

61.

*In view of the foregoing, the answer to the fourth question must be that, under Article 6(3) of the Habitats Directive, **an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site’s conservation objectives must be identified in the light of the best scientific knowledge in the field. The competent national authorities, taking account of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned in the light of the site’s conservation objectives, are to authorise such an activity only if they have made certain that it will not***

adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects.”

Case C-418/04 *Commission v Ireland* [2007] ECR I-10947. Judgment of the Second Chamber dated 13 December 2007.

“243

*Under Article 6(3) of the Habitats Directive, an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site’s conservation objectives must be identified in the light of the best scientific knowledge in the field. **The competent national authorities are to authorise an activity on the protected site only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects** (see *Waddenvereniging and Vogelbeschermingsvereniging*, paragraph 61).”*

Case C-404/09 *Commission v Spain* [2011] ECR I-11853. Judgment of the Fourth Chamber dated 24 November 2011.

“99

*Under Article 6(3) of the Habitats Directive, an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site’s conservation objectives must be identified in the light of the best scientific knowledge in the field. **The competent national authorities are to authorise an activity on the protected site only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects** (see, in particular, *Commission v Ireland*, at paragraph 243).”*

From our initial review of the material presented to the Agency it is difficult to identify a scientific basis upon which the Agency can be certain, as it says it is, that the Habitats Directive threshold under Article 6(3) is met.

We submit that in accordance with the Habitats Directive as interpreted by the Court in the three cases mentioned above, the Environmental Protection Agency is precluded from granting a licence on the following grounds:

- (a) authorisation for this project may only be given once **all aspects** of the project have been identified which can, by themselves **or in combination with other plans or projects**, affect the conservation objectives of the site concerned. That has not been done.
- (b) authorisation for this project, may only be given if, in the light of the best scientific knowledge in the field, the Environmental Protection Agency is **certain** that project will not have lasting adverse effects on the integrity of the Cork Harbour SPA site. That threshold of certainty is only passed if and when there is no reasonable

scientific doubt as to the absence of such effects. That threshold of certainty has plainly not been achieved in this case.

As the Court of Justice added in C-258/11 *Sweetman & Others v An Bord Pleanála*. Judgment of the Third Chamber dated 11 April 2013:

“It is to be noted that, since the authority must refuse to authorise the plan or project being considered where uncertainty remains as to the absence of adverse effects on the integrity of the site, the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle and makes it possible to prevent in an effective manner adverse effects on the integrity of protected sites as a result of the plans or projects being considered.”

As is made clear in the judgment of Finlay Geoghegan J. in *Eamon (Ted) Kelly v An Bord Pleanála* [2014] IEHC 400 dated 25 July 2014, the Agency has three sets of separate and distinct duties under EIA, the Habitats Directive and what may be called ordinary planning law.

3. Unfounded Assumptions

We note that the licence is granted on the assumption that licenced conditions will be met. We also note however that the Inspector's Report dated 12 December 2019 also recites at page 3 multiple departures from existing licence terms. See the following:

“3. Compliance and Complaints Record

Compliance and complaints under existing licence

The Agency recieved (sic) three complaints in 2019 and six in 2018, mainly relating to noise and odour from the operation of the existing installation under the current licence (P0817-01) and the construction work currently taking place onsite.

There were seven non-compliances issued in 2018 in relation to odour, unapproved alterations to the site, cracked hardstanding at the milk intake area, bunding not meeting capacity requirements, waste storage and emission limit value (ELV) exceedance for suspended solids, from the operation of the Dairygold installation under the current licence reg no P0817-01.

There was one compliance investigation (CI001485) opened on 16 June 2017 to address bunding and pipeline testing and repair, weekly drainage checks onsite and groundwater reporting. An action has been raised on this CI with a due date of 31 January 2020. This is to address the outstanding programme of repairs and retests of the process pipelines and manholes that failed previous integrity testing.”

There is patently therefore no basis for the assumption of compliance upon which the decision to grant the licence has been made. Quite the contrary, there is a history of not meeting conditions. The proper basis for assessing the application therefore has to be one

where *non-compliance* is assumed. That approach has not been taken. A decision made on a hypothetical assumption at odds with objective evidence is not a rational decision and is not compliant with Irish or EU legal requirements.

Either of the above factors on their own would be sufficient to render it impossible for the Agency to grant the licence having regard to the exigencies of the Habitats Directive.

4. Expression of Uncertainty

The Inspector acknowledges candidly (final paragraph Addendum Report #3 dated 17 February 2020) that it may be necessary to review the Waste Water Discharge Licence D0056-01.

“Midleton WWTP and Stormwater Overflows

Mr. Hugh Jones additionally raised the performance of Midleton WWTP in his submission dated 18th of December 2019. He notes that the Midleton WWTP is operating at above its design capacity and is responsible for a large number of stormwater overflows to the Owenacurra estuary each year. Mr. Hugh Jones links the frequent stormwater overflows to the poor water quality and very high concentrations of dissolved inorganic nitrogen routinely measured in the Owenacurra estuary. The submission reiterates concerns regarding the cumulative effect of an additional discharge of nutrients from the Dairygold/TINE installation at Mogeely on the water quality of the North Channel of Cork Harbour.

Agency Response

The concerns raised in this submission have been substantially dealt with in the Inspector's Report dated 12th December 2019 and addenda to this report dated 12th December 2019 and 17th December 2019.

It is noted however, that since this WWDL was initially assessed, for a population equivalent (p.e.) of 15,000, the peak loading has increased to 16,724 p.e. The addition of the proposed discharge from the Dairygold/TINE installation at Mogeely, will further increase the emission of BOD, suspended solids, phosphorus, and dissolved inorganic nitrogen from the Rathcoursey combined outfall by 26% (as estimated by the IH report). The WWDA Licence does not specify a limitation on the mass loading or volume of the discharge; however, due to the substantial increase in the mass load of nutrients emitted to this water body, it indicates that a review of WWDL Ref. No. D0056-01 may be required under Regulation 14 of the Waste Water Discharge (Authorisation) Regulation 2007.”

It is clear from the context of this acknowledgement that there is uncertainty in the mind of the Inspector as to the future impact of the discharges having regard to the constellation of discharges already authorised and in particular that under the licence just instanced. Such activity itself is a further factor rendering it impossible for the Agency to validly grant a licence having regard to the requirements of the Habitats Directive, the requirements of the

EIA Directive and the requirement of Section 83(3) Environmental Protection Agency Act 1992 (as amended).

5. Undue Reliance on Compliance with and Adequacy of Another Licence

The Inspector asserts that she and the Agency are entitled to rely on the fact that Irish Water has a waste water discharge licence from the Agency and that it is Irish Water's responsibility to ensure compliance with that licence. The view seems to be that because Irish Water has been issued with an authorisation under S.99E, no pollution to waters will occur and that applicable ELVs will be met:

“Treated effluent from this installation, in addition to emissions from Irish Distillers (P0442-02) and Midleton WWTP (D0056-01) combine in an Irish Water pipeline before discharging to the North Channel. These discharges are limited under waste water discharge licence (WWDL) register no D0056-01, held by Irish Water. Irish Water, under Section 99E of the EPA Act, as amended, gave its consent for this discharge, specifying ELVs and certain other conditions and restricted periods of emission. Where a discharge is to sewer, it can be taken that, as the waste water discharge has been subject to authorisation by the Agency, the relevant environmental quality standards have been met through the ELVs and conditions associated with that authorisation. In addition, the WWDL has regard to the water quality standards and objectives for the receiving water and protected areas (including shellfish). It is the responsibility of Irish Water to ensure that the combined discharge meets the limits and satisfies the conditions set in the WWDL.”

The Inspector and the Agency assume that the conditions of WWDL D0056-01 have been met and will be met into the future. On that assumption the Inspector and Agency conclude there will be no unacceptably adverse impact on the water quality. This is a legally mistaken view and the Agency would be quite wrong to base a final decision on it. The existence of another discharge licence in no way displaces the obligations on the Agency under the EIA Directive or Habitats Directive with regard to impact assessment and appropriate assessment.

Conclusion

The material before the Agency does not equip it to satisfy its obligations under:

- a) EIA Directive
- b) Habitats Directive
- c) Environmental Protection Agency Act 1992 (as amended)

In these circumstances it is precluded from approving the application.

Yours sincerely,

Joe Noonan

Joe Noonan

NOONAN LINEHAN CARROLL COFFEY LLP

Paul Whelan, Holm Oak, Jamesbrook. Co. Cork Ireland



March 17th, 2020

EPA

Dear Sir/Madam,

I write to comment and object to DairyGold at Mogeely being allowed to discharge effluent directly into Cork Harbour.

My objections below are both scientific and ethical observations:

1. The effluent will directly pollute the water of the harbour and the pollution will stay within the harbour confines long enough for it to kill marine life that specifically are filter feeders or that depend on a limited pH range of the water. The length of predicted time the effluent will stay within the harbour varies according to scientific studies, but one thing is sure, it does not flush from the harbour in a tide or two or three or even a hundred. This is enough to change the marine environment substantially.
2. The discharge is effectively changing the marine ecosystem, making it unsuitable for a very high percentage of existing marine life. DairyGold are effectively destroying an existing marine ecosystem.
3. The destruction of a marine ecosystem flies in the face of a global need to preserve all ecosystems where possible, to help maintain and increase the planet's existing biodiversity levels. If the EPA does not protect this environment when it is obviously possible, then they are breaking the NATURA 2000 objectives.
4. The destruction of the marine environment around the East Ferry area of Cork Harbour can be avoided. There has not been evidence to show that DairyGold have made any effort to avoid this destruction.
5. The effluent will pollute Natura 2000 sites in the East Ferry area. The area is already under environmental stress from the sewerage that is being discharged. Currently the discharge from the sewerage from the pipe is carried down the East Ferry and surfaces where the current speed drops off just below the Church. *This discharge can be seen on a regular basis.* The same will happen with the DairyGold effluent.
6. Saleen Estuary will be affected day after day by the discharge. The SE is shallow and floods quickly bringing in detritus food matter for microscopic filter feeders and birds. DairyGold effluent will regularly flush into the estuary reducing accessibility to the food that drives the ecosystem in the area.
7. Saleen Estuary is home to over forty (40) lichen species from *Cladonia* species on the old mortared walls to lower seashore species such as *Lichina confinis* in tidal areas. The lichen 'flora' in the area will be reduced in two ways (at least): 1/ DairyGold effluent will leave a microscopic film on lichens destroying their ability to carry out

gaseous exchange and subsequently leading to their death. 2/ Many lichens in the area depend on nutrients from bird droppings. The bird population will drop because of the effluents.

8. The discharge will increase the level of phosphorus in the East Ferry area. This will certainly create algal blooms in the Saleen Estuary, depleting the water in the Estuary of oxygen.
9. The Saleen Estuary and East Ferry areas are a health-giving amenity for many local people. It is aesthetically pleasing to walk or boat in the area. Medical science appreciates the value of such amenities to people who use them. It is now a scientific fact that 120 minutes per week in such an environment bring significant health benefits. The value of this area is likely to decrease from the DairyGold discharge, slowly and imperceptibly over years.
10. Allowing DairyGold to discharge here will set a precedent for further industrial discharge. The existing discharge of sewerage has been used as a precedent and convenience for the DairyGold discharge as it is.
11. The decision to allow a discharge into an effectively enclosed body of water, with extremely poor flush cycles, in an environmentally sensitive area in which so many plants, animals, fungi and humans live, is very difficult to understand, unless of course the economics of the area and specifically DairyGold, are examined. My point is that the decision is driven by economics rather than preservation of biodiversity. Few will gain financially but many will see the environment nit.
12. Water is essential for all forms of life. This discharge strikes at the core of this single abiotic feature of an ecosystem. We are constantly told in the media and by Waste Water Ireland, of the value of water to the health of our country. Advertising material shows us clean pure water running from taps or mountain streams. It is presented to us as the purest environmental accolade.
13. There have been few alternative methods to disposing of the waste examined. One solution seems to have appealed to DairyGold from the beginning. There are alternative methods and they should all have been examined in the same detail as the discharge at East Ferry.
14. While the development at DairyGold will provide more jobs, the cost to the health of the environment is much too high. The EPA did little or nothing over the years in regard to the pollution (both noise and air) of Irish Steel and later ISPAT in Cork Harbour. It looks like they are taking the same approach here. The credibility of the EPA as an independent body helping protect the environment, is again called into question.

I now repeat again part of my previous submission here:

The Natura report examines the current state of the environment at habitats possibly affected by the Dairygold development. It does not examine the possible effects of the Dairygold development on these habitats in any scientific way; it simply draws 'hopeful' conclusions that the development will not adversely affect the habitats.

The report appreciates the value of the benthic fauna on the Natura habitats and yet fails to survey this important habitat.

The benthic fauna are essential as a food source for the Natura species described in the report. Damage to the benthic fauna (and indeed flora) will affect all the habitats at the eastern end of the harbour.

The report draws conclusions as to how the Dairygold development will affect the habitats (no appreciable deterioration) in the future without examining or referring to existing reports on the abiotic environment factors that will be affected by the development. I refer specifically to the following:

1. The report fails in particular to examine the physical and chemical properties of the discharge at Rathcoursey and its possible affect on living organisms.
2. The report does not refer to the factors affecting the dispersal of the discharge at Rathcoursey in the light of the following processes / parameters:
 1. The turbidity currents in the East Ferry channel
 2. The 'mixing area' which is described in other reports on Cork harbour as being mobile under the influence of the tide

The flush of water in the harbour.

Extensive studies have being carried out on this and none have be referenced in the report.

Without considering the above it is impossible to draw conclusions on the future effects of the Daiygold discharge at Rathcoursey, yet the report draws positive conclusion after positive conclusion. The report, it seems, was written without scientific logic or with a disinterest in discovering the true nature of the Rathcoursey discharge on the habitats.

Below are some specific points worth noting in the Natura report.

Specific considerations on the Natura report

Sections 5.0 to 5.2.1 of Chapter 5 on Ecological Impacts are missing from the PDF copy of the Main EIS document received by local residents of the East Ferry area.

Page 8: states that the main water body associated with the waste water discharge is the transitional 'North Channel Great Island'. I think this is an oversimplification as the Saleen Estuary must also be included specifically as it is a similar habitat and will be vulnerable to grey water influx as soon as a discharge occurs. Indeed it is possible more vulnerable to discharge than other bodies of water within the examined area.

The flushing of water at both these sites can take up to 76 days (see Nash report). Thus the Saleen Estuary would be at risk (high risk) '*of not achieving good status*' .

Re 7.3.1

This paragraph makes many assumptions and has many tenuous words or statements such as '*considered to be highly variable*' or '*discharge is not expected to significantly negatively impact*' prior to concluding with an assertive '*therefore*'.

This is a very unscientific way to come to a conclusion. Specific field work needs to be carried out to evaluate many of the statements in the paragraph.

*'The receiving water at Rathcoursey is dynamic in terms of its physicochemical properties, owing to the tidal nature of the waterbody and the various freshwater influences acting upon it. The benthic community, **which is integral to the habitats and species designated within the area**, is considered to be highly variable in terms of density and composition across the various physicochemical gradients within the receiving environment. The proposed discharge is **not expected** to significantly negatively impact or indeed alter the dynamic, typically estuarine properties of the receiving water as the concentration of nitrogen and BOD will have **no discernible effect on the receiving waters**. Therefore, it is envisaged that the benthic and infaunal community and subsequently the associated habitats and species of the Cork Harbour SPA and the Great Channel Island SAC will not be significantly impacted owing to operational discharges.'*

The simplified conclusion cannot be made in the light of the above and is one of the major weaknesses in the report. The statement that the benthic community will not be adversely affected needs more scientific attention as it is critical to the Natura 2000 evaluation on the area.

Re 7.4.1.1

This paragraph is again an example of poor scientific thinking. Because there are no known 'qualifying species listed' does not mean 'that there is no potential for disturbance of species'.

Re 7.4.1.2

This section considers only the bird populations of the area. There are other species

that can be affected by the discharge.

The lichen and diatom populations will be under threat from the discharges. These organisms, for example, do not depart when the discharge occurs, and then return.

Taking the irresponsible assumption that only birds are of interest (probably because of their appeal to amateurs whom have contributed significantly to data collection) the following statement from 7.4.1.2 is naive and fails miserably to follow any Aristotelian logic that a biologist, environmentalist or any scientist or school boy or girl would apply, namely:

*'the majority of SCI species feed in the intertidal, and are unlikely to be impacted by operational discharges, **as these species are unlikely to be present during discharge events.***

It needs to be pointed out that many of these species feed on material (invertebrates in particular) that are likely to be affected by the discharge. The conclusion drawn at the end of this section is **not reasonable**:

It is reasonable to conclude that significant habitat alteration impacts within the Cork Harbour SPA will not arise as a result of the proposed discharge.

Further under section 7.4.1.2 many unreasonable and unscientific conclusions are made under the heading **Operational phase**.

Some examples are,

- (i) it refers specifically to bird populations again without evaluating their dependence on the benthic fauna
- (ii) its uses the assumption that benthic species will not be impacted (no study to support)

(iii) 'the dilution and flushing capacity of the receiving water is considered adequate to assimilate the proposed discharges.'

Re point (iii) above:

Dilution: due to the complex nature of water flow in the channel and the further complex mixing of fresh and salt water and its tidal nature and the physical and chemical properties of the discharge, it is reasonable to conclude that discharged material will not be diluted adequately, indeed parts of it may be concentrated by vortex currents, surface wind and other forces.

Flushing: the flushing cycle and rate in Cork Harbour has undergone considerable study over the years. Flushing is not adequate in the area of the discharge pipe, or in any of the mudflats at the east end of the harbour. Indeed a duration of 76 days has been calculated for much of the east end of the harbour due to its extensive shallow depth Too many assumptions

1. It does not differentiate between the proposed discharges when the project is concluded (700m³) to 2700m³ in the medium term to a possible 4000m³ (nearly 6 times more than in the initial phase) in the long term.
2. The report fails to understand the complex nature of the water system carrying the discharge
3. The report fails to acknowledge in any way the very very poor flushing rate of the waters in the area of the discharge.
4. The report is focused on bird populations only
5. Data on bird populations in the area is of high quality but data on other species in

inadequate and desk-top studies should have illustrated that point. Much work on biodiversity needs to be done in Ireland. This is not a criticism of our National Biodiversity Data Centre, but rather a criticism of the lack of field work carried out in the preparation of the Natura report.

6. The report treats the species protected as isolated object whereas they depend on a significant food chain which is likely to be adversely affected by discharges.
7. It is worrying that this Natura Impact Statement has NO worries at all about the proposed development and the discharge. It describes NO areas for further study. All will be perfect and we should all be so happy that potentially 4000m³ of discharge will enter Cork Harbour in an area where the flush duration is as long as 76 days!

Comments on Field Surveys

1. The Natura 2000 report states that the benthic fauna will not be impacted by the discharge at Rathcoursey, yet there is no survey of the benthic fauna.
2. There is no survey of lichens which are critical for evaluation of the effect of the discharge in rocky seashore areas that potentially would be washed by the water carrying the discharge.

In summary, it is very obvious that this application for a discharge at Rathcoursey is unlawful and aggressive and flies in the face of both the opposing scientific community and the community of people living in the area. Its unlawfulness will have to be challenged if it proceeds.

Signed,



Consultant Lichenologist

Dr Tom Doyle

Lecturer in Zoology

School of Biological, Earth and Environmental Sciences

University College Cork

Room 1.14, Enterprise Building, Distillery Fields, North Mall, Cork

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To the EPA,

I wish to make a submission to the proposed determination of an industrial emissions licence application by Dairygold Co-Op Society Ltd and Tine Ireland Ltd., for an installation at Mogeely and an outfall to Cork Harbour.

Specifically I am concerned about the proposed emissions of nutrients from the Dairygold sewer into the Rathcoursey area **ignores the fact that this area is well known to have a high residence time in terms of water flow** (i.e. it has limited water exchange, see Nash et al. 2011).

The proposal will see a maximum of 4000 m³ discharge of emissions to the sewer per day which equates to **40 kg of FOGs, 140 kg of suspended solids, 60 kg of total nitrogen** etc. This is a significant amount of nutrients into an area that has a high residency. In their response to the EPA, Dairygold and Tine Ireland Ltd state “This figure of “up to 9 days” is not significantly different from the IH calculation of “3 – 8 days”. **Ok, this is correct but this ONLY refers to water moving very locally from North Channel into East Ferry.** I have personally spoken to Dr Stephen Nash (18th March 2020) and the correct residence time for the proposed outflow at Rathcoursey Point out of Cork harbour is in the order of 30-50 days!! The 3-8 days refers to the residence time of water in the North channel (near

Rathcoursey) that is near the entrance to East Ferry i.e. it will take it 3-8 days to move out of the north channel **AND then only into East Ferry**. However, East Ferry also has a very high residence time of 40-60 days (values interpreted from Fig 14 in Nash et al. 2011). Then when water flows from East Ferry in the Main harbour this also has a very high residence time i.e. Rostellan area has similar high residence times as East Ferry (20-33 days).

So in essence much of the extra nutrients coming from the proposed Dairygold sewer **will stay near the Rathcoursey area, and slowly move into East Ferry channel and then from there it will slowly move into the Rostellan inlet (an SPA) of the Main Harbour**. This is unacceptable considering that Rathcoursey is right beside an SAC which we have a responsibility to avoid their deterioration of and the species protected by both the Birds and Habitats Directives. What will happen to all the FOGs entering this body of highly restricted water movements? Has the industry carried out any discharge studies to observe how FOGs behave in such a small area? Will it leave a scum floating on the surface of the water and will much of this wash up on the immediate rocky shorelines? Has there been any measurements of the metal content of these emissions also?

Studies by Raine (2014; A review of the biophysical interactions relevant to the promotion of HABs in stratified systems: The case study of Ireland) have shown that the hydrographic of the North Channel makes it more susceptible to increased occurrence of Harmful Algal Blooms. We cannot ignore these important studies as extra nutrients would only make these more likely to occur. See Raine (2014) quote:

“Phytoplankton will bloom inside coastal bays only if their growth rate exceeds the flushing rate of the bay. Alexandrium blooms occur in Cork Harbour, Ireland. This estuary is hydrographically quite complex, but Alexandrium blooms initiate in the North Channel, a deduction based on both cyst surveys and high frequency (2–3 week) sampling of the entire harbour at bloom initiation stage (Ní Rathaille, 2007). Growth of Alexandrium in the estuary is controlled by both irradiance and temperature, which combine with light attenuation to form a temporal window when the growth rate is high enough to overcome tidal flushing. Blooms typically occur when the tidal flushing rate is slow for long enough to allow full development of a bloom (Ní Rathaille et al., 2008a). Low tidal flushing implies decreased turbulence, a condition favouring dinoflagellate growth (see Wyatt (2014)), as well as a reduction in suspended sediment loads with improved quality of irradiance, allowing sufficient light to penetrate throughout the water column. As Alexandrium blooms here require 2 weeks to develop, a length of time which will span a spring tide, they only occur when the spring tides are small enough to allow a net positive growth as is found in June and July.”

I also want to state that Rathcoursey outflow is directly located where a localised population of sea bass are known to aggregate (Doyle et al. 2017 Scientific Reports; see figure 1 below). Sea bass are an economically important species with the combined commercial and recreational fishing mortality well above the maximum sustainable yield (so they are declining; Doyle et al. 2017) so protecting them when they are inshore in their foraging areas is really important. Furthermore, as a long lived fish, ~20 years, what are the cumulative effects of the input of such nutrients over 20 years into a known foraging area? Our tagging study showed that sea bass are highly resident in this area which has important implications for the species' susceptibility to local depletion (Doyle et al. 2017).

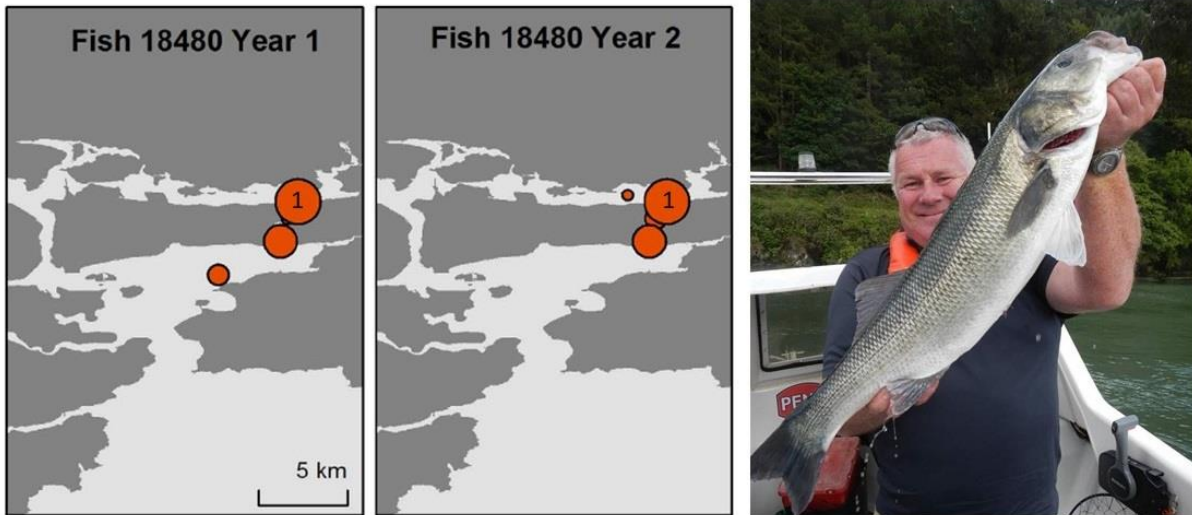


Figure 1: An example of a sea bass that was tagged in Cork harbour and subsequently spent ~6 months at East Ferry in 2014 and a similar period of residency at East Ferry in 2015. Coloured bubbles indicate the relative total residency the sea bass spent in a particular area. Note that the fish spent most of its time in the very north of the East Ferry Channel (labelled 1) which is very close to the proposed outflow. This sea bass could spend up to 29 days continuous at this location before moving south to the bottom of the ferry and then returning back to the north.

Yours sincerely,
Tom Doyle.

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Brian Byrne,
LoughcarrigHouse
Midleton,
Co. Cork.
P25D785
15th March 2020.

Objection to the Proposed Determination by the EPA of 19th February 2020 in the case of Dairygold/TINE Ref. No. P1103-01

I wish to add some more observations to my earlier objection regarding water movement in the East Ferry Channel and to call on the EPA now to give us the chance to make our objections to their Proposed Determination at an Oral Hearing of this case.

Over the last 10 years numerous boats have come upstream from their moorings and grounded north of the Midleton Sewage Outfall (proposed Dairygold outfall).

A 40ft cruiser owned by Quilligans in Cobh and a 25ft leisure boat are still on the shore east of Aghanesk House under the woods.

There is a 50ft decommissioned Trawler & 30ft Leisure cruiser, they are also still on the shore up the Ballinacurra river underneath Alan Navratill's land.

Over the years when I was a Sea Angling Charter Skipper I retrieved numerous boats and punts from the Aghanesk Shore and up the Ballinacurra River. All of these boats were either moored in the East Ferry Estuary or at moorings south of the Sewage Outfall (proposed Dairygold outfall).

In 30 years going in and out from East Ferry Pier as a Charter Skipper I never retrieved a boat south of the mouth of the East Ferry estuary in the main Harbour, as they all end up in the North Channel area. This would seem to me to be clear, practical evidence of the overall water movement in the East Ferry, which, in all these cases has been upstream.

The question has to be asked. With all the proof that the waters of East Ferry do not discharge into the main channel past Roche's Point, how come that a more direct route to the open sea (which was an option) was not taken? Was it because Garryvoe Beach is an EU blue flag designated beach, and would alert the EU Authorities to the fact that this outfall discharge would end up in the Ballycotton and surrounding area, and on Garryvoe Beach.

Brian Byrne, Loughcarrig House, Midleton, Co. Cork

East Cork Harbour for a Safe Environment

Dr. Darina Allen, Martin Edwardes BSc. Roma Fulton BSc., Michael Harty, Joan Hayes MA.,
AJ Navratil BSc., Anna O'Connor, Anne Marie Russell, William Russell & others
in Alliance with Climate Aware Middleton & FH Wetland Systems Ltd.

Tel: 021-461-3555

ajnavratil@eircom.net

Please reply to;
AJ Navratil,

Ballinacurra House,
Middleton, P25 AH30
County Cork.

The Secretary,
Environmental Protection Agency,
Johnstown Castle,
Y35 W821
County Wexford
www.epa.ie

17-3-2020

Re: Proposed EPA licence No. Ref: P1103-01

Dear Sir/Madam,

The following are the objections, submissions and representations to the proposed determination of an industrial emissions licence application by Dairygold Co-Op Society Ltd and Tine Ireland Ltd., for an installation at Mogeely and an outfall to Cork Harbour on behalf of all those named above.

Preamble:

1 In the context of the multiple submissions regarding the above proposal by Dairygold-Tine to the Planning Authority of the Cork County Council since late 2016 and subsequently the quality and detail of the submissions to the EPA it is difficult to find any lawful justification for how both organisations could have created the current improper and unacceptable situation.

2 It is a matter of particular significance and public knowledge that Irish Water are now the Water Services Authority (not the CCC as stated on page 10 of the proposed licence) and understood to have advised the applicants and the CCC that the cheese effluent should be conveyed by long pipe and then joined into the Middleton sewerage system. For such methodology to be lawful and correct, however, it has to be fully compliant with all relevant aspects of the EU Habitats Directive. Please see References [not exhaustive] in this document. We are not satisfied that this DIRECTIVE has been fully complied with and that nothing is left to peradventure.

3 It should be clearly understood by all concerned that the said Habitats Directive is what it says it is in the title. It is a "DIRECTIVE". A directive is an imperative. It is not a suggestion or any sort of option. A directive requires full compliance with all aspects thereto and therefore *beyond all doubt* to validate a Planning Consent. Absent such total compliance any Planning Permission or licence is ill-founded and null and void and thereby unlawful. As this group have never been afforded sight or evidence of the requisite 100% compliance accordingly absent such unequivocal evidence it is reasonable to adduce that the actions taken and the Planning Permission and proposed licence are not compliant and thus may indeed be unlawful and legally unsafe.

4 For the absolute avoidance of doubt you are referred to the Habitats Directive (92/43/EEC) Article 6(3)

*“3 . Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4 , the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned **and , if appropriate, after having obtained the opinion of the general public.**” ECHSA believe that, in that context, the rights of the general public have been and are being compromised.*

* The test for Appropriate Assessment is not as the report suggests but is explicitly stated by Finlay Geoghegan J. in Kelly v An Bord Pleanala (2014) IEHC 400 25-7-2014. qv.

* Please also note that Irish and EU court rulings were as follows:

The Irish High Court Judge cited various European Court of Justice (ECJ) rulings in s.35,

*“The ECJ has considered what is required by an "appropriate assessment" in a number of judgments. In Mechanical Cockle Fishing case (Case C-127/02 Waddenzee), the ECJ stated that an "appropriate assessment" implies that **ALL** the aspects of the plan or project which can, by themselves **or in combination** with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field. In Case C 404/09 Commission v. Spain, the ECJ held that an assessment cannot be regarded as "appropriate" if it contains gaps and lacks complete, precise and definitive findings and conclusions **capable of removing all reasonable scientific doubt as to the effects of the proposed works on the site concerned.** NB: This requirement has been restated in more recent judgments, including Case C 258/11 Sweetman, [44] and Case C 521/12 Briels”.*

In the Case C-258/11, quoted here, the judgement was similar:

*“44. So far as concerns the assessment carried out under Article 6(3) of the Habitats Directive, it should be pointed out that **it cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned.**”*

It is manifestly clear that Dairygold or the relevant authorities have NOT made the case to address our concerns which, pursuant to the EU Directive as supported by court Judgements, require **complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt.**

Accordingly, notwithstanding the assertion in the text of the draft licence on page 12 that an Appropriate Assessment was undertaken ECHSA herewith formally question the conclusion of that alleged AA and therefore demur from paragraph 6 (inter alia) on page 12 of the proposed draft EPA licence **with most particular reference to Paralytic Shellfish Poisoning (PSP).** Please see contextual extracts from publications under “References” below.

The following should be well noted that in the considered view of ECHSE and its advisors;

- Compliance with the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I No 272 of 2009), [as amended] is not the same as removing all reasonable scientific doubt.
- It is incorrect to state in the Proposed Determination (PD) that Monitoring will ensure the emissions from the site will not negatively impact on the environment and will ensure the protection of human health. That is manifestly absurd. **Monitoring will not ensure anything of the sort.**
- The Proposed Determination (PD) requires that all storm waters exceeding trigger levels will be diverted for retention and suitable disposal certainly does not remove all reasonable scientific doubt.
- Best Available Techniques in no way removes all reasonable scientific doubt.
- The Office of Environmental Enforcement (OEE) is responsible for the enforcement of EPA licences issued to industry and is committed to taking action against those who flout the law but not orders of the High Court.

5 Plainly stated; **It is simply not good enough that the ‘cart was put before the horse’** as Planning Consent was given to build a factory and a long outfall pipe before all technical details submissions and objections were properly considered or even could be considered at all and now the EPA propose to grant a licence without full, clear, proper and total regard to;

- a. the relevant EU Directives referred to above including court judgements evidencing unlawful non-compliance in respect of water pollution et al.
- b. The Irish States obligations to reduce National pollution in compliance with relevant EU Directives. (qv)
- c. the fact that neither the Applicant nor the Planning Authority or Irish Water or the EPA have NOT proven to the degree demanded by the Habitats Directive that they have been given *complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt* about our concerns (the public) as legally required by the Directive.
- d. all the realities cogently articulated and contained in the submissions, representations and objections made and the holistic impact on the Irish economy with particular regard to Irelands accepted legal obligations in the context of reduction of Greenhouse gases etc., and pollutants.
- e. Scientifically grounded and clearly stated opposition to the degradation of the waters of Cork Harbour including, inter alia, the impact of the proposed additional nutrient and organic loading on the harbour in the particular context of **the potential to render shellfish actually toxic to mammalian consumption**, tourism and amenity in the harbour.

Caveat: When critical levels of nutrients such as N&P are reached algal blooms can

and do result which in turn cause Dinoflagellates that exist in the North Channel and the Owenacurra River to cause toxins to be produced which are concentrated by filter feeders such as mussels and oysters. The consumption of such contaminated organisms by humans can lead to rapid paralysis, heart failure and even death.

- f. As the proposed discharge is of the order of 4,000 m³ or 4,000 tons of water per day ECHSA have yet to see positive evidence of the effect of this and thus is concerned that the hydrological and or phreatic considerations have been holistically and properly addressed in particular context of (in no particular order);

1. the river at Mogeely and the wildlife therein,
2. the local segment of the biosphere (i.e. future farm crops) and
- 3 the future integrity of adjacent buildings
- 4 any other relevant aspect.

- g. and, more recently, the Objections of An Taisce, *The National Trust For Ireland*, dated the 6th of march 2020 under the following principal headings;

- I. Overarching Considerations.
- II. Bovine Agricultural Impacts.
- III. Failure of Proposed determination to assess use of resources and direct, indirect and cumulative impact.
- IV. Information deficiencies in the environmental impact assessment report and Natura impact statement.
- V. The Pipeline discharge issue.
- VI. The site suitability issue.
- VII. Appendices numbered 1,2,3,4& 5.

In summary:

It is clear that the Planning Consent was given for the construction of a plant which included a long pipe for minimally treated effluent **before** all technical details submissions and objections were properly considered or even could be considered at all and now the EPA propose to grant a licence without full, clear, proper and total regard to EU Directives, extant court Judgements and the increased risk of Paralytic Shellfish Poisoning (PSP) and the legal obligation for the removal of all scientific doubt etc., was prejudicial to proper development.

That conduct it seems;

- (i) pre-supposed that the EPA, notwithstanding any and all objections and representation by the residents of the Harbour area and scientifically qualified concerned parties, would automatically grant a licence for discharge as originally proposed by the applicant investors or

- (ii) passed the burden on to the EPA to impose further and better conditions.

Both such 'back to front' outcomes can clearly be described as deeply unfair to the community and profoundly prejudicial to proper planning.

General: Any decisions that may have been grounded on prejudice and/or cavalier disregard for the fundamentals would be manifestly wrong and in justice if excused would remain wrong. In all events, the individuals involved in and also the relevant authorities themselves, if culpable of untenable procedures, will be held fully accountable.

As so many fundamentals and alternatives have been overlooked or seemingly even ignored by Cork County Council, Irish Water and now the EPA in arriving at, de facto, incongruent

conclusions it raises the query as to what part of the word “Directive” the various parties seem unable to understand? The intended decision seems to ECHSA to at least call to question the authenticity, validity, methodology and indeed conduct leading to all the decisions reached by all these bodies in this specific Dairygold-Tine application also the various consents may well have incurred the risk of the creation of a stranded asset with all that that implies including relevant accountability.

Conclusion:

East Cork Harbour for a Safe Environment and all Allied groups or persons as per this letter heading accordingly are left with no alternative but to seek that all matters surrounding the Planning Consents and licences as given be re-visited We request and require that all necessary corrections and rescissions are duly made and in accordance with all the matters raised. We would expect no less of an august body such as the EPA to objectively and methodically re-visit all and every one of the considerations systematically and all reservations as articulated above and per attached references.

It is a *sine qua non* that that is the duty and function of the EPA to ensure full compliance who should note that no underperformance whatsoever will be accepted by the Objectors named herein.

ECHSA and the Allied groups named in this objection would support, in due course, whatever challenge may be lawfully required and permitted involving the Applicants, Irish Water, CCC and the EPA *et al* in our opposition to the granting of a discharge licence as proposed.

Yours faithfully,

AJ Navratil,

Chairman ECHSA

E&OE

References include the following:

European Commission
Environment DG

Methodological guidance on the provisions of
Article 6(3) and (4) of the Habitats Directive 92/43/EEC
November 2001

Impacts Assessment Unit, School of Planning, Oxford Brookes University, Gipsy Lane

Headington, Oxford OX3 0BP, United Kingdom. Tel. (44-1865) 48 34 34

E-mail: wjweston@brookes.ac.uk

and

Guidance document on Article 6(4) of the
'Habitats Directive' 92/43/EEC

**CLARIFICATION OF THE CONCEPTS OF: ALTERNATIVE SOLUTIONS,
IMPERATIVE**

**REASONS OF OVERRIDING PUBLIC INTEREST, COMPENSATORY MEASURES,
OVERALL COHERENCE, OPINION OF THE COMMISSION.** 2007/2012

This guidance document should be read in conjunction with the booklet published by the European Commission in 2000 and entitled "Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC". The current document intends to further develop and replace the section on Article 6(4) of this earlier

publication leaflet.

FH Wetland Systems Ltd., Submission dated 14th March 2020 as below.

Paralytic Shellfish Poisoning

Paralytic shellfish poisoning (PSP) is a worldwide problem caused by consumption of shellfish that have accumulated potent neurotoxins produced by toxicogenic dinoflagellates. From: Encyclopedia of Separation Science, 2000

Venoms and Poisons from Marine Organisms

Jay W. Fox, in *Goldman's Cecil Medicine (Twenty Fourth Edition)*, 2012
Gonyautoxin

Saxitoxin and

Paralytic [shellfish poisoning](#) is typically associated with the [ingestion](#) of mussels, clams, and oysters. The two toxins associated with this poisoning, [saxitoxin](#) and gonyautoxin, are produced by marine microalgae dinoflagellates that are associated with [harmful algal blooms](#), such as “red tides,” and are then accumulated in bivalve [shellfish](#) to give rise to “paralytic” shellfish poisoning. The primary paralytic [shellfish poisoning toxins](#) are heterocyclic compounds that block nerve and [muscle action potentials](#) by binding to sodium channels at the same site as [tetrodotoxin](#), thereby resulting in [paralysis](#).

Paralytic shellfish poisoning, which is significantly more severe than neurotoxic shellfish poisoning, predominantly involves neurologic symptoms with less pronounced nausea, vomiting, or diarrhea. Symptoms appear soon after the consumption of contaminated shellfish (minutes to hours), beginning with circumoral and extremity [paresthesias](#). Additional neurologic symptoms such as [ataxia](#), [arthralgia](#), [dysphagia](#), [dysmetria](#), [diaphoresis](#), and [tachycardia](#) soon follow the initial paresthesias. Respiratory depression or failure can result in death, usually within 12 hours of the onset of symptoms. As with other shellfish poisoning, therapy is supportive, with close attention to potential [respiratory distress](#) or failure.

Seafood Poisoning

Vernon Ansdell, in *Travel Medicine (Fourth Edition)*, 2019

Paralytic Shellfish Poisoning

Paralytic [shellfish poisoning](#) (PSP) has been recognized for over 200 years. The first documented outbreak in travelers was in 1793 and was reported in Captain George Vancouver's *A Voyage of Discovery to the North Pacific Ocean and Round the World*. On June 15, 1793, during his exploration of British Columbia, Vancouver described in his diary classic cases of [PSP](#) in five crew members who had eaten locally harvested mussels for breakfast. One of the crew members, John Carter, died 5.5 hours later. The others survived. Vancouver subsequently named the area where the mussels were harvested Poison Cove.

PSP is the most common and most serious form of [shellfish](#) poisoning and occurs after eating contaminated bivalve [mollusks](#) (clams, cockles, mussels, oysters, and scallops), crustaceans (Dungeness crabs, shrimp, and lobsters) containing [saxitoxin](#), and other potent [neurotoxins](#) produced by dinoflagellates (e.g., *Alexandrium* sp.). Saxitoxin, like CTX and [tetrodotoxin](#), causes paralysis by blocking sodium channels in [nerve cell membranes](#). It is 50 times more potent than [curare](#). Saxitoxin and other toxins that cause PSP are heat stable and are not destroyed by normal cooking procedures, marinating, or freezing.

As in other forms of shellfish poisoning, outbreaks of PSP often follow dinoflagellate blooms. In the past, most cases of PSP occurred in cold, temperate waters above latitude 30° north and below latitude 30° south. Recently, however, outbreaks in tropical and subtropical waters have become more frequent, with cases reported from countries such as Guatemala, El Salvador, Mexico, Thailand, Singapore, Malaysia, Papua New Guinea, India, and the Solomon Islands.

Because the main toxins that produce pufferfish poisoning (tetrodotoxin) and PSP (saxitoxin) are very similar, the clinical effects are almost indistinguishable. Symptoms of PSP usually occur within 30–60 minutes of eating toxic shellfish but can be delayed for 3 hours or longer. Early symptoms include [paresthesias](#) of the face, lips, and tongue, and later the arms and legs. Affected persons may complain of [lightheadedness](#) or a floating sensation. Other symptoms may include headache, increased [salivation](#), [nausea](#), [vomiting](#), and diarrhea. Hypertension may be an important finding. Severe cases are usually associated with [ingestion](#) of large doses of toxin and clinical features, such as ataxia, [dysphagia](#), and mental status changes. [Flaccid paralysis](#) occurs in the most severe cases, with respiratory insufficiency as a result of paralysis of the diaphragm and [chest wall](#) muscles. Deaths are typically caused by respiratory failure and tend to occur within 12 hours of eating toxic shellfish. For patients who survive past 12 hours, the prognosis is good. Recovery usually occurs within a week but may occasionally be prolonged for several weeks.^{32,33}

[Case fatality rate](#) averages 6% but may be as high as 44%. Mortality is higher in children, who seem to be particularly sensitive to the effects of the toxin. Travelers to low- and middle-income countries who are tempted to eat shellfish should be reminded that the highest mortality from PSP occurs in areas with poor access to good-quality medical care.

Diagnosis is usually made on clinical grounds, although in special circumstances it can be confirmed by a standard mouse bioassay method.

There are no [antidotes](#) for PSP, but saxitoxin and other toxins that cause PSP bind well to charcoal and, if safe, oral charcoal should be given. Sufferers should be observed for at least 24 hours for respiratory insufficiency. [Mechanical ventilation](#) may be necessary.

PSP can be prevented by avoiding potentially contaminated shellfish. This is particularly important in children, who are at greater risk of fatal illness. It is important to emphasize that the presence of the toxin does not affect the appearance, smell, or taste of the shellfish, and cooking will not destroy the toxin. Because of the lack of sophisticated medical facilities for [resuscitation](#) and mechanical ventilation, it is prudent for all travelers to developing countries to completely avoid potentially toxic shellfish.

Synthesizing Organism

Paralytic Shellfish Poisoning

[Dinoflagellates](#) in Australian waters that can synthesize the toxins to cause [paralytic shellfish poisoning](#) (PSP) include members of the genera *Alexandrium* (*Gonyaulax*), *Gymnodinium*, and *Pyrodinium*. A number of toxigenic species of *Alexandrium* are found in New Zealand waters.

Neurotoxic Shellfish Poisoning

Neurotoxic shellfish poisoning (NSP) in New Zealand has been caused by brevetoxin synthesis by an organism similar to *Gymnodinium breve* (*Ptychodiscus brevis*), which is the organism responsible for NSP in the [Gulf of Mexico](#). Similar organisms have been found in Australian waters. Compounds similar to brevetoxin can also be synthesized by some other marine algae found in Australian waters.

Diarrhetic Shellfish Poisoning

Potentially toxic diarrhetic shellfish poisoning (DSP) [dinoflagellates](#) in Australian waters include species of the genera *Dinophysis* and *Prorocentrum*. The toxicity of these species is variable, and sometimes dense blooms occur with no toxin synthesis. DSP is relatively rare in New Zealand.

Amnestic Shellfish Poisoning

The toxin responsible for amnestic shellfish poisoning, domoic acid, is synthesized by diatoms of the genus *Pseudo-nitzschia*.

Fish and Shellfish Poisoning

Elaine C. Jong, in *The Travel and Tropical Medicine Manual* (Fifth Edition), 2017

Paralytic Shellfish Poisoning

An unusual [neurologic disorder](#) that may follow [shellfish ingestion](#) is termed paralytic [shellfish poisoning](#). The disease is primarily associated with the consumption of bivalve [mollusks](#), such as clams, mussels, and oysters, but has also been reported following ingestion of [gastropods](#), [chitons](#), starfish, and crustaceans. Crab, abalone, and fin fish do not appear to be affected. The disease is mainly restricted to temperate climates, with most reported outbreaks in North America, Europe, and Japan, although cases have also occurred in South Africa, Papua New Guinea, and New Zealand.

The toxicity of paralytic shellfish poisoning is due to the accumulation of [saxitoxin](#), a tetrahydropurine base, and related compounds in the shellfish. It does not affect the appearance or taste of the marine mollusks, nor is it effectively inactivated by cooking. Like [tetrodotoxin](#), it blocks action potential generation by preventing [sodium ion](#) flow in [nerve and muscle cell membranes](#).

Saxitoxin originates in a unicellular dinoflagellate known as *Gonyaulax*. Since bivalve mollusks are filter feeders, they concentrate the toxins from *Gonyaulax* in their digestive glands (the hepatopancreas). In the Alaska butter clam (*Saxidomus*), the saxitoxin is concentrated in the siphon as well. Toxicity of shellfish correlates with the bloom of this dinoflagellate, known colloquially as “red tide” due to discoloration of coastal waters. Along the Pacific Coast these usually occur between May and October. Toxicity lessens as the dinoflagellate population decreases, but complete [detoxification](#) of shellfish may take up to a year.

Symptoms usually occur within 30 minutes after ingestion of contaminated shellfish and include [distal and oral paresthesias](#) that may progress to [numbness](#). A sensation of “floating,” gross incoordination, and [paralysis](#) with respiratory compromise may develop. The [case fatality rate](#) is 8.5%.

Diagnosis is clinical, and treatment is supportive, as with other fish poisonings. Suspect shellfish can be analyzed in a mouse bioassay. Toxic shellfish have more than 4 MU (mouse unit)/g wet flesh (1 MU of saxitoxin is the amount that kills a 20-g mouse 15 minutes following [intraperitoneal injection](#) of a heated acid extract of the shellfish). Increasing application of [liquid chromatography-mass spectrometry](#) methods for the detection of marine biotoxins in seafood safety and surveillance programs will allow for faster analysis of toxic samples.

Prevention of paralytic shellfish poisoning requires public health measures, with routine surveillance and prompt closure of any beach to shellfish collecting when toxic levels of saxitoxin are detected. A [Shellfish Safety Hotline](#) (1-800-562-5632) gives information 24 hours a day on harmful [algal blooms](#) on Pacific Ocean beaches in Washington state; Oregon maintains its own hotline (1-800-449-2474).

Cardiovascular Toxicity from Marine Envenomation

Benjamin Seymour, ... Jamie Seymour, in Heart and Toxins, 2015

Saxitoxin

Saxitoxin (STX) and its derivatives cause a poisoning commonly referred to as paralytic [shellfish poisoning](#) and paralytic pufferfish poisoning following [bioaccumulation](#) and [ingestion](#). The toxins are produced in the marine environment by groups of dinoflagellates, namely *Alexandrium* spp., *Gymnodium* spp., and *Pyrodinium* spp.^{1,2} A number of different bioaccumulation pathways have been shown, with typical vectors including bivalves and pufferfish and extending into atypical hosts (e.g., crustaceans, [gastropods](#), a number of fish species, and a significant number of marine mammals and birds).

The structure of [saxitoxin](#), like most phycotoxins, is relatively complex (Figure 7.1) and has several different derivatives.¹ Saxitoxin toxicity is mediated through its effects on the Na⁺, K⁺, and Ca²⁺ channels. The primary target of saxitoxin has long been established as the Na⁺ channel where it binds externally to receptor site 1 to halt inward Na⁺ flow while also acting as a cationic substitute. In vitro saxitoxin has been shown to modify K⁺ channel gating causing retardation of opening and activation while increasing the deactivation rate and subsequently resulting in decreased [ion](#) transmission through the channel.³ Further, in vitro studies have demonstrated saxitoxins' effect on L-type Ca²⁺ channels where the toxin caused a channel blockade with a

maximal effect of 49%, suggesting a mechanism other than a simple pore block as seen in Na⁺ channels; as yet, this remains to be fully elucidated.⁴

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Climate Aware Midleton & FH Wetland Systems Ltd., as per memos below

Climate Aware Midleton

**Objection to the proposed determination to Dairygold Co- Operative
Society Ltd and TINE Ireland Ltd License application registration number
P1103-01 16th March 2020**

I am making an objection on behalf of the group *Climate Aware Midleton*. Many of our members are people of East Ferry and as a member of the broader East Cork around Midleton town. We object to the granting of this wastewater license in the strongest possible terms.

We object to the proposal on the grounds that Dairygold's Natura Impact Statement (NIS) is seriously flawed. In the NIS it is claimed that water in the area of Cork Harbour where the discharge will end up will undergo an 80% exchange rate on the ebb tide. There is no basis or source given in the NIS for this highly optimistic figure. The figure is used to argue that no significant risk exists to the habitats and protected species of the Great Channel Island Special Area of Conservation (SAC) and Cork Harbour Special Protected Area (SPA). This claim is directly contradicted by an independent report completed by Irish Hydrodata Ltd. for Irish Water, which drew on earlier research. The much lower exchange value, identified in this research, indicates a risk of mixing and accumulation of pollution resulting from the discharge proposal.

Dairygold's NIS says that "there will be no significant elevation in nutrient or BOD concentrations owing to the proposed WWTP discharges" were made before the Irish Hydrodata Ltd. report was included in it. Therefore this part of the NIS does not stand up to scrutiny. Indeed, there appears to be no contrary evidence proffered to establish the NIS claim, prior to this other research coming to light.

There is a lack of detailed consideration in the NIS of where released effluent will end up in the restricted space of Cork Harbour. A 2012 study by NUIG researchers (Hartnett at al.) shows that residence times of waters in Cork Harbour can be over 60 days; in the region of the Rathcoursey outflow and the East Ferry channel it is around 50 days.

European legislation mandates appropriate assessment of conservation sites (the Cork Harbour Special Protected Area and the Great Island Channel Special Area of Conservation). The documents submitted by Dairygold to date represent stage 1 (screening) and stage 2 (NIS) of such an assessment process. As the NIS has not shown that adverse impacts on protected wildlife can be ruled out, Dairygold is obliged to proceed to stage 3 (assessment of alternative solutions). The standard that must be reached by Dairygold according to EU directives on the protection of species and habitats is that "no reasonable scientific doubt as to the absence of such effects".

Alternatives to the current waste discharge proposal were requested by Cork Co. Council at an earlier stage in the planning process. Dairygold's response to this request contained no analysis of alternatives. I wrote to Dairygold in June 2019 asking for details on alternative waste water plans they have considered and received a general paragraph on their commitment to environmental standards but no answer to that question.

Accordingly, due to the serious flaws in Dairygold's Natura Impact Statement and the contrary evidence from independent sources that protected species and water quality would be at significant risk from their waste discharge, as well as Dairygold's lack of consideration of alternative waste discharge plans, we object strongly to Dairygold's proposal. As such as do not believe that the waste water discharge license can ethically be granted by the EPA. Climate Aware Midleton, as well as our fellow neighbours and friends in East Cork, Midleton and the broader Cork Harbour area, request an oral hearing on Dairygold and TINE license application.

Yours truly,

Roísín Cuddihy

Roisin Cuddihy on behalf of *Climate Aware Midleton*

21 Blossom Hill, Broomfield East, Midleton, Co.Cork.

SYSTEMS Ltd.

30 Woodlawn, Lahinch Rd., Ennis, Co. Clare, V95 A8D3. Tel: 065 6797355

Input on joint objection to the EPA from “Climate Aware Midleton” and “East Cork Harbour for a Safe Environment” 14 March 2020

Re. Alternative disposal options for Dairygold/TINE discharge at Rathcoursey Point.

This submission is made for a more complete appraisal of options for high quality treatment on site and discharge to adjacent waterways rather than piping to Cork Harbour. With over 20 years of experience working with constructed wetlands, reed beds and other natural treatment systems it is my opinion that high quality effluent treatment on site is a viable alternative to the proposed 14km pipe to Rathcoursey Point.

The size of a constructed wetland system need not be overly arduous. If the majority of treatment is carried out by a standard mechanical aeration unit with additional phosphate removal, a constructed wetland system of c.5.5ha would be sufficient to provide tertiary polishing of effluent prior to discharge into the river at the site.

Another option worthy of greater consideration is to irrigate a willow crop using the effluent. Willows are well known for their usefulness in mopping up liquid, nitrates and phosphates and have been used in Denmark over the past 20 years for sewage treatment applications. If Dairygold were to utilise the effluent as a nutrient source for a biomass crop this would eliminate any pollution source and would create a viable crop for sale. Bord na Mona are looking for biomass to augment their co-firing plant in Edenderry and elsewhere. This will become more important in coming years as Moneypoint either closes or converts from coal to biomass, helping to guarantee a market.

The land area that could be irrigated with willows is c.385ha, based on previous experience with zero discharge willow systems in Ireland. Diversification of land use will become increasingly important in Ireland as CAP reform puts ever greater pressure on our farmers to become more financially viable with ever more limited subsidies.

Conversely if the aim is to dispose of the effluent rather than irrigation per se, then discharge via percolation through a willow filter system may also be a viable option. An area of 22-170ha (depending on infiltration rates) would be suitable, as long as the effluent was treated to a suitable standard prior to the willow system. This would also provide nutrient uptake, and a biomass willow crop. Recent forestry grants for short rotation coppice plantation establishment would offset implementation costs. Flooding in the area may reduce the effectiveness of the percolation treatment on an occasional basis, but for the majority of the time, this would not be an issue, and the dilution rates would be high enough during a flood event to offset the reduced soil treatment.

Please do not hesitate to call or email with any questions on any of the above information.

Yours sincerely, *Féidhlím Harty*

Directors: F. Harty, Dr. E Hitching

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