Eve O'Sullivan

Subject: S0024-002 MI Observations
Attachments: S0024-02 MI Observations on monitoring.pdf

From: Francis X O Beirn <Francis.XOBeirn@Marine.ie>
Sent: Wednesday 11 May 2022 13:10
To: Licensing Staff <licensing@epa.ie>
Cc: Alison McCarthy <A.McCarthy@epa.ie>
Subject: S0024-002 MI Observations

Please find attached the MI observations in relation to spoil site disposal and monitoring.
All the best
Francis

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Date: **11th May, 2022**

To: **licencing@epa.ie**

CC: **Alison McCarthy, EPA**

From: **Francis O'Beirn, Marine Institute**

Re: **S0024-02 – Dublin Port Company DAS Application (MI Observations on Spoil Site Monitoring)**

In the absence of a viable alternative, it is acknowledged that the disposal, at sea, of sediment (spoil) dredged on foot of maintenance or capital dredging campaigns in ports is an acceptable practice. To this end, many ports and harbours have identified specific locations near their facilities for the disposal of such material.

Certain principals apply when identifying a suitable dredge spoil disposal site. For one, the location of the site must be accessible, have the ability to retain material (for the most part), and preferably have a sediment composition that is broadly similar to that being disposed. In addition, while it is generally accepted that the deposition of sediment will result in 'harm' to animals living on and in the sediment within the spoil site, disposal should be carried out in such a manner to minimise this harm. In other words, the material should be disposed of in such a manner to minimise any large-scale accumulation. Notwithstanding, it is also generally accepted that the seabed community within a site is, for the most part, sacrificed in order to facilitate the practice and that any 'harm' be confined within the boundaries of the site.

While the primary effect of sediment disposal (i.e., dumping at sea) is smothering of benthic communities by physical burial (Schaffner, 2010)[1], the extent of this impact is also a function of the quantity of material deposited, the nature of said material and the sensitivity of the receiving environment. In some instances, large quantities of spoil can lead to mortality of resident fauna. However, it must also be noted that sedimentation is also a natural phenomenon governed by a range of hydrodynamic and environmental conditions (including, among others, wave climate, depth, current regime etc..) and that infaunal communities have demonstrated a certain tolerance to sedimentation (Schaffner, 2010).

The dredge spoil disposal site used by Dublin Port is found to the west of the Burford Bank in Dublin Bay. This site was first used in 1996 and has received spoil material on an ongoing basis since. Assuming the material is safe from a chemical contaminants perspective[2], the site been used for numerous maintenance and capital dredging campaigns in Dublin Port, among others. While capital programmes have the ability to remove (and deposit) considerable quantities of spoil material, it is the annual maintenance programme that typically has resulted in the disposal of the largest quantities

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[1] Schaffner, L.C. 2010. Patterns and Rates of Recovery of Macrobenthic Communities in a Polyhaline Temperate Estuary Following Sediment Disturbance: Effects of Disturbance Severity and Potential Importance of non-local Processes. Estuaries and Coasts 33, 1300–1313

[2] Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters, Marine Institute, Marine Environment and Health Series, No. 24, 2006

(≈ 0.5 million Tonnes) on an ongoing basis (yearly). Future use of the site (i.e., capital and maintenance programmes) up to 2029 is expected to result in a cumulative total of approximately 5.9 x 10^6 Tonnes of spoil being disposed at the site[3].

To date, monitoring of the activities in and around the spoil site has tended to focus upon turbidity monitoring and bathymetric surveys of the dredge spoil site pre- and post-disposal (short term). The tidal atlas (published in application documents and monitoring reports) indicates the site is subject to considerable currents and therefore, likely strong erosional forces. Furthermore, reports prepared on behalf of Dublin Port[4] indicates that the site is considered a dispersive site and that while coarse sands and gravels are expected to be retained within the site, finer fractions (fine sands and silt) are not.

Annual Environmental Reports (AER) up to 2020 provide images of bathymetric surveys from dump site pre and post dumping. What was not communicated in these reports was the difference in the depth between the bathymetric surveys. It was up to the reader to determine these differences, which proved difficult given the poor resolution of the images. Cursory examination of bathymetric readings, however, indicated that material is retained within the spoil site for extended periods (e.g. AER 2019). In 2021, however, the AER did include an additional plot indicating the difference between the pre- and post-dumping bathymetric surveys. It clearly demonstrates that material is disposed within the boundary of the site and is being retained at least during the period defined by the surveys. What is unclear is the longer term fate of material at the spoil site. In other words, does the site retain all material disposed?

In 2022, Dublin Port Company provided an additional report to the EPA[4]. This report detailed the outputs of depositional modelling of silts from the spoil site in Dublin Bay. The report details the fate of fine material disposed at the spoil site resulting from a combination of the maintenance and capital programmes currently applied for. It demonstrates that the finer sediments will migrate from the site resulting in some accumulation in more sheltered regions of Dublin Bay. However, the extent of these accumulations are considered small and are considered consistent with natural sedimentation levels. The report communicates that coarser material is, for the most part, retained within the spoil site, however, the modelling carried out did not appear designed to determine the long-term fate of these coarser sediments. While it is desired that sedimentary material will be retained within the bounds of the spoil site, it is not likely this will occur and it is expected that the fine sand and sand fractions will migrate from the site given the strong tidal currents in the Bay. However, it would be important that any material moving off the site should do so gradually such that it does not result in a large scale deposition event in the bay. Future monitoring by the licensee might be designed to determine the rate of erosion at the site and subsequently the ultimate fate of such non-silt material?

Notwithstanding the observations and recommendation above, it is important to note the ongoing condition of benthos in Dublin Bay. The Marine Institute, since 2012, has carried out monitoring to determine macroinvertebrate ecological quality status (EQS) in coastal and transitional waters around the Irish Coast in order to fulfil requirements of the Water Framework Directive (WFD). As part of this

[3] DUBLIN PORT COMPANY - DUMPING AT SEA PERMIT APPLICATION S0024-02. March 2022. MP2 Project – Modelling Report on predicted cumulative deposition of silts within Dublin Bay arising from proposed Dumping at Sea Activities under S0024-02, S0004-03 and S0033-01

[4] Dublin Port Company 2021. Dublin Harbour Capital Dredging Project Volume 2 EIAR Main Document

programme sampling must be carried out within each waterbody at least twice within the 6-year cycle (once every three years). Dublin Bay is a coastal waterbody that is part of the WFD operational sampling programme.

WFD Sampling of the bay is carried out as part of the Marine Institute Winter Environmental Survey where 15 sites are sampled (Figure 1), infauna macroinvertebrates are analysed (identified and enumerated) and the status of the benthos in the bay is calculated using the Invertebrate Quality Index (IQI)[5].

On the basis of monitoring in 2022, sediments samples from stations in Dublin Bay all tend to be comprised of muddy and fine sand or very fine sands. Silt/clay content, in 2022, ranged from 1.46% to 15.68%. The sand component was dominated by very fine sand (63µm-125µm). Gravels tended to contribute an insignificant part of the sediment. Total organic matter is low and as expected for this sediment type.

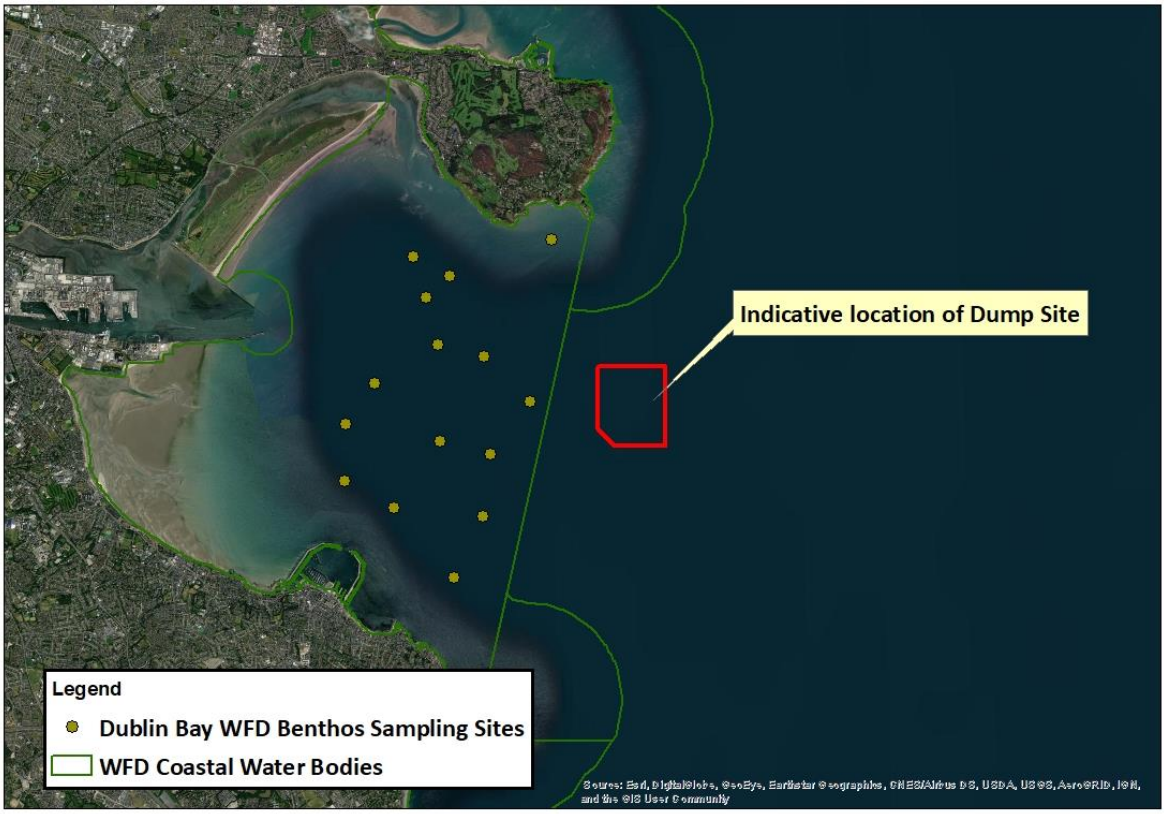

Figure 1. Dublin Bay Water Framework Directive benthos macro-invertebrate sampling points (n=15). General location of spoil site is also provided.

Furthermore, the communities surveyed in Dublin Bay were characteristic of the shallow muddy fine sand sediments sampled. Taxa common throughout the stations included the polychaetes *Glycera tridactyla, Nephtys hombergii, Spiophanes bombyx, Chaetozone christiei, Magelona johnstoni and*

[5] Infaunal Quality Index: Water Framework Directive classification scheme for marine benthic invertebrates Report: SC080016

Galathowenia oculata, the bivalve molluscs *Abra alba, Fabulina fabula, Kurtiella bidentata* and *Nucula nitidosa* and Amphiuridae brittle stars. Crustaceans tended to be less abundant but the amphipod *Ampelisca brevicornis* was recorded at a number of the stations.

It should be noted that, in the 9 benthic sampling events since 2012, the benthic macro-invertebrate EQS has been classed as Good or better in all (Table 1).

Table 1: WFD (IQI) benthos scores Dublin Bay. 2012-2022

	2012	2014	2015	2016	2018	2019	2020	2021	2022
IQI - Score	0.765	0.664	0.717	0.747	0.753	0.708	0.733	0.729	0.722
EQS	High	Good	Good	Good	High	Good	Good	Good	Good

It is clear from the benthic monitoring carried out in Dublin Bay that the condition of the benthos is broadly consistent from year-to-year. The IQI is a versatile metric capable of determining impact on benthic macro-invertebrates resulting from organic enrichment, chemical contamination as well as physical disturbance (i.e., smothering). It can be reasonably concluded, therefore, that the effects of dredging (and loading) and spoil disposal appear to be contained within the areas in question and do not appear to be impacting the wider seabed invertebrate communities in Dublin Bay.