ONeill, Pat

From: Margot Cronin [margot.cronin@marine.ie]
Sent: 13 May 2009 17:36
To: Terry McMahon; OBrien, Grace; ONeill, Pat
Cc: Francis X O Beirn; Jimmy King; Williams, Allen; declan.mcgabhann@spfa.ie; CANTWELL Nick
Subject: Arklow Dumping at Sea application_comments mfc_may09

Apologies for previous version with changes tracked - this should be easier to read!

All the best,
Margot

m.

Marine Institute
Foras na Mara

Arklow Dumping at Sea application

General:

The proposal is to dredge 60 000 tonnes of material from Arklow Harbour, and to dump the material at sea. The material is composed of approx 65%silt and 35% sand. The majority of the sediment is contaminated by copper, zinc and, to a lesser extent, lead as a consequence of earlier mining operations in the Avoca River. There is also some degree of contamination from TBT and PAH / TEH. Contamination extends through the depth of the sediment.

It is proposed by Arklow Harbour Commissioners that "marginally or uncontaminated" sediment be dredged by trailer suction and dumped at the previously used dumpsite. Heavily contaminated material (from the dock area) is proposed to be removed by way of environmental profiling grab and disposed of in a "dig, dump and cover" operation at a dumpsite closer to the harbour. It is not clear what proportion of the sediment is considered heavily contaminated.

Notes

Chemistry: Apart from the area at the very east of the dredge area, all sediment would be classed as contaminated - some areas to a greater extent than others, but nonetheless all samples demonstrate a significant level of contamination (see table 1). (A few class 2 results in predominantly class 1 sediment is an entirely different scenario to a few class 2 results in predominantly class 3 sediment.) While there may be a gradual decrease of sorts from the upstream samples to the downstream, there is no clear delineation between contaminated and clean sediments. It is very difficult in this instance to draw the line between clean and contaminated sediment, aside perhaps from the outside zone. I would be reluctant to encourage dumping of any of the inner sediments at the dumpsite suggested for the "clean" spoil.

Biology: An assessment was conducted on the biological components of the proposed new dumpsite. While the sites selected within the dumpsite were appropriate, the lack of sampling from reference sites beyond the perimeter is problematic, as there will be little to compare for future monitoring. In the event of licensing this should be addressed prior to dumping. In addition the conclusions that the site is circalittoral muddy sand is slightly at odds with the visual descriptors of sediments from the cores which suggest a more mixed sediment habitat. No quantitative granulometric information was provided from the new dump site. In addition, the classification of the biotope is unusual as the species listed are not dominant and the overall number of species is low making classification very difficult. This has implications as it suggest that the site is more erosional than depositional.

***Suitability of dumpsite proposed for contaminated sediments*:** Is the new inner dumpsite suitable in terms of oceanography to contain the contaminated sediment in its capped form? Currents measured at 3m above bottom demonstrate flows of up to one knot in the dumpsite proposed for the contaminated spoil. These current speeds would be considered relatively high (in comparison, eg to the west coast open water where average current speed is in the region of 0.4kn) and could cause substantial dispersion of the fine sediments during the disposal operation. No mention has been made of treating the sediment prior to dumping at sea - cementation would both bind the metals and increase the density of the dredge spoil thus reducing the potential for migration of the fine particles.

The bathymetric survey indicates that the proposed dumpsite slopes away to the east with a noticeable dip on the northeast corner. The consultants should be asked for any extra bathymetry they have in order to investigate if this is a natural hole or just a continuing slope? If it is a hole, then perhaps the feature could be used as a dumpsite.

The report states that the proposed dumpsite is 0.6km to shore at Ferrybank although measurements from the accompanying map in Figure 2.2 indicates the dumpsite is only 0.2km from shore. Is this likely to be an issue with local fishing boats?

Capping operation: There is no detail provided as to the design of the cap or method to be used for the capping operation. The design of the cap and the methodology for placing it are fundamental to achieving the goals for which a capping operation is selected in the first place, ie to lock away contaminated sediments in order to reduce exposure of organisms to contaminants. No details are given regarding the number of journeys required for the disposal of the contaminated sediment, over what period of time the operation will be carried out or how the contaminated sediment will remain in place on the seabed until such time as the cap is put in place. What are the existing bed sediments at the proposed new dumpsite? The cap needs sand in order to allow a seal to form around the contaminated sediments. The method to be used for the capping was not modelled to determine how much clean sediment is required for the cap to remain in place successfully. Arup Engineers confirmed that their budget did not run to modelling. No sediment transport details have been provided. This should be addressed in order to determine sediment pathways, in the event of sediment migration. The United States Army Corps of Engineers (USACE) have cap-integrity models available for use on their website.

Monitoring: In terms of proposed monitoring during the dredging (section 10.2), the purpose served by some of the monitoring activities proposed is not evident (eg monitoring BOD & COD on a weekly basis, monitoring of dredge spoil for macro-invertebrates, Q value assessment, which is for freshwater systems). Consultation with MI should be recommended in order to devise a more relevant monitoring plan, both for during the dredging operation and for longer term monitoring at the dumpsite. Monitoring guidelines for cap performance are available from USACE (ref Schroeder, 2009).

Overall comment:

We would recommend refusing this permit at the present time on the basis of:

1. Lack of detailed study of proposed dumpsite eg no sediment transport modelling.
2. Proximity of dump-site to shore.
3. Current speeds at dumpsite indicate a high energy environment, which would not be considered suitable for this operation, as described.
4. The design of an appropriate methodology to ensure the integrity of the cap and the restriction of the contaminated sediment appears to have had little time or thought allocated. We believe that this is a fundamental area of study which has not been addressed.

If the gaps in information can be filled, and confidence can be given regarding the integrity of the process, then a permit could be granted at some time in the future.

Recommendations:

- If a permit is granted, it should contain conditions for disposal to take place at slack water only, or by way of a delivery tube.
- Sediments from turning circle should be treated as contaminated.
- Toxicity testing could be used to attempt to identify less contaminated sediment, but it may not produce a clear line of less contaminated sediments.

- More information is needed regarding the capping methodology and the proposed dumpsite. The operation needs to be modelled in order to identify the conditions to ensure cap stability.
- Sediment transport information should be provided.
- A relevant monitoring plan should be devised in consultation with MI.

M Cronin
F O'Beirn
12 May 2009

Table 1. Classification of sediment in terms of contamination

Sample	Granulometry	Contamination rating	Decision
BC1A	Med / coarse sand	Cu – high category 3 As, Pb, Ni, Zn – low category 2	Heavily contaminated
BC1B		Cu, Zn – mid category 2 As, Pb, Ni – low category 2	Marginally contaminated
BC1C		Cu – high category 2 As, Pb, Ni, Zn – low category 2	Moderately contaminated
BC2A	Silt/ fine sand	Cu, Zn – mid category 2 As, Pb, Ni – low category 2	
BC2B		Cu – high category 3 Zn – low category 3 As, Cd, Pb, Ni – low category 2	
BC2C		Cu, Zn – mid category 2 As, Pb, Ni – low category 2	
BC3A	Mainly silt	Ok.	Clean
BC4A	Mainly silt	Cu – low category 3 As, Pb, Ni, Zn – low category 2	
BC4B		Zn – low category 3 Cu – high category 2 As, Pb, Ni, Zn – low category 2	
BC4C		As, Cu, Ni, Pb, Zn – mid category 2	
BC5A	Silt/ fine sand	Cu, Zn – low category 3 As, Pb, Ni – low category 2	
BC5B		Zn – low category 3 As, Cu, Pb, Ni, Zn – low category 2	
BC5C		Cu, Zn – mid category 2 As, Pb, Ni – low category 2	
BC6A	Fine / med sand	Ok	
BC6B		Ok	
BC6C		Ok	
BC7A	Silt	TBT – high category 2 Cu, Zn – low category 3 As, Cd, Pb, Ni, Zn – low category 2 Σ16PAH – low category 2 TEH – low category 2	
BC7B		Cu, Zn – high category 3 As, Pb, Ni,– low category 2	
BC7C		Cu, Pb Zn – very high category 3 Cd – high category 2 As, Ni,– low category 2 Σ16PAH – low category 2	
BC8A	Silt	TBT – high category 2 Cu, Zn – high category 3 As, Pb, Ni, Zn – mid category 2	
BC8B		Cu, Pb, Zn – high category 3 Cd – high category 2 As, Ni, Zn – mid category 2	
BC8C		Cu, Pb, Zn – high category 3 Cd – high category 2 As, Ni, Zn – mid category 2	