MWP

Fenit Harbour Dredging 2023

Water Quality Monitoring – Schedule C

Kerry County Council

Contents

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1. Introduction

The following sections addresses the requirements of the Dumping at Sea Licence Ref S0007-03 for Fenit harbour in Co Kerry. Section 2 below gives background information on Tralee Bay and the Oyster Fishery.

Section 3 give details on the Dredging proposed in Fenit Harbour this spring between March and May 23.

Section 4 addresses the requirements of the Licence conditions.

2. Tralee Bay, Inner Tralee Bay and the Protected Shellfish (oyster) Area. :

Tralee Bay is a relatively shallow, flat, and wide expanse of open water. Inner Tralee Bay (due east of Fenit Port towards Tralee) is a very shallow, flat, and wide expanse of water which has a tidal range of approximately 4m and receives freshwater flows from the River Lee as it enters the Bay at Blennerville and also from a series of rivers and streams on the south side of the Bay that flow from land and from the Sliabh Mish Mountains range catchments.

Water quality in the inner Tralee Bay area is influenced by these freshwater flows and run off from lands surrounding the inner bay area along with discharges along the coats. This process in itself occurs all year round and it was one of the deciding factors that can influence whether oysters are harvested. After intense or prolongated periods of heavy rainfall there is an extensive influx of run off from land to sea and with that comes increased sediment load combined increased nutrient load. This affects water quality and can deem oysters unsuitable for harvesting or consumption.

The material to be dredged within Fenit Harbours is deposited on an ongoing basis by the functioning of the natural coastal system. Material is constantly being moved and deposited at different rates and distribution throughout the system and this is influenced by severe weather, changes in tidal cycles, coastal currents, spring, and neap sides etc. So, this system is very dynamic.

Dredging within Fenit harbour is effectively assisting the movement within the system, as material is deposited, then dredged, and the day after you finish it starts being deposited once more. The dredging process is merely moving the same material within this system and within the wider Tralee Bay Area.

The material to be dredged is clean uncontaminated material and is a fine silt mud material that is so fine that it will stay in suspension for a significant period of time subject to weather, wave action, currents, tides etc. Hence turbidity levels can be high and vary significantly naturally.

Given the topography of the Bay and in particular the shallow nature and flat seabed of the Inner Tralee Bay area, turbidity is naturally high here. In order to encounter low turbidity and a clear water column with good visibility requires extensive periods of calm weather, no wind , little rainfall and moderate tides. At period of low tide and especially at extreme low tides then the water depths east of the pier head and marina area can be as low as 0.5m CD in places. With this shallow depth at the bottom of the tide turbidity is high and around 2 hours at the bottom of the filling or ebbing tide currents are stronger and in a shallow flat bay like Tralee this can then generate higher turbidity levels as part of the natural system process.

The harbour itself and its physical footprint and orientation also creates local currents at both filling and ebbing tides and these in turn also influence turbidity levels.

In reality Tralee Bay has natural turbidity levels and the levels are influenced by what's happening in the natural coastal system and combined with weather and tides.

Without any dredging taking place in Fenit Harbour there will be a natural cycle of highly variable turbidity and suspended solids in the Bay.

The sensitive receptor in the Bay is the oyster beds due east of the Harbour and particularly within the Shellfish Protection Area. Oysters are filter feeders and live within the upper layers of seabed sediments and in the case of Tralee Bay these are fine mud sediments. The material within the harbour and within the inner Tralee Bay area is the same.

Pressures on water quality within Tralee Bay come from land based run off and inputs from rivers and streams along with outfalls and discharges to the bay.

Oysters are harvested by means of a dredge trawl. This process requires a steel rake/trawl to be dragged along the seabed and this penetrates into the upper layers of mud/sediment and captures or combs the oysters from the seabed. This process in itself mobilises significant and localised dredge plumes and increases suspended solid load and thus turbidity levels within the bay where the dredge trawl is taking place. The process of harvesting in this manner is the established and historical practice within the Bay for oysters and this all takes place within the Shellfish Protected Area.

The oyster beds here in Tralee Bay are one of the very few naturally self-propagating beds in the country and the oysters have survived and thrived in this area while enduring annual harvesting campaigns. The fishery is managed by Tralee Bay Oyster Society.

The threat to the oyster beds can come from a number of pressures or inputs, smothering if an extensive or thick layer of suspended/dredged material accumulated on the oyster beds, water quality changed due to increased inflows of nutrient rich or contaminated water flows off the landmass occurs, or where there is a direct physical intrusion or change in the oyster bed areas by an external source such as a dredger or other intrusive activities.

3. Proposed Dredging campaign.

The dredging of the inner harbour at Fenit included the removal of approximately 55,000m^3 of fine silt mud material. This material is clean and has accumulated from the coastal system within Tralee Bay. The dredging process will be completed using a barge with spud legs which has a mounted excavator. The excavator removes material and places it within a barge, which then travels to the dump site for disposal. This method of dredging is slow due to the tight confined space within the inner harbour and marina area. This method is significantly different from the previous suction hopper dredging method which was used in the outer harbour area to the east along the main commercial berth which is open to the open seascape. The current campaign will take place within the confines of the inner harbour and will be a slower and lesser impact scale, which reduces risk, minimises dispersion and is more manageable.

When dredging is taking place within the inner harbour there will be a localised plume of suspended sediment material. When there is an ebbing tide, any suspended material will move out of the harbour and localised currents will drag material around the head of the pier at the eastern end and out the natural navigation channel to the west. This movement can be seen in the model scenarios showing dispersion in the original applications documents. At mid cycle in the tide then there is a period where there is slack waters, effectively where there is less filling or ebbing tide, so any localised plume within the harbour has little movement of material, so the plume will tend to sit locally.

When the tide is rising/filling into the bay, then water is coming into the harbour and if dredging is taking place at this period in the tidal cycle, material in suspension will not exit the harbour as the filling tidal current will maintain it within the harbour confines and in suspension.

It is important to understand the tidal cycle, the dredging method, the maximum volumes per day, the physical shape and orientation of the inner harbour structures and how these things combined will reduce the scale and level of mobility of any localised dredging plume.

The dredging process can potentially generate two risks for the oyster or shellfish protected areas due east of the harbour. Firstly, smothering due to deposition and secondly poor water quality. The application studies showed that there is no risk of smothering to the oyster beds to the east and secondly the material being dredged is clean material and thus water quality impacts from either are not a risk. Increased turbidity over background levels may be a concern, but in this instance the natural background turbidity levels within the Bay vary widely and within the natural cycle and within that natural process the oyster fishery survives and thrives.

The two previous campaigns of dredging completed by suction hopper dredgers within the open waters commercial shipping berth were both the subject of continuous monitoring before, during and after dredging. The data from both campaigns showed that the limits set or experienced varied widely even when there was no dredging taking place. The data also showed spikes in the levels of NTU's during dredging. These spikes can be explained by a number of things including probes being congested with material and requiring cleaning and also the shallow water depths at both buoy locations meant that the probes were on occasion at bed level and within such shallow or low water that turbidity/suspended solid levels were severely elevated. This can be seen if one looks at the low tide periods versus the spikes in NTU levels. High NTU levels will also be explained by rough weather, the changing tidal cycle, neaps and spring and wind and storm events.

The natural background and natural range of suspended sediment and turbidity levels is not influenced or impacted upon by the dredging process. This method of water quality monitoring is not effective and does that have any beneficial use. This is not being critical, but based on the dynamics of the system in this location, and also acknowledging the habitat and environment within which the native oyster and other species here survive on the seabed and within the mud strata. Water quality in Tralee is more influenced by land-based run off combined with severe weather periods and high rainfall events.

4. Condition 4. Control and Monitoring.

The following sets out how we are complying with the conditions of the Licence for this 2023 dredging campaign.

Condition 4.7. Turbidity and Suspended Solids

4.7.1. We confirm that Kerry County Council will complete suspended solids monitoring during the dredging campaign. Each week during the dredging campaign water samples will be taken at both the dredging buoy due east of the harbour and also at the control buoy due west of the harbour. Water samples will be taken twice weekly, and samples analysed at Kerry County Council Laboratories.

4.7.2. It is agreed that the intent of the dredging is not give rise to turbidity levels at either of the two buoy monitoring locations above the predicted suspended solids values as agreed by the Agency. This will be

achieved by continuous monitoring and the implementation best practice mitigation when dredging within the inner harbour.

4.7.3. Contents noted.

4.7.4. Once dredging is completed for this campaign the results and data from the monitoring campaign will be provided to the agency and also included in the AER.

Schedule C : Monitoring.

C.1.2. Water Quality Monitoring

Turbidity.

Two monitoring buoys have been deployed by LCF Marine within waters adjacent to Fenit Harbour on Friday the 24th of February and both buoys have been continuously monitoring and accumulating data since that date . Both buoys have been relocated to areas of deeper water from those that were included in the licence in order to have sufficient water under the monitoring probes at low tide periods and to avoid elevated turbidity readings due to proximity to the seabed. (See Figure 1 below)

Buoy Fenit TB1 – Dredge Monitoring Buoy was deployed due east of the harbour at the following co-ordinates

Latitude: 52.27164, Longitude: -9.853788

Buoy Fenit TB2 – Control Monitoring Buoy was deployed due west of the harbour at the following co-ordinates

Latitude: 52.252043, Longitude: -9.962375

Both buoys are taking readings every 5 minutes and the data stream from both buoys is available on the LCF Marine portal for review and monitoring.

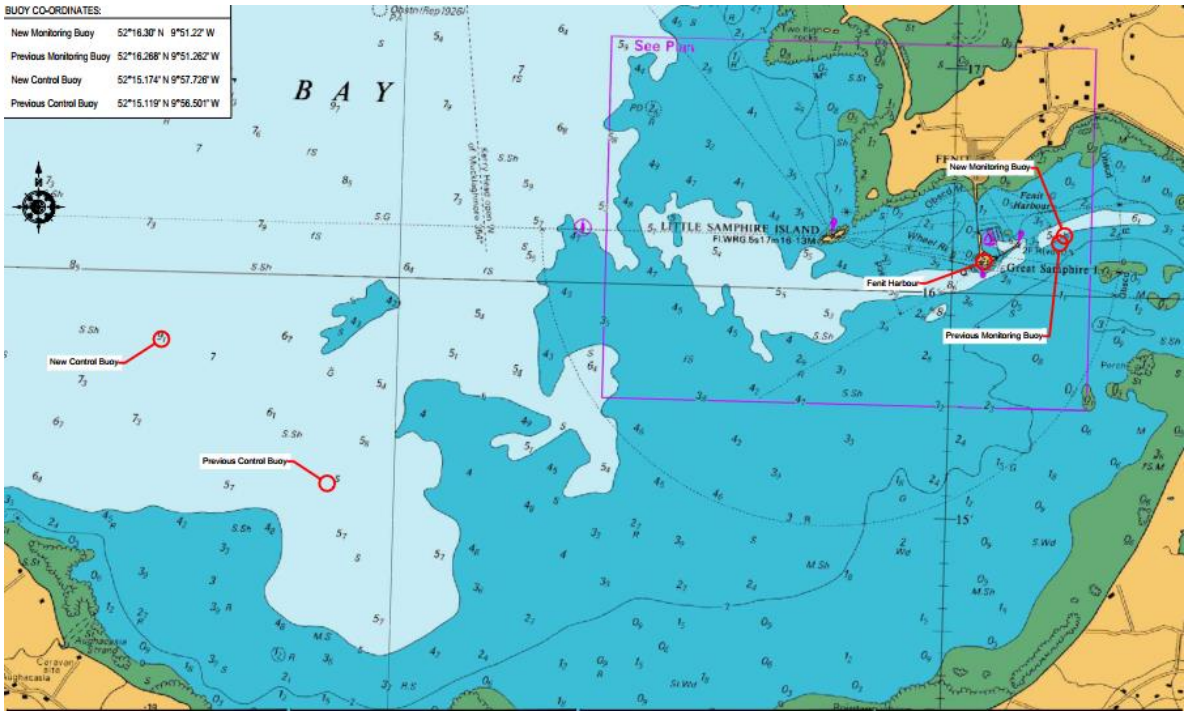

Figure 1. Admiralty Chart showing previous buoy locations and proposed new monitoring buoy locations.

Suspended Solids

Water samples will be taken twice weekly at Buoy Fenit TB 1 and TB2 throughout the dredging campaign subject to weather, tides, swell and safety.

Water samples will be delivered to Kerry County Council Laboratory in Tralee for analysis.

Results and data will be provided to the agency.

Data will be used to establish a relationship between turbidity data and suspended solids where possible.

Any relationship or correlation will be provided to the Agency as part of the reporting requirements.

The water samples will be taken from the water column at approximately 500mm below the surface water level as this will be close to the level of the probe within the water column and thus gives a representative reading at this point in the water column.

Proposed Alarm limits for Monitoring Buoys.

Based on a review of the previous two dredge campaigns and the available data it is clear that despite having continuous monitoring buoys in place and regularly taking suspended solid samples, exceedence events did occur. Any exceedances could be explained and were normally due to things like , weather, very low tides combined with shallow buoy probes, dirt on a sensor or technical issues.

Any proposed alarm levels have to take account of what's happening within the natural dynamic coastal system and then allow for any dredge related suspended solids mobilisations in the water column.

We propose two alarm levels as follows:

Warning Alarm level = 35NTU – the purpose of this is to check the buoy, note the state of the tide, the weather and verify of there is any visual plume heading towards or at the buoy location.

This level is based on a review of previous data and allowing for weather events, wind direction change/intensity, swell and strong tidal currents at buoy locations and also to allow for low tide period where there is higher turbidity at bed level and in closer proximity to the suspended probes that are approximately 500m below water.

MAX Level Alarm = 60NTU – in this instance the above checks would also be performed. In the event that it is proven that the alarm or dredge plume is impacting on Turbidity at the monitoring Buoy would the dredging be slowed down until a resolution for the high readings are resolved. This level is based on a review of previous data from the previous dredge campaigns.

Both levels are also reflective of the data we are seeing since February 24th to date , where turbidity levels at higher tidal levels were hovering in the low single digits of between 2 to 10 NTU , but you also have increased turbidity at low tide periods where levels are at 15NTU and in some cases spiking up to 25NTU and indeed up to 56NTU and 67NTU. Four random spikes at levels between 200 and 1350 NTU have occurred over the last 10 days.