

Attachment F1.

Impacts on the receiving Environment.

This section addresses the potential impacts on the environment related to the dredging operations and the dumping at sea activities.

It is informed by the following reports which are also included in the application documentation.

- Natura Impact Statement (NIS) by Malachy Walsh & Partners.
- Fenit Harbour Dredge Disposal Site – Sediment Transport Model by Aquafact
- Fenit Harbour & Proposed Dumpsite Baseline Characterisation Report by Aquafact
- Underwater Archaeological Impact Assessment by Lar Dunne Archaeology
- Dump site selection report
- Review of existing reports and records
- Discussions with stakeholders
- Bathymetry mapping by Hydrographic Surveys Ltd

The report is set out in two sections. The first section deals with the dredge location and the second with the dumpsite location.

1 DREDGE LOCATION WITHIN FENIT HARBOUR.

1.1 SITE LOCATION AND DESCRIPTION

The site is located on the west coast of Ireland, in County Kerry on the northern side of Tralee Bay. The bay is sheltered from the Atlantic by the Maharee tombolo, which extends northwards from the Dingle Peninsula. Fenit Harbour and Marina is located about 10km west of Tralee Town, just south of the mouth of the Shannon Estuary (Lat 52°16'N Long 9°52'W). The village of Fenit lies north of the harbour. A location map of the site is presented in Figure 1 below.

A 400 m long causeway and viaduct connects the site to the village. The footprint of the existing harbour and marina is 7ha. From the viaduct the fishing quays stretch south to the rocky outcrop that is Saphire Island and turn east to the newer commercial shipping quays and spur/spring pier. The marina area is located within the shelter of the rubble mound breakwater to the northeast of the site. The location of the harbour and proposed dumpsite can be seen in Figure 1 below.



Figure 1. Location of Fenit Harbour (dredge location), and proposed dumping at sea site.

Fenit is the most westerly commercial port in Ireland and is the only commercial port between Foynes and Cork. It is used for commercial shipping, servicing a domestic fishing fleet, leisure and amenity and lifesaving. The main deep sea pier is 175m long with extensive storage facilities available. The landing quays have a design dredge depth of -7.5mCD. Fenit Harbour is an important logistical base for the Killarney based Liebherr cranes.

The commercial shipping quays facilitate 15,000 tonne ships of container cranes of a frequency of approximately 15 to 20 per annum. Currently, the fishing fleet operating out of Fenit include approximately 1 large trawler, 2 medium trawlers and 24 half decker trawlers in addition to a number of charter sea angling vessels. Fenit Marina was built in 1997 and has a 130 berth marina and caters to leisure craft from 6m to 15m in length. It has a plan area of approximately 1.5ha. The marina has a design dredge depth of -3.5mCD. The existing marina berths facilitate leisure craft during the peak summer months and a mixture of both fishing and leisure in the off-season.

Land use in the vicinity of the harbour on the mainland includes agricultural, recreational, residential, commercial and open space. The harbour is approximately 500m south of Fenit village. The land directly to the north of the proposed expansion is primarily amenity, residential and open space. The Fenit blue flag beach is located to the northwest of the site and is an important amenity area for the local community. A further stony beach is located to the northeast of the site.

The proposed maintenance dredging will take place within the commercial shipping berth and at the manoeuvring area as can be seen in Figure 2 below.



Figure 2. Location of dredging within Fenit Harbour.

1.2 EXISTING ENVIRONMENT

1.2.1 Bedrock geology and coastline to the north

Fenit Harbour is situated on the northern shore of Tralee Bay, north of the Dingle Peninsula. According to Geological Survey of Ireland (GSI) mapping and supporting data the Dingle Peninsula which makes up the southern shore of the bay is a syncline of Devonian Sandstone with Namurian Sandstone on its flanks. In addition, the GSI map indicates that Tralee Bay is underlain with

Carboniferous Limestone as is the Tralee area with the hills to the west consisting of Namurian sandstone.

The Carboniferous Limestone outcrops within the harbour at Samphire Island. Geotechnical investigations undertaken in 1996 indicate that the rock dips away under the surrounding overburden which forms the bed of the harbour and nearby area. The existing harbour was constructed on the rock of Samphire Island with an original L-shaped pier extending north and east-northeast of the rock outcrop. The north oriented leg of the harbour is connected to the mainland via a piled viaduct and causeway.

The shore to the north of the harbour consists of a glacial till cliff to the northeast and a short sandy beach to the northwest. Further west the beach merges into a rocky foreshore. The shore immediately east of the viaduct consists of a rock cliff becoming a glacial till cliff further east. Fronting the glacial till cliff is a layer of sand, gravel and cobbles overlying an eroded platform in the till. The shoreline at Fenit comprises sandy beach, rocky shore and cobble and gravel shingle.

1.2.2 Bathymetry

The bathymetry survey conducted by Hydrographic Services Ltd in July 2014 indicate that depths in the current commercial berth range from -4.5 to 5.5mCD, a decrease of up to -3mCD in places from the optimum design depth of -7.5mCD as a result of the accumulation of silt over time (see application drawing 14996-5004, Appendix 2). Depths in the shipping manoeuvre area have decreased from the optimum design depth of -5mCD to -4mCD, and to -2mCD in places. The bathymetry survey indicates an accumulation of sediment in all parts of the harbour including the inner harbour and the marina since the last maintenance dredge of this area in 2011.

1.2.3 Marine Sediments

Sediment sampling for quality analysis was undertaken at seven locations across the harbour area including one at the fishing berth (F1), marina (F2), commercial berth (F3), maneuvering area (F6) and navigation channel (F7), and two immediately east of the eastern breakwater (F4, F5). F3 and F6 locations are representative of the dredge area sediment quality while locations F4 and F4 are representative of the edge of the backslope dredge areas.

There are no current or historic heavy industries, boat building or repair associated with Fenit Harbour. The principal sources of pollutants within the harbour would be hydrocarbons associated with vessels, machinery and equipment.

The sediments from the harbour area were classified as muddy sand throughout by Folk (1954), being dominated by silt-clay and very fine sand for the most part. The levels for arsenic and nickel exceeded the lower Irish action limits for many of their samples placing them in Class 2. Class 2 sediments hold contaminant concentrations between Level 1 and Level 2 and are considered marginally contaminated (Cronin *et al.*, 2006). None of the parameters exceed the upper Irish action limit.

Arsenic can be naturally present in marine sediment and in some locations natural levels of arsenic can exceed the upper value of 70 mg kg⁻¹. The lower level is 9 mg kg⁻¹ and this is exceeded at sampling stations F1, F2, F3, F4, F6, F8, DS2 and DS3 with levels ranging from 11.2 mg kg⁻¹ to 19.6 mg kg⁻¹. Levels for arsenic do not exceed the upper Irish action level and do not exceed the U.S. probable effects level (PEL) used for biological effects guidelines of 41.6 mg kg⁻¹ (Cronin *et al.*, 2006).

Nickel levels exceeded the lower Irish action level of 21 mg kg⁻¹ for six out of the seven sampling stations for sediment quality, namely F1, F2, F3, F4, F6 and F7, thus categorising them as Class 2 sediments. Nickel levels were below the lower Irish action level for the dumpsite. Levels for nickel do

not exceed the upper Irish action level of 60 mg kg⁻¹ and do not exceed the U.S. probable effects level (PEL) used for biological effects guidelines of 42.8 mg kg⁻¹ (Cronin *et al.*, 2006).

1.2.4 Benthic Ecology

In 2009 Aqua-Fact undertook benthic survey work at 10 sampling stations in and around Fenit Harbour to inform the Fenit Harbour and Marina Expansion project.

The western part of the inner harbour area (grab Stations S1 and S2) was dominated by fine muds (>98% silt-clay content). Only three species were recorded in any appreciable numbers in this area but numbers were still low when compared to the stations outside the harbour. *Nephtys hombergii* and nemerteans dominated here.

The harbour entrance area (grab Stations S3) was dominated by silt-clay, with Stations S4 and S6 dominated by sandy mud. All stations had a poor species assemblage with *Nephtys hombergii* dominated each site.

The area east of the harbour was relatively homogenous consisting of sandy mud formed into small wavelets by the action of the tidal currents. Further east, areas of compact clay formed large shallow mounds on the bottom. Apart from drift algae, no flora or fauna was observed. Faunal grab station S4 revealed the dominance of the infaunal polychaete *Nephtys hombergii* in this location along with the bivalve molluscs *Abra nitida* and *Nucula nucleus*. The community here was consistent with the SS.SMU Sublittoral cohesive mud and sandy mud communities biotope.

1.3 PROPOSED DREDGING

Fenit Harbour has a need for regular maintenance dredging. Historically, this is done in a 3 or 5 year cycle depending on whether it is the commercial shipping berth or the inner marina harbour area. The first and only capital dredging operation was undertaken in 1995/6 to develop the new marina, spring pier and breakwater, and to provide sufficient navigation depth for fishing vessels, yachts and commercial shipping during all tides. Following this dredging operation the optimum design depths were a minimum of -3.5mCD¹ for the inner harbour and marina area, -7.5mCD for the commercial shipping berth and -5mCD for the shipping manoeuvre area.

Presently, a significant volume of material has accumulated in the commercial berth since it was last dredged in 2011, which is actively used by Liebherr Crane shipping activities. Inadequate navigation depth leads to reduced control of ship movement and resulting safety and navigation issues. Admiralty chart shows the optimum design depths for navigation and berthing safely, however, the site as evident from the recent bathymetry data currently does not meet these.

Approximately, 63,000m³ of material needs to be dredged, removed and deposited at the dumpsite located in the outer Tralee Bay area. This will be removed from the commercial berth and at the mouth of the harbour area and beyond to the east as seen in Figure 2 above. The dredge area comprises of two separate dredge locations, namely Area A and Area B. Area A, the commercial berth, lies in the vicinity of the mouth of the harbour covering an area of 11,820m² and to achieve a depth decrease from approximately -5mCD to -7.5mCD will require the removal of approximately 44,000m³. The maximum depth will be achieved in the vicinity of the pier while the area to the north will be back-sloped. Area B, the ship manoeuvring area, lies east of the mouth of the harbour covering an area of 14,000m² and to achieve a depth increase from approximately -3mCD to -5mCD will require the removal of approximately 19,000m³. The maintenance dredging project will prioritise

¹ Chart Datum is the lowest depth at low water, which creates a safe water depth for navigation (only used by boats)

dredging adjacent to the commercial berth and the total maximum area or footprint to be dredged is 2.6 ha and the total maximum volume is 63,000m³. These figures are the maximum dredge areas and volumes because in reality it will be funding and financial constraints that will determine the actual area and volume of maintenance dredging.

1.4 POTENTIAL ENVIRONMENTAL IMPACTS

This section outlines the potential impacts that could arise when the dredging is being undertaken within the harbour area. It should be noted that the dredging will take 3 to 4 weeks to complete and so any impacts are temporary and short term.

The potential impacts to Natura 2000 have been discussed in detail in Natura Impact Statement which is enclosed with the application. The following is a list of potential impacts that may arise due to dredging operations:

- Loss and alteration of seabed habitat and associated species at the location of the dredge areas, which lie within an Natura 2000 site
- Water quality impacts from increased suspended sediment and turbidity levels in the water column at the dredge location
- Disturbance to species through smothering from the deposition of suspended solids
- Temporary noise disturbance from dredging plant
- Water quality impacts from accidental oil spill associated with fuelling activities of the suction hopper dredger

The following sections address each of the potential impacts outlined above.

1.4.1 Loss and alteration of seabed habitat

The loss of habitat relates to both the physical footprint on the sea bed and also relates to the communities/species that live within. The area that is being dredged is dynamic in that there is constant deposition of material within the area due to the natural coastal cycle. The dredging will remove material from the berth and re-deposit it at the dumpsite location in the outer bay. Once dredging is complete the cycle of deposition will commence once more. So from a habitat perspective there will be a temporary loss of material from within the berth. Within the dredge material there will be some loss of species due to smothering or physical impacts, but such loss is not deemed significant. The species are abundant within the seabed and the loss of some seabed species at this location is not significant.

1.4.2 Water quality impacts from increased suspended sediment and turbidity levels in the water column at the dredge site

During the four week dredging operations there will be a localised increase in turbidity as there will be disturbance of silt/sand on the bed as it is removed and there will also be spill over from the hopper as it is filled. This in effect will generate a localised dredge plume in the immediate vicinity of the dredge vessel. This is a temporary impact as once each stage of dredging is completed some of the material will settle out and be deposited on the sea bed and some will remain in suspension within the water column.

Given the location of the dredging the harbour structures do provide a physical defence against the spread of the dredge plume. The material in suspension can also be transferred via currents and tides. In order to monitor this plume and the effects of turbidity a series of alarmed monitors will be deployed during the dredging event and these will highlight any significant increase in the plume and any directional movement. In addition the supervising engineer and the dredge captain will visually monitor the plume and control dredging accordingly.

It should be noted that this type of dredging campaign has been undertaken on many occasions over the last 20 years and on each occasion control measures and adequate supervision have ensured that no negative effects on water quality were experienced. In addition the dredge material is relatively clean and reflects the general quality of the material that naturally occurs within the inner bay.

Based on good dredge methods, tight controls and monitoring it is possible to effectively manage the four week dredge campaign. What is important to state is that turbidity within the water body is influenced by the natural daily tidal cycle and also by weather and storm events. The inner reaches of Tralee are shallow and have significant areas of mud, sand and silt. This material is regularly agitated by the tidal cycle and so there is naturally a level of turbidity in the water column due to coastal processes.

The proposed dredging is a short term temporary event and the increase in turbidity is manageable and is not deemed significant.

1.4.3 Disturbance to species through smothering from the deposition of suspended solids

This impact relates to the species that live within the sea bed at the dredge location but also to species that are located nearby in the seabed. This aspect has been discussed in the NIS and also in the report completed by Aquafact International which is included in the application.

The effects of the short term dredge campaign will be temporary and are deemed not significant. In addition the control measures outlined above will ensure that the impacts are minimal and temporary in nature.

1.4.4 Temporary noise disturbance from dredging plant

There will be some localised noise impacts from the dredging vessel as it works within the harbour. The harbour itself is a busy port with large scale shipping traffic and so the natural background levels will not be dissimilar to what is experienced while the dredger is in place. The dredger will not be a constant either, in that it will be coming and going from the harbour to the dumpsite and so the noise impact is intermittent and temporary. Given the nature of the dredging vessel and the typical noise from such crafts it is well within the normal background levels experienced in the busy commercial shipping port. There is also a significant separation distance from the village and any surrounding residential homes. The noise levels experienced in the area are those that are typical of a busy port and the dredging operations won't adversely impact on residents or the wider locality.

1.4.5 Water quality impacts from accidental oil spill associated with fuelling activities of the suction hopper dredger

The dredger will require fuelling, but in this instance it may only arise once or twice as the vessel will usually fuel up before heading to Fenit Port. The ship will also be stopping at other ports along the route to Fenit and will have fuelled up there. In the event that the ship needs refuelling it will be undertaken by a specialised fuel delivery truck, which regularly visits the harbour to fuel the commercial ships that frequent the port along with local vessels. The harbour has a protocol for how fuelling is undertaken and best practice measures are in place to avoid fuel spills. A spill kit is available within the harbour and the harbour staff is trained in dealing with fuel and fuel spills

should they occur. In addition the dredger has its own protocols and procedures to manage fuelling operations in ports. The risk of spillage is low and the process is manageable within the context of the proposed works.

2 PROPOSED DUMPING AT SEA SITE

2.1 SITE LOCATION AND DESCRIPTION

The dumpsite is located approximately 3km west of the coast at Carrahane Lower townland and approximately 1.5km north-northwest of Fenit Island in the outer part of Tralee Bay. It lies between 1.5km to 2.5km south and southeast of Illaunnabarnagh and Mucklaghmore Islands, which are essentially small rocky outcrops. The seabed in the general surrounds is classified as sand and muddy sand with reefs located over 1km to the northwest.

The boundary extents of the dumpsite are square in shape with each side measuring 1km giving a total area of 100ha. The location of the proposed dumpsite is outlined on the drawings attached to the application. The location can also be seen in Figure 1 above.

2.2 EXISTING ENVIRONMENT

2.2.1 Bedrock geology

The GSI map indicates that Tralee Bay is underlain with Carboniferous Limestone as is the Tralee area.

2.2.2 Bathymetry

The bathymetry survey conducted by Hydrographic Services Ltd in July 2014 indicate that depths in the dumpsite range from 13m to 17mCD (see application drawing 14996-5202).

2.2.3 Marine Sediments

The sediment type in the eastern half of the dumpsite consisted of fine/medium sand, coarse/medium sand and coarse/very coarse sand. Areas of hard ground were encountered in the western half. Immediately south of the dumpsite coarse/medium sand dominated and very fine sand dominated just over 1km south of the dumpsite. Fine/very fine sand dominated to the east of the dumpsite and coarse/very coarse sand dominated to the north. All sediments were classified as sand or gravelly sand by Folk (1954). Silt-clay fractions were extremely low throughout. (AquaFact, 2014)

The chemical characteristics of the marine sediments within the dumpsite have been presented in the report completed by AquaFact and included as Attachment B2 in this application.

2.2.4 Benthic Ecology

The faunal assemblage of the dumpsite and surrounding areas can be classified by Fossitt (2000) as *SS1 Infralittoral gravels and sands*. Variations in the community type and dominating species between the stations was evident. These local variations are common in the natural environment. All species observed are typically of the gravelly/sandy habitat in the area and the species present represent a balanced mix of longer lived deeper burrowing equilibrium species and smaller shorter lived opportunistic species. Some of the main dominants of the assemblage include the gastropod mollusc *Caecum trachea*, bivalve molluscs *Goodalia triangularis*, *Angulus fabula*, *Chamelea striatula* and Pharidae, Nematoda, the polychaete *Chaetozone christiei* and *Spiophanes bombyx* and the copepod crustacean *Longipedia scotti*. (AquaFact, 2014).

It is worth noting that one of the reasons the site was selected was not a favoured fishing grounds for local fishermen and they had no fishery related concerns here.

2.3 POTENTIAL ENVIRONMENTAL IMPACTS

This section outlines the potential impacts that could arise when the dredged material is deposited at the dumpsite. It should be noted that the dredging will take 3 to 4 weeks to complete and so any impacts are temporary and short term.

The potential impacts to Natura 2000 have been discussed in detail in Natura Impact Statement which is enclosed with the application. The following is a list of potential impacts that may arise due to deposition of dredge spoil at the proposed dump site:

- Loss and alteration of seabed habitat and associated species at the location of the dump site
- Water quality impacts from increased suspended sediment and turbidity levels in the water column at the dumpsite
- Disturbance to species through smothering from the deposition of suspended solids
- Temporary noise disturbance from dredging plant
- Archaeology

The following sections address each of the potential impacts outlined above.

2.3.1 Loss and alteration of seabed habitat

The loss of habitat relates to both the physical footprint on the sea bed and also relates to the communities/species that live within. The area that has been selected is dynamic in that there is constant change within the area of seabed due to tidal currents and storms over the year.

The natural hydrodynamics of the bay and the dump site area means that there is always movement of material in the bay, some is moved at bed level and some is in suspension and moved with tides and currents.

The dredger will visit the dumpsite on a regular basis over a three to four week period and will deposit its load after the completion of each dredge cycle. The deposition of the material in the bed will have the effect of covering the sea bed with material and this process will have some impacts on local fauna on the surface of the bed and on species contained within. While some loss of fauna will occur it is not deemed significant. It will be a temporary impact in that they will recover and replenish numbers in due course. This aspect has been dealt with in the Aquafact Report included in this application and it is also discussed in the Natura Impact Statement.

2.3.2 Water quality impacts from increased suspended sediment and turbidity levels in the water column at the dredge site

During the four week dredging and dumping operations there will be a localised increase in turbidity as there will be disturbance of silt/sand on the bed as dredge spoil is deposited on the bed from the dredger. In addition there will be material in suspension in the water column while it settles out of suspension and deposits on the sea bed. Some of the material will remain in suspension and will move with currents and will eventually settle out within the coastal system.

This in effect will generate a localised dredge plume in the immediate vicinity of the dredge vessel while it opens the bottom doors from the hopper and while the material drops to the sea bed. There will be a temporary impact on turbidity levels in the water column but this will reduce over time as the material settles out or disperses in the coastal system.

It should be noted that this type of dredging and dumping at sea campaign has been undertaken on many occasions over the last 20 years and on each occasion control measures and adequate supervision have ensured that no negative effects on water quality were experienced.

Based on good dredge methods, tight controls and monitoring it is possible to effectively manage the deposition of material at the dumpsite during a four week campaign. What is important to state is that turbidity within the water body is influenced by the natural daily tidal cycle and also by weather and storm events. The dumpsite is within open water and so the water column has naturally occurring levels of turbidity due to the effects of the tidal cycle.

The proposed dumping at sea process is a short term temporary event and the increase in turbidity is manageable and is not deemed significant.

2.3.3 Disturbance to species through smothering from the deposition of suspended solids

This impact relates to the species that live within the sea bed at the dumpsite location but also to species that are located in the seabed. This aspect has been discussed in the NIS and also in the report completed by Aquafact International which is included in the application.

2.3.4 Temporary noise disturbance from dredging plant

There will be some localised noise impacts from the dredging vessel as it delivers material to the site and deposits the material on the sea bed. There is a significant separation distance from the dumpsite location to the mainland and so any noise levels associated with the dumping at sea process will not reach receptors on land. There may be some perceptible noise levels immediately adjacent to the dumpsite on flat calm days when there is little or no background noise from the sea or environment. However this effect is temporary and not significant to wildlife.

2.3.5 Archaeology

A full archaeological assessment has been undertaken for the proposed dump site location. This report was prepared by Lar Dunne Archaeology and a copy is included with the application. The report concludes that there will be no impacts.

3 DISCUSSION

The process of dredging and dumping at sea has similar potential impacts. The immediate receptor is the water body and good practice and controls can manage this impact. The use of turbidity monitors combined with visual monitoring by a dedicated supervising engineer will allow for control of the dredging and dumping process. Weather allowing it would also be possible to use a drone craft to hover above the dredge and dump locations to get an aerial photograph of the process at various stages and this would inform the control process, as any plume dispersion would be visible. Taking water samples along with data from the turbidity monitors will provide good baseline data for future dredging and dumping at sea events.

The reports completed discuss the project and assess the potential for impacts. The reports broadly conclude that while there will be some impacts they are not significant. For the majority of the four week period there will be some localised temporary impacts or disturbance, but the nature of this is typical of what has been successfully undertaken before without issue.

The dumpsite selection report was completed using a constraints led approach and thus avoiding all ecological, archaeological, fishing sensitivities. That report was also based on consultation with all stakeholders and their views were important in the selection process.

In the opinion of Malachy Walsh & Partners the dredging and dumping at sea process can be safely undertaken providing the controls outlined are fully implemented. As part of the dredging process the local stakeholders will be consulted prior to the dredging taking place, but also during and post completion. This engagement is essential in order to minimise any disturbance or impacts.

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