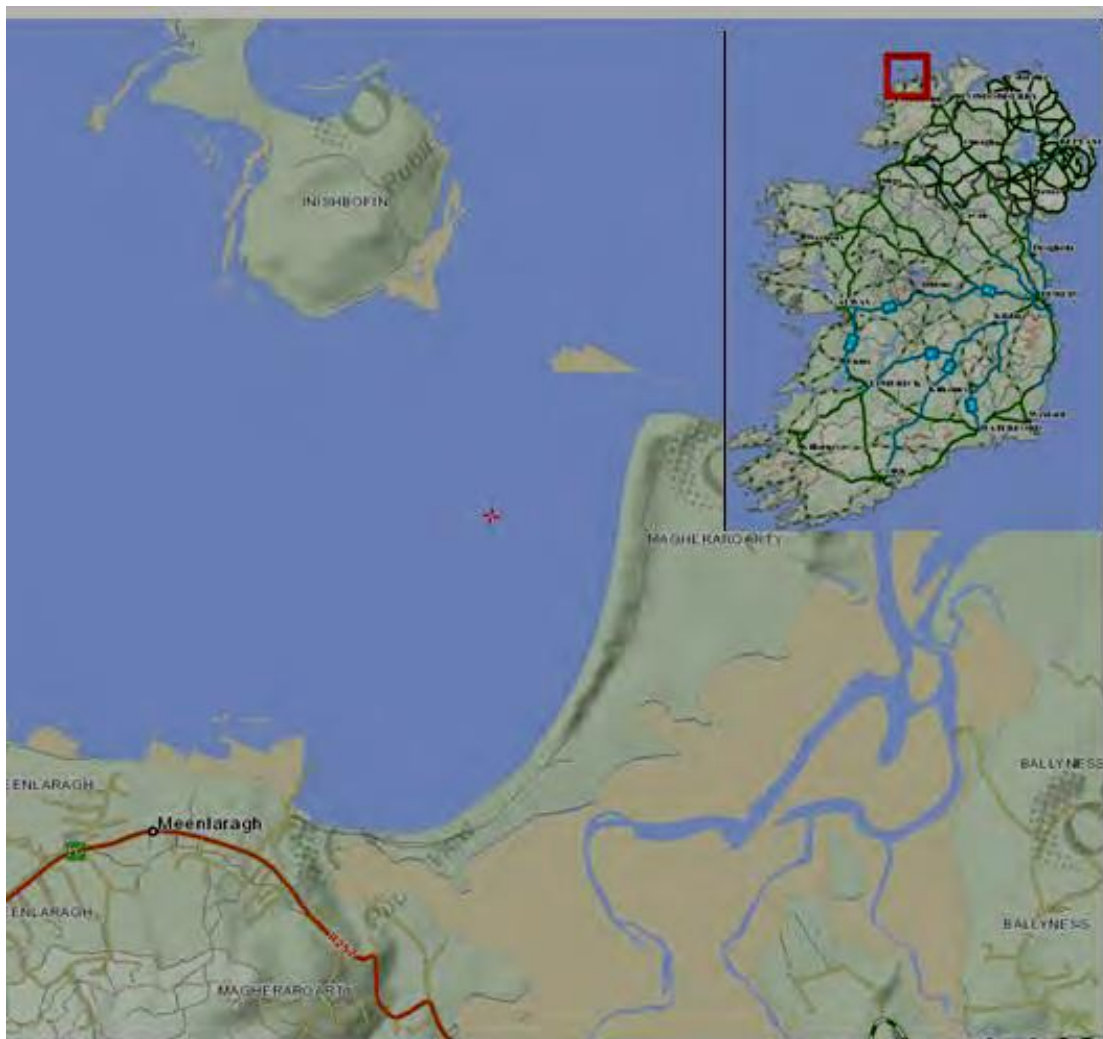




# Donegal Co. Council Comhairle Contae Dhún na nGall

Jan 2021

## Shore Based Dredging and Beach Nourishment at Magheraroarty Harbour Details & Methodology



## 1.0 INTRODUCTION

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Along the Irish Coast, the high-energy waves experienced during storms and high seas create a strong longshore drift and large amounts of sediment transport. The direction of the coastline and the incoming waves determine the direction of the longshore drift while during calmer periods sediment is transported with the tidal currents.

Magheraroarty Harbour experiences continued accretion from deposited sediment which is transported along the 3km long beach, known as Dooley Strand. The harbour is tidally restricted and exposed to wave energy generated in the Atlantic Ocean over unlimited fetch lengths.

Magheraroarty harbour is located within a Natura 2000 designated site, Ballyness Bay SAC (001090)", and close to the Falcarragh to Meenlaragh SPA (004149) Natura 2000 site.

Although the majority of sediment is deposited along Dooley Spit, the sediment deposited within the harbour is substantial, reducing navigable depths for the Tory Island Ferry and commercial fishing fleet.

Sand has been depositing at Magheraroarty Harbour since the construction of the pier in the 1970s. In 2002 an L-shaped extension was added to the pier and this has increased the build-up of sand at the base of the pier. Since 2002, annual maintenance dredging is required to remove sediment from the harbour basin. The dredged material is then returned to the adjacent beach, replenishing areas which have been eroded.

## 2.0 REQUIREMENT

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Annual maintenance dredging of Magheraroarty harbour is required to maintain navigable depths to -2.5m Chart Datum for the Tory Island ferry, commercial fishing boats and charter boats in the local area.

Dredging is scheduled to take place each year to coincide with the largest tidal ranges of the year, the 'equinoctial-springs', that occur shortly after the new moon closest to the spring or 'vernal' equinox, usually around the 21st of March. It is not advisable to carry out dredging earlier than this as the risk of storms can negate progress made by the dredging campaign. It is preferable to carry out only one dredging campaign per year.

The total amount of material to be removed each year varies and can be influenced by winter storm events.

The photo below (Photo 1) taken early in the year shows the typical state of Magheraroarty pier with access only to the outer reaches of the pier at low



tide. Most of the pier is inaccessible due to the accumulation of sand over the winter months with dredging required to provide access along the pier.



The photo to the left shows the typical state of Magheraroarty pier following winter storms with access only to the outer reaches of the pier at low tide. Most of the pier is inaccessible due to the accumulation of sand over the winter months with dredging now required to provide access along the pier for the upcoming season.

The practice since 2002 has been to remove this accumulation of sand along the pier and return it to the beach from where it originated. This maintains access to the pier through spring and summer, making it available to inshore fishermen and leisure users and it allows the ferry maintain an uninterrupted passenger service to Tory Island. The sand then continues to accumulate again throughout the winter months particularly during storm conditions.

### 3.0 METHODOLOGY

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Two No. tracked excavators and dump trucks will be used to excavate a channel along the pier with the sand returned to the adjacent beach, replenishing areas which have been eroded. The photo on the left shows similar work being carried



out in 2019. A beach nourishment area has been identified and will be marked out in advance of the works with timber stakes. A haul route will also be marked out and the entire work area will be cordoned off to safeguard pedestrians using the beach. Signage will be used to notify the public of the ongoing works and sentries will continue to patrol the area to safeguard the public.

At the beach nourishment area the sand will be dumped and spread also using a tracked excavator as in previous years. Spreading the sand allows the beach to quickly return to its original state thereby minimising impact and ensuring the safety of the public. Every effort will be made to reduce the impact on the beach and adjacent sand dunes. The movement of plant will be restricted to a designated route and all plant will be checked and monitored for leakage of oil based substances. No plant or equipment will be



parked on the beach over night or outside of working hours. Access to the beach will be restricted during the course of these works for 4 hours each day over a 5 - 6 day period. The proposed works will be advertised on radio and pier users will also be notified in advance. Access to the pier will be restricted for all vessels during these works.



Final grading is carried out on the final day of the works to provide a smooth transition with the adjacent beach.

The proposed works will be undertaken as follows:

Day 1:

- Notification by local media of up-coming dredging works at Magheraroarty pier & beach with details of restrictions to access.
- Consultation with pier users including fishermen and ferry operators and advice on restrictions to access.
- Notice to Irish Coast Guard and advice on issuing notice to mariners.
- Notice to NPWS on commencement of works

Day 2:

- Erect signage advising public of proposed dredging works.
- Further consultation with pier users to advise on details of works and restrictions on access to the pier.
- Erect pedestrian barriers where possible above HWM.



- Take delivery of some excavating plant and park it in the adjacent car park
- Deal with any concerns raised by NPWS Ranger.

#### Day 3:

- Complete erecting pedestrian barriers and signage in the morning
- Provide sentries on beach to advise public of proposed works
- Mark out beach nourishment area and haul route using hand held GPS and timber stakes.
- Take delivery of remaining plant items and park them safely in the adjacent car park.
- Check all plant for suitability and particularly for leaks of oil/fuel/water.
- Brief plant operators on proposed works including, location of excavation, haul route, dump area, impact on beach, sand dunes, public, pier users, pedestrians, dredging procedure, communication, health & safety, working near water, soft sand, etc.
- Mobilise excavators and dumpers to the beach at 9:30am and commence excavating working out with the ebb tide. Commence spreading material at the Nourishment area as it arrives on the dump trucks via the haul route.
- Continue to monitor progress until tide returns at 1:00pm including depth and extent of excavation, soft spots, pedestrian barriers, condition of plant, etc.
- De-mobilise excavators and dump trucks and return them to the car park. Check again for leaks.
- Remove all pedestrian barriers and signage below HWM
- Note extent of excavation and advise pier users as excavation is covered by tide. Advise also of any obstructions to boating.
- Allow access to the pier and beach for the remainder of the day and de-mobilise from the pier and the beach at 3:00pm

#### Day 4 – Day 6:

- Erect signage, barriers and put sentries in place by 9:30am.
- Mobilise plant to the beach by 10:00am and continue excavating and dumping as previous.
- Remain vigilant as extent of excavation increases and around soft spots, incoming tide and the general public.

#### Day 7:

- Proceed as on previous days with barriers and signage for mobilisation of plant by 11:00am.
- Emphasis will be on grading the excavation and profiling the beach for safety. Any high spots will also be removed.
- De-mobilised plant by 3:30pm and return all plant to the car-park.
- Remove all barriers, signage and any other equipment.

- Advise all pier users on completion of works.
- Advise Irish Coast Guard on completion of works.
- Begin removing plant from car park

All personnel involved in the dredging operation will be experienced and will have received all training required to carry out the operation in a safe manner with full regard to the environment, general public, pier users (both commercial & leisure) and all other requirements. All plant and equipment will be certified and thoroughly checked in advance of the works.

#### **4.0 IMPACT**

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Approximately 15,000 – 20,000 tonnes of sand will be removed annually from alongside the pier in the proposed dredging campaign. If dredging is not carried out then there will be no access to Tory Island for approximately a 4 hour period around low spring tide with this scenario worsening as further sand accumulates.


The operation will result in the placement of less than 100mm of sand over the entire beach nourishment area with the material excavated being clean recently deposited sand.

Users of the beach and pier will be impacted for less than 24 hours in total (4-5 hours each day for 6 days)

All plant and equipment will be checked thoroughly for leaks, residues and anything that could cause contamination of the foreshore and these checks will be ongoing throughout the period of works. All refuelling will be carried out in the car park adjacent to the beach with spill kits available.

Drawing No. 02 shows the extent of the works, the haul route and the nourishment area.

As in previous years sand will accumulate along the pier again with the impact of this campaign being negated by January/February of subsequent years depending on winter storms.

  
Executive Engineer – Marine Section  
Donegal Co. Council