MWP

Waste Licence Application For Howth Harbour Dredging and Reclamation Project

Waste Acceptance Procedure

Department of Agriculture, Food and the Marine

22/11/2023

Contents

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1 Introduction

The waste acceptance procedure will follow the following flow path:

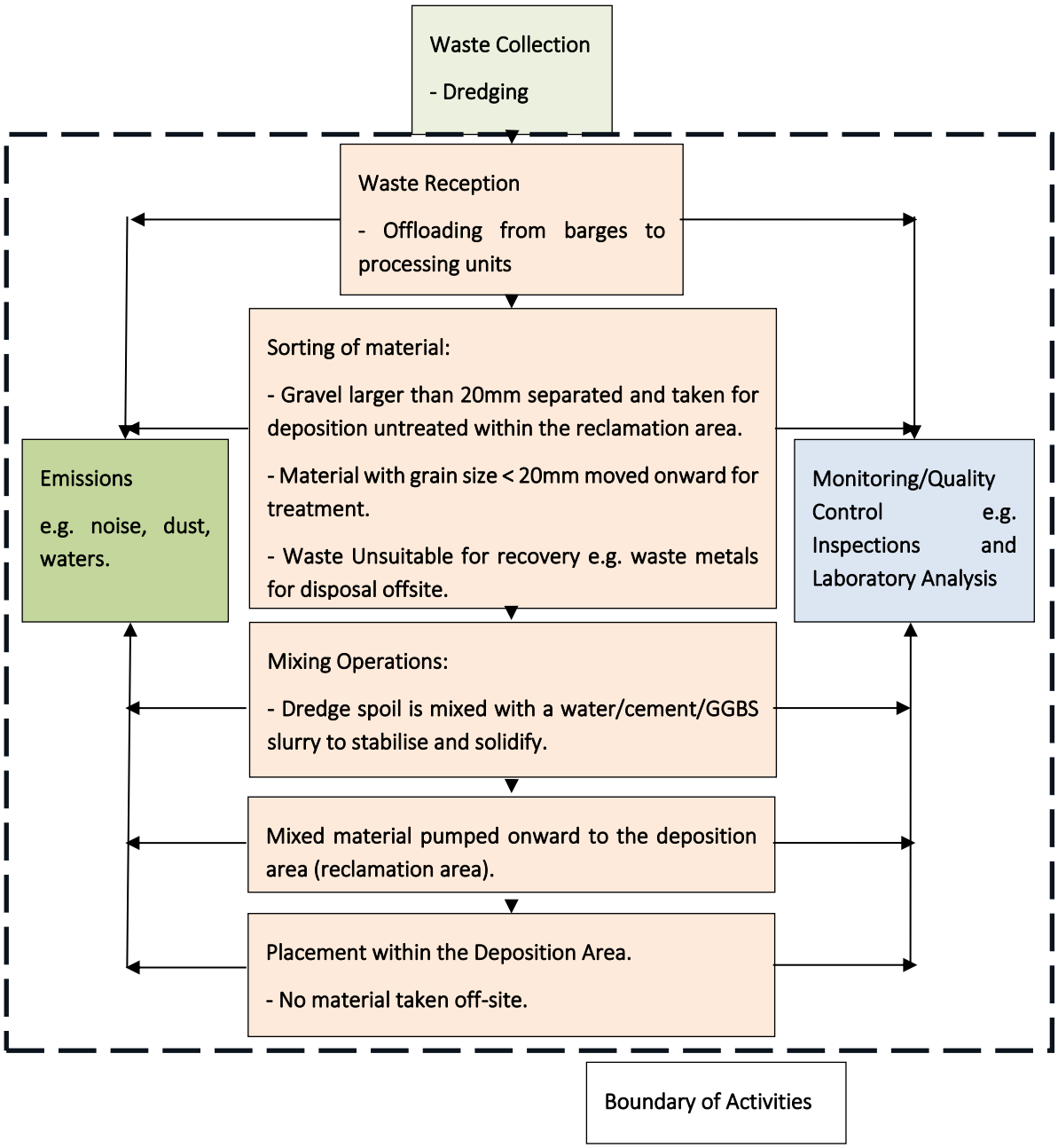

Figure 1.1 Summary of Facility Activities

2 Dredging

The dredging works will be undertaken using a long reach excavator or grab operating from a floating pontoon barge or an equivalent configuration (see Figure 1 below) or a suction dredger.

As part of the hydrodynamic assessment undertaken for the EIAR, an assessment of the grain size of the material to be dredged was made based on the grain size distribution of the samples taken from the overburden from a ground investigation undertaken within the harbour during 2015. This assessment indicated that a portion of the dredge spoil will be coarse enough (>0.6mm) to quickly fall through the water column if disturbed into the water column. However, some 60% of the overburden to be dredged will be finer than 0.6mm, with 50% in the clay silt fraction.

Figure 1 Example dredging operations using a floating barge and long reach excavator.

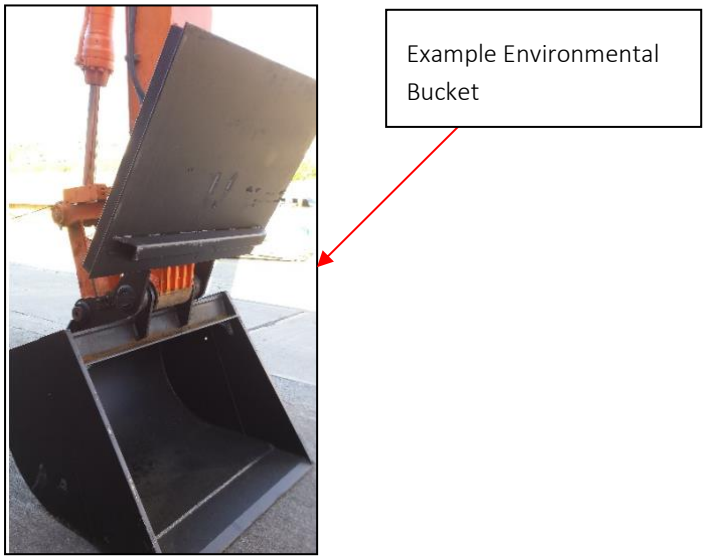

Figure 2 Example environmental bucket showing a lid that can be closed to seal contents during lifting.

While it is not expected that the dredge plume will escape the harbour in sufficient quantities to cause issues in sensitive areas outside the harbour, if concerns were raised during the course of the works it would be possible to surround the dredge plant with a silt curtain. An assessment of suspended sediments/plumes was undertaken and given in the "Hydrodynamic and Sediment Regime Assessment" report included within the EIAR.

It should be noted that these are only feasible in areas of low current where there is less risk of material being carried in suspension to a sensitive area - such as the SAC and beach to the west of the harbour. See example below in Figure 3.

Figure 3 Example silt curtain arrangement surrounding dredging activities.

The total volume of material to be dredged during the construction of the proposed development is estimated to be 240,000m^3.

The rate of dredging will be dictated by the mixing rate for the binder and dredge spoil. It is anticipated that the maximum mixing rate is approximately 500m3/day for each mixing unit, and this rate would dictate the average dredge rate as there is little scope for storing dredge material prior to mixing. Based on a 10-hour day, this gives a dredging rate of less than 1m3/minute. It maybe possible to have more than one treatment process in operation at the same time. In such a case the rate of dredging could be increased. The assessment in the EIAR assumed that dredging was undertaken 24/7 and at a rate of 2,400m3/day, equivalent to 1.67m3/minute to allow for some flexibility in operations.

Bathymetric surveys will be used to ensure the correct dredge depths are achieved and to identify high spots for further dredging. Bathymetric surveys will be undertaken prior to dredging to confirm the quantities of material to be dredged and during dredging to ensure that required dredge depths are achieved.

Monitoring of turbidity will be undertaken within the harbour and at sensitive locations outside the harbour to ensure that excess suspended sediment from the dredge plume do not impact on such areas. These monitoring points will also be used to monitor any excess suspended sediment when the seawater initially trapped within the perimeter embankment is drained to the sea.

Waste debris (such as discarded metal or plastic items) collected from the harbour during dredging works will be segregated and removed offsite by a licenced haulier to a licensed facility. See below Figure 4 as an example.

Figure 4 Example waste segregation arrangement

Dredging work can be undertaken in parallel with the perimeter construction if the perimeter construction is undertaken in a phased manner using temporary cross bunds.

Daily record sheets from the dredge captain will be kept of working hours, location, no. of barges filled.

3 Unloading

Dredge material will be brought to an unloading point within the trawler basin of the harbour.

Dredge spoil will be comprised predominantly of silt, with some sand and gravel.

Coarser spoil (>20mm) material will be screened out from the dredge spoil and temporarily stockpiled. This material will then be transferred to the reclamation area by truck where it will be directly placed in layers and compacted into the infill area or used in temporary bunds or in the perimeter embankment.

4 Processing and Deposition of Dredge Material

Sandy and silty material will undergo an engineering stabilisation and solidification process prior to placement into the reclaimed infill area. Such finer material will be transferred either by pumping through a pipeline into a mixing unit or lifting by excavator into the mixing unit. A binder in the form of a slurry will be added to this dredge spoil within the mixing plant until a homogenous mix of binder and dredge material is attained. The binder will consist of a combination of Portland Cement and Ground Granulated Blast Furnace Slag (GGBS) or equivalent. The mix will then be pumped as a wet mix from the mixing unit plant to the infill area where it will be deposited. Excess water (supernatant) will be collected from the surface of the deposited material and returned to the treatment area for reuse to help fluidise the dredge spoil as necessary to make it pumpable.

The below Figure 5 shows an example mixing facility layout. In the case shown the dredge spoil is brought to the quayside in a barge. Within the barge the material is agitated and fluidised to allow it to be pumped into the mixing unit. Material could similarly be transferred to bunded areas on land where the material can be agitated and fluidised and screened for larger sized particles. Silos containing cement/GGBS/ Binder are based within the facility. These components are conveyed to the mixing process plant in liquid form. Mixing is undertaken in an enclosed system. Dust emissions can be controlled within an enclosed plant operation. A controlled and consistent end-product can be produced with predicable engineering characteristics.

Daily record sheets will be kept of processed material volumes, tonnage, sampling results, debris found, deposition locations.

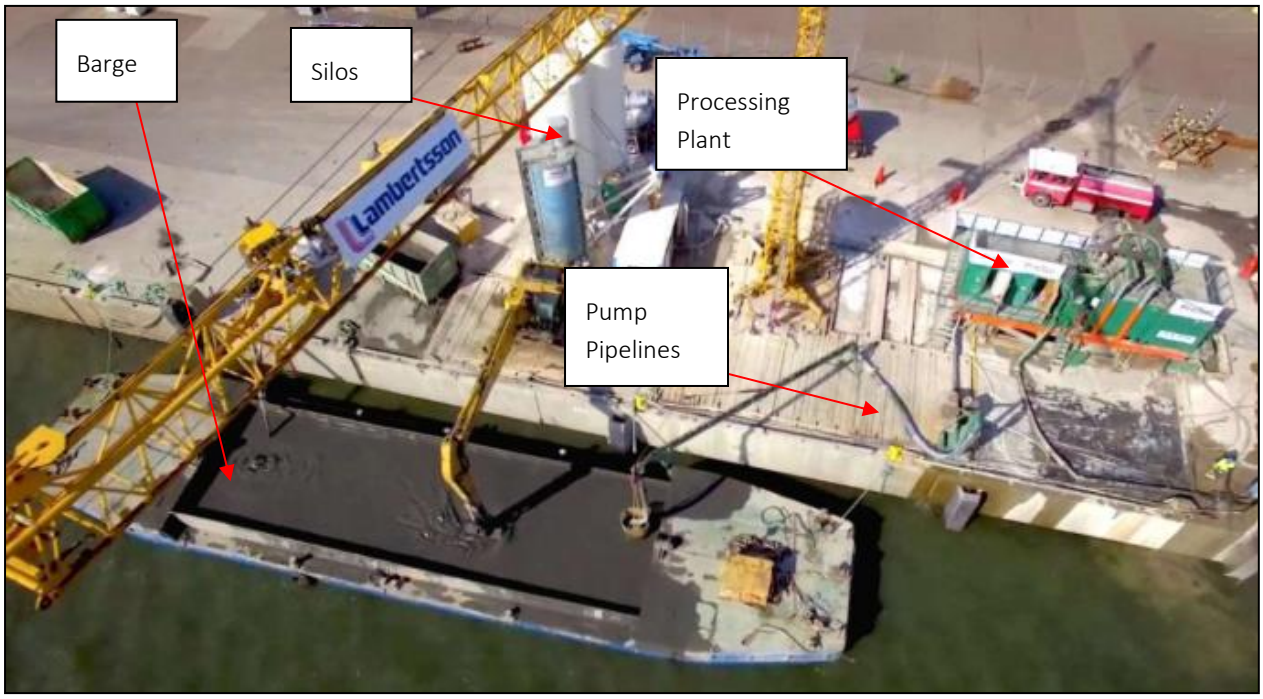

Figure 5 Example dredge spoil processing facility

The quantities of dredge spoil, binders, processed material, when mixed and where deposited will be recorded. It is estimated that the bulking factor will be between 5-10%.

Stabilisation and solidification processing and placement within the reclamation area will be undertaken in parallel.

Figure 6 below is a schematic of a possible processing, pumping and placement layout. The pipeline outlet placing the material within the bunded area can be moved as areas fill up. The overall area may be filled as one unit or may have a number of temporary bunds within the overall perimeter, and be filled in sections.

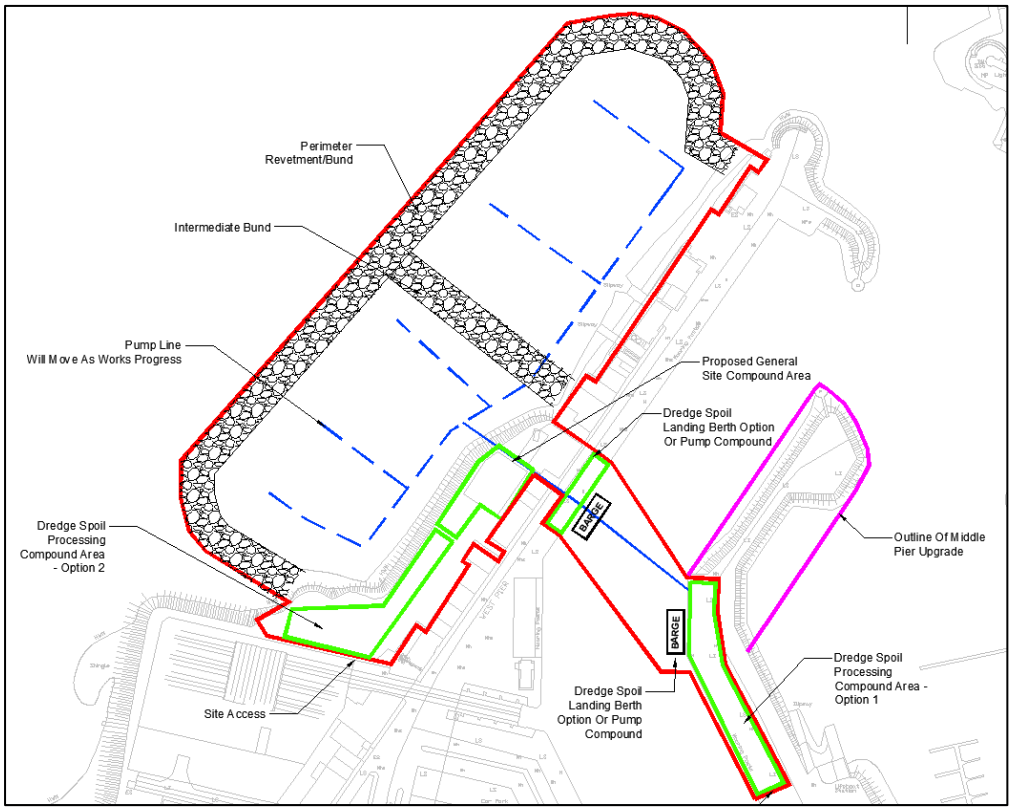

Figure 6 Proposed Site layout during construction.

5 Monitoring/Quality Control

The quality control and monitoring of the recovery process will include:

- Location: the intermediate cell location, quantity and level of each week's infilling will be recorded.
- Samples taken every 3,000m^3 will be tested for:
    - Strength of processed material, UCS, 5 concrete type cubes of the processed material would be taken for crushing at 7, 28, 56 and 112days with one spare.
    - Strength of binder, UCS, 3 concrete type cubes of the binder taken for crushing at 7 and 28days with one spare.
    - Contaminant concentrations: tested for total content of the following parameter values; Arsenic, Barium, Cadmium, Chromium, Copper, Mercury, Mickel, Lead, Antimony, Selenium, Zinc, Chloride, Flouride, Soluble Sulphate, Total Organic Carbon, BTEX, 7 PCBs, Mineral Oil C5 to C44, 17 PAHs, DBT and TBT. The results can be used if required to establish the material waste classification.
    - Waste Acceptance Criteria (WAC) to be tested for leachate values using monolithic tank tests (as per "NEN 7375:2004 Leaching Characteristics of Moulded or Monolithic Building and Waste Materials"). The results are to be compared against the WAC limits. Two samples, one to be broken down prior to testing and the other to be tested as a monolith.

- Permeability of a cured (28day) cube of processed dredge spoil. Initially every 3000m3 for 4 weeks and then monthly.
- Consolidation characteristic of a cured (28day) cube of processed spoil. Initially every 3000m3 for 4 weeks then monthly.

Following construction – approximately 28 days following the filling of each cell, the following engineering tests will be undertaken. They relate to strength characteristics.

- Plate load tests to establish CBR values. 12 locations.
- SPT tests undertaken in 8 cable percussive boreholes.
- Dynamic probing at 32 locations.
- Settlement monitoring at 8 locations.
- Monitoring of placed material temperature (4 locations).

6 Determining Waste Loads

Waste loads will be determined as follows:

- The volume (m3) will be calculated by measuring flow rates through the pipework.
- The weight (T) will be calculated by multiplying the density of the processed material by the volume. The density will be determined by taking samples for laboratory analysis.

Other methods may be used such as by the measurement of the change in draft of the dredge barge as it fills, and via bathymetric surveys.

7 Non-Conforming Waste

Should samples results return classifying the dredge material as hazardous i.e. non-conforming with the conditions of the waste licence, that barge load of processed material will be excavated from the in-fill area. The location of the deposited material will be recorded allowing for the full volume of the material to be removed.

Record sheets will be kept including details of non-conforming wastes such as material analysis results, locations of dredge material, locations of deposited material, dates, disposal sites and receipts.

Such material will be removed from site to an appropriately licenced facility.