

BPEO Statement and Assessment of chemical and physical characteristics of the dredged material

1. Introduction

Perth & Kinross Council is the harbour authority for Perth Harbour in Scotland. Perth Harbour accepts coastal and dry bulk ships up to 90 m in length, carrying up to 2,500 tonnes from Europe, the Baltic and Scandinavia.

The harbour was last dredged circa. 2004. Recent bathymetric surveys have revealed that navigable depths are severely compromised, placing significant restrictions on harbour operations. Following a review of the harbour's Navigational Risk Assessment, the Harbour Operator identified a number of mitigations that were required to reduce the likelihood of grounding. These mitigations have had a significant impact on harbour trade.

To restore navigable depths in the harbour, two phases of dredging are proposed:

- Phase 1: an urgent small-scale plough dredging operation to remove a 'bar' of sediment that has accumulated at the harbour entrance
- Phase 2: a larger scale dredging operation to restore the harbour to its previously dredged levels.

Phase 1 will proceed as soon as a marine licence can be obtained, and this will enable the harbour to remain operational in the short-term. A separate marine licence will be submitted for Phase 2 once the dredging and disposal method options have been determined.

This document describes the Phase 1 dredging and the material to be dredged, and includes a Best Practicable Environmental Option (BPEO) Statement explaining why a full BPEO is not necessary/appropriate for Phase 1.

2. Description of proposed dredging

The area to be dredged comprises a 'bar' of accumulated material at the harbour entrance, as shown on Figure 1. The volume of material to be dredged is approximately 1,500 m³ (2,400 wet tonnes), to achieve a depth of 1.5 m below Chart Datum.

The method to be adopted is proposed in document '3. Perth Harbour Dredge Method Statement'.

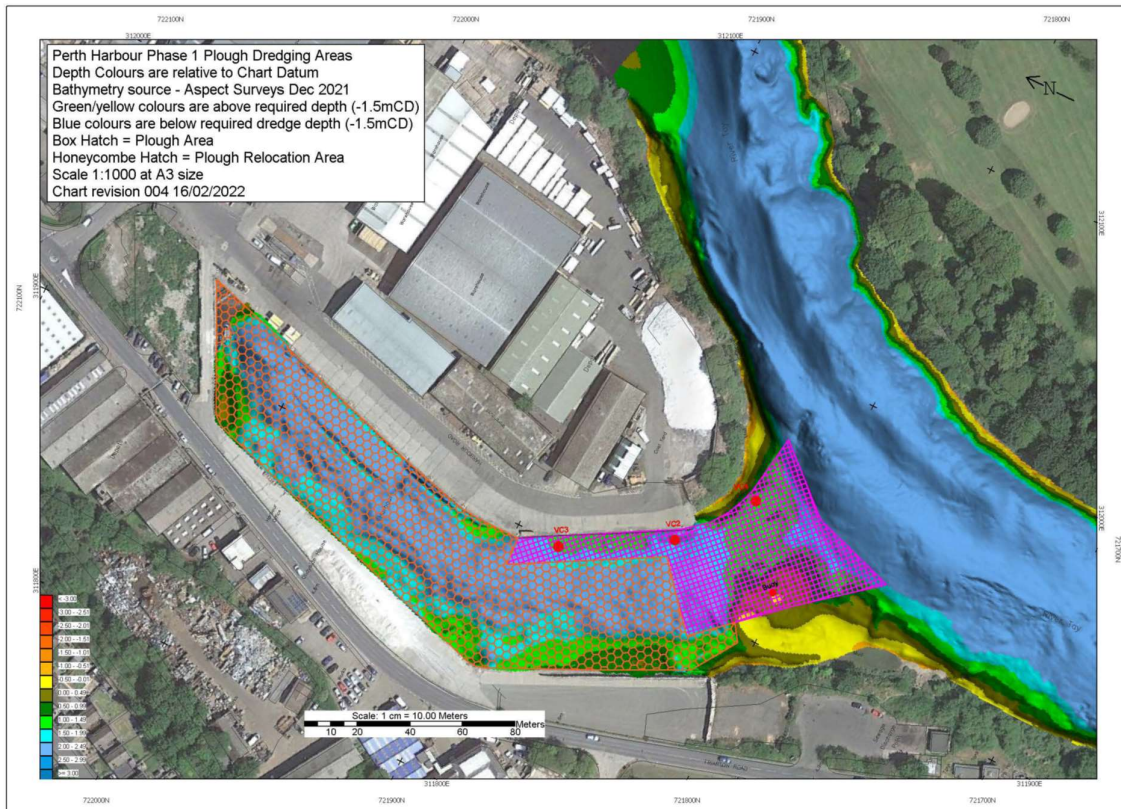


Fig. 1: Proposed Dredge and disposal areas

3. Material to be dredged

3.1. Physical Characteristics

Two surface samples taken from the dredge area in October 2024 (VC5 & VC6), supported by a previous sample taken in December 2021 (VC4/top) indicate that the material is predominantly sand (average 61%) with some gravel (average 24%) and silt (average 14%).

3.2. Chemical Characteristics

The samples were analysed for the Marine Scotland suite of parameters and the results are summarised in Table 1. The results have been compared to the Marine Scotland Revised Action Levels, which are used to determine the contaminant loading of the material and its suitability for disposal at sea. The findings show that no levels of heavy metals, organotins or total hydrocarbons exceeded the Marine Scotland Revised Action Level 1.

Based on the results of the sediment sampling, the material to be dredged is considered to be suitable for both dispersive dredging and disposal at sea.

Parameter	Units (dry weight)	Marine Scotland Revised Action Levels		Sample Reference & Date		
		AL1	AL2	VC4/top Dec 21	VC5 Oct 24	VC6 Oct 24
Heavy Metals						
Arsenic	mg/kg	20	70	2.8	5.8	4.5
Cadmium	mg/kg	0.4	4	0.19	0.2	<0.2
Chromium	mg/kg	50	370	18.8	19	15
Copper	mg/kg	30	300	15.1	14	11
Lead	mg/kg	50	400	12.9	13	8
Mercury	mg/kg	0.25	1.5	0.05	<0.3	<0.3
Nickel	mg/kg	30	150	13.8	17	13
Zinc	mg/kg	130	600	51.8	74	46
Organotins						
Tributyl tin	mg/kg	0.1	0.5	0.008	<0.01	<0.01
Dibutyl tin	mg/kg	None exist	None exist	0.029	<0.01	<0.01
PAHs						
Acenaphthene	µg/kg	100	None exist	11.8	<50	<50
Acenaphthylene	µg/kg	100	None exist	2.8	<50	<50
Anthracene	µg/kg	100	None exist	10.1	<50	<50
Benzo(a)Anthracene	µg/kg	100	None exist	48.3	<50	<50
Benzo(a)Pyrene	µg/kg	100	None exist	52.2	<50	<50
Benzo(b/k) Fluoranthene	µg/kg	100	None exist	32.1	<50	<50
Benzo(ghi)Perylene	µg/kg	100	None exist	35	<50	<50
Chrysene	µg/kg	100	None exist	54.9	<50	<50
Dibenzo(ah) Anthracene	µg/kg	10	None exist	4.8	0	0
Fluoranthene	µg/kg	100	None exist	66	<60	<50
Fluorene	µg/kg	100	None exist	6.7	<50	<50
Indeno(123-cd) Pyrene	µg/kg	100	None exist	33.5	<50	<50
Naphthalene	µg/kg	100	None exist	7.9	<50	<50
Phenanthrene	µg/kg	100	None exist	29	<50	<50
Pyrene	µg/kg	100	None exist	65.2	<50	<50
Total hydrocarbons	µg/kg	100,000	None exist	97,200	<800	<800

Table 1 Sediment sampling results

4. BPEO Statement

Section 34 of the Environmental Protection Act 1990 (as amended) makes it a duty to take all measures available as are reasonable in the circumstances to apply the waste hierarchy set out in Article 4(1) of the Waste Directive. The waste hierarchy ranks waste management options according to the best environmental outcome taking into consideration the lifecycle of the material. In its simplest form, the waste hierarchy gives top priority to preventing waste. When waste is created, it gives priority to reuse, then recycling, then other recovery, and last of all disposal (i.e. landfill).

The preferred dredging method for Phase 1 is to use a plough box mounted on a small tug to move material from the bar at the harbour entrance into deeper water within the harbour, where there is sufficient capacity within adjacent areas of deeper water, as shown on Figure 1. Further information on the dredging method is provided in the document '3. Perth Harbour Dredge Method Statement' submitted with the marine licence application.

The plough dredging method eliminates the requirement for 'disposal' as material is redistributed from a shallow area of the harbour to a deeper area without mechanical removal of the material. All other dredging options would involve mechanical removal of the dredged material with a requirement for disposal. As such, it is possible to conclude without a detailed assessment of all potential disposal options that plough dredging to retain material within the harbour area is the BPEO as it eliminates the requirement for disposal.

For the larger-scale Phase 2 dredging operation described in Section 1, mechanical removal of the dredged material is likely to be required, and a full BPEO assessment will be carried out to support the marine licence application.

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