Port of Cromarty Firth Phase 5 Dredge Licence Best Practicable Environmental Option Report

Report No. 71_REP_18_1

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Document Control

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Contents

1 Introduction

The Port of Cromarty Firth (PoCF) are applying for the appropriate consents to construct their proposed Phase 5 Development, which includes a land reclamation and the creation of new berthing at the Invergordon Service Base (ISB). The Phase 5 Development will allow continued support to current users of the multi-use facility, as well as the potential to accommodate larger scale floating offshore wind turbines (FOWT), which continue to increase in size as technology advances. The Phase 5 berthing area is to be dredged to -14 metres (m) Chart Datum (CD), to allow the integration and pre-commissioning of FOWT at the quayside.

Full details of the proposed development are provided within the ISB Phase 5 Development Environmental Impact Assessment Report (EIAR) (Affric Limited, 2025). As part of the consenting process, a capital dredge licence is being sought. Dredging is required to achieve the project design depths at the new quay and to facilitate construction works (namely, a toe dredge of the perimeter of the land reclamation area and removal of sub optimal sediment within the land reclamation area), as shown on Drawing PC4461-RHD-ZZ-SD-DR-C-1010 P01: Dredge Areas.

This Best Practicable Environmental Option (BPEO) report has been produced to support the Marine Licence Application for Dredge and Sea Disposal under the Marine (Scotland) Act 2010 as amended, for the capital dredge works required for the Phase 5 Development.

1.1 Report Aims and Objectives

The purpose of this report is to identify and assess the available options for the use/disposal of materials arising from the capital dredge works associated with the Phase 5 Development of the ISB.

The objectives are:

- To provide an overview of the required dredging works;
- To describe the dredge material to be removed including volumes, physical and chemical characteristics;
- Describe the BPEO methodology employed to complete the assessment; and
- To identify and assess options for reuse/disposal of material to determine the BPEO.

2 Background

2.1 Dredge Arisings

To facilitate the land reclamation, a toe dredge will be required in order to create a perimeter around the land reclamation area in which to anchor the edge of rock armour. It is anticipated that the volume of this dredge will be 30,000 metres cubed (m^3).

Due to the presence of sub-optimal sediment within the proposed land reclamation area, up to 275,000m^3 will be dredged to allow placement of a more suitable engineered infill material, to meet heavy-lift and settlement requirements.

Dredging of the berthing areas will be required to lower seabed levels and create a suitable berthing space to accommodate large vessels and FOWT substructures. Berthing areas will be dredged to a maximum of -14mCD, with an associated 400,000m^3 of associated dredge spoil.

The total volume of material to be dredged for the Phase 5 Development is 705,000m^3.

2.2 Dredge Material Characteristics

2.2.1 Sampling

A full ground investigation of 54 boreholes was conducted during early spring 2023. In conformance with the Pre-Disposal Dredge Sampling Guidance (Marine Scotland, 2017), core samples for dredge analysis were obtained from 23 locations, which are shown within orange circles on Drawing 1024-PH5-GI-025: Marine Exploratory Hole Plan with Bathymetric Survey.

Core samples were obtained using sonic drilling techniques using both Fraste CRS-XL 140 Duo and Fraste CRS-XL170 Duo rubber-tracked roto-sonic drilling rigs. Cores were logged and photographed prior to sampling. Cores were sub-sampled in 50cm sections where possible, with the top, middle and bottom sample for each being sent for analysis. Only two samples were taken from three of the cores due to low recovery of material and hence inability to achieve an adequate third sample. Boreholes were extended to 32.5m below seabed. Samples for chemical analysis were taken down to the proposed dredge depths, of -14mCD on the quay front and 1.5 to 2.5m below seabed level for the toe dredge.

2.2.2 Sample Analysis

All samples were analysed by the Laboratory SOCOTEC who are ISO17025 accredited for marine sediment analysis, and which takes part in intercomparison exercises such as QUASIMEME. The laboratory also meets the Limit of Detection (LoD) and sensitivity requirements set out in the Clean Seas Environmental Monitoring Programme (CSEMP) Green Book (Marine Assessment and Review Group, 2020).

2.2.3 Sample Results

The sample results are summarised in this section, and the entire set of sample results are available in the spreadsheet 71_FOR_02: Phase 5 Dredge Sample Results (SOCOTEC, 2023), provided alongside this BPEO and Marine Licence Application.

2.2.4 Physical Properties

On average the samples were 81.8% solid. The solids were 17.36% gravel, 39.02% sand and 43.63% silt on average. Silt levels varied from 8.17% to 77.24% however, of the 67 samples analysed only four contained less than 20% silt. High levels of silt make the material unsuitable for reuse as construction material.

The high concentration of silt also explains the high specific gravity which is 2.63 tonnes per metre cubed (T/m^3) average across all samples.

2.2.4.1 Chemical Properties

No asbestos was identified in any of the samples, and all organohalogen concentrations are below Action Level (AL) 1 (measured in milligrams per kilogram (mg/kg)) dry weight and so will not be discussed further.

2.2.4.2 Trace Metals

Contaminant levels of dredged material below AL1 are generally assumed to be of no concern, contaminant levels between AL1 and AL2 will typically trigger further investigation, and if

samples exhibit contaminant levels above AL2 then they are usually considered unsuitable for at sea disposal.

No sample results breached AL2 limits, however some did surpass AL1, though exceedances were marginal in all cases. A full breakdown of samples which had trace metal concentrations over AL1 is outlined in Table 2.2.1.

Table 2.2.1: Trace Metal Sample Results and AL1 Limits

Metal	AL1 (mg/kg)	AL2 (mg/kg)	No of Samples exceeding AL1	Highest Recorded (mg/kg)	Average (mg/kg)
Cadmium (Cd)	0.4	4	1	0.52	0.14
Chromium (Cr)	50	370	1	52.8	25
Zinc (Zn)	130	600	2	154	38.7
Nickel (Ni)	30	150	10	37.8	18.4

Having reviewed the results against the ALs, the material within the area of proposed dredge works is not predicted to have a negative effect on the marine environment due to the presence of metal contaminants, as there are only limited slight exceedances above AL1.

2.2.4.3 Polycyclic Aromatic Hydrocarbons

Sample results for Polycyclic Aromatic Hydrocarbon (PAH) concentrations are displayed in spreadsheet 71_FOR_02: Phase 5 Dredge Sample Results (SOCOTEC, 2023).

Perylene is the only PAH to exhibit an AL1 exceedance over multiple samples: 11 samples exceed 100 micrograms per kilogram (µg/kg) for Perylene, however there is no AL2 for Perylene in the Marine Scotland (now Marine Directorate) pre-sample guidance (Marine Scotland, 2017).

Sample MAR01901.001, the top sample from borehole BH43 is the only sample which is over AL1 for Total Hydrocarbon Content (THC), however, the average across all samples does not breach the allowable concentration under AL1.

Sample MAR01864.0001, the top sample from borehole BH02, has levels above AL1 for multiple PAHs. This seems to be a bit of an anomaly as there are not high levels in other sections of the core nor in other boreholes in the area. The result is deemed to be non-representative of the materials in the area and, as the THC from the same sample is within limits, there are no concerns.

2.2.4.4 Sample Summary

It can be concluded that due to the high silt content, the proposed dredge spoil material is not of use as engineered fill material. Although a few individual samples exhibit results slightly above AL1 for metals and PAHs, there is no indication in the chemical analysis of contamination issues or reason that the material cannot be deposited in the marine environment.

3 BPEO Methodology

In identifying the BPEO for the proposed dredging works, the following methodology has been employed:

- Identification of options available for material disposal;
- Screening to eliminate unsuitable options;
- Scoring of remaining options; and
- Comparison of options and identification of the BPEO.

3.1 Option Identification

Options for management of material within the proposed dredge area were identified through discussions with the PoCF.

3.2 Screening

All options were screened against a minimum criterion. Each option had to meet the minimum criteria in order to be taken forward for detailed consideration. Any option which failed to meet one or more of the criteria was not taken forward for detailed assessment. The criteria are as outlined below:

- The proposed option must be suitable for the physicochemical characteristics of the material;
- It must be technically viable;
- It must be legally compliant; and
- It must not delay or prevent the overall construction programme for the Phase 5 Development.

3.3 Scoring

Attributes utilised in the options assessment were identified and scored out of 5, with 1 being the worst performing and 5 being the best. Each score has been designated a colour to aid visual comparison. Attributes are outlined in Appendix 1.

Options which met minimum criteria and progressed to detailed assessment were scored against each attribute (Appendix 2), with reasoning for the corresponding scores provided in Appendix 3.

3.4 Comparisons of Options and Identification of the BPEO

Following the scoring of the options, a detailed comparison was undertaken to identify the BPEO.

4 Assessment of Options

4.1 Identification of Options Available

Several options were identified for the management of material within the proposed dredge area, including both terrestrial and marine based disposal options. Options identified are outlined below:

- Do Nothing;
- Disposal to Landfill;
- Dredge with Disposal to Sea – assumed at CR019 Deposit Site;
- Bed-Levelling by Plough Dredge;
- Side Casting;
- Beneficial Re-Use within the Phase 5 Development; and
- Beneficial Re-Use elsewhere.

4.2 Unfeasible Options

Options were screened against the minimum criteria outlined in Section 3.2. This process eliminated four of the seven options as they do not meet one or more of the screening criteria. The reasoning behind discounting the four options is discussed below.

4.2.1 Do Nothing

To not undertake dredge works within the dredge areas would impose a significant operational impact on the Phase 5 Development. Without a toe dredge the revetment would be structurally less stable and potentially unsafe. The land reclamation area dredge has been identified as being needed by the designers to meet settlement requirements for operations. If the settlement requirements were less onerous, then alternative design options could reduce the dredge requirement. At this stage that cannot be assumed, hence it is assumed that the site would not be suitable as laydown of FOWT components without being dredged.

The berth needs to be dredged to accommodate FOWT substructures and associated vessels to berth, in keeping with the purpose of the Phase 5 Development. This option is not technically feasible for the safe construction of the Phase 5 Development that would meet client's needs. As such, this option will not be taken forward to assessment.

4.2.2 Disposal to Landfill

This option involves the disposal of material, removed from the identified area as dredge spoil, to landfill. For this option to be possible, dredged material would need to be brought to land, de-watered and stored within the harbour area, prior to loading onto trucks and transport to a landfill site. Following dewatering, the material would possess suitable physiochemical characteristics for disposal to land.

Landfill capacity in Scotland is at a premium and the volumes required to be disposed of as a result of the Phase 5 Development are substantial. It is highly unlikely that landfill space could be found to accommodate the quantities of dredge spoil arising. Hence, this option is technically unfeasible. It is also noted that disposal of dredge material to landfill does not align with the waste hierarchy and government policy.

Given that a typical truck carries 20 tonnes, there would be in the region of 90,000 trips to a landfill site. Not only would these vehicle journeys give rise to adverse effects on roads and

have an associated carbon cost, but they also take time which would greatly lengthen the timelines. Therefore, impacts would likely be felt upon the construction programme for the Phase 5 Development.

The option of dredging with disposal of dredge spoil to landfill does not meet two of the minimum criteria: being technically viable and not causing delay to the overall construction programme for the Phase 5 Development. With landfill space issues and time-constraints considered, this option presents an unacceptable risk and will not be taken forward to assessment.

4.2.3 Beneficial Re-Use Within the Phase 5 Development

Dredged material can be suitable as infill material if the appropriate Particle Size Distribution (PSD) and chemical characteristics are available in sufficient volume. Suitable material is generally made up of sands and gravel.

The variability of PSD across the samples, and an average of 43.63% silt content across the total dredge area, indicates that the dredged material from this area would not be suitable for re-use as a construction material, for example as infill material within the Phase 5 Development. Suitable engineered material, for example 6A, is required for the majority of the infill for the area of land reclamation to achieve the required loading and settlement tolerances. However, there is a possibility that spoil from the toe dredge could be deposited within the footprint of the development, to remain on-site as infill and not be removed from site. The very small volume of material associated with the revetment toe dredge could be placed within the Phase 5 Development area with little interference to the engineering of the land reclamation area. See Section 4.3.3 for additional detail.

4.2.4 Beneficial Re-Use Elsewhere

As outlined in Section 4.2.3, dredged material may be suitable for other uses, such as land reclamation or coastal remediation works, dependent on the dredge spoil material PSD, chemical characteristics and available volume. However, the high silt content of the sample makes it unsuitable for use as infill material for construction or as sediment for beach replenishment.

This option, due to the high silt content of the dredge spoil, is not deemed technically viable, and so will not be taken forward for further consideration.

4.3 Assessment of Feasible Options

Following the screening process, the only options to take forward for detailed assessment are to:

- Dredge with Disposal to Sea;
- Plough Dredge; and
- Side Casting.

Each of these options have been assessed against the attributes detailed in Appendix 1. The options scoring is provided in Appendix 2 with the reasoning for attribute scoring provided in Appendix 3.

4.3.1 Dredge with Disposal to Sea – Assumed at CR019 Deposit Site

There are numerous dredge spoil deposit sites in Scottish waters for the deposition of dredged material. The closest and most appropriate dredge spoil Deposit Site CR019, henceforth known as Sutors, is an open spoil deposit site which is located approximately 11km east of the proposed dredge works at the Phase 5 Development.

Initial mobilisation of equipment to conduct dredging operations is minimal, and the 22km round-trip for disposal of the material is unlikely to impact timescales to complete the dredging campaign. The relatively short distance to the disposal ground will help to minimise greenhouse gas emissions associated with transport of dredge spoil. Subsequently, cost is also kept relatively low with this option, due to the nearby location of the disposal ground which will reduce the running cost of marine plant required for dredge and disposal.

Trailing suction or backhoe techniques could be utilised, with either integrated hoppers for dredge spoil arisings, or separate disposal barges which will transport dredge spoil to the Sutors disposal site. Environmental impacts are minor but will need to be mitigated. This will be achieved by avoiding dredging during the month of May when the salmon smolt are running and implementing a marine mammal protocol at the Sutors during dredge disposal to the prevent physical harm to marine mammals.

It is recognised that disposal of material to sea disposal sites is an established industry practice and has been completed by PoCF previously. As the activity is standard practice, the legislative complexities involved are relatively simple.

Overall, the Dredge with Disposal at Sea option scores: **27 out of 35** (see Appendix 2 and 3).

4.3.2 Plough Dredge

Plough dredging involves the redistribution of sediment from higher areas of the seabed to lower parts using a plough which is dragged by a vessel that passes over the area, hence levelling the sediment to a determined depth.

To meet the required berth dredge depths of -14 CD, in the region of 4m to 6m of material would need to be moved. To dredge this volume of material, it would not be possible to use plough dredging in place of trailer suction or backhoe dredging. This is because an inordinate number of plough passes would be necessary to conduct a capital dredge of this magnitude, making this option technically unviable and environmentally undesirable due to increased fuel usage. Additionally, plough dredging such a large volume of sediment could result in redistribution of the sediment to other berths at the ISB due to material suspension and transportation within the water column. Knock-on time implications for the programme would be expected due to the length of time that the plough dredge vessel would need to be in the construction zone. This may also result in clashes with ongoing operational activities at the Quay West berths and other construction activities associated with the Phase 5 Development. However, there may be areas where plough dredging would be an appropriate method to level the seabed where areas of sedimentation are limited. It is envisaged that this technique may be useful towards the end of the dredge campaign, when small areas may need to be levelled following other works. The assessment is based on plough dredge for remedial dredge only.

In areas where sediment build up is limited, the option to plough dredge exhibits few logistical and cost impacts. Material removed from the high points of the seabed will be distributed to

deeper areas. It is anticipated that plough dredging will be an appropriate dredge method to conduct remedial dredges on-site to achieve final dredge depths at the end of construction.

In areas of the ISB where an appropriate volume of sediment is being redistributed via plough dredge, then there are no anticipated operational constraints associated with this option, and the material does not cause concern for public or the environment within the proposed dredge location. Environmental effects on water quality from a plough dredge are very limited, localised and temporary. To protect the salmon smolt run plough dredging would not be completed in May.

The option to plough dredge scores: **30 out of 35** (see Appendix 2 and 3), in areas where it could be utilised.

4.3.3 Side Casting

Side casting involves the redistribution of dredged material to adjacent areas. In the case of the Phase 5 Development, this technique would only be applicable for small volumes, potentially during the revetment toe dredge. With the dredged material being deposited within the land reclamation area. Side casting is assessed on the basis that it would only be used for a portion of the revetment toe dredge.

As discussed in Section 4.2.3, the dredge spoil is too silty for use as infill material, however a small volume would not be expected to have any negative effect on the stability of the land reclamation.

Side casting would provide a technically viable option to remove from the revetment toe dredge area as a backhoe dredger will be deployed for this dredge. It may be of particular benefit for the northern revetment toe dredge, as the shallow waters may limit barge access to collect the spoil. Hence, it would avoid tidal delay to the toe dredge works.

The option to utilise side casting dredge technique scores: **29 out of 35** (see Appendix 2 and 3).

4.4 Comparison of Options

As detailed in Appendix 3, all options score well, with plough dredge and side casting scoring equal or higher than dredge with disposal to sea on all attributes aside from technical flexibility. This is due to both techniques being limited in suitability to smaller areas of the Phase 5 Development. The use of a plough is most suited to the remedial removal of high spots in the berth dredge area, while side casting may be appropriate for small amounts of sediment from the revetment toe dredge.

Dredge with disposal to sea is the only appropriate technique for large volumes of material arising from the Phase 5 development. As such it is likely that all three methods will be used during the construction of the Phase 5 Development, as all options are the BPEO for use in different circumstances.

5 Conclusion

All three options which passed screening scored favourably and will be appropriate for use in different scenarios during the construction of the Phase 5 Development. Dredging with disposal at sea is the only technique viable for the large volumes of silty material arising. While side casting may be used during the toe dredge, and plough dredging utilised for remedial works. These options will avoid additional costs, time and logistical constraints associated with other options that were considered, with minimal environmental disruption, noting that dredging will not be undertaken during the month of May and that dredge disposal at the Sutors will be subject to a marine mammal protocol as discussed in the EIAR (Affric Limited, 2025).

6 References

Affric Limited, 2025. Invergordon Service Base Phase 5 Development Environmental Impact Assessment Report. 71_REP_23.

Marine Assessment and Review Group, 2020. Clean Seas Environmental Monitoring Programme. Retrieved from: https://www.bodc.ac.uk/resources/portals_and_links/merman/project_specific/documents/green_book_v16.pdf.

Marine Scotland, 2017. Pre-disposal sampling Guidance. Version 2. Retrieved from: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2020/02/marine-licensing-applications-and-guidance/documents/guidance/pre-disposal-sampling-guidance/pre-disposal-sampling-guidance/govscot%3Adocument/Pre-disposal%2Bsampling%2Bguidance.pdf.

Scottish Government, 2010. Scotland's Zero Waste Plan. Retrieved from: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2010/06/scotlands-zero-waste-plan/documents/00458945-pdf/00458945-pdf/govscot%3Adocument/00458945.pdf.

SOCOTEC, 2023. 71_FOR_02: Phase 5 Dredge Sample Results.

7 Glossary

Acronym	Definition
AL	Action Level
BPEO	Best Practicable Environmental Option
Cd	Cadmium
CD	Chart Datum
Cr	Chromium
CSEMP	Clean Seas Environmental Monitoring Programme
EIAR	Environmental Impact Assessment Report
FOWT	Floating Offshore Wind Turbines
ISB	Invergordon Service Base
LoD	Limit of Detection
m	Metres
m^3	Metres cubed
mg/kg	Milligrams per kilogram
Ni	Nickel
PAH	Polycyclic Aromatic Hydrocarbon
PoCF	Port of Cromarty Firth
PSD	Particle Size Distribution
THC	Total Hydrocarbon Content
T/m^3	Tonnes per metre cubed
Zn	Zinc
µg/kg	Micrograms per kilogram

Appendix 1: Attributes

Attribute	Description	1	2	3	4	5
Alignment with Policy	How the works align with government policy.	In direct conflict with policy.	Does not fully align with policy.	No policy implications.	In the spirit of policy.	Positively implements policy.
Timescale	Impact of works on project programme.	Methodology would extend the project programme.	High risk works couldn't be completed within required timescale.	Slight risk works couldn't be completed within required timescale.	Allows works to be completed within required timescale.	Allows works to be completed comfortably within required timescale.
Distance	Impact location has on logistics for material movements.	Beyond 50 miles	40-50 miles	30-40 miles	1-30 miles	Within 1 Mile
Material Suitability	Is the chemical makeup of the dredge material suitable for the option selected?	Not all of the material is acceptable.	Requires significant mitigation to be made suitable.	Acceptable with mitigation.	Acceptable material for option.	Ideal material for option.
Technical Flexibility	Is the technology practical and to be used in a range of circumstances.	Technology not proven.	Practicable with management for specific areas.	Practicable with management in some areas.	Practicable with basic management for most areas.	Standard practice can be used for any area.
Environmental Effects	Potential environmental effects associated with implementing the option.	Very Significant	Significant	Minimal	Trivial	None
Legislative Complexity	How complex are the regulator requirements and what risks are posed.	Significant risk additional permits, licences or consents will not be granted.	Requires significant additional permits, licences or consents.	Requires additional permits, licences or consents.	Minor management required to comply with legislation	Complies with all relevant legislation.

Appendix 2: Options Scoring

Attribute	Dredging with Disposal to Sea at CR019 Deposit Site	Bed-Levelling by Plough Dredging	Side Casting
Alignment with Policy	2	4	4
Timescale	4	5	5
Material Suitability	5	5	4
Distance	4	5	5
Technical Flexibility	4	2	2
Environmental Effects	3	4	4
Legislative Complexity	5	5	5
Total	**27**	**30**	**29**

Appendix 3: Reasoning for Attribute Scoring

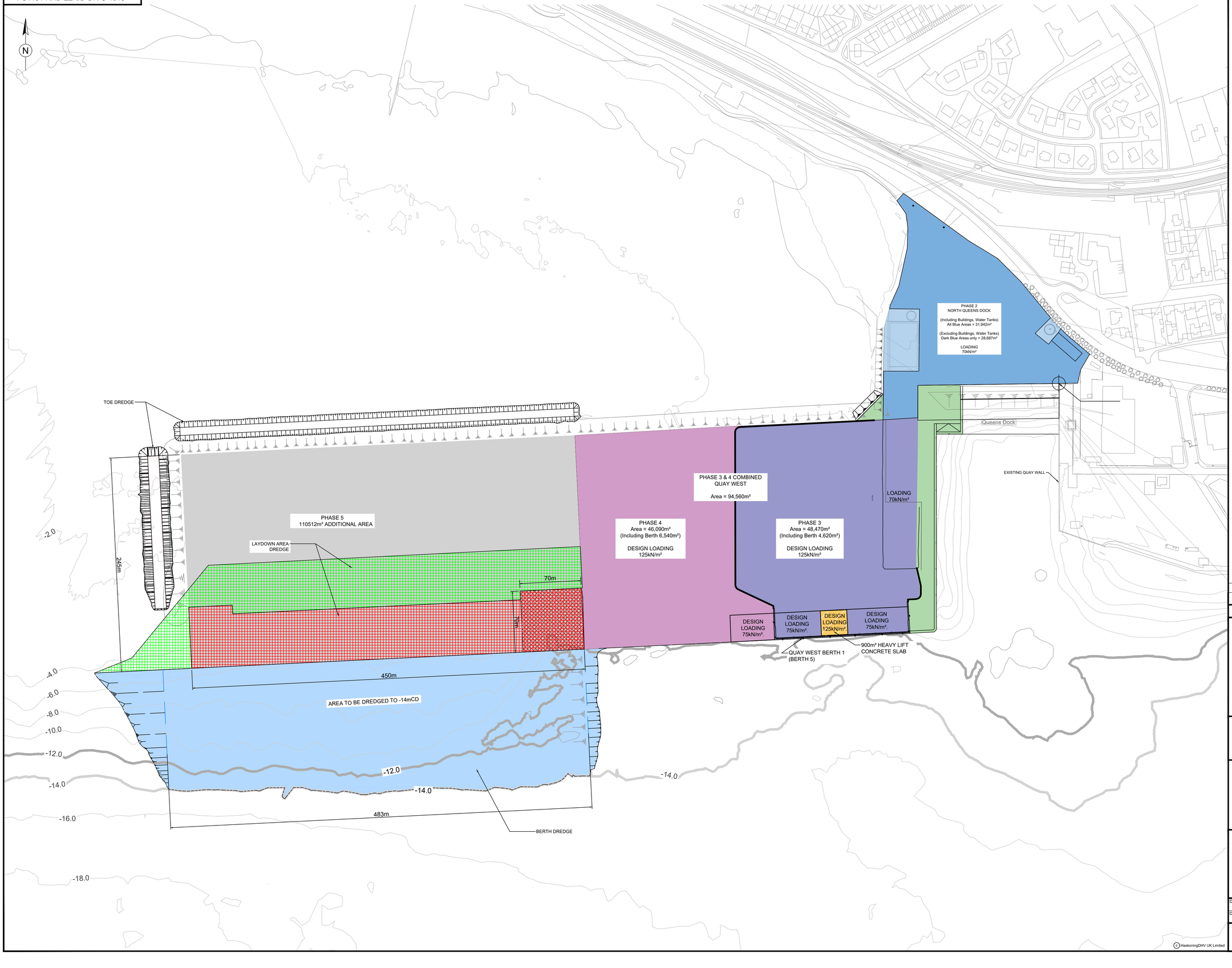
Attribute	Dredging with Disposal to Sea	Bed-Levelling by Plough Dredging	Side Casting
Alignment with Policy	Disposal at sea is low on the waste hierarchy and as such does not align to policy.	This option does not give rise to waste and therefore is aligned with the Zero Waste Scotland by 2025 Policy (Scottish Government, 2010).	This option does not give rise to waste and therefore is aligned with the Zero Waste Scotland by 2025 Policy (Scottish Government, 2010).
Timescale	The dredge and disposal at sea could be completed within the required timeline, additional time will be required to transport material to the Sutors.	The plough dredge can be completed in line with the required timeline, for remedial dredge only.	Side casting can be completed in line with the required timeline, for part of toe dredge only.
Material Suitability	The chemical and physical properties of the dredge spoil are suitable for disposal at sea.	The chemical and physical properties of the dredge spoil are suitable for plough dredging.	The chemical and physical properties of the dredge spoil are suitable for side casting, as only a small volume of spoil material will be deposited in the land reclamation area.
Distance	The distance from the Sutors site is 11km from the works site, meaning a 22km round trip would be required for disposal at sea.	There is no distance aspect associated with plough dredging.	There is no distance aspect associated with side casting.
Technical Flexibility	Disposal at sea is an established industry practice. PoCF have previously completed disposal to sea.	Plough dredging is standard practice; however, it is only suitable for levelling small volumes of material and is not a technical solution for the full dredge requirements.	This method is only suitable for material from the revetment toe dredge.
Environmental Effects	The location of the Sutors within the Moray Firth SAC is an area popular with numerous marine mammal species. As such, visual marine mammal observations will generally be conducted at set observation locations at either North or South Sutor, or on the disposal vessel or separate observation vessel if required. Potential temporary increase in solids in the water column at both dredge and disposal	Increased sediment in the water column will be at depth only and reduce quickly. Potential temporary increase in solids in the water column can affect salmon smolt run if undertaken in May.	Increased sediment in the water column will be at depth only and reduce quickly. Potential temporary increase in solids in the water column can affect salmon smolt run if undertaken in May.

Attribute	Dredging with Disposal to Sea	Bed-Levelling by Plough Dredging	Side Casting
	grounds, can affect salmon smolt run if undertaken in May.		
Legislative Complexity	Legislative complexities around disposal at sea are relatively simple and will require minor management.	Legislative complexities around plough dredging are simple and will require minor management.	Legislative complexities for side casting are simple and will require minor management.

Drawings

DRAWING No.
PC4461-RHD-ZZ-SD-DR-C-1010

DO NOT SCALE



NOTES

1. THIS PROPOSED DEVELOPMENT GENERAL ARRANGEMENT IS BASED ON CLIENT'S DRAWING 1024-PH5-048.
2. THE ADDITIONAL AREA OF PHASE 5 IS 110512m^2.
3. PHASE 2, 3 AND 4 ARE EXISTING.

KEY:

- PHASE 2
- PHASE 3
- PHASE 3B
- PHASE 4
- PHASE 5

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	12/12/2024	FIRST ISSUE	SJ	TH	AM

REVISIONS

CLIENT

PORT OF CROMARTY FIRTH

PROJECT

PoCF - PHASE 5

TITLE

DREDGE AREAS

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Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
SJ	TH	AM
DATE	SCALE	REF.
DEC'24	AT A1 1:2000	PC4461-RHD-SD-XX-DR-C-1010.dwg

DRAWING No.	SUITABILITY	REVISION
PC4461-RHD-ZZ-SD-DR-C-1010	S5	P01

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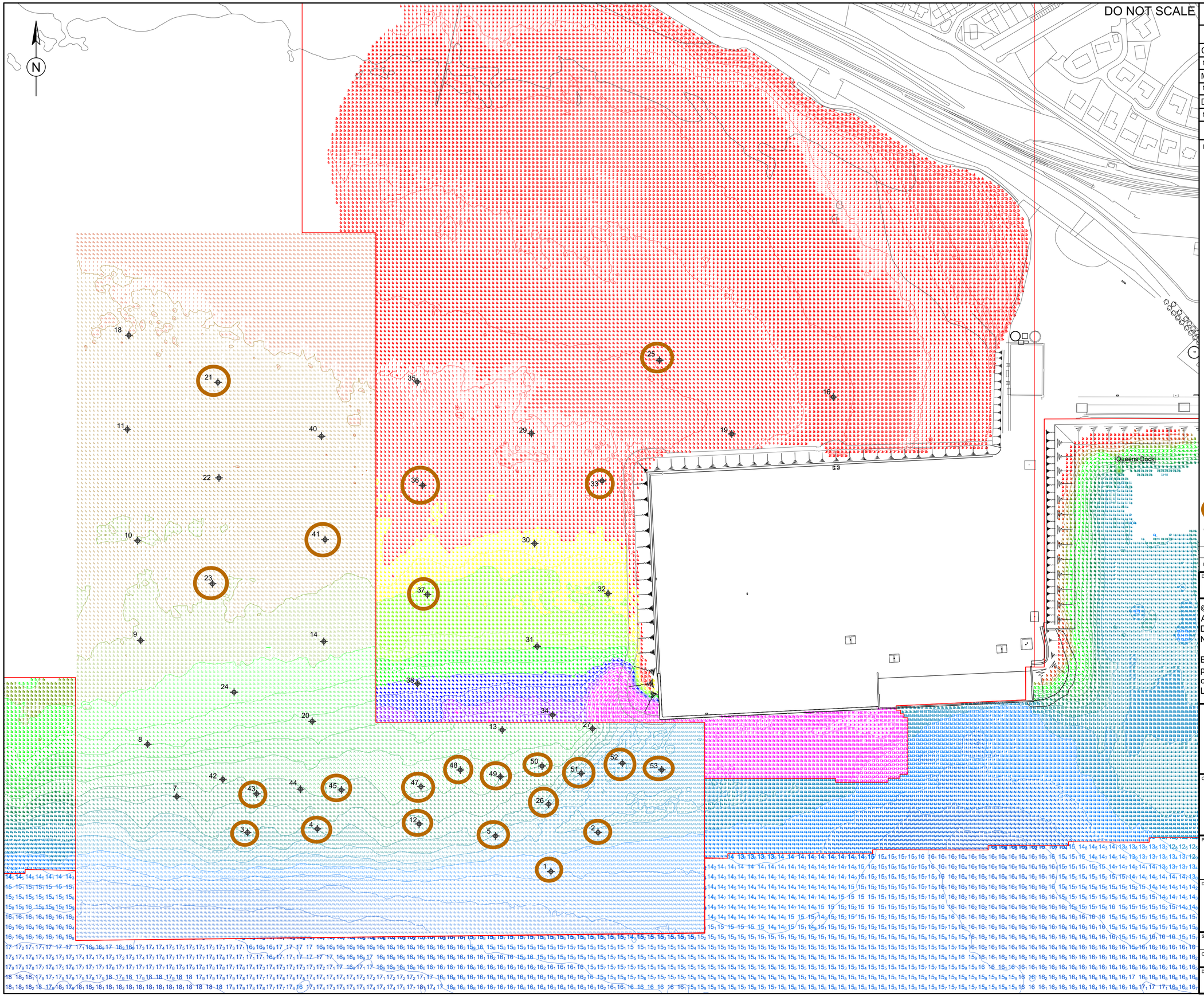

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

N/A

MAINTENANCE/CLEANING

N/A

DECOMMISSIONING/DEMOLITION

N/A

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH CAUSEWAY GEOTECH LIMITED GROUND INVESTIGATION REPORT (2023) & HASKONINGDHV UK LIMITED GEOTECHNICAL DESIGN REPORT (2023).
2. THE GI WORKS ARE SHOWN ON DRAWING 1024-PH5-GI-022_AB.
3. HISTORICAL GI RECORDS RELATIVE TO PREVIOUS PHASE 3 & PHASE 4 DEVELOPMENTS ARE AVAILABLE AS LISTED IN NOTE 3 AND SHOWN IN DRAWING 1024-PH5-GI-020.
4. REFERENCE SHOULD BE MADE TO
   - 4.1. ('13) CAUSEWAY GEOTECH LTD PHASE 3 DEVELOPMENT GROUND INVESTIGATION, FACTUAL REPORT, REF 13-200, 2013;
   - 4.2. ATKINS, PHASE 3 REDEVELOPMENT, GROUND INVESTIGATION REPORT, OCTOBER 2013;
   - 4.3. ATKINS GROUND INVESTIGATION REPORT "PCF4-ATK-PH4-ZZ-GIR-C-0001" JANUARY 2018;
   - 4.4. ('17) FUGRO FACTUAL REPORT ON GROUND INVESTIGATION, REF "G1700010" DATED 4TH SEPTEMBER 2017; AND
   - 4.5. ('19) FUGRO GEOSERVICES LIMITED, MARINE GROUND INVESTIGATION, REF: G190003U, 2019.
5. SURFACE FEATURES OMITTED FOR CLARITY.
6. THE BATHYMETRIC SURVEY DATA AS SHOWN ON DRAWING PoCF-Quays_09-01 & 10-01 & 10-02 FOR PHASE 5 WAS COMPLETED IN JULY 2022 BY CLYDESIDE SURVEYS LTD & PoCF-Inner Area_01-01 A SURVEY CARRIED OUT BY CLYDESIDE SURVEYS LTD ON 23/01/21 & PoCF-Quays_12-01 FOR PHASE 5 WAS COMPLETED ON 22/02/23 BY CLYDESIDE SURVEYS LTD.

KEY:

- DREDGE ANALYSIS SAMPLES
- CAUSEWAY GEOTECH LTD. 2023 INVESTIGATION LOCATION

Rev.	Date	Description	By	Chk'd	App'd
AB	18/05/23	UPDATED WITH AS BUILT POSITIONS	DM	GMC	GMC

Drawing Status: AS BUILT

Suitability: AB

LEAPMOOR

Client: PORT OF CROMARTY FIRTH

Project Title: INVERGORDON SERVICE BASE PHASE 5 DEVELOPMENT

Drawing Title: MARINE EXPLORATORY HOLE PLAN WITH BATHYMETRIC SURVEY

Scale	Designed	Drawn	Checked	Authorised
1:1750	GMC	DM	GMC	GMC
Original Size: A1	Date 19/10/22	Date 19/10/22	Date 19/10/22	Date 19/10/22

Drawing Number: 1024-PH5-GI-025

Revision: AB