Corran Ferry Infrastructure Improvement Scheme

Best Practicable Environmental Option Report

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For

The Highland Council
Comhairle na Gàidhealtachd

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1 Introduction

The Corran Ferry service carries passengers and vehicles across Loch Linnhe at the Corran Narrows between the settlement of Corran (within the region of Nether Lochaber) in the east and the settlement of Ardgour on the western shore. The service provides an essential connection for the western peninsular communities to and from Lochaber, as well as for those on the Isle of Mull via the Fishnish – Lochaline ferry crossing. The Highland Council (THC) owns, funds and operates the Corran Ferry service, which is the busiest single vessel operated route in Scotland. The ferry operates a frequent transit 361 days of the year, carrying over 270,000 cars each year. The alternative route is a 40-mile road journey between Ardgour and Corran via Fort William.

THC has proposed to construct new ferry service infrastructure at the Corran Narrows under the Corran Ferry Infrastructure Improvement Scheme (hereafter referred to as 'CFIIS' or 'the scheme'), approximately seven miles south-west of Fort William. The CFIIS will involve marine construction and dredging works below Mean High Water Springs (MHWS), as well as construction works above Mean Low Water Springs (MLWS).

A capital dredge will be required to provide sufficient navigable water depths for vessels utilising the new slipways and overnight berthing structure. Dredging at the toe of the new breakwater and land reclamation will also be required to support the installation of rock armour.

The dredging activities will remove material of up to 3.5 metres (m) depth as per the plan outlined in Drawing 2387-WS-ZZ-AG-DR-C-0911 and Drawing 2387-WS-ZZ-NL-DR-C-0912. Estimates suggest approximately 17,500 metres cubed (m^3) (up to 35,000 wet tonnes) of predominantly sand and gravel will require removal from the Ardgour side of the Narrows and approximately 6,500m^3 of rock from the Nether Lochaber side (up to 17,550 wet tonnes) during the capital dredge works. The total dredge volume (spanning across all dredge pockets) will be up to 24,000m^3 (52,550 wet tonnes). Estimates include an additional allowance for sufficient flexibility during construction.

This Best Practicable Environmental Option (BPEO) report has been produced to support the marine dredge licence application under the Marine (Scotland) Act 2010, as amended, for the dredging associated with the CFIIS.

1.1 Report Aims and Objectives

The purpose of this report is to identify and assess the available options for the reuse or disposal of materials arising from the dredge works associated with the CFIIS.

The objectives are:

- To provide an overview of the required 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 disposal of material to determine the BPEO.

2 Background

Dredging of the berthing areas will be required to lower seabed levels and create a sufficient navigable depth to accommodate ferries utilising the slipways and overnight berthing structure. Dredge pockets at the overnight berthing structure on the Ardgour side and the new slipway on the Nether Lochaber side will be dredged to -3m Chart Datum (CD), removing material of up to 3.5m depth. In addition, a small toe dredge on the edge of the breakwater and land reclamation on the Nether Lochaber side, to a depth of <1m, will also be required to facilitate construction. A falling toe detail will also be installed at the land reclamation and sub-sea bund on the Ardgour side. Refer Drawing 2387-WS-ZZ-AG-DR-C-0911 and Drawing 2387-WS-ZZ-NL-DR-C-0912.

2.1 Dredge Material Characteristics

2.1.1 Sampling

In compliance with the Pre-Disposal Dredge Sampling Guidance (Marine Scotland, 2017), a pre-dredge sampling plan (Drawing 2387-WS-XX-00-D-C-0012) was approved by the Marine Directorate Licensing Operations Team (MD-LOT) on 16th June 2023.

In the lead up to mobilisation of the Ground Investigation contractor, it was identified some of the proposed sample stations on the Ardgour side would conflict with exclusion zones imposed by Scottish and Southern Electricity Networks (SSEN) around their existing sub-sea transmission cable assets. Subsequently, the sample stations were relocated slightly to avoid the exclusion zones, whilst still providing sufficient spread of the proposed dredge pockets to represent the dredge area. The revised sample plan is depicted in Drawing 2387-WS-ZZ-AG-DR-C-0911 and Drawing 2387-WS-ZZ-NL-DR-C-0912. Note, the sample plan included additional samples, above what was required in the Pre-Disposal Dredge Sampling Guidance for this dredge volume. This was to account for the two dredge pockets on either side of the Narrows, and to inform engineering input regarding seafloor conditions.

Sampling was undertaken in November 2023. A total of seven vibrocores were attempted; five on the Ardgour side and two on the Nether Lochaber side. Four grab samples were also attempted for pre-dredge sampling; two on each side of the Narrows. Co-ordinates of these sample stations are outlined in Table 2.1.1.

Table 2.1.1: Sample ID, Locations and Type

Site	Sample ID	Co-ordinates (Easting, Northing)	Sample Type
Ardgour	VC01	201656.98 763925.01	Vibrocore
	VC02	201625.55 763770.77	Vibrocore
	VC03	201518.60 763907.50	Vibrocore
	VC04	201559.43 763862.10	Vibrocore
	VC07	201590.73 763992.52	Vibrocore

	GS01	201674.61 763685.07	Grab Sample
	GS02	201727.38 763606.30	Grab Sample
Nether Lochaber	GS_VC05	202215.00 763903.00	Attempted Vibrocore and Grab Sample (both unattainable)
	GS_VC06	202175.50 763810.99	Attempted Vibrocore and Grab Sample (both unattainable)
	GS03	202124.00 763770.00	Attempted Grab Sample (unattainable)
	GS04	202184.00 763700.00	Attempted Grab Sample (unattainable)

During sampling on the Nether Lochaber side of the Narrows, the substrate of the proposed dredge pocket and surrounding area was confirmed to be predominantly rockhead. No sediment could be sampled from any of the sample stations depicted in Drawing 2387-WS-ZZ-NL-DR-C-0912. Note, intended vibrocores VC05 and VC06 could not be sampled by the proposed coring method. These stations were renamed as grab samples, GS_VC05 and GS_VC06 (in Table 2.1.1). Furthermore, an additional four grab samples were attempted at sample stations initially proposed for geotechnical sampling (see Table 2.1.2). However, no material could be recovered from any of these stations for sampling as there was so little depth of unconsolidated material.

Table 2.1.2: Sample ID, Locations and Type

Site	Sample ID	Co-ordinates (Easting, Northing)	Sample Type
Nether Lochaber	GS_T06	202118.00 763788.00	Attempted Grab Sample (unattainable)
	GS_T07	202195.00 763888.00	Attempted Grab Sample (unattainable)
	GS_T08	202129.00 763761.00	Attempted Grab Sample (unattainable)
	GS_T09	202161.00 763746.00	Attempted Grab Sample (unattainable)

On the Ardgour side of the Narrows, five core samples were obtained using a vibrocore device with aluminium core tubes. Once in position the vibrocore system was deployed to the seabed by the vessel's crane and sampling was conducted at the relevant sampling locations. Following retrieval, cores were sub-sampled from the surface layer (0-15 centimetres (cm)), then every 50cm thereafter. Where core depth allowed, top, middle and bottom sub-samples were analysed in line with the guidance, and all sub-samples were retained for further analysis, if required.

Two grab samples (BS01 and BS02) were obtained on the Ardgour side of the Narrows for physical and chemical analysis. An addition five grab samples were sampled and analysed for

physical characteristics only to inform the engineering design (GS_T01 – GS_T05). Grab samples were obtained by a grab-bucket, lowered to the seafloor in a frame. Once contact was made with the seafloor, a catch switch was released which released the bucket. The bucket was driven into the sediment and then recovered for analysis.

2.1.2 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 will also meet the limit of detection (LOD) and sensitivity requirements set out in the Clean Seas Environmental Monitoring Programme Green Book (Marine Assessment and Review Group, 2020).

2.1.3 Sample Results

As mentioned, the substrate on the Nether Lochaber side is predominantly rock head, and therefore could not be sampled. Rockhead was found to be psammite over the full depth of the boreholes and this rock will account for approximately 5,500m^3 of the proposed dredge material. There is no reason to suspect this rock could by any means harbour contamination that would make it unsuitable for re-use or disposal. The following data presented in this section pertains only to the unconsolidated material sampled from the Ardgour side of the Narrows.

The sample results are summarised in this section, and the entire set of laboratory sample results are available in the pre-dredge sample results (SOCOTEC, 2023), provided in Appendix 4 of this BPEO report.

Sample results have been assessed using the Marine Directorate Revised Action Levels (ALs) outlined in the Pre-Disposal Dredge Sampling Guidance (Marine Scotland, 2017). Contaminant levels of dredged material below AL1 are generally assumed to be of negligible 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 disposal at sea.

No asbestos was identified in any of the samples, and all organohalogen concentrations are below AL1 and so will not be discussed further.

2.1.3.1 Physical Properties

On average, the solids were made up of 48% gravel, 45% sand and 7% silt. High levels of gravel and sand may make a large volume of the material suitable for reuse as construction material.

2.1.3.2 Trace Metals

No sample results breached any AL2, however some did marginally surpass AL1. Exceedances of AL1 trace metal concentrations (measured in milligrams per kilogram (mg/kg) dry weight) are outlined in Table 2.1.2.

Table 2.1.2: Trace Metal Sample Results Exceeding 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	0.43	0.26
Nickel (Ni)	30	150	7	36.3	26.99

Having reviewed the results against Marine Directorate ALs, dredge and disposal of material within the proposed dredge area is not predicted to result in any negative environmental impacts, regardless of disposal method, as no contaminant level has exceeded AL2. Additionally, the Cd and Ni samples which exceed AL1 are only marginally above AL1 as outlined by the highest recorded individual sample concentrations shown in Table 2.1.2. The average concentrations of Cd and Ni are below AL1.

2.1.3.3 Polycyclic Aromatic Hydrocarbons

Sample results for Polycyclic Aromatic Hydrocarbon (PAH) concentrations are displayed in pre-dredge sample results (SOCOTEC, 2023). Results show that no concentrations are above AL1 and therefore any negative environmental impacts from dredge or disposal of this material are anticipated to be negligible.

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 unfeasible options;
- Scoring of remaining options; and
- Comparison of options and identification of the BPEO.

3.1 Option Identification

Options for disposal and management of dredge material from the proposed dredge area were identified through discussions with the CFIIS Project Team.

3.2 Screening

All options were screened against a set of minimum criteria. 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
- Must not prevent operational activities of the Corran Ferry service.

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, see Appendix 2. Reasoning for the corresponding scores is 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;
- Beneficial Re-Use within the CFIIS;
- Beneficial Re-Use Elsewhere; and
- Dredge with Disposal to Sea – assumed at HE070 Deposit Site.

4.2 Unfeasible Options

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

4.2.1 Do Nothing

To not undertake dredge works within the identified area would impose a significant operational impact on the CFIIS. The seabed within the area must attain a depth of -3m CD to create a sufficient navigable depth to accommodate ferries at the slipways and overnight berthing structure associated with the CFIIS. This option would inhibit the operation of the Corran Ferry service. As such, this option will not be taken forward to assessment.

4.2.2 Disposal to Landfill

This option involves the disposal of dredge arisings to landfill. Disposal of dredged material within landfill sites is unusual; if it does occur, it is typically used as capping or restoration material. Material would need to be brought ashore and dewatered before being transferred to trucks and taken by road to a landfill site. Suitable land for drying lagoons is not available within the site boundary. Space maybe available nearby, e.g., the beach north of Ardgour, however use of this space for the purposes of dredge arisings deposition and dewatering could have potential negative impacts on the shore environment and would be expected to increase the nuisance and negative visual impacts for residents.

The closest operational landfill site to the CFIIS is at Duisky on the southern shore of Loch Eil, approximately 30 kilometres (km) from the site. Existing landfill sites must cope with large volumes of domestic and industrial waste, and dredge spoil would place an intolerable burden on such sites. Dredged material is relatively inert by landfill standards, so disposal at a landfill site is not usually necessary or recommended unless it is contaminated, which it is not in this case (see Section 2.2: Dredge Material Characteristics).

Transportation of material from the CFIIS to a landfill site would generate a considerable increase in heavy goods vehicle movements on local roads, contributing to traffic congestion and air and noise pollution.

In addition, disposal of dredge material to landfill does not align with the waste hierarchy and government policy. 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.

For the reasons outlined above, this option will not be taken forward to assessment.

4.3 Assessment of Feasible Options

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

- Dredge with Disposal to Sea – Assumed at HE070 Licensed Deposit Site;
- Beneficial Re-Use within the CFIIS; and
- Beneficial Re-Use Elsewhere.

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 Beneficial Re-Use Within the CFIIS

The construction activities associated with the proposed CFIIS include land reclamation and construction of slipways, an overnight berthing pier and a breakwater structure. These will require considerable volumes of infill aggregate.

For material to be suitable for reuse from a construction perspective, it needs to be both chemically and physically suitable. As discussed in Section 2.1.3.1, the Particle Size Distribution (PSD) of unconsolidated material across the pre-dredge samples has an average of 48.03% gravel and 44.72% sand content, which indicates that the dredged material from this area would be suitable for re-use as an infill material. Additionally, rock arising from the Nether Lochaber side dredge is inherently suitable for infill. The trace metal and PAH sample analysis did not identify any chemical contamination issues and hence, the dredge material is determined to be physically and chemically suitable for re-use as infill within the CFIIS.

The re-use of material is near the top of the waste hierarchy and is therefore consistent with the Scottish Government's policy of a Zero Waste Scotland by 2025. In addition, the reuse of

dredge spoil onsite as an aggregate is line with the Waste Directive Framework and The Waste (Scotland) Regulations 2012.

The re-use of the dredge material onsite minimises the required transport distance. This brings both cost and environmental benefits. Furthermore, re-use of the material potentially reduces the cost and environmental impact of sourcing material from offsite.

No significant timescale issues are anticipated with material being immediately available for reuse as infill. Furthermore, the volume of infill required for the CFIIS is expected to be in excess of the volume of dredge arisings so potentially, the entire volume of dredge arisings could be re-used within the scheme. It should be noted, however, that careful planning of construction task sequences would be needed to ensure that the dredged material can be taken directly to its destination of intended use within the permanent works.

Overall, the Beneficial Re-Use Within the CFIIS option scores: **36 out of 40** (see Appendix 2).

4.3.2 Beneficial Re-Use Elsewhere

As discussed in Section 4.3.1 above, the physical and chemical characteristics of the proposed dredged spoil indicate the material would be suitable for beneficial re-use elsewhere, e.g., on another project site as infill aggregate.

Again, this option prevents the material becoming waste and so aligns with the Scottish Government's policy of a Zero Waste Scotland by 2025.

Re-use elsewhere does however increase the negative environmental impact as there will be greenhouse gas emissions associated with the transport of material to its destination. This will also incur an addition cost (which may or may not be covered by the purchaser) and would require additional project management and programming effort to ensure the dredge arisings are relocated to the receiving site as they are produced.

No suitable receptor sites for this volume of dredge arisings have been identified along Loch Linnhe between Fort William (to the north) and Glensanda quarry (to the south-west). It is therefore understood potential for beneficial re-use elsewhere would require transport of material for more than six miles by vessel, or else the added complication of trying to dewater arisings on land for onward road transport.

As stated above, it is unlikely that there will be any surplus material beyond what can be beneficially re-used within the CFIIS. Any material not suitable for this purpose is also unlikely to be suitable for beneficial re-use elsewhere and so will need to be disposed of in another manner.

Overall, the Beneficial Re-Use Elsewhere option scores: **32 out of 40.**

4.3.3 Dredge with Disposal to Sea – Assumed at HE070 Deposit Site

There are numerous dredge spoil deposit sites in Scottish waters for the deposition of dredged material. The closest site to the proposed CFIIS dredge is at Armadale (HE070 Spoil Deposit Site), located off the Isle of Skye approximately 70 nautical miles from the CFIIS. Armadale is an open spoil deposit site which requires dredge material to be disposed of directly from marine plant.

The deposit of dredged material to Armadale spoil site does not fully align with the Scottish Government's policy of zero waste as it is low on the waste hierarchy.

There will be a cost associated with transporting dredge material to the disposal site. Disposal would be carried out during dredging works and would therefore be aligned with the construction programme. Disposal to sea will prolong the timescale of dredging because of the distance to the disposal site.

As discussed in Section 2.1.3, the physical and chemical analysis of pre-dredge samples indicates that the material is suitable for disposal at sea (no AL2 exceedances and only marginal AL1 exceedances of some metals). Furthermore, the high sand and gravel content mean the dredge spoil will drop rapidly through the water column and settle on the seabed.

The deposit of dredge spoil to the sea is an established and well-practiced method and could be permitted in terms of the dredge and sea deposit licence for the CFIIS with no further licences or permits required. However, it is recognised the disposal site is located within the bounds of the Inner Hebrides and Minches Special Area of Conservation (SAC), designated for harbour porpoise. Other protected species, namely marine mammals, basking sharks and otter may also be present and at risk from spoil disposal activities.

Bottom-dump disposal (such as via split hopper barge) generates little underwater noise, occurring in a localised area over a short-term, therefore no disturbance to these species due to underwater noise is likely to occur. However, there is a risk of injury to these species if passing below the vessel during disposal. Therefore, should disposal to a designated Spoil Deposit Site be required, a Spoil Disposal Marine Mammal and Basking Shark Protocol will be developed, outlining specific mitigation measures which will be implemented prior to disposal activities, to prevent injury to these species potentially passing below the vessel during disposal.

Overall, the Dredge with Disposal at Sea option scores: **24 out of 40.**

As stated previously, most dredge arisings are expected to be of suitable characteristics for re-use in the scheme. Hence, it is envisaged that only material unsuitable for re-use in the scheme will be considered for disposal at sea.

4.4 Comparison of Options

Beneficial re-use of dredge spoil within the CFIIS was the highest scoring option and determined to be the BPEO with a score of 36 out of 40. Whilst beneficial re-use elsewhere also scored highly (32 out of 40), this was less preferable than re-use in the scheme due to additional costs, greenhouse gas emissions and programme/time constraints associated with material transport. Dredge with disposal to sea scored the lowest (26 out of 40), primarily falling down with regard to transport distance and alignment with waste hierarchy policy.

5 Conclusion

As the highest scoring of the options that passed screening, it is determined that Beneficial Re-use Within the CFIIS is the BPEO for the required works at the CFIIS. This option will avoid additional costs, time, and logistical constraints associated with other options that were considered, with minimal negative environmental impacts. The next best option for disposal of the dredge material would be Beneficial Re-use Elsewhere. However, this option is unlikely

to be used as all material suitable for re-use will be utilised within the CFIIS. Disposal to Sea, at disposal site HE070, scored the lowest of the three options assessed.

Pre-dredge sampling indicates all dredge arisings will be suitable for re-use as infill aggregate or rock armour. If, however, material unsuitable for re-use is encountered as part of the dredge, this material is proposed to be disposed at sea to site HE070 as the only practicable option for materials of this kind.

Should disposal to a designated Spoil Deposit Site be required, a Dredged Spoil Disposal Marine Mammal and Basking Shark Protocol will be developed and included within the Construction Environmental Management Document for the CFIIS. The protocol will outline specific mitigation measures which will be implemented prior to disposal activities, to prevent injury to these species potentially passing below the vessel during disposal.

References

Marine Assessment and Review Group, 2020. Clean Seas Environmental Monitoring Programme. Available at: https://www.bodc.ac.uk/resources/portals_and_links/merman/project_specific/documents/green_book_v16.pdf. Accessed 17/04/2024.

Marine Scotland, 2017. Pre-disposal sampling Guidance. Version 2. Available at: 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.

The Scottish Government, 2010. Scotland's Zero Waste Plan. Available at: Scotland's Zero Waste Plan.

SOCOTEC, 2023. Pre-dredge Sample Results.

Glossary

Acronym	Definition
AL	Action Level
BPEO	Best Practicable Environmental Option
Cd	Cadmium
CD	Chart Datum
CFIIS	Corran Ferry Infrastructure Improvement Scheme
cm	Centimetre
km	Kilometre
LOD	Limit of Detection
m	Metre
m^3	Metre cubed
MD-LOT	Marine Directorate Licensing Operations Team
mg/kg	Milligrams per kilogram
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
Ni	Nickel
PAH	Polycyclic Aromatic Hydrocarbons
PSD	Particle Size Distribution
SAC	Special Area of Conservation
THC	The Highland Council

Appendix 1: Attributes

Attribute	Description	1	2	3	4	5
Alignment with Policy	How complex are the regulator requirements and what risks are posed.	In direct conflict with policy.	Does not fully align with policy.	No policy implications.	In the spirit of policy.	Positively implements policy.
Cost	Financial Cost of the Option	>£ 500,000	£300,000 to £500,000	£150,000 to £300,000	£50,000 to £150,000	<£50,000
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 Feasibility	Is the option within the capabilities of CFIIS to carry out?	Technology not proven.	Complex requirements, but proven technology.	Simple proven technology available.	Practicable with basic management.	Standard practice
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 HE070 Deposit Site	Beneficial Re-Use Within the CFIIS	Beneficial Re-Use Elsewhere
Alignment with Policy	2	5	5
Cost	2	5	4
Timescale	4	5	4
Material Suitability	5	4	4
Distance	1	5	4
Technically Feasibility	4	4	4
Environmental Effects	3	4	3
Legislative Complexity	3	4	4
Total	**24**	**36**	**32**

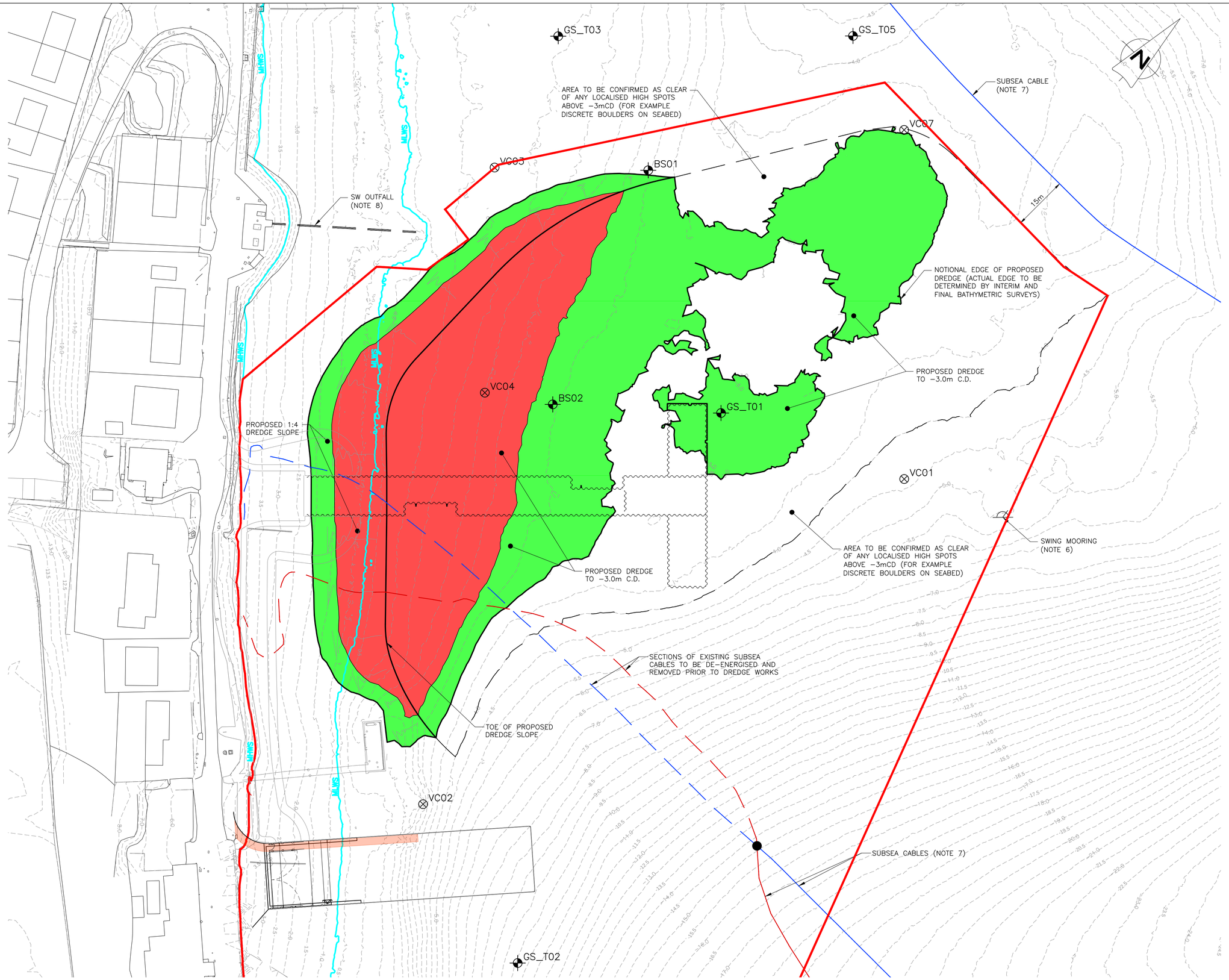
Appendix 3: Reasoning for Attribute Scoring

Attribute	Dredging with Disposal to Sea at HE070 Deposit Site	Beneficial Re-Use Within the CFIIS	Beneficial Re-Use Elsewhere
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).
Cost	There are associated costs with marine plant required to conduct a dredge and transport the spoil to the disposal site.	Potential royalty to Crown Estate Scotland for use of material. Some additional cost associated with plant used to transfer dredge arisings to location to be used	Additional cost associated with transport to destination potentially covered by purchaser.
Timescale	The dredge and disposal at sea could be completed within the required timeline, additional time will be required to transport material to the disposal site.	Can be completed in line with the required timeline. Some management of programme may be needed to facilitate single movement of material.	Can be completed in line with the required timeline. Some management of programme may be needed to facilitate removal of material as it is produced.
Material Suitability	The dredge spoil will be suitable for disposal at sea.	The chemical and physical properties of the dredge spoil are suitable for re-use within the CFIIS.	The chemical and physical properties of the dredge spoil are suitable for beneficial re-use elsewhere.
Distance	The distance from the CFIIS to disposal site HE070 south of the Isle of Skye is approximately 70 nautical miles. Hence a round trip of 140 nautical miles.	There is minimal distance associated with re-use within the CFIIS.	Exact distance unknown, although likely to be a reasonable distance form the CFIIS given the lack of known project local to the site.
Technically Feasibility	Disposal at sea is an established industry practice.	Re-use onsite is standard practice and can be exempt from Marine Licencing.	Beneficial re-use elsewhere is standard practice.
Environmental Effects	Dredging outwith salmon smolt run season (May), hence no impact on fish predicted. Potential temporary increase in solids in the water column at both dredge and disposal grounds (although this	Dredging outwith salmon smolt run season (May), hence no impact on fish predicted. Increases in sediment in the water column will be reversed quickly due to the PSD of the sediment being dredged.	Dredging outwith salmon smolt run season (May), hence no impact on fish predicted. Increases in sediment in the water column will be reversed quickly due to the PSD of the sediment being dredged.

Attribute	Dredging with Disposal to Sea at HE070 Deposit Site	Beneficial Re-Use Within the CFIIS	Beneficial Re-Use Elsewhere
	will be minimal given the PSD of the dredge spoil). Emissions associated with transport to disposal site.		Emissions associated with transport to destination.
Legislative Complexity	Disposal at sea requires management of some legislative considerations e.g., marine mammals.	Legislative complexities around dredging are simple and will require minor management.	Legislative complexities around dredging are simple and will require minor management.

Appendix 4: Pre-dredge Sampling Results (SOCOTEC, 2023)

Drawings



GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM UNLESS NOTED OTHERWISE.
3. CHART DATUM IS 1.96m BELOW ORDNANCE DATUM.
4. TIDE LEVELS ARE AS FOLLOWS:

HAT	+4.9mCD
MHWS	+4.4mCD
MHWN	+3.3mCD
MLWN	+1.7mCD
MLWS	+0.7mCD
LAT	0.0mCD

5. GRAB SAMPLES AND BULK SAMPLES COMPLETED AS PART OF GROUND INVESTIGATION, BY CAUSEWAY CIRCA 2023.
6. EXISTING SWING MOORING, SWING RADIUS APPROXIMATE 75m (NN0169063927).
7. SUBSEA CABLE RESTRICTIONS. NO FLOATING PLANT WITHIN 15m AND 6.5m IN PLAN AND VERTICALLY RESPECTIVELY.
8. SW OUTFALL RESTRICTIONS. NO WORKS WITHIN 10m EXCLUSION ZONE.
9. DREDGE MATERIAL ASSUMED GRANULAR SEABED MATERIAL (TYPICAL MAKE−UP: SILT / CLAY 8%, SAND 41%, GRAVEL 45%, COBBLES 6%), BASED ON GROUND INVESTIGATION DATA.

LEGEND:

- DREDGE DEPTH BELOW 1m (6,930m²)
- DREDGE DEPTH OF 1m AND GREATER (5,470m²) MAXIMUM DREDGE DEPTH = 3.5m
- GS01 – GRAB SAMPLE AND BULK SAMPLE
- VC01 – VIBROCORE
- SUBSEA CABLE – (DE−ENERGISED)
- SUBSEA CABLE – (DE−ENERGISED) REMOVED
- SUBSEA CABLE – (ENERGISED)
- SUBSEA CABLE – (ENERGISED) REMOVED
- MARINE CONSENTS BOUNDARY
- BOUNDARY OF AREA TO BE CLEARED OF DREDGE HIGH SPOTS ABOVE −3.0m CD

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D
P03	22.01.25	DREDGE HIGH SPOT BOUNDARY ADDED TO LEGEND	PM	BP	BP
P02	09.12.24	MARINE CONSENTS BOUNDARY ADDED	PM	BP	BP

AMENDMENTS

CLIENT: The Highland Council / Comhairle na Gaidhealtachd

PROJECT: CORRAN FERRY REDEVELOPMENT

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DRAWING TITLE: ARDGOUR PROPOSED DREDGE CONSENTS LAYOUT

DRAWN	CHECKED	APPROVED
PM	BP	BP
DATE 27.11.24	DATE 03.12.24	DATE 03.12.24
SCALE (A1) 1:500	STAGE PRELIMINARY	REV P03

DRAWING No.: 2387−WS−ZZ−AG−DR−C−0911

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GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM UNLESS NOTED OTHERWISE.
3. CHART DATUM IS 1.96m BELOW ORDNANCE DATUM.
4. TIDE LEVELS ARE AS FOLLOWS:

HAT	+4.9mCD
MHWS	+4.4mCD
MHWN	+3.3mCD
MLWN	+1.7mCD
MLWS	+0.7mCD
LAT	0.0mCD

5. GRAB SAMPLES AND BULK SAMPLES COMPLETED AS PART OF GROUND INVESTIGATION, BY CAUSEWAY CIRCA 2023.
6. SUBSEA CABLE RESTRICTIONS, NO FLOATING PLANT WITHIN 15m AND 6.5m IN PLAN AND VERTICALLY, RESPECTIVELY.
7. DREDGE MATERIAL ASSUMED WEAK TO MEDIUM STRONG PSAMMITE, BASED ON GROUND INVESTIGATION.
8. DREDGE LAYOUT ASSUMES ALL ROCK ARMOUR FOUNDED WITHIN TOE TRENCH, FORMED IN ROCKHEAD WITH LITTLE OR NO SUITABLE OVERBURDEN MATERIAL.

LEGEND:

- DREDGE DEPTH BELOW 1m (1,900m²)
- DREDGE DEPTH OF 1m AND GREATER (1,820m²) MAXIMUM DREDGE DEPTH = 3.5m
- GS01 – GRAB SAMPLE AND BULK SAMPLE
- SUBSEA CABLE – (DE–ENERGISED)
- MARINE CONSENTS BOUNDARY
- BOUNDARY OF AREA TO BE CLEARED OF DREDGE HIGH SPOTS.

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D
P03	22.01.25	DREDGE HIGH SPOTS BOUNDARY ADDED TO LEGEND	PM	BP	BP
P02	09.12.24	MARINE CONSENTS BOUNDARY ADDED	PM	BP	BP

AMENDMENTS

CLIENT: The Highland Council – Comhairle na Gaidhealtachd

PROJECT: CORRAN FERRY REDEVELOPMENT

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HEBRIDES 01851 600220 hebrides@wallacestone.co.uk

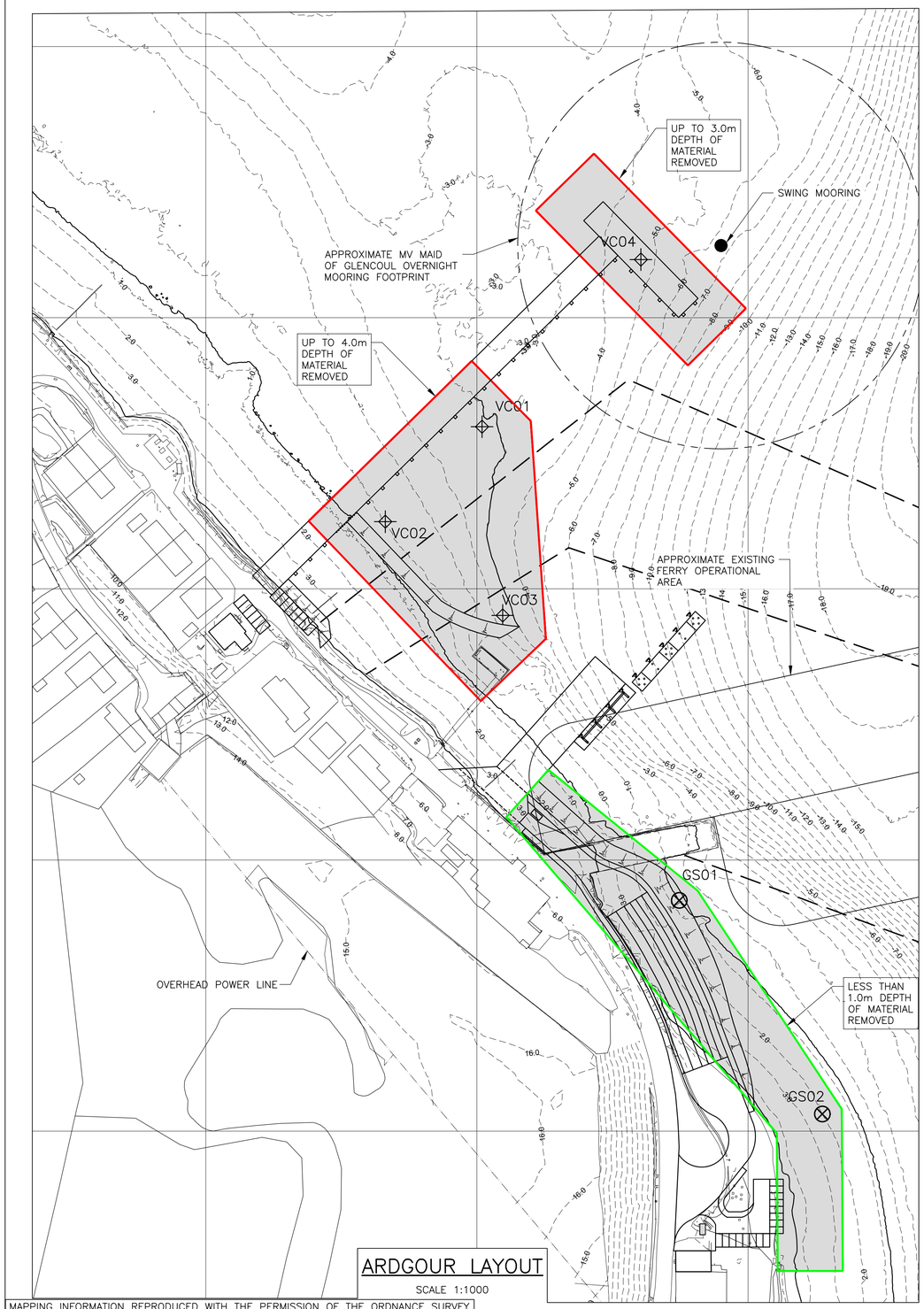
DRAWING TITLE: NETHER LOCHABER PROPOSED DREDGE CONSENTS LAYOUT

DRAWN	CHECKED	APPROVED
PM	BP	BP
DATE 15.10.24	DATE 03.12.24	DATE 03.12.24
SCALE (A1) 1:500	STAGE PRELIMINARY	REV P03

DRAWING No. 2387–WS–ZZ–NL–DR–C–0912

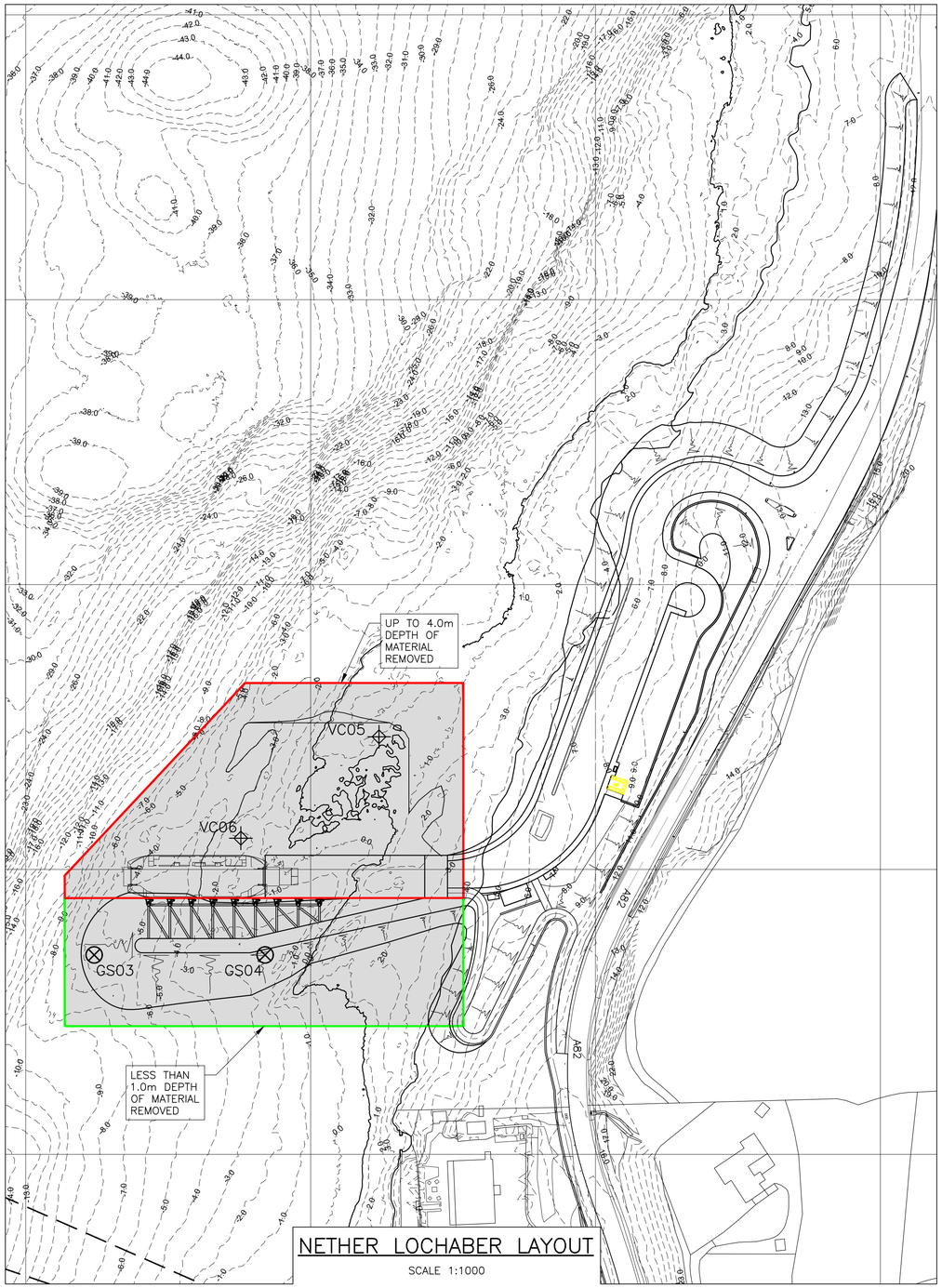
VIBROCORE CO-ORDINATES		
LOCATION	EASTING	NORTHING
VC01	201601.909	763859.772
VC02	201566.213	763824.761
VC03	201609.524	763790.199
VC04	201660.484	763921.441
VC05	202223.997	763846.568
VC06	202184.500	763853.000

GRAB SAMPLE CO-ORDINATES		
LOCATION	EASTING	NORTHING
GS01	201674.614	763685.074
GS02	201727.381	763606.301
GS03	202124.000	763770.000
GS04	202184.000	763770.000



ARDGOUR LAYOUT

SCALE 1:1000



NETHER LOCHABER LAYOUT

SCALE 1:1000

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM UNLESS NOTED OTHERWISE.
3. TIDE LEVELS ARE AS FOLLOWS:
   HAT +4.9mCD
   MHWS +4.4mCD
   MHWN +3.3mCD
   MLWN +1.7mCD
   MLWS +0.7mCD
   LAT 0.0mCD
4. CHART DATUM IS 1.96m BELOW ORDNANCE DATUM.
5. FERRY OPERATIONAL AREA INDICATIVE ONLY. TO BE CONFIRMED WITH FERRY OPERATOR LOCALLY AS MAY VARY SUBJECT TO ENVIRONMENTAL CONDITIONS.
6. IF VIBROCORE LOCATIONS CANNOT BE PROGRESSED BEYOND 1.0m DEPTH GRAB SAMPLES TO BE TAKEN INSTEAD.
7. GRAB SAMPLES HAVE ALSO TO BE TAKEN AT EACH TRANSECT. REFER TO DRAWING 2387-WS-XX-00-D-C-0011.
8. FOR BOREHOLE TRIAL PIT AND BULK SAMPLE LOCATIONS REFER TO DRAWING 2387-WS-XX-00-D-C-0010.

LEGEND

VC01 VIBROCORE LOCATIONS

GS01 GRAB SAMPLE LOCATIONS

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D
T01	30.05.23	TENDER ISSUE.	AB	BP	TR

AMENDMENTS

CLIENT

The Highland Council
Comhairle na Gaidhealtachd

PROJECT

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DRAWING TITLE

PRE-DREDGE DISPOSAL SAMPLE PLAN

DRAWN	CHECKED	APPROVED
JR	BP	TR
DATE	DATE	DATE
JUN 23	JUN 23	JUN 23
SCALE (A1) 1:1000	STAGE TENDER	REV T01

DRAWING No.

2387-WS-XX-00-D-C-0012