

Morven Offshore Wind Farm

Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 2, Annex 8.2: Cable Burial Risk Assessment

MVCNS-J4029-GLM-00001
October 2026
B01

GLOBAL MARITIME

Document status

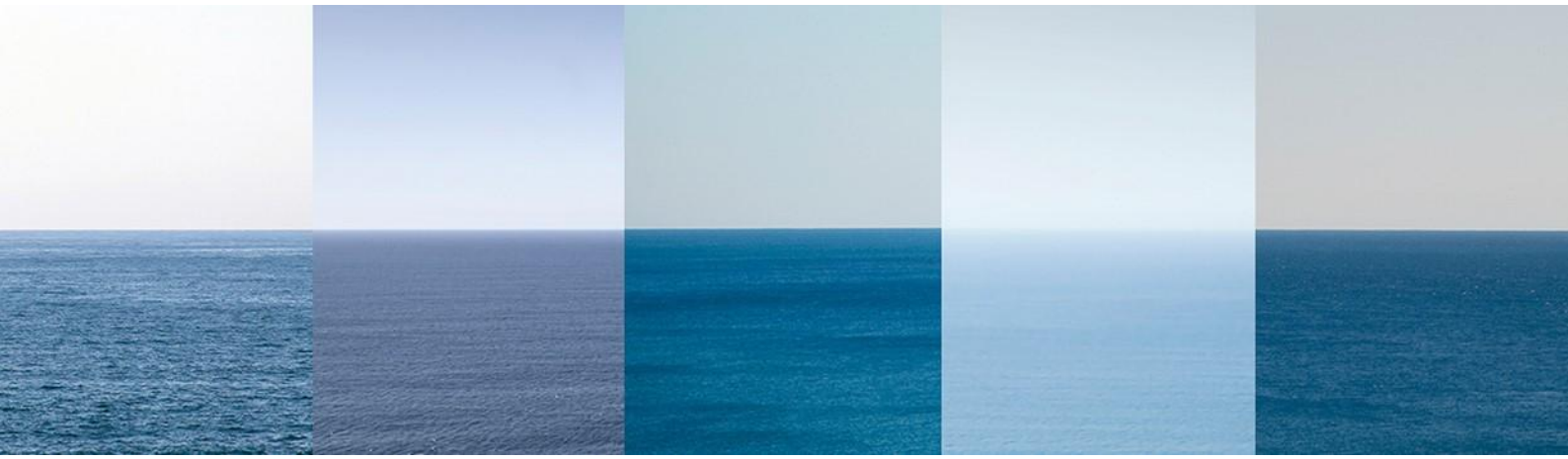
Version	Purpose of document	Authored by	Checker	Approved by	Date
B01	PEIR	ML	LL	LS	October 2026

Prepared by:

Global Maritime

Prepared for:

Morven Offshore Wind Limited



MV EX-GC1 Cable Burial Risk Assessment Report

For Morven Offshore Wind Limited

GM-PRJ116388-GEO-RP-0001 MVEXC-G1207-GML-20001

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DOCUMENT ISSUE RECORD

Rev	Date	Status	Prepared by	Reviewed by	Approved by
01	31/05/24	Issued For Review	Emma Lee	Kieran Hill	Matthew Laing
02	12/08/25	Issued For Review	Emma Lee	Kieran Hill	Matthew Laing
B01	17/08/2026	Issued for Use	Emma Lee	Kieran Hill	Matthew Laing

DOCUMENT CHANGE RECORD

Rev	Section(s)	Page(s)	Brief Description of Change
01			Original Issue to Client
02	Numerous	Numerous	Updated for all comments provided under MVEXC-G1207-GLM-20001_A01_FinalizedReview and MVEXC-G1207-GLM-20001_A01_ReviewComments
B01	N/A	N/A	Document revision updated as issued for Use. No other changes.

DOCUMENT HOLD RECORD

Section(s)	Page(s)	Brief Description of HOLD

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1. INTRODUCTION

1.1 Project Description

The Morven Offshore Wind Limited (MOWL) project is being developed as a Joint Venture between bp and EnBW. The lease area is located ~60 km off the coast of Aberdeen with the proposed export cable corridor running through both English and Scottish waters and making landfall around Seaham. MOWL will consist of fixed bottom WTG's and has a planned capacity of 2.9 GW evenly split over 2 separate grid connections. Three potential export routes linking to Grid Connection (GC) 1 have been identified with cable lengths of between ~215 and 260 km.

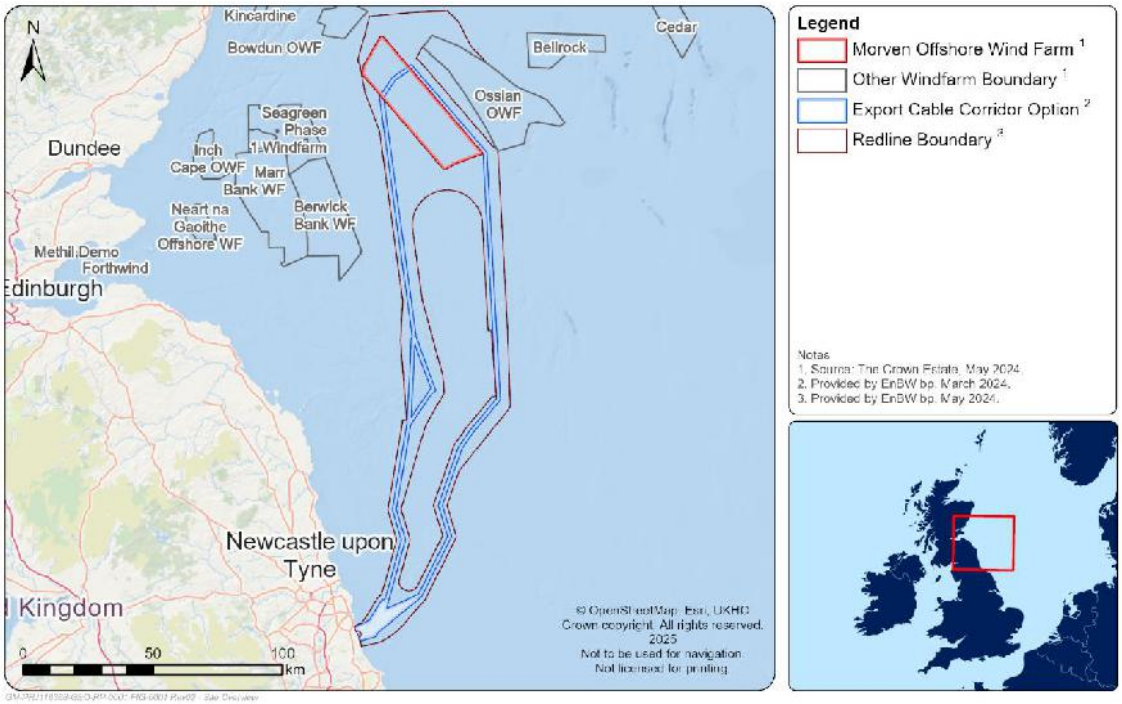


Figure 1: Morven Offshore Wind Farm development location.

1.2 Purpose of Report

The purpose of this report is to present the results of the CBRA completed by Global Maritime for the Morven Export Cable Routes (ECR). The ECR have multiple options, shown in Figure 3Figure 2 to 4 and summarised inTable 1, which are discussed throughout the report and results presented for each option.

A Cable Burial Risk Assessment (CBRA) is undertaken to determine the optimal Depth of Lowering (DoL) for subsea cables based on a combination of key factors. The assessment aims to achieve a DoL that adequately protects the cable from external damage, while remaining commercially viable and technically feasible for installation. By systematically evaluating potential risks such as fishing activity, anchoring and natural seabed movements, CBRA aims for long-term integrity and reliability of the cable system.

Cable ID	Route Length (km)	Cable ID	Route Length (km)	Cable ID	Route Length (km)
A1	214.43	**B1**	218.55	**C1**	253.37
A2	216.12	**B2**	220.24	**C2**	253.82
A3	218.84	**B3**	222.95	**C3**	255.34

Table 1: Cable ID and approximate lengths

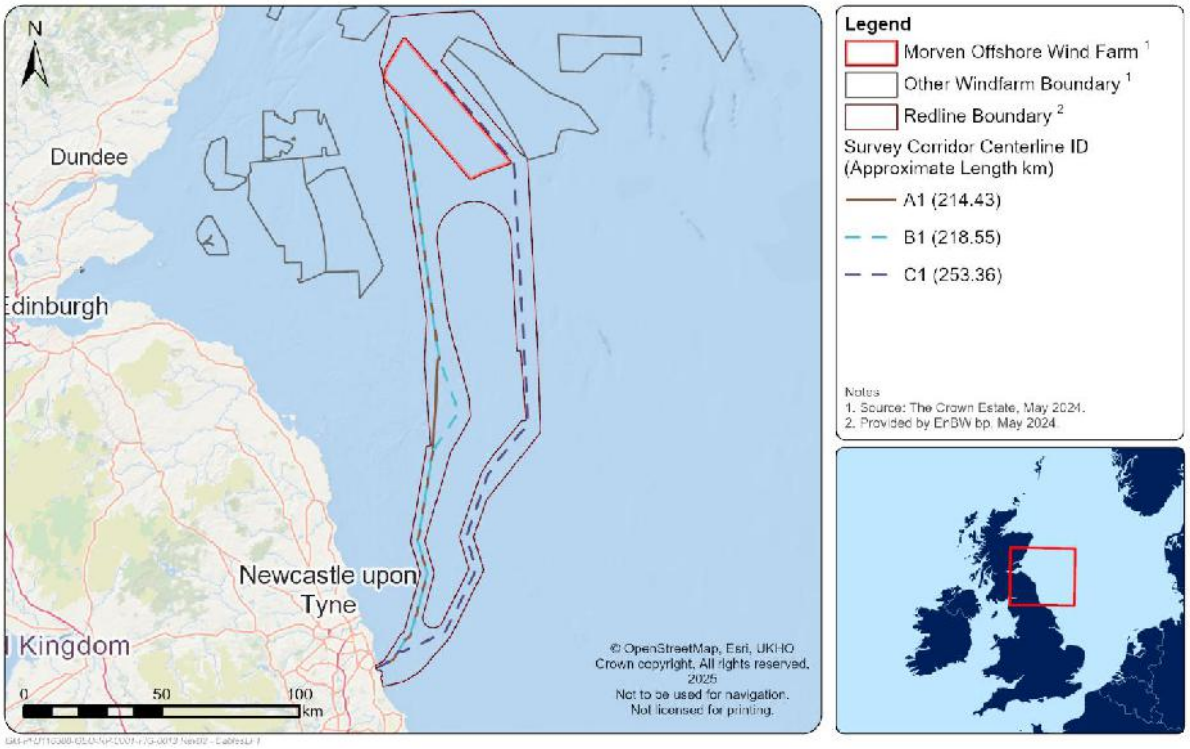


Figure 2: Route Option Schematic – Northern Landfall

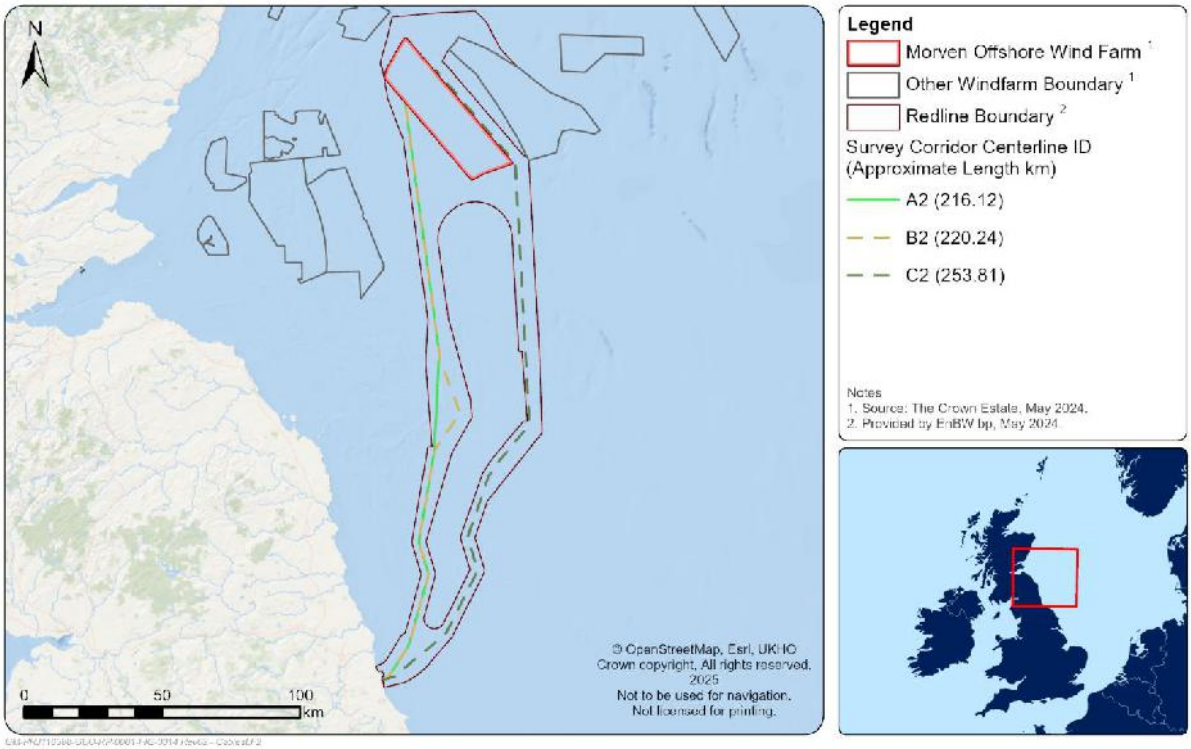


Figure 3: Route Option Schematic – Central Landfall (within Redline Boundary)

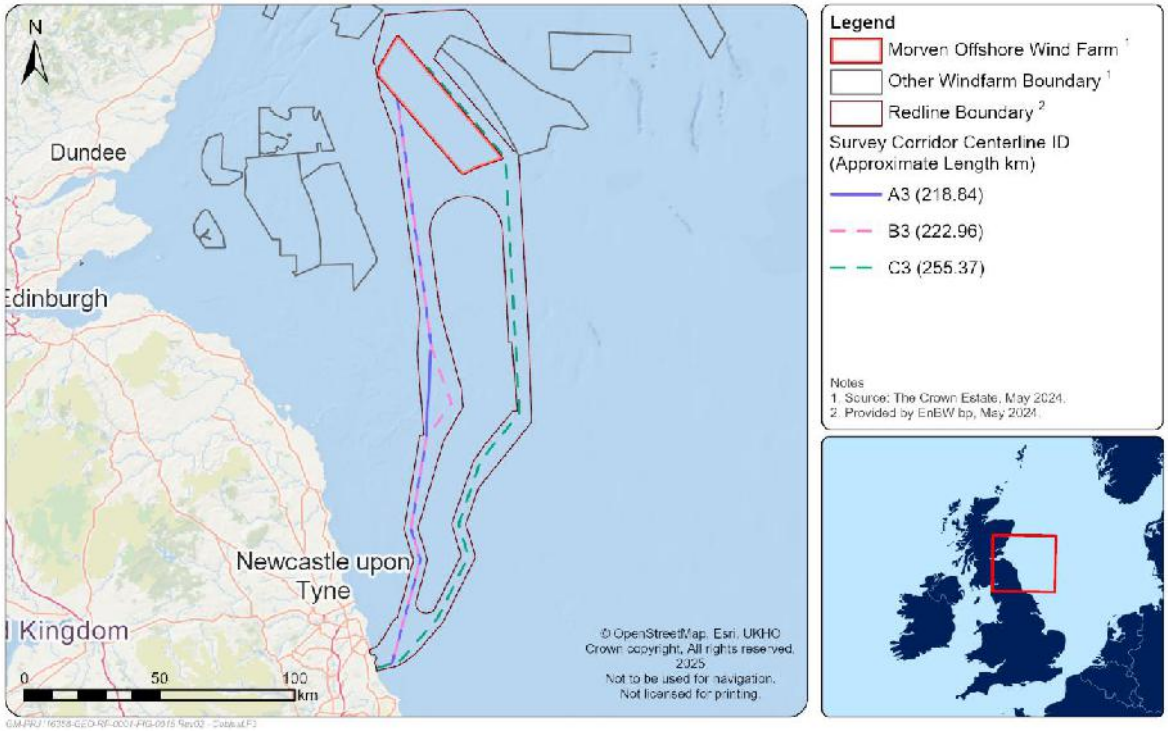


Figure 4: Route Option Schematic – Southern Landfall (out with Redline Boundary)

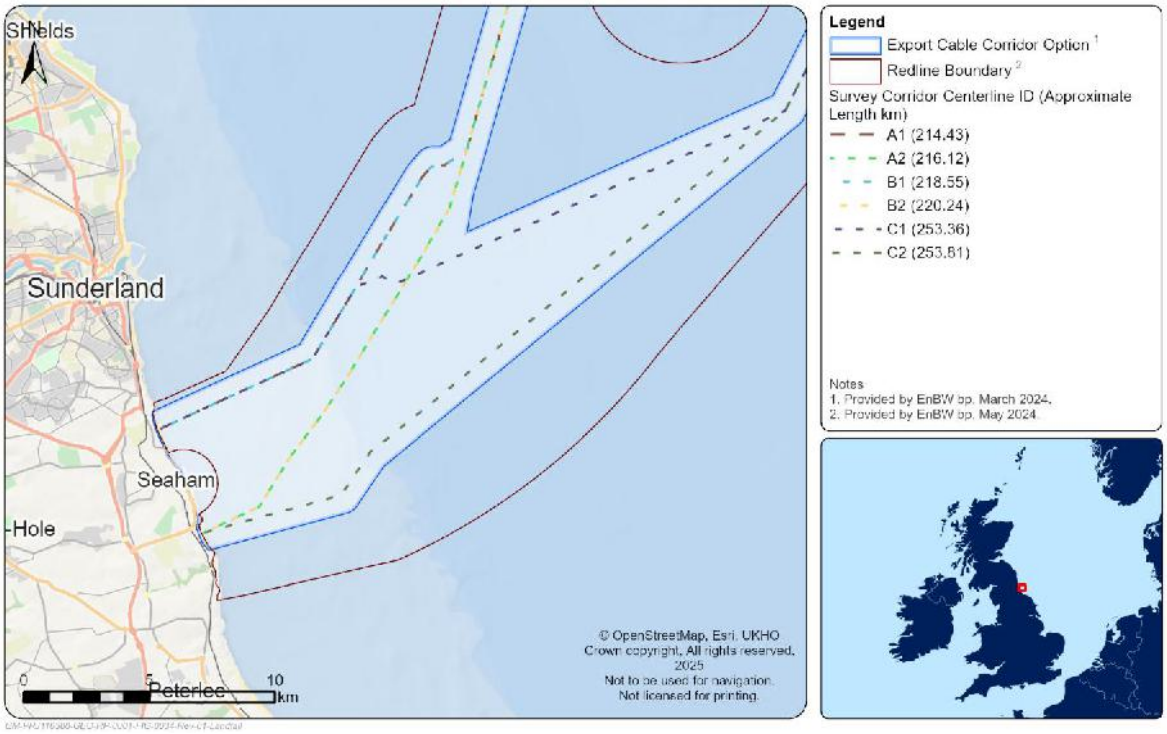


Figure 5: Landfall Options

1.3 Geodetic Parameters

The following geodetic parameters, unless specified otherwise, have been used throughout this report.

Reference	Description
Datum	European 1950
Projection	UTM Zone 30N
Vertical Reference	m LAT

Table 2: Geodetic Parameters

1.4 Units

All distance and depth units within this report are measured in metres, unless stated otherwise.

Dates are given in dd/mm/yyyy format.

1.5 Abbreviations

Abbreviation	Description
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practical
BAS	Burial Assessment Study
BGS	British Geological Survey
BSF	Below Seafloor
CBRA	Cable Burial Risk Assessment
CDM	Construction (Design and Management)
CPS	Cable Protection System
CPT	Cone Penetration Test
DOB	Depth of Burial
DOC	Depth of Cover
DOL	Depth of Lowering
DNV	Det Norske Veritas
DTM	Digital Terrain Model
DWT	Dead Weight Tonnage
ECR	Export Cable Route
ECC	Export cable Corridor
GC	Grid Connection
GIS	Geographical Information System
GM	Global Maritime
IMR	Inspection and Maintenance Regime
KP	Kilometre Point
LAT	Lowest Astronomical Tide
MBES	Multibeam Echosounder
MOWL	Morven Offshore Wind Limited
NGI	Norwegian Geotechnical Institute
O&M	Operations & Maintenance
RSBL	Reference Seabed Level
SBP	Sub-bottom Profiler
SEGL	Scotland to England Green Link
SSS	Side Scan Sonar
Te	Tonne
TN	Technical Note
TPI	Topographic Position Index
TSV	Trenching Support Vessel
UHC	Ultimate Holding Capacity
UTM	Universal Transverse Mercator
VC	Vibrocore
WTG	Wind Turbine Generator

Table 3: Table of Abbreviations

2. DATA REVIEW AND GAP ANALYSIS

2.1 Data Sources

As reviewed and discussed in MVEXC-G4901-GLM-20001, *Data Review and Survey Recommendations Technical Note,* the following references have been used in the development of the CBRA ground model.

Ref. No.	File Name	Document Title / Data Description	Originator
1.	MV_PRJ_BP_0096_OffshoreCableRoutePDEExclSouth1pt5km_Rev01	Export Cable Route	Morven
2.	MV_PRJ_BP_0170_R03_SCP_OffshoreScopingRedlineBoundary	Redline Boundary	Morven
3.	XOcean MBES tiles	00741-BPX-SCO-WIND_Morven_ECR_Results_Report_Rev0	XOcean
4.	Oil and Gas Pipeline Datasets	Oil and gas pipelines	NSTA
5.	SEGL1_Marine_Installation_Corridor	SEGL1 Export Cable Corridor	Morven
6.	SEGL2_Marine_Installation_Corridor	SEGL2 Export Cable Corridor	Morven
7.	H1_Depth_0pt5m_grid_Rev01	Depth to base of H1	XOcean
8.	Seabed_Depth_0pt5m_grid_Rev01	Seabed depth	XOcean
9.	Horizons	Depth to the base of various ground model surfaces.	NGI
10.	RSBL Datasets	C3132.05.03.D01.v02_FINAL - ENbW bp Morven EXC Route Morphodynamic Study_Phase 1	Partrac
11.	Geomorphology, Megaripples, Sand waves	20230203-17-R_Rev1_Export_Cable_Route_Geoscience	NGI
12.	MT_CLT_MSDS_0060_ArchaeologicalExclusionZones_Rev02	EOR0813B_Transmission_Off_Exc_MetoceanBuoys_Preliminary DBA_Rev03	Morven
13.	EES1423_ECR_Merged_230510_ED5030N_UXORZ_v01	MV_5000181_02-00_MV_GEO+MET_CLB_UXO DTS EXP Cable Routes for Surveys	RPS
14.	CPT AGS4 Rev1.ags	54027 - Volume I - Grid Connection One Morven 2023 Export Cable Route Survey (Final Rev1)	Gardline
15.	VC AGS4 (1).ags	54027 - Volume I - Grid Connection One Morven 2023 Export Cable Route Survey (Final Rev1)	Gardline
16.	20240404_GlobalMaritime_AISData_Updated22_23_24.zip	AIS data (2 years)	Morven

Table 4: Data Sources

2.2 Key References

17. Global Maritime, MV EX-GC1 Geological and Geotechnical Interpretation Technical Note, MVEXC-G4901-GML-20002, GM-PRJ116388-GEO-TN-0003
18. Global Maritime, MVEXC-G4901-GLM-20001, Data Review and Survey Recommendations Technical Note
19. XOcean, Morven Cable Route Survey Results Report, Doc. No. 00741-BPX-SCO-WIND, Rev. 01, 22.09.2023
20. Partrac, Morven EXC Route Seabed Mobility Assessment – Phase 1 Report, Doc. No. C3132.05.03.D01.V02, Rev. 02, 19.03.2024
21. Gardline, Export Cable Route Shallow Geotechnical Survey – Volume I: Field Operations and Preliminary Results, Doc. No. CW204658, Rev. Final, 06.12.2023
22. Gardline, Morven ECR – Environmental Survey Field Report, Doc. No. 54027.E1, Rev. 0 Draft, 08.12.23
23. NGI, Morven Offshore Wind Farm – Evaluation of Export Cable Routes, Doc. No. 20230203-17-R, Rev. No. 1, 12.03.2024
24. NGI, Morven Offshore Wind Farm – Export Cable Route, Review and Recommendations, Doc. No. 20230203-14-R, Rev. No. 1, 22.05.2023
25. Xodus, Morven Offshore Wind Farm – Preliminary Cable Burial Risk Assessment, Doc. No. L-100828-S00-R-REPT-001, Rev. 01, 24.02.2023
26. Carbon trust, Application guide for the Specification of the Depth of Lowering using the Cable Burial risk assessment (CBRA) methodology, Dec. 2015
27. Carbon Trust, Cable Burial Risk Assessment Methodology, guidance for the preparation of ale Burial depth of Lowering Specification, CTC835, February 2015.
28. DNVGL, recommended Practice, Subsea Power Cables in Shallow Water, Doc. No. DNVGL-RP-0360, March 2016
29. DNV, recommended Practice, Risk Assessment of Pipeline Protection, Doc. No. DNV-RP-F107, October 2010.
30. Versey, H. C., The North Sea Earthquake of 1931 Jun 7, Geophysical Journal International Vol. 4, Issue 6, pp. 416-423
31. BGS, Offshore Seismic Hazard in UK Waters, https://www.earthquakes.bgs.ac.uk/hazard/hazard_offshore.html. Accessed: 29th July 2025.
32. Global Maritime, MV-EX-GC1 Survey Recommendation Technical Note, GM-PRJ116388-GEO-TN-0002, 31.07.2025.

2.3 Data Review Summary and Recommendations

Although data gaps exist, the data provided is adequate for carrying out the current scope of work. Where any data gaps have been identified, recommendations for performing appropriate survey works to obtain the required data have been detailed within the survey recommendations technical note, Ref. 32.

3. SITE CONDITIONS

3.1 Bathymetry

The bathymetry dataset has been provided as gridded bathymetry data measured in m LAT with 1m resolution. There is minor data striping observed within the MBES data as described within the data review and gap analysis (Ref.18), but this is unlikely to affect data adequacy. The 1m resolution bathymetry data is sufficient to assess both small- and large-scale seabed features and bedforms and is considered adequate for the current work scope.

A high-level overview of bathymetric trends along the route corridors is shown on Figure 6 and Figure 7 below. Detailed representation of bathymetric depths and seabed morphology are provided on the alignment charts in Appendix B.2.

Route	Water Depth (m) Range
A	55 - 106
B	64 – 96
C	60 – 91
Landfall	<55m

Table 5: Water Depths from (Ref. 23)

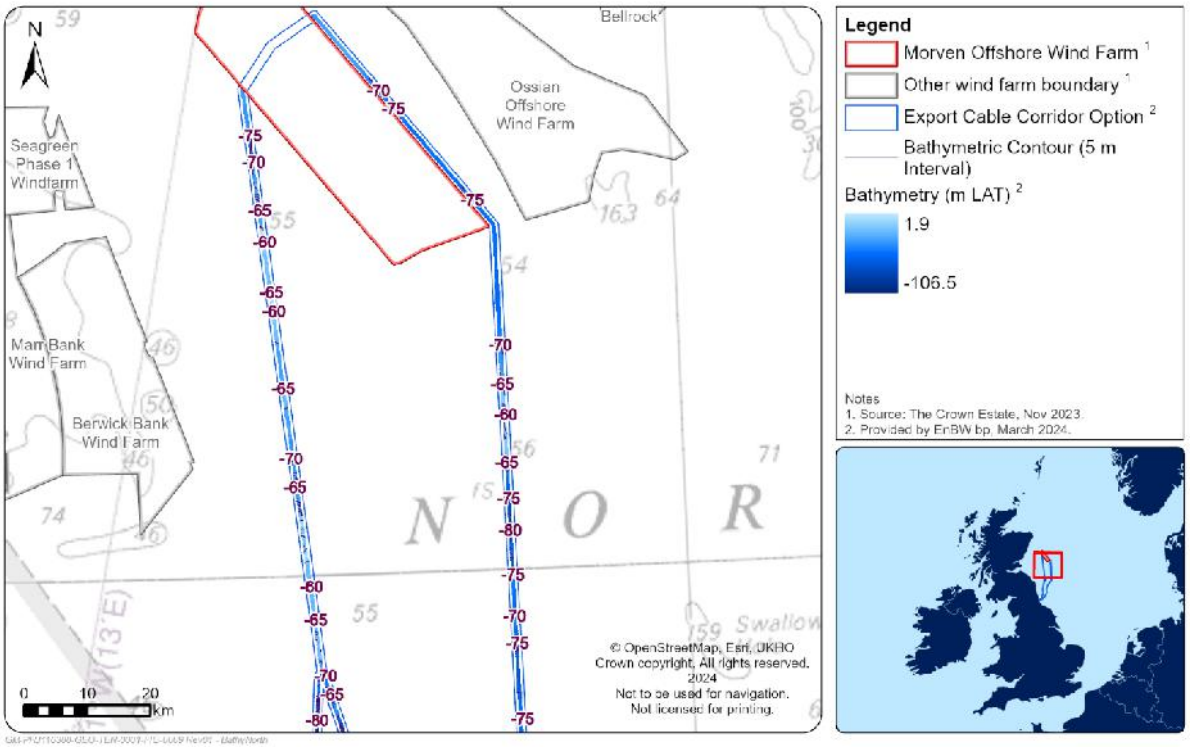


Figure 6: Morven ECR Bathymetry (North)

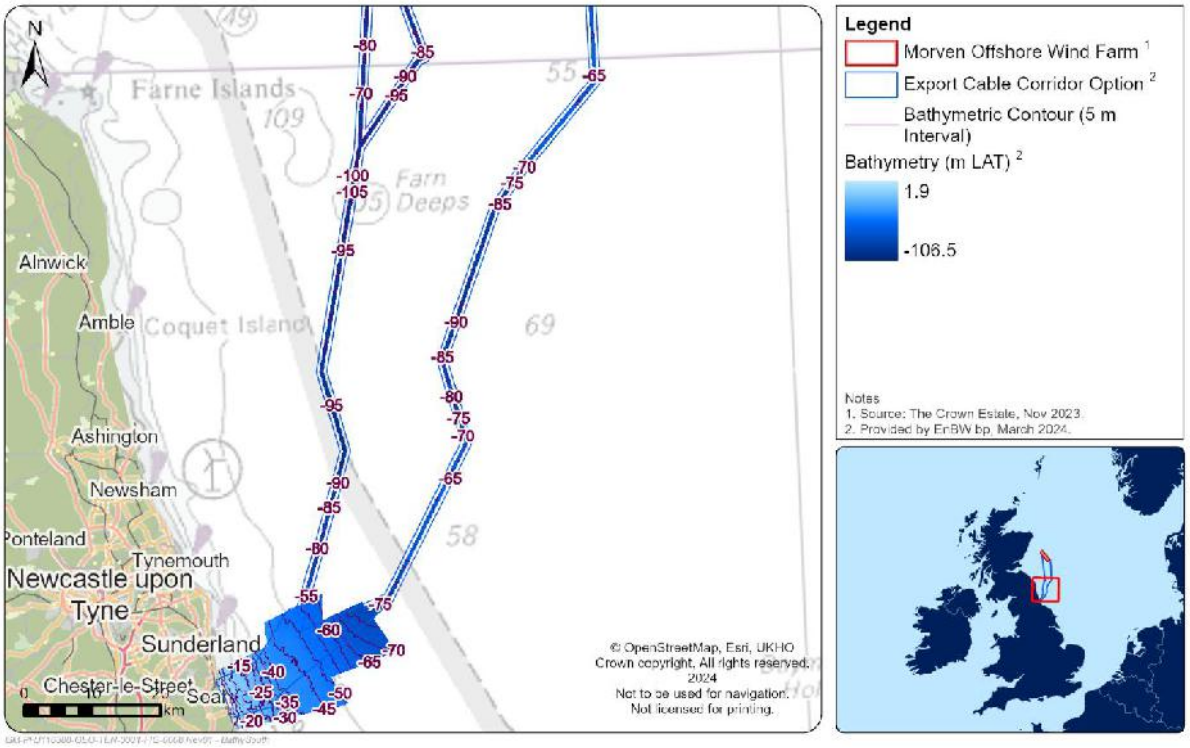


Figure 7: Morven ECR Bathymetry (South)

3.2 Seabed Sediments

An interpretation of the seabed sediments was performed by integrating data from Geotechnical tests and using the publicly available BGS data. Much of the seabed sediment composition are determined by the glacial deposits. They generally comprise of a thin veneer (<1m thick) of Holocene SAND of variable thickness along all three ECR corridors, whereas the landfall area and southern parts of route C is typified of bedrock at seafloor (Refs. 19, 21, 23).

Detailed representation of seabed substrate is provided on the alignment charts in Appendix B.2.

3.3 Seabed Features and Geohazards

The seabed features and geohazards reported along the ECR options have been described and summarised in Ref. 17. These features have been used when assessing risk to achieving cable burial and have been taken into consideration when down selecting preferred ECR survey corridor.

Table 6 below lists the seabed features and geohazards that may impact cable installation and burial. The full Geohazard and Geotechnical Risk Register is presented in Appendix A. Detailed representation of seabed features is provided on the alignment charts in Appendix B.2.

Seabed Features	Hazard details
Bedrock Outcropping at Seabed	Presence of outcropping rock can cause issues to cable installation. Trencher ability along those areas is highly dependable on the geotechnical parameters of the rock and cables might be not sufficiently protected if targeted burial depths are not achieved. Exposed cables have increased risks to internal and external threats.
Hard Soils Within Burial Profile	Presence of high-strength clays can cause issues to cable installation. Trencher ability along those areas is highly dependable on the geotechnical parameters of the soils and cables might be not sufficiently protected if targeted burial depths are not achieved. Exposed cables have increased risks to internal and external threats.
Boulders at and within Seabed	Boulders of indurated and cemented material derived from the underlying geological units. Boulders >0.3m in anyone direction create obstructions for trenching and installation activities. Buried boulders can cause reduced burial.
Soft Soils at and within Seabed	Presence of soft, unconsolidated soils can cause issues to cable installation.Soft soils can cause trencher sinkage and less efficient trenching if not planned for.
Irregular Seabed	Presence of irregular seabed can cause issues with trencher traction and progress, also reduced burial where trencher tools pull out of seabed.
Gravel Reduces Depth of Lowering	Gravels present within seabed soils, or even flints within chalk, may not be fully removed from trench, limiting the depth to which lowering can occur.
Dense Sands across site	Dense sands can greatly reduce plough progress rates.
Organic Material within Burial Profile	Organic materials in soil can reduce jet trenching performance.
Shells and shell fragments reducing Depth of Lowering	Shells and shell fragments, may behave similarly to gravel, limiting the depth to which lowering can occur.
Wrecks	Several wrecks are observed on the seafloor, majority within the landfall area and will be taken into consideration during route engineering.
Existing infrastructure	Existing infrastructure in the area comprises of other wind farm developments and oil and gas infrastructure. ECR crosses pipelines, outfall pipes (near central landfall), telecom cables.
Disposal Ground	Designated disposal ground within the nearshore area will be taken into consideration during route engineering.
Soluble Rock	The landfall approach and nearshore section of the ECC is underlain by Permian strata of the Zechstein Group, comprising, evaporite,

Seabed Features	Hazard details
	dolostone, limestone and mudstone. Evaporite, dolostone and limestone are expected to be soluble, and dissolution of evaporites could be expected to occur under conditions of circulating groundwater within asset lifecycle. Groundwater conditions in the landfall or shore approach are expected to be hydrostatic with tidal influence rather than flowing / circulating, and therefore the primary geo-constraint is expected to be cavities formed through dissolution in the geological past, formed during subaerial exposure of the Zechstein Group during the Jurassic. Pre-existing solution cavities or karst features in limestone, dolostone or evaporites may present a collapse hazard under changes in applied load or during trenching operations, in areas where bedrock is close to seabed.
Mobile bedforms	Dependent on height, wavelength, and rate of migration, mobile features can lead to exposed or insufficiently buried cables. Mobile bedforms can be mitigated by burying below a stable reference seabed level (RSBL) such as is provided in Partrac's sediment mobility assessment (Ref.20). Partrac summarise that fine sediment transport throughout the corridor is weak, and transport of sand is "not sufficiently pronounced to give rise to large morphological changes to the seabed".
Moraine ridges	Moraine ridges are elongate topographic highs commonly observed on formerly glaciated margins. They may form potential route engineering constraints due to the associated coarse-grained sediments, mixture of winnowed sand, gravel, cobbles and boulders.
Grounding zone wedges	Grounding zone wedges (GZW) are low angle, asymmetric sedimentary depocentres which form through the rapid accumulation of glaciogenic debris at the grounding zone of marine-terminating ice sheets. They comprise of coarse sediments, mixtures of winnowed sand, gravel, cobbles and boulders that may form potential geohazards to cable routing.

Table 6: Summary of Seabed Features

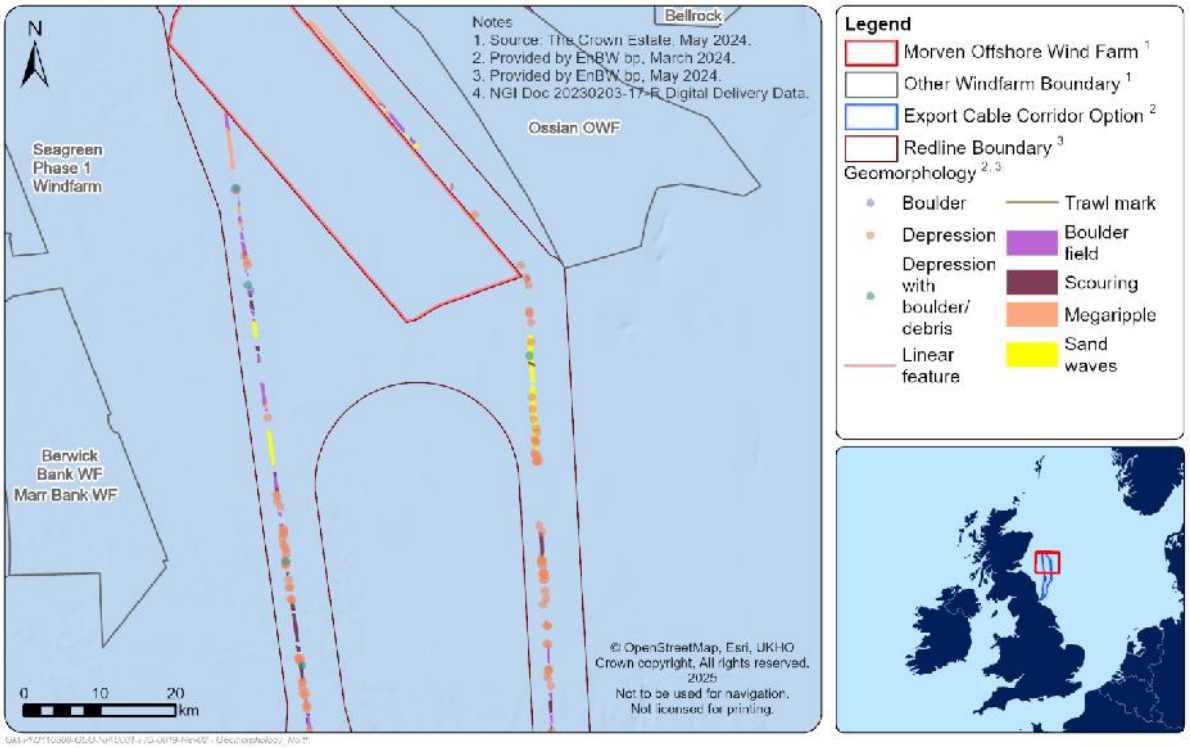


Figure 8: Geomorphology – North Section

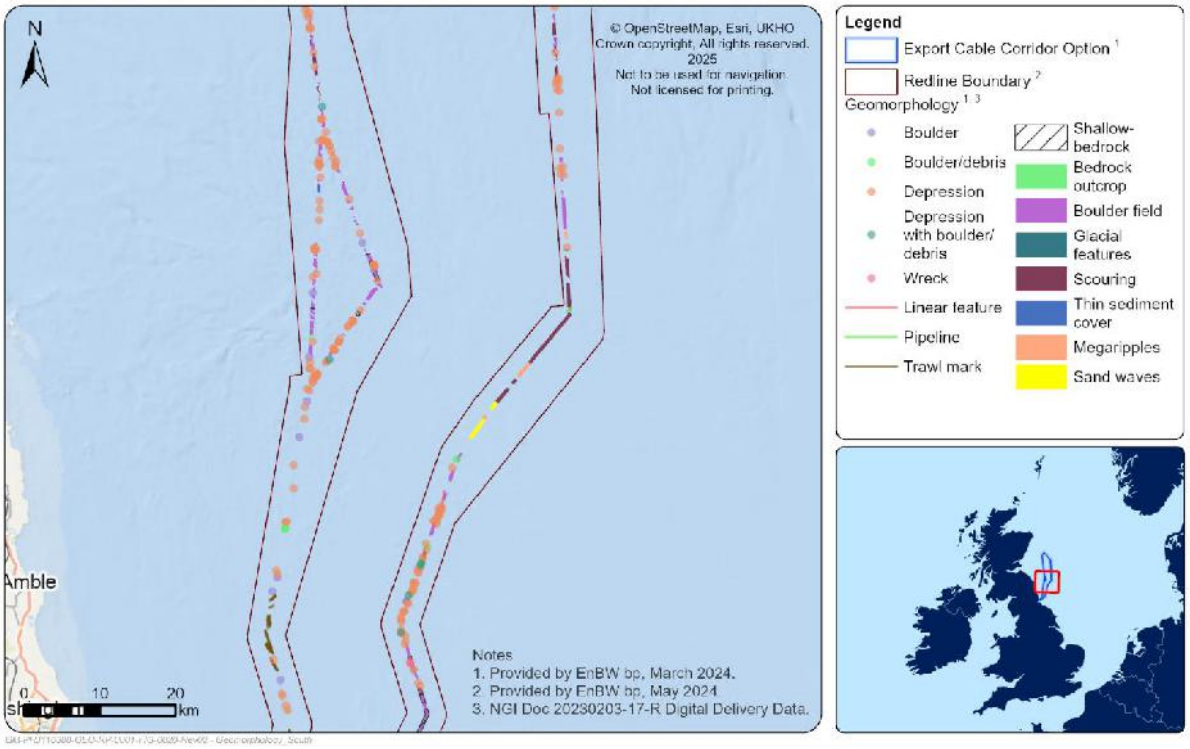


Figure 9: Geomorphology – Mid-Section

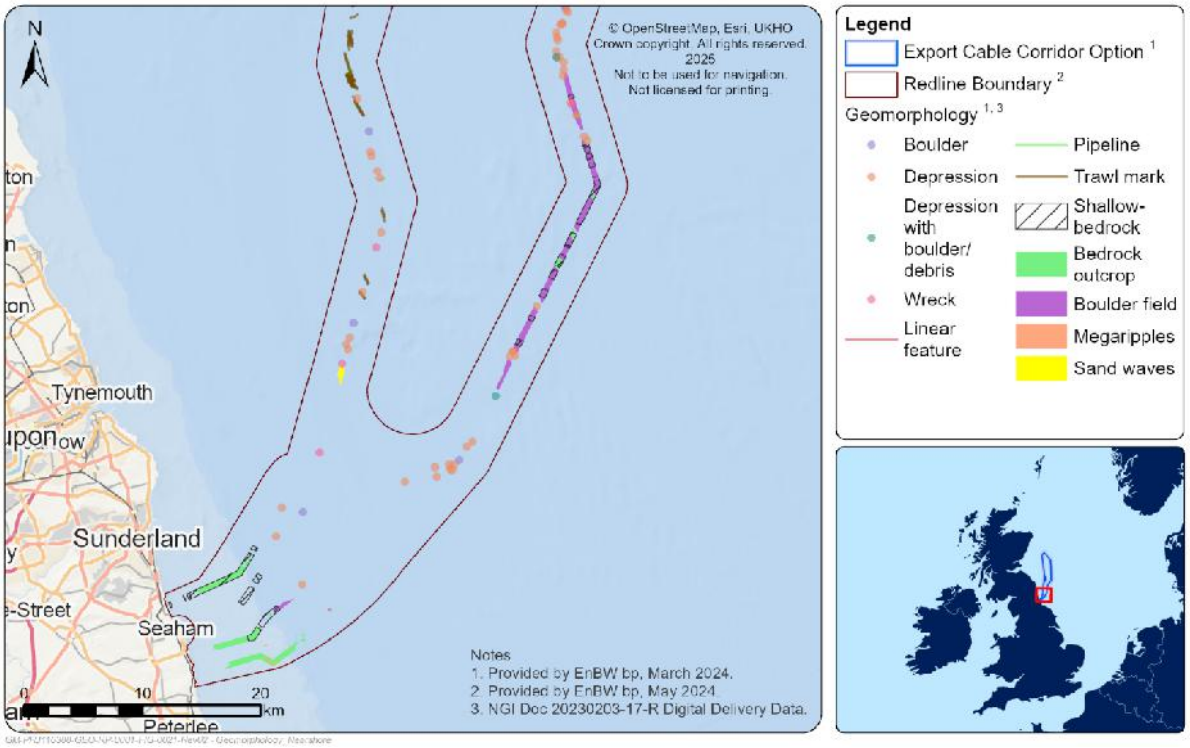


Figure 10: Geomorphology – South Section

3.4 Local Geology

The anticipated geological formations along the ECR options are discussed in Ref. 17. Table 7 summarises the main geological formations present across the ECR corridors. The base of these formations has been defined on the sub-bottom profile data within the NGI ground model (Ref. 23) and the associated horizon name detailed.

Geological Formation	Horizon Name	Description
Holocene	Base Hol 1 Base Hol 2 Base Hol 3	Majority loose to medium dense SAND, with local sandy CLAY. Some areas of gravelly SAND (Hol 3).
Forth Formation	Base Fth 1 Base Fth 2 Base Fth 3	Dense to very dense SAND (Fth 1 and 3). Extremely low to low strength sandy CLAY and clayey SAND (Fth 2).
Marr Bank Formation	Base MB	Dense to very dense fine to medium SAND often with beds of medium to high strength CLAY with gravels, cobbles, boulders.
Wee Bankie Formation	Base WB	Medium dense to very dense gravelly CLAY and SAND.
Bedrock	Bedrock	Varying, dipping strata.

Table 7: Geological Formations across ECR corridors (Ref.23)

3.5 Soil Zonation along ECR

The ground model information provided by NGI and the ECR geotechnical site investigation data was used in Global Maritime's 3D CBRA model, with the zones categorised into two soil layers for the CBRA modelling procedure. The layers were defined using the soil types and soil properties reported with depth below the reference seabed level (RSBL) reported for the transition between these units. Using these properties the soil zones were defined using GM's geological classification as presented in Table 8. The soil zonation created within the CBRA ground model is referenced from the RSBL.

Unit Code	Soil Description	Undrained Shear Strength, Su (kPa)		Relative Density, Dr (%)	
		From	To	From	To
S1	Loose SAND	n/a	n/a	0	35
S2	Medium dense SAND	n/a	n/a	35	65
S3	Dense SAND	n/a	n/a	65	100
C1a	Extremely low strength CLAY	1	5	n/a	n/a
C1b	Extremely low strength CLAY	5	10	n/a	n/a
C2	Very low strength CLAY	10	20	n/a	n/a
C3	Low strength CLAY	20	40	n/a	n/a
C4	Medium strength CLAY	40	75	n/a	n/a
C5	High strength CLAY	75	150	n/a	n/a
C6	Very high strength CLAY	150	300	n/a	n/a
C7	Extremely high strength CLAY	300	1000	n/a	n/a

Table 8: GM CBRA model Geological Units

All ECR options within the Northern section of the routes are dominated by SAND soil as shown in Figure 11. Within Layer 1 there are isolated occurrences of CLAY material, however it is within soil layer 2 that the CLAY soil increases in presence as the routes transition south (Figure 12). The CLAY is anticipated to be firm to high strength within in soil layer 2.

Figure 13 shows the depth to the base of soil layer 1, i.e. the anticipate soil layer thickness. Across all ECR route options soil layer 1 is up to 2m thickness.

Drawings visualising the spatial distribution of layer 1 and 2 units and depth to base of layer 1 are provided in Appendix B.1.

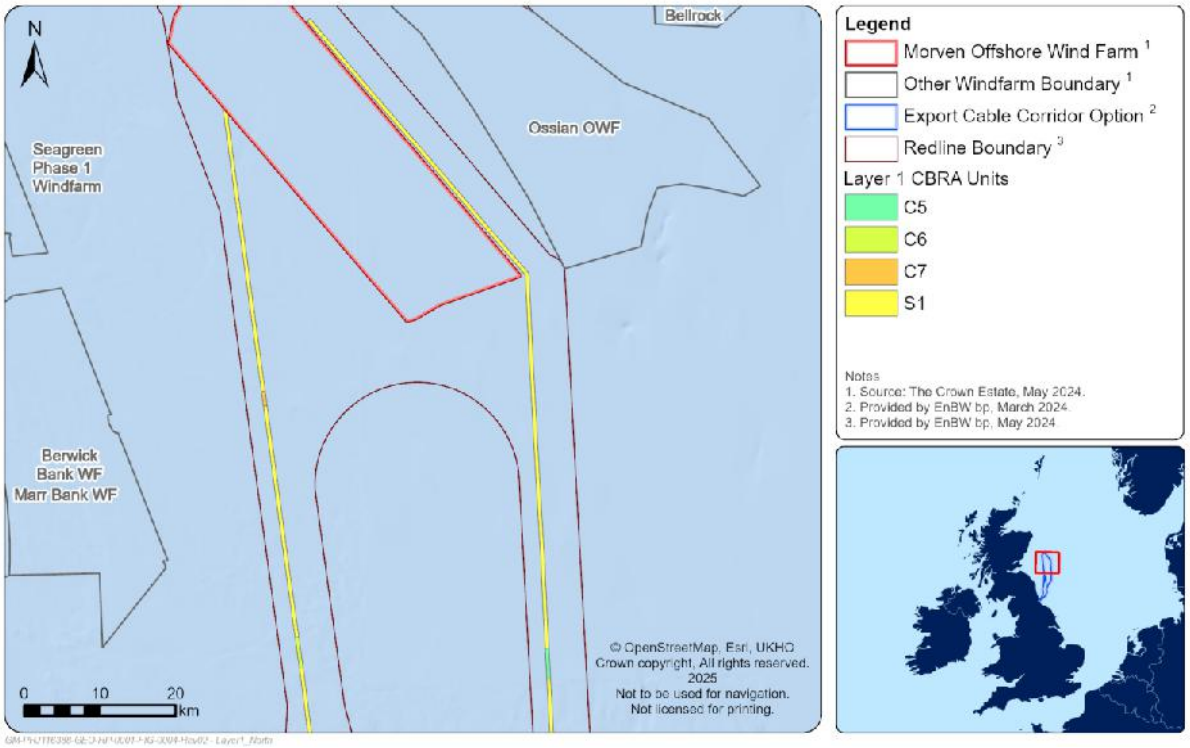


Figure 11: Soil Layer 1 – North

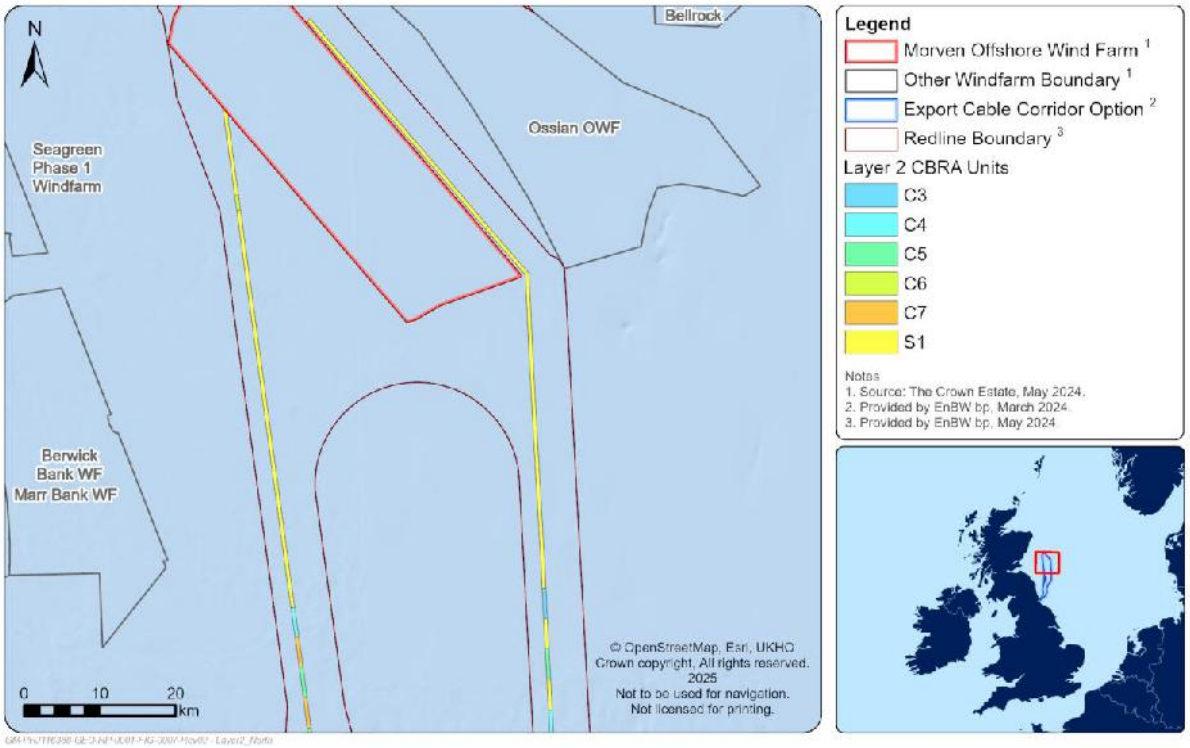


Figure 12: Soil Layer 2 – North

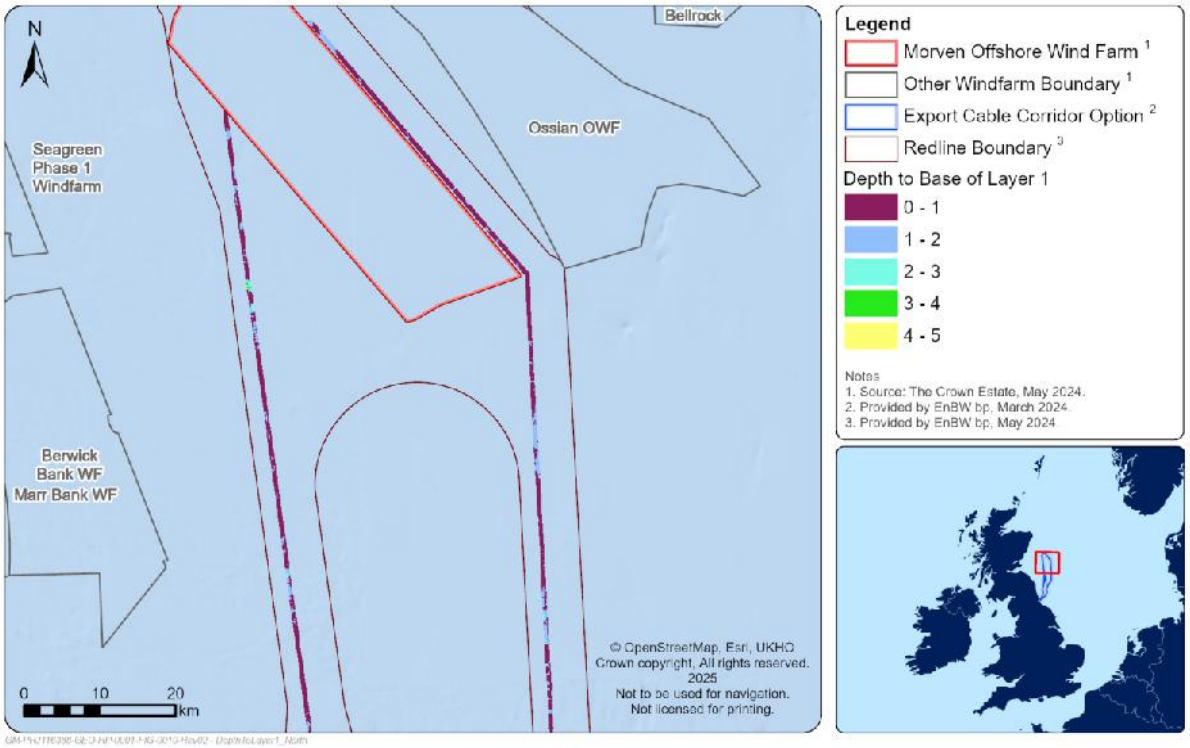


Figure 13: Thickness of Soil Layer 1

Reviewing the geotechnical data and soil zones within the mid-section of all ECR options the soil conditions change as the route migrates further south. Within soil layer 1 on routes A and B the SAND soil is replaced by extremely low to low strength CLAY at approximately KP90.000. Soil layer 2 along routes A and B is also CLAY with increasing strength with depth. Thickness of soil layer 1 increases as the route continues southwards with depths up to 2 to 3m, particularly in areas of low strength CLAY.

Route C continues to be dominated by SAND within soil layer 1, however CLAY soil increases in variability within soil layer 2 and in some instance extremely high strength CLAY and bedrock were reported. The thickness of soil layer 1 mostly ranges between 0 to 1m along this section of the route, with some places up to 2m thick.

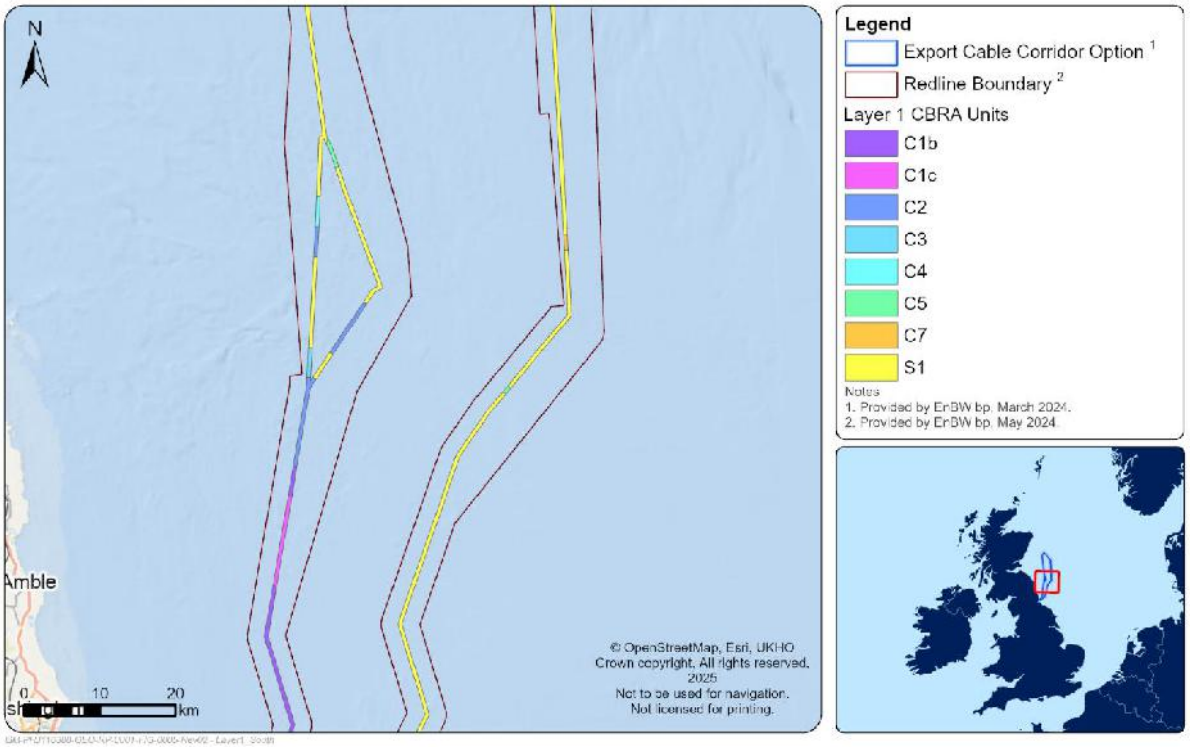


Figure 14: Soil Layer 1 – Mid-Section

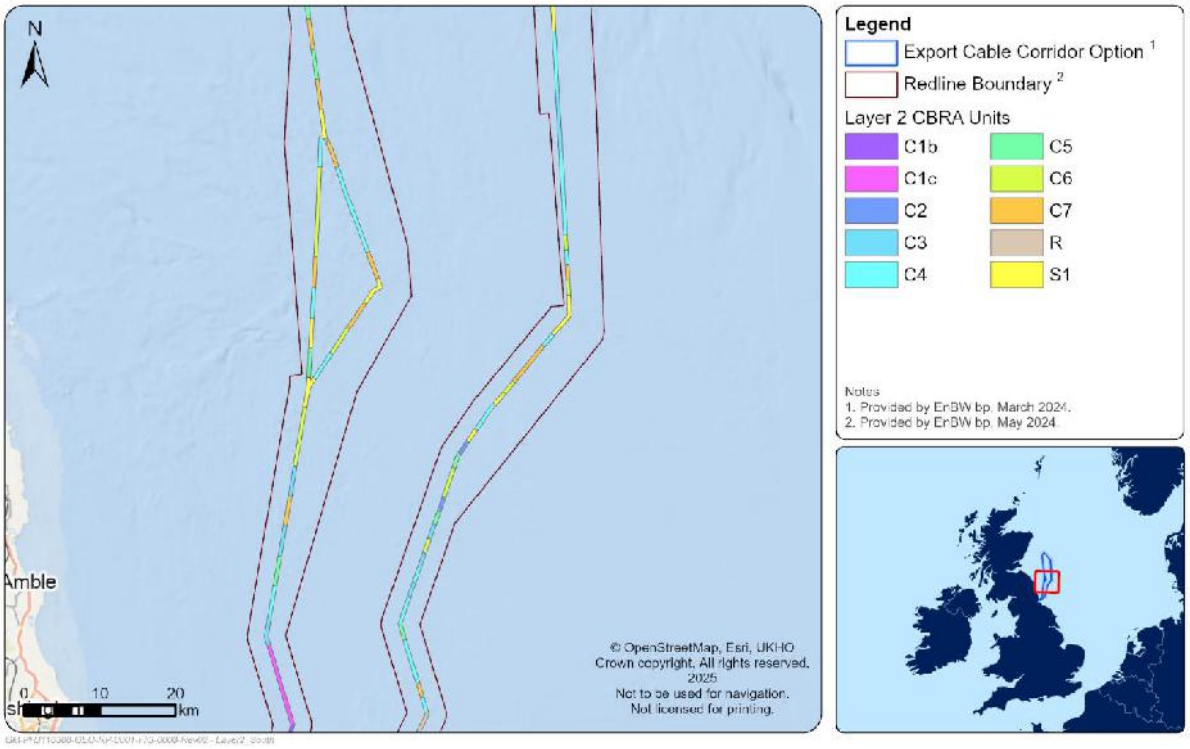


Figure 15: Soil Layer 2 - Mid-Section

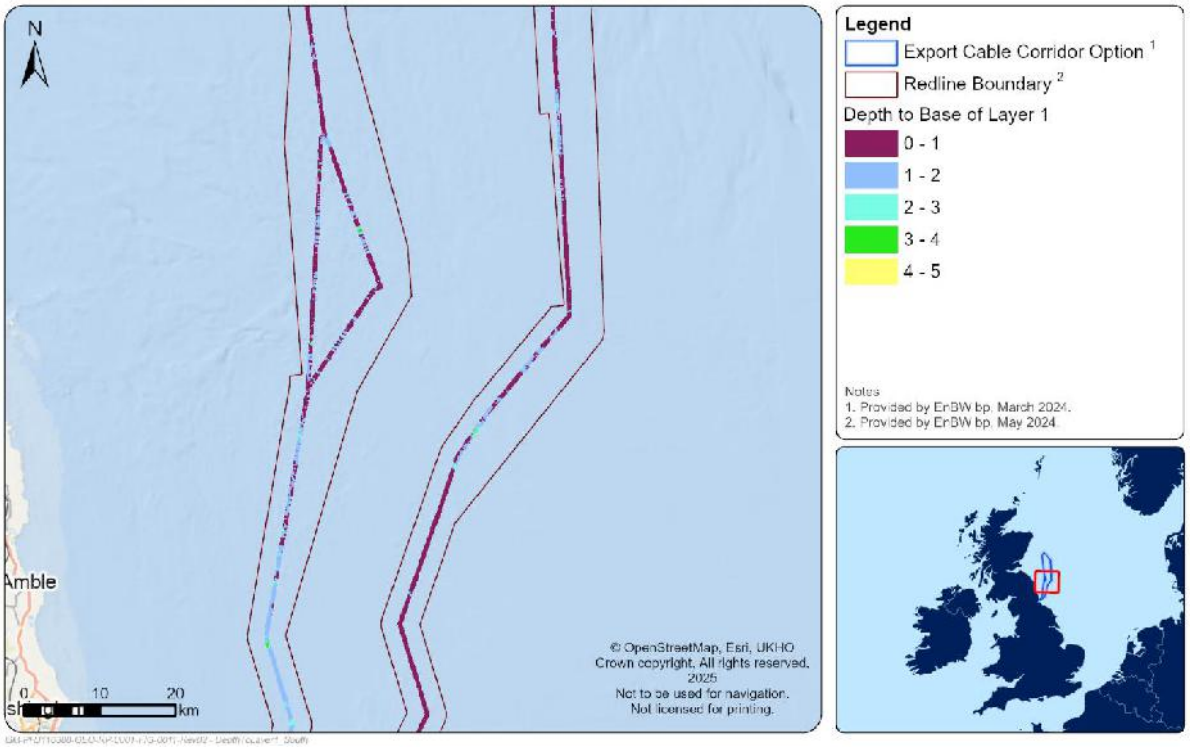


Figure 16: Thickness of Soil Layer 1

Routes A and B continue to be dominated by extremely low to low strength CLAY within soil layer 1 as the routes continue south towards the nearshore and landfall areas. As the route splits into the landfall approach, all options are anticipated to comprise of SAND within soil layer 1, except options A1, B1 and C1, where bedrock is anticipated within soil layer 1 for the last 8km to shore.

Route C is dominated with SAND within soil layer 1 however bedrock is reported at surface at approximately KP44.500 to KP46.700. At approximately KP27.000 very low to low strength CLAY is anticipated within soil layer 1 as the route continues to nearshore to approximately KP12.000 and KP13.000 on routes C2 and C3 respectively and ~KP15.000 on route C1 where SAND is the anticipated soil type in layer 1.

Thickness of soil layer 1 is presented in Figure 19 and shows up to 2m across most routes and channel features running across all route options with thicknesses >5m.

All landfall approaches have bedrock within soil layer 2. Routes A3, B3 and C3 should anticipate this around the 25m water depth mark, approximately KP4.750. Route C2 similarly around 25m LAT at ~KP4.500. Routes A2 and B2 should anticipate bedrock in soil layer 2 between KP6.000 and KP10.00 and from KP2.800 to shore (KP0.000). As mentioned previously in soil layer 1, routes A1, A2, A3 are reported to have bedrock from KP8.000 to shore, which thus applies to soil layer 2.

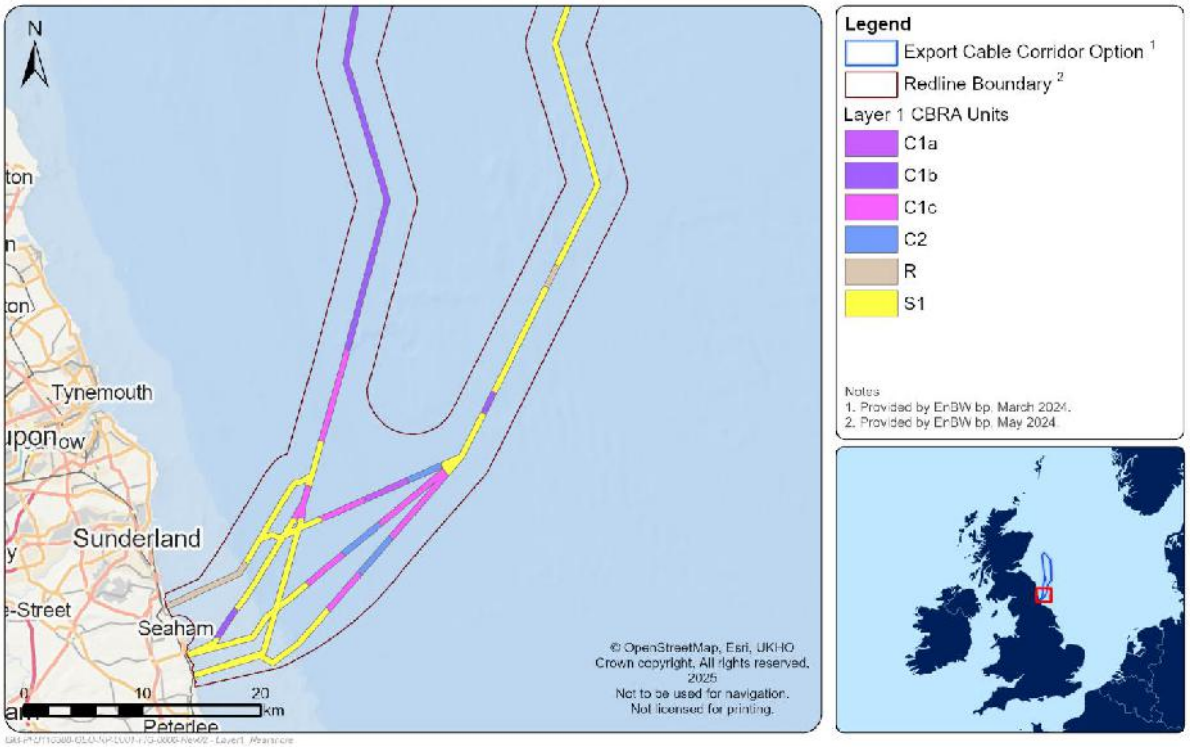


Figure 17: Soil Layer 1 – South approach

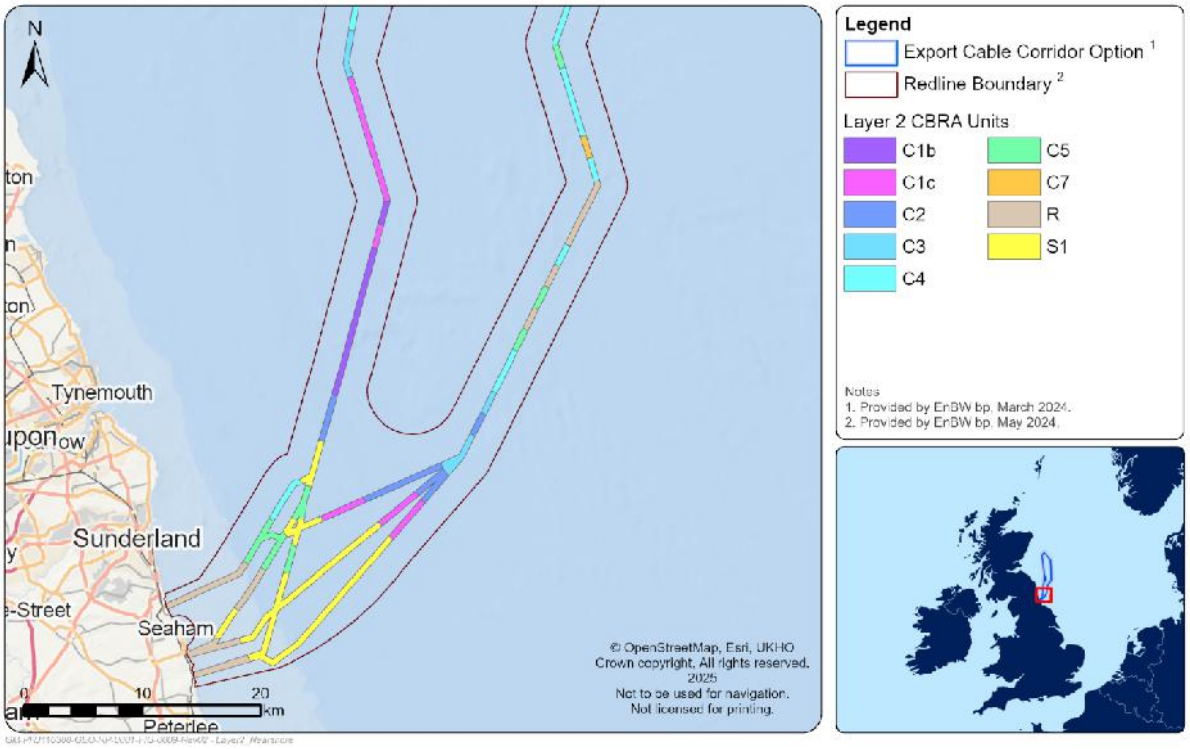


Figure 18: Soil Layer 2 -South approach

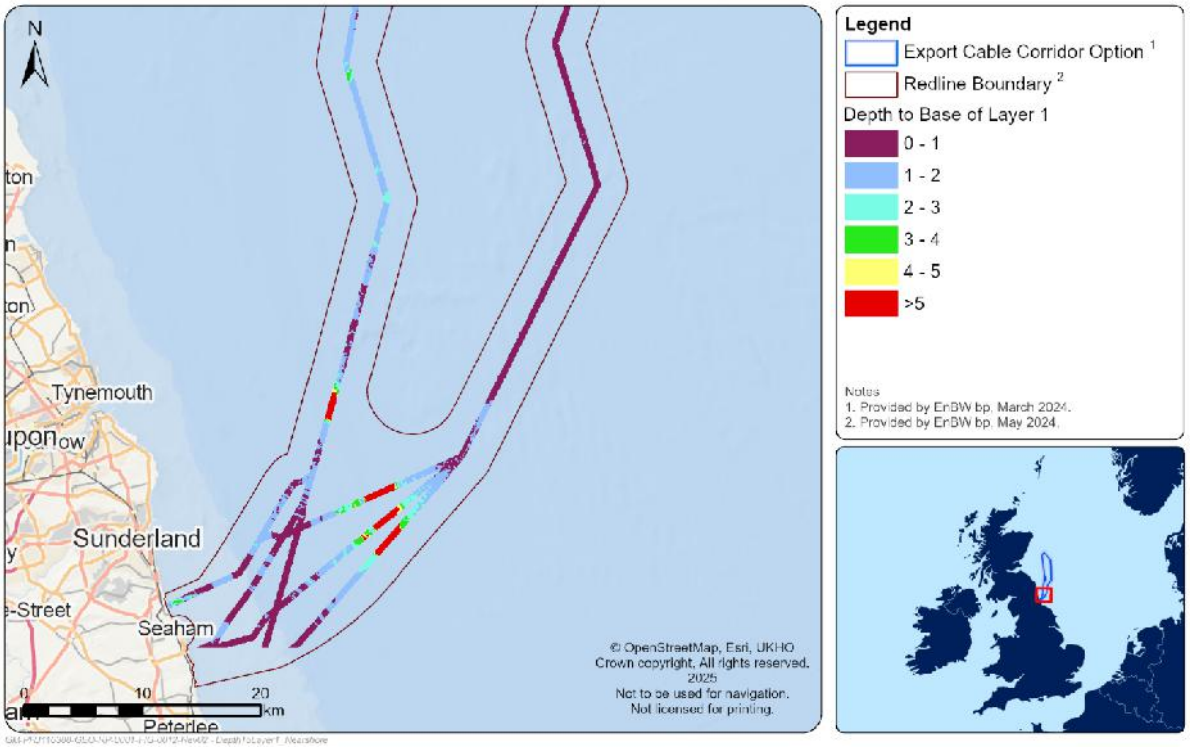


Figure 19: Thickness of Soil Layer 1 – South approach

4. CABLE BURIAL RISK ASSESSMENT (CBRA)

4.1 CBRA Methodology

4.1.1 Risk Assessment Methodology

There are a wide range of obstacles and seabed users that present potential hazards to subsea cables; or which have direct interactions with cables that risk damage. Such hazards include ship anchors, which could impact or snag the cable if dragged along the seabed; and fishing, where bottom trawling gear can snag and damage cables. The aim of this study is to evaluate potential risks to the cable and provide recommendations as to the most efficient risk mitigation, including recommendations of burial depth where appropriate.

The basis of a risk assessment for a submarine cable relies on identifying the potential hazards, associated risks, and evaluating the level of protection that may be given to the cable by its armouring (internal and/or external), cable burial beneath the seabed or any other means, such as rock placement or concrete mattress protection.

The most reliable and cost-effective form of cable protection is generally recognised to be ensuring no interaction between the cable and the identified hazards. This is most easily achieved by routing the cable away from such hazards or, where this is not practical, by burial below the seabed.

The simplified methodology followed in this report is adopted in accordance with the guidance documents:

- Carbon Trust, Cable Burial Risk Assessment (CBRA) Methodology (Ref. 26)
- Carbon trust, CBRA Application Guide (Ref. 27)
- DNV-GL Subsea Power Cables in Shallow Water (Ref. 28)

The methodology for the CBRA includes an assessment of the seabed conditions followed by the identification and quantitative assessment of the threats/hazards for the area. A probabilistic assessment has then been performed using Global Maritime's in-house GIS based software to assess the risk posed to the cable by external threats and a recommended burial depth has been established. This includes a full 3-dimensional approach to the probabilistic calculation of the threat of an anchor strike.

The CBRA method reviews an identified hazard based on its anticipated frequency and consequence. The combined outcome of frequency and consequence indicates whether risk is unacceptable, "As Low As Reasonably Practical" (ALARP) or Acceptable. This adheres to the criteria outlined in DNVGL-RP-F107 (Ref. 29). The risk matrix used, and definitions of probability and severity are shown in the below tables.

		Probability				
		A	B	C	D	E
Consequence	1					
	2					
	3					
	4					
	5					

Table 9: Risk Matrix

Probability	Definition
A (Very Unlikely)	Never Heard of in Industry
B (Unlikely)	Heard of in Industry
C (Possible)	Incident has been known to occur, but rarely
D (Likely)	Happens several times a year in Industry
E (Very Likely)	Happens several times a year at project location

Table 10: Probability Definitions

Consequence	Definition
1	Negligible Damage
2	Minor Damage / Exposure to other hazards
3	Localised Damage / No unplanned loss of capacity
4	Major Damage - replacement of small section / Unplanned loss of capacity
5	Extensive Damage – replacement of significant section of cable / Significant unplanned loss of capacity

Table 11: Consequence Definitions

4.2 Hazard Classification

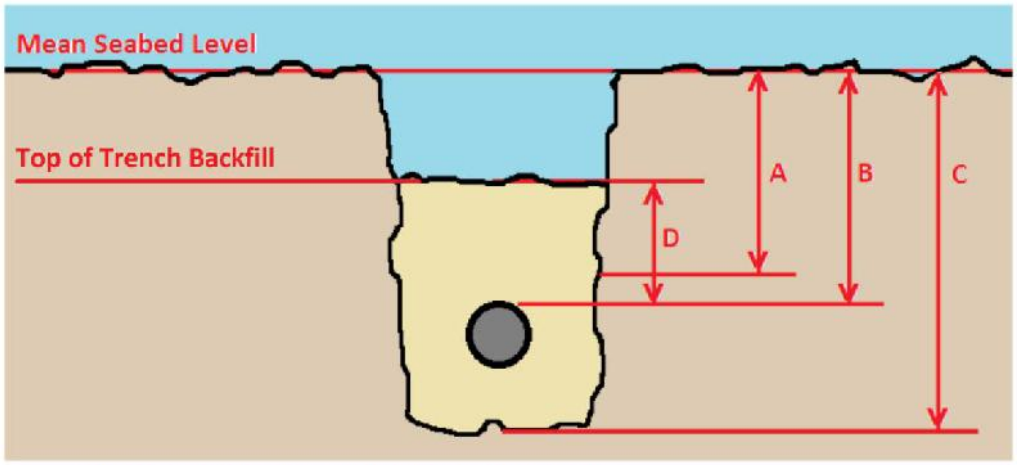
Hazards are classified as primary or secondary. Primary hazards are those that have a direct impact upon the cable and can cause damage and secondary hazards are those that do not damage the cable directly but can result in increased risk or susceptibility to damage from primary hazards.

An example of a primary hazard would be impact or snagging of the cable due to a ships anchor being deployed. An example of a secondary hazard would be seabed mobility

resulting in reduced cable burial cover or exposure, leaving the cable vulnerable to primary hazards.

4.3 Cable Burial – Carbon Trust Terminology

As presented in the methodology above, threat lines have been suggested for the identified site hazards for cable burial. These follow the information and terminology described in the Carbon Trust Guidance Documents (Ref. 27). Figure 20 provides an illustration and summary of the main abbreviations and terminology used for burial in this report. The Target DOL generally includes an installation tolerance (or safety allowance).



A Recommended Minimum Depth of Lowering
B Target Depth of Lowering
C Target Trench Depth
D Depth of Cover

Figure 20: Definition of Trench Parameters and Abbreviations

4.4 Hazard Identification and Assessment

4.4.1 Introduction and Risk Register

Data supplied and acquired from third parties has been assessed to develop a risk register (Appendix A), which has been compiled using probability and severity classification to evaluate the potential risks to export cables for both installation phases and the operational lifetime. The purpose of this exercise is to ensure that all hazards are identified and assessed and the risk to the ECR appropriately acknowledged, with initial indications on mitigations presented where possible. Identification of risks and hazards is also a critical element of CDM requirements.

The main hazards identified in the risk register are discussed in more detail below.Note that the Risk Register is considered a live document which will be updated throughout the life of the project and should be reviewed frequently.

4.4.2 Primary Hazards

4.4.2.1 Vessel Traffic

Vessel traffic is generally the most onerous anthropogenic risk to cables in terms of threat line depth (even if not the most likely to occur). The main hazard associated with vessel traffic is the deployment of an anchor in proximity to a cable leading to anchor strike. Anchor strike does not necessarily lead to cable damage though it is likely to occur if a cable is inadequately protected through burial to an appropriate depth. The risk of this hazard is associated with the type of vessel traffic, its density, and the frequency of transit in proximity to the cable or cables.

The vessel traffic density for 01/01/2022 to 28/03/2024 is shown for all vessel categories and sizes in Figure 21. Drawings visualising the spatial distribution of traffic densities for individual vessel categories are provided in Appendix B.1. Vessel traffic in this study is derived from as-reported AIS data for the above date range, modelled by Global Maritime to estimate migration of transit routes post-wind farm construction. Cargo and tanker vessels are expected to re-route around the wind farm to avoid the turbines once installed, so all AIS tracks for this category have been redistributed from the post-construction AIS data used for the CBRA probabilistic assessment. Remaining vessel activity is expected to maintain similar patterns of density and transit post-construction as pre-construction.

The post-construction vessel traffic was used to conduct the CBRA as this is more representative of traffic patterns during wind farm operation. Post-construction traffic modelling also adds in any service vessels for the windfarm expected to be additionally used for operations and maintenance throughout the lifetime of the Wind farm, as shown on Drawing 9 in Appendix B.1. An indicative WTG layout has been generated by GM and agreed by MOWL to provide an indication of the likely post-construction vessel traffic. Based on instruction from MOWL, the Port of Montrose is used as an indicative port for all O&M activity. Simulated AIS tracks from WTG to WTG and from the Port of Montrose to the wind farm site have been modelled, and a representative number of these have been included in the post-construction AIS dataset to account for service operation vessels, offshore supply vessels, survey research vessels, jack-ups, and offshore support/construction vessels for an average 2-year period.

The hazard to subsea cables from vessels is associated with the deployment of anchors either in designated anchorage zones (which should be avoided through routing) or in emergency situations that result in anchor deployment through mechanical failure or deployment without due care. The potential impact on the seabed and/or the resultant snagging of a deployed anchor can result in damage to a buried cable.

The vessel traffic across all the ECR is well distributed with a higher density of traffic hugging the north-east England coastline. All ECR route options cross main shipping lane that extends out of Newcastle in a south-easterly direction. Traffic is denser across the ECR in the southern section in a southeast to north-west direction. The marine traffic data can be further analysed and categorised into various vessel categories as follows:

- Cargo / Tanker Vessels
- Fishing Vessels
- Government Vessels
- Offshore Industry Vessels
- Passenger / Pleasure Vessels

- Port / Dredging Vessels

Figure 22 and Figure 23 show the density of cargo and fishing vessels which create the most traffic across the ECR options. Also present with lower densities are vessels in the categories 'Offshore industry', 'Passenger/Pleasure' and 'Port/Dredging'. Drawings representing these vessel categories are included in Appendix B.1.

AIS transmitters also provide a status of the vessels, as determined by the vessels themselves. Few vessels reported as 'engaged in fishing' (Figure 26), and none had the status 'at anchor', which suggests a reduced risk of impact associated with these activities; however this information relies on the vessel crews accurately updating their status, which is not necessarily always the case.

The main mitigation for vessel hazards (anchor strike) is typically burial beneath the identified threat line for a given return period/acceptable level of risk. The optimum burial depth is dependent on the results of the probabilistic risk assessment and cost of achieving the target burial depth. The method and results of the probabilistic assessment are discussed in section 4.6. Within the two-year period of the available AIS, cargo vessels are anchored outside of Seaham harbour (Figure 27),

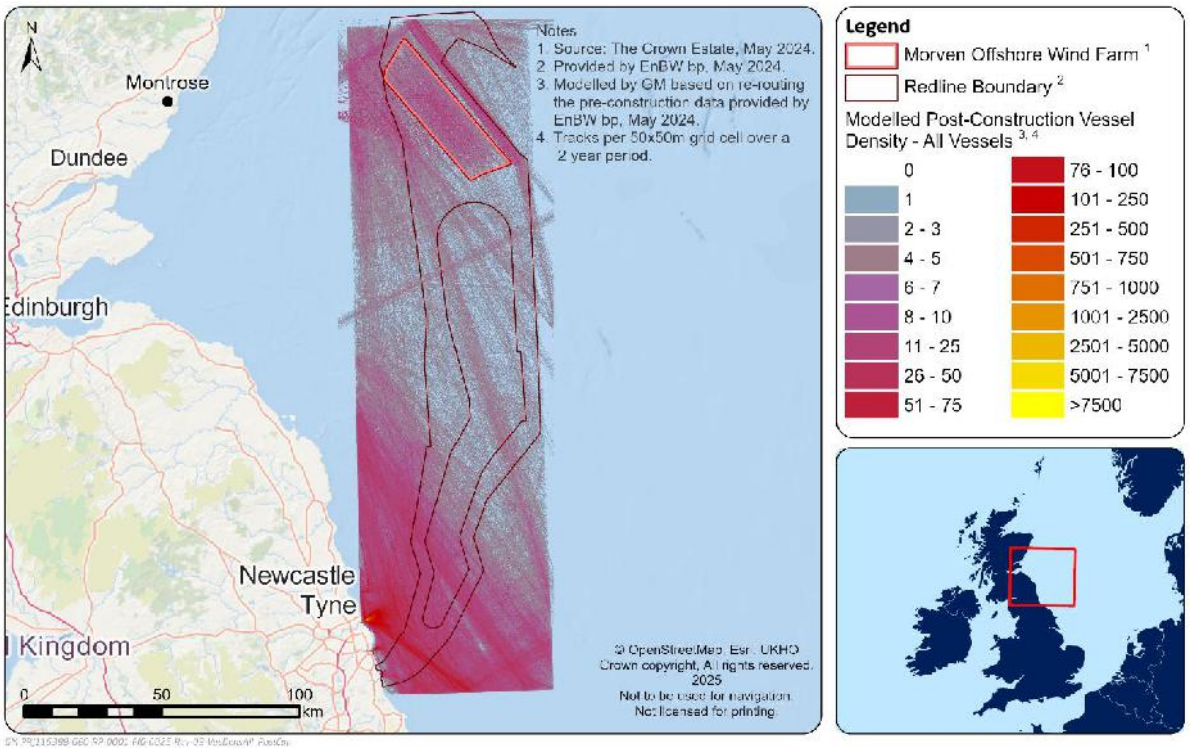


Figure 21: Post-Construction Vessel Traffic Density: All Vessels

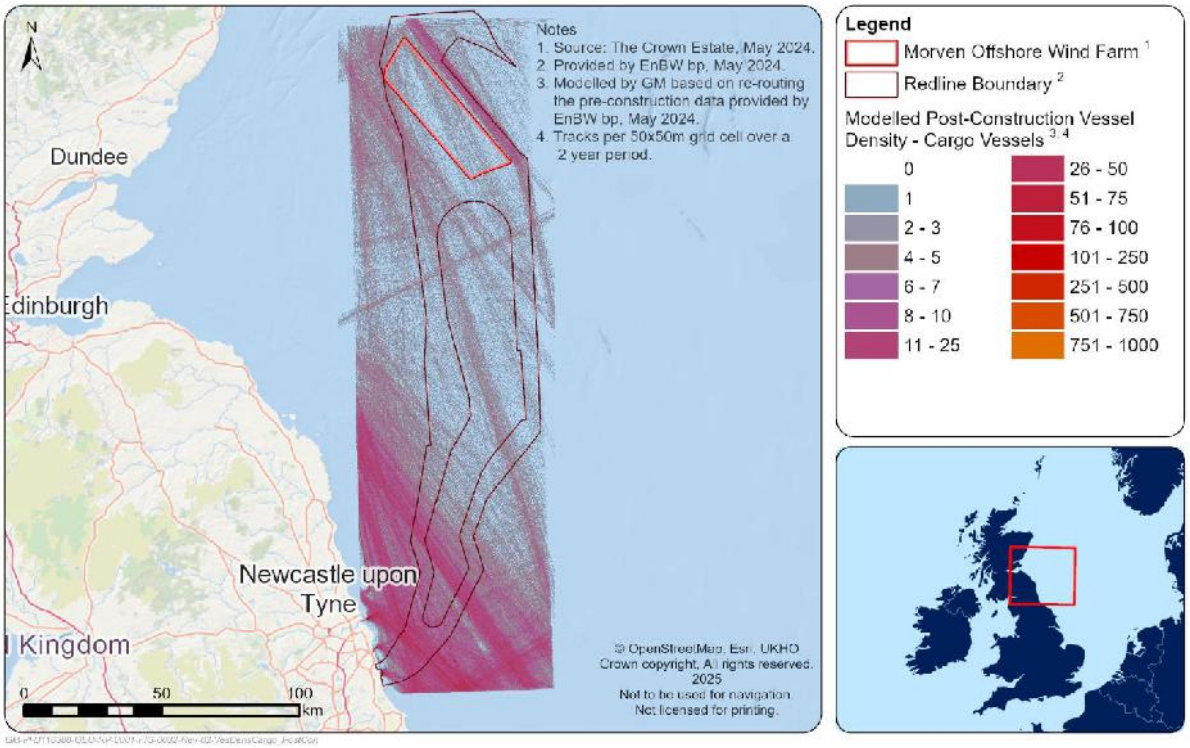


Figure 22: Post-Construction Vessel Traffic Density: Construction and Cargo

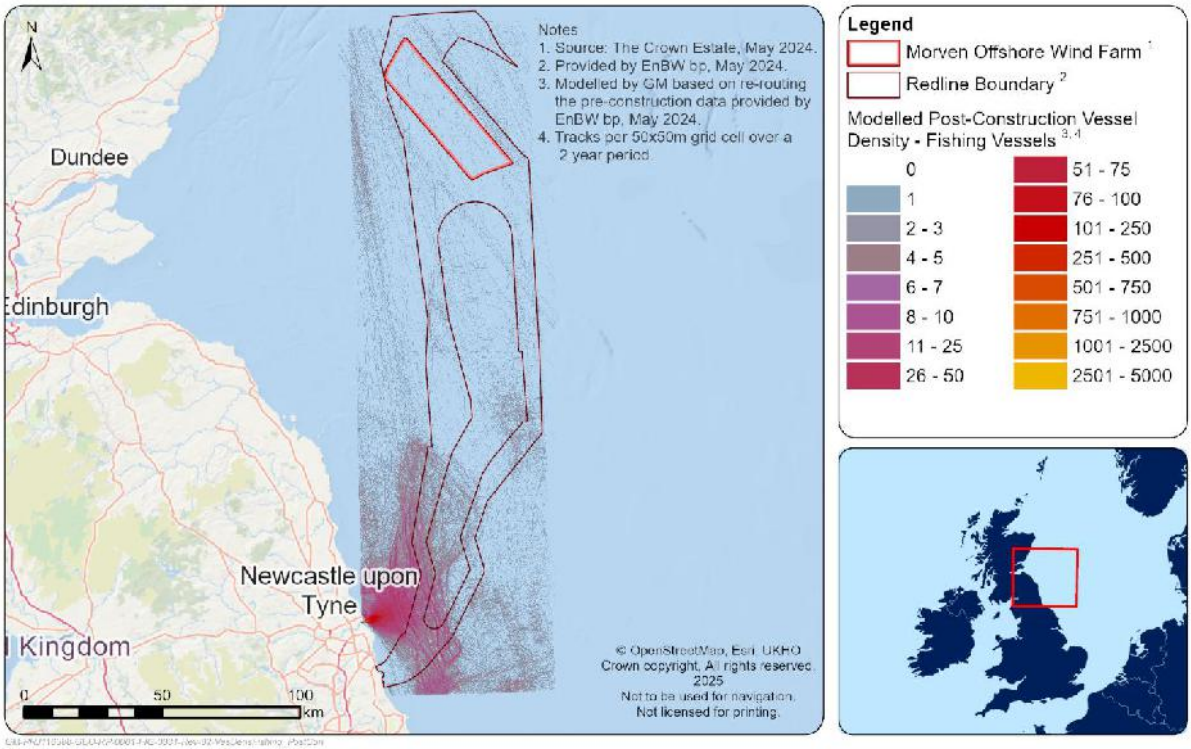


Figure 23: Post-Construction Vessel Traffic Density: Fishing

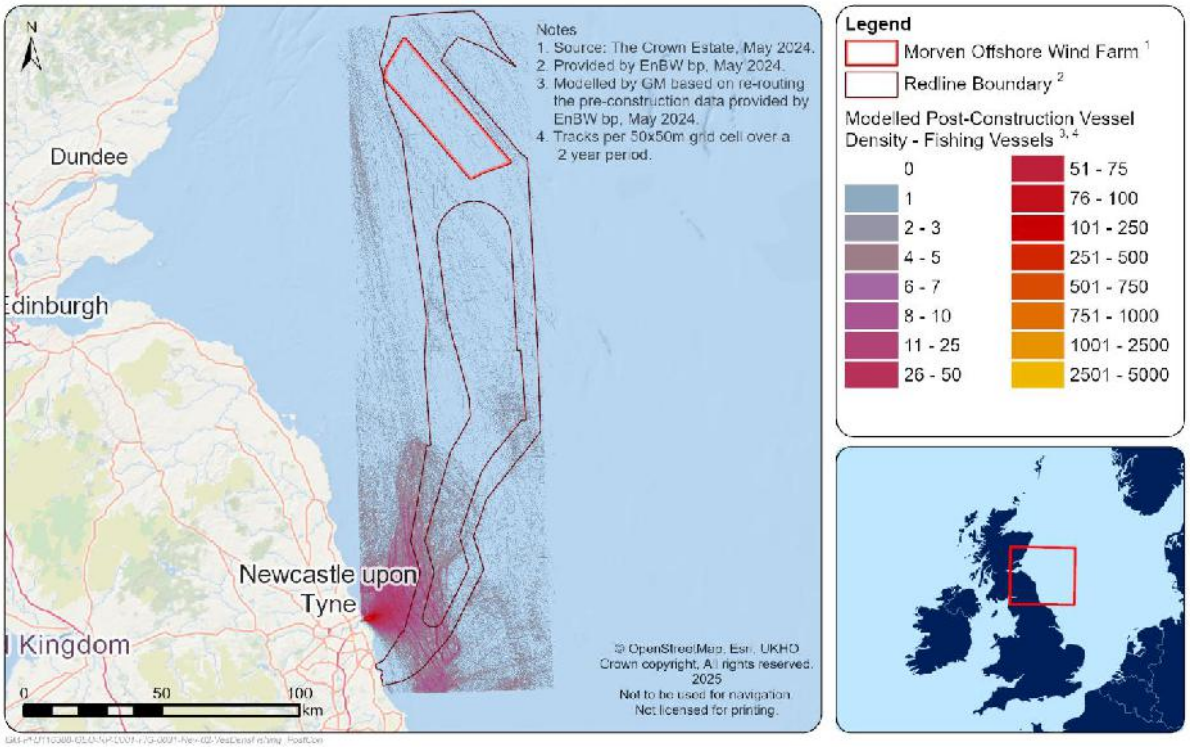


Figure 24: Post-Construction Vessel Traffic Density: Other/ Unknown

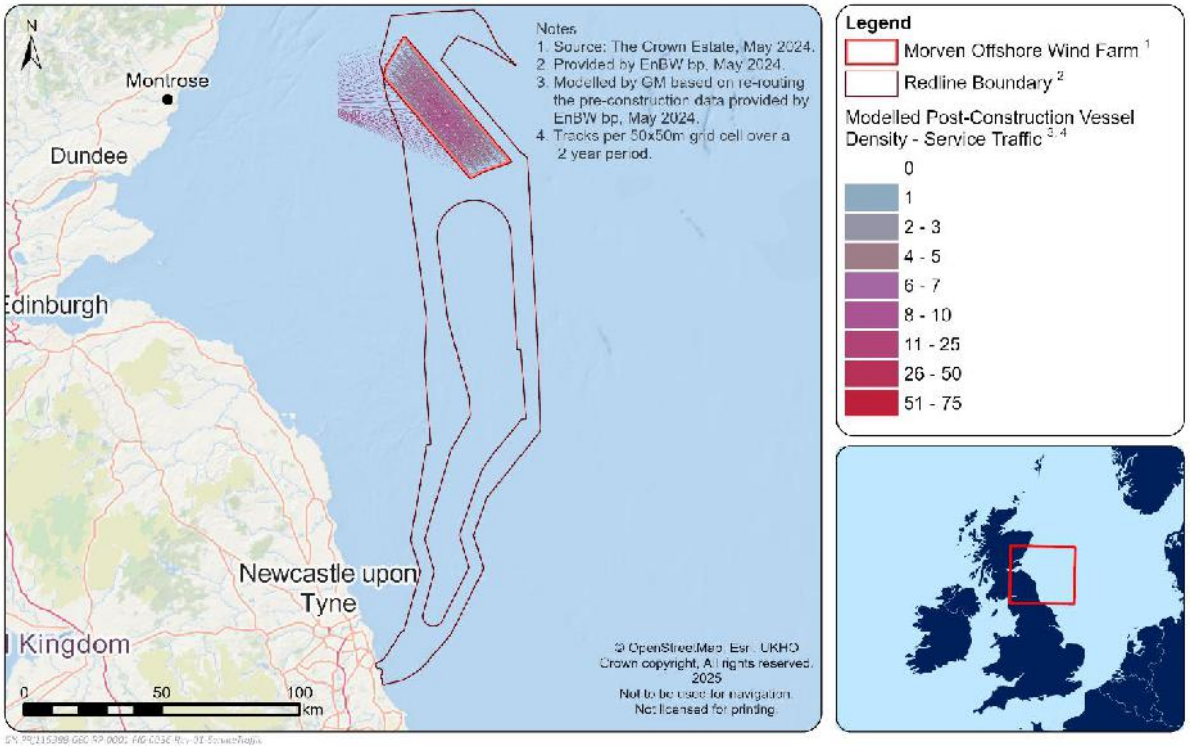


Figure 25: Post-Construction Vessel Traffic - Modelled Service Traffic

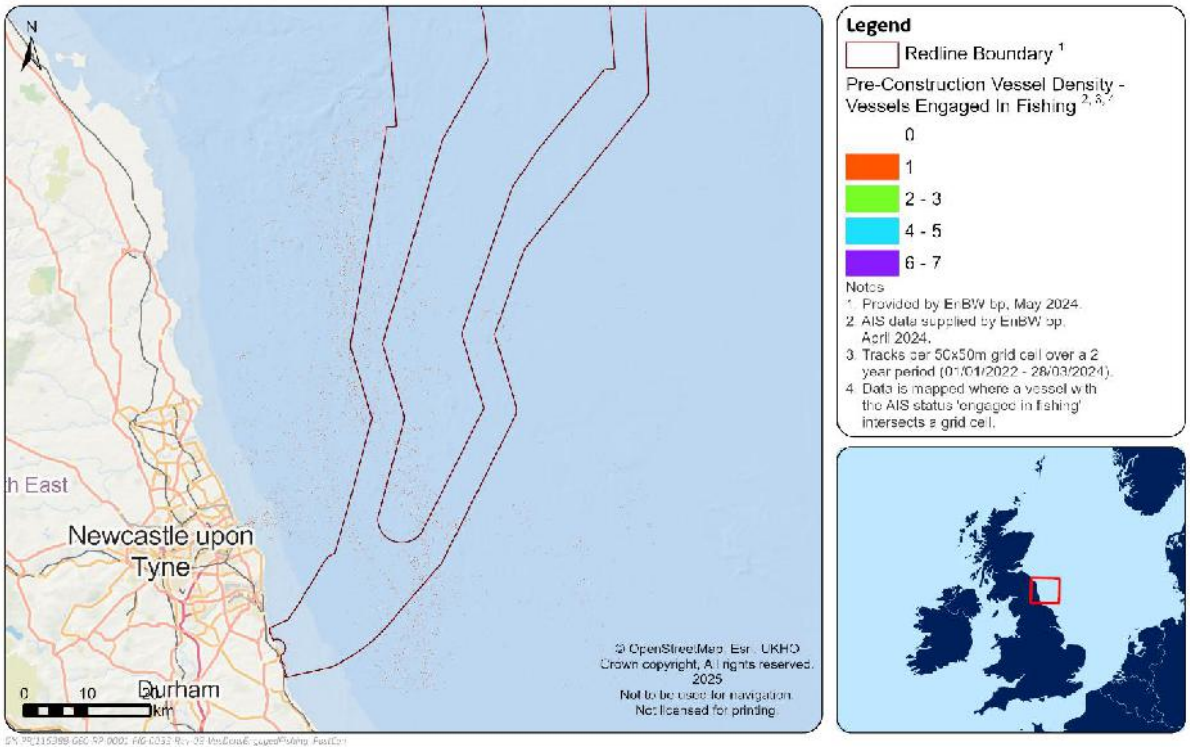


Figure 26: Vessels Engaged in Fishing

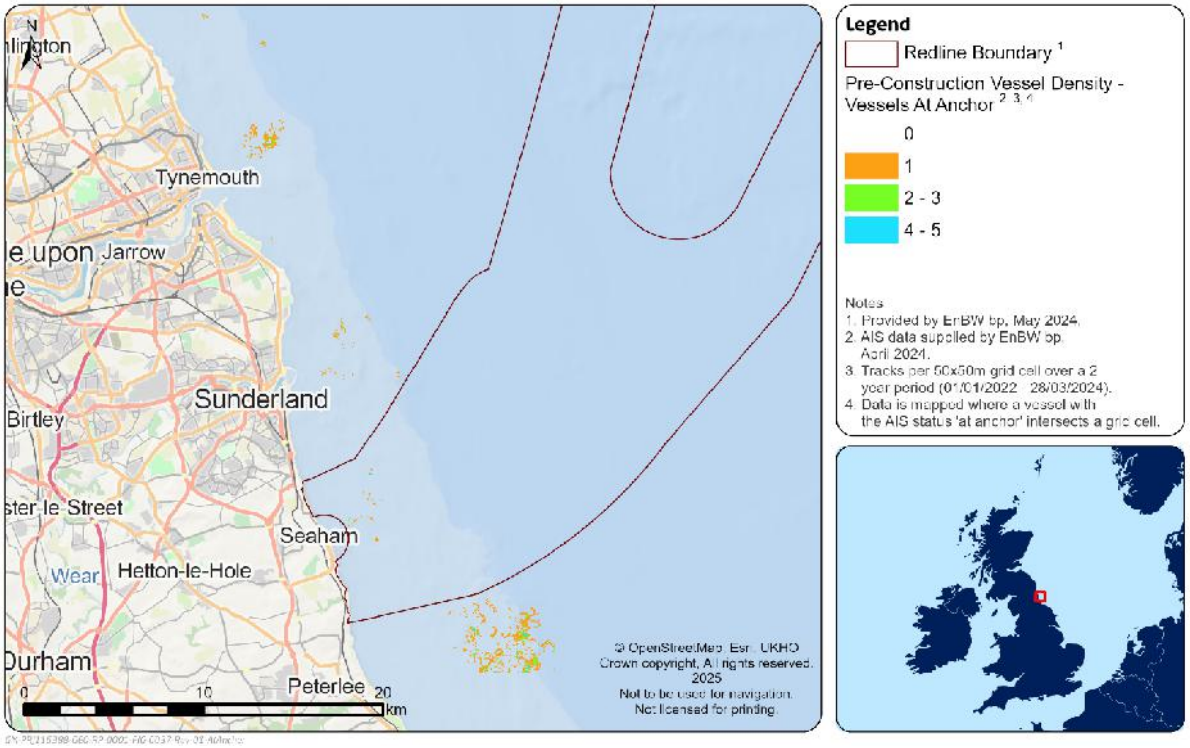


Figure 27: Vessels At Anchor

4.4.2.2 Fishing Activity

Commercial fishing is a hazard to subsea cables (even armoured cables) where fishing gear interacts with the seafloor, potentially resulting in damage due to impact or snagging. It should also be noted that a cable can pose a risk to the fishing vessels themselves if left on or close to the seabed, as small vessels can founder if snagged on a significant obstruction, of particular concern in areas of strong currents. For example, fishing vessels have been known to founder when trawl gear has become snagged on subsea infrastructure and attempts to free the gear have been unsuccessful.

As can be seen from the AIS data shown in Figure 23, fishing vessels do cross the ECR, though the density of these tracks is relatively low. Density of vessels with the navigational status 'Engaged in Fishing', appears to be extremely low across the site. However the results from the geophysical survey (Ref. 12) shows evidence of trawl marks and anchor scars within the ECR survey corridors. Therefore, it is clear that protection will still need to be implemented against the risk of damage through impact / snagging of bottom trawl gear with the cables. In the case of the identified fishing methods currently employed in the region the following threat line depth is considered reasonable below a non-mobile seabed:

- Fishing gear threat line depth in sand ~0.2m
- Fishing gear threat line depth in stiff clays ~0.1m

These values are in line with the Carbon Trust CBRA guidance (Ref. 12) which provides an estimate of maximum penetration of fishing bottom trawl equipment. It is noted that the risk of emergency anchor deployment described previously provides a greater threat line and is the governing case along the cable routes.

4.4.2.3 Stability/Fatigue

Surface laid cables are subject to loading from waves and currents and this could result in cable movement and migration across the seabed. Excessive movement on the seabed could cause abrasion and/or fatigue issues. Wave induced movements will be likely during storm activities. If the cable is unstable then abrasion can occur where unburied cable is migrating across the seabed and 'rubbing against' any hard granular material, like gravels, or outcropping rock, often causing significant damage.

Cable migration is also likely to increase the risk profile, as the cable movement is likely to cause a cable fault. It is also possible that the cable position will no longer be accurately identified on marine charts and this is likely to result in an increased risk from other primary hazards such as vessel anchors, fishing and construction activities. However, power cables such as the proposed are heavy and likely to have high friction with the seabed, therefore damage to the cable is more likely to occur than large displacements with suitable continued cable performance.

Whilst cable migration and fatigue may be issues for unburied cables, where a fatigue life of 20 years may be assumed in less energetic environments, experience indicates that minimal burial/embedment is usually required to ensure on-bottom stability. Therefore, where practical it is recommended that cable burial is planned unless not practical or proven to not be necessary with further in-depth analysis. If the cable is not to be buried due to outcropping rock or other factors, a more detailed cable protection strategy including the following is recommended:

- Micro-routing is undertaken to take advantage of any local features (gullies, ridges, depressions) to avoid free spans and shelter the cable where possible.
- On-bottom stability and fatigue assessments should be carried out to investigate the cable response and ascertain the likelihood for damage of the cable and the likely fatigue life under the loading regime.
- Plan appropriate mitigation methods i.e., pinning by anchoring or rock placement, additional internal stiffeners/armour, etc.

At minimum, shallow cable burial is recommended for the entirety of the export cable routes, regardless of the three line depth for a particular location, to ensure the cables are stable. Cable Protection Systems (CPS) may be required where burial of cable cannot be achieved due to hard ground conditions or bedrock or where the ECR crosses an existing asset and cable crossings will need to be constructed.

4.4.3 Secondary Hazards

4.4.3.1 Mobile Sediments

The Partrac report (Ref. 20) assess the site morphodynamics across all the ECR options. It is reported that the seabed is largely devoid of significant mobile bedforms. Isolated megaripple fields are observed across the ECR options however limited evidence of bedform migration exists. The seabed mobility and potential for morphological adjustment is considered to be low under the prevailing wave and tidal regimes. The data indicates that the seabed, on occasion is mobile and thus it is likely that low magnitude morphological adjustment at the seabed will occur through time associated with progressive changes to the seabed.

Tidally driven sand transport is not considered sufficiently pronounced; however, a long-term accretionary trend has been identified and reported in Ref. 20. This could potentially drive seabed elevation changes in the order of a few metres across the full extent of the development life of field.

A reference seabed level (RSBL) has been produced by Partrac and is used as the reference point for determining cable burial. Partrac define the RSBL as "the level broadly coincident with the trough of… bedforms for a given timestep bathymetry". In the available scenario, Partrac's RSBL is determined through site-specific bathymetric survey (Ref. 19) combined with six UKHO bathymetric DTMs surveyed between 1998 and 2018. Global Maritime have compared the RSBL to the most recent bathymetric survey data (XOcean 2023, Ref. 19) along all ECR options. The delta between RSBL and bathymetry has been classified as follows:

- Class 1 – 0 – 0.25 m
- Class 2 – 0.25 – 0.5 m
- Class 3 – 0.5 – 1.0 m
- Class 4 – 1.0 – 2.0 m
- Class 5 - >2.0 m

Table 12 below shows the percentage of route of the delta between RSBL and bathymetry within the 5 predefined classes. Figure 28 visualised an example of the delta distribution for the mid-section of the corridors, with the full route corridor presented on Drawing 2 in Appendix B.1. The RSBL presented shows areas where delta is >2m. In some instances these are in areas where Partrac note these are historical seabed features. Confirmation

as to whether these features are "active" and likely to be mobile should be made in future bathymetric surveys. Should active mobile features be determined to be present after repeating bathymetric surveys, a stable seabed level assessment should be undertaken, and the threat lines adjusted to be based on this new stable reference level.

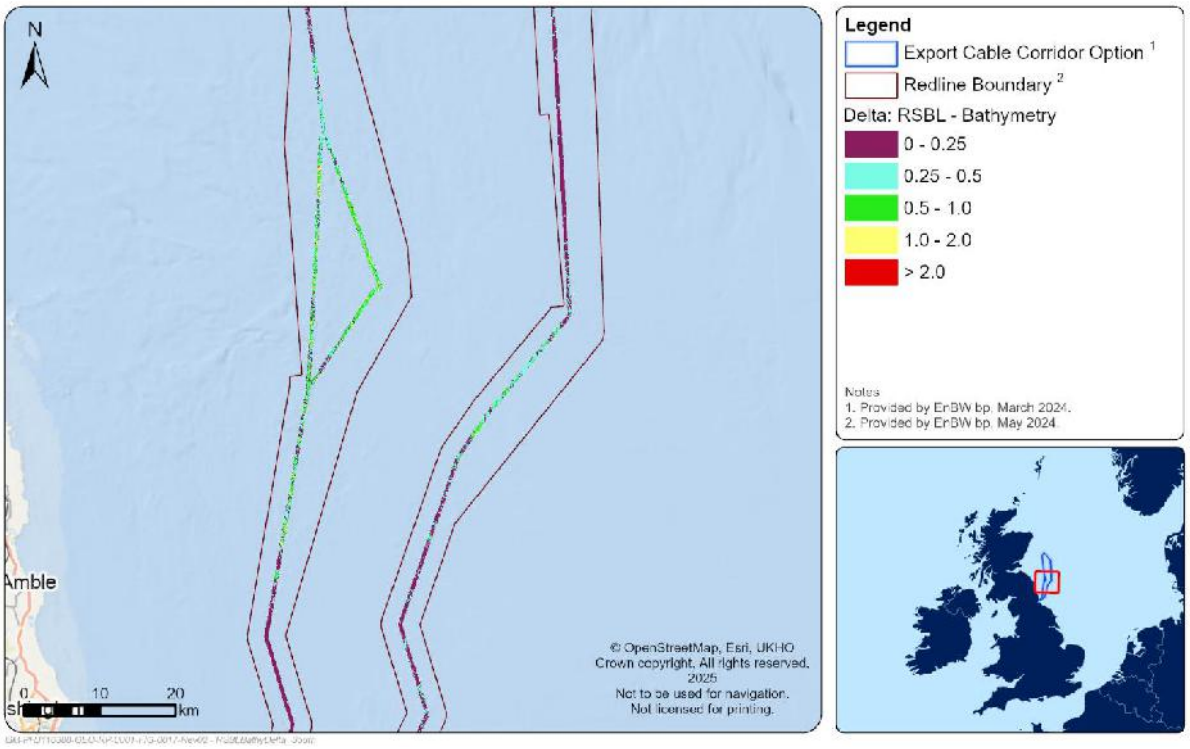


Figure 28: RSBL vs Bathy Example on mid-section

Cable ID	Class 1	Class 2	Class 3	Class 4	Class 5
A1	57.99%	28.91%	10.13%	2.73%	0.23%
A2	59.60%	28.37%	9.26%	2.56%	0.22%
A3	59.97%	27.77%	9.27%	2.77%	0.22%
B1	56.56%	27.55%	12.97%	2.75%	0.17%
B2	58.15%	26.98%	12.13%	2.58%	0.16%
B3	58.52%	26.40%	12.13%	2.79%	0.16%
C1	79.25%	17.08%	3.36%	0.29%	0.02%
C2	80.40%	16.46%	2.94%	0.18%	0.03%
C3	80.40%	16.39%	2.83%	0.37%	0.02%

Table 12: Route length % difference between RSBL and Bathymetry

The potential for seabed level change over the development life of could result in (deeper) burial of cables sections and/or the exposure/free spanning of previously buried sections, as the bedforms migrate. Therefore, the following should be considered:

- The performance of the cable when buried, confirming that there is not a risk of overheating at the possible burial depth due to the mobile sediments in this area.

- The increased risk of primary hazards such as fishing, anchoring and stability/fatigue due to mobility and exposure of the cable.
- It is recommended that an allowance be made for seabed level change where appropriate, with increased burial depth in areas of confirmed mobile features following further studies.
- It is also recommended that when further bathymetric surveys are performed, they are compared with the current bathymetry dataset for seabed migration.

4.4.3.2 Seismicity and Tectonics

Although not a region of high seismic activity, the risks posed to subsea cables in the northern and southern North Sea are not entirely insignificant. Seismic risk in the central North Sea – where MOWF is situated – is considered lower than both the north and south (Figure 29).

Any risks to subsea cables associated with seismic activity are typically related to secondary effects. Earthquakes can trigger submarine landslides and turbidity currents - powerful, fast-moving underwater flows of sediment - that can damage or displace cables. The North Sea has a history of such events, with the largest recorded earthquake in the region being the 1931 Dogger Bank earthquake, which had a magnitude of 6.1 (Ref. 30).

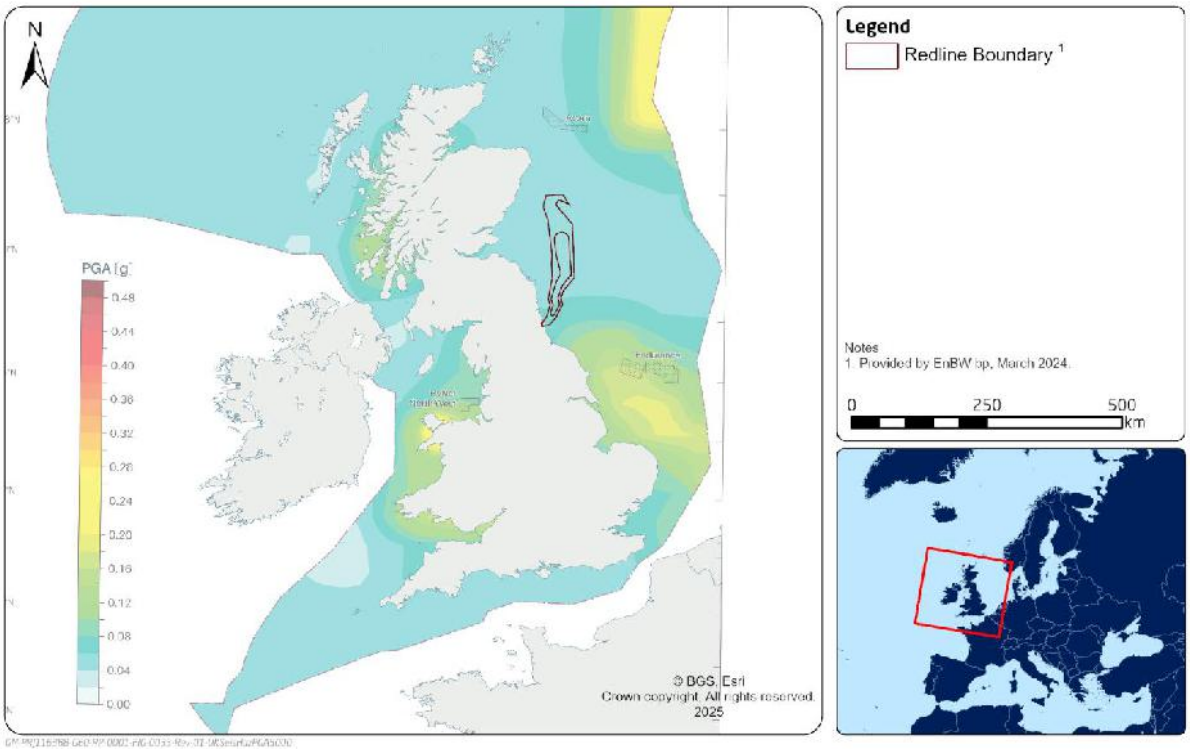


Figure 29: Peak Ground Acceleration (PGA) On Rock for a 5,000-Year Return Period (Modified from Ref. 31)

4.5 Probabilistic Risk of Anchor Strike

A probabilistic assessment of the ECR anchor strike risk due to the identified vessel activity has been performed following the carbon trust guidelines (Ref. 12) using Global Maritime's GIS based approach. This has been performed using the site AIS data which was adjusted to model the post-windfarm construction traffic.

This method evaluates the external threat to the cable by considering the amount of time vessels spend within a critical distance of the cable and the probability that a vessel might have an incident that requires the deployment of an anchor. The effect of water depth and bathymetric profile is considered very important and is included as a qualitative factor.

The calculation for the probability of a cable strike is given by the following formula:

$$P_{strike} = P_{traffic}\, P_{wd} \sum_{1}^{No.\ ships\ in\ Section} \frac{D_{ship}}{V_{ship} * 8760hrs\ per\ year}\, P_{incident}$$

Where:

$P_{traffic}$: Probability modifier based on the tolerable level of risk

P_{wd} : Probability modifier for nature and depth of seabed

V_{ship} : Ship speed (metre/hr)

D_{ship} : Distance travelled by ship in area under consideration (metre)

$P_{incident}$: Probability of incident occurring for that vessel size and type

$8760hrs$: Facture to annualise the results

Values for the above parameters are shown in the table below:

Parameter	Description / Comments	Value Used
$\boldsymbol{P_{traffic}}$	Probability modifier to determine acceptable level of risk. Indicates the percentage of vessels for which burial is required for protection. Conservative value used for initial assessment.	1
$\boldsymbol{P_{wd}}$	Indication of risk due to seabed profile and water depth. Values chosen as per the Carbon Trust guidelines.	See Table 14: P_{wd} Values According to Water Depth and Vessel DWT
$\boldsymbol{V_{ship}}$	Individual vessel speeds taken from AIS data when crossing cable, with a maximum speed of 2 knots	Various
$\boldsymbol{D_{ship}}$	Distance travelled by the anchor when deployed to exert its holding capacity and immobilise the vessel. Vessel outside of a distance equal to D_{ship} from the cable is not a hazard.	$D_{ship} = \frac{m * V_{ship}{}^2}{4 * UHC}$

	Calculated on vessel mass (m) taken as displacement and estimated Ultimate Holding Capacity (UHC) which is estimated for each individual vessel.	
$P_{incident}$	This is the probability of an incident occurring on the vessel which requires the deployment of an anchor. This is taken as the probability of engine failure in single engine tankers in the North Sea, as per DNV guideline DNV-RP-F107	$1.75x10^{-1}$ incidents per year per vessel

Table 13: Parameter Values of Probabilistic Risk Assessment

Vessel DWT (t)	Minimum Water Depth (m)			
	0-10	**10-30**	**30-50**	**>50**
0	1	0.1	0	0
2000	1	0.3	0	0
5000	1	0.5	0.1	0
20000	1	0.9	0.3	0.1

Table 14: P_{wd} Values According to Water Depth and Vessel DWT

The DWT field was blank in many of records within the two years of AIS data provided. This field was infilled based on an internal GM vessel database of vessels with known type, lengths and DWT. Data is infilled using a machine learning method based upon the correlation of length and DWT for each vessel type. Where the project AIS data has no length values, or a satisfactory length-DWT correlation cannot be established for the vessel type from the internal GM database, an average DWT for the vessel type is applied. It should be noted that infilled DWT values are estimates only, and actual DWT values should be acquired for future CBRA runs.

Possible anchor penetration can be estimated, based on the soil properties and the typical anchor sizes (fluke length) used by vessels categorised by their deadweight tonnage. As described within Section 3.5, the seabed within the cable route corridor area consists of primarily sands overlying clays of varying strengths, with some areas in the south-west along ECR route A and B exhibiting surficial clays. The penetrative ability of anchors of different sizes in these variable soil conditions must be considered in the CBRA. This is summarised in the below table for the vessels identified.

Vessel Deadweight (DWT, Te)	Maximum Anchor Fluke Length (m)	Anchor Penetration (m)		
		In Units S1, S2 & S3 (Sands)	In Unit C4 (Medium Strength Clay)	In Unit C5 & C6 (High & Very High Strength Clay)
1000	0.8	0.6	0.9	0.6
2000	0.9	0.7	1.0	0.7
5000	1.2	0.8	1.3	0.8
10000	1.3	1.0	1.5	0.9
20000	1.6	1.1	1.7	1.1
50000	1.9	1.4	2.1	1.3
100000	2.2	1.6	2.5	1.6
200000	2.6	1.8	2.9	1.8

Table 15: Anchor Penetration

The main mitigation for the hazard of anchor strike is generally burial beneath the identified threat line for a given return period / acceptable level of risk. This has been calculated in terms of a recommended depth of lowering across the lease area to sufficiently protect it to reduce the risk below acceptable levels. As such the recommended depth of lowering will vary across the site depending on the modelled traffic density and the seabed composition.

4.6 CBRA Results

The threat line depth based on modelled post-construction vessel density and seabed composition was produced for the whole of the export cable corridor. The threat line depth was interpreted to define recommended burial depths within zones of the export cable route to satisfy the risk requirement and minimise burial depth where possible to reduce installation costs through maximising tooling choice and reducing installation schedules.

The results for the site are summarised in Table 17. Figure 30 to Figure 32, along with drawings in Appendix B.1, show the calculated P_{strike} spatially across all ECR options. Spatial distribution of P_{strike} was used to define the results in Table 13, which details the recommended depth of lowering for the ECR options, and the updated CBRA analysis results associated with these burial depths. The strike return period and corresponding DNV risk category (Ref. 29) is also stated for each zone. The strike return period is equal to $1/P_{strike}$. As P_{strike} is annualised, this gives the theoretical period in years between anchor strikes on the cable based on the probabilistic CBRA calculation, i.e., the number of years statistically within which one anchor strike will occur. When considering the risk and required depth of lowering, it is important to consider what risk profile for the cables is considered acceptable. For export cables, it can be considered that a risk return period of

greater than 10,000 years is suitable for each cable string, where a strike in that period will, as a worst case, prevent transmission of electricity for that cable only.

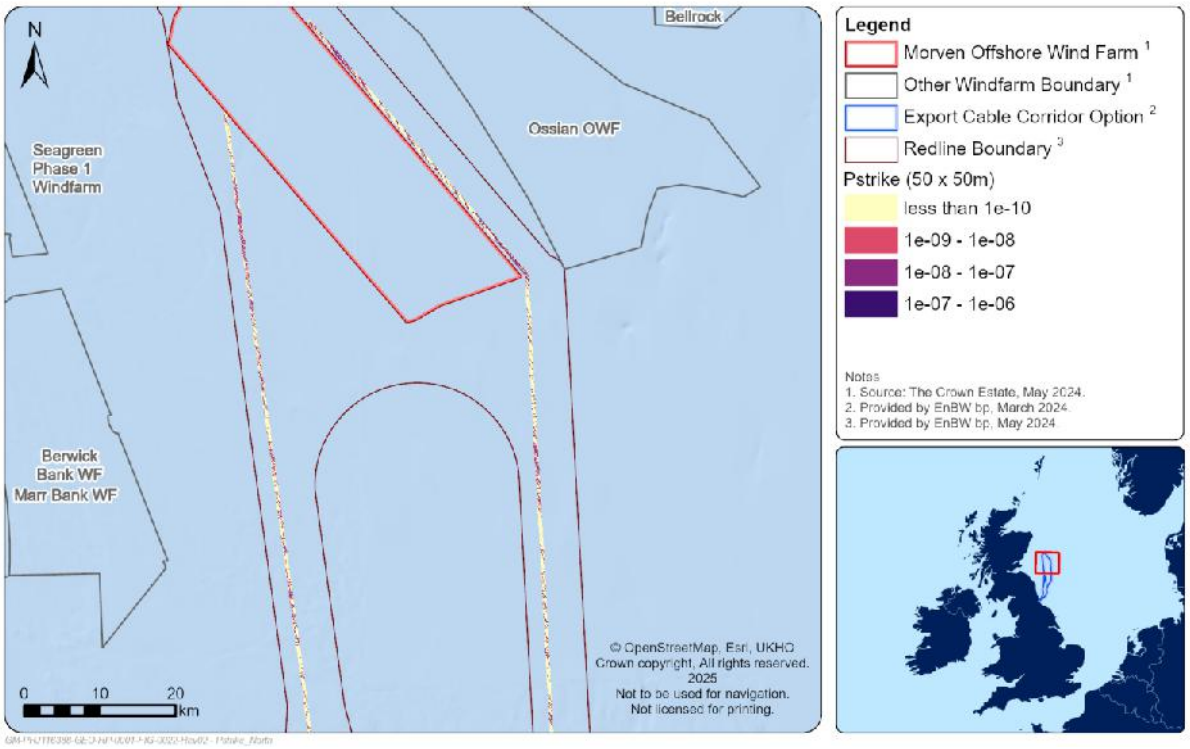


Figure 30: Pstrike at seabed surface (per 50m x 50m cell) – North Section

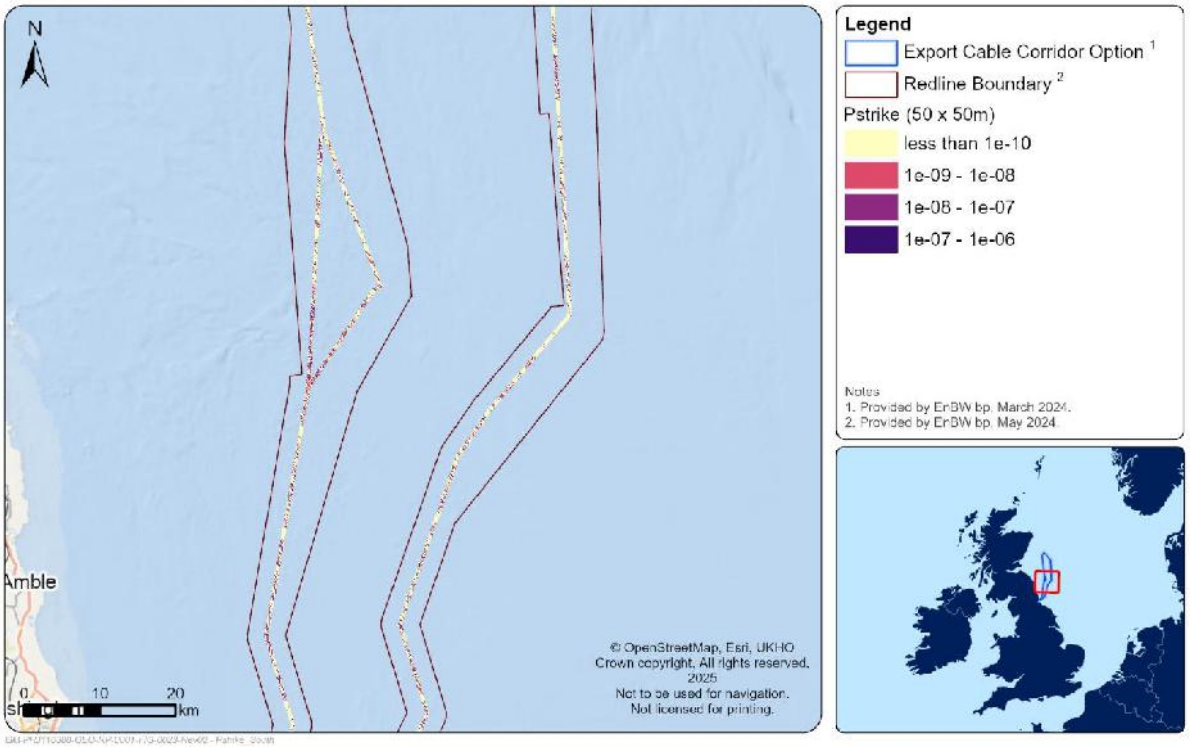


Figure 31: Pstrike at seabed surface (per 50m x 50m cell) – Mid-Section

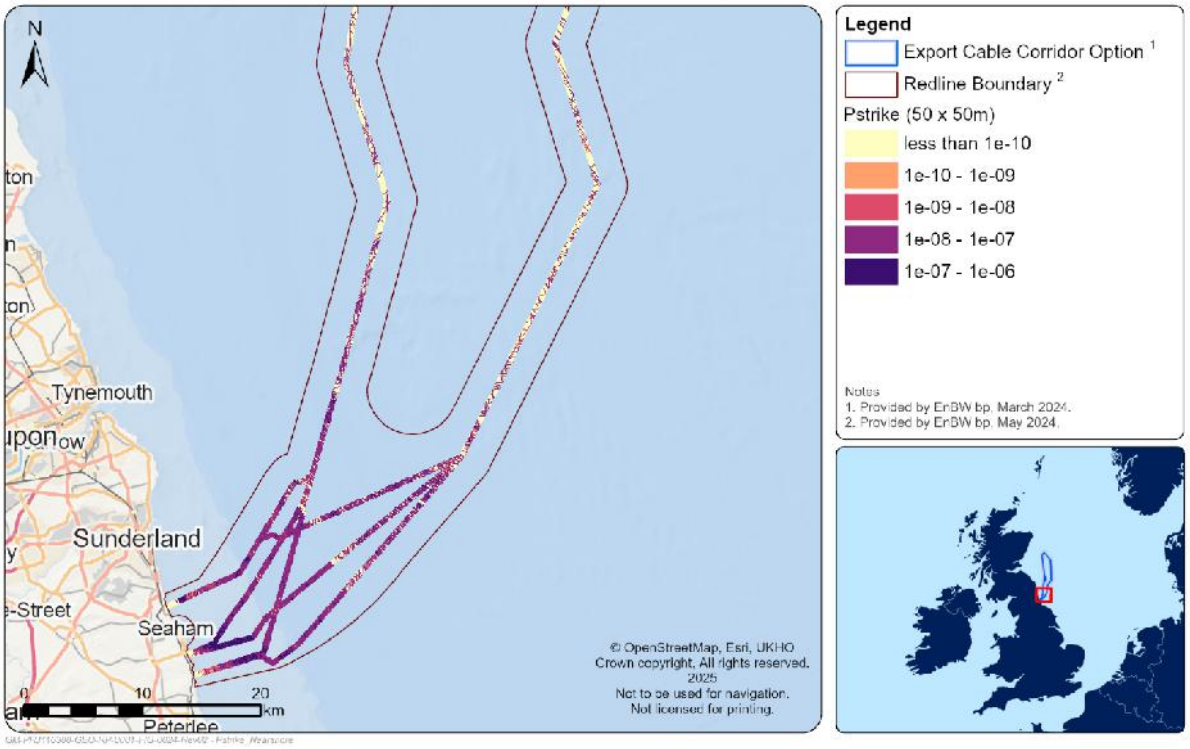


Figure 32: Pstrike at seabed surface (per 50m x 50m cell) – South Section

DNV Risk Category	P_{Strike}	Return Period (years)
1	0.00001	100,000+
2	0.0001	10,000 to 100,000
3	0.001	1,000 to 10,000
4	1	1 to 1,000

Table 16: DNV Risk Categories

Cable ID	Route Length (km)	Recommended Depth of Burial (m)	Return Period (years)	DNV Category
A1	214.43	0.5	21,812	2
A2	216.12	0.5	16,915	2
A3	218.84	0.5	17,224	2
B1	218.55	0.5	22,117	2
B2	220.24	0.5	17,099	2
B3	222.95	0.5	17,386	2
C1	253.37	0.5	16,981	2
C2	253.82	0.5	15,482	2
C3	255.34	0.5	14,718	2

Table 17: CBRA Results

The results of the CBRA have allowed the determination of suitable target depth of lowering along all ECR options. The outcome of the analysis has shown that no individual sections of the cables, when categorised by the recommended DOL, have a DNV risk category above 2 (equivalent to the probability of the cable being struck by an anchor being from 10,000+ years). There is no standard of what risk level is acceptable; this is down to the developer's appetite to risk, and the lowering of costs during the installation phase, but typically across the industry having a risk of DNV Category 2 is considered appropriate for export cable route sections.

The risk levels are based upon oil and gas assets and the implications which come from failure of those assets, including environmental etc. The DNV categories are commonly discussed to be considered onerous and therefore DNV Category 2 for the cumulative risk profile of ECR, is considered acceptable, although this should be confirmed by the developer. Further reductions in risk, though not likely to be necessary, can be found with increased burial depths in local sections of the ECR options.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Global Maritime, as part of the Morven OWF Export Cable Route options scope of work have conducted a review of the site conditions within all export cable route options, along with a Cable Burial Risk Assessment (CBRA) and Burial Assessment Study (BAS).

The site conditions were assessed to determine the anticipated seabed conditions along the export cable routes. Surficial SAND is dominant along most of the routes within soil layer 1. Low strength CLAY is more prevalent in route options A & B compared to C. All routes have CLAY soil within soil layer 2 with increased variability in clay strength throughout the route. Bedrock is present at surface along route C. All routes have bedrock within the nearshore approach to landfall.

Seabed features along the ECR options have been reviewed and considered when presenting a suitable depth of lowering from RSBL. Boulder fields and sand waves were identified; however it is recommended that future survey works allow for boulder identification and comparison with historical datasets to assess any potential sand wave migration.

Global Maritime's CBRA method was applied with modelled post-construction vessel traffic to analyse the anchor strike risks to the cable and propose a target depth of lowering from RSBL along each cable route to minimise the risk to acceptable levels whilst also maintaining practical burial requirements along each ECR. The depth of lowing values and risk profile for each cable route is 0.5m from RSBL and is considered sufficient to minimise the risk of anchor strike to an acceptable level in line with DNV Category 2.

5.2 Recommendations for Further Work

Throughout the report, various recommendations for further work or items to be included within future work scopes have been made These are summarised for clarity below:

- A detailed AIS data assessment should be made to infill the null DWT values present in the current AIS dataset. This will allow for a more accurate assessment of anchor penetration risk.
- When further bathymetry data is available throughout the project, this should be used to assess seabed mobility, though comparison with previous datasets and used to calculate updated non-mobile reference seabed level. This should be used as the reference elevation for depth of lowering values. This will also enable understanding of any seabed mobility and topics such as sand wave migration.

APPENDICES

APPENDIX A GEOTECHNICAL RISK REGISTER

GEOHAZARD & GEOTECHNICAL RISK Register (GRR) - Cables

Project Number:	**PRJ116388**		**Project Name:**	**Morven Offshore Wind Farm Export Cable Route Options**	
GRR Review Date:	**13/08/2025**		**Project Manager:**	**Emma Lee**	

				Risk Evaluation				Risk Evaluation		
Ref.	**Hazard**	**Hazard Details**	**Hazard Location**	**Inherent Risk Severity**	**Inherent Risk Probability**	**Inherent Risk Level**	**Control Measures**	**Residual Risk Severity**	**Residual Risk Probability**	**Residual Risk Level**
Cable Installation	**PRJ116388**									
1	Bedrock Outcropping at Seabed	Presence of outcropping rock can be challenging to perform cable burial or protection. Trenchability along those areas is highly dependable on the geotechnical parameters of the rock and cables might be not sufficiently protected if targeted burial depths are not achieved. Exposed cables have increased risks of external threats.	Llikely to be encountered at all landfall locations and is reported within ECR Route option C.	3	E	H	At present, geotechnical sampling and geophysical data suggests subcropping bedrock within the target burial depth and to seabed surface is likely to be encountered at all landfall locations and is reported within ECR Route option C. No outcropping bedrock is reported at surface on Route options A & B, further geotechnical survey along the selected export cable routes can confirm if the route is clear of shallow subcropping bedrock. Further testing of rock is required to undeerstand likelihood of burial or requirements for external protection. Risk to be controlled through avoidance through routing, burial through methods such as mechanical cutting, or where not possible, externally protecting the cables through means such as rock placement, mattresses or cable protection systems.	2	E	M
2	Hard Soils Within Burial Profile	Presence of high-strength clays can be challenging for cable burial and protection. Trenchability along those areas is highly dependable on the geotechnical parameters of the soils and cables might be not sufficiently protected if targeted burial depths are not achieved. Exposed cables have increased risks to internal and external threats.	Localised at the centre of offshore routes. Route A/B KP 120 - 180, Route C KP100 - 160	3	D	M	Detailed route specific assessment of the geotechnical parameters of the tertiary soil units is recommended, in order to understand the burial feasibility. ECR route selection has considered strength of CLAY material within target burial depth. The recommended burial strategy for preferred route option uses jet trenching and notes jet trencher feasibility in hard Clay soils. Alternative protection methods such as rock dumping or concrete mattresses might be required should final route selection be within high strength CLAYs. At present it is avoided where possible.	3	C	M
3	Boulders at and within Seabed	Boulders of indurated and cemented material derived from the underlying geological units. Boulders create obstructions for trenching and installation activities. Buried boulders can cause reduced burial.	Prevelant across the offshore sections, particulary Route C KP 35 - 64 and Route A/B KP 92 - 140	4	E	H	Detailed, high resolution bathymetric and side scan sonar survey. Sympathetic routing design, resilient trenching methods, boulder clearance campaigns ahead of installation.	2	D	M

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				Risk Evaluation				Risk Evaluation		
Ref.	Hazard	Hazard Details	Hazard Location	Inherent Risk Severity	Inherent Risk Probability	Inherent Risk Level	Control Measures	Residual Risk Severity	Residual Risk Probability	Residual Risk Level
4	Soft Soils at and within Seabed	Presence of soft, unconsolidated soils can cause issues to cable installation. Soft soils can cause trencher sinkage and less efficient trenching if not planned for.	Southern half of offshore routes, prevelant more on western route (A/B)	3	D	M	Detailed installation engineering examining trencher types, bearing pressures and means of reducing bearing pressure if necessary. Trencher slection, or modification through additional buoyancy if required.	1	C	L
5	Irregular Seabed	Presence of irregular seabed can cause issues with trencher traction and progress, also reduced burial where trencher tools pull out of seabed.	Seabed slopes steeper and more prevalent around landall	3	C	M	Detailed installation engineering examining routing, trencher types, utilise suitable trencher.	2	B	L
6	Gravel Reduces Depth of Lowering	Gravels present within seabed soils, or even flints within chalk, may not be fully removed from trench, limiting the depth to which lowering can occur.	Gravel found in Holocene unit within geotechnical samples across the corridor options	3	C	M	Evaluate detailed geotechnical and geophysical survey. Account for risk with increased trench depth and trenching methods to maximise suspension and eduction.	3	B	M
7	Dense Sands across site	Dense sands can greatly reduce progress rates	Dense sands present within Forth Formation	3	D	M	Jet trenching would be preferred technical solution where dense SANDs present, however if cable plough is chosen for cable burial, ensure the plough has jetting assistance to fluidise sands and increase progress rates.	2	C	M
8	Organic Material within Burial Profile	Organic materials in soil can reduce jet trenching performance. Organic material (e.g. Peat) is less easily fluidised than sand. Fibrous nature challanging for jetting swords.	Not found during testing	1	B	L	Interrogation of geotechncial samples, surficial sediments and sub-bottom data to ensure avoidance of any organic material depositis within the corridor.	1	B	L
9	Shells and shell fragments reducing Depth of Lowering	Shells and shell fragments, may behave similarly to gravel, limiting the depth to which lowering can occur	Shell fragments present within Holocene unit	3	C	M	Acquire and evaluate existing and further geotechncial data to assess the shell content in the seabed and how likely it will affect jetting. Account for risk with increased trench depth and trenching methods to maximise suspension and eduction.	3	B	M
10	Wrecks	Several wrecks are observed on the seafloor, majority within the landfall area. Archaeologically sensitive areas such are wrecks designated as war graves.	Four wrecks present within RLB, located between KP 0 - KP 62	3	D	M	Locate during survey and apply hard constraint around known location when performing rout engineering for the cables.	3	A	L
11	Existing infrastructure	Existing infrastructure in the area comprises of other wind farm developments and oil and gas infrastructure.	Cable crossings shown on Alignment charts	2	E	M	Locate during survey and apply appropriate crossing design and asset separation offsets. Exisiting infrastructure locations are know and recorded on their relevant dataset platforms.	2	B	L

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				Risk Evaluation				Risk Evaluation		
Ref.	Hazard	Hazard Details	Hazard Location	Inherent Risk Severity	Inherent Risk Probability	Inherent Risk Level	Control Measures	Residual Risk Severity	Residual Risk Probability	Residual Risk Level
12	UXO and MOD Firing Ranges	UXO within the site area can be hit and explode damaging the tools and orvessels. Large explosions can cause further damage and catastrophe. As a minimum, UXO if not properly accounted for and found during survey can slow down works if found during the installation campaign	Risk present across all cable corridor options until pUXO assessment carried out	4	B	M	Appropriate survey for ALARP certification of UXO risk is required, as well as micro-routing where applicable to avoid if required.	2	A	L
13	Disposal Ground	Areas of disposal of material	Nearshore area of all 3 routes	2	B	L	Designated disposal ground within the nearshore area will be taken into consideration during route engineering.	1	B	L
14	Moraine ridges	Moraine ridges are elongate topographic highs commonly observed on formerly glaciated margins. They may form potential route engineering constraints due to the associated coarse-grained sediments, mixture of winnowed sand, gravel, cobbles and boulders.	Ridges found across all corridor options with implications discussed though hazards apparent in the ridges (I.e. gravels, boulders etc)	5	C	H	Avoidance as much as possible through survey of gravels and boulders, etc and micro-routing, and selection of the appropriate trenching tool	5	B	M
15	Grounding zone wedges	Grounding zone wedges (GZW) are low angle, asymmetric sedimentary depocentres which form through the rapid accumulation of glaciogenic debris at the grounding zone of marine-terminating ice sheets. They comprise of coarse sediments, mixtures of winnowed sand, gravel, cobbles and boulders that may form potential geohazards to cable routing and installation.	Nearshore area of all 3 routes with implications discussed though hazards apparent in the ridges (I.e. gravels, boulders etc)	5	C	H	Avoidance as much as possible through survey of gravels and boulders, etc and micro-routing, and selection of the appropriate trenching tool	5	B	M

GEOHAZARD & GEOTECHNICAL RISK Register (GRR) - Cables

Project Number:	PRJ116388		Project Name:	Morven Offshore Wind Farm Export Cable Route Options
GRR Review Date:	13/08/2025		Project Manager:	Emma Lee

				Risk Evaluation				Risk Evaluation		
Ref.	Hazard	Hazard Details	Hazard Location	Inherent Risk Severity	Inherent Risk Probability	Inherent Risk Level	Control Measures	Residual Risk Severity	Residual Risk Probability	Residual Risk Level
Cable Operation										
1	Shipping	Ships can cause direct damage to exposed or insufficiently buried or protected cables by deploying anchors either deliberately (in case of anchorages) or accidentally over / next to a cable. Direct cable strike or more likely snagging of cable can cause damage to cable (and potentially the vessel).	Risk present across all cable corridor options	2	C	M	Probabilistic assessment of shipping and estimation of likely anchor penetration depth relative to seabed geology and shipping activity. Conservative approach to be taken with regard to unknown factors (e.g. number of smaller vessels without AIS). Risk is inherently lower for array cables as they are within the wind farm boundary. Determination of appropriate cable burial depths to provide adequate protection through performing the CBRA and detailed CBRA when more data is availabel throught project	2	B	L
2	Fishing	Fishing activities although not prevalent in the project area can result in direct damage to exposed or insufficiently buried cables by fishing gear snagging on the cable. Also (greater) risk to the fishing vessel in the event of a snagging incident. Fishing vessels account for a proportion of the traffic in the area.	Risk present across all cable corridor options	2	C	M	Assessment of likely fishing gear penetration based on identified fishing types relative to seabed geology and recommendation of burial to sufficient depth to afford adequate protection. Ongoing monitoring of fishing activity and methods as part of IMR regime. Identification of new cables on nautical charts / fishermen awareness initiatives.	2	B	L
3	Fishing - future variations in equipment	Fishing methods and equipment could vary with time resulting in increased risk to the cables.	Risk present across all cable corridor options	2	C	M	Ongoing monitoring of fishing activity and methods as part of IMR regime. The risk to the cables should be reassessed if there is a significant change in fishing activities which results in greater penetration of fishing equipment into the seabed. If necessary, mitigation actions to be taken (deeper burial, rock dump, fishing exclusion zones, etc.). Given the increased vessel running costs of deeper penetrating fishing gear (higher towing force), increase in this factor is considered unlikely, however it is possible that the locations of fishing grounds will change in future.	2	B	L
4	On-bottom Stability	Water depth and metocean conditions influence cable on bottom stability (abrasion / fatigue effects on surface laid cables, which could be exacerbated by the uneven seabed surface in areas of outcropping rock or sand waves).	Risk present across all cable corridor options, increased at nearshore where outcropping bedrock is present	2	B	L	Cables are planned to be buried for the entirety of the route. Where burial may not be possible, and alternative method of cable protection is to be considered.	2	A	L

GEOHAZARD & GEOTECHNICAL RISK Register (GRR) - Cables

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				Risk Evaluation				**Risk Evaluation**			
Ref.	**Hazard**	**Hazard Details**	**Hazard Location**	**Inherent Risk Severity**	**Inherent Risk Probability**	**Inherent Risk Level**	**Control Measures**	**Residual Risk Severity**	**Residual Risk Probability**	**Residual Risk Level**
5	Dredging / Dumping	Dredging activity can result in direct damage to cables as well as exposure of buried cables or reduction in burial, increasing risk to primary hazards such as shipping or fishing. Over-burial by dumping, can result in exceeding cable thermal / physical design parameters.	Spoil dumping ground present at central landfall location. No dredging licenses currently in operation	2	B	L	Consultation with dredging licence holders, as required. Identification of new cables on nautical charts / implementation of exclusion zones for dredging / dumping activity.	2	A	L
6	Sediment Mobility	Mobile sediments can cause reduced burial of cables and increase siceptibility to other third party threats such as fishing and shipping, or expose the cable causing free spans or stability issues.	Risk present across all cable corridor options	2	D	M	A full study of seabed mobility with an RSBL (already included) should be understaken from repeat datasets with the target burial depths accounting for the mobility, and highly mobile areas avoided through routing.	2	B	L
7	Cable Thermal Dissipation	Cables buried within unfavourable thermally resistant soil, and to excessive burial depths may experience otherheating issues.	Typically where the cable will be buried in clay units, prevelent across all areas of all routes.	3	B	M	Burial depths minimised where possible to ensure that while maintining adequate protection, the cables are still located at a practical depth to perform thermally. Cable rating studies should be performed based on the measured thermal resistivity of the soils along the cable route, and at the design depths to ensure no overheating.	2	B	L
8	Soluble Rock	The landfall approach and nearshore section of the ECC is underlain by Permian strata of the Zechstein Group, comprising, evaporite, dolostone, limestone and mudstone. Evaporite, dolostone and limestone are expected to be soluble, and dissolution of evaporites could be expected to occur under conditions of circulating groundwater within asset lifecycle. Groundwater conditions in the landfall or shore approach are expected to be hydrostatic with tidal influence rather than flowing / circulating, and therefore the primary geo-constraint is expected to be cavities formed through dissolution in the geological past, formed during subaerial exposure of the Zechstein Group during the Jurassic.	Landfall approach nearshore section of all routes	1	C	L	Monitoring over the lifetime of the project should be carried out (intermittent MBES and /or DTS/DAS) with any large changes in seabed level or changes in stress in cable	1	C	L

GEOHAZARD & GEOTECHNICAL RISK Register (GRR) - Cables

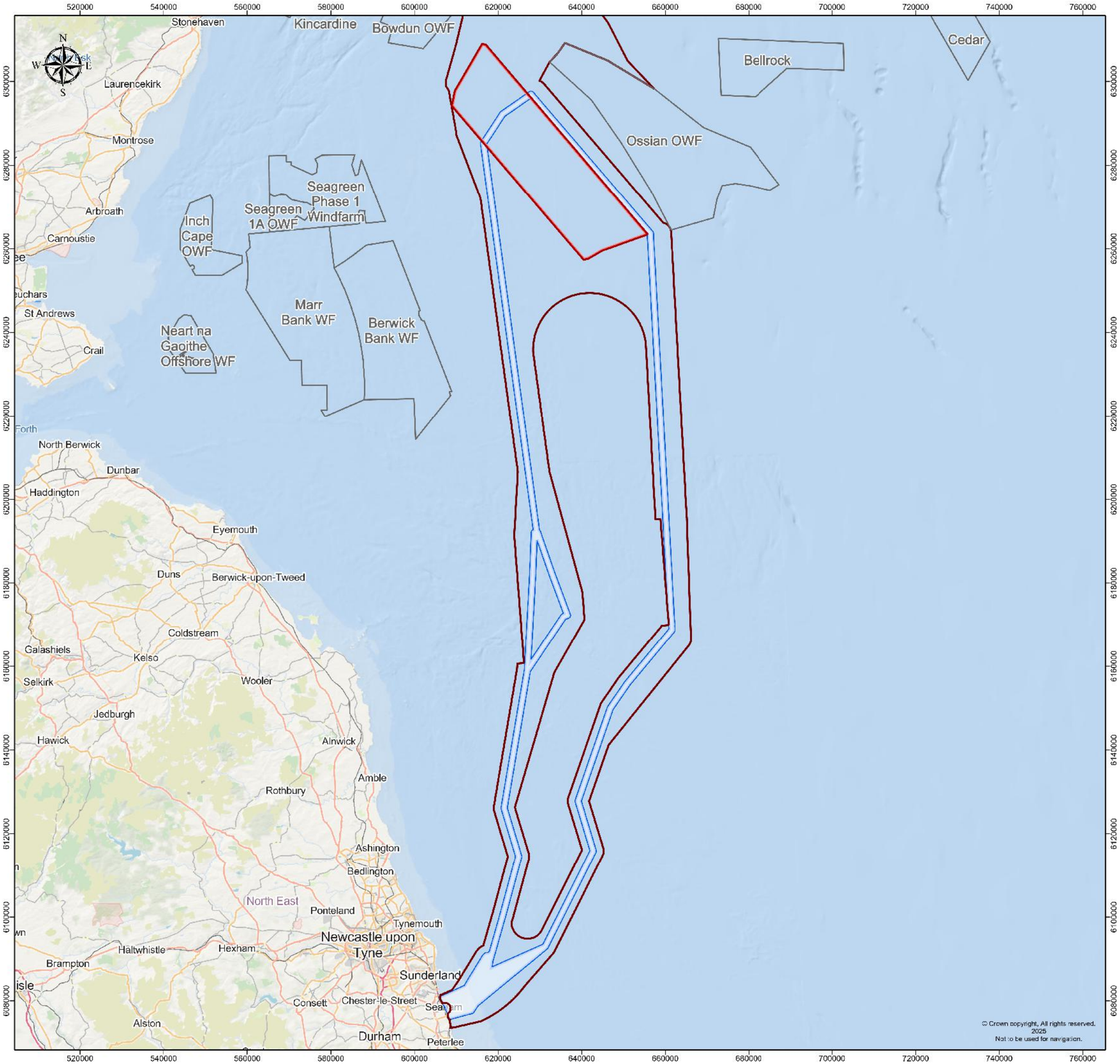
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				Risk Evaluation				Risk Evaluation		
Ref.	Hazard	Hazard Details	Hazard Location	Inherent Risk Severity	Inherent Risk Probability	Inherent Risk Level	Control Measures	Residual Risk Severity	Residual Risk Probability	Residual Risk Level
9	Aggressive Ground due to the presence of Sulpates	Sulphate-rich marine or coastal sediments (e.g., clays, evaporitic deposits, shell sands, or organic silts) can lead to accelerated corrosion of metallic cable components (armour wires, sheaths) through sulphate-reducing bacteria activity and sulphide generation under anaerobic conditions. Sulphates can also degrade cementitious protection (e.g., grout bags, mattresses) if not sulphate-resistant.	Landfall approach nearshore section of all routes	1	C	L	Pre-installation surveys: Conduct geotechnical and geochemical sampling along route to measure total and soluble sulphate content in soils/sediments. Material selection: Specify polymer-coated or galvanised armour, corrosion-resistant sheaths, and sulphate-resistant Portland cement for concrete protection. Route optimisation: Where feasible, avoid high-sulphate sediments or reduce burial depth in aggressive strata. Monitoring: Implement periodic integrity checks (ROV inspection, electrical testing) for early detection of corrosion. Backfill management: Use inert, low-sulphate backfill material in cable trenches in high-risk areas	1	C	L
10	Mobile bedforms	Dependent on height, wavelength, and rate of migration, mobile features can lead to exposed or insufficiently buried cables. Mobile bedforms can be mitigated by burying below a stable reference seabed level (RSBL) such as is provided in Partrac's sediment mobility assessment. Partrac summarise that fine sediment transport throughout the corridor is weak, and transport of sand is "not sufficiently pronounced to give rise to large morphological changes to the seabed".	Risk present across all cable corridor options	2	D	M	A full study of seabed mobility with an RSBL (already included) should be understaken from repeat datasets with the target burial depths accounting for the mobility, and highly mobile areas avoided through routing.	2	B	L

APPENDIX B DRAWINGS

B.1 Technical Drawings

B.2 Alignment Charts



Location Map



Legend

- Morven Offshore Wind Farm [1]
- Export Cable Corridor Option [2]
- Redline Boundary [3]
- Other Windfarm Boundary [1]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:900,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 40 km

0 10 20 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, March 2024.
3. Provided by EnBW bp, May 2024.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

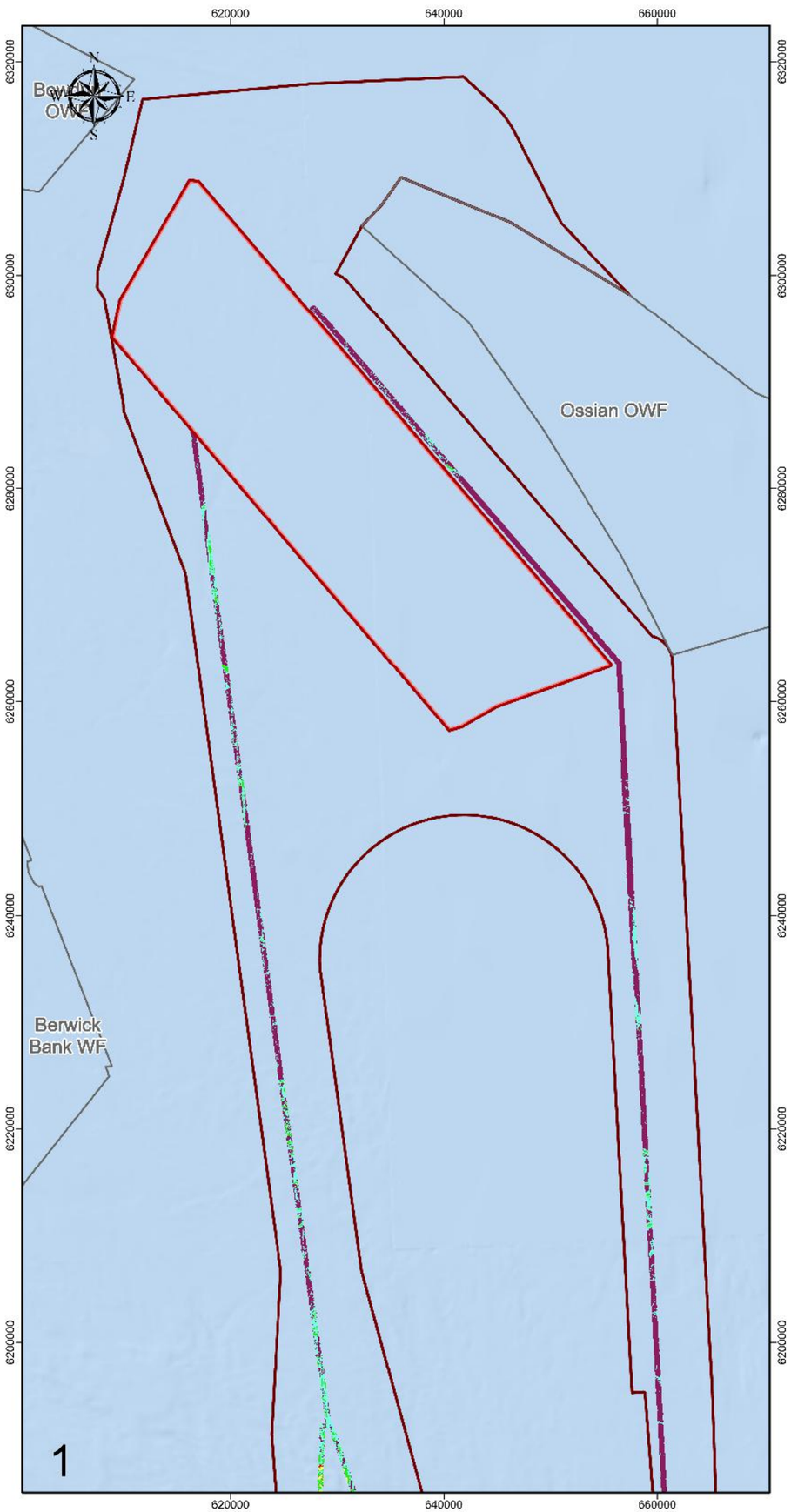
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Site Overview

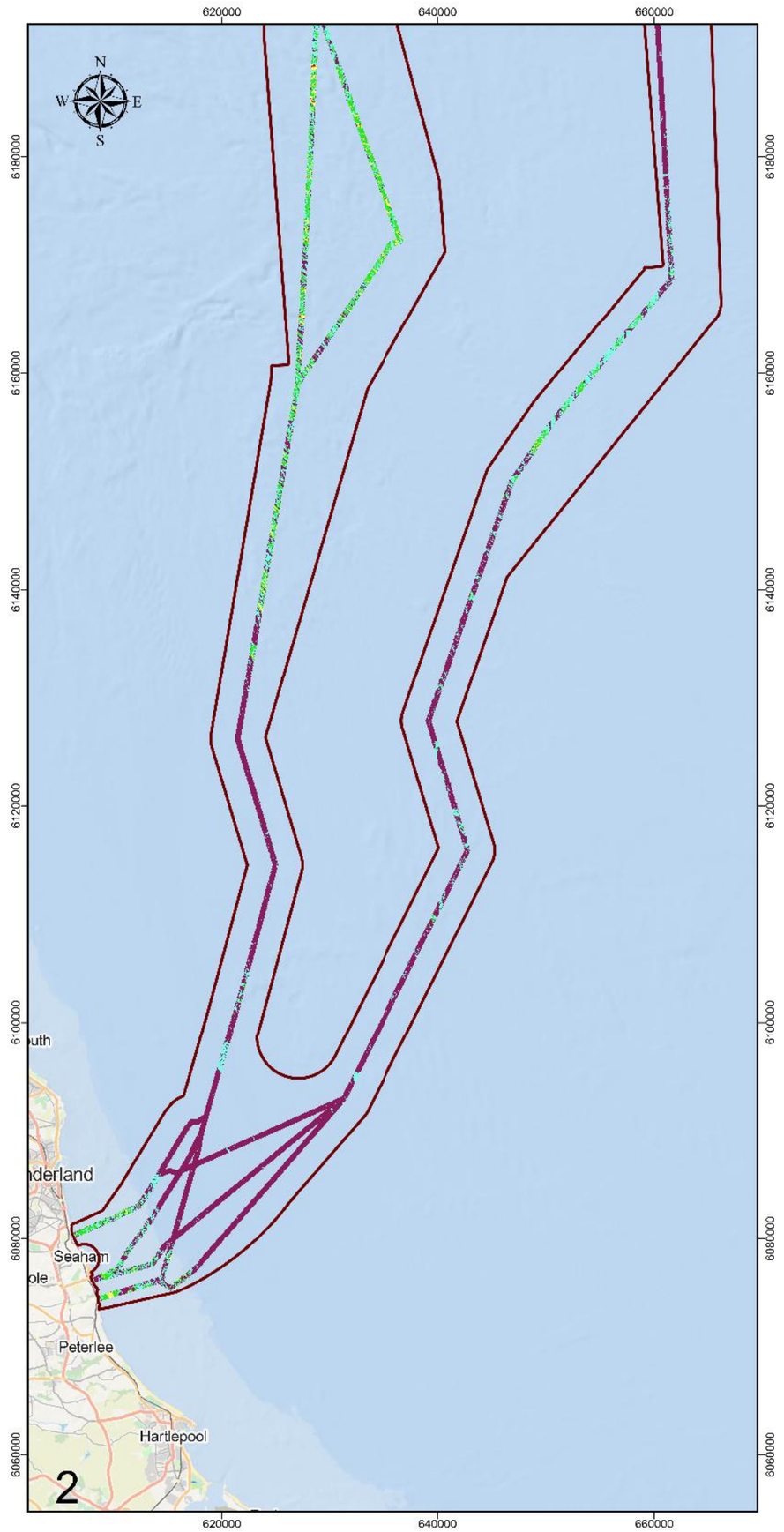
Drawing Number
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bp
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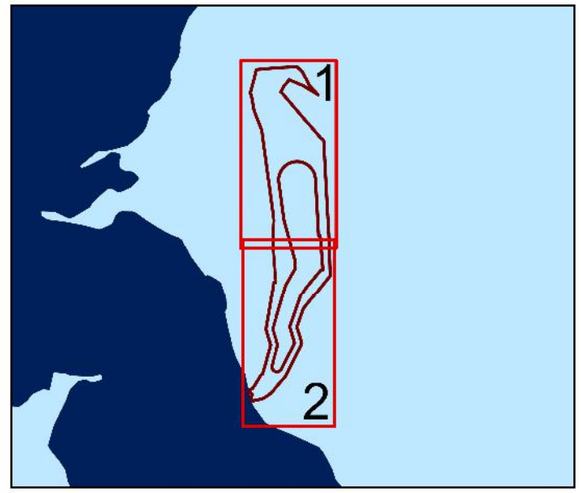
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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Delta: RSBL - Bathymetry (m) [3]

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Bathymetry and RSBL provided by EnBW bp, March 2024.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

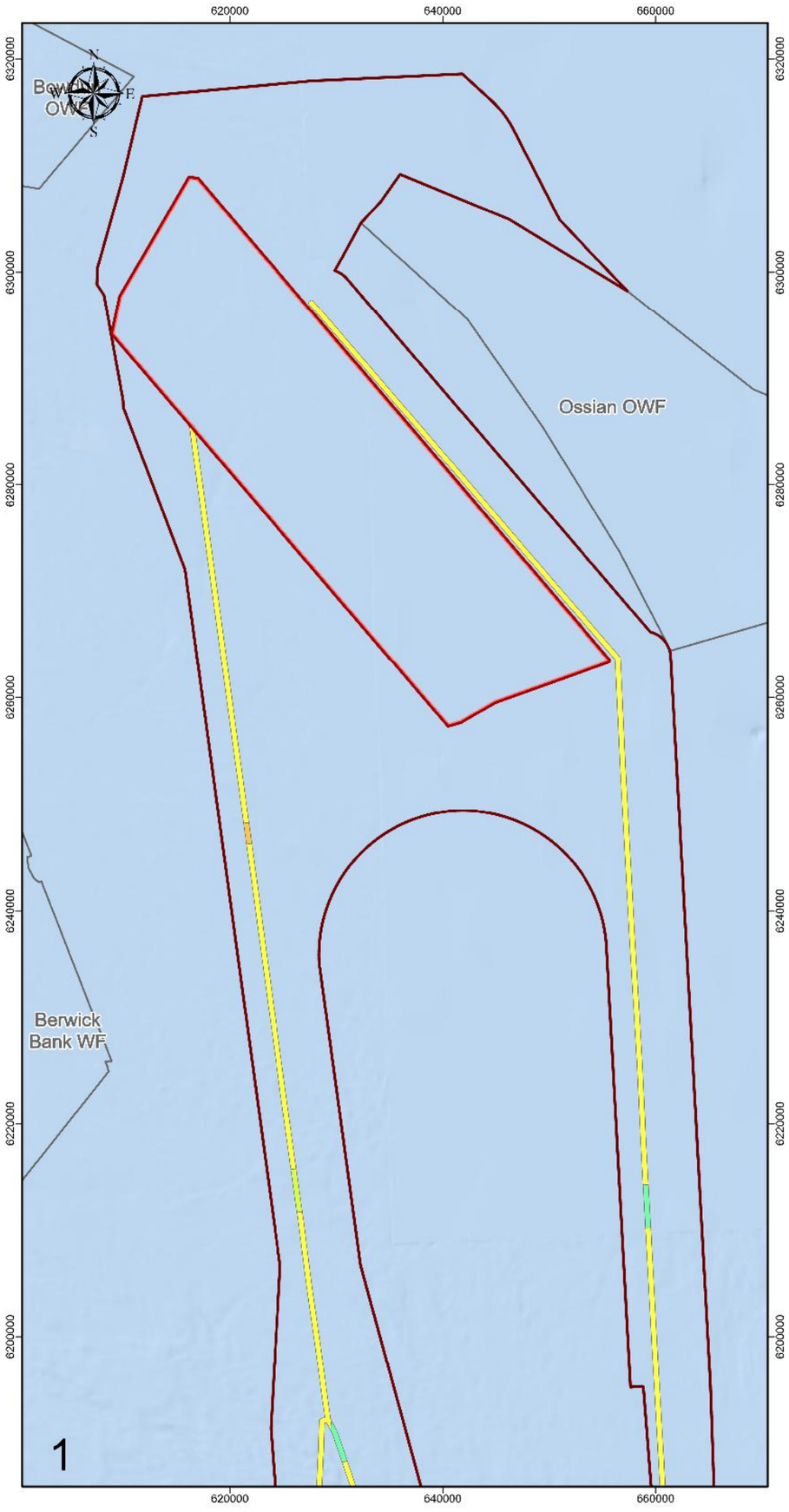
Drawing Title
Delta: RSBL - Bathymetry

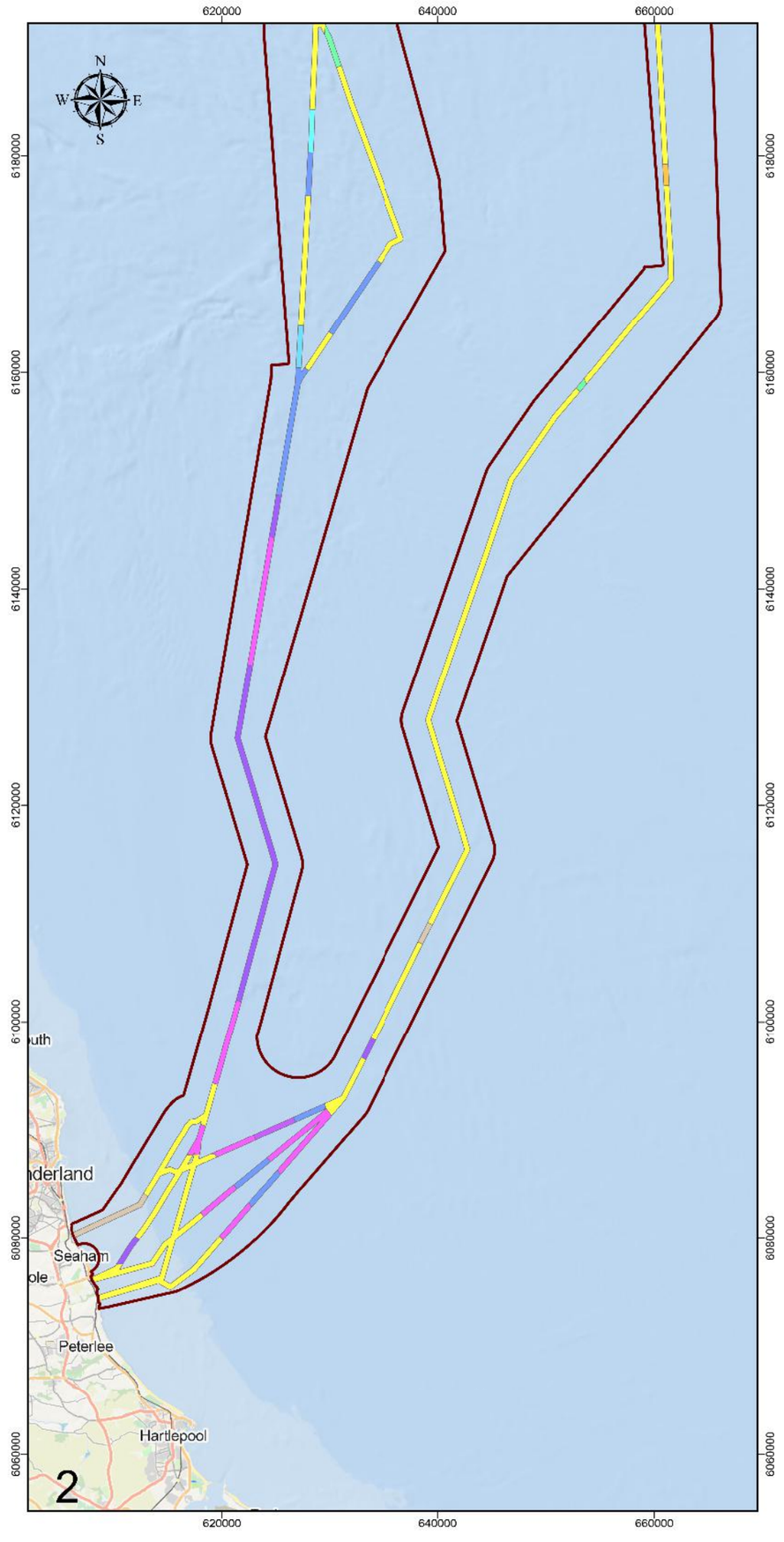
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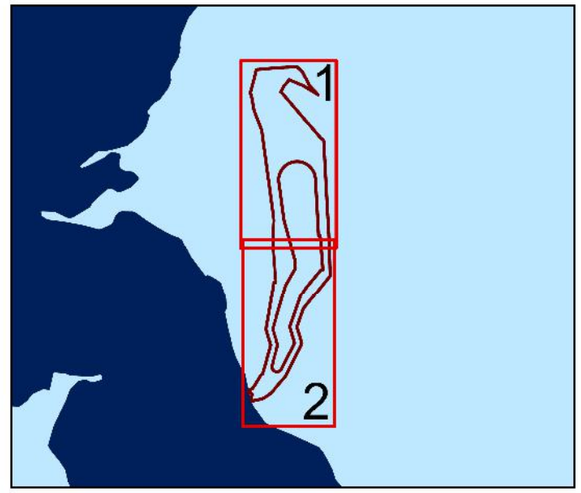
OceanWise, Esri, GEBCO, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Layer 1 CBRA Units [3, 1]

- C1a
- C1b
- C1c
- C2
- C3
- C4
- C5
- C6
- C7
- R
- S1

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Derived from Gardline PRJ 54027 CPT and VC data provided by EnBW bp, March 2024.
4. Created by GM, May 2024.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

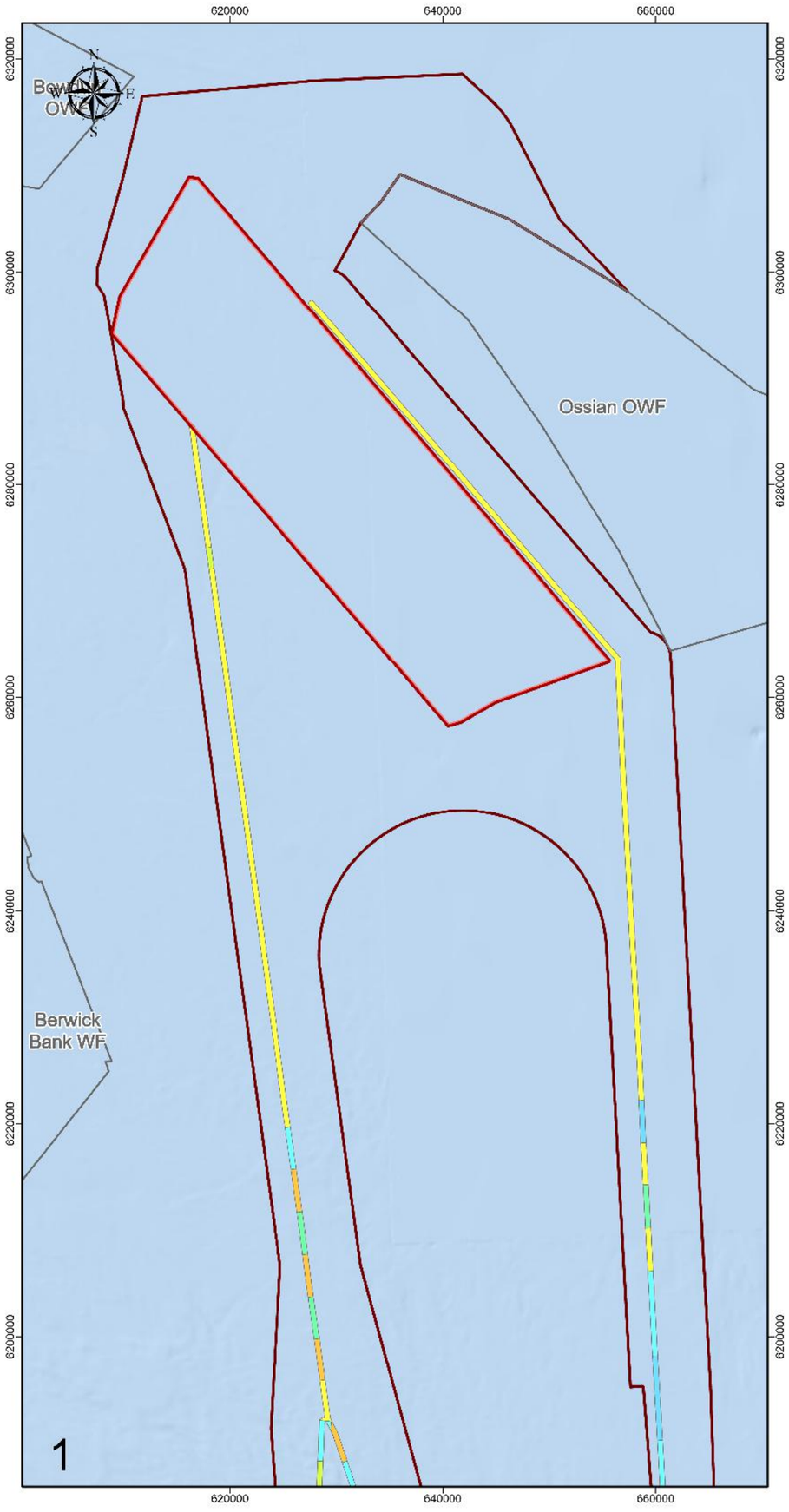
Report Title
Cable Burial Risk Assessment Report

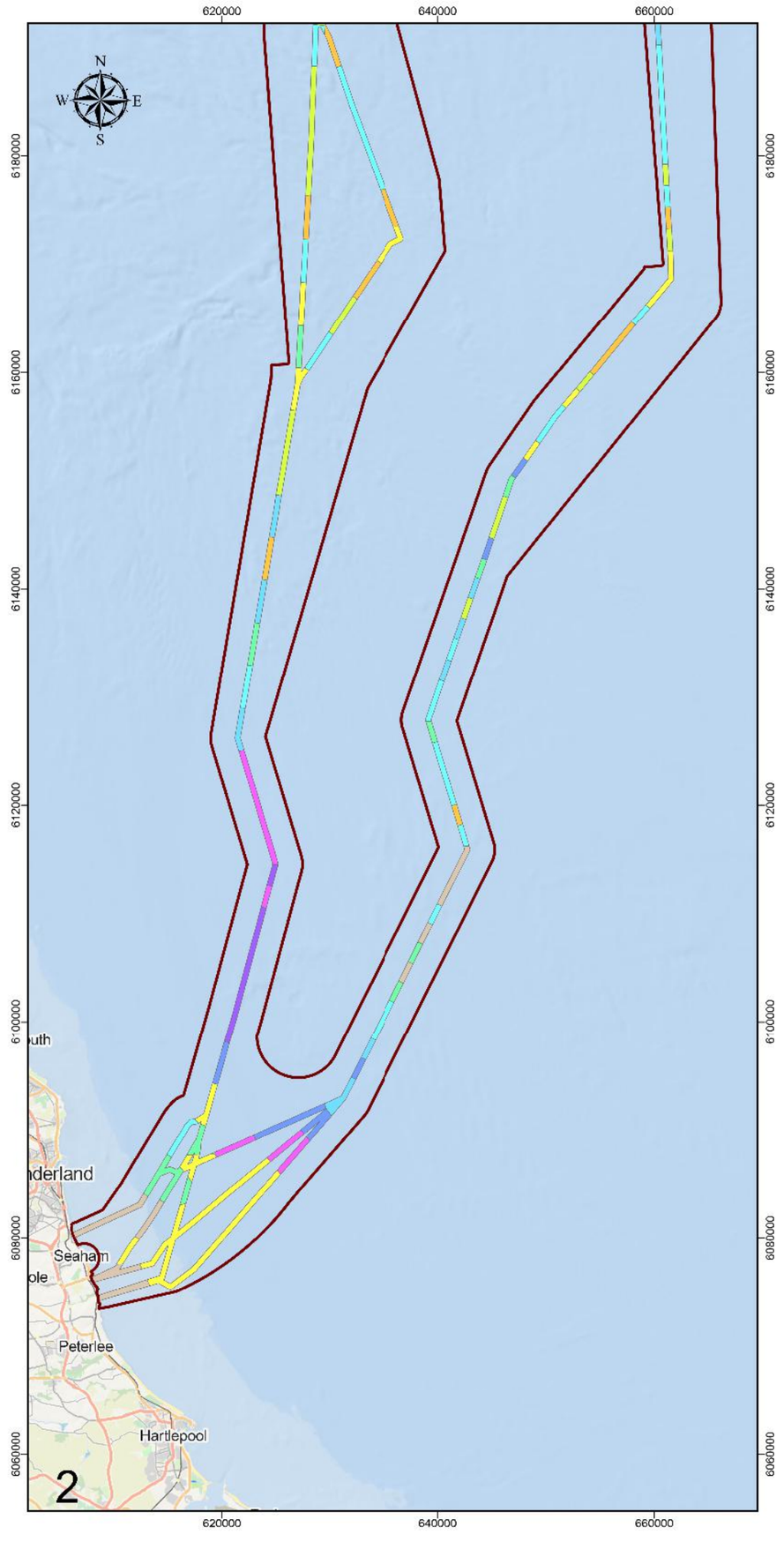
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Drawing Number
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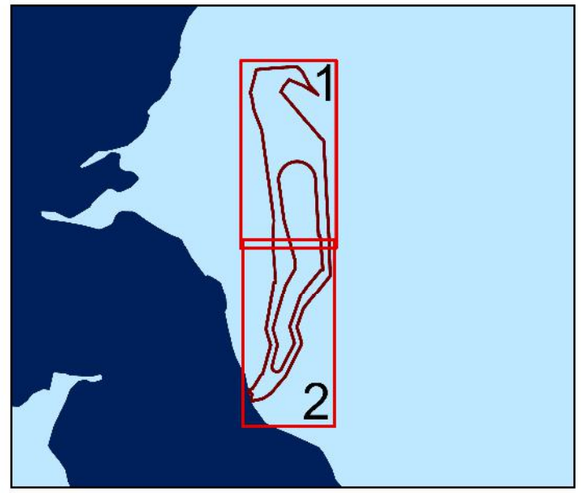
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue





Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Layer 2 CBRA Units [3, 1]

- C1b
- C1c
- C2
- C3
- C4
- C5
- C6
- C7
- R
- S1

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Derived from Gardline PRJ 54027 CPT and VC data provided by EnBW bp, March 2024.
4. Created by GM, May 2024.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

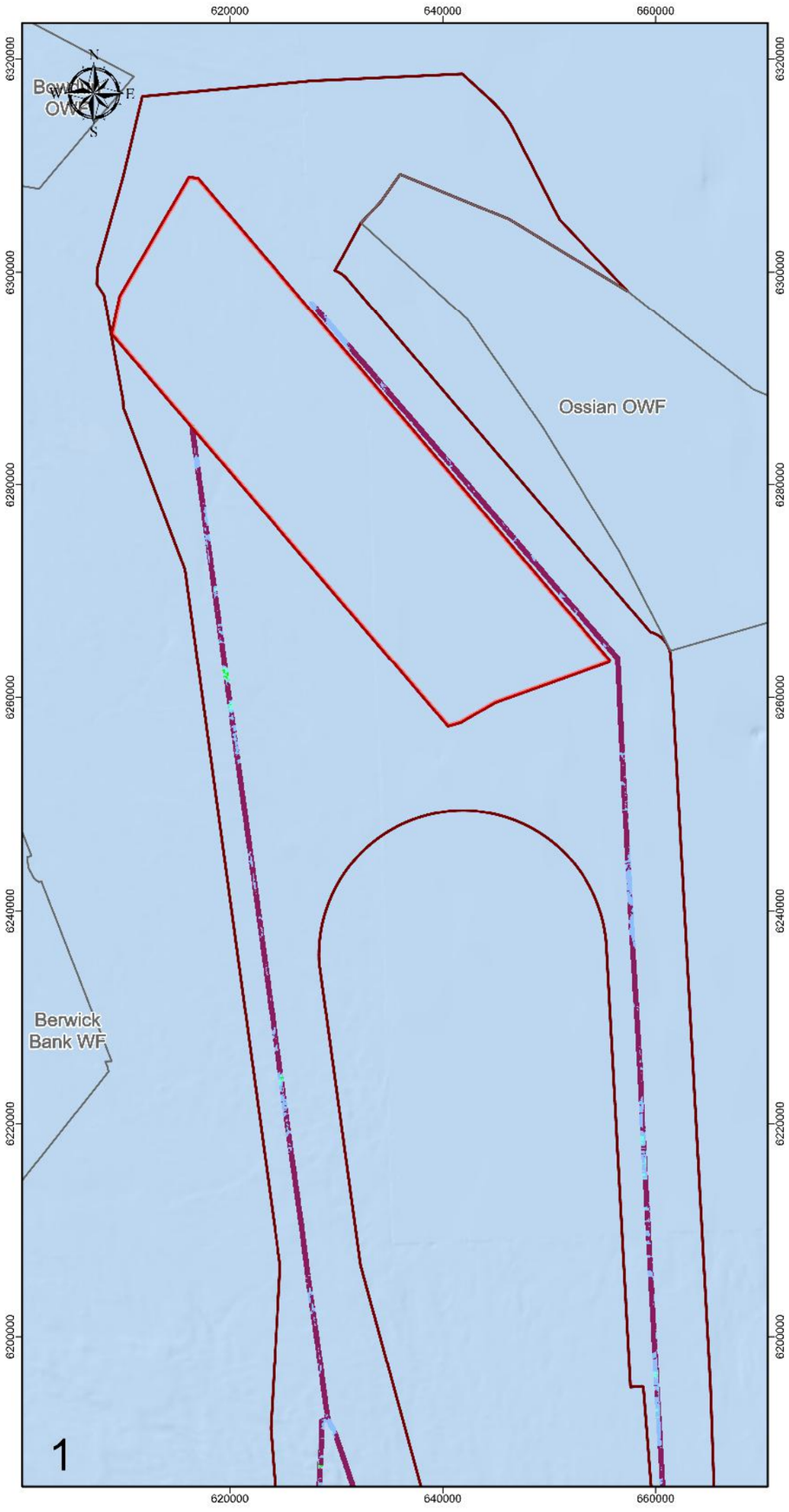
Report Title
Cable Burial Risk Assessment Report

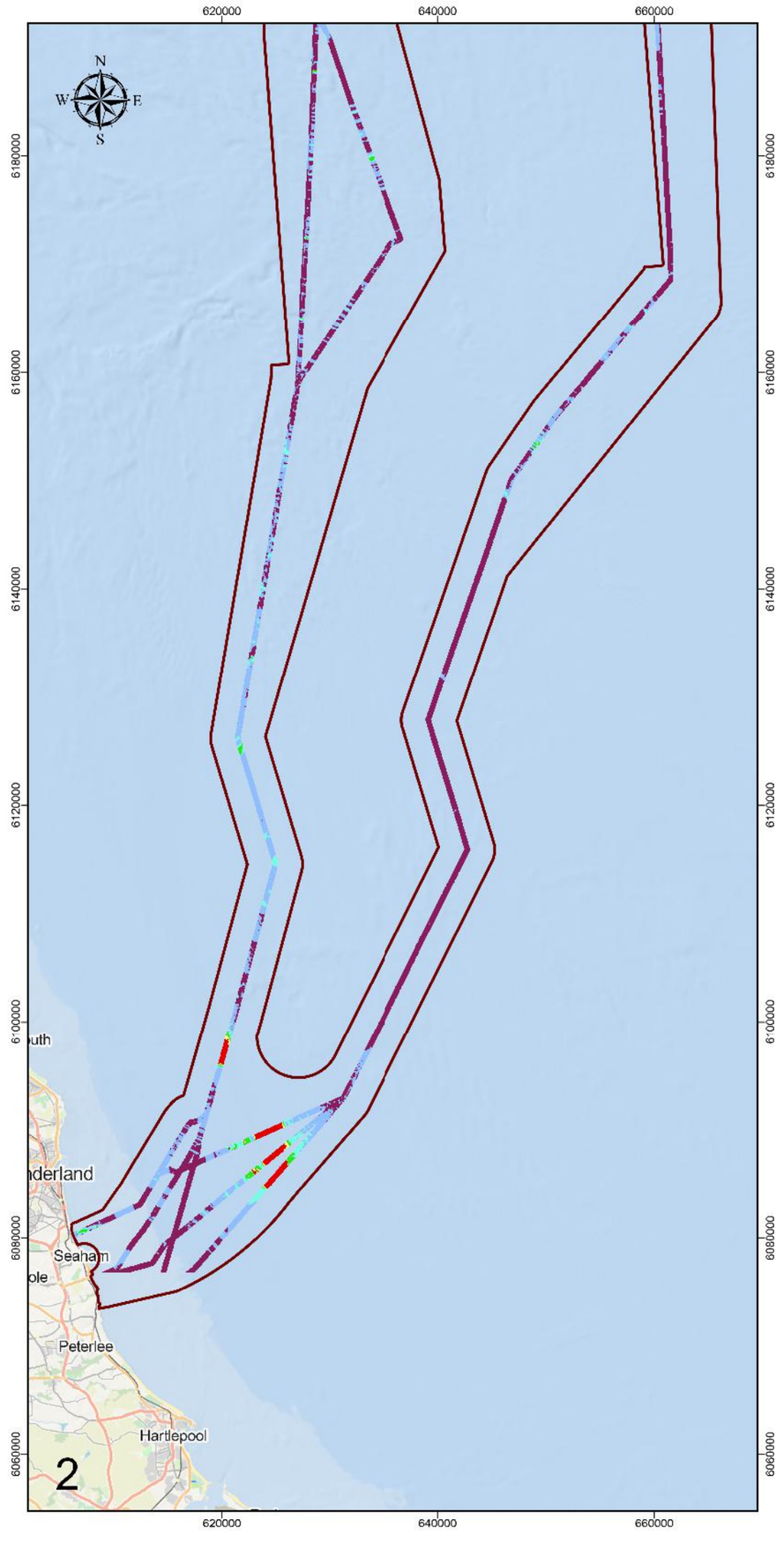
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Drawing Number
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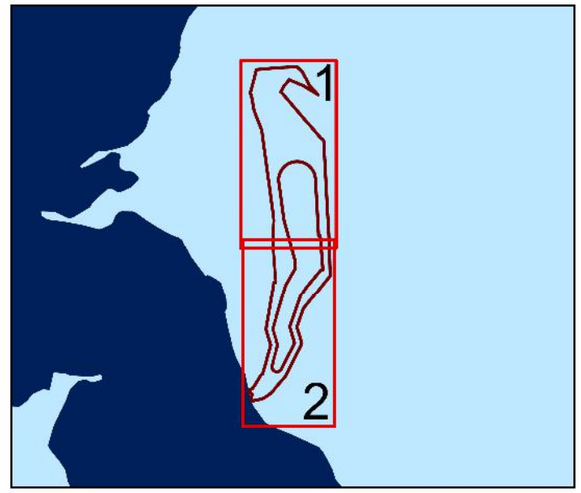
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

OceanWise, Esri, GEBCO, Garmin, NaturalVue, Esri, GEBCO, Garmin, NaturalVue





Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Depth to Base of Layer 1 (mBSB) [3,4]

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- >5

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Derived from NGI Doc 20230203-17-R Digital Delivery Data.
4. Created by GM. May 2024.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

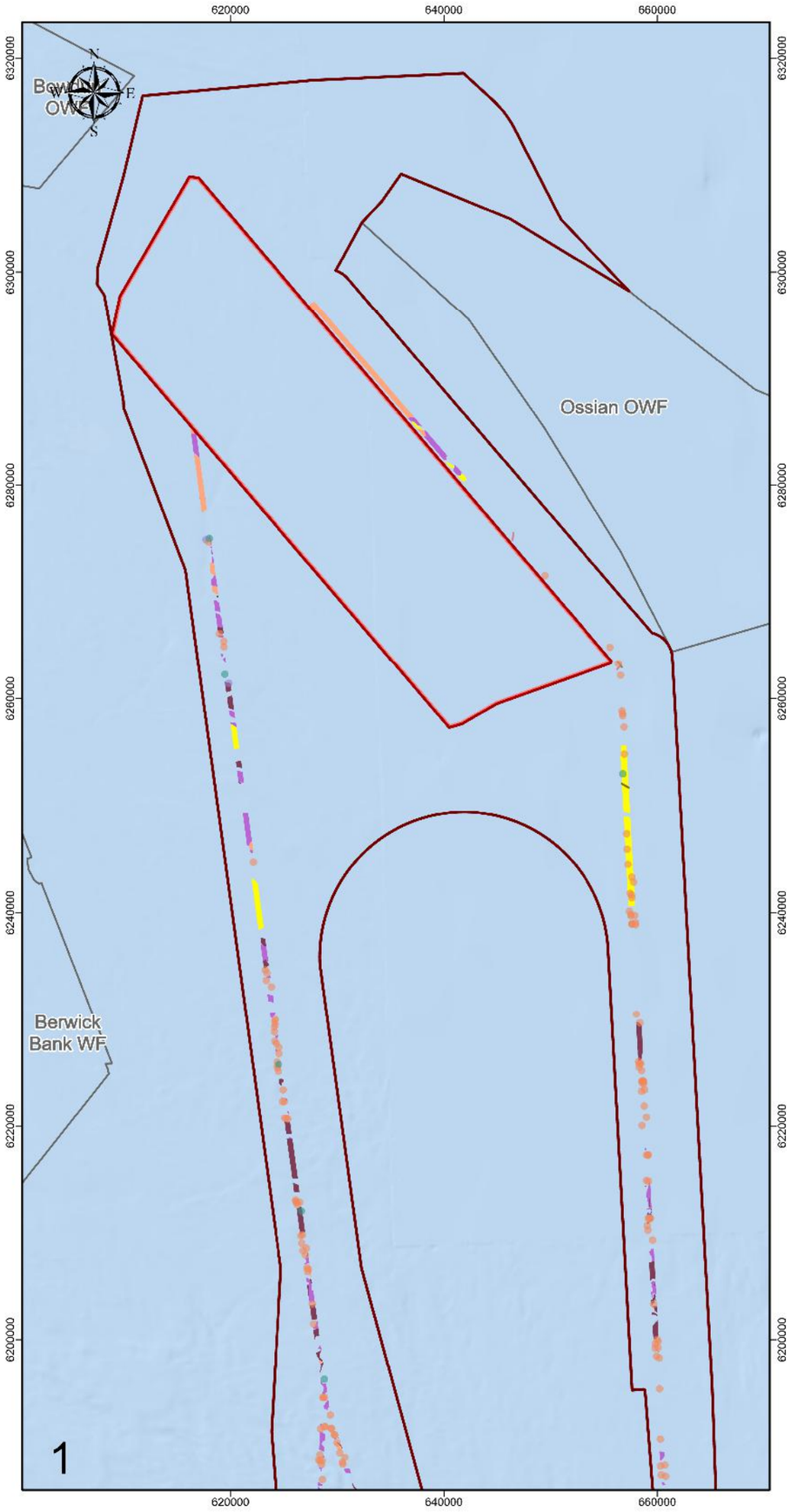
Report Title
Cable Burial Risk Assessment Report

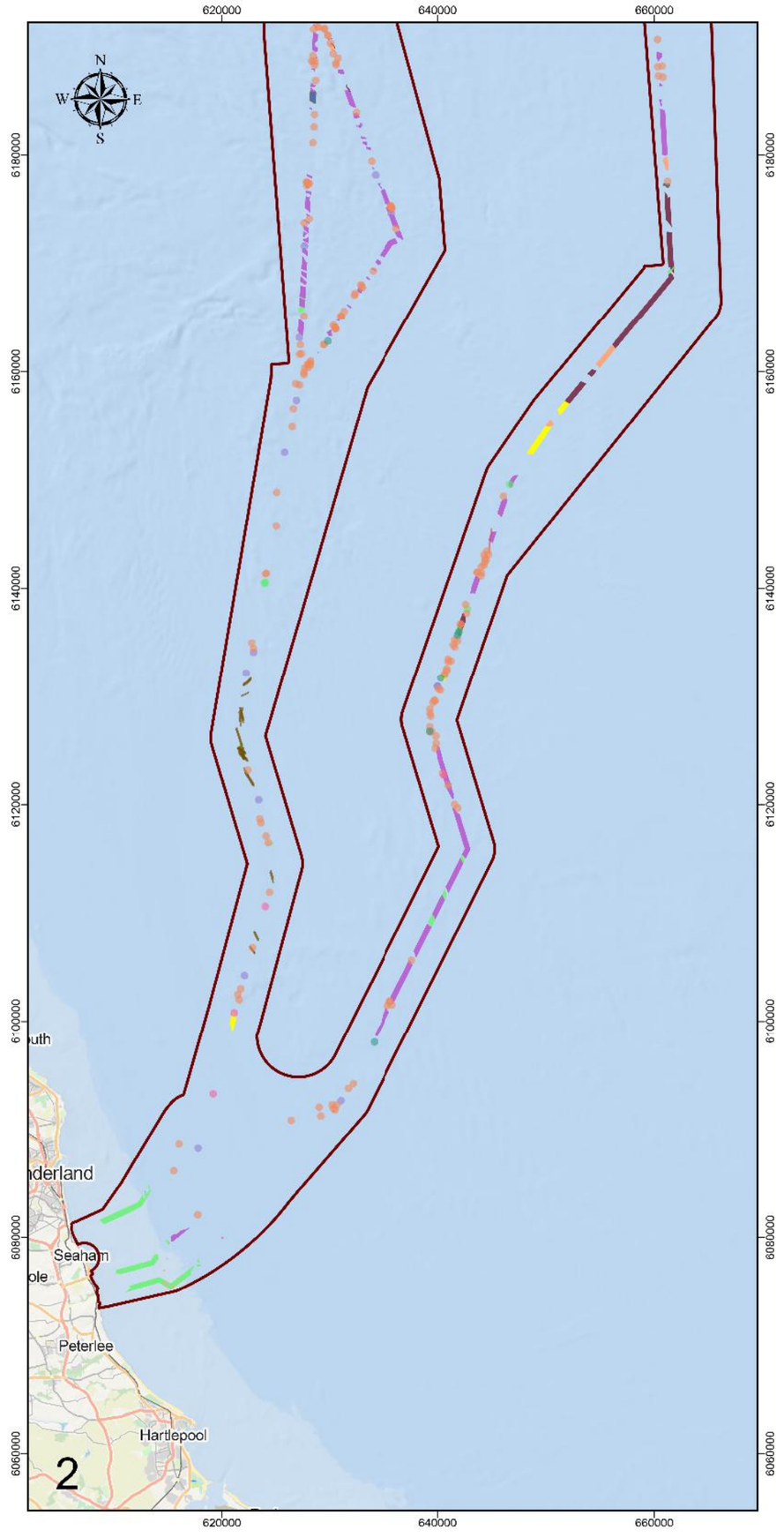
Drawing Title
Depth to Base of Layer 1

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-005

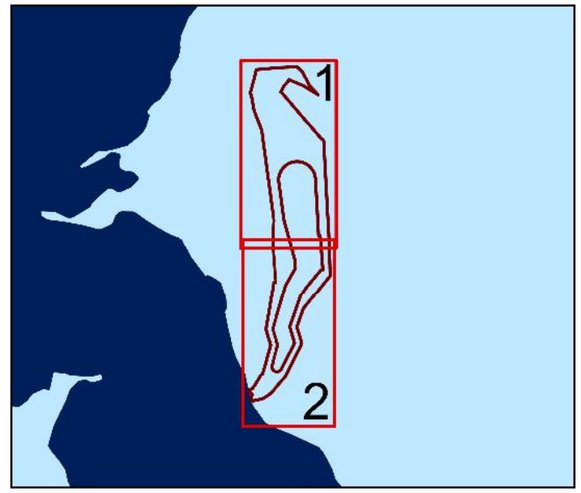
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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Geomorphology [3, 4]

- Boulder
- Depression
- Depression with boulder/debris
- Linear feature
- Pipeline
- Trawl mark
- Sand waves
- Megaripples
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Provided by EnBW bp, March 2024.
4. NGI Doc 20230203-17-R Digital Delivery Data.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

Drawing Title
Geomorphology

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-006

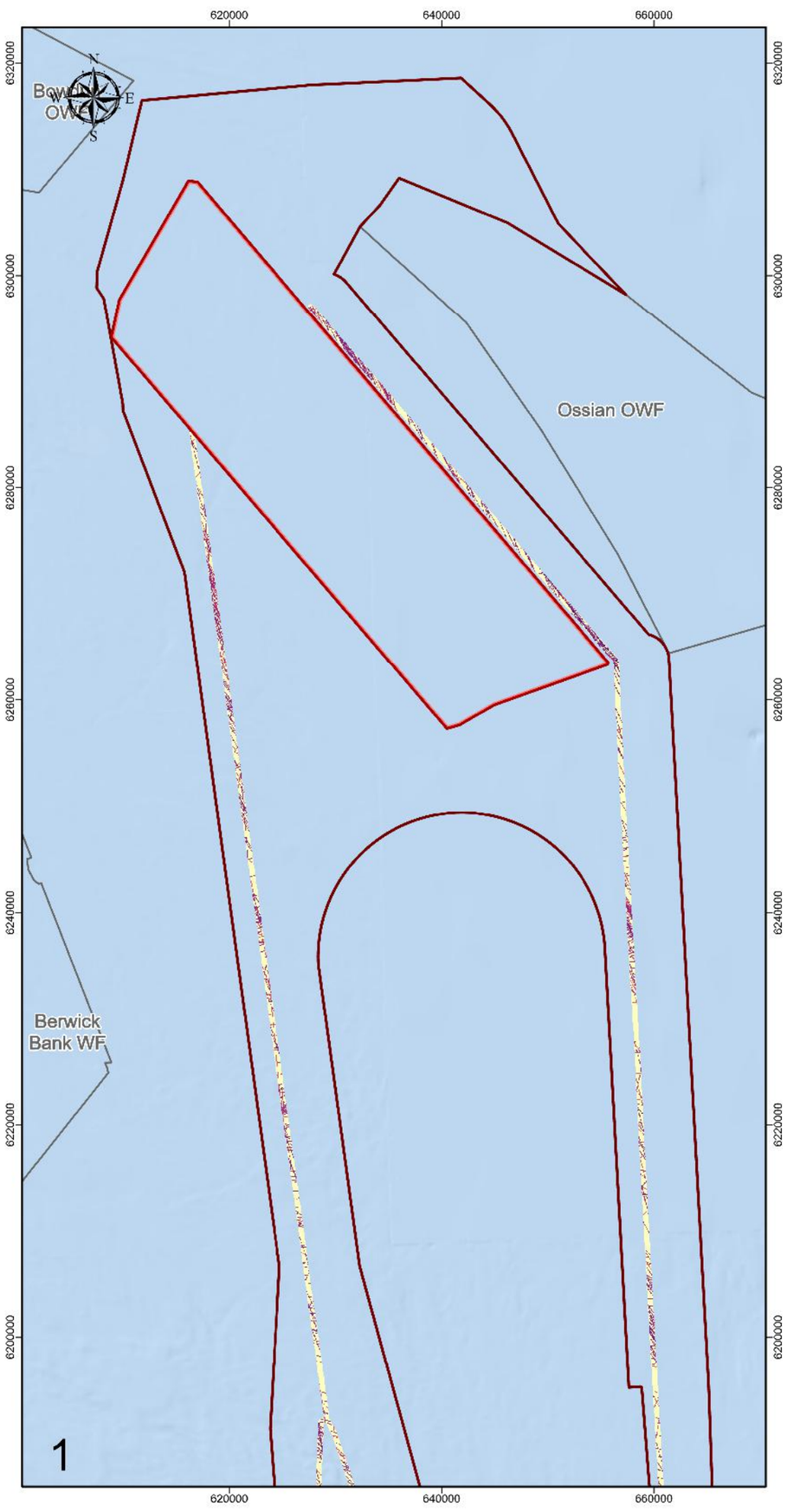
GLOBAL MARITIME

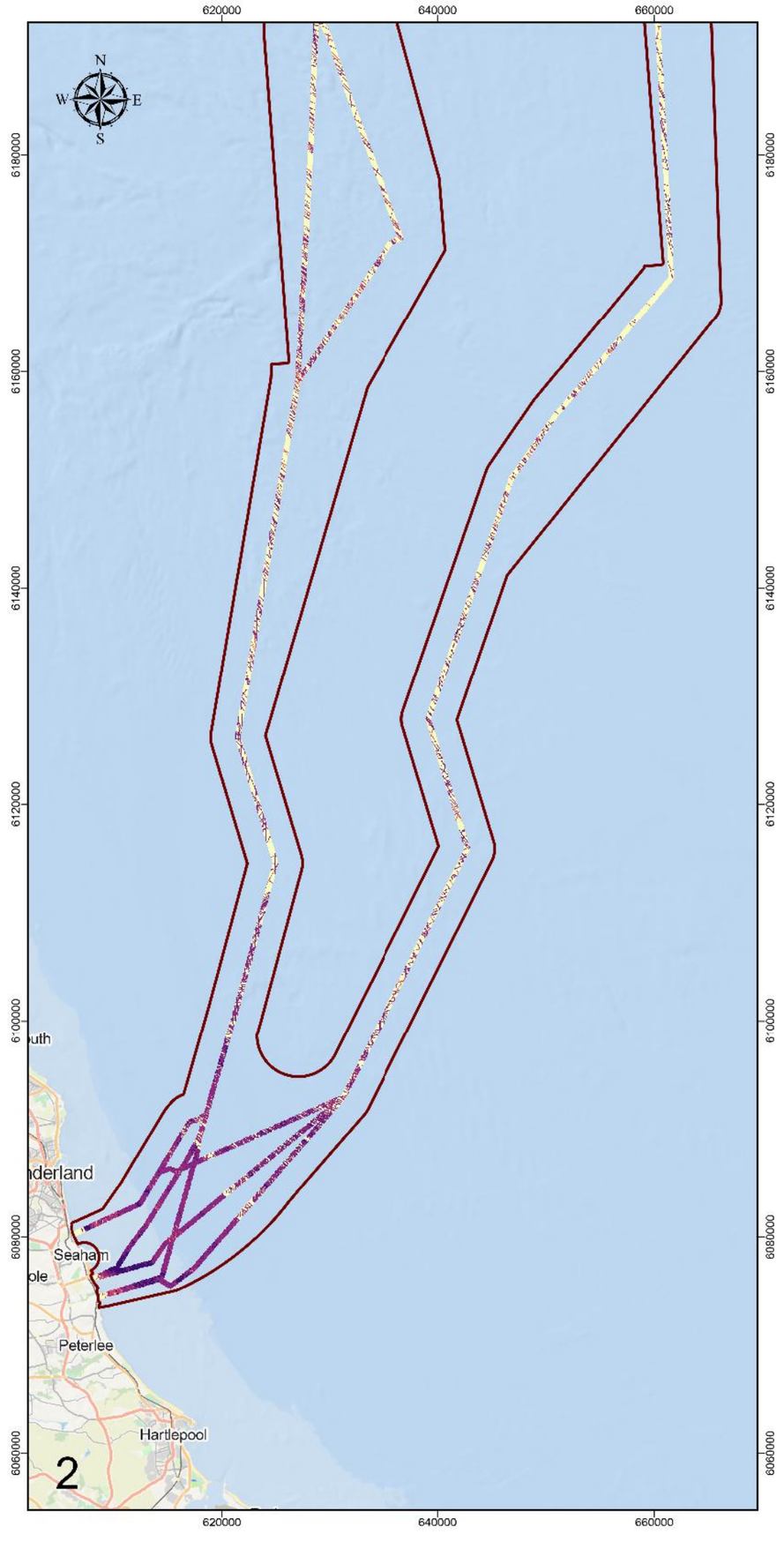
EnBW bp

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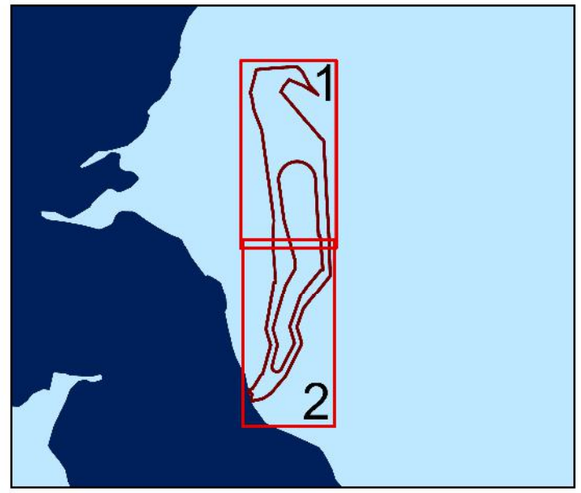
OceanWise, Esri, GEBCO, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Pstrike (50 x 50m) [3]

- less than 1e-10
- 1e-10 - 1e-09
- 1e-09 - 1e-08
- 1e-08 - 1e-07
- 1e-07 - 1e-06
- 1e-06 - 1e-05

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Pstrike represents the probability of an anchor strike within a set time period. For example, for a Pstrike value of 0.0001 an anchor strike would be expected, on average, once every 10,000 years. High Pstrike values represent high risk to the cable, whereas lower Pstrike values represent lower risk to the cable. Pstrike applies to a given distance or area (in this case 50x50m) and is defined as the inverse of return period.

Project Title
Morven OWF - Offshore Export Cable pre-FEED

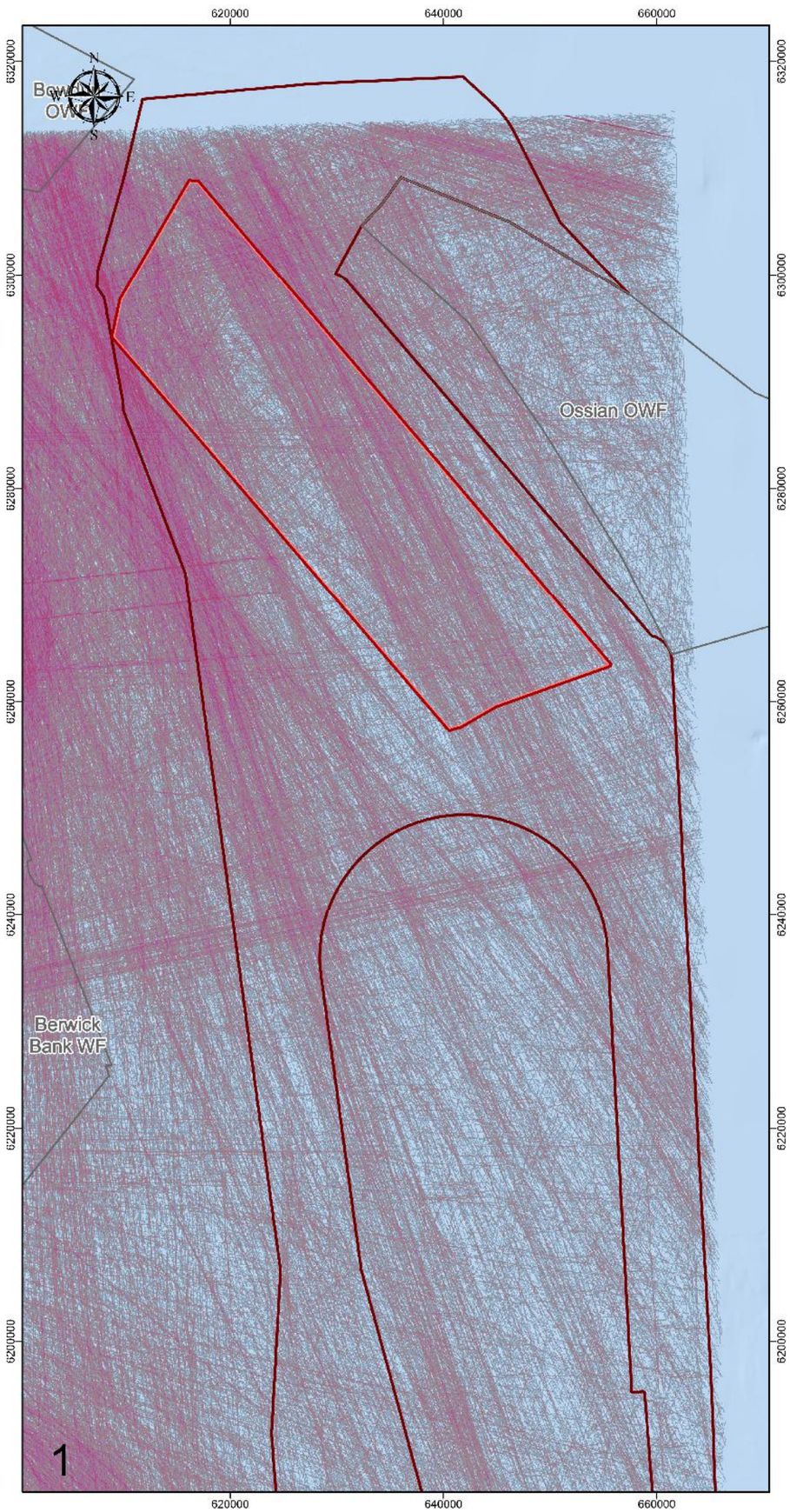
Report Title
Cable Burial Risk Assessment Report

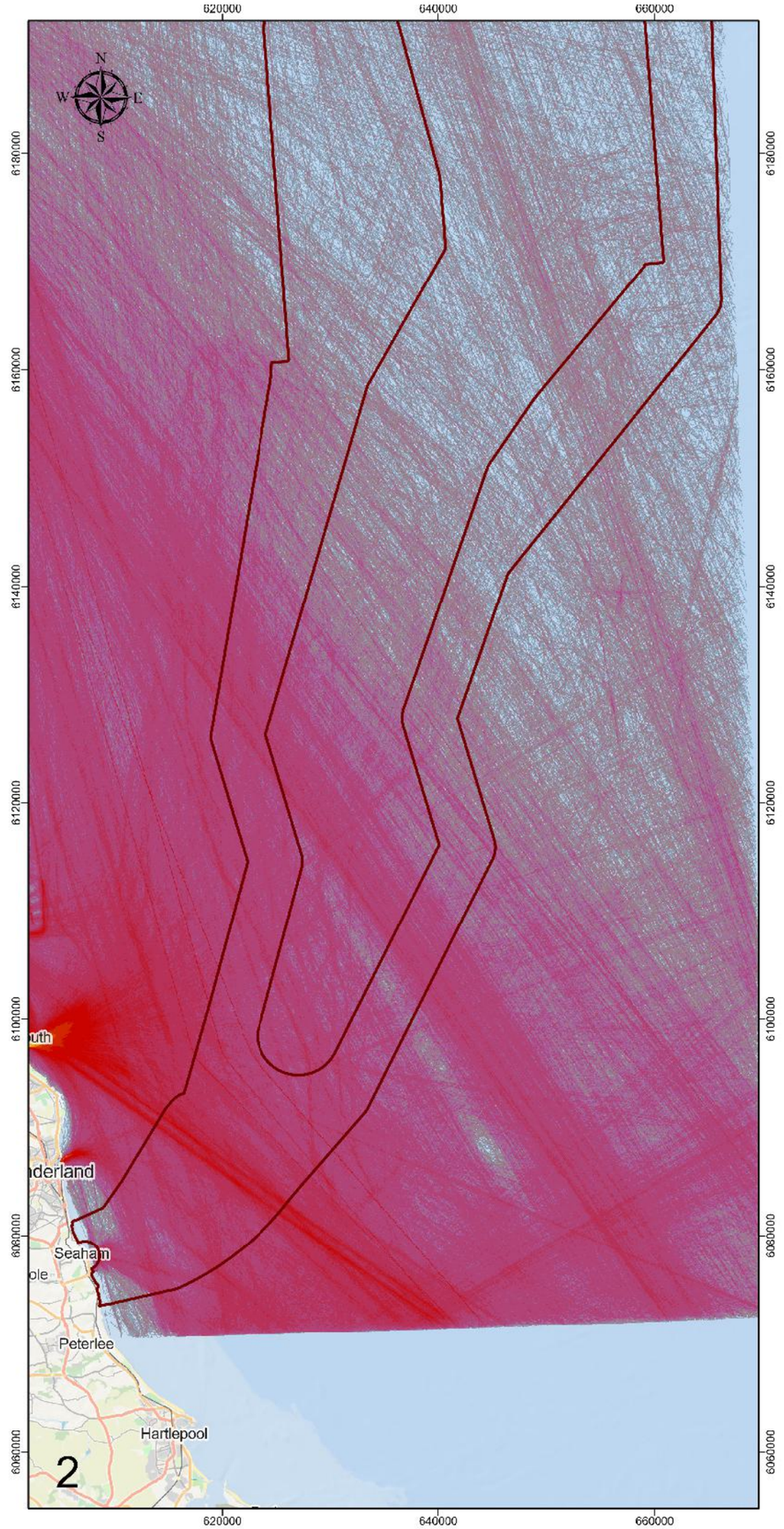
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Pstrike (50 x 50)

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-007

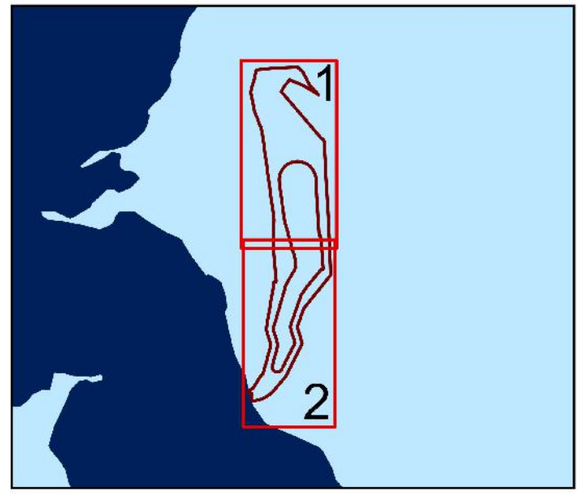
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Partners in UK offshore wind

OceanWise, Esri, Garmin, NaturalVue





Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Pre-Construction Vessel Density - All Vessels [3,4]

0	26 - 50
1	51 - 75
2 - 3	76 - 100
4 - 5	101 - 250
6 - 7	251 - 500
8 - 10	501 - 750
11 - 25	751 - 1000
	1001 - 2500
	2501 - 5000
	5001 - 7500
	>7500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. AIS data supplied by EnBW bp, April 2024.
4. Tracks per 50x50m grid cell over a 2 year period (01/01/2022 - 28/03/2024).

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

Drawing Title
Pre-Construction Vessel Density - All Vessel Types

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-008

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OceanWise, Esri, GEBCO, Garmin, NaturalVue

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620000

640000

6300000

6280000

6260000

N

W

E

S

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Not to be used for navigation.

Location Map



Legend

- Morven Offshore Wind Farm [1]
- Redline Boundary [2]
- Indicative WTG Layout [3]

Modelled Post-Construction Service Vessel Density [4, 5]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:200,000
Datum: European 1950
Projection: UTM Zone 30N

0 4 8 km

0 5 nm

Notes

1. Source: The Crown Estate, Nov 2023.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM, May 2024.
4. Modelled by GM based on a typical post-construction scenario of port to WTG and WTG to WTG track movements by re-routing the pre-construction data provided by EnBW bp, May 2024.
5. Tracks per 50x50m grid cell over a 2 year period (01/01/2022 - 28/03/2024).

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

Drawing Title
Modelled Post-Construction Service Traffic

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-009

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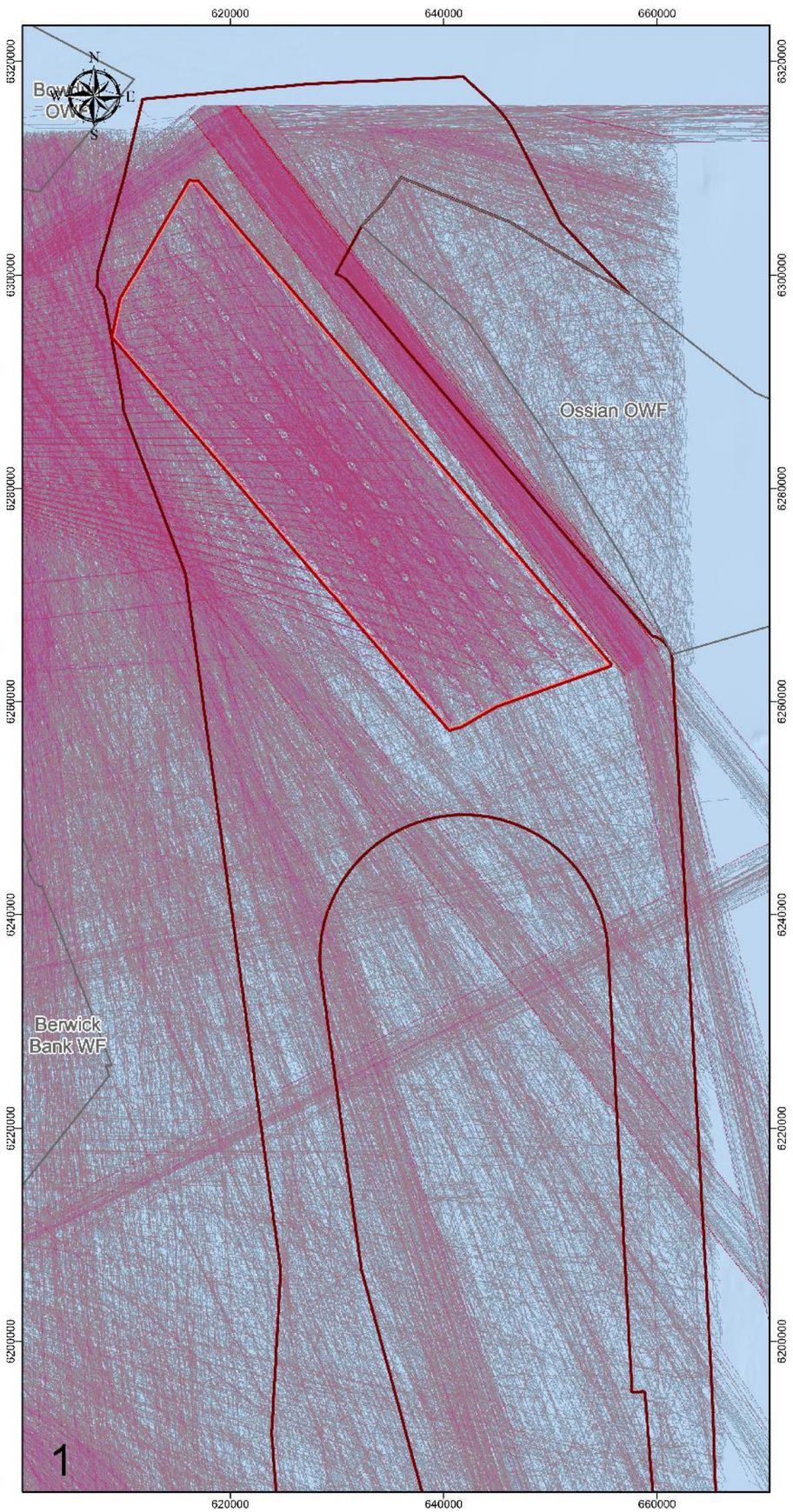
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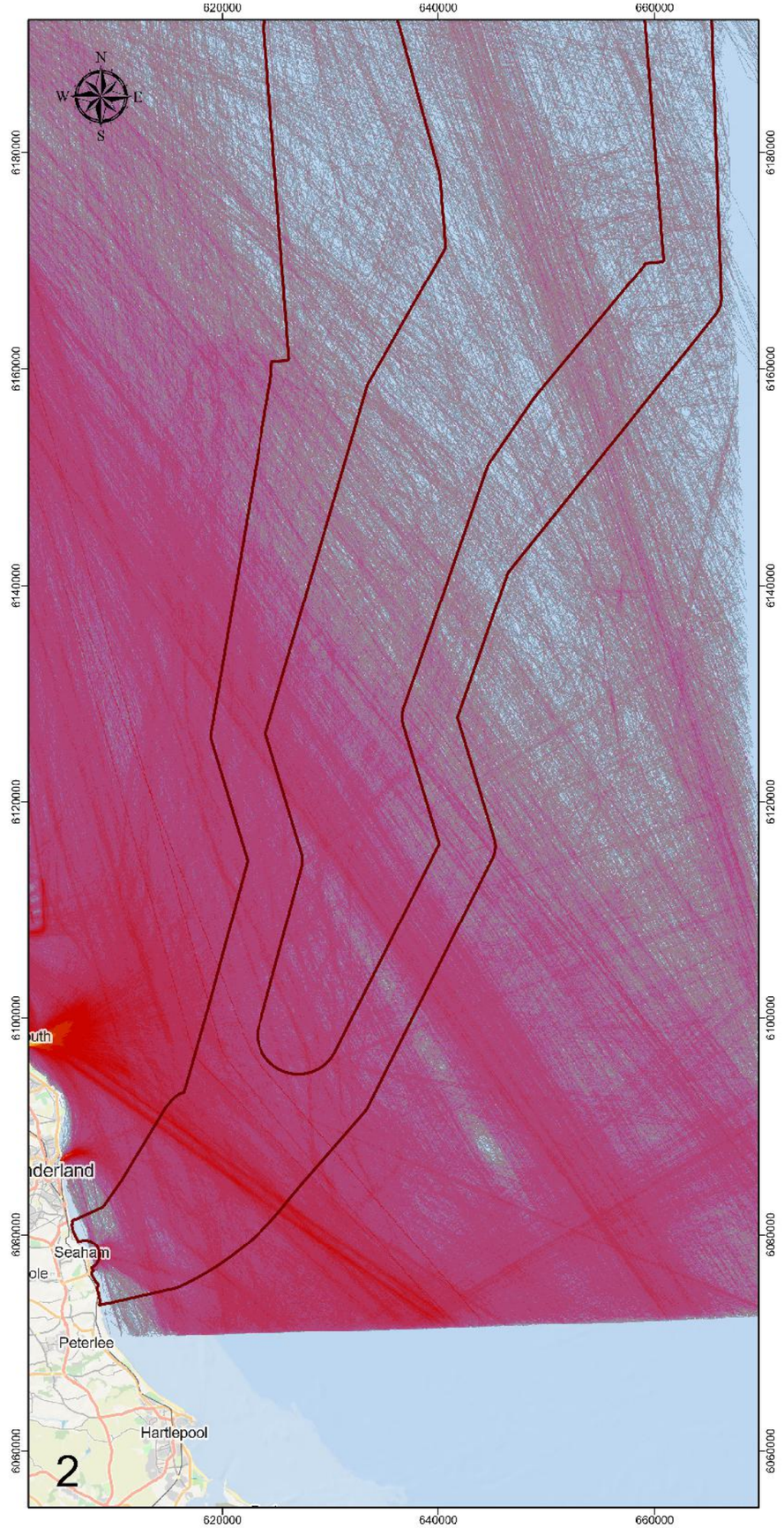
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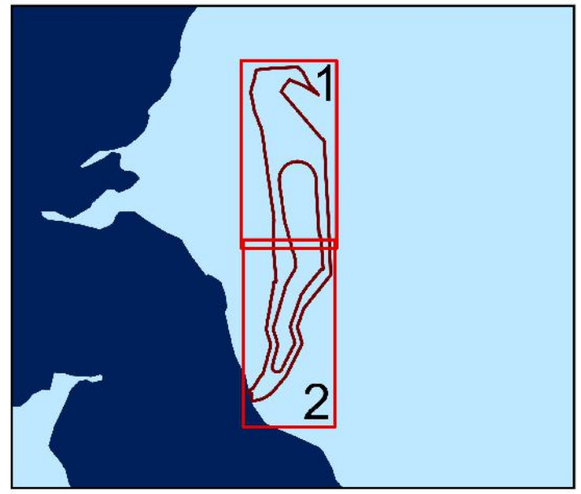
OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - All Vessels [3,4]

0	26 - 50
1	51 - 75
2 - 3	76 - 100
4 - 5	101 - 250
6 - 7	251 - 500
8 - 10	501 - 750
11 - 25	751 - 1000
	1001 - 2500
	2501 - 5000
	5001 - 7500
	>7500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

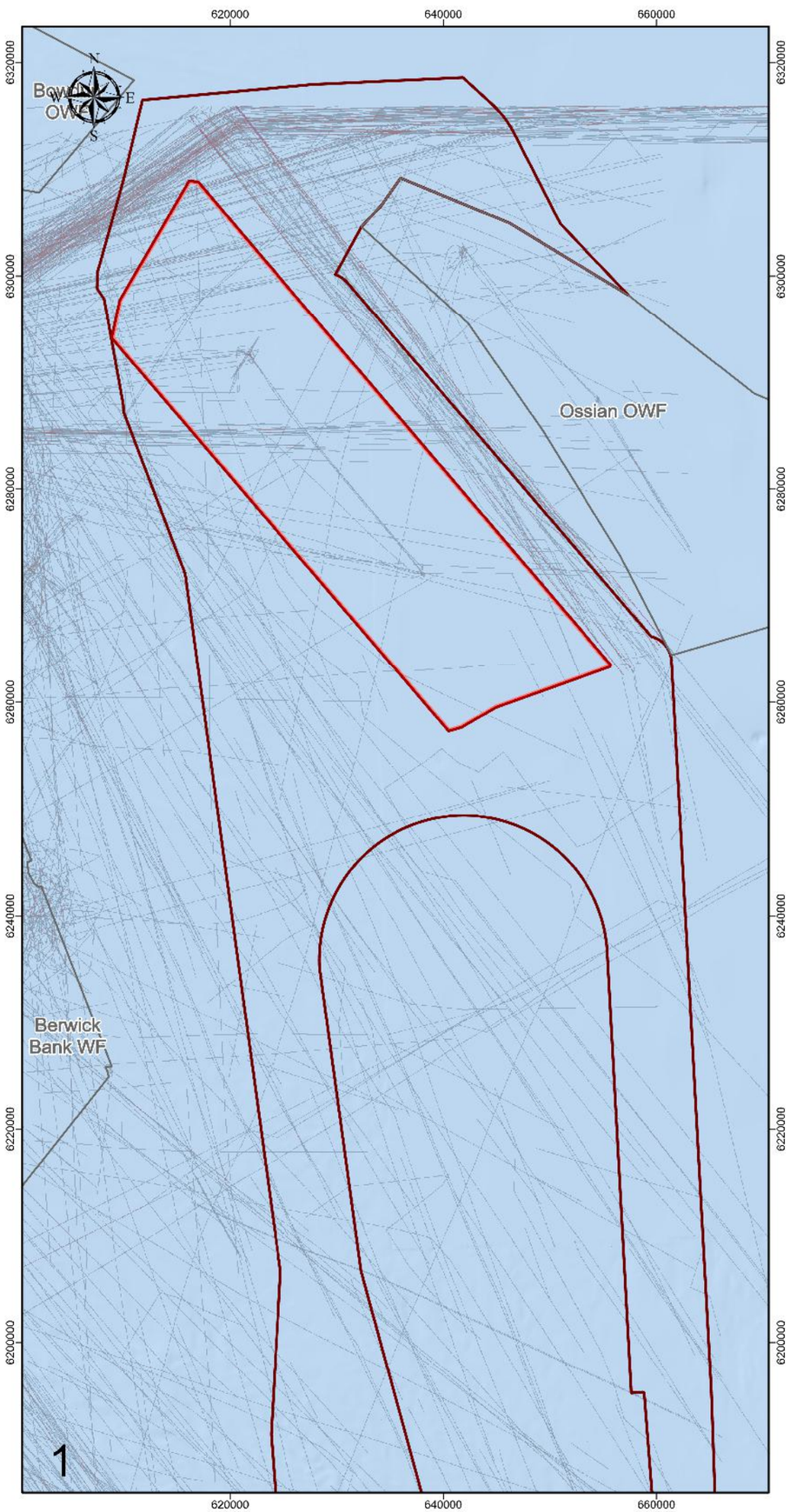
Drawing Title
Modelled Post-Construction Vessel Density - All Vessel Types

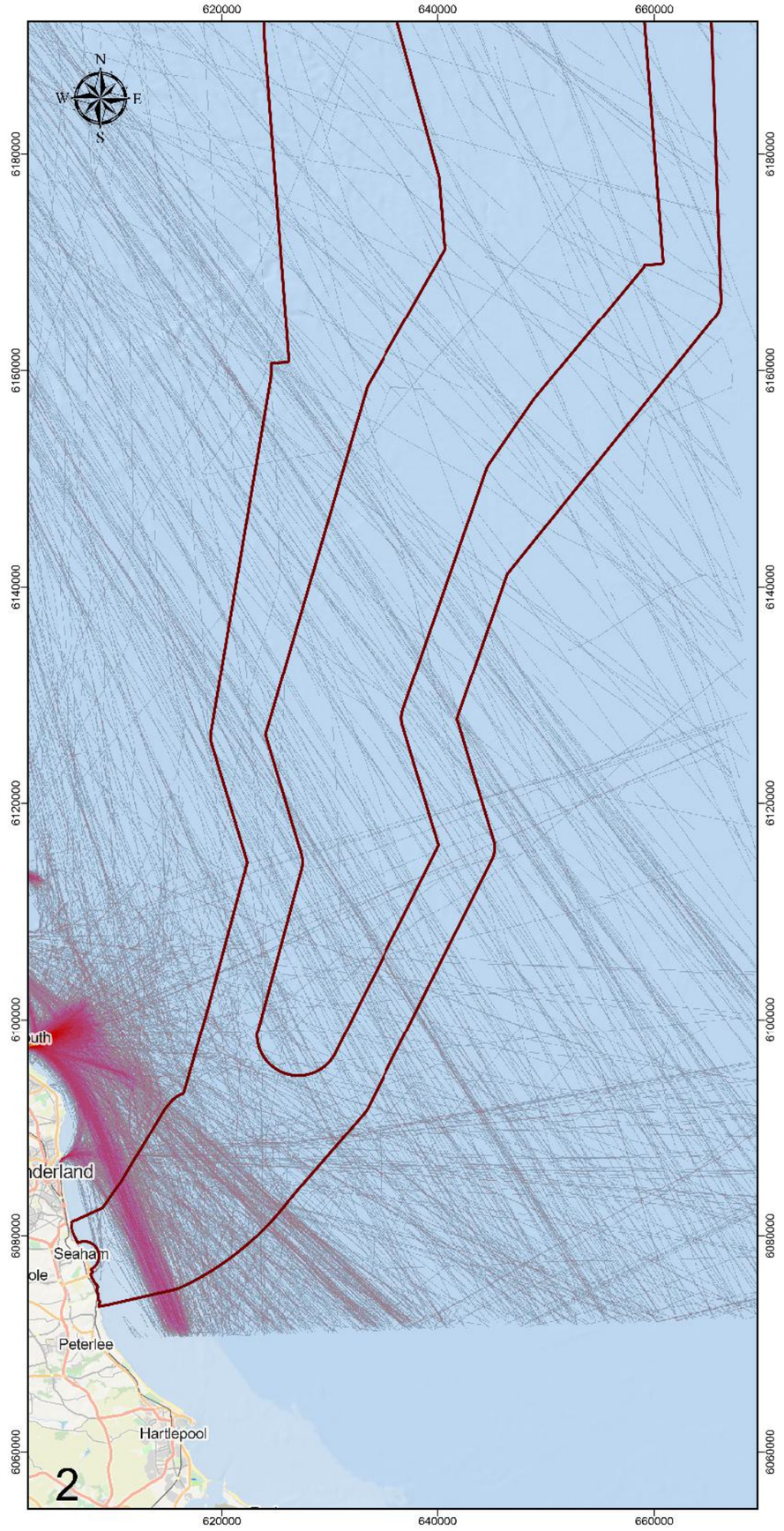
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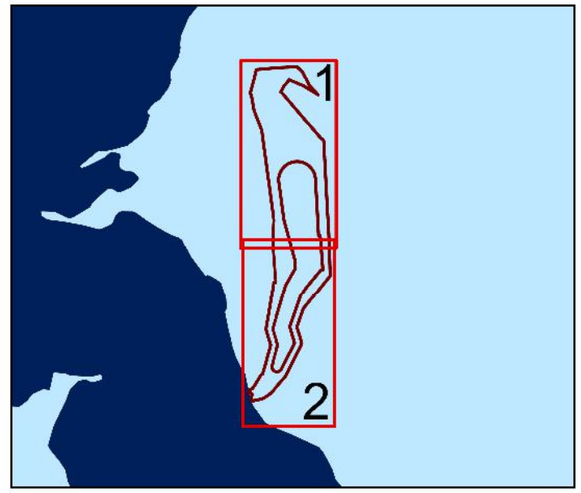
OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Port Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500
- 501 - 750
- 751 - 1000
- 1001 - 2500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

Drawing Title
Modelled Post-Construction Vessel Density - Port Vessels

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-011

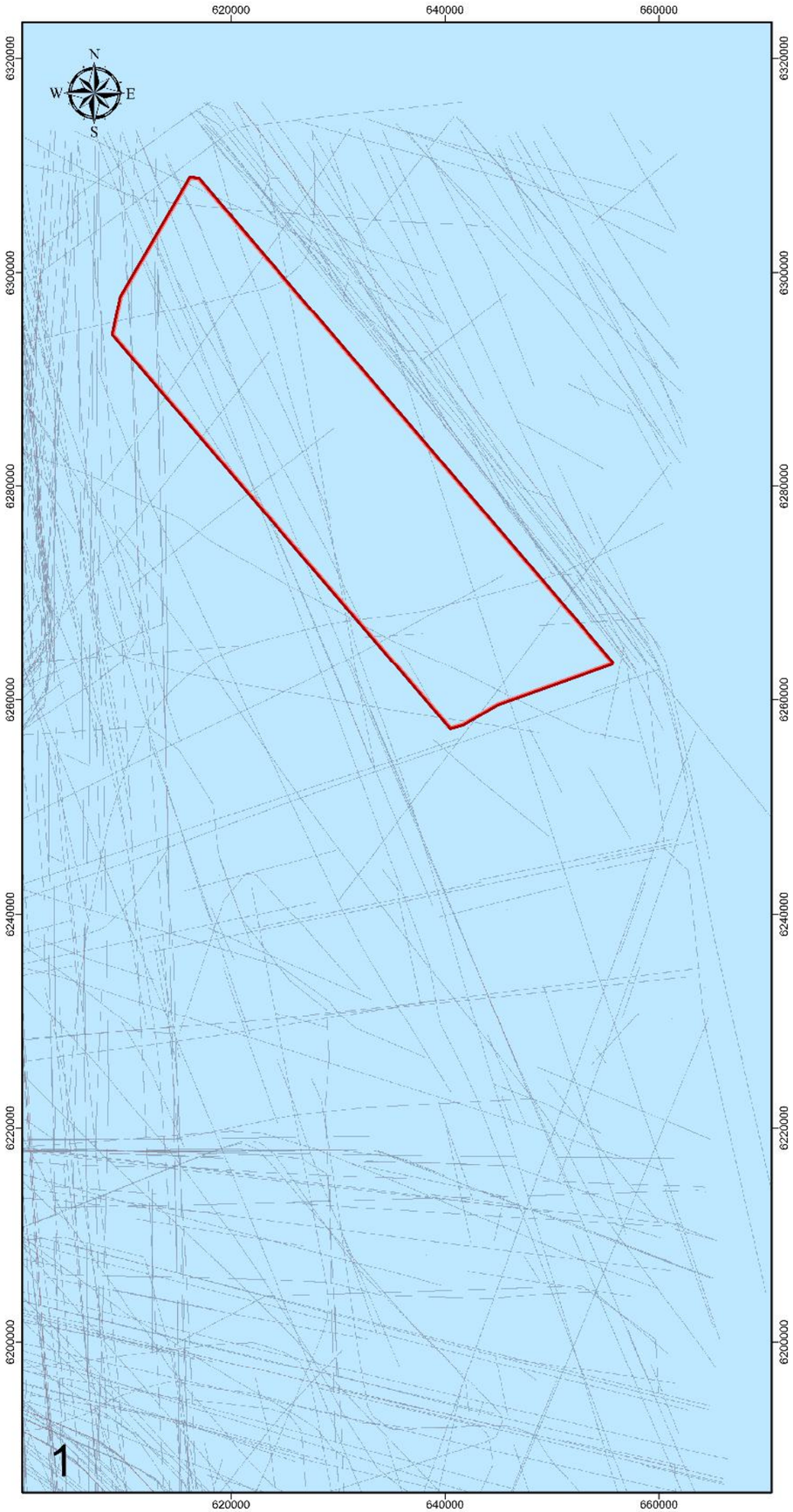
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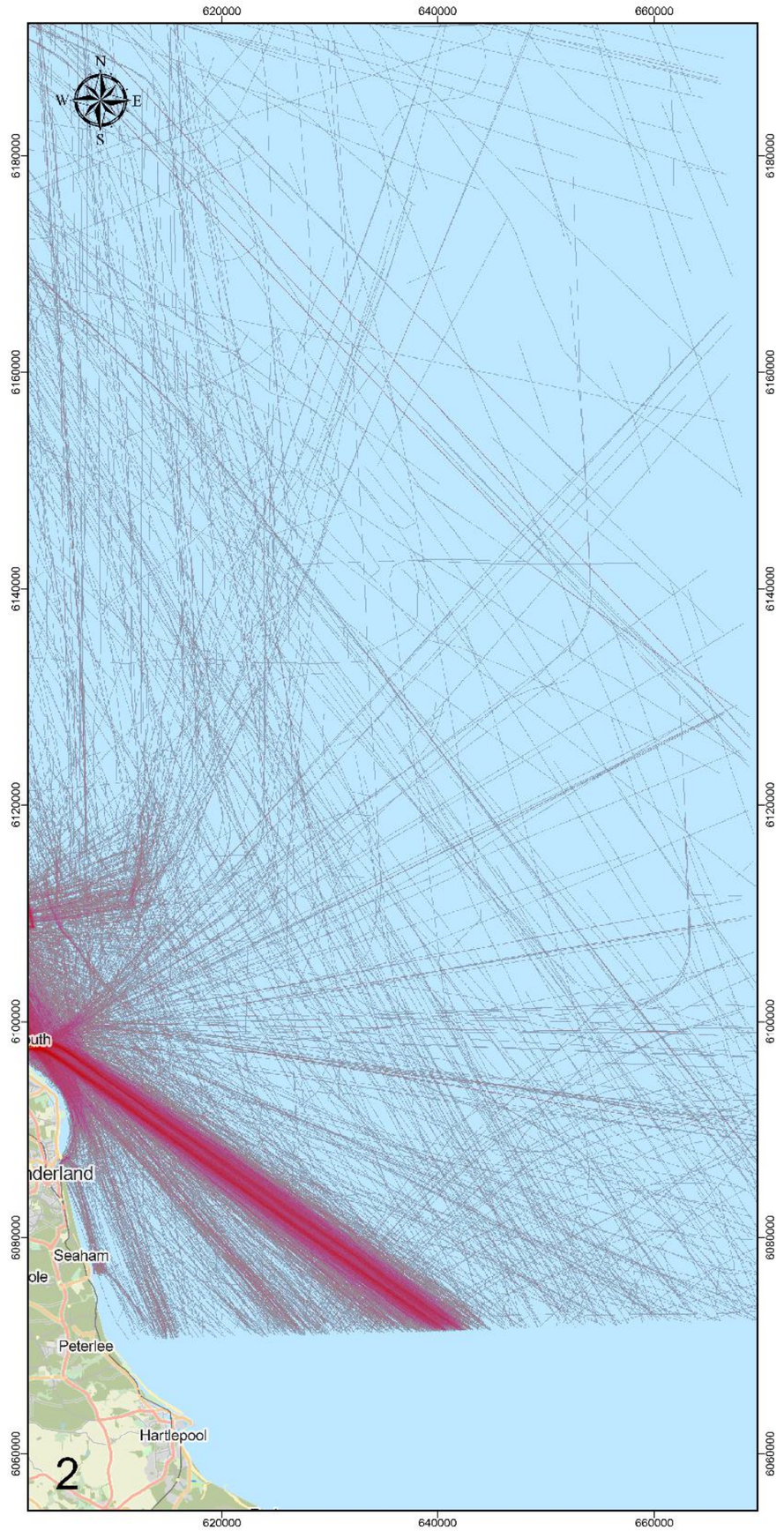
EnBW bp

Partners in UK offshore wind

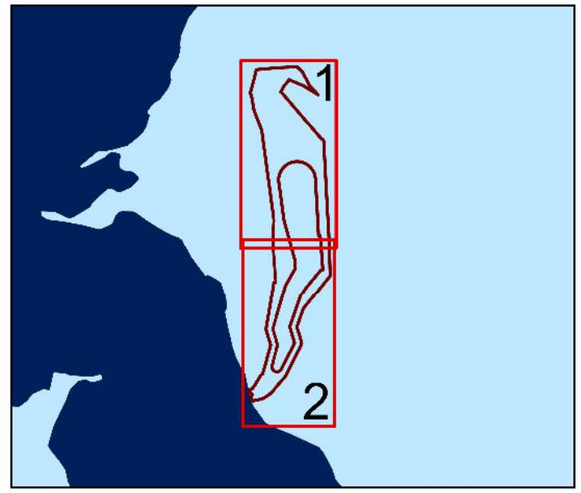
OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Wind Farm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Passenger Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500
- 501 - 750
- 751 - 1000
- 1001 - 2500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	SFC	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

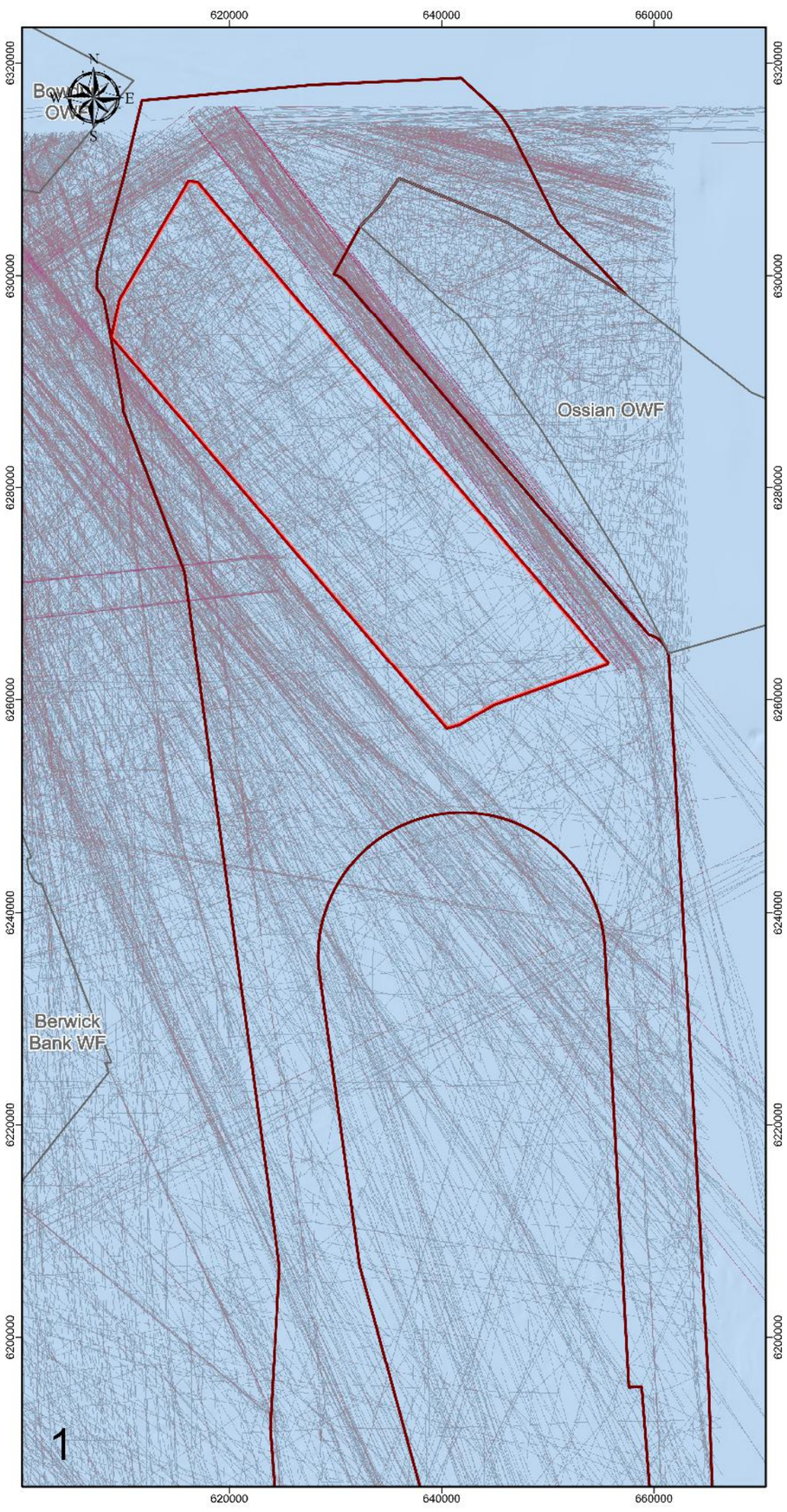
Report Title
Cable Burial Risk Assessment Report

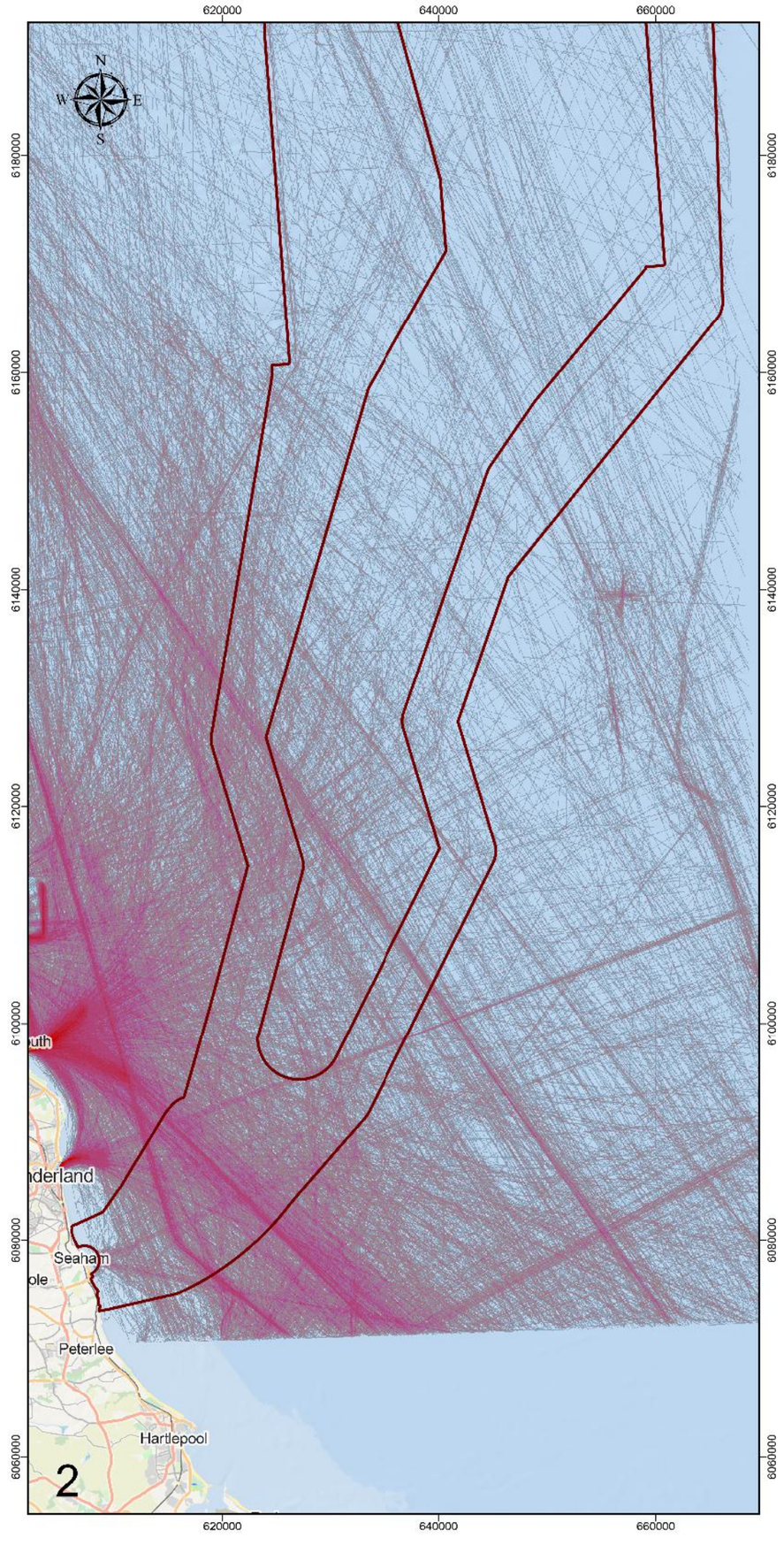
Drawing Title
Modelled Post-Construction Vessel Density - Passenger Vessels

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-012

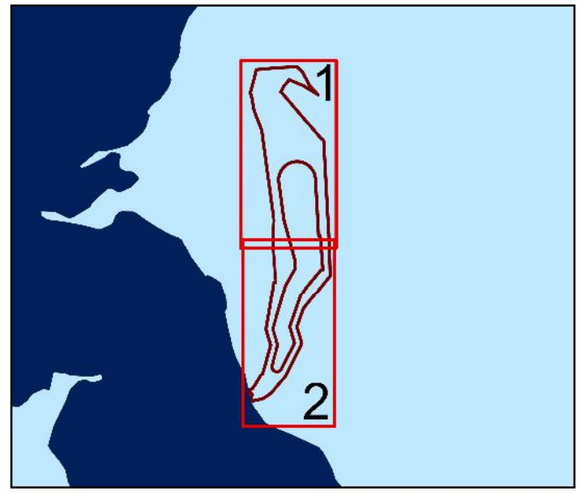
GLOBAL MARITIME
EnBW
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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Other Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500
- 501 - 750
- 751 - 1000
- 1001 - 2500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

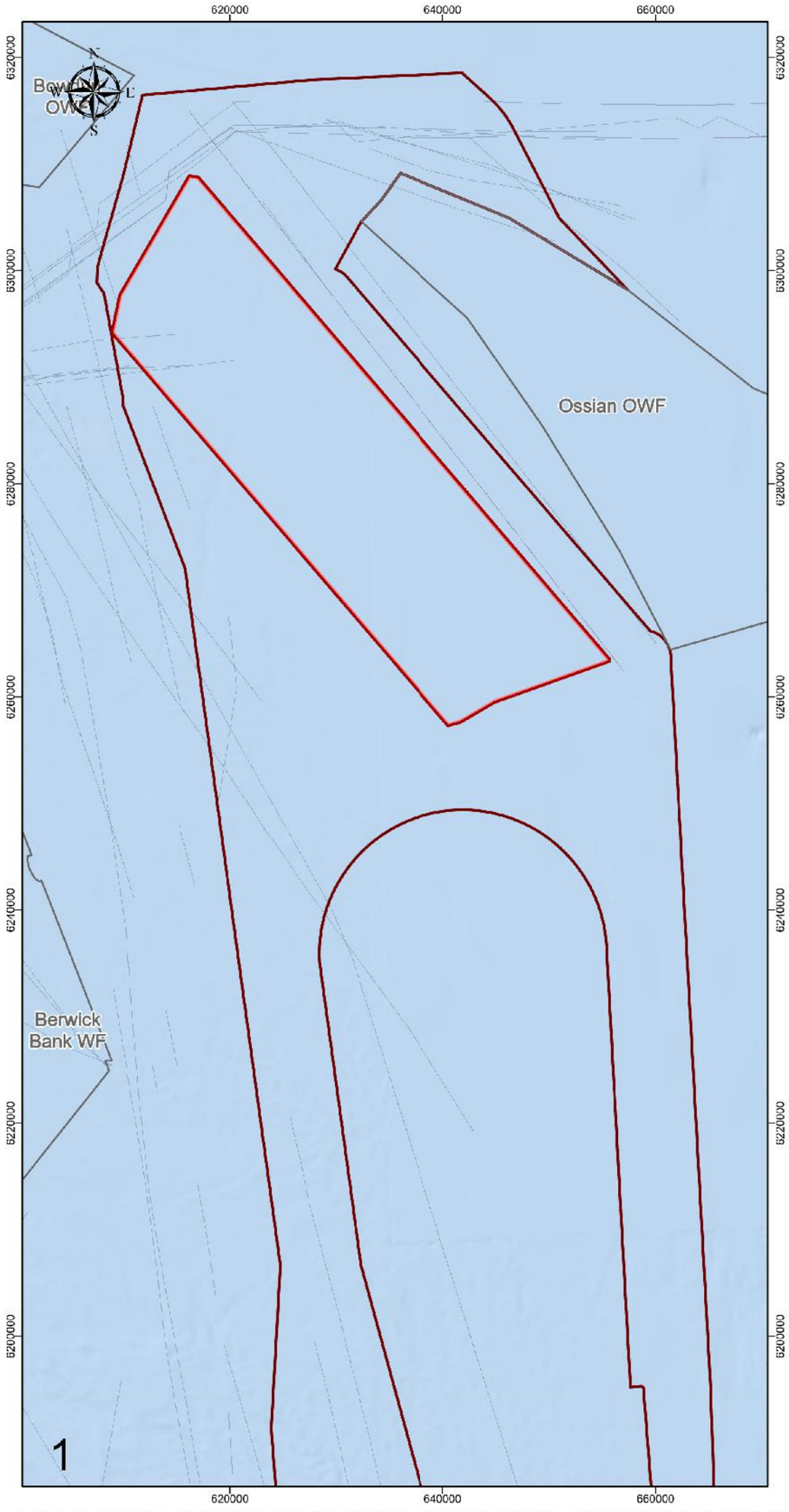
Drawing Title
Modelled Post-Construction Vessel Density - Other Vessels

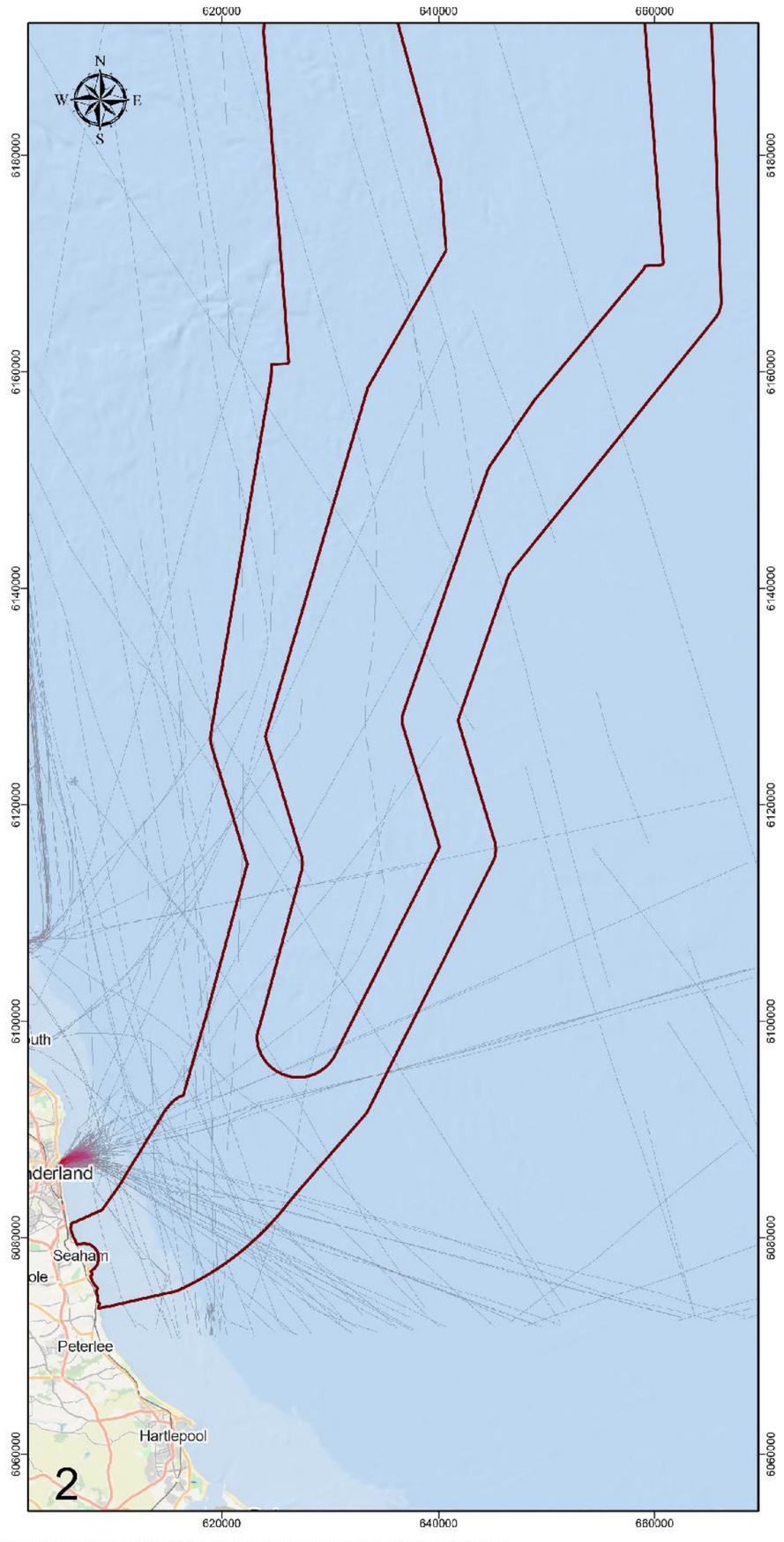
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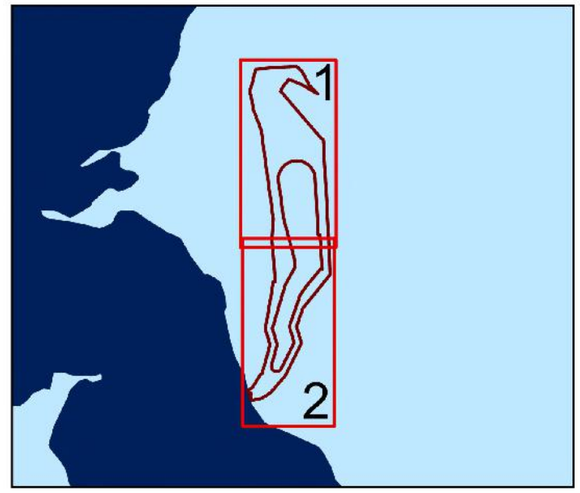
OceanWise, Esri, GEBCO, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Offshore Industry Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

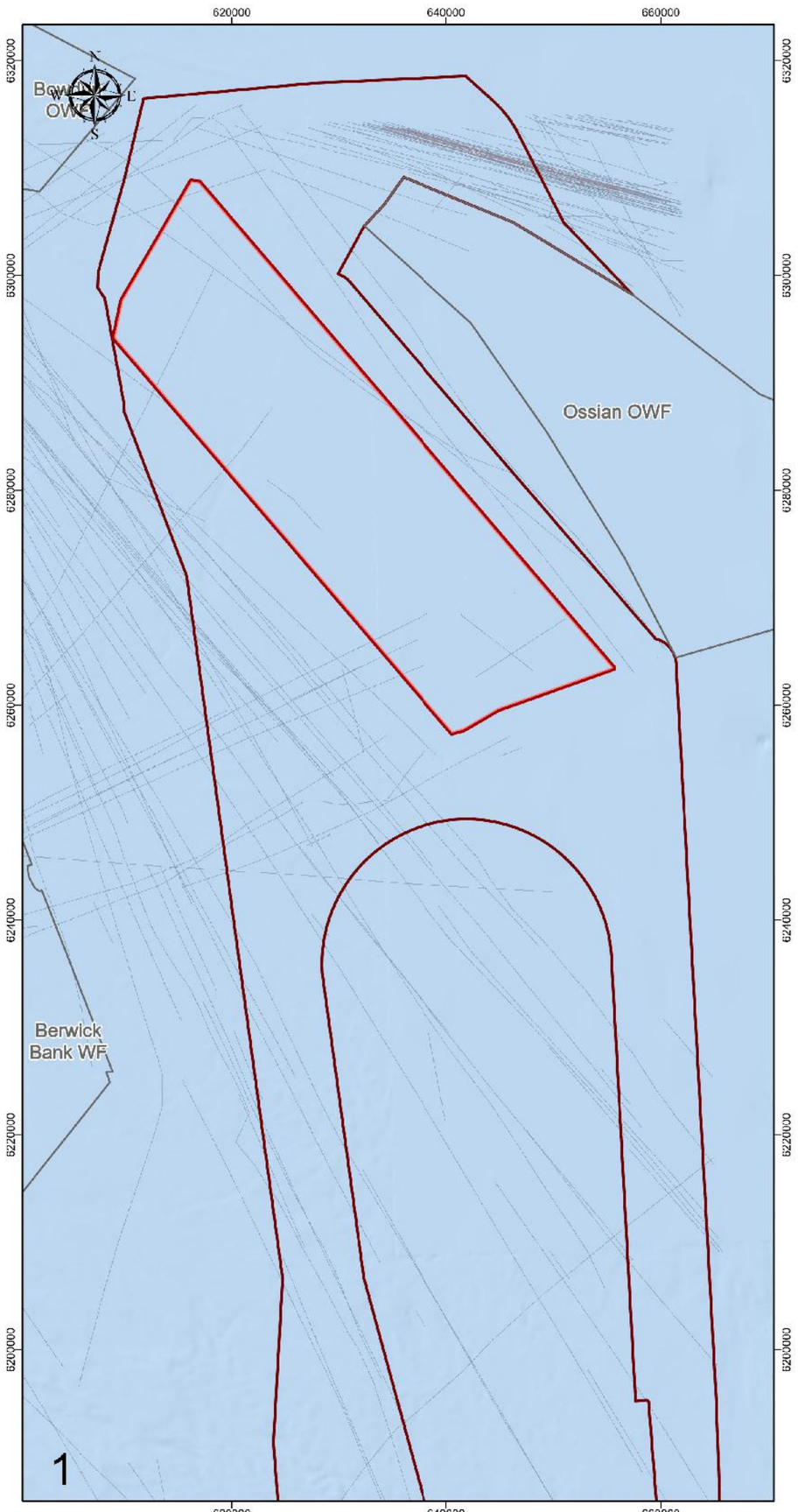
Drawing Title
Modelled Post-Construction Vessel Density - Offshore Industry Vessels

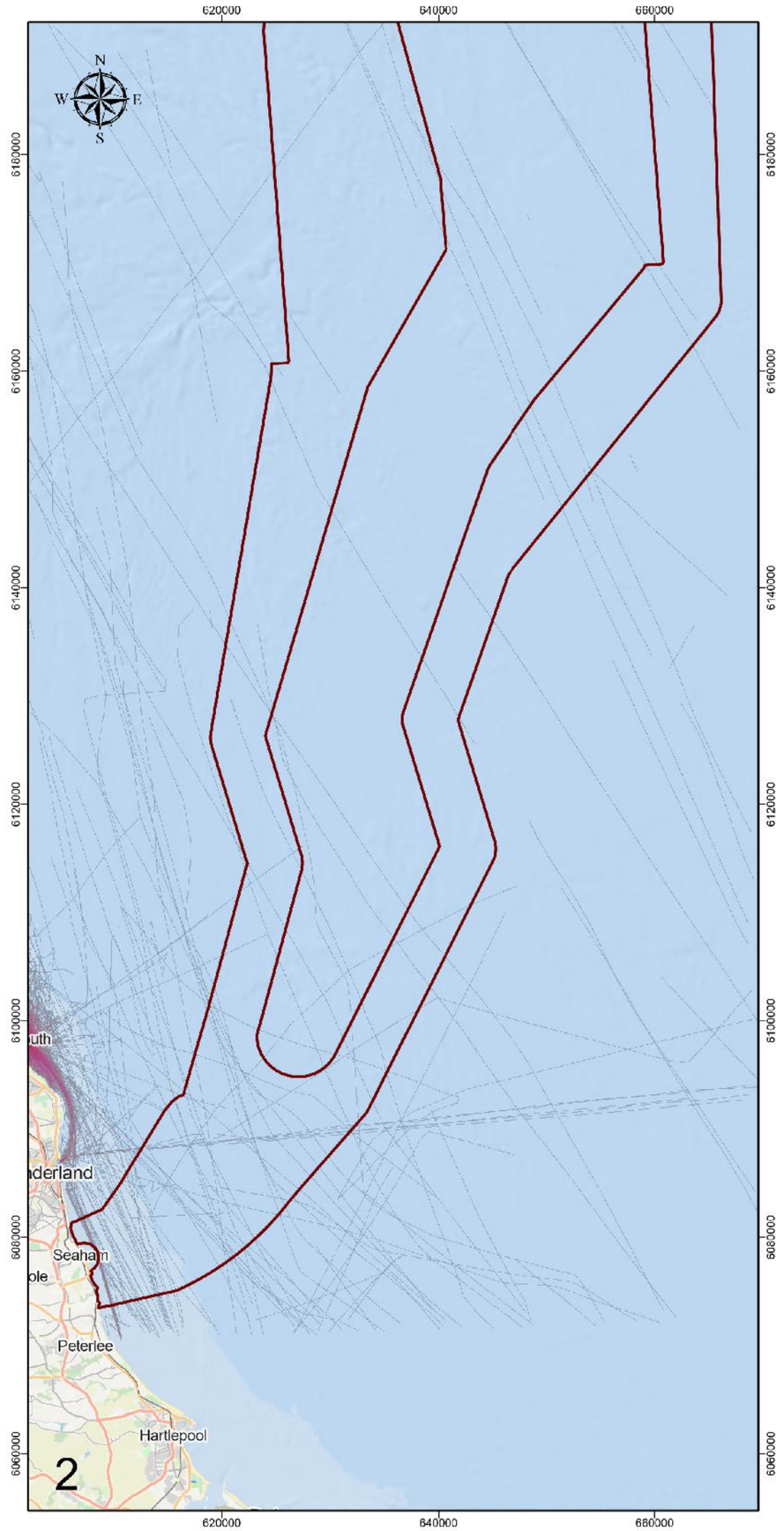
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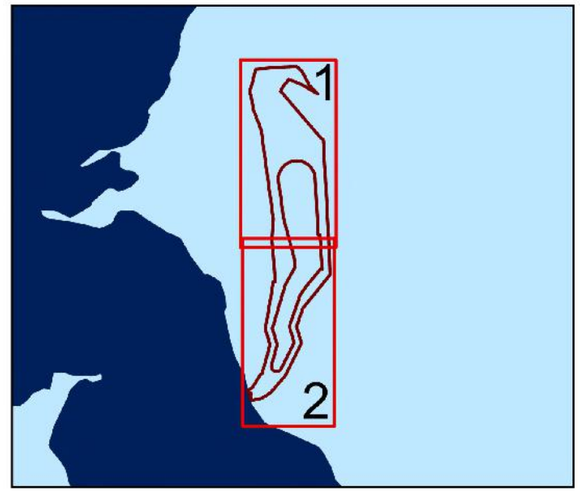
OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Government Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes
1. Source: The Crown Estate. May 2024.
2. Provided by EnBW bp. May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp. May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

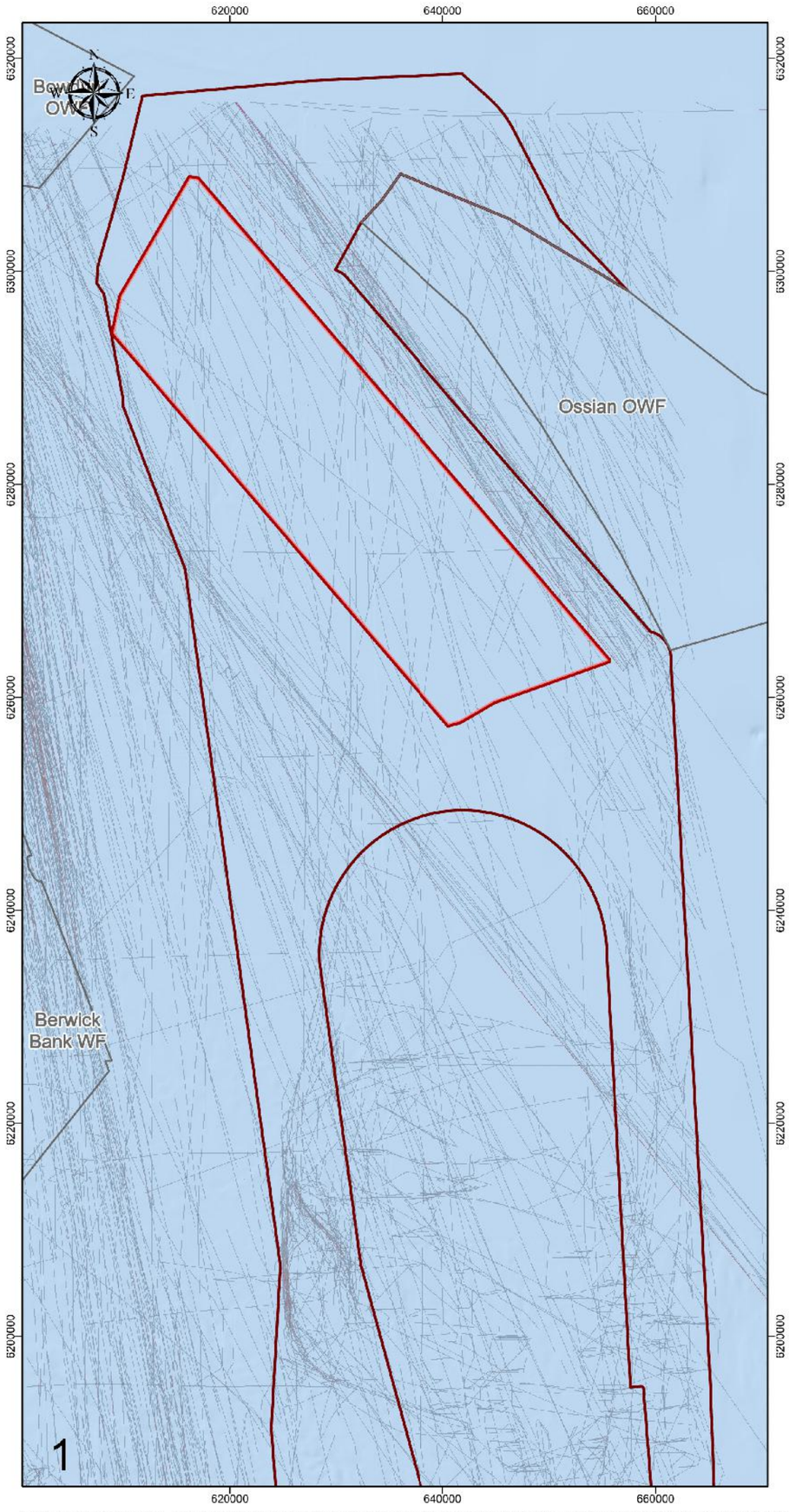
Drawing Title
Modelled Post-Construction Vessel Density - Government Vessels

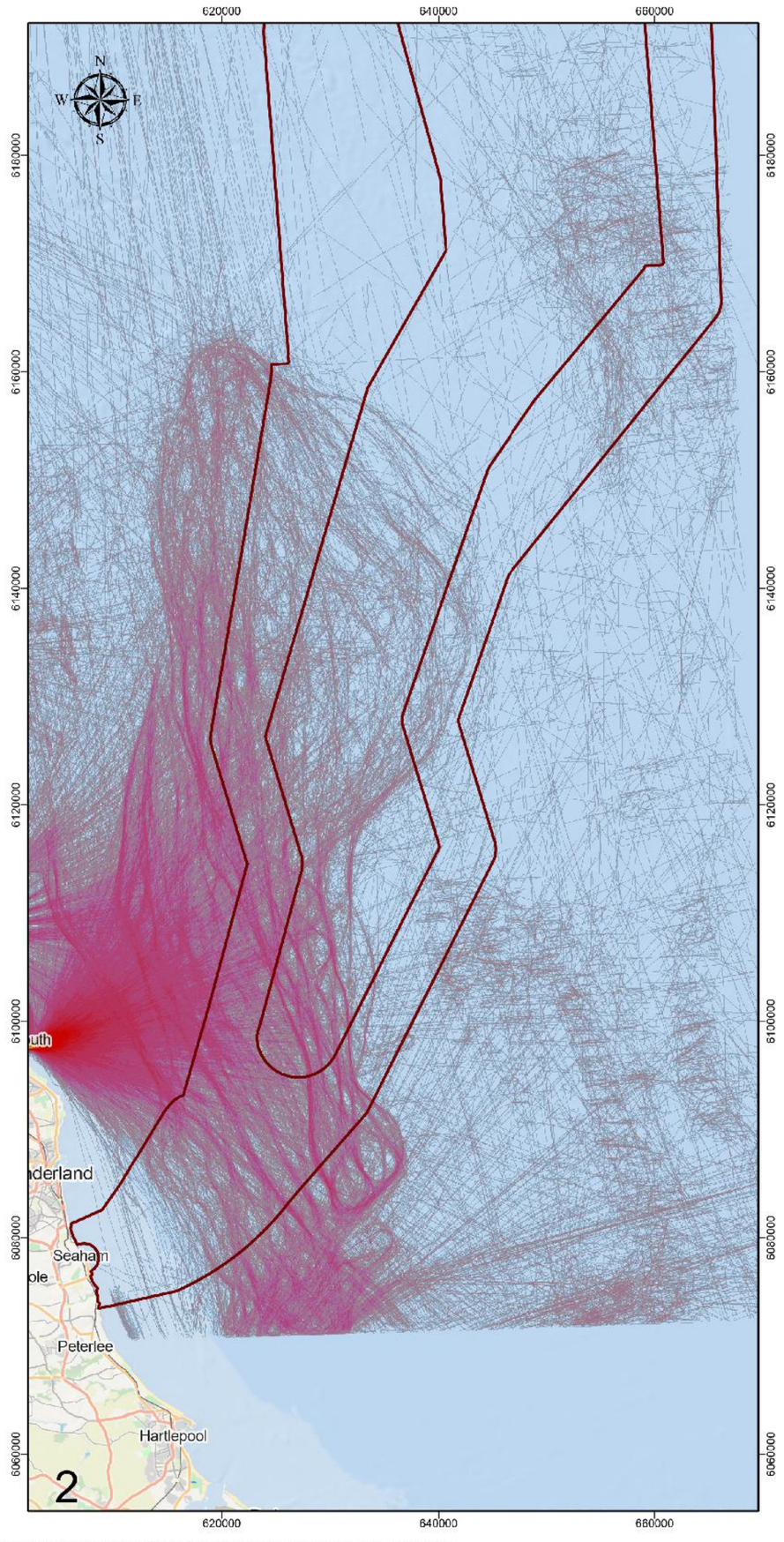
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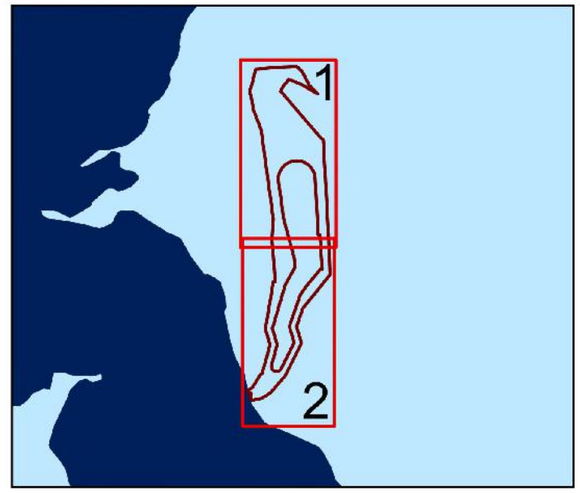
OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Fishing Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500
- 501 - 750
- 751 - 1000
- 1001 - 2500
- 2501 - 5000

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km
0 10 nm

Notes
1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

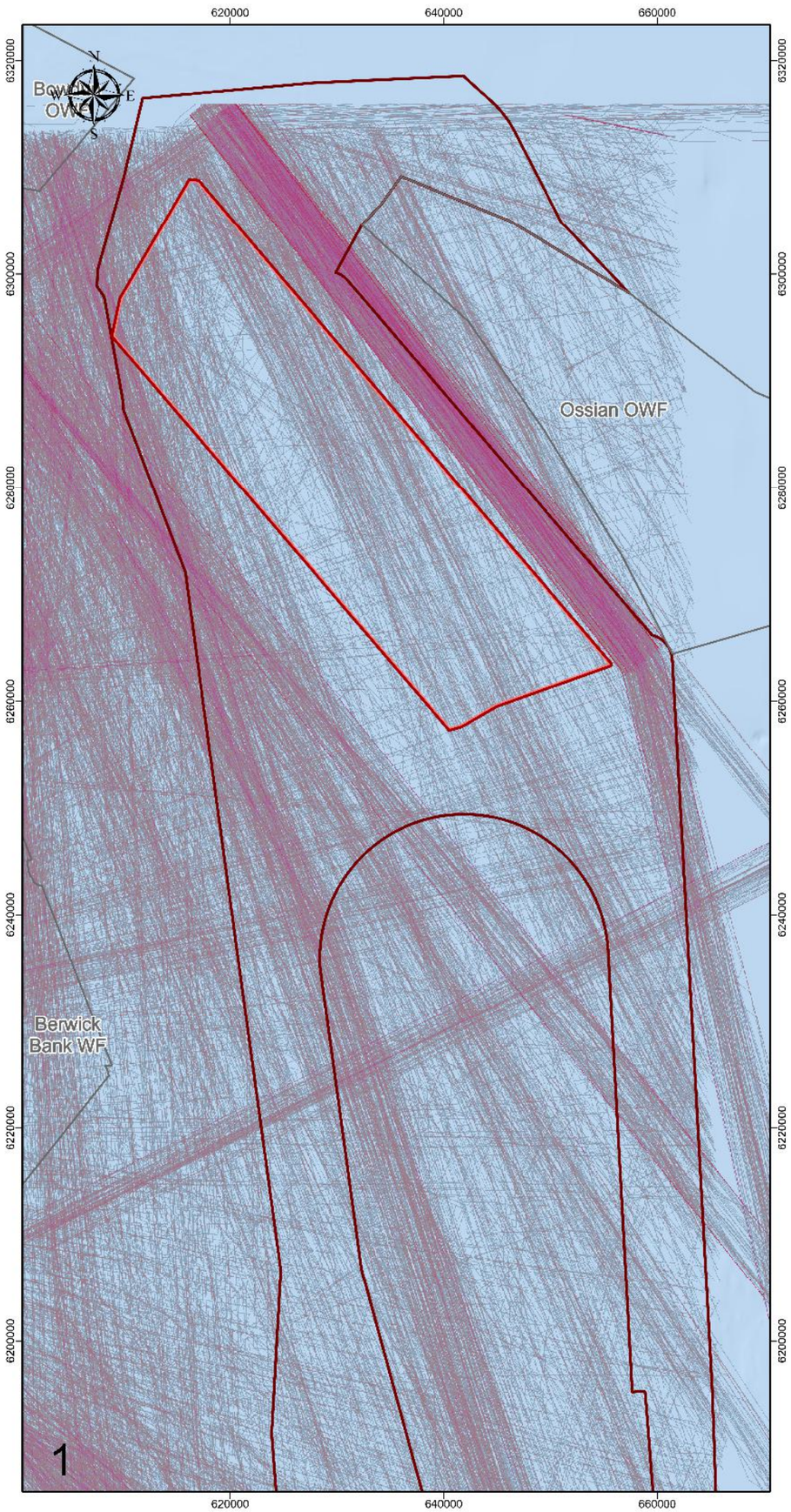
Drawing Title
Modelled Post-Construction Vessel Density - Fishing Vessels

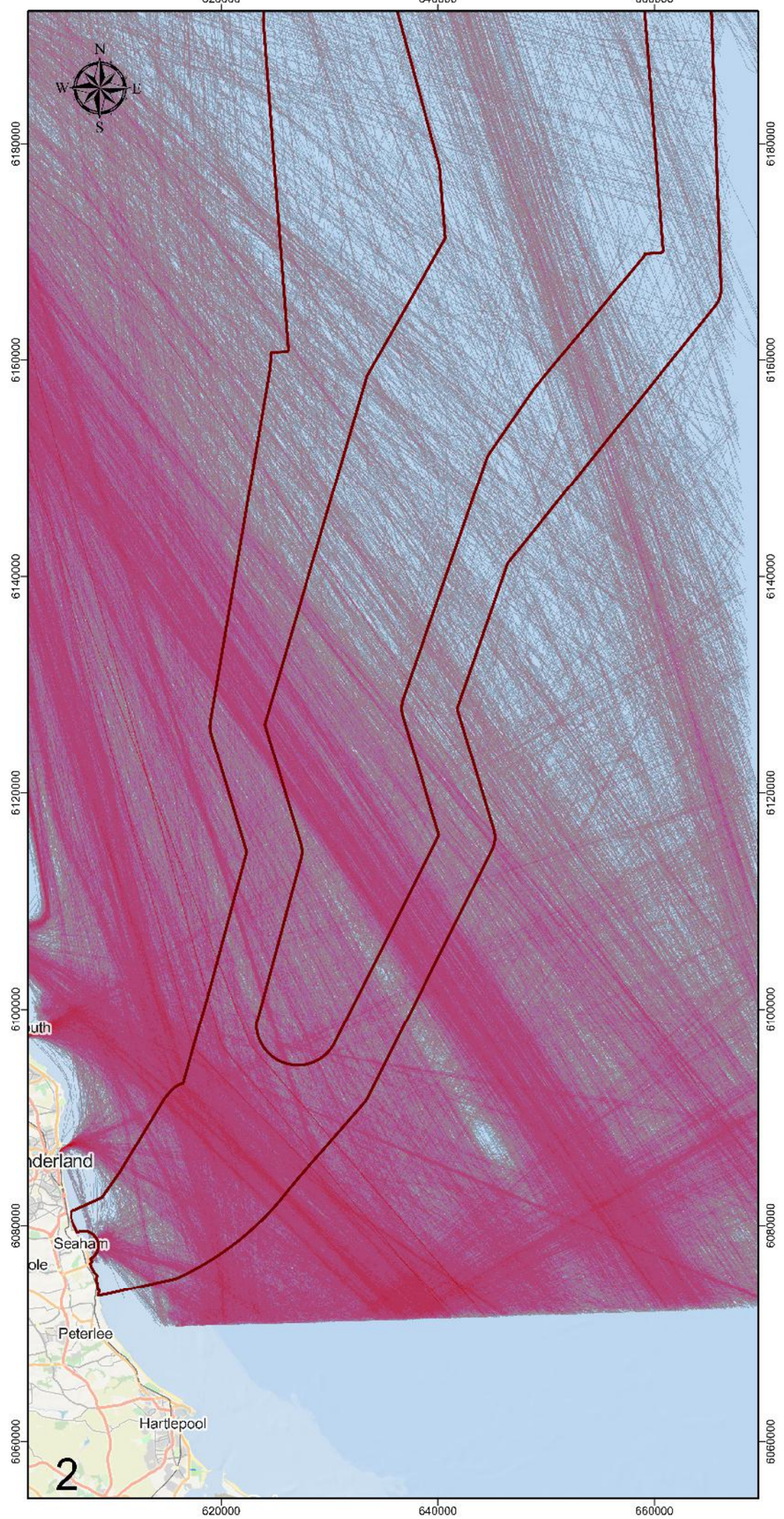
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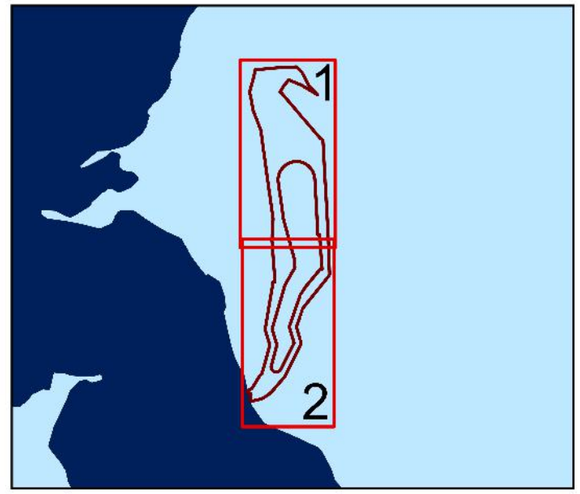
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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Modelled Post-Construction Vessel Density - Cargo Vessels [3,4]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7
- 8 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 251 - 500
- 501 - 750
- 751 - 1000

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:500,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. Modelled by GM based on re-routing the pre-construction data provided by EnBW bp, May 2024.
4. Tracks per 50x50m grid cell over a 2 year period.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

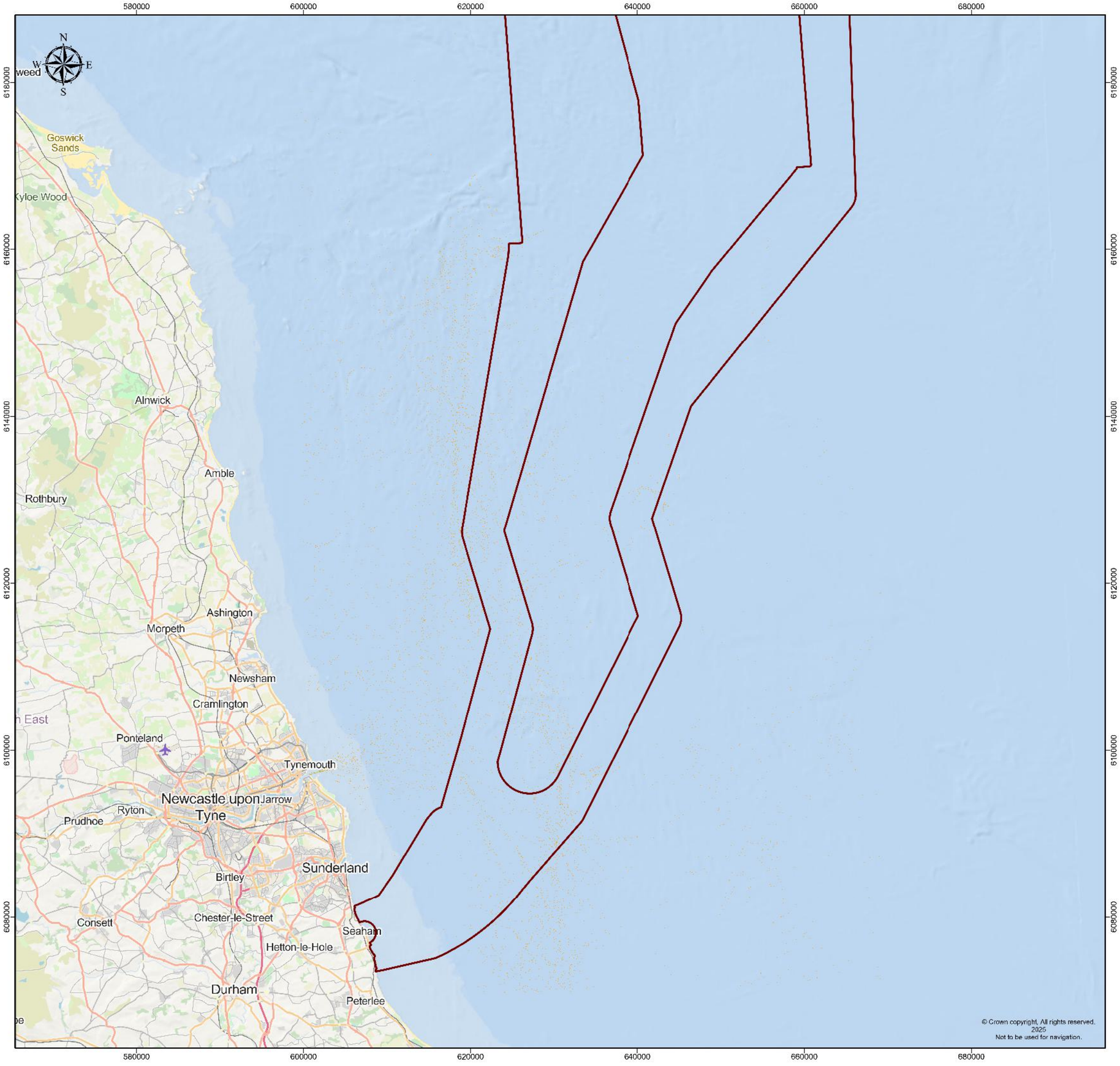
Drawing Title
Modelled Post-Construction Vessel Density - Cargo Vessels

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-017

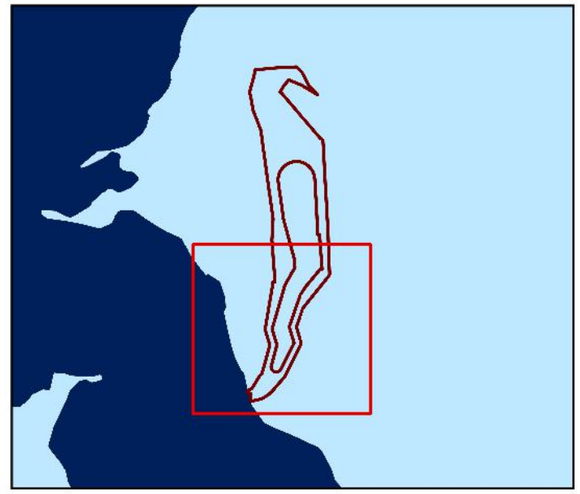
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OceanWise, Esri, GEBCO, Garmin, NaturalVue, OceanWise, Esri, Garmin, NaturalVue

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Location Map



Legend

- Morven Offshore Wind Farm [1]
- Other Windfarm Boundary [1]
- Redline Boundary [2]

Vessel Density - Vessels Engaged In Fishing [3, 4, 5]

- 0
- 1
- 2 - 3
- 4 - 5
- 6 - 7

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	23/05/2024	FIRST ISSUE	LMC	HCA	MLA
02	30/07/2025	CLIENT COMMENTS ACTIONED	LMC	LMU	MLA

Scale @ A3: 1:450,000
Datum: European 1950
Projection: UTM Zone 30N

0 20 km

0 10 nm

Notes

1. Source: The Crown Estate, May 2024.
2. Provided by EnBW bp, May 2024.
3. AIS data supplied by EnBW bp, April 2024.
4. Tracks per 50x50m grid cell over a 2 year period (01/01/2022 - 28/03/2024).
5. Data is mapped where a vessel with the AIS status 'engaged in fishing' intersects a grid cell.

Project Title
Morven OWF - Offshore Export Cable Route pre-FEED

Report Title
Cable Burial Risk Assessment Report

Drawing Title
Vessel Density - Engaged in Fishing Vessels

Drawing Number
GM-PRJ116388-GEO-RP-0001-DWG-018

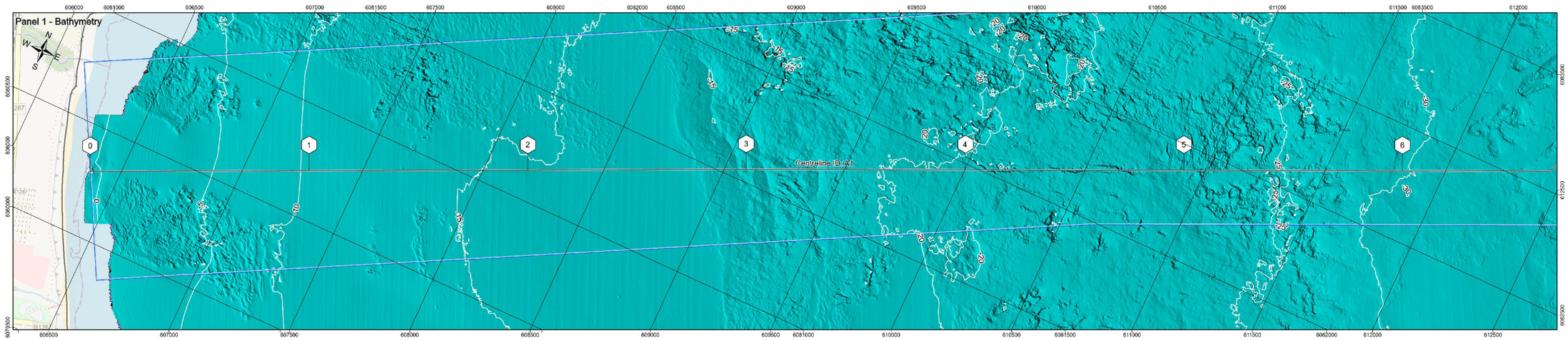
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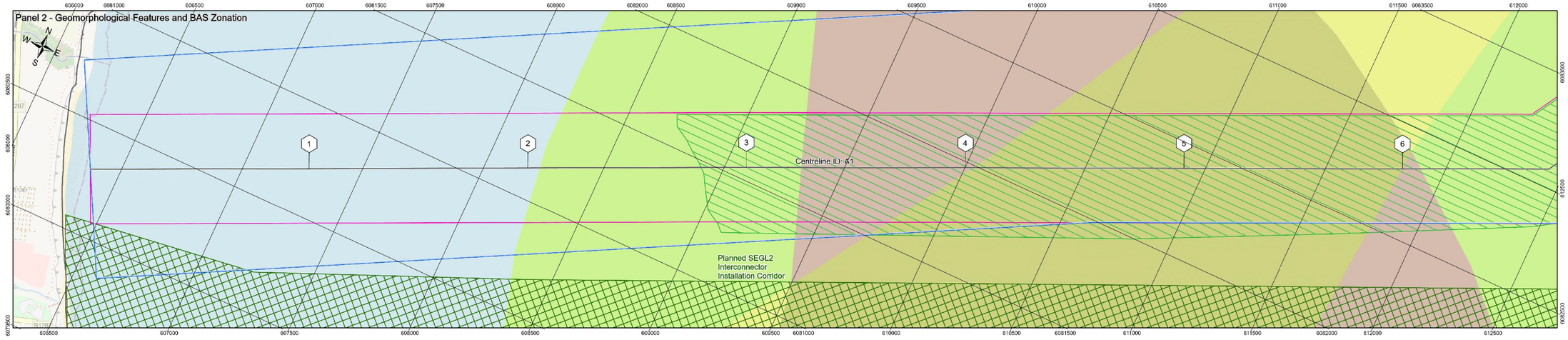
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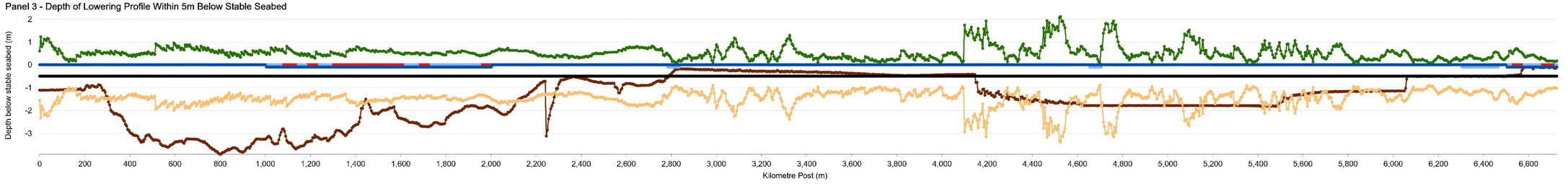
Panel 1 - Bathymetry



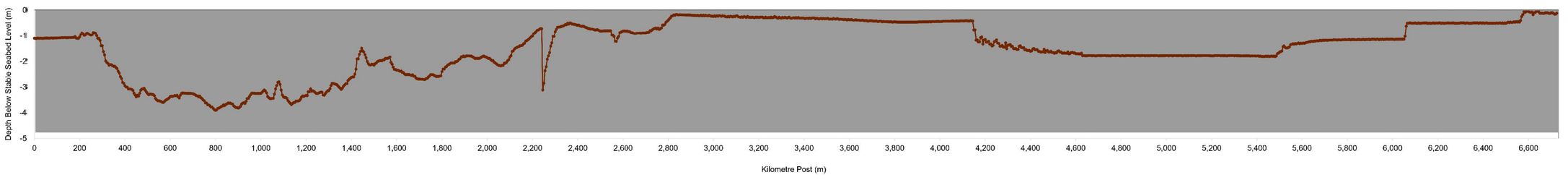
Panel 2 - Geomorphological Features and BAS Zonation



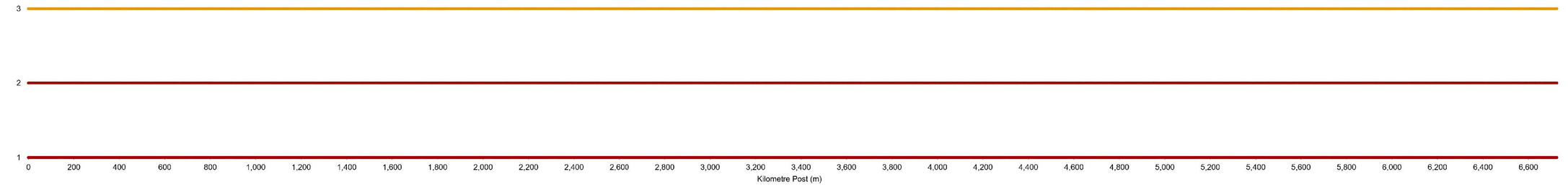
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



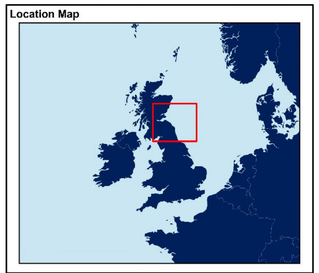
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



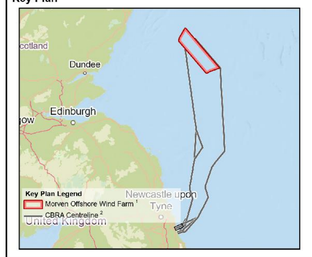
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [4]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
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- Linear feature
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- Trawl mark
- Bedrock outcrop
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- Glacial features
- Scouring
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Seabed Substrate [4]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [9]
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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
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- Extremely High Strength CLAY (C7)
- Rock (R)

- Layer 1/Layer 2 Boundary [8]

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

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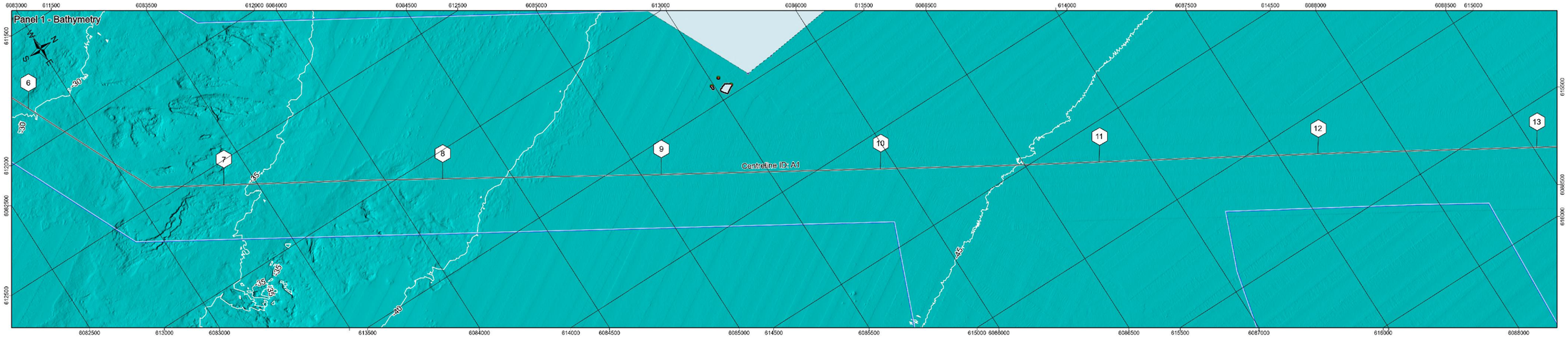
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 1 of 34

Drawing Status
Issue for Review

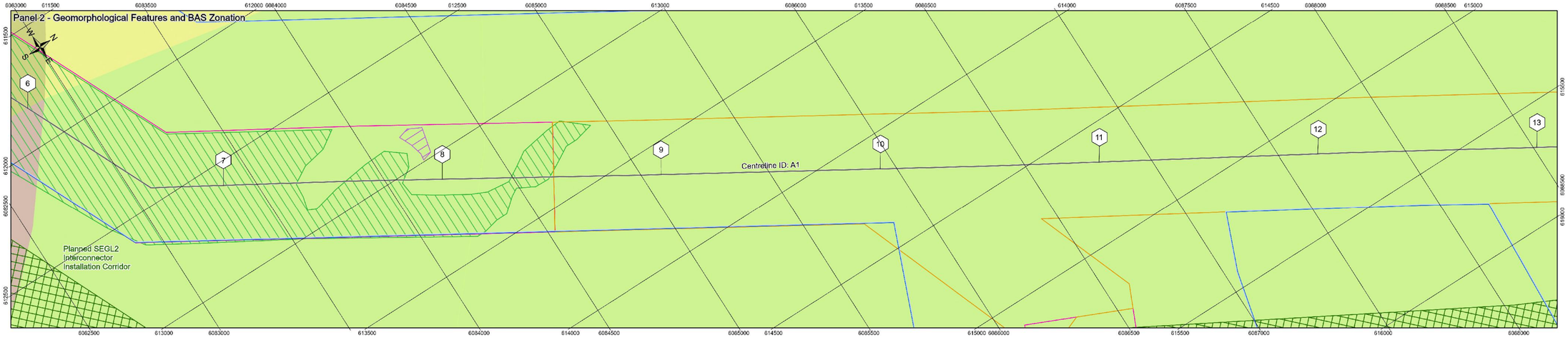
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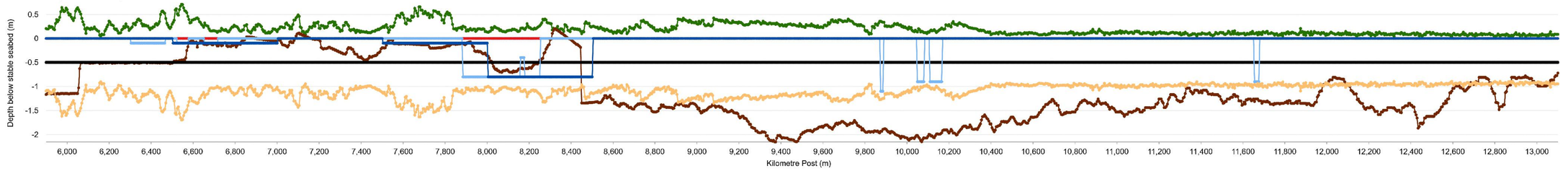
Panel 1 - Bathymetry



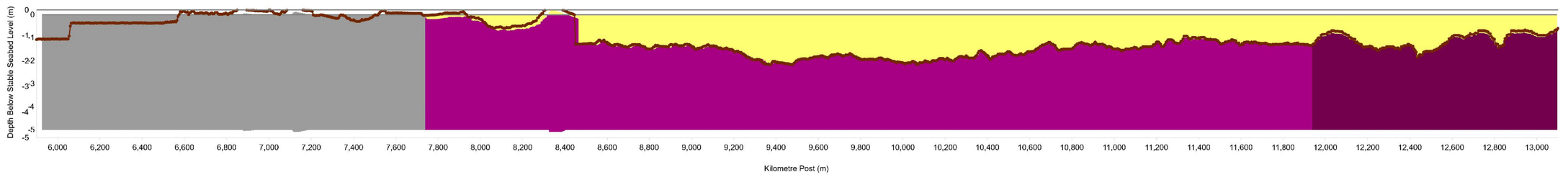
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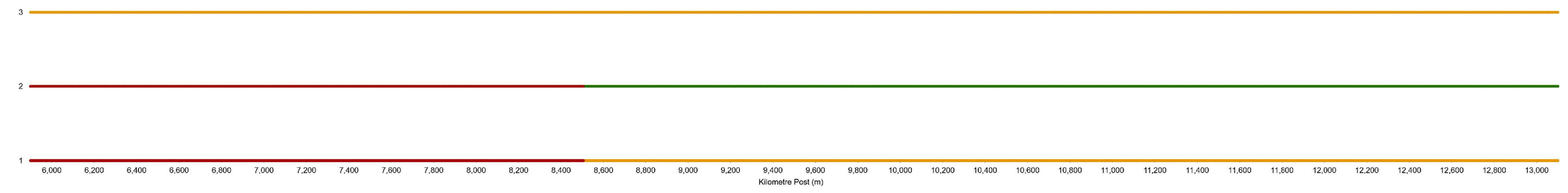
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



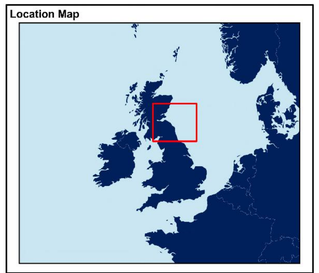
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



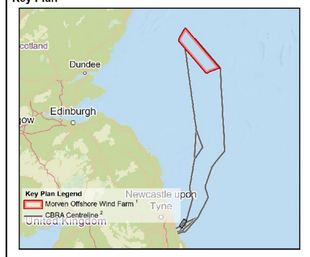
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Legend

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- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
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- Suitable [3]
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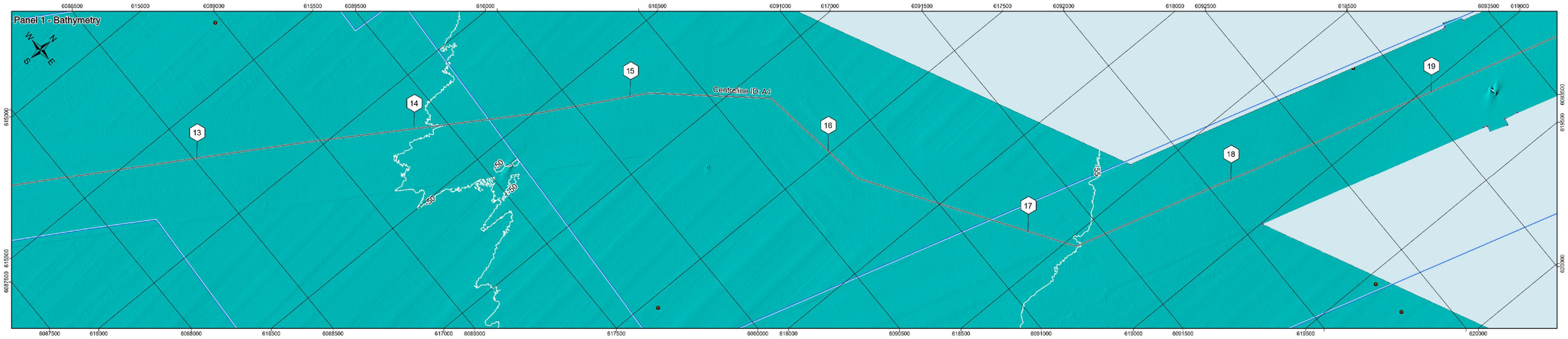
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

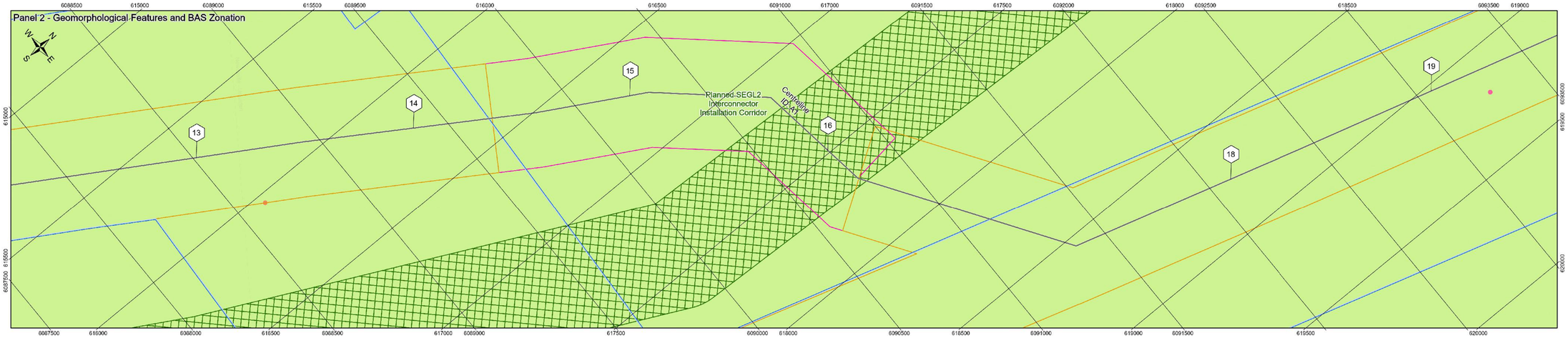
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 2 of 34

Drawing Status
Issue for Review

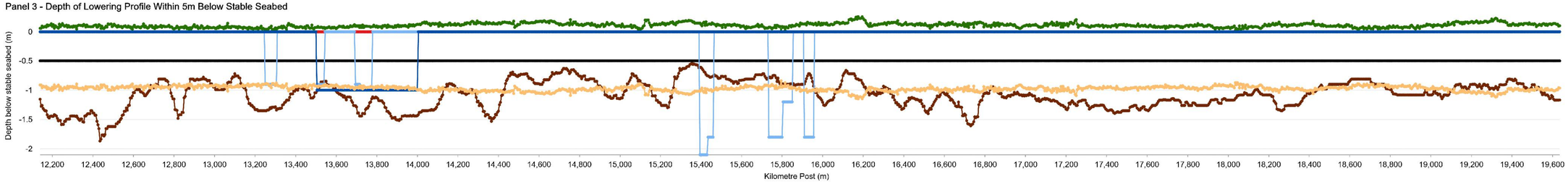
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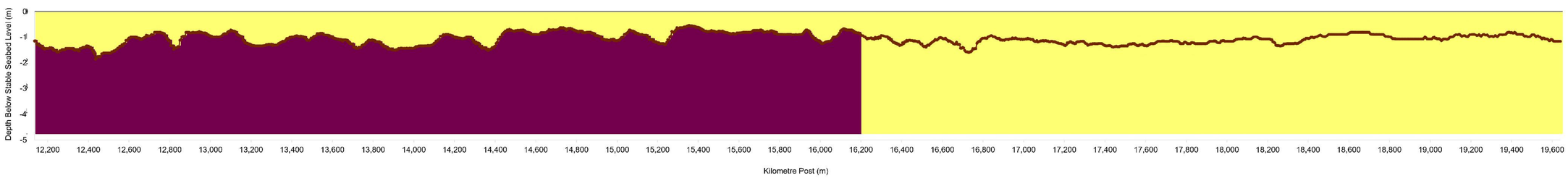




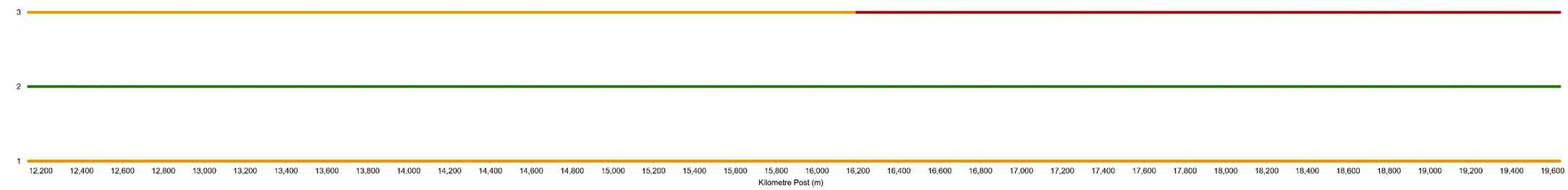
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



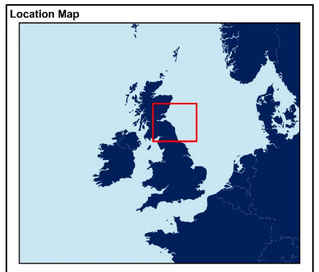
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



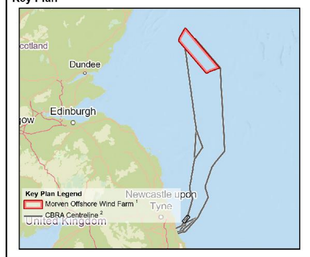
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Key Plan



Legend

Panel 1 & Site Data

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BAS Zone Classification [9]
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- Depression with boulder/debris
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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- Suitable [3]
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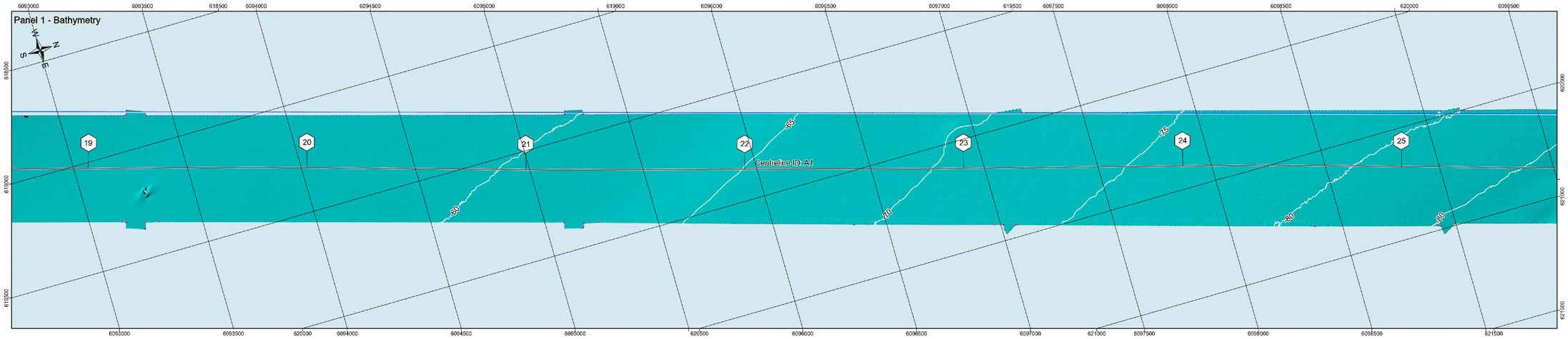
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 3 of 34

Drawing Status
Issue for Review

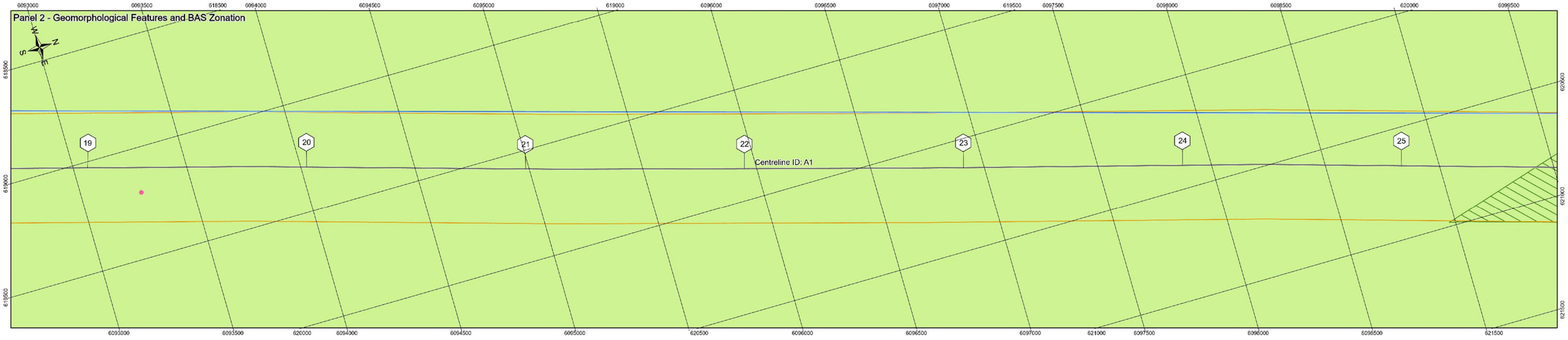
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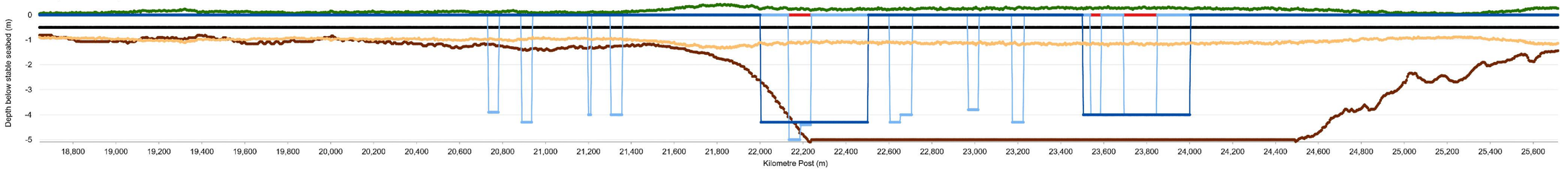
Panel 1 - Bathymetry



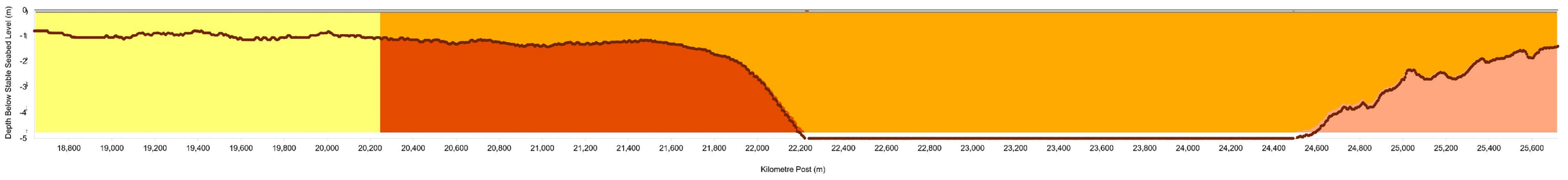
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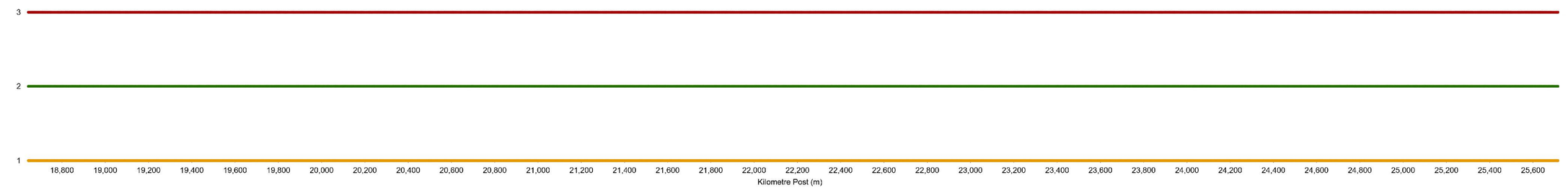
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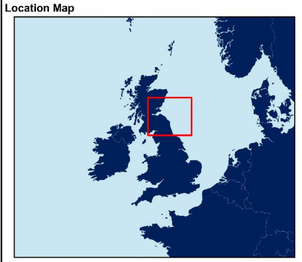
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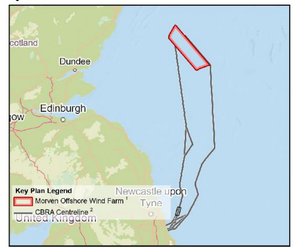
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Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

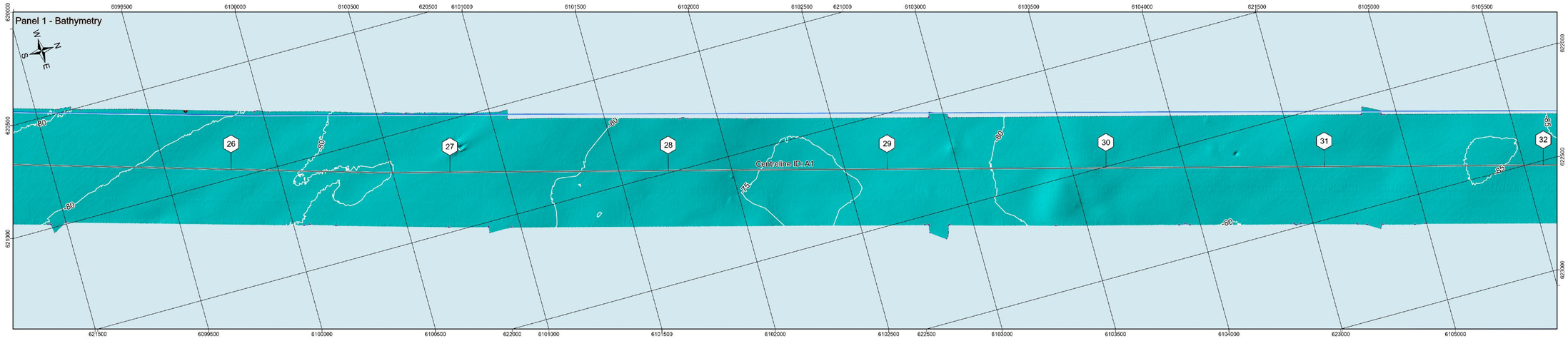
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 4 of 34

Drawing Status
Issue for Review

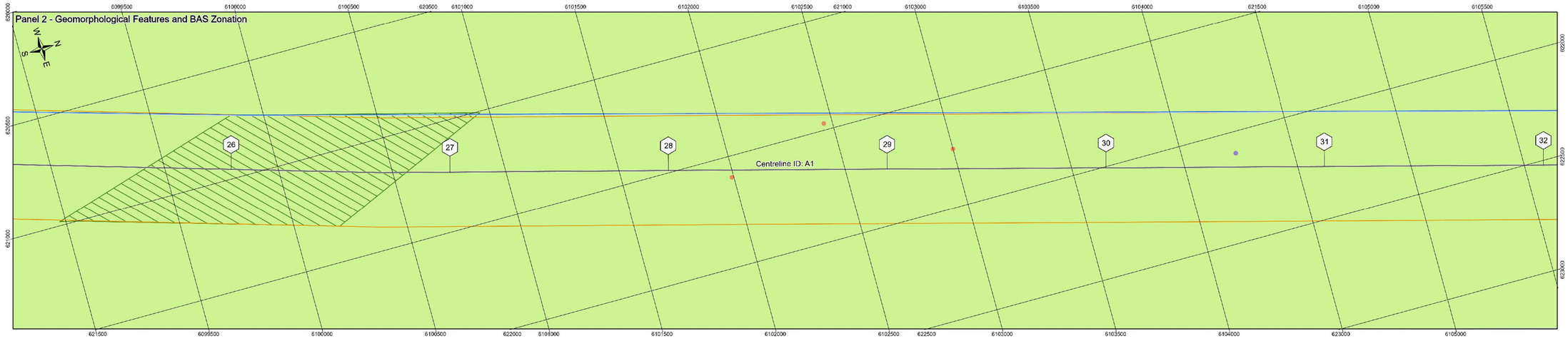
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GLOBAL MARITIME — EnBW — bp
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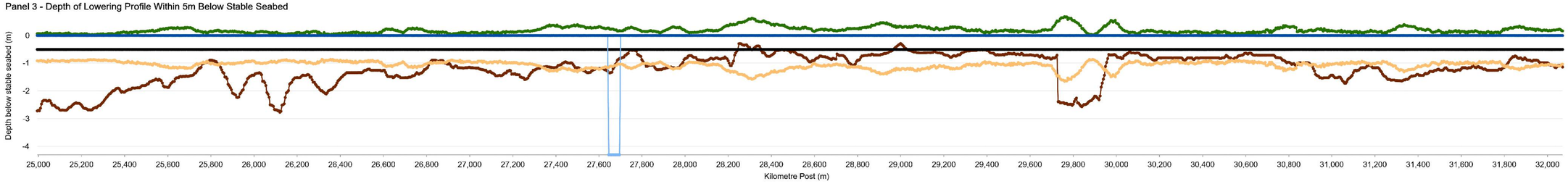
Panel 1 - Bathymetry



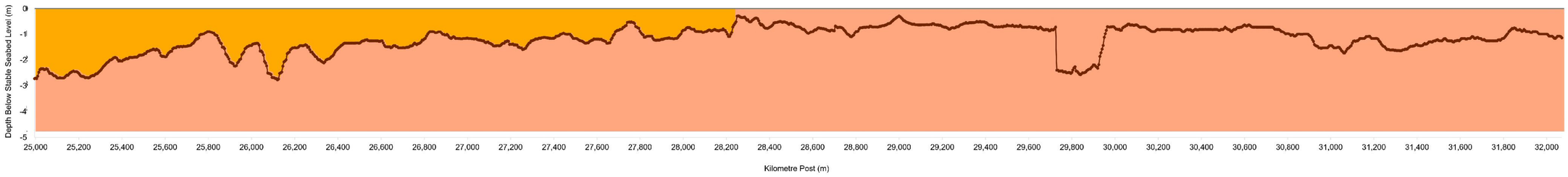
Panel 2 - Geomorphological Features and BAS Zonation



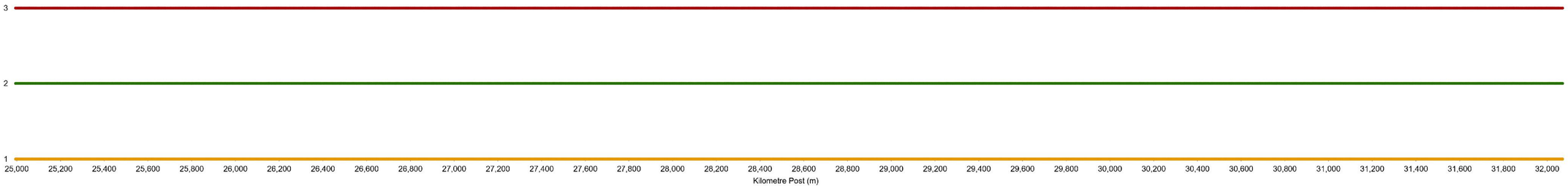
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



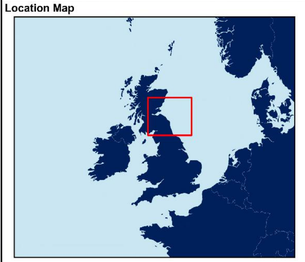
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



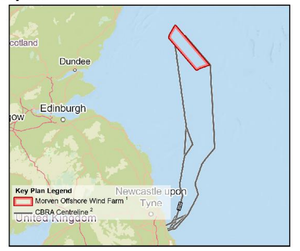
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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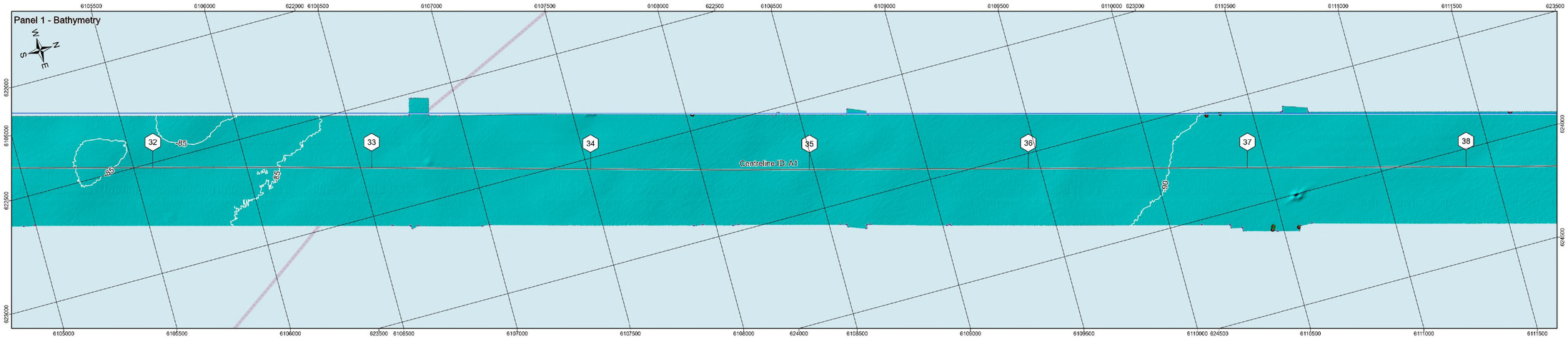
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 5 of 34

Drawing Status
Issue for Review

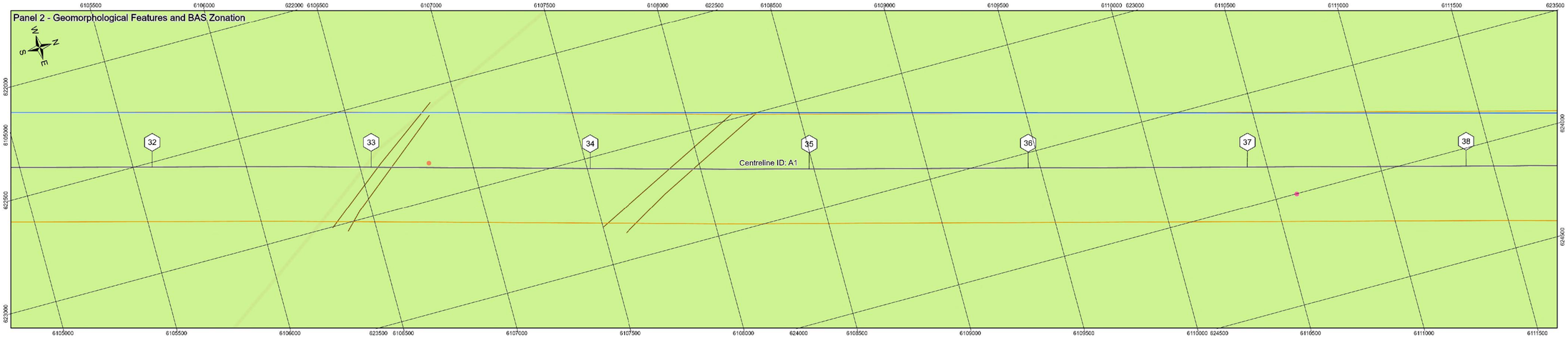
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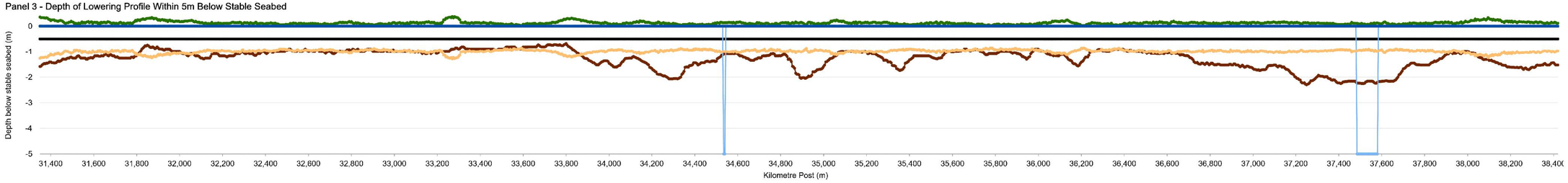
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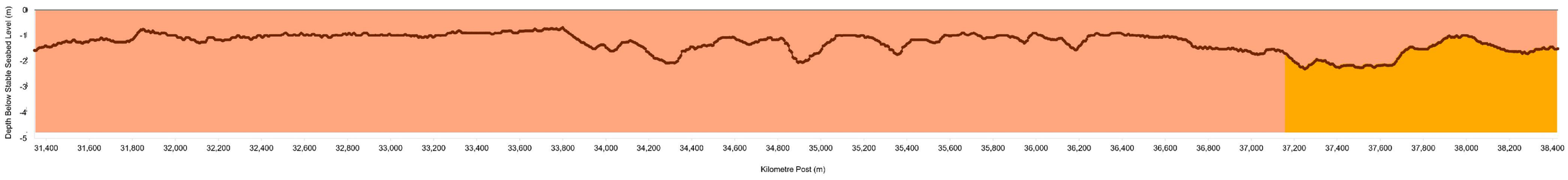
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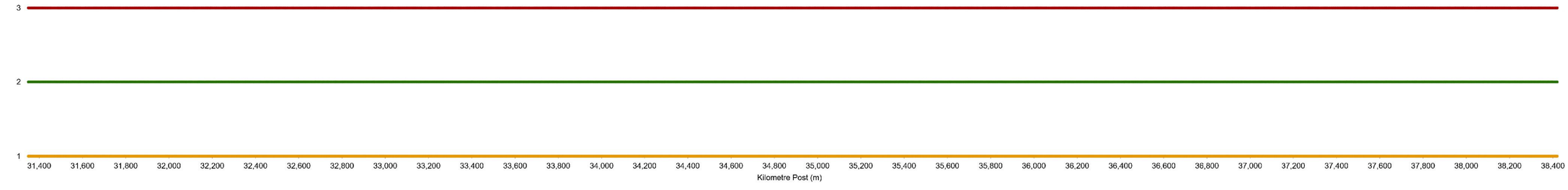
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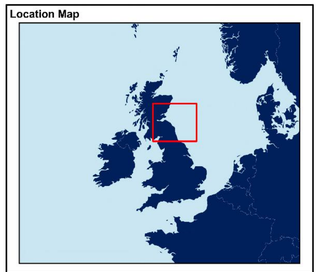
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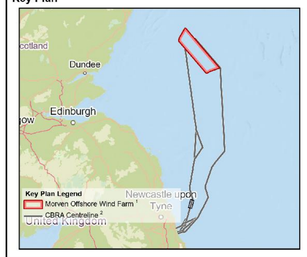
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Key Plan



Legend

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- Possible Mobile Bedform Height [8]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Central Meridian: -3.0000
Latitude of Origin: 0.0000
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Map Units: Meter

Notes:
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Morven Offshore Wind Farm

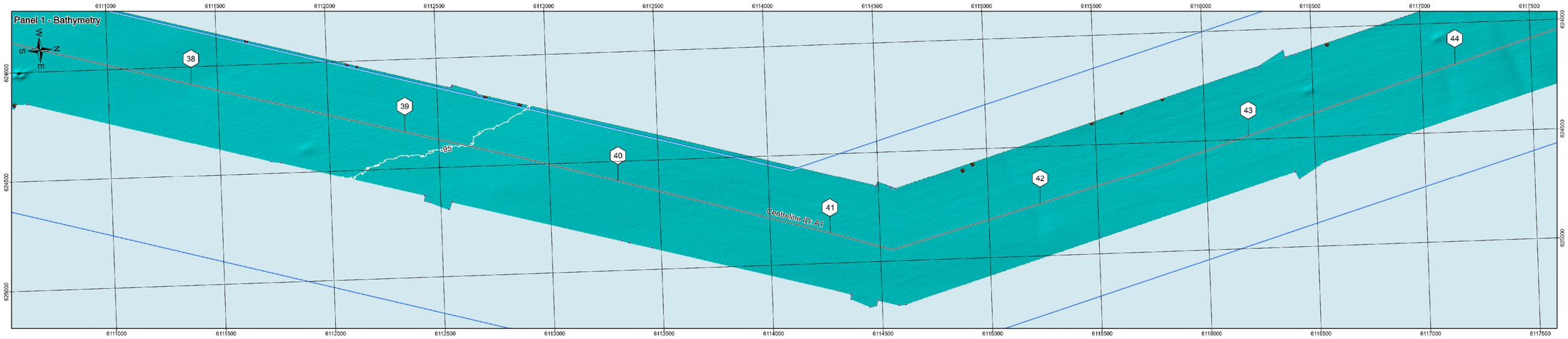
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

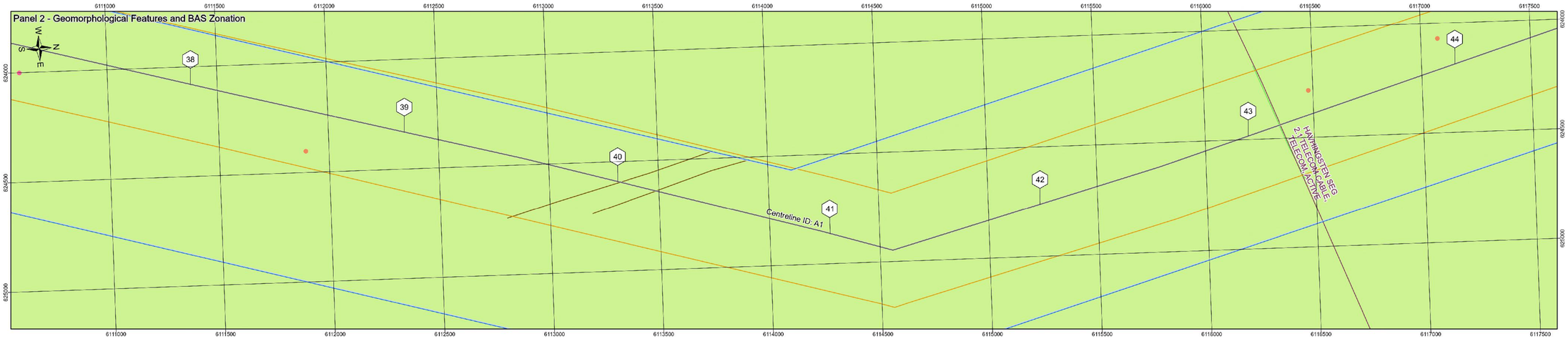
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 6 of 34

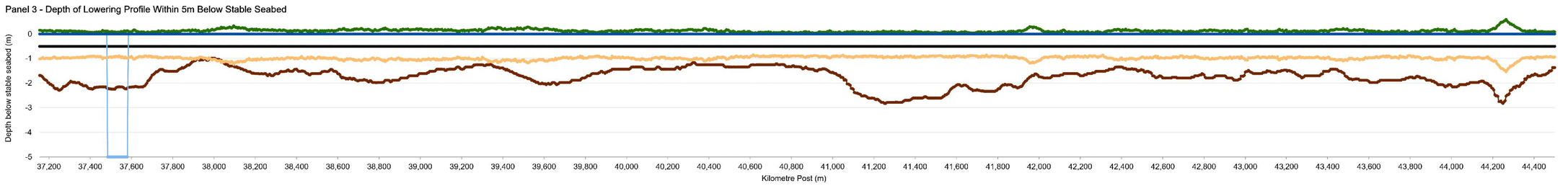
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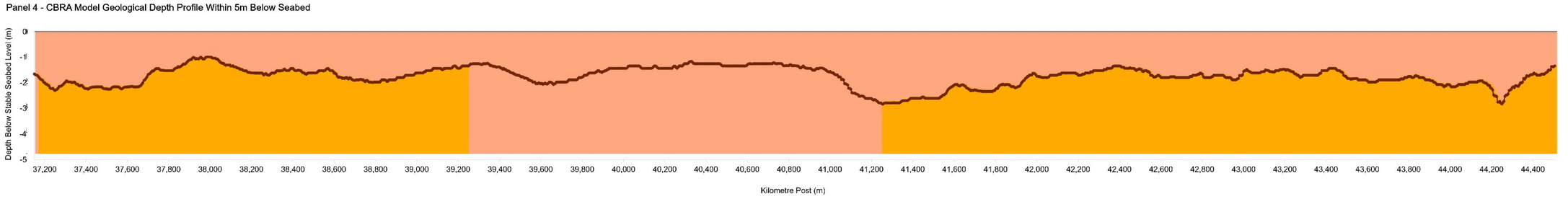
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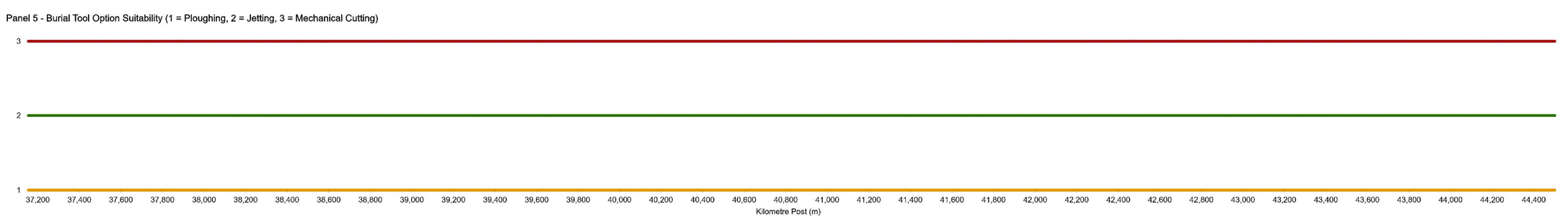
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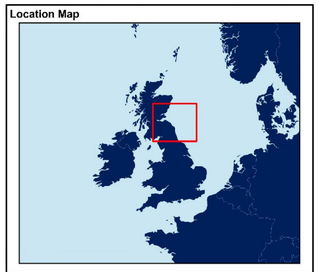


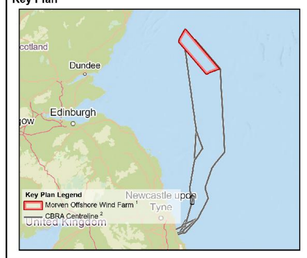












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Layer 1/Layer 2 Boundary [8]	

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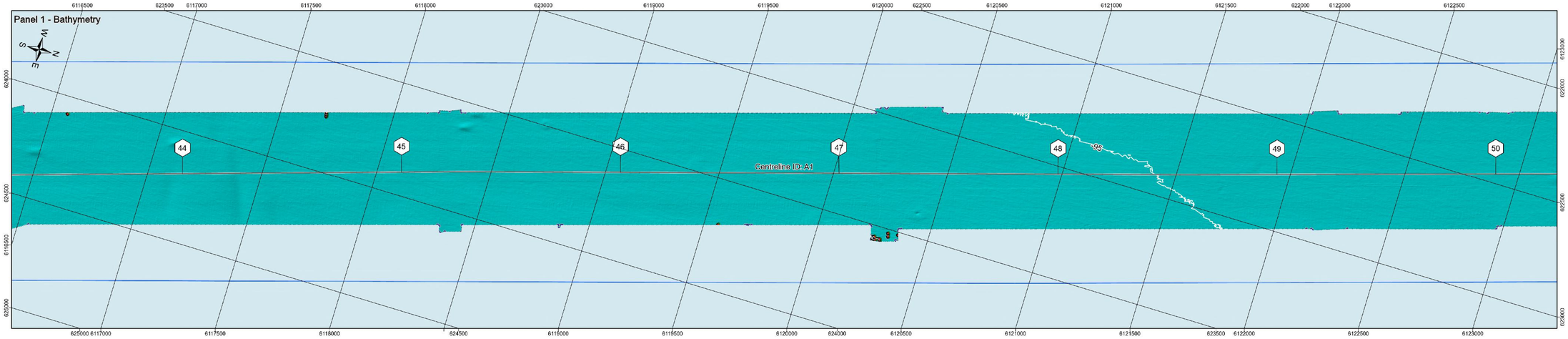
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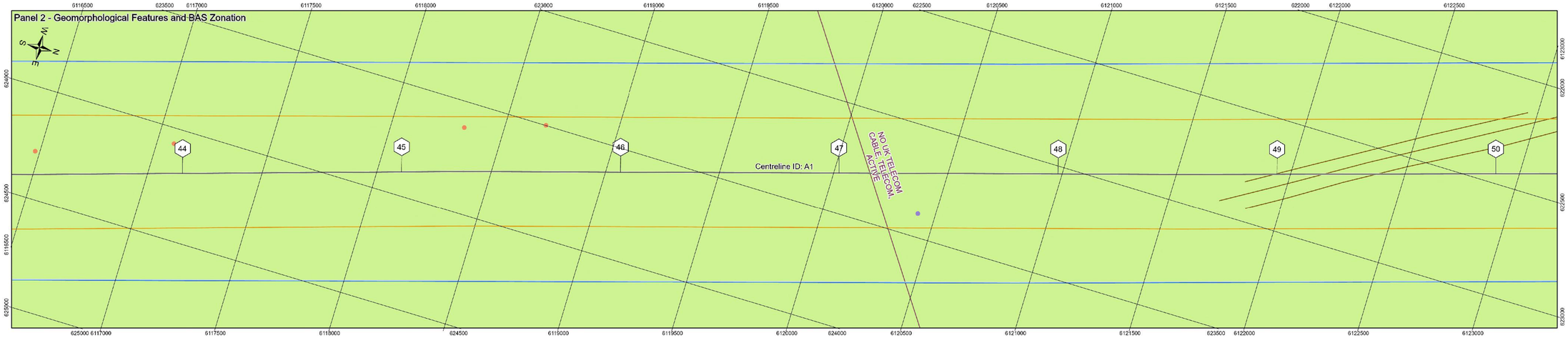
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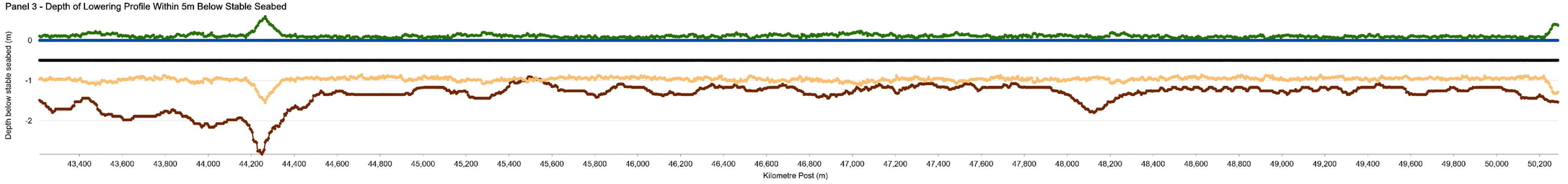
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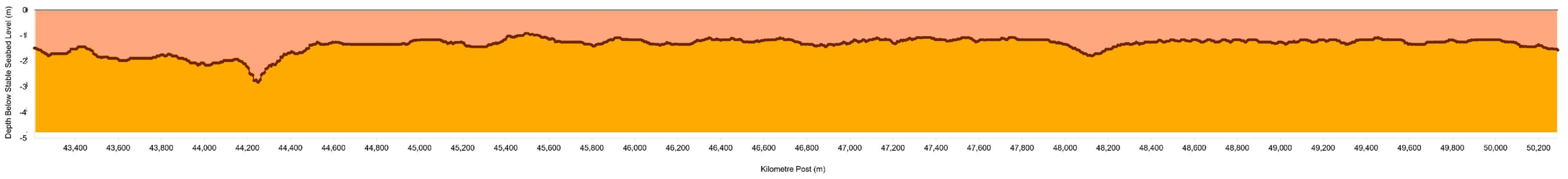
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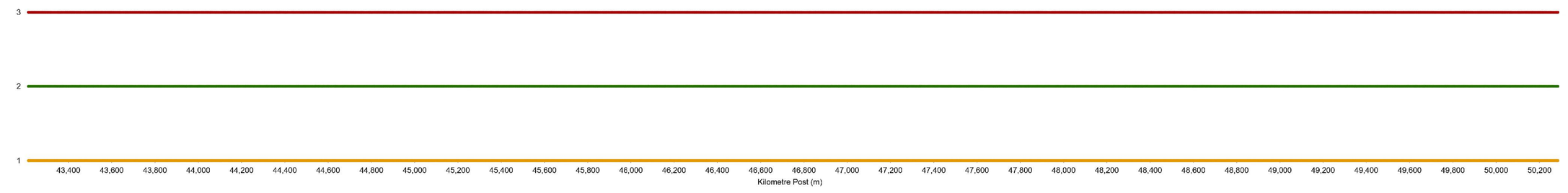
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



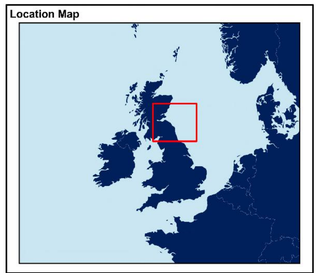
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



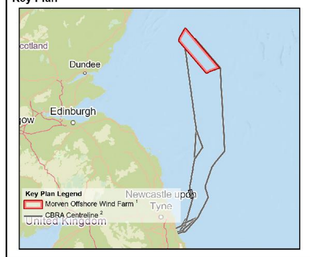
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Kilometre Post (1km Interval) [2]
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- Depression with boulder/debris
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Panel 4

Layer 1 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Azimuth: 0.0000
Map Units: Meter

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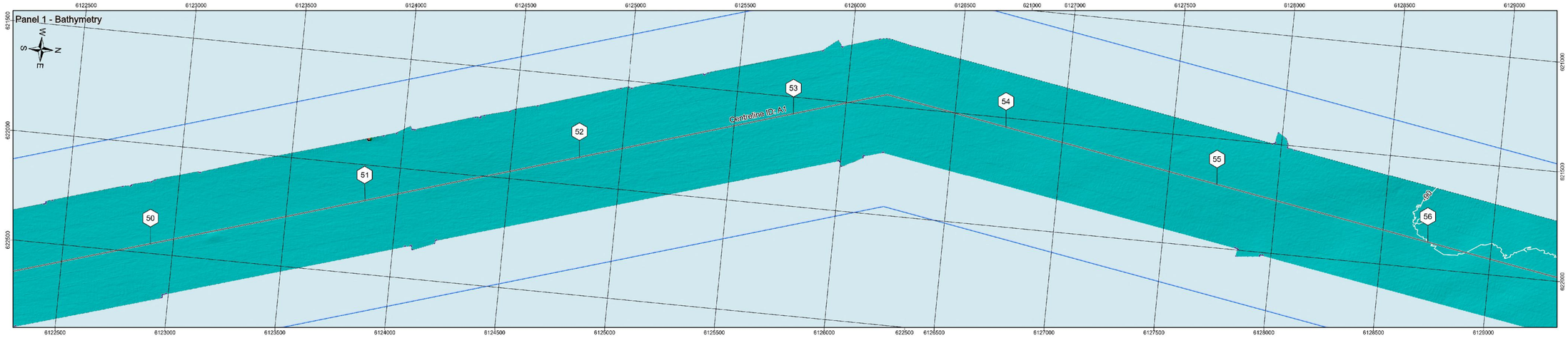
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 8 of 34

Drawing Status
Issue for Review

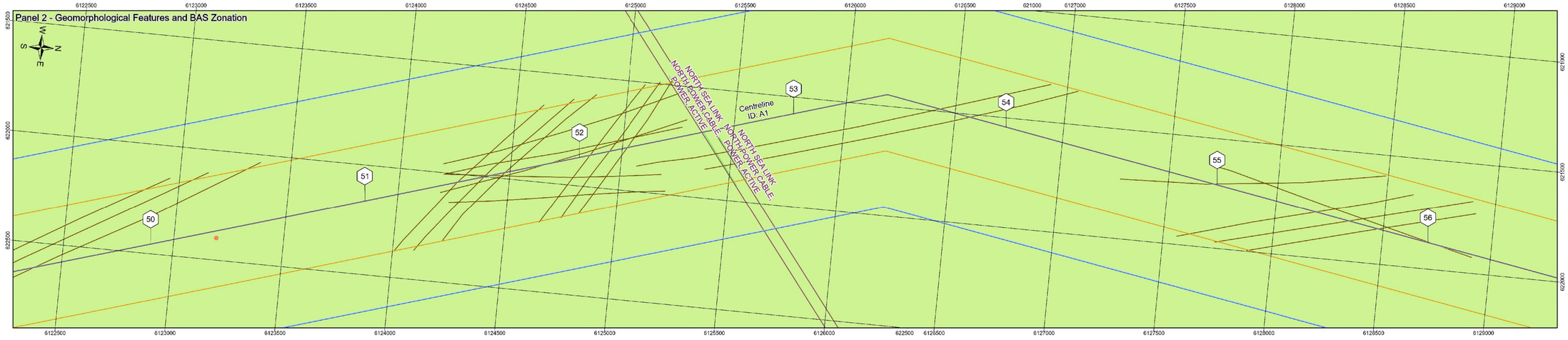
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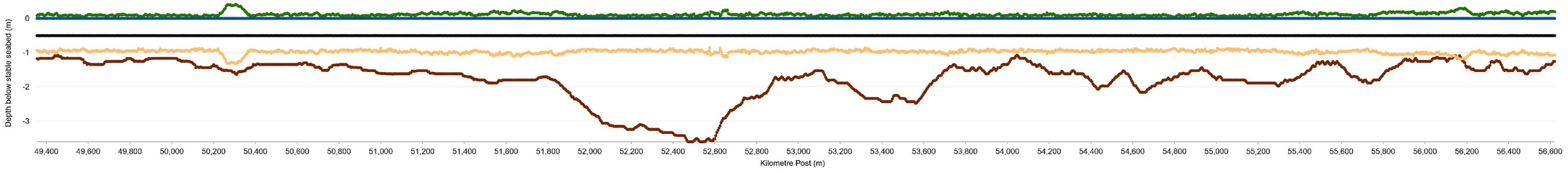
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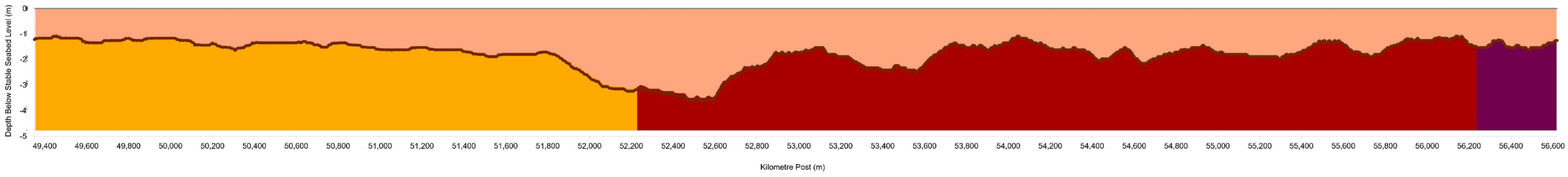
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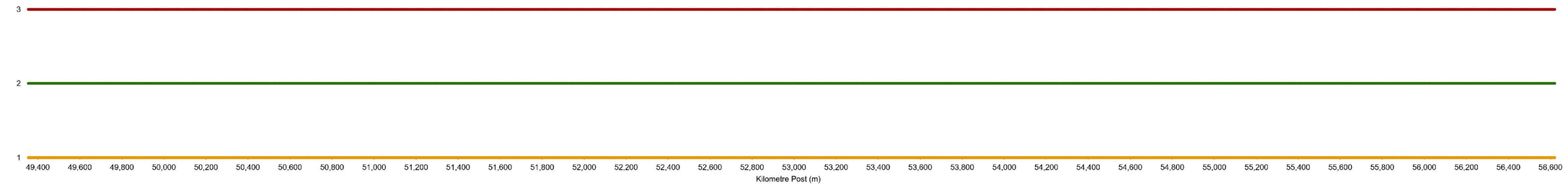
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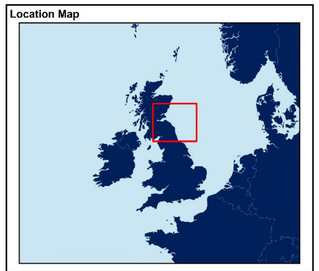
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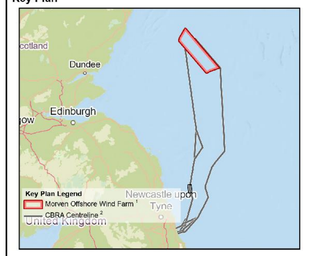
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
Datum: European 1950
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Project Title
Morven Offshore Wind Farm

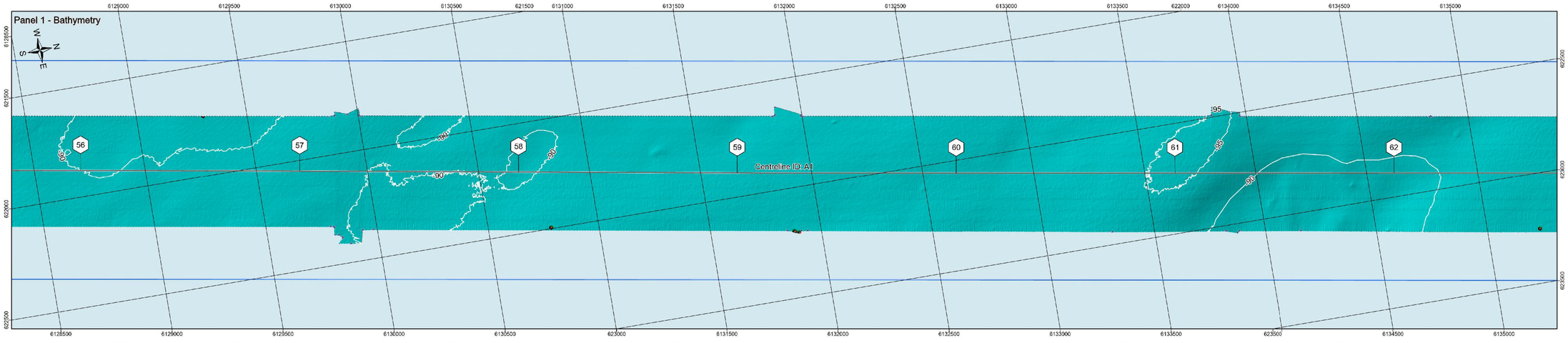
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

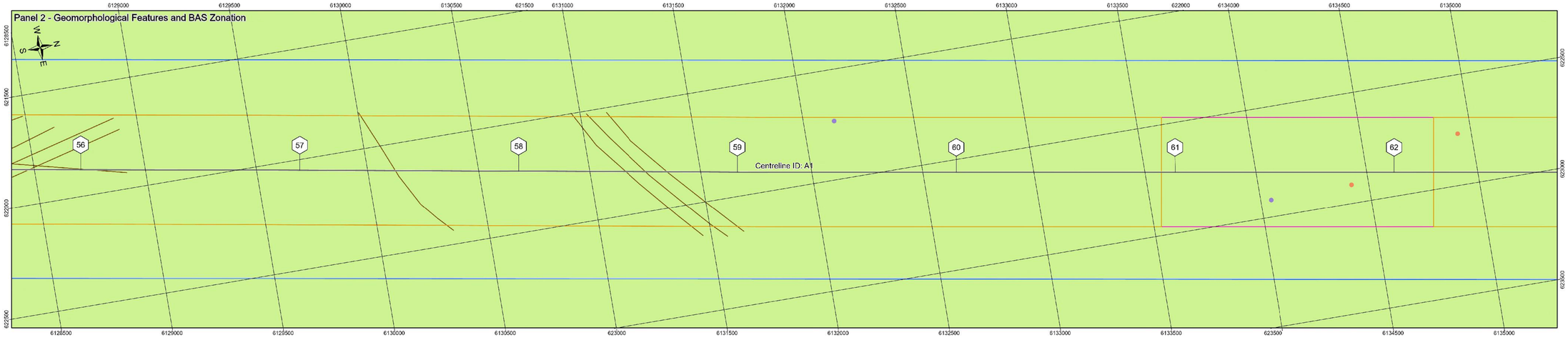
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 9 of 34

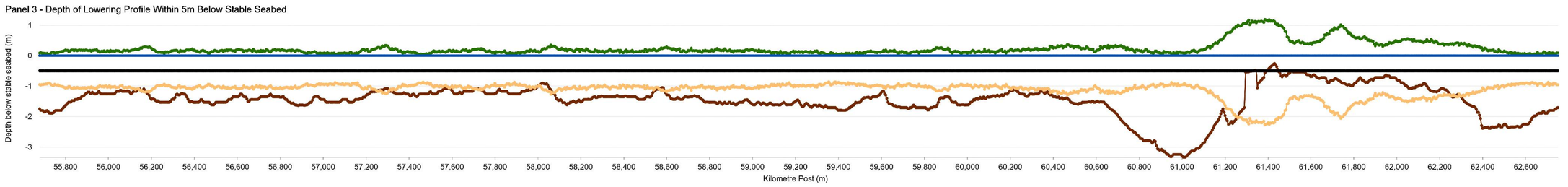
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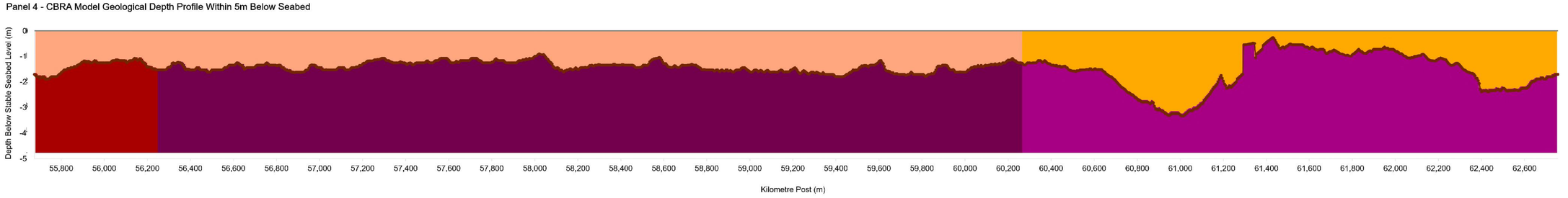
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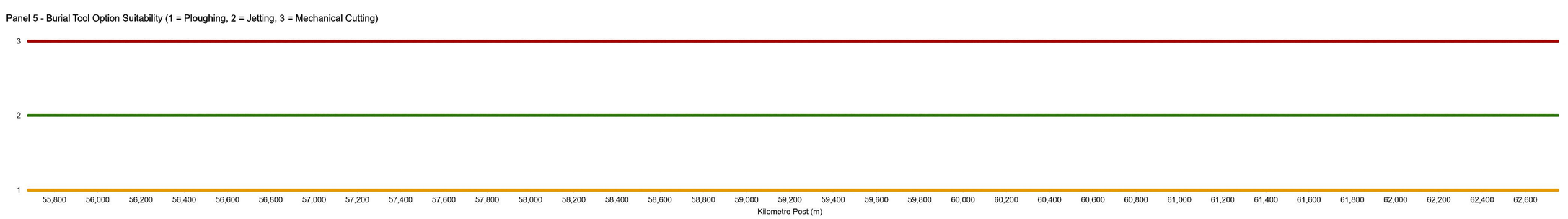
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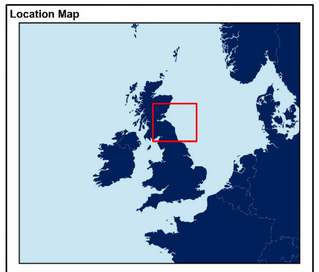




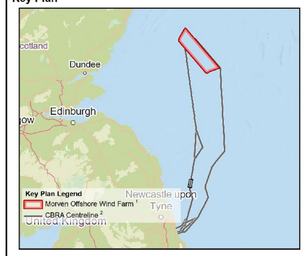




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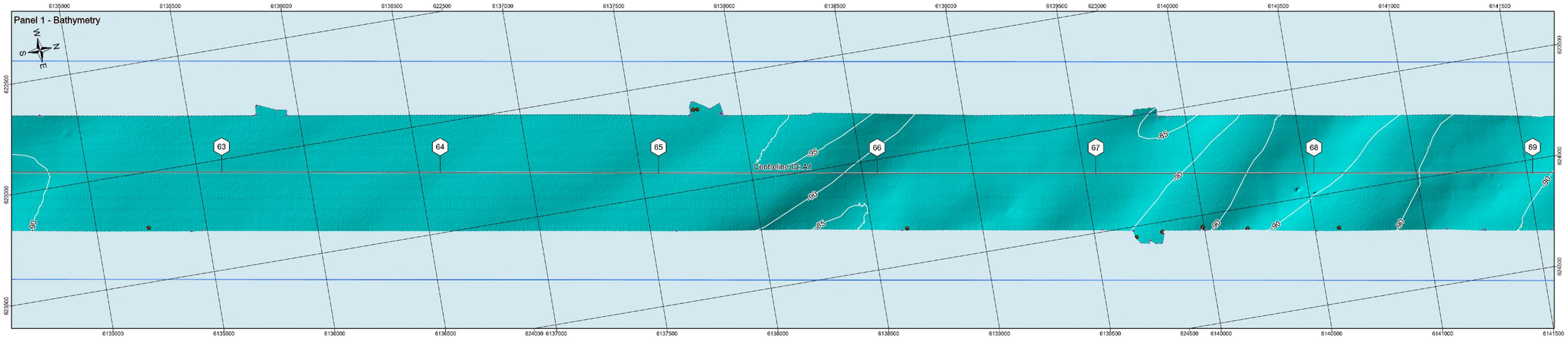
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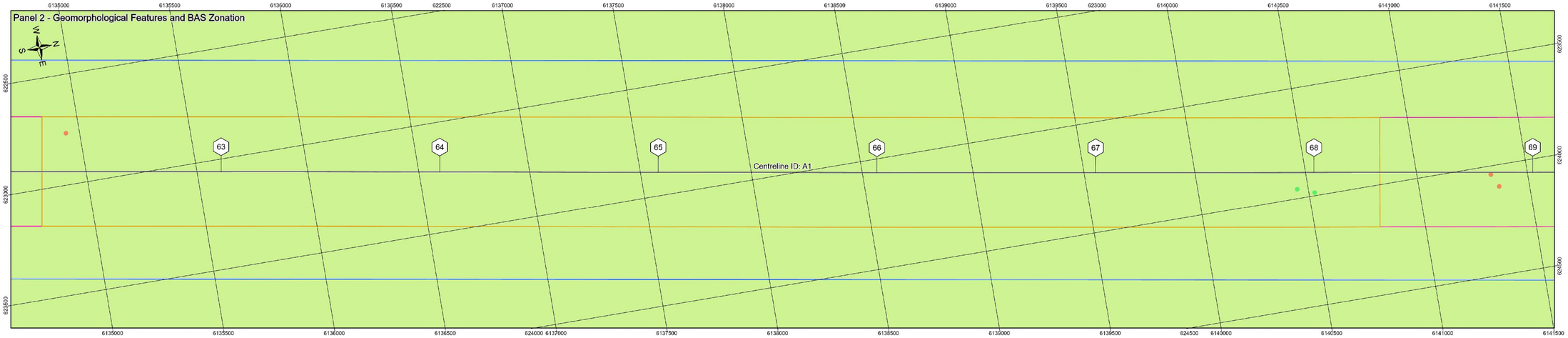
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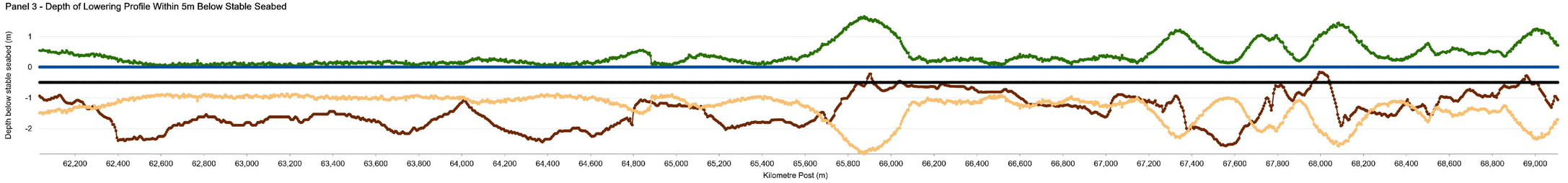
Panel 1 - Bathymetry



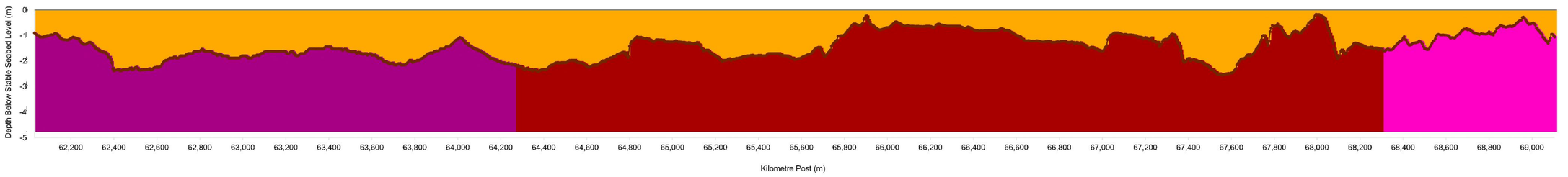
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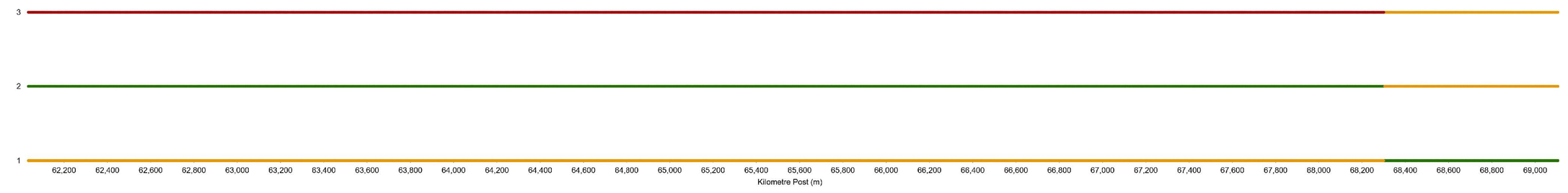
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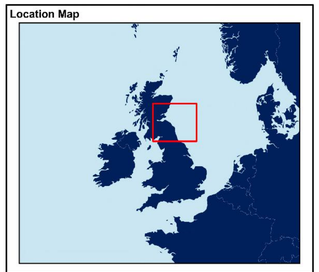
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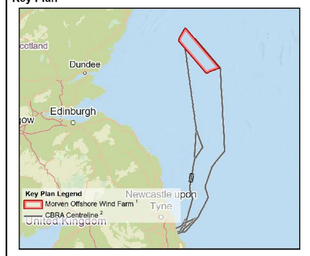
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Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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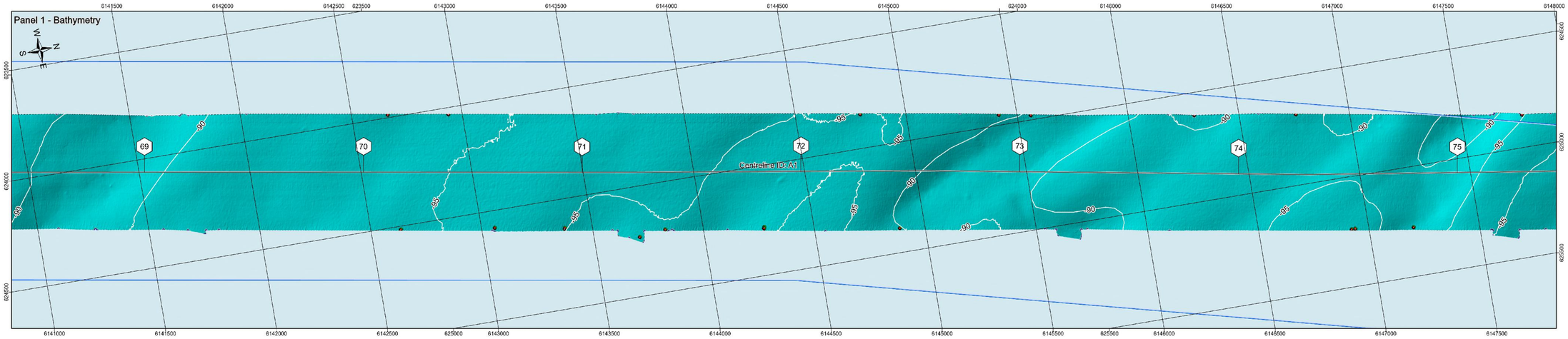
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

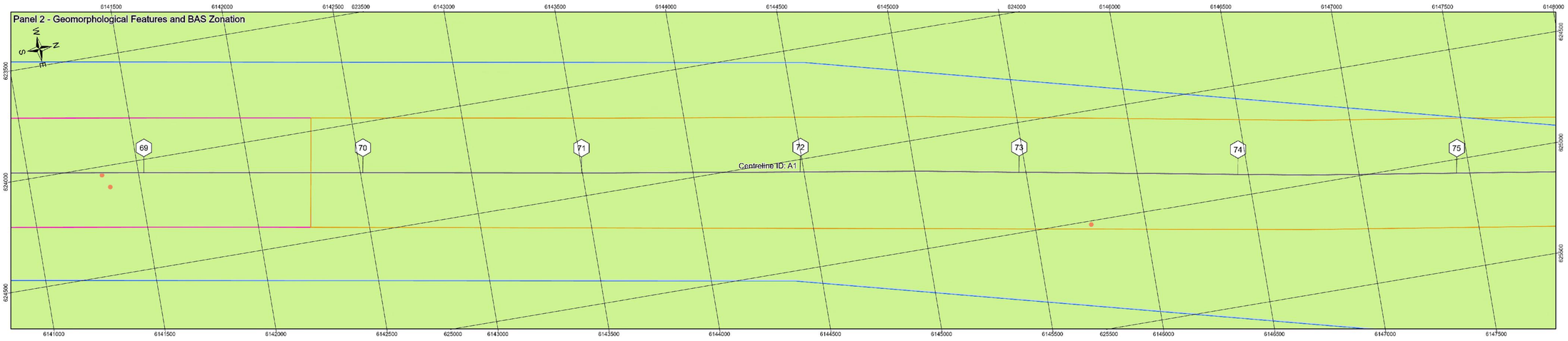
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 11 of 34

Drawing Status
Issue for Review

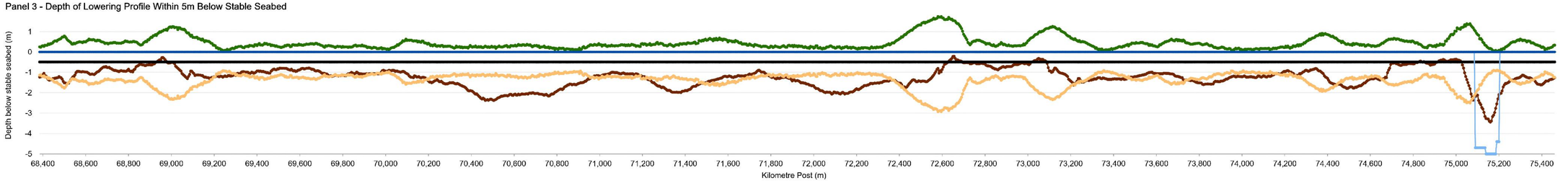
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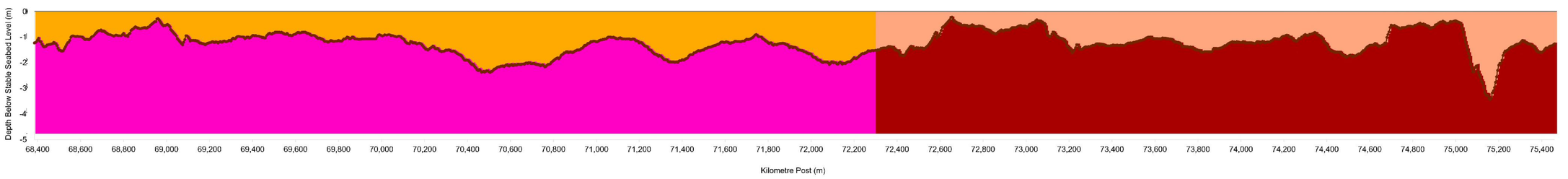




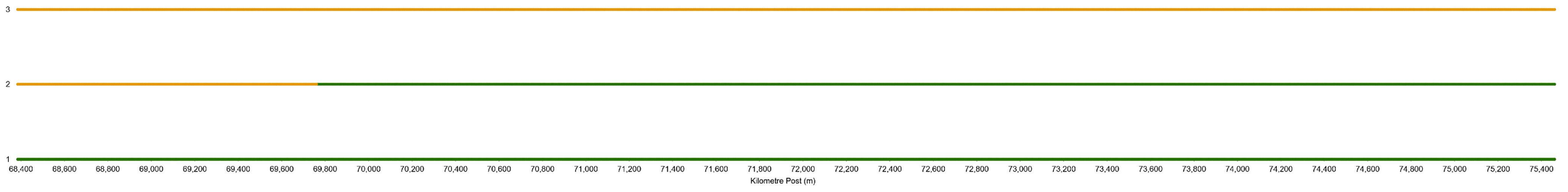
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



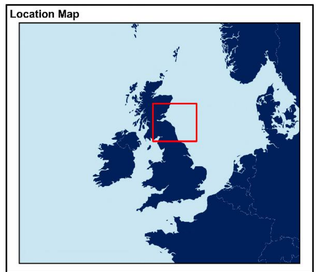
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



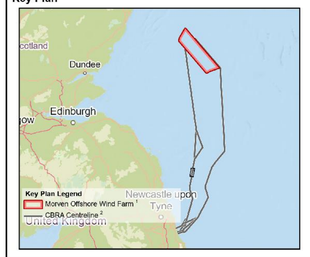
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Proposed 1000m Survey Corridor [3]
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BAS Zone Classification [3]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
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Map Units: Meter

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Report Title
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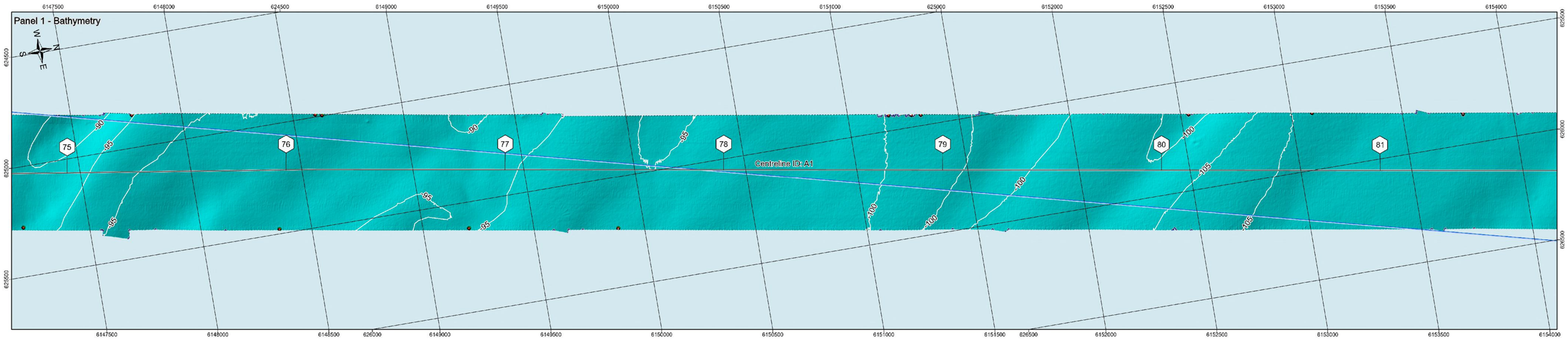
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 12 of 34

Drawing Status
Issue for Review

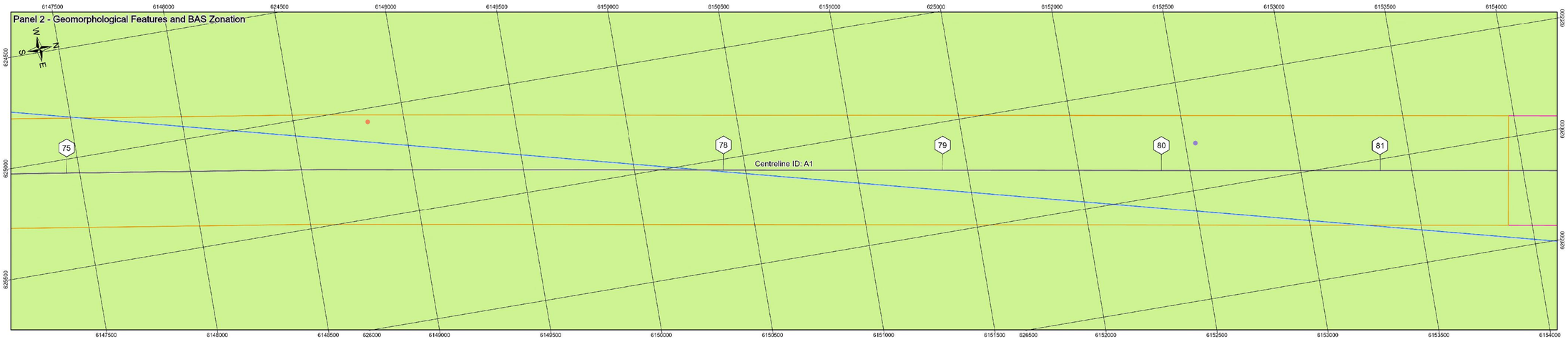
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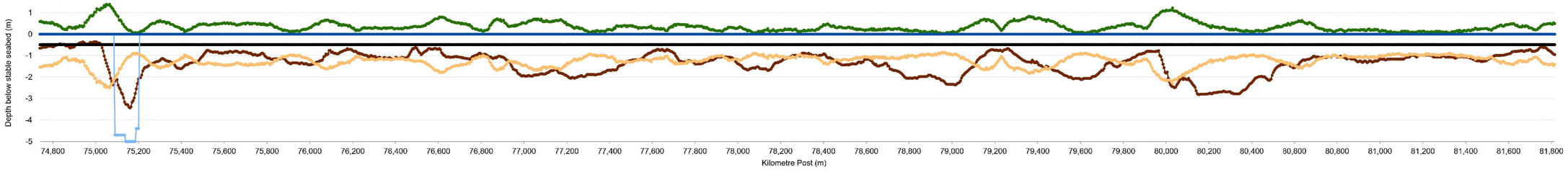
Panel 1 - Bathymetry



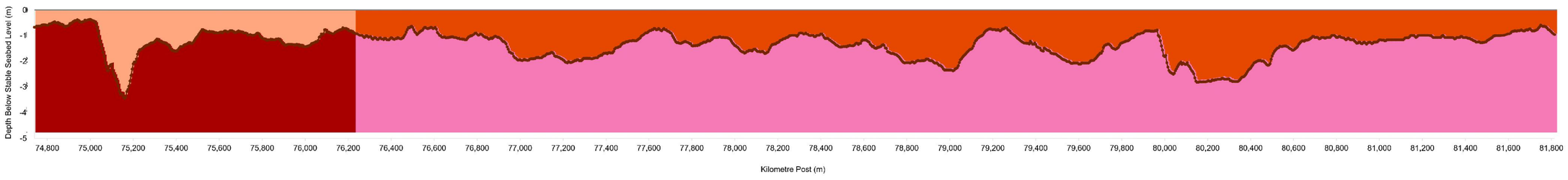
Panel 2 - Geomorphological Features and BAS Zonation



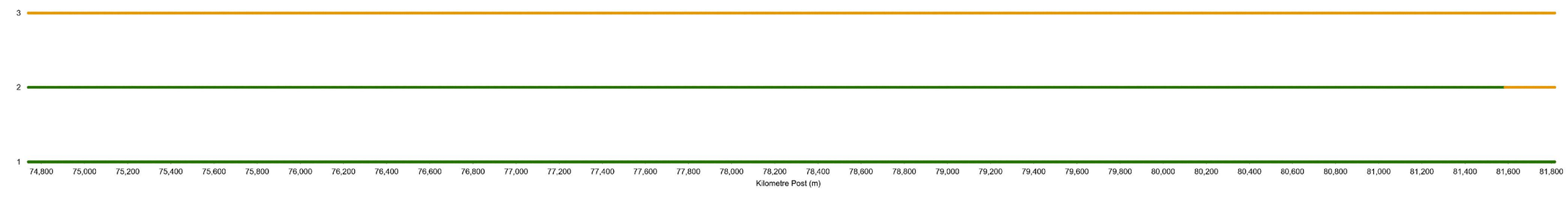
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



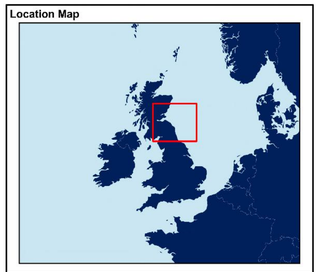
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



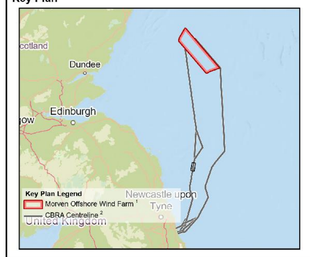
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Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [4]
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- Depression with boulder/debris
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Notes:
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Morven Offshore Wind Farm

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Morven Offshore Wind Farm Cable Burial Risk Assessment

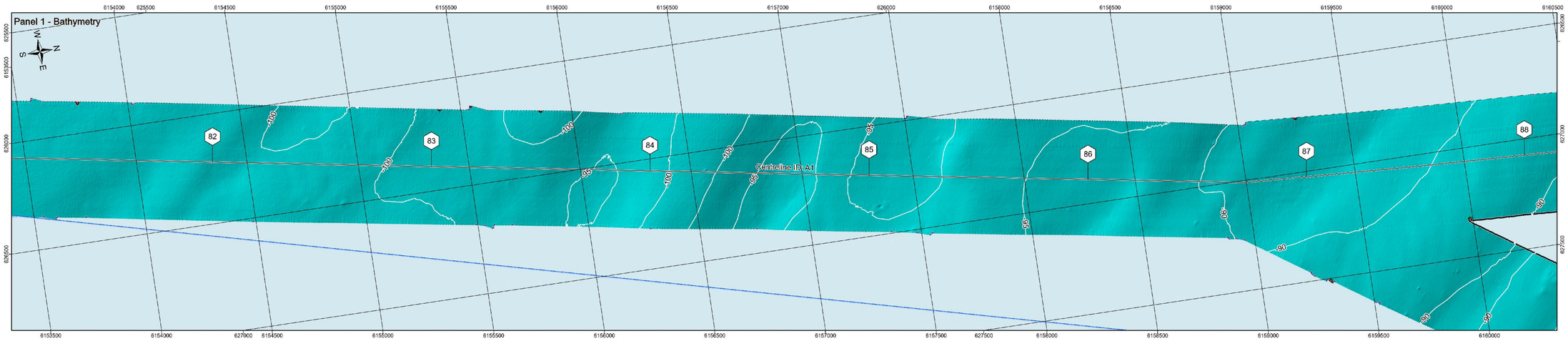
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 13 of 34

Drawing Status
Issue for Review

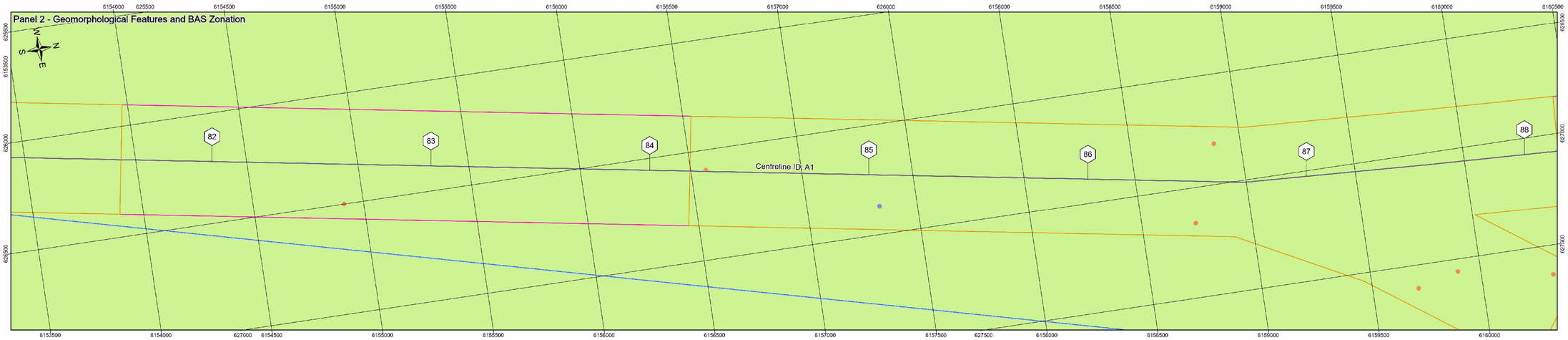
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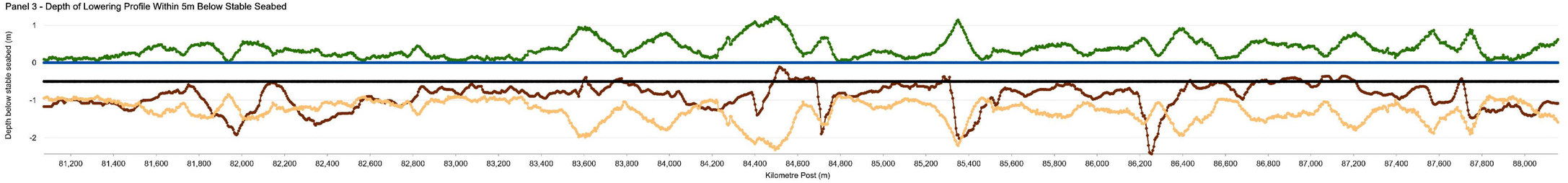
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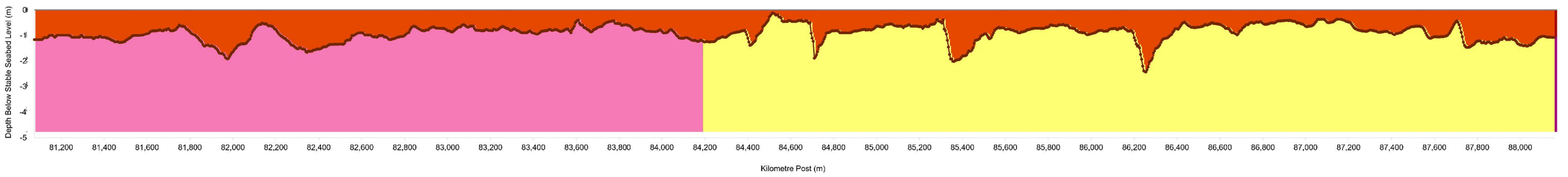
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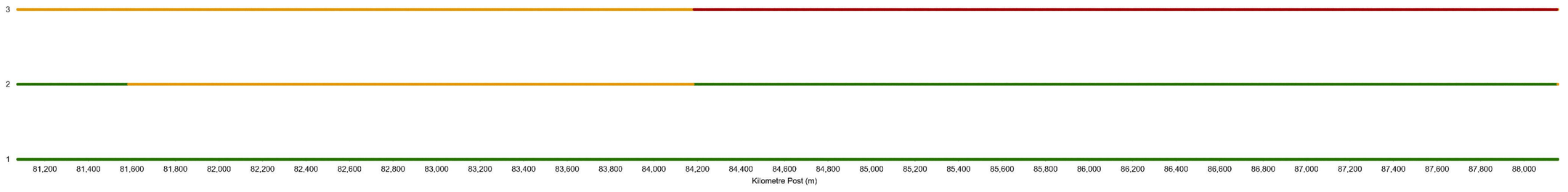
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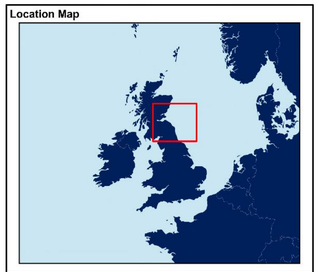
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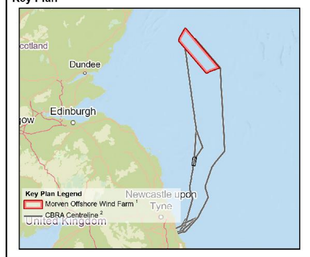
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
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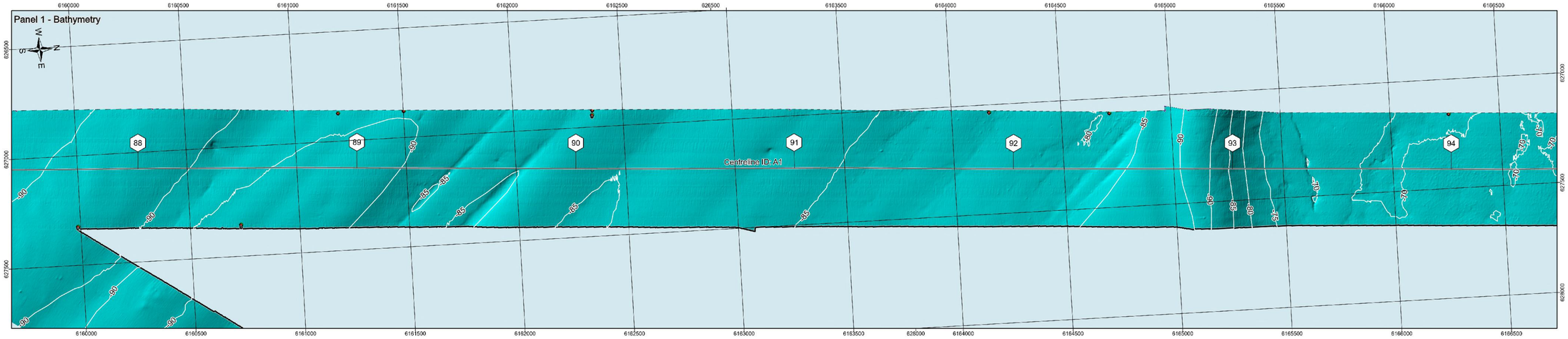
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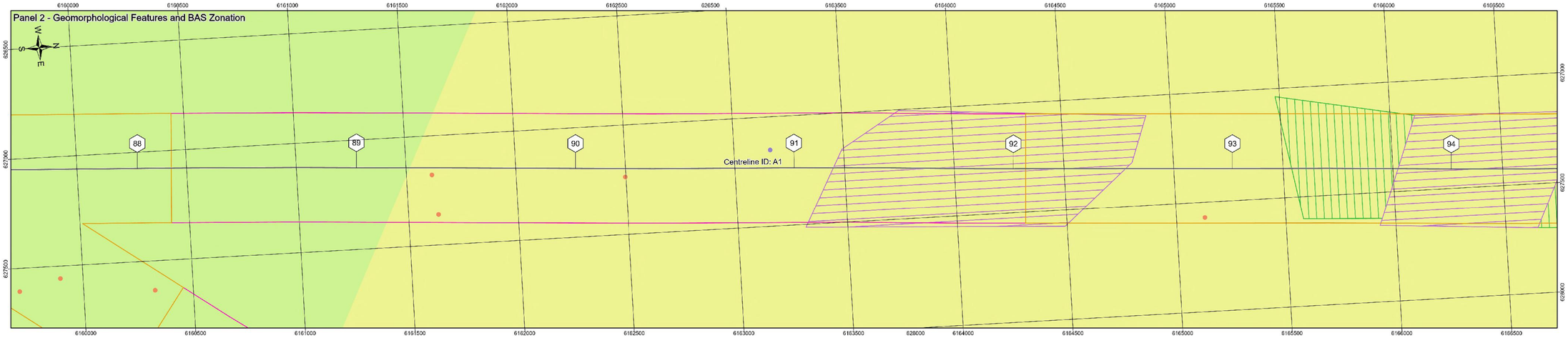
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
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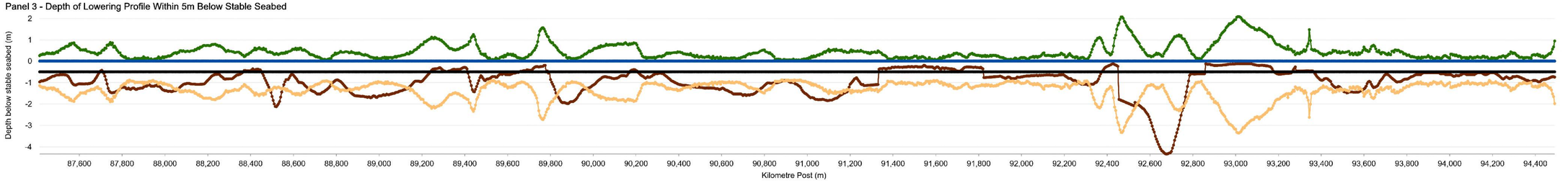
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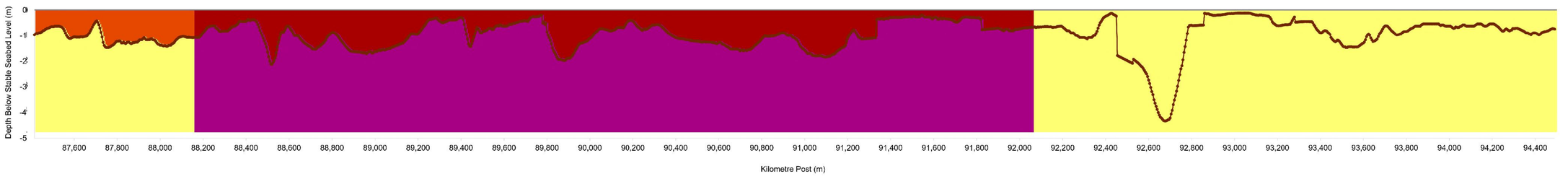
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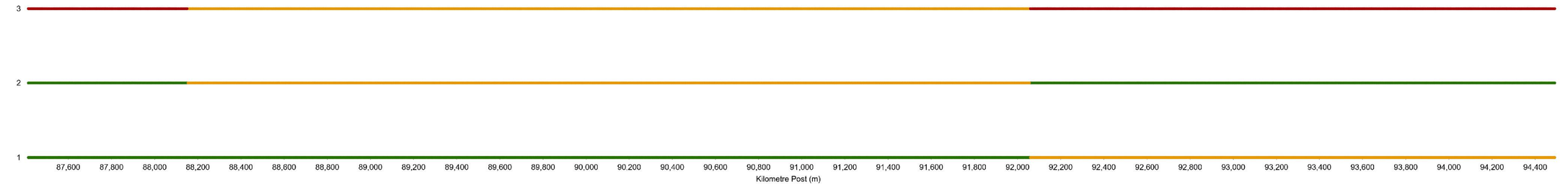
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



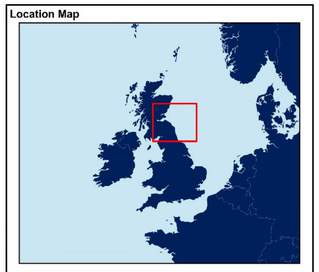
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



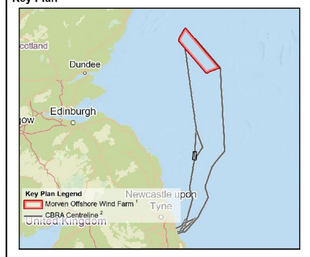
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



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Legend

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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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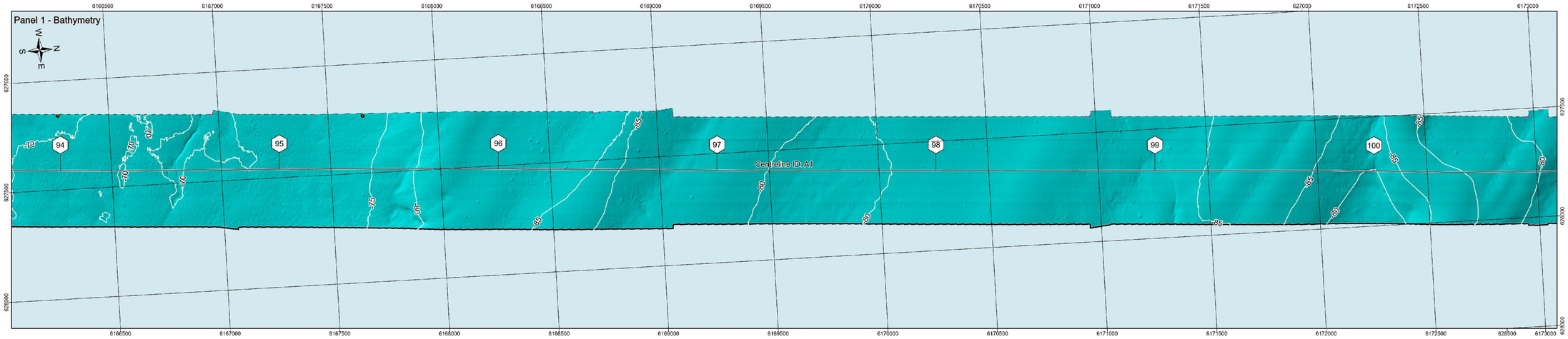
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

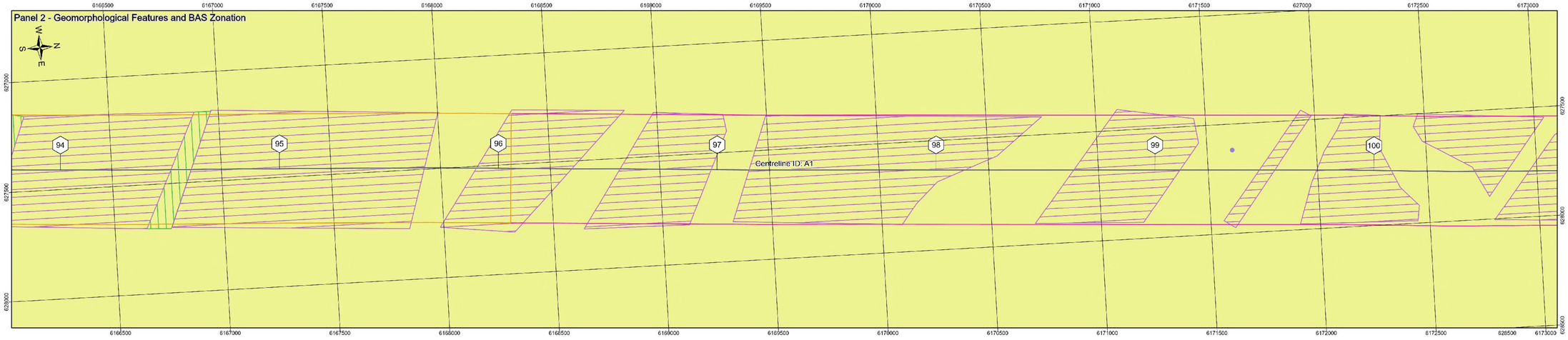
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 15 of 34

Drawing Status
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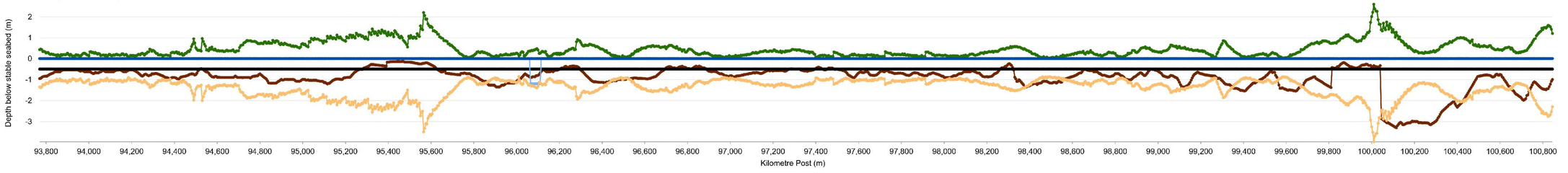
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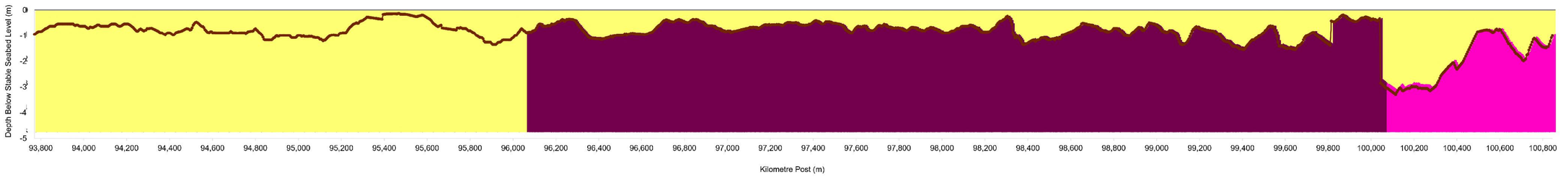




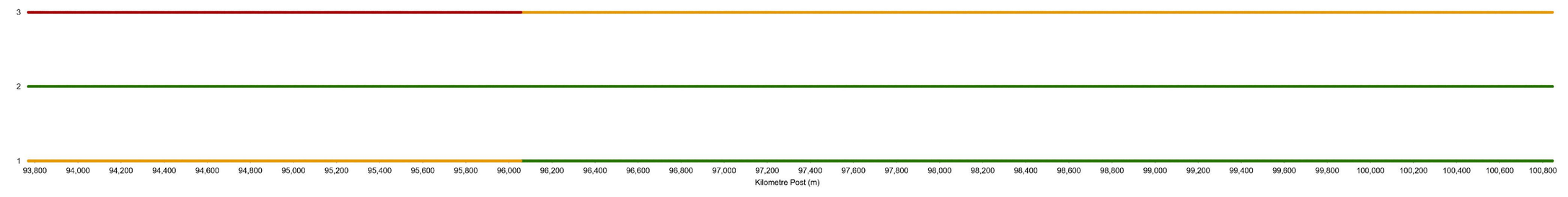
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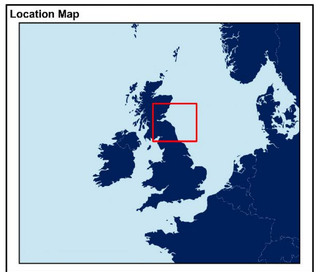
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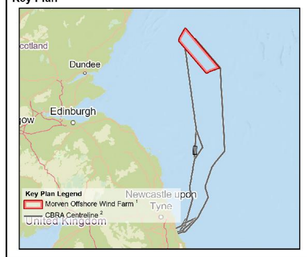
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
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Panel 5

- Suitable [3]
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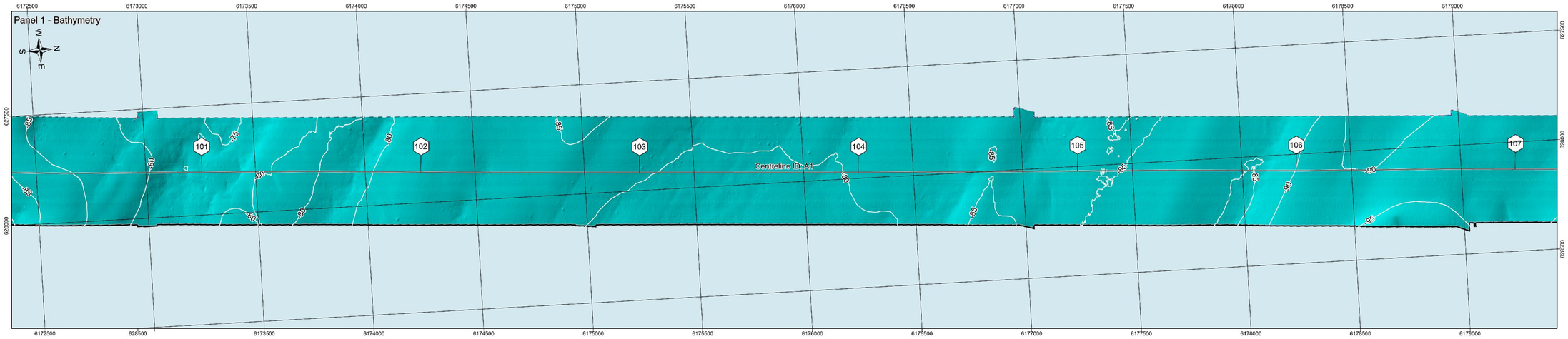
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 16 of 34

Drawing Status
Issue for Review

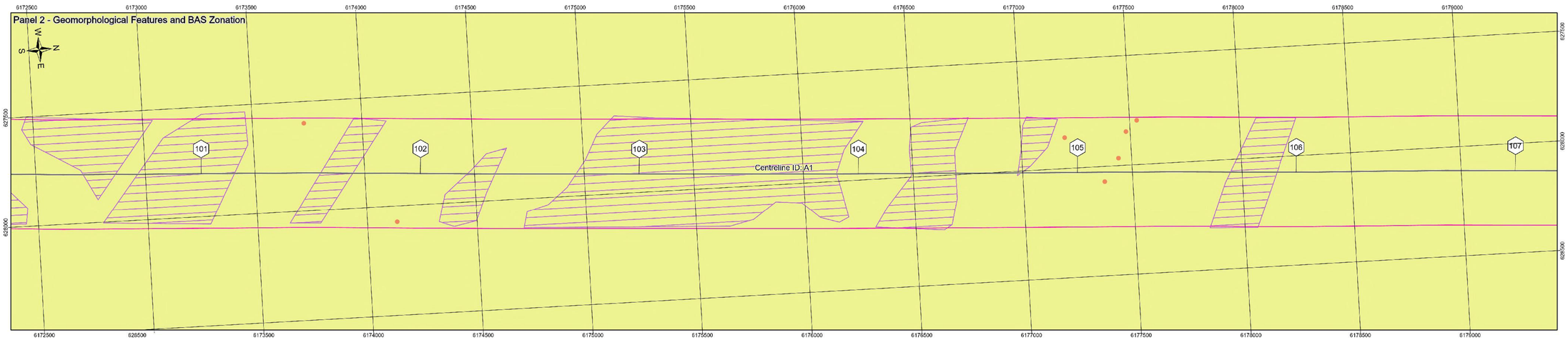
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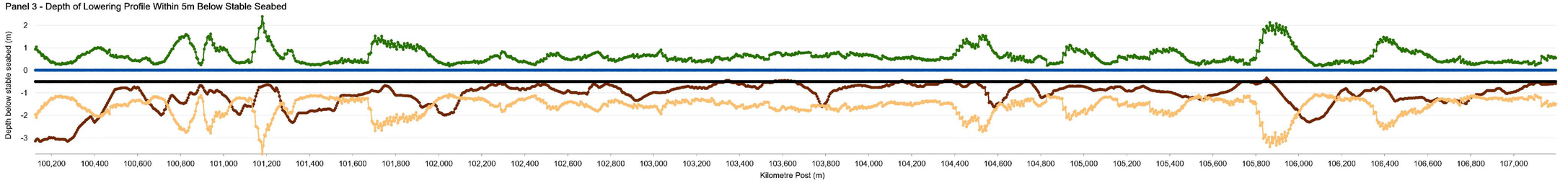
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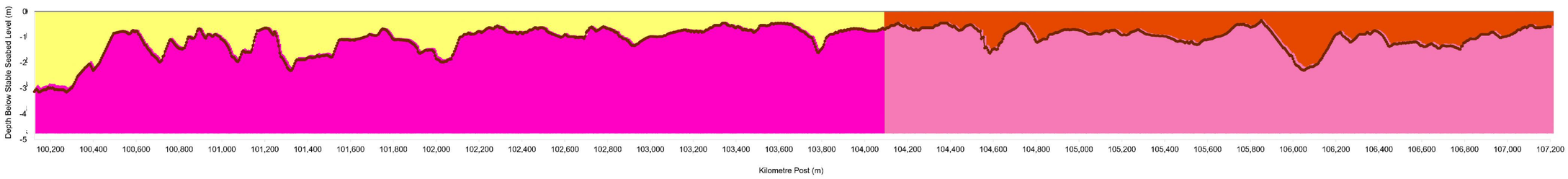
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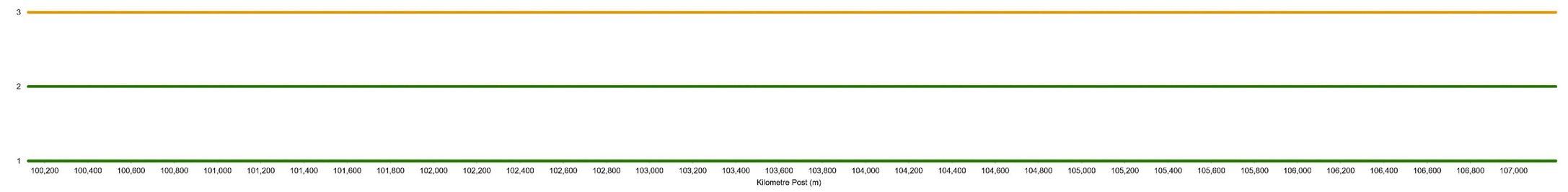
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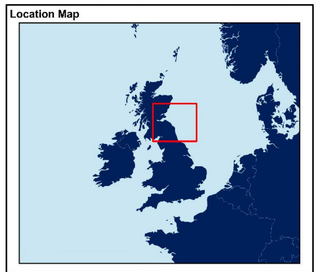
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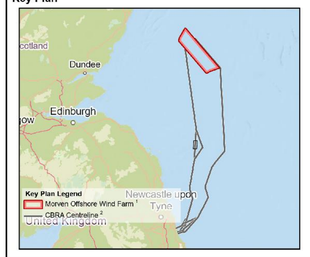
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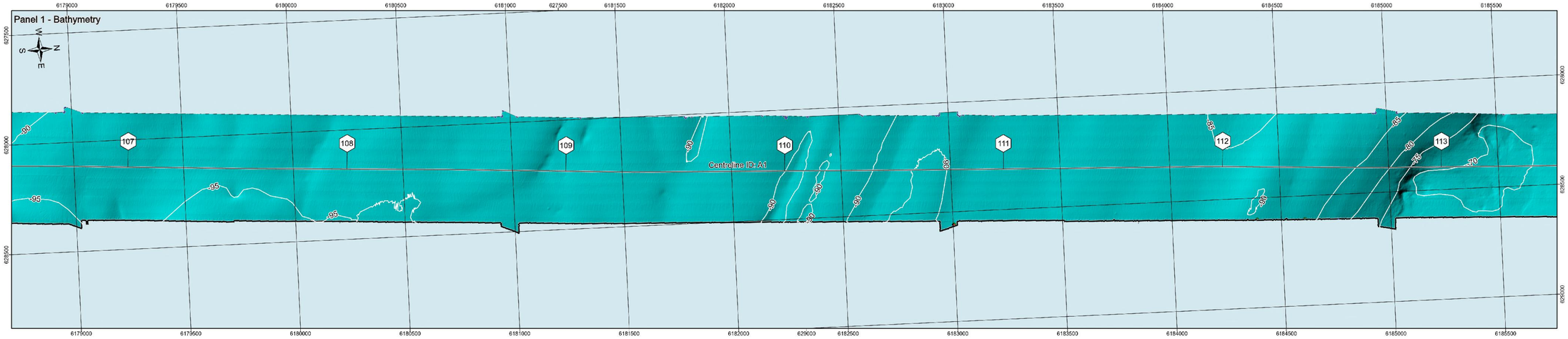
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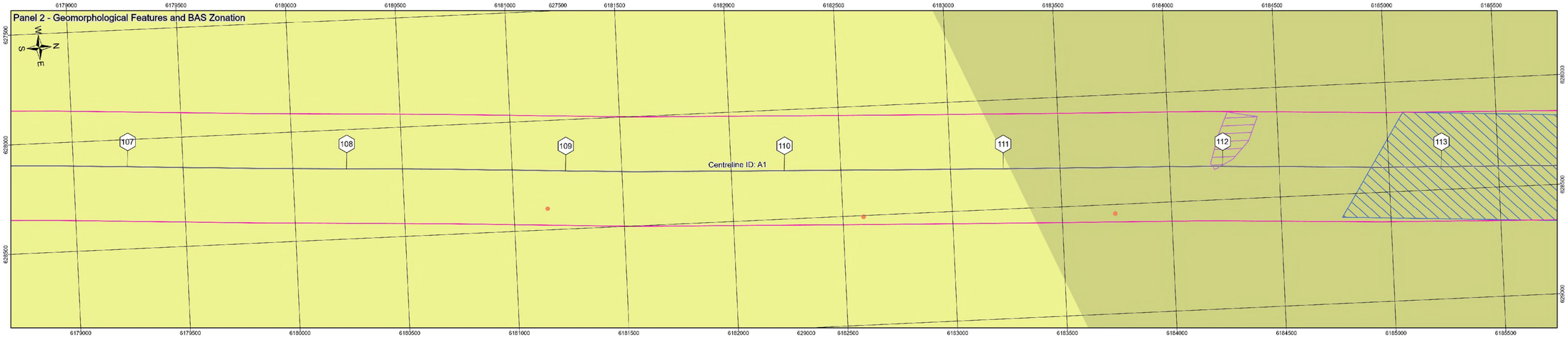
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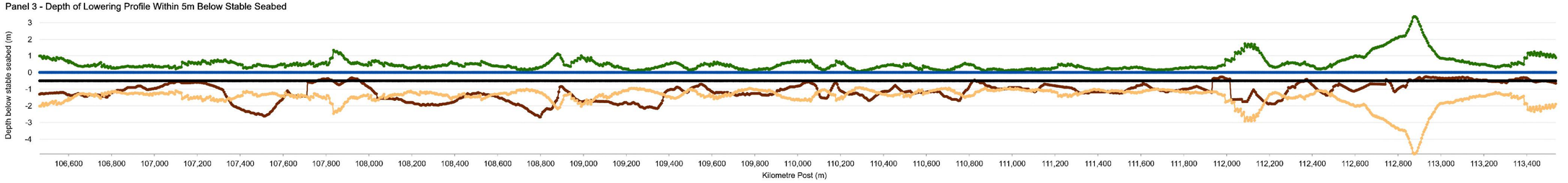
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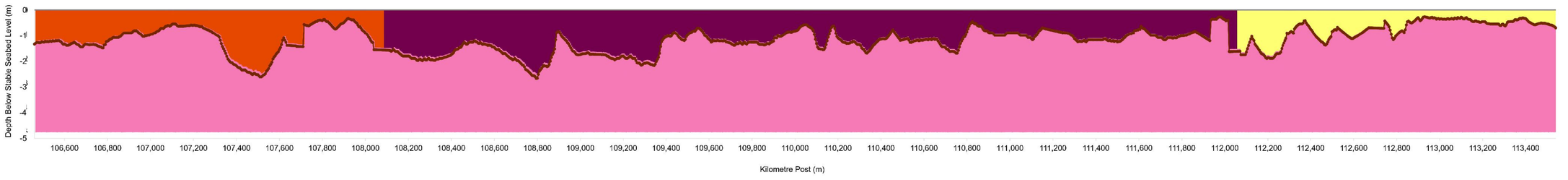
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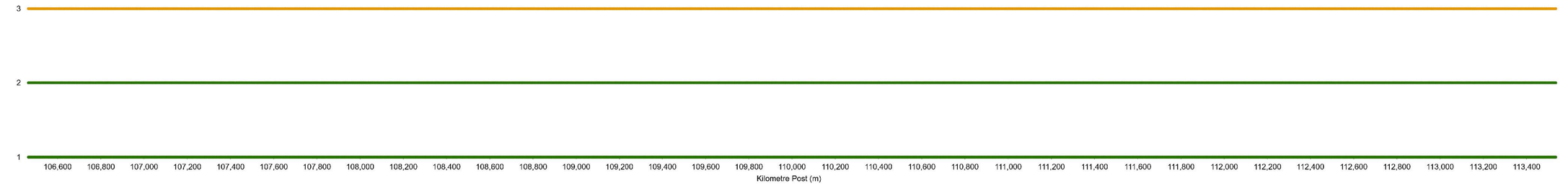
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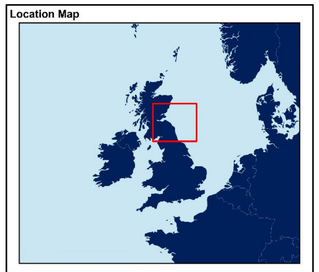
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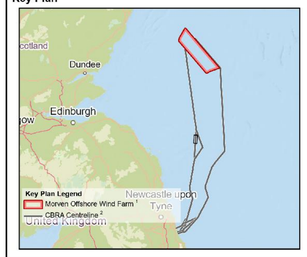
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- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [6]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Travel mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
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Panel 3
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- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5
- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Map Units: Meter

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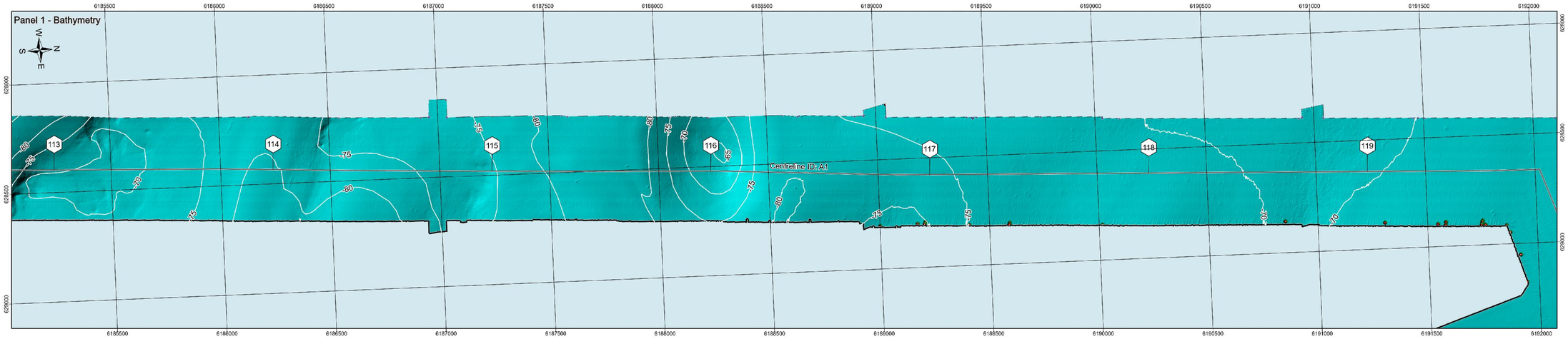
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 18 of 34

Drawing Status
Issue for Review

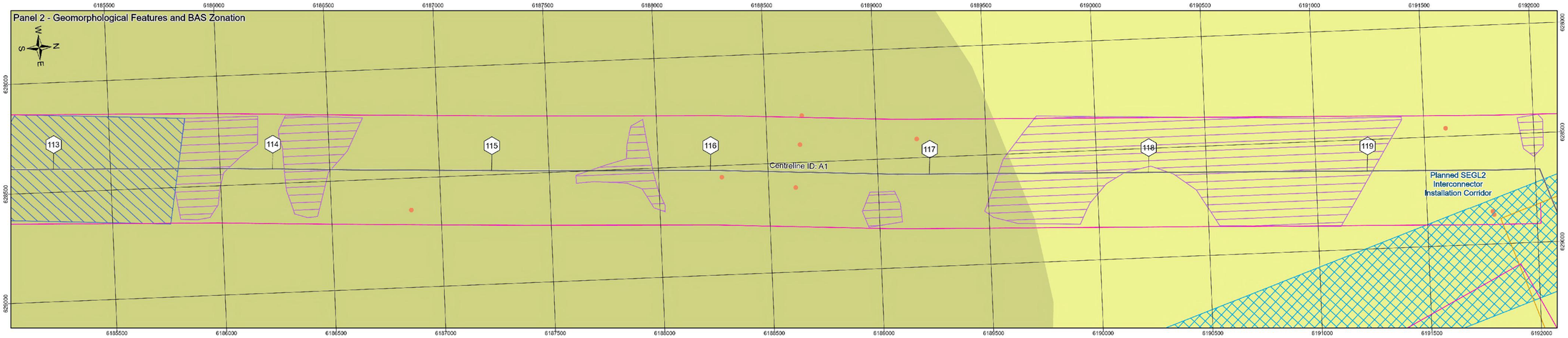
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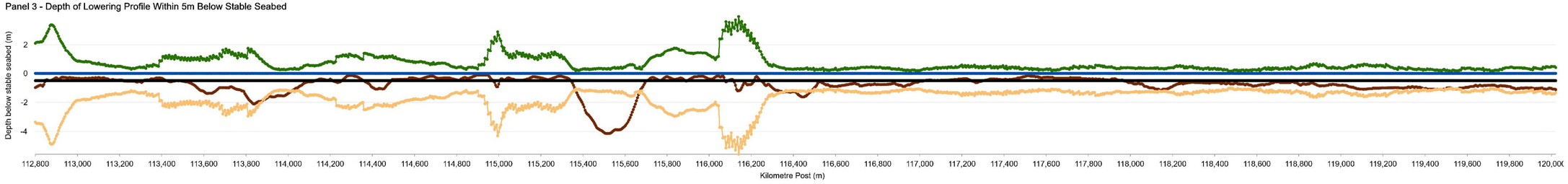
Panel 1 - Bathymetry



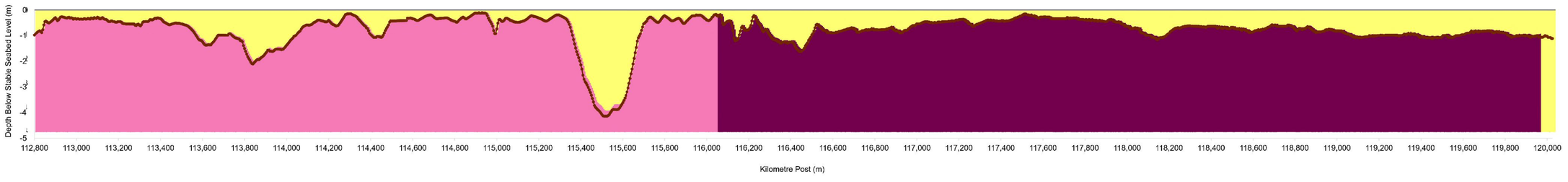
Panel 2 - Geomorphological Features and BAS Zonation



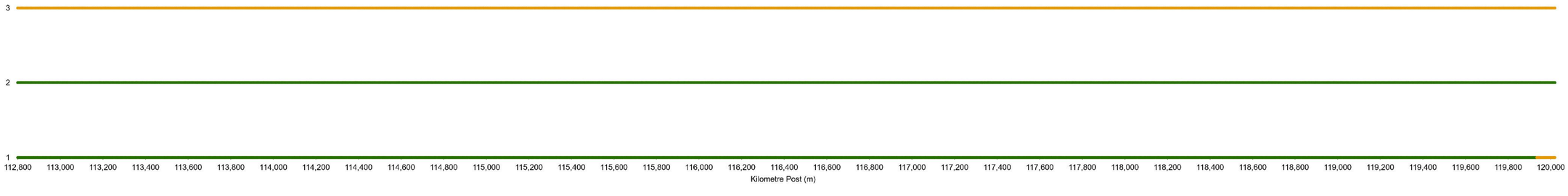
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



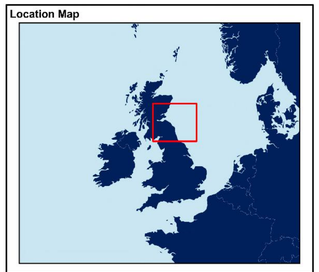
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



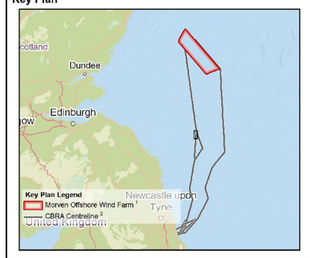
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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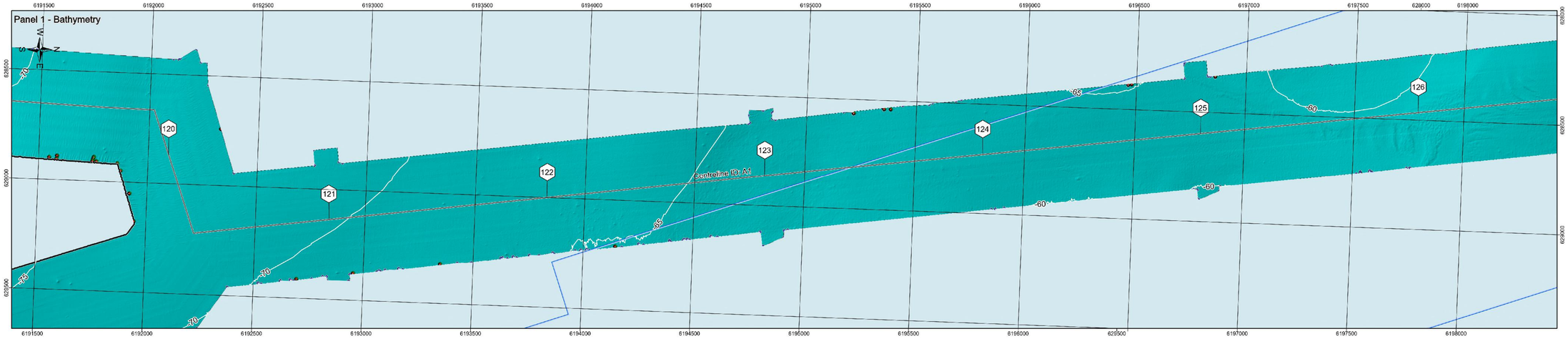
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 19 of 34

Drawing Status
Issue for Review

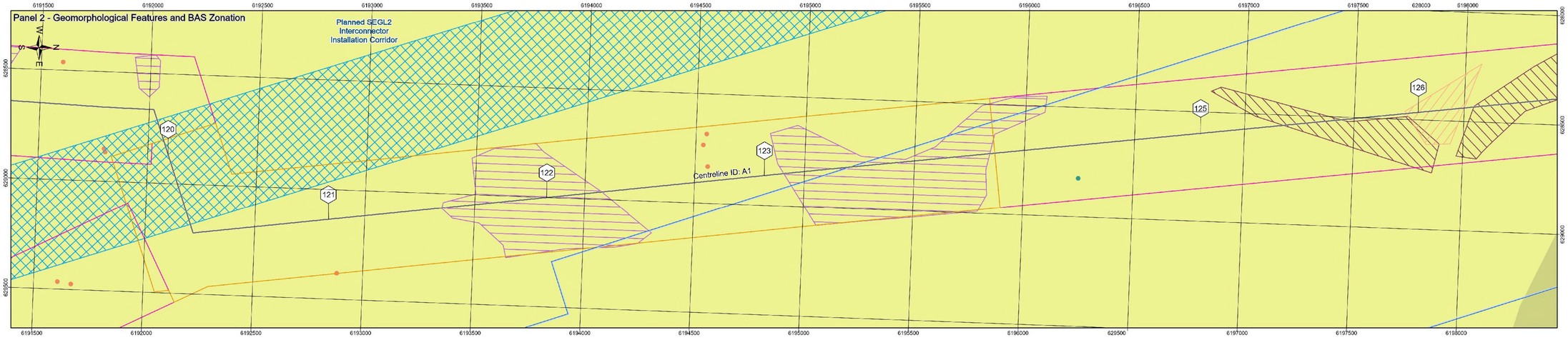
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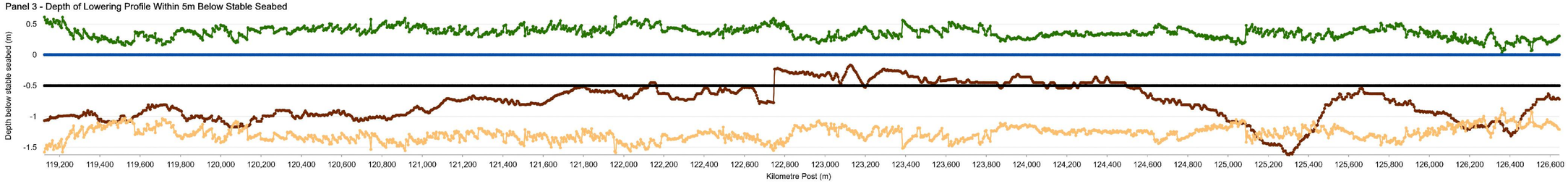
Panel 1 - Bathymetry



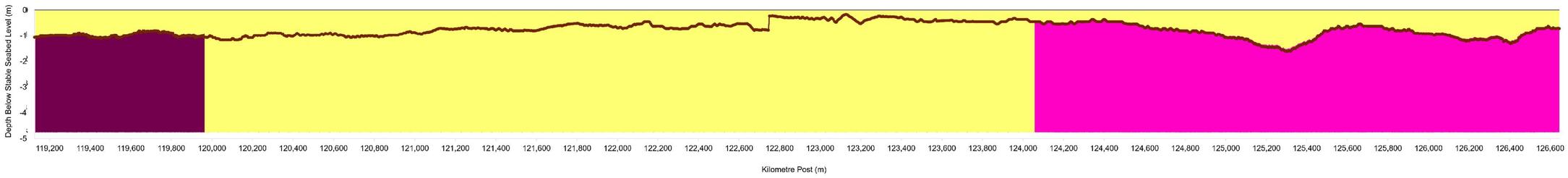
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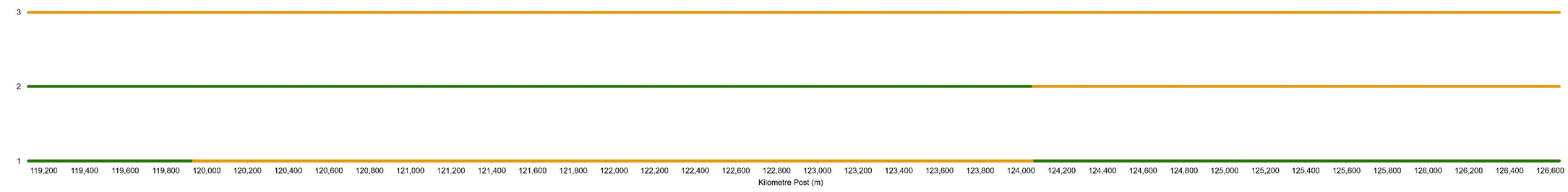
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



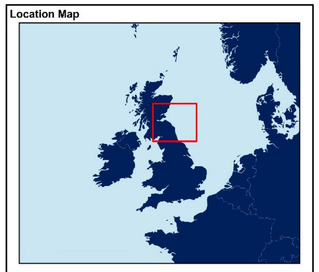
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



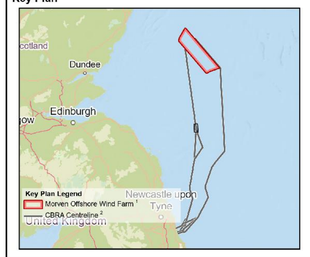
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Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
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BAS Zone Classification [3]
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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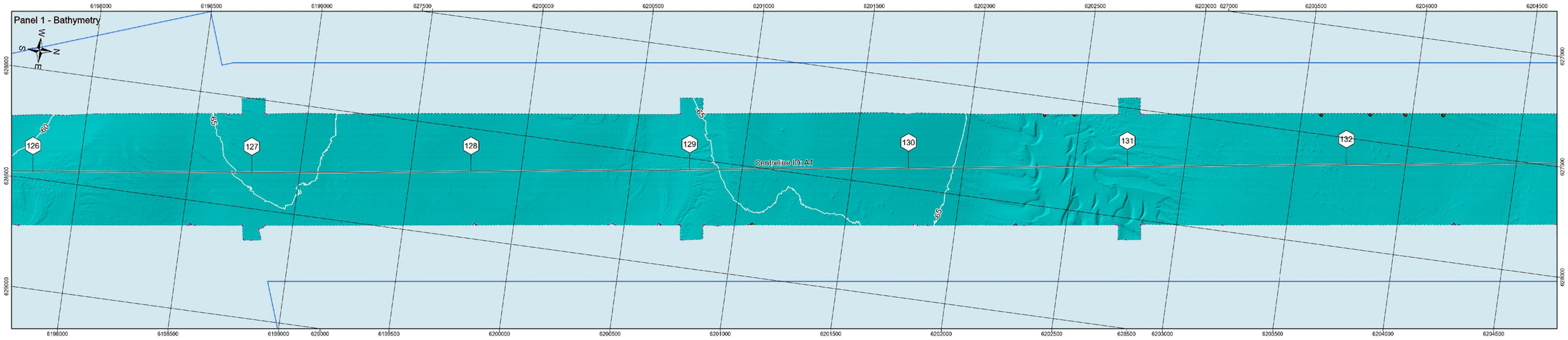
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 20 of 34

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Issue for Review

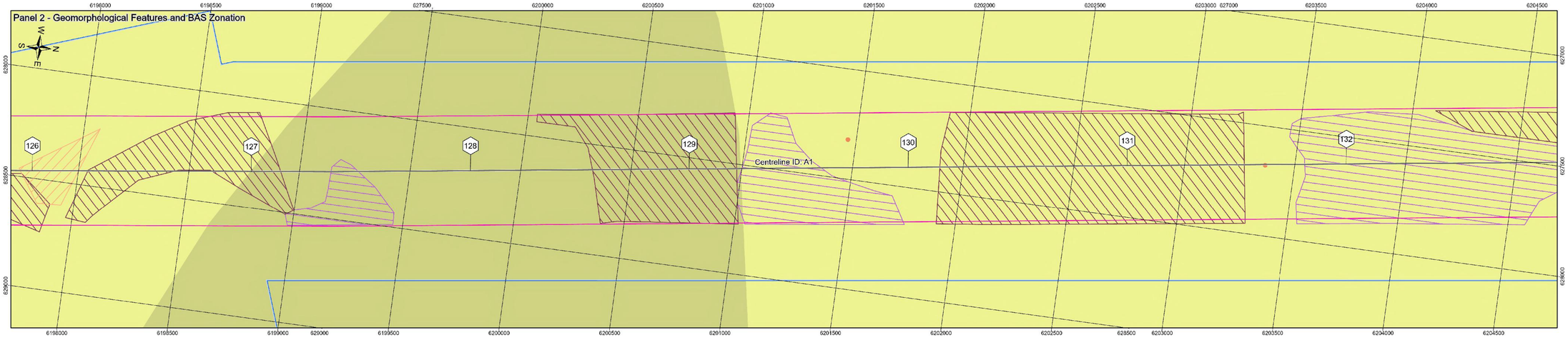
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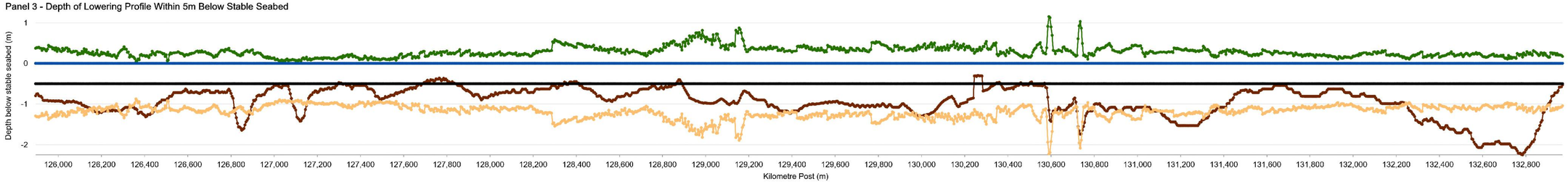
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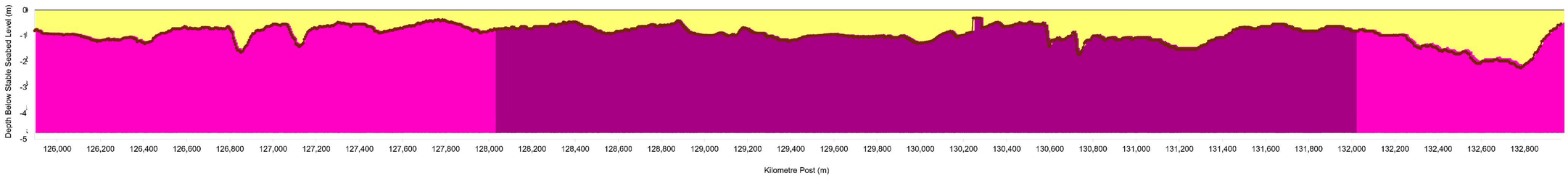
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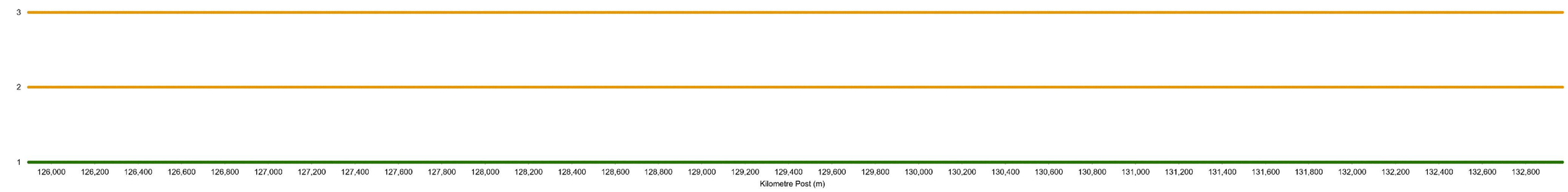
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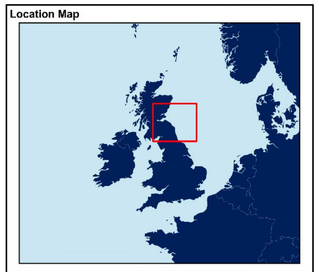
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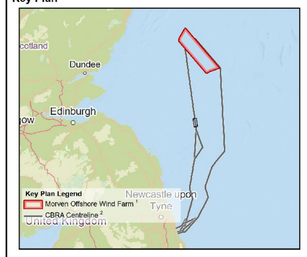
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- Extremely High Strength CLAY (C7)
- Rock (R)
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

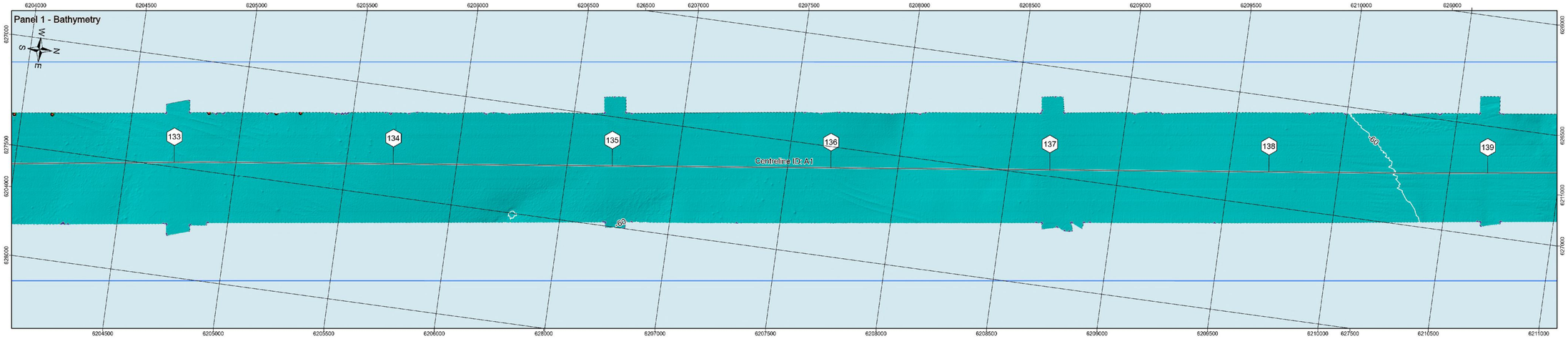
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

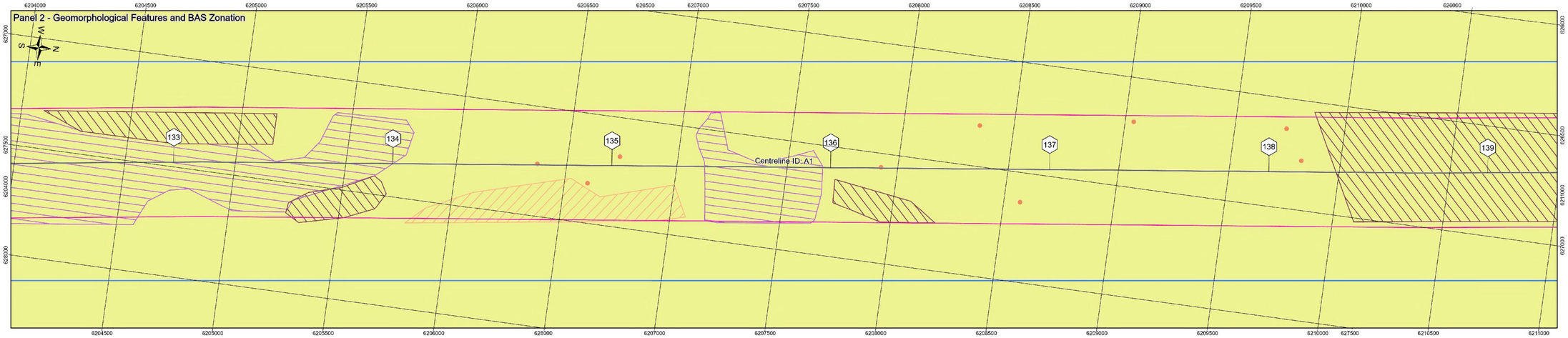
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 21 of 34

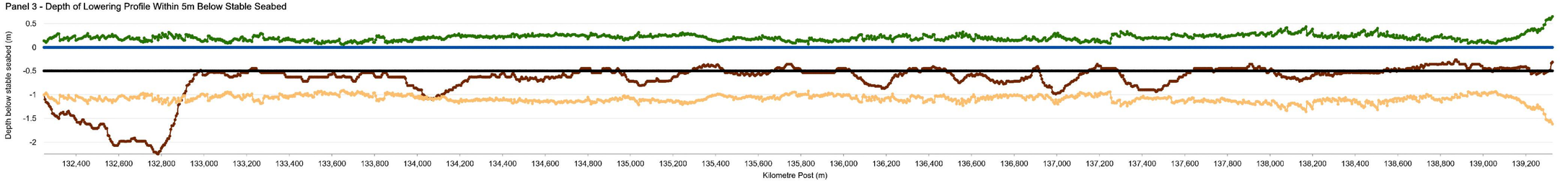
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Issue for Review

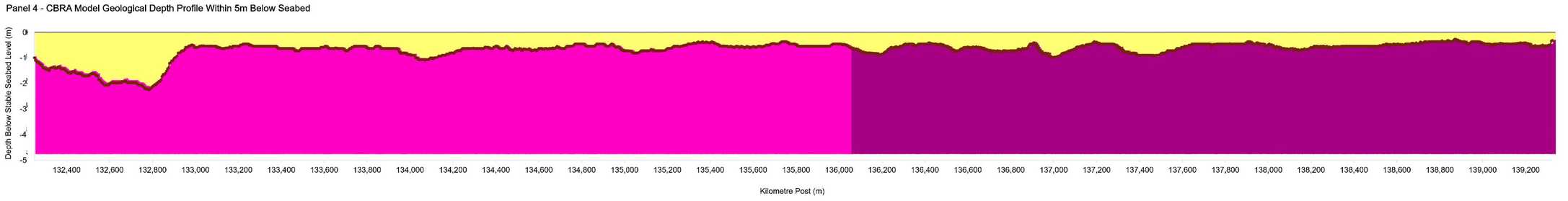
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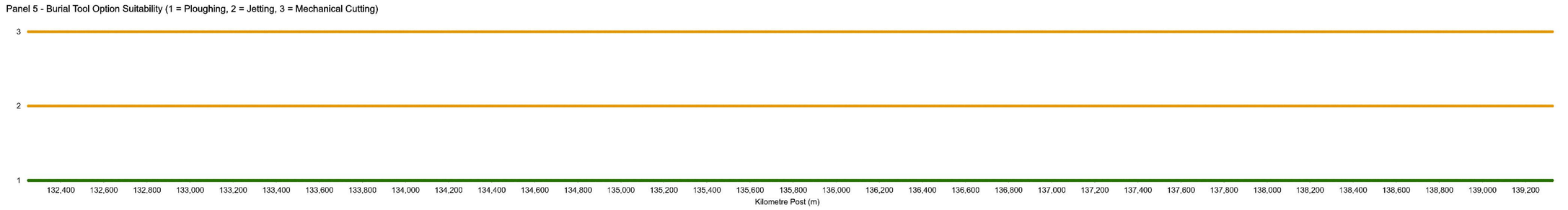
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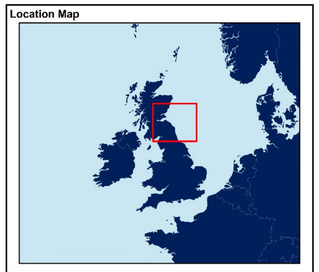




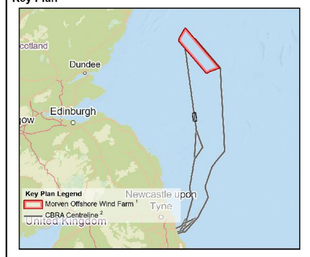




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Proposed 1000m Survey Corridor [3]
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- Depression with boulder/debris
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Panel 3

- Possible Mobile Bedform Height [5]
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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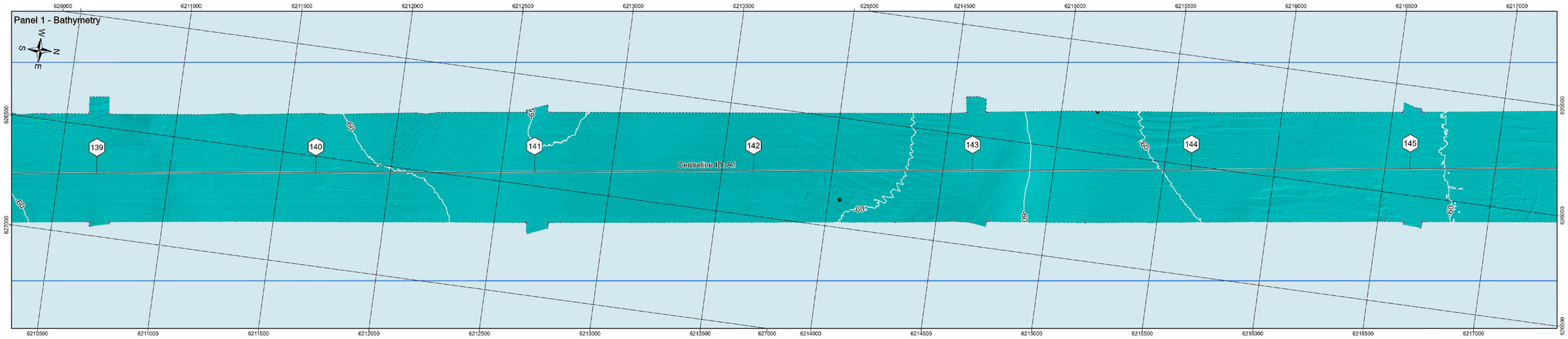
Report Title
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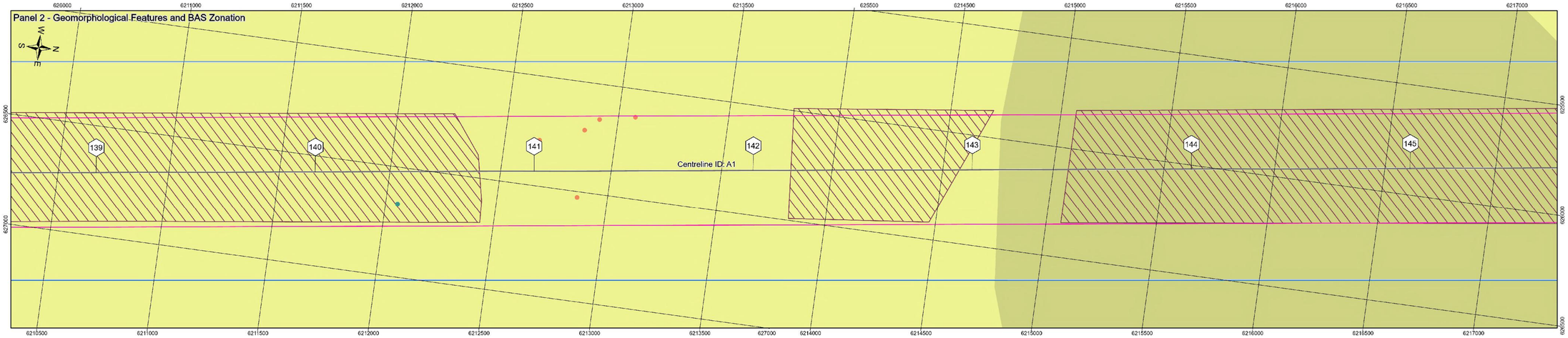
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 22 of 34

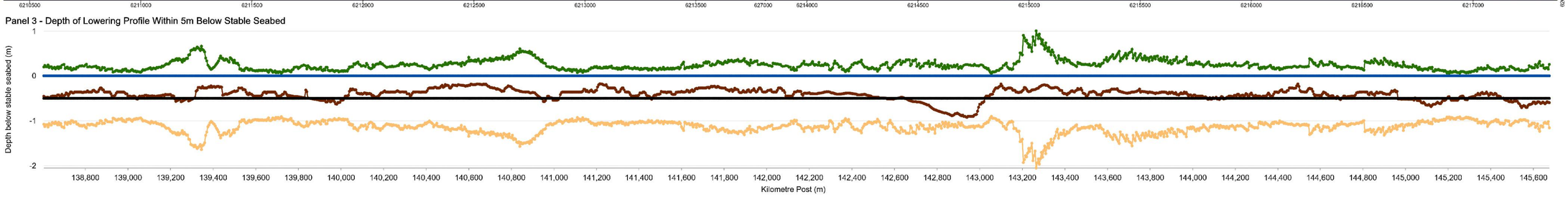
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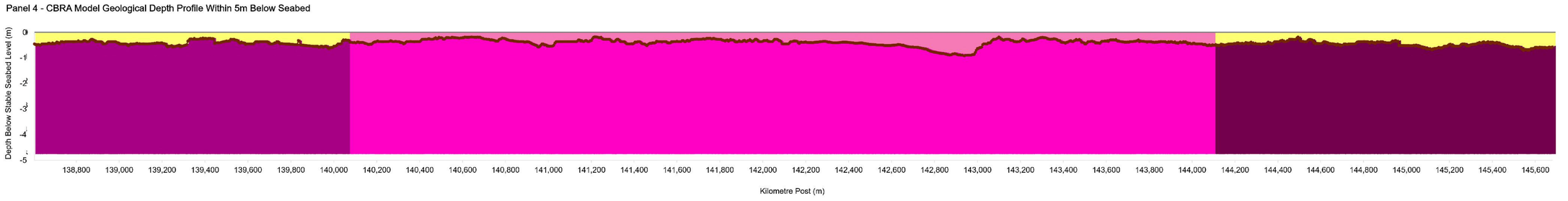
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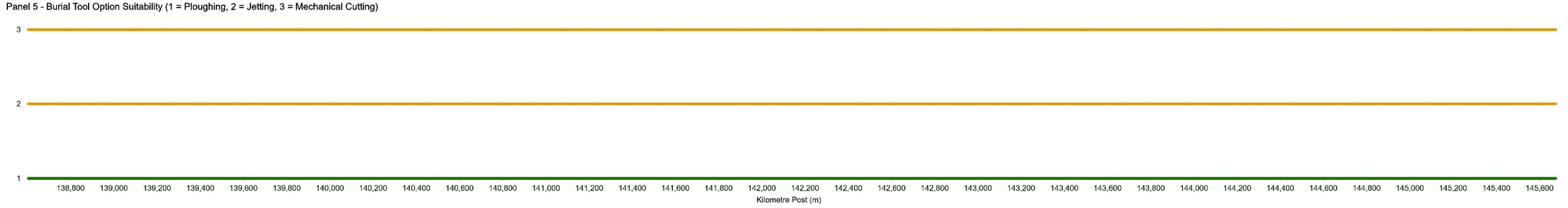
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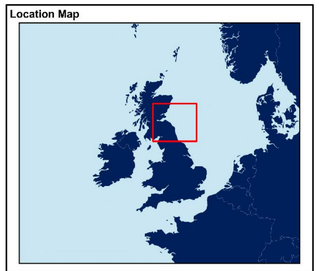




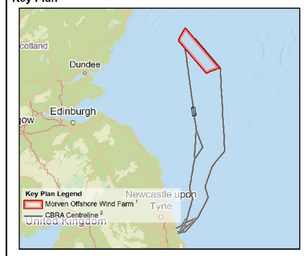




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

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BAS Zone Classification [3]
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- Boulder/debris
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- Depression with boulder/debris
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- SEGL1 Installation Corridor [4]
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Panel 3

- Possible Mobile Bedform Height [5]
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Latitude of Origin: 0.0000
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Scale Factor: 0.9996
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Notes:
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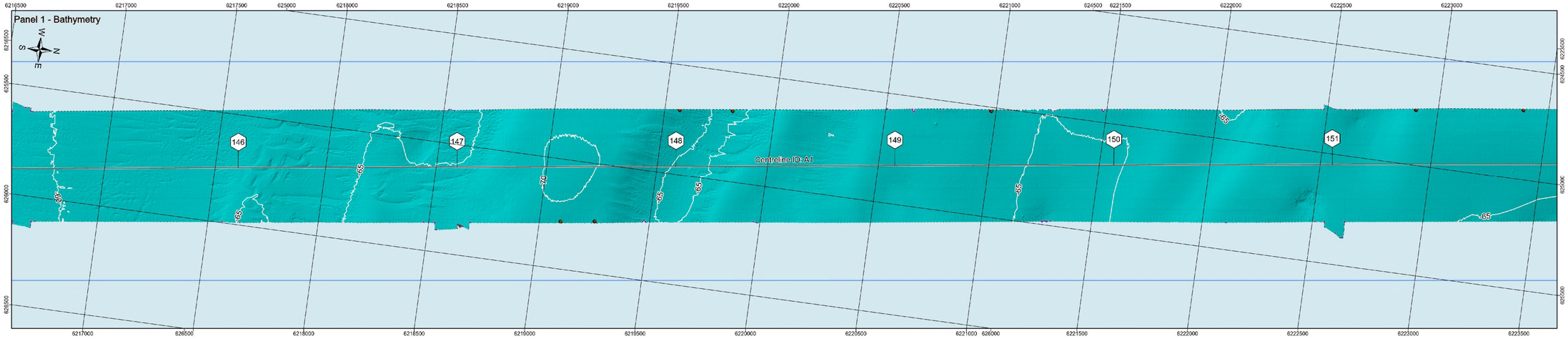
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 23 of 34

Drawing Status
Issue for Review

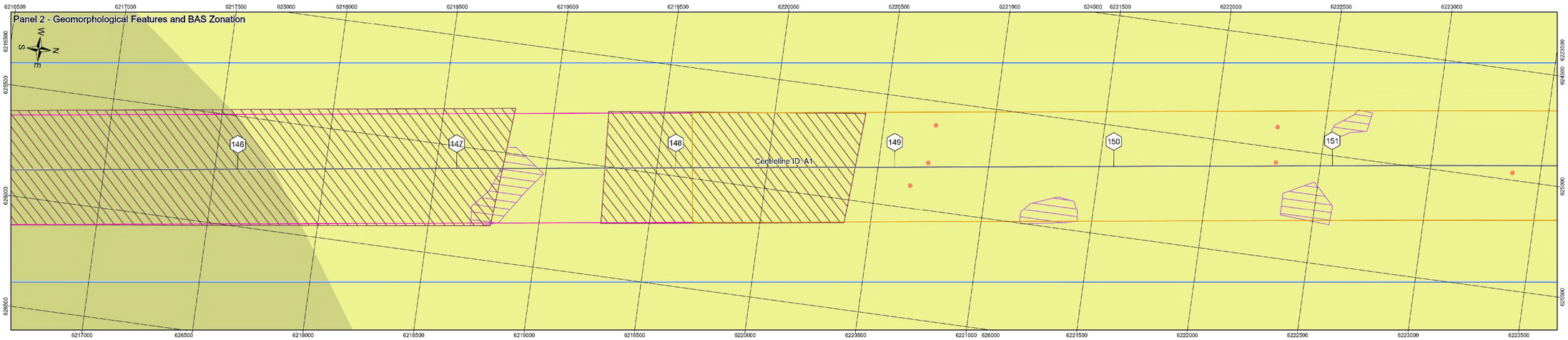
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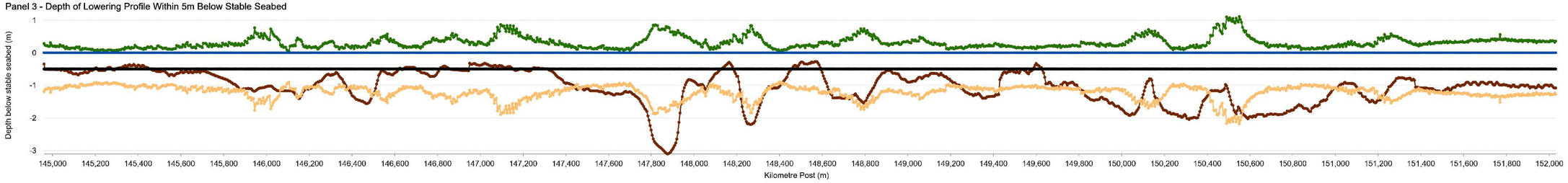
Panel 1 - Bathymetry



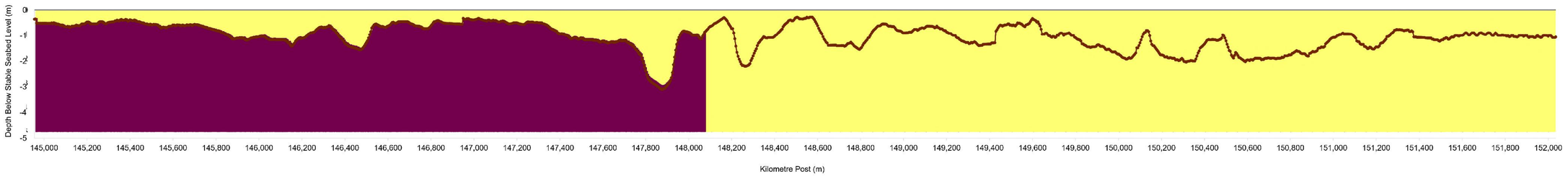
Panel 2 - Geomorphological Features and BAS Zonation



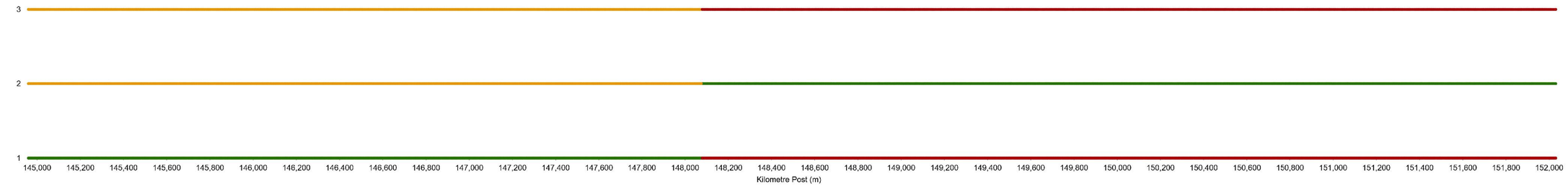
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



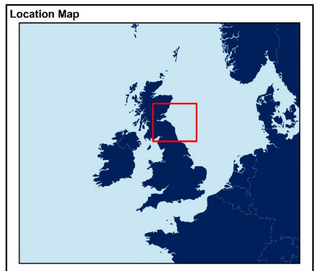
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



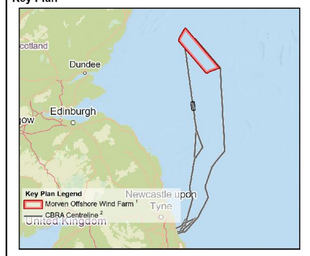
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

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- Suitable [3]
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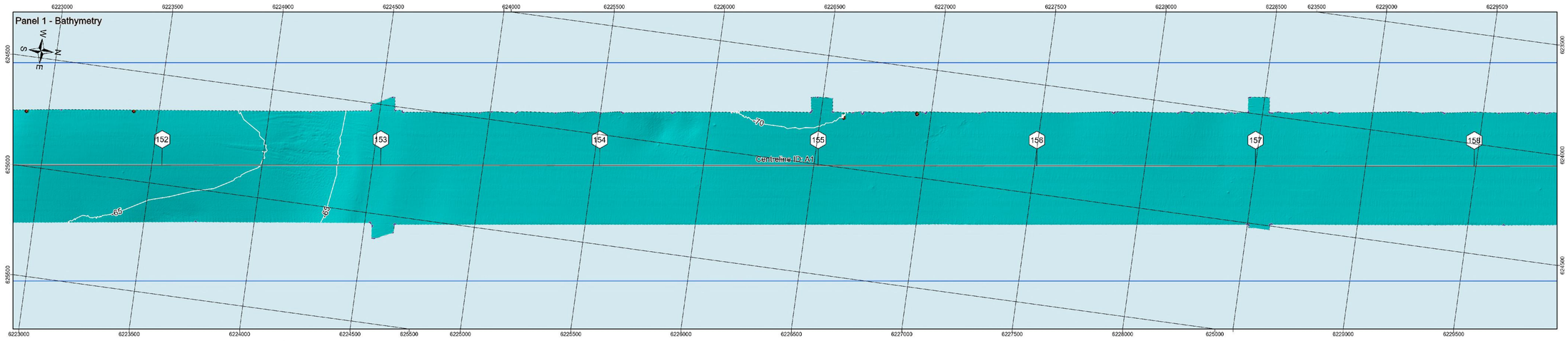
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 24 of 34

Drawing Status
Issue for Review

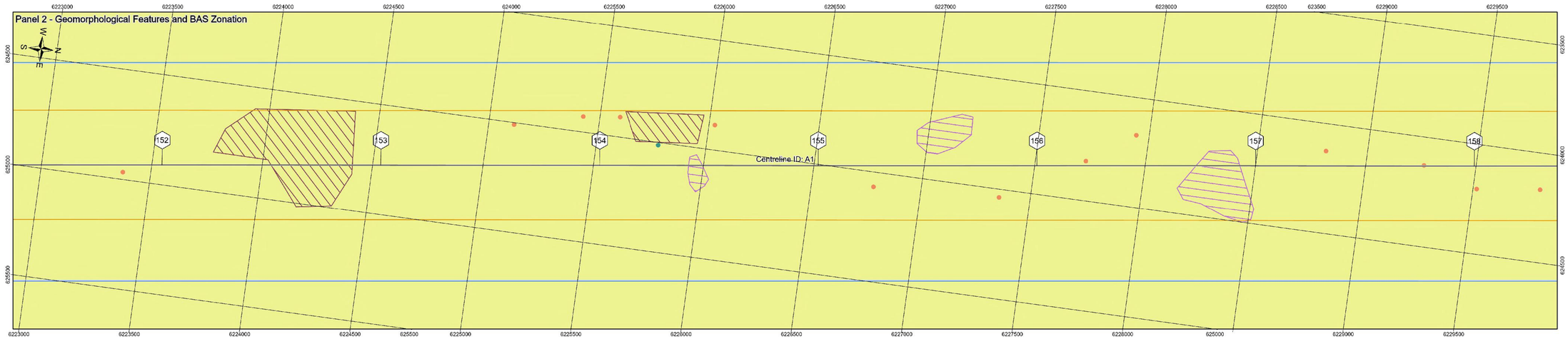
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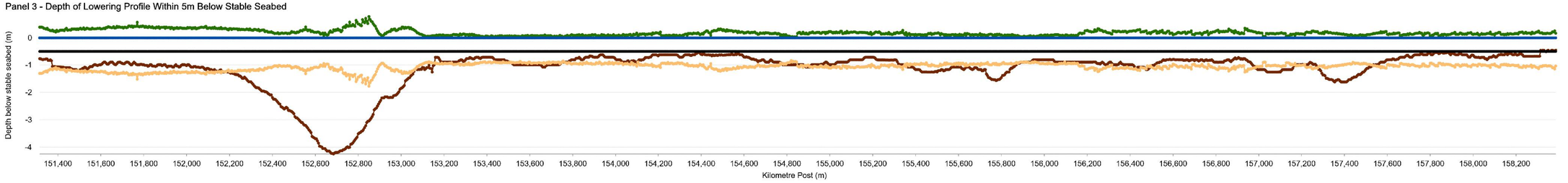
Panel 1 - Bathymetry



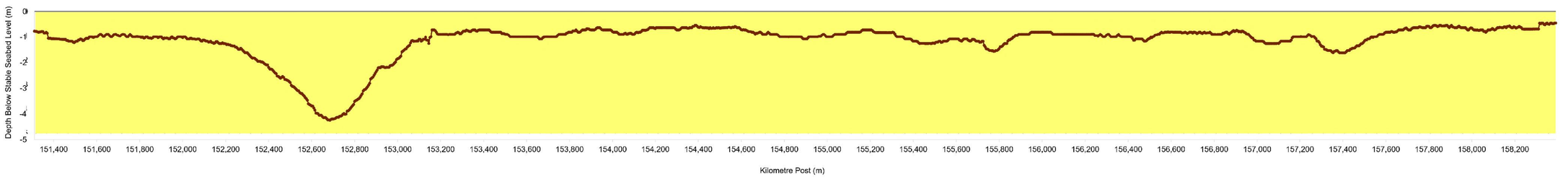
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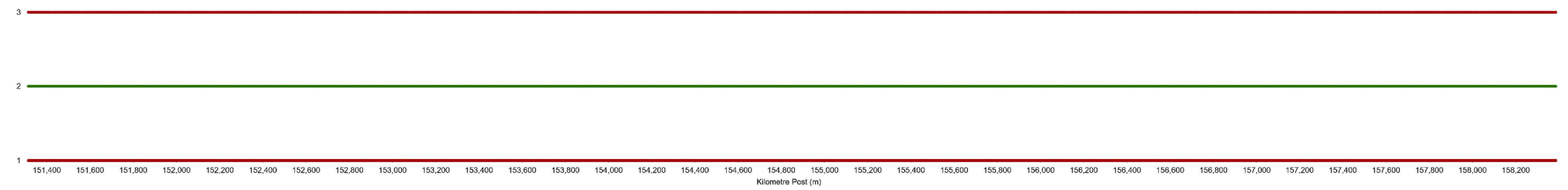
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



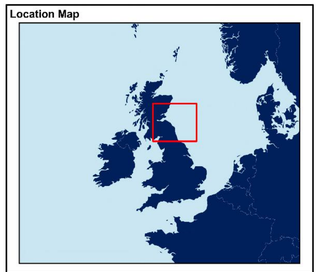
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



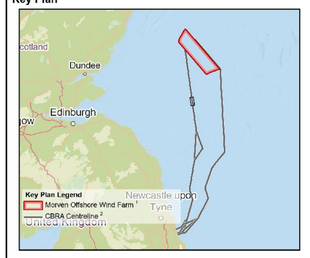
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [1]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [4]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
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- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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2. Created by GM, March 2024.
3. Created by GM, May 2024.
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Report Title
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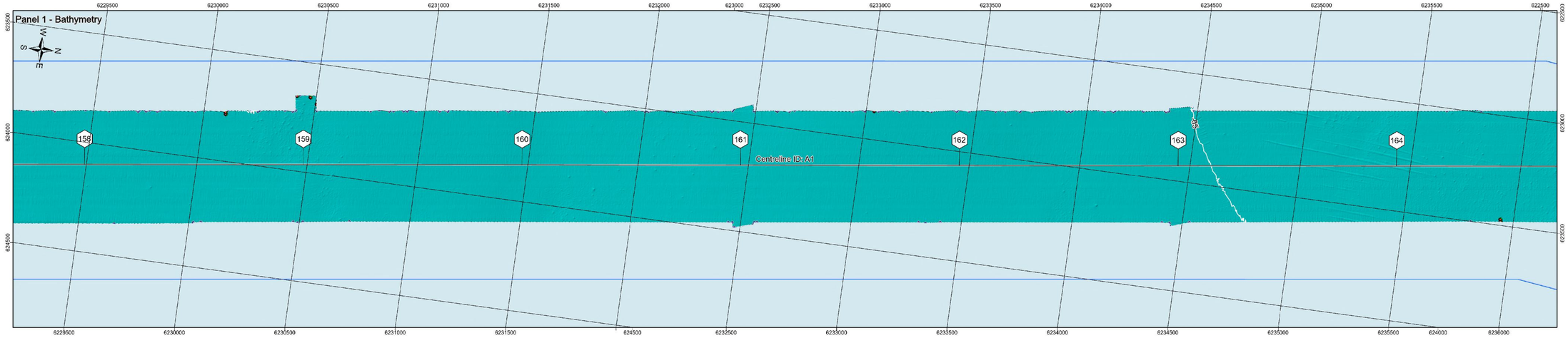
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 25 of 34

Drawing Status
Issue for Review

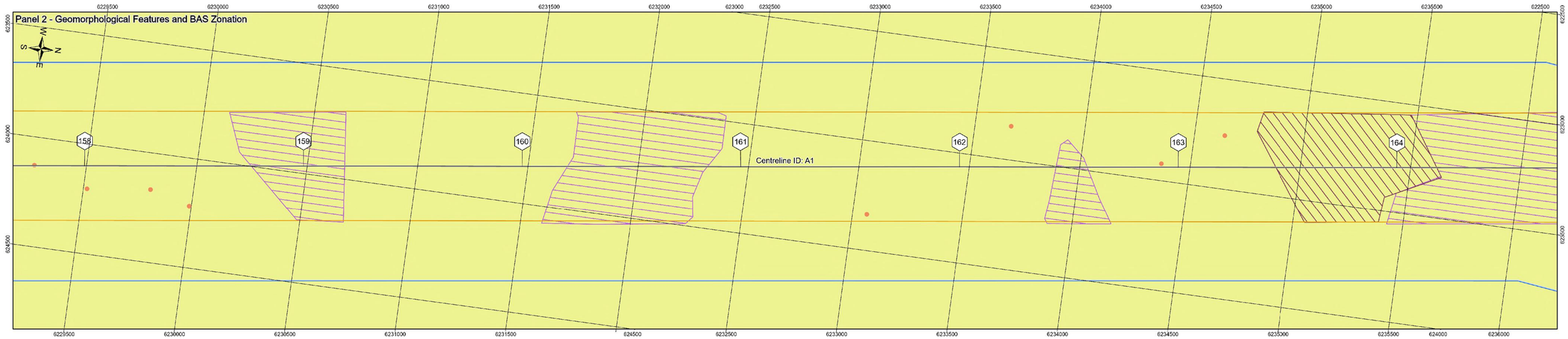
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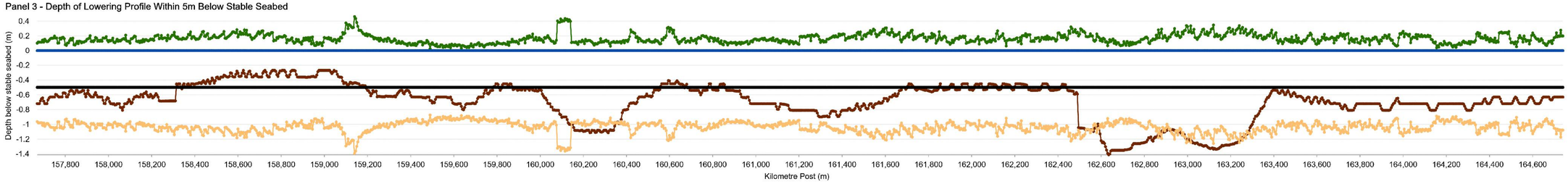
Panel 1 - Bathymetry



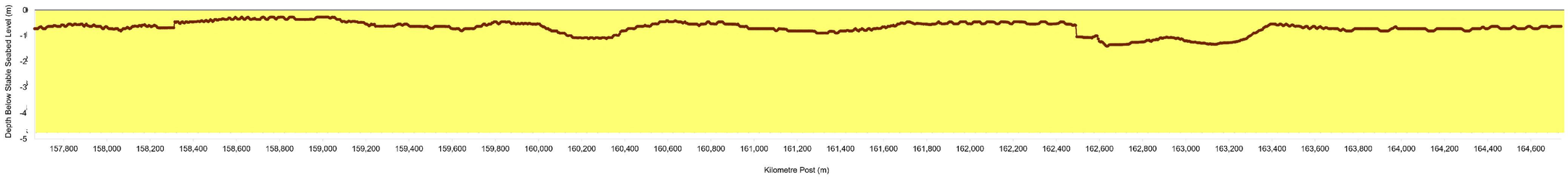
Panel 2 - Geomorphological Features and BAS Zonation



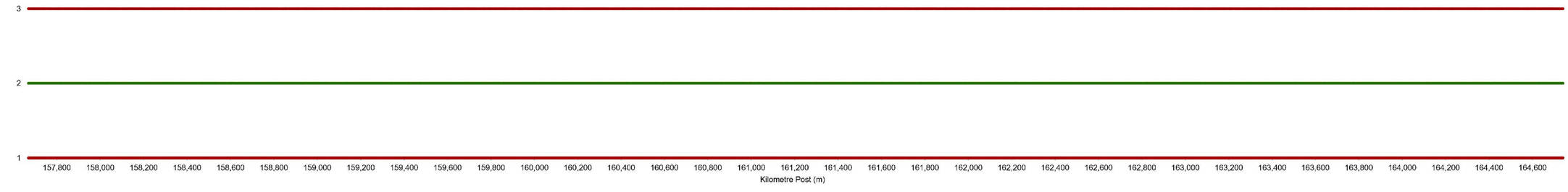
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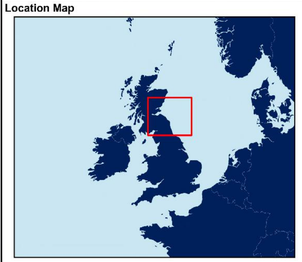
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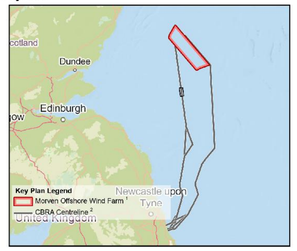
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Panel 5
- Suitable [3]
- Possible [3]
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Projection: UTM Zone 30N

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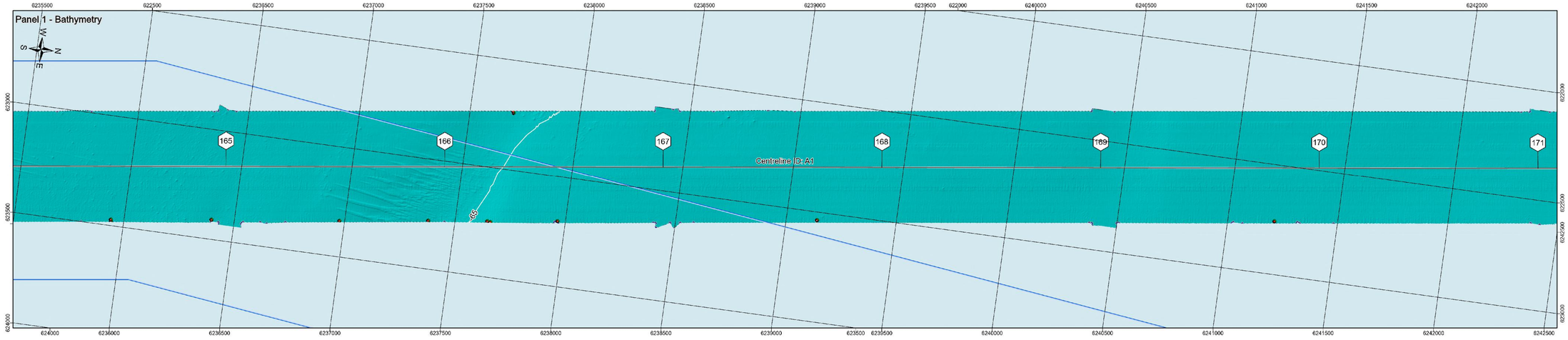
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 26 of 34

Drawing Status
Issue for Review

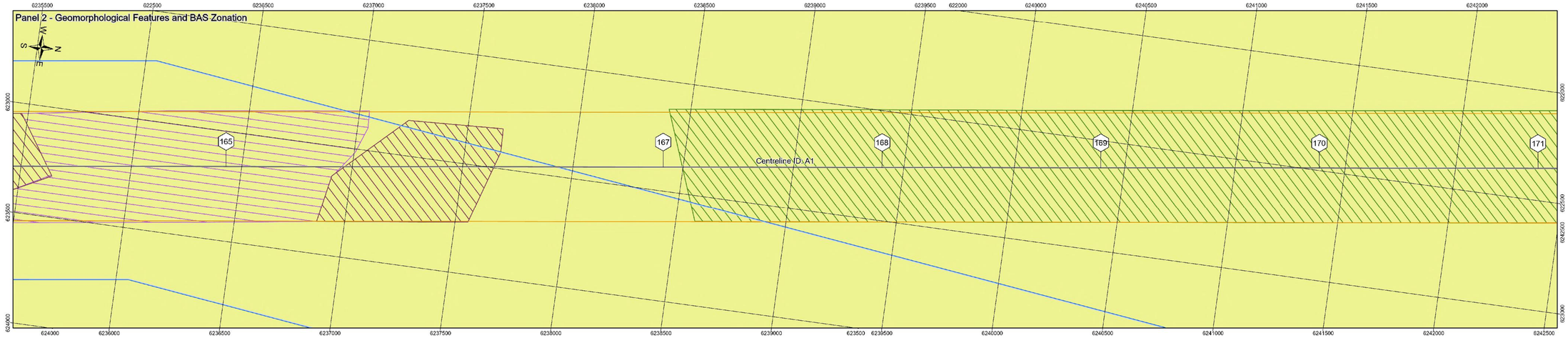
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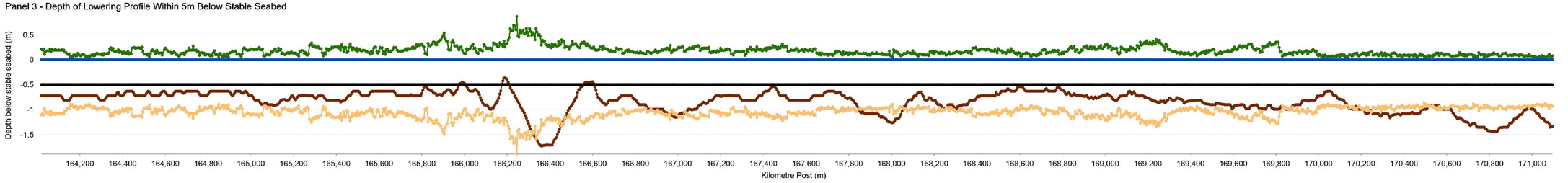
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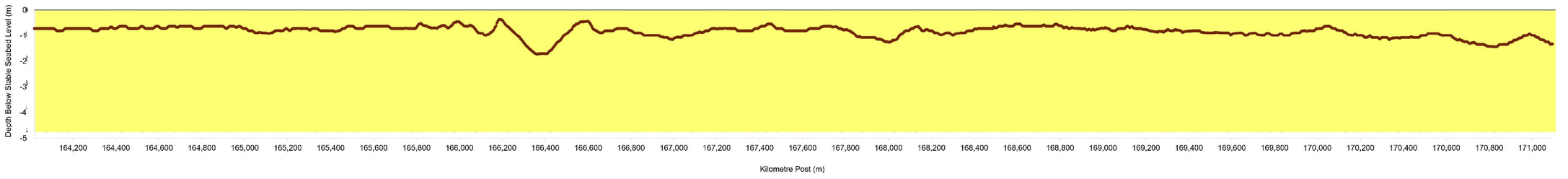
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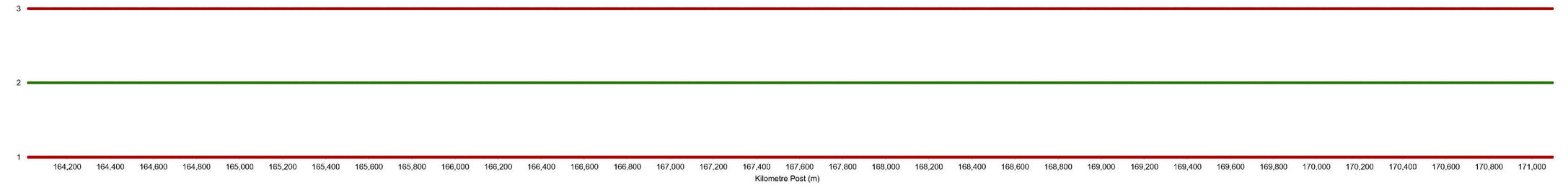
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



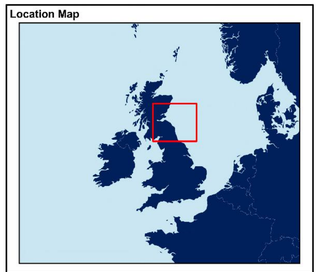
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



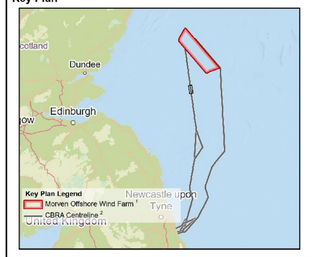
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Key Plan



Legend

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BAS Zone Classification [9]
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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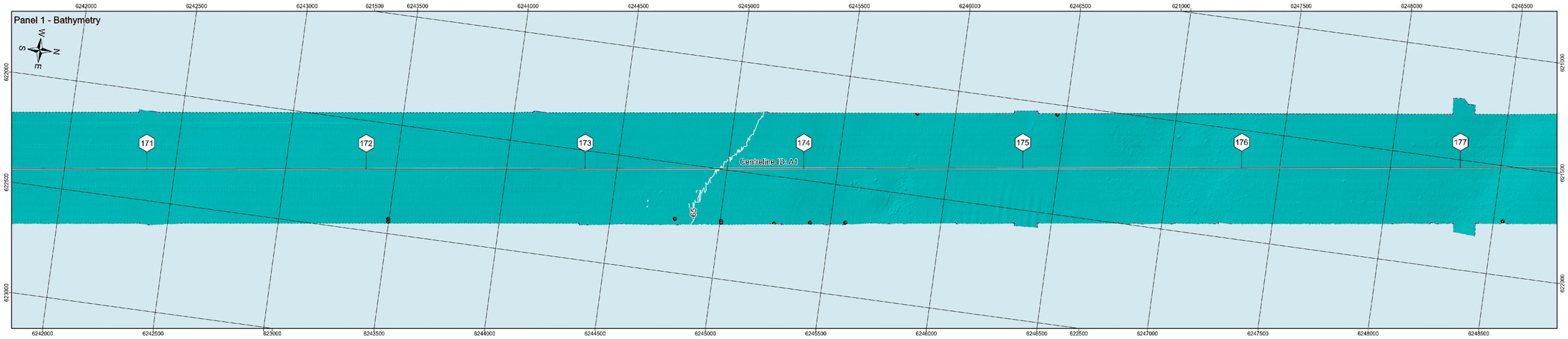
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 27 of 34

Drawing Status
Issue for Review

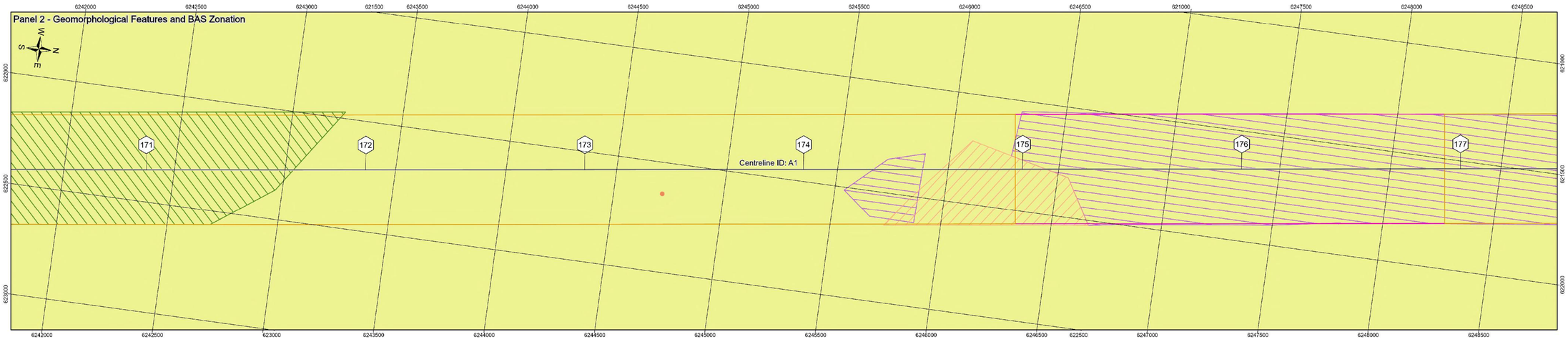
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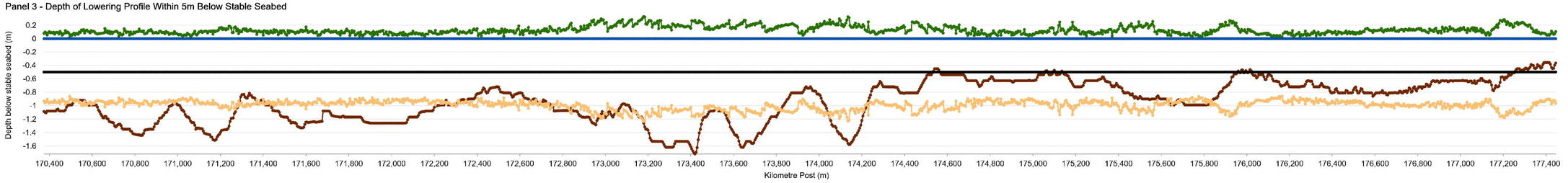
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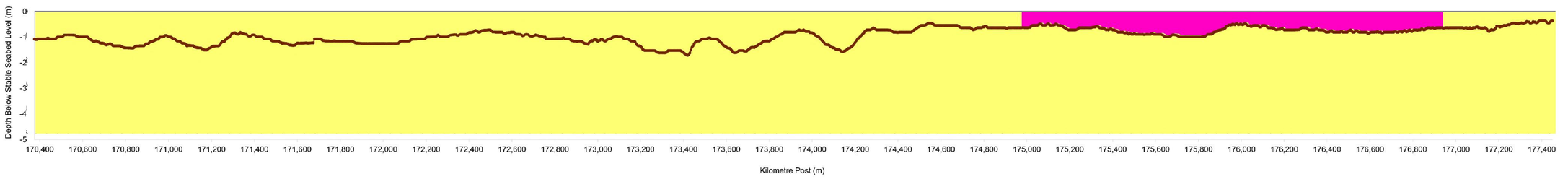
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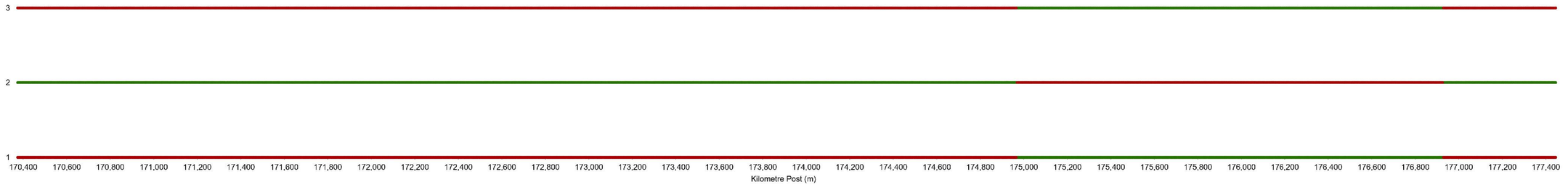
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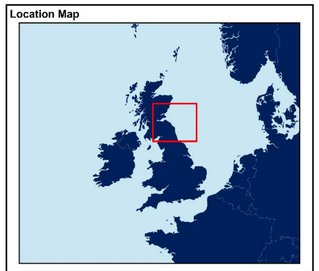
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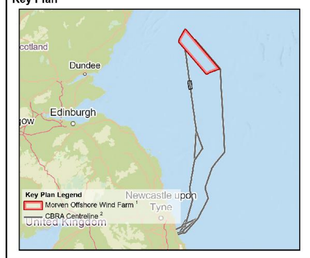
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- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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- Very High Strength CLAY (C6)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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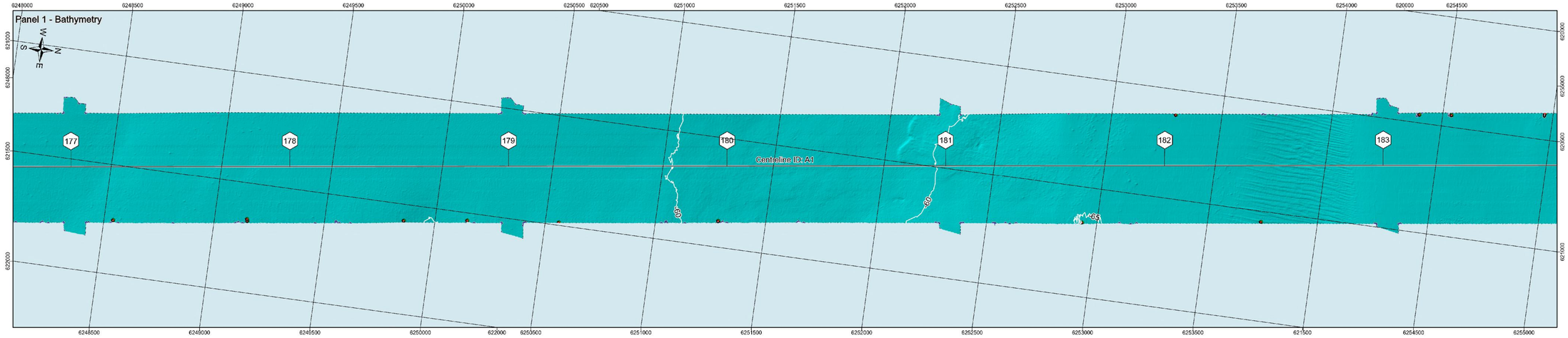
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 28 of 34

Drawing Status
Issue for Review

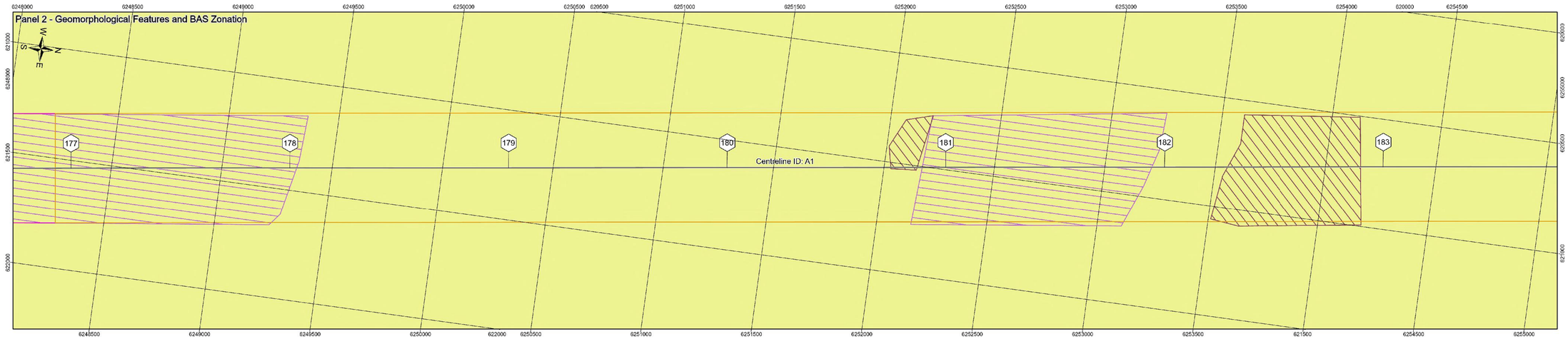
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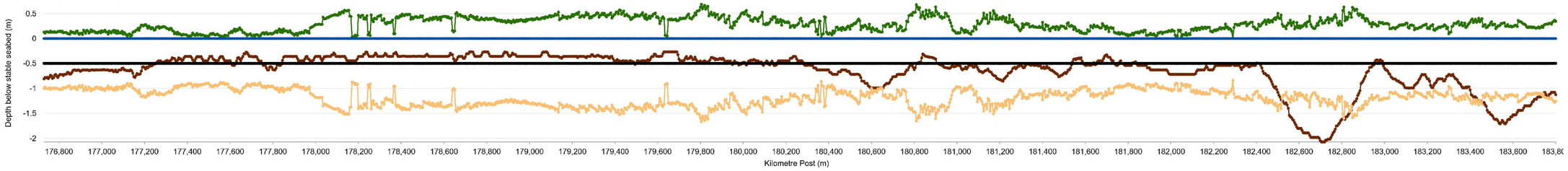
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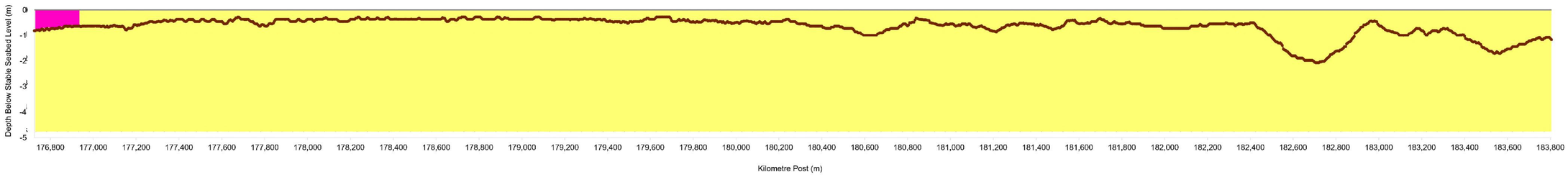
Panel 2 - Geomorphological Features and BAS Zonation



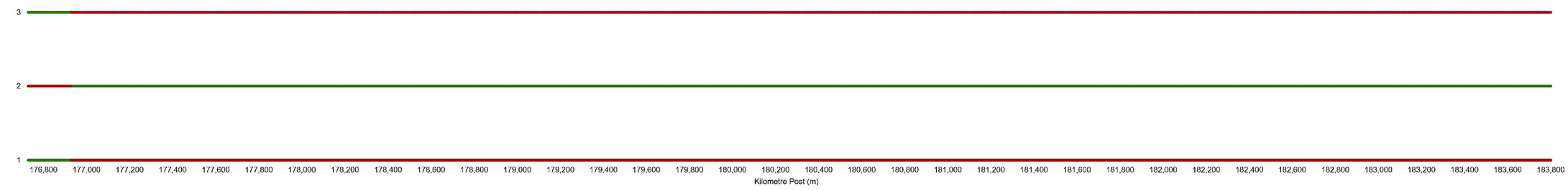
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



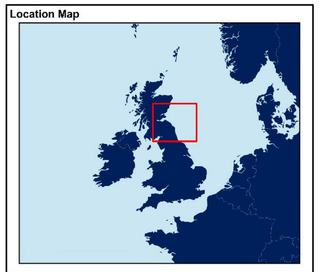
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



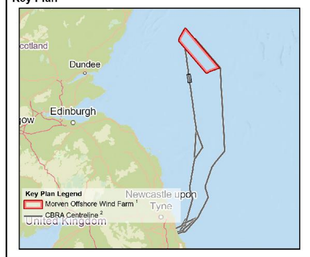
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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BAS Zone Classification [3]
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- Depression with boulder/debris
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
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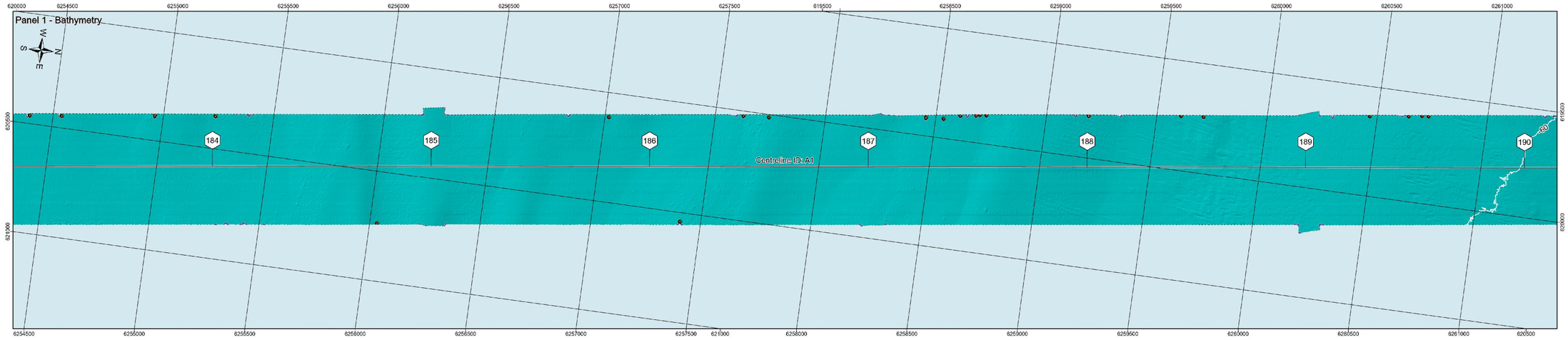
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 29 of 34

Drawing Status
Issue for Review

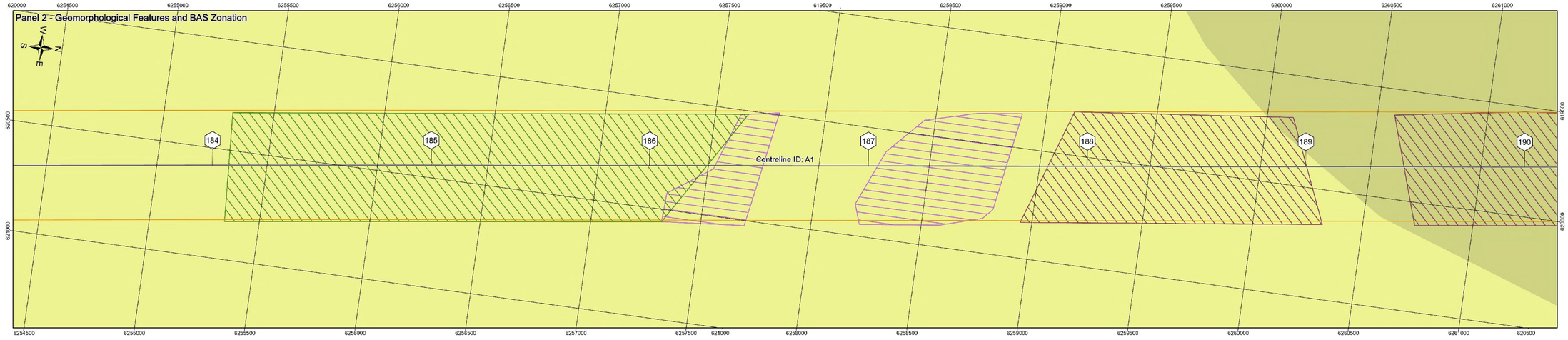
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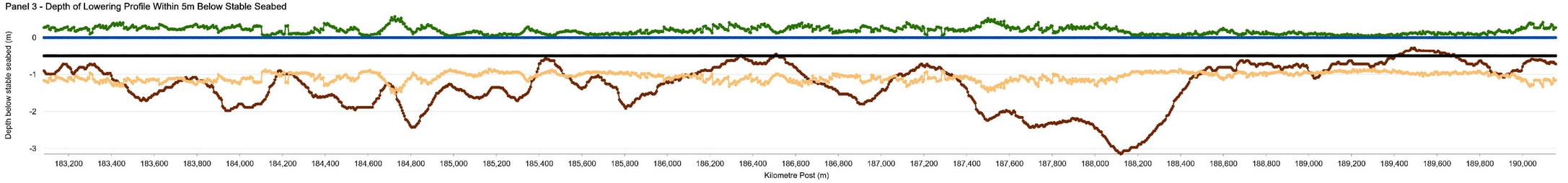
Panel 1 - Bathymetry



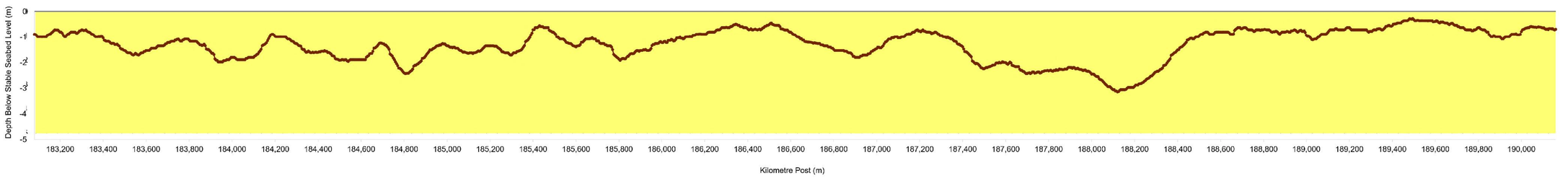
Panel 2 - Geomorphological Features and BAS Zonation



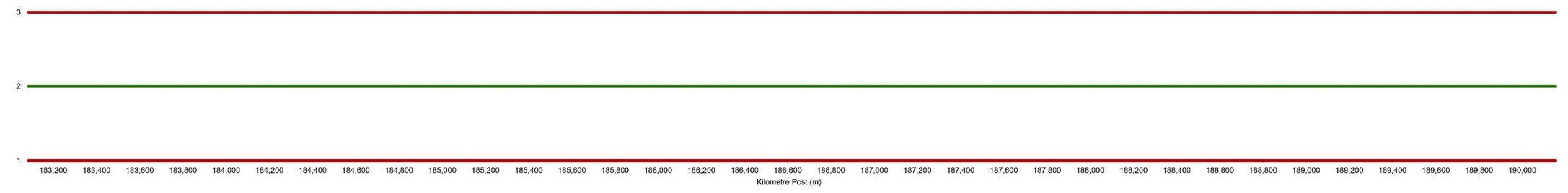
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



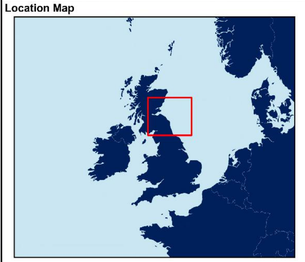
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



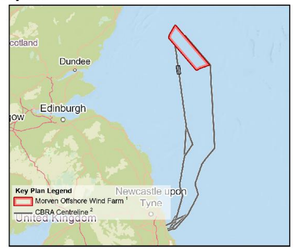
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Key Plan



Legend

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BAS Zone Classification [3]
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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [5]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Notes:
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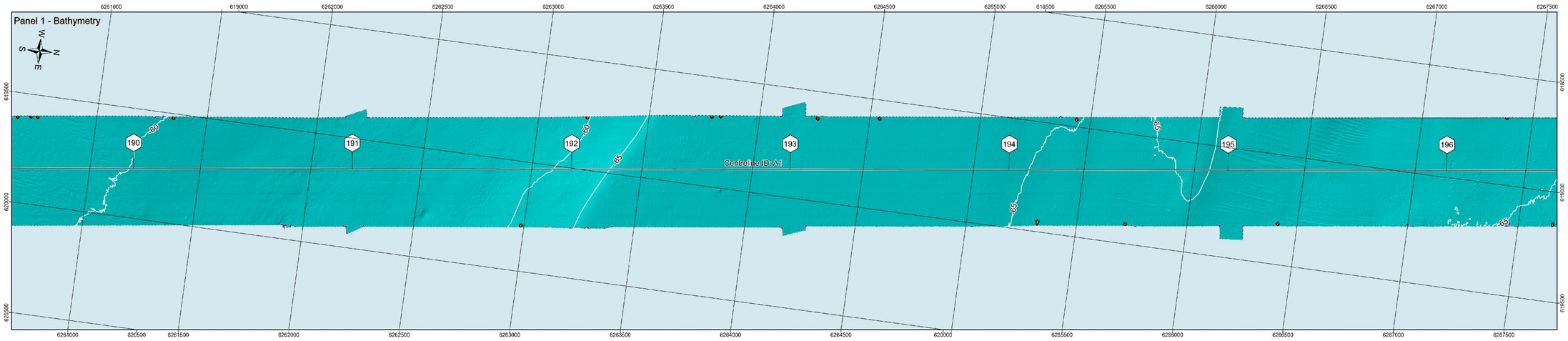
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 30 of 34

Drawing Status
Issue for Review

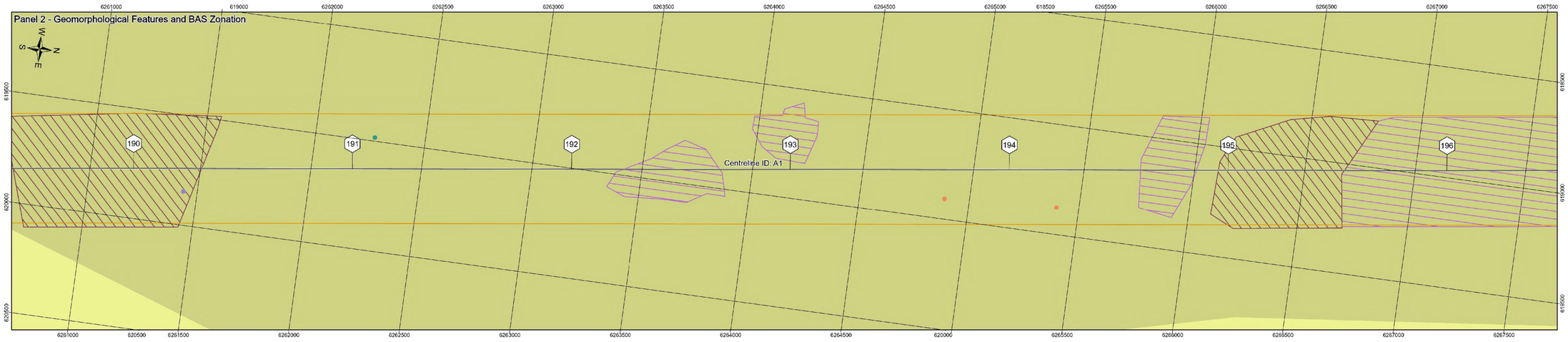
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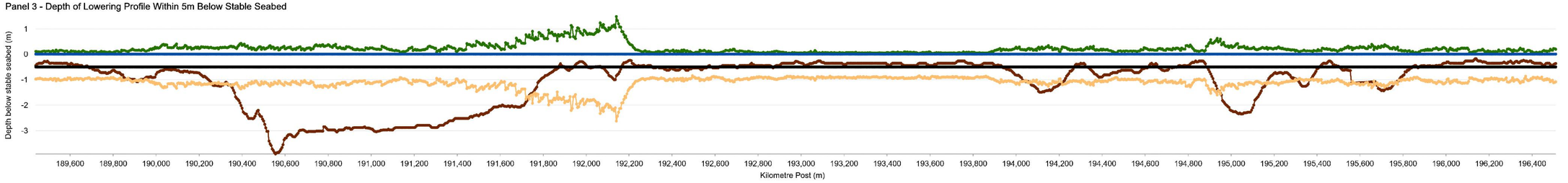
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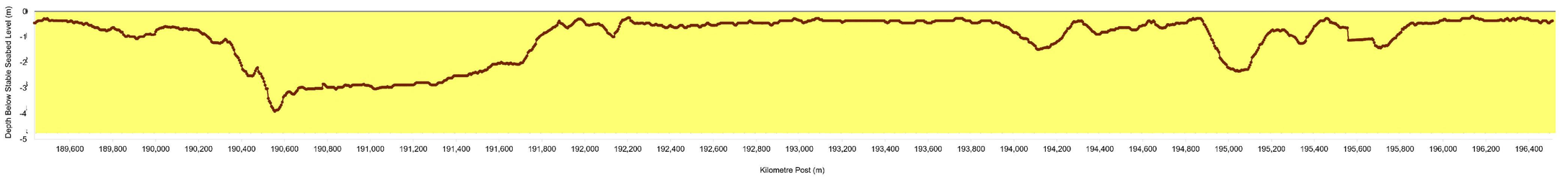
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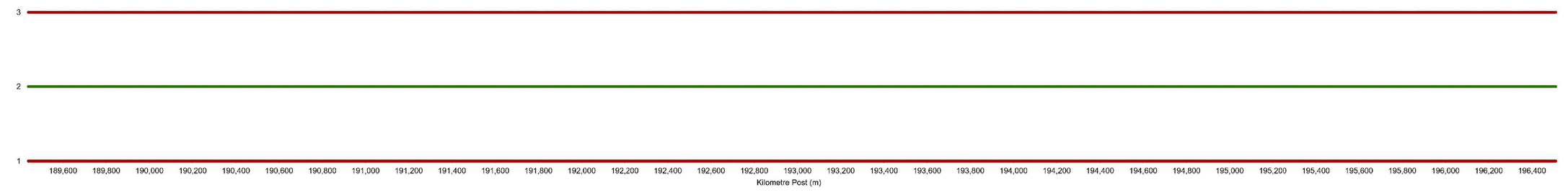
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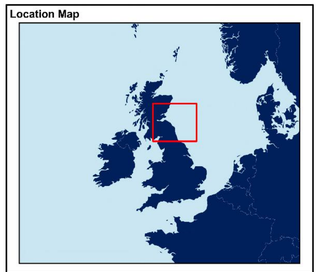
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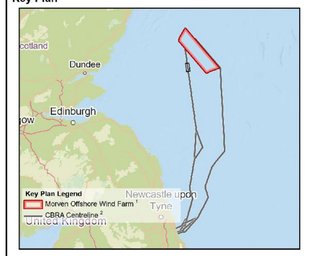
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- Extremely High Strength CLAY (C7)
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- Very Low Strength CLAY (C2)
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- Suitable [3]
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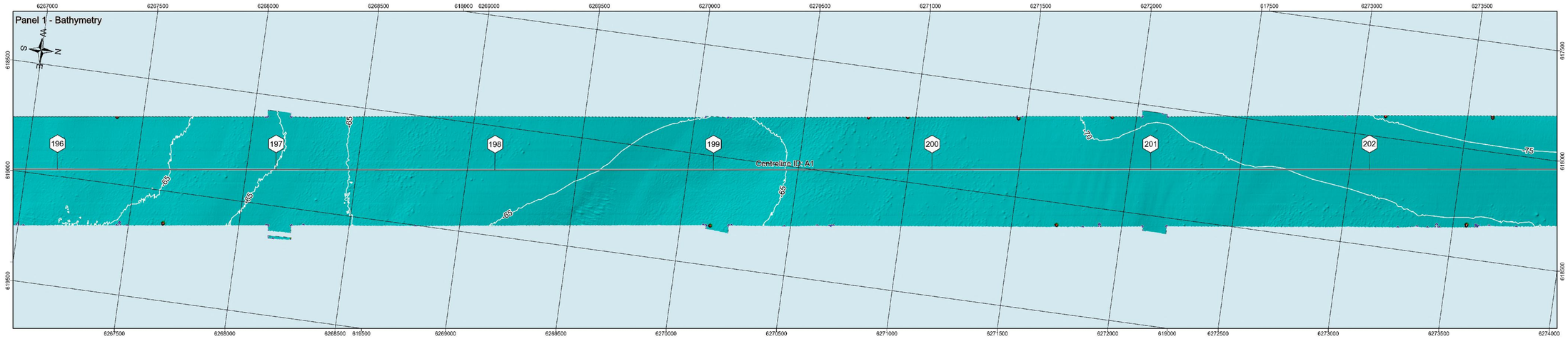
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Drawing Status
Issue for Review

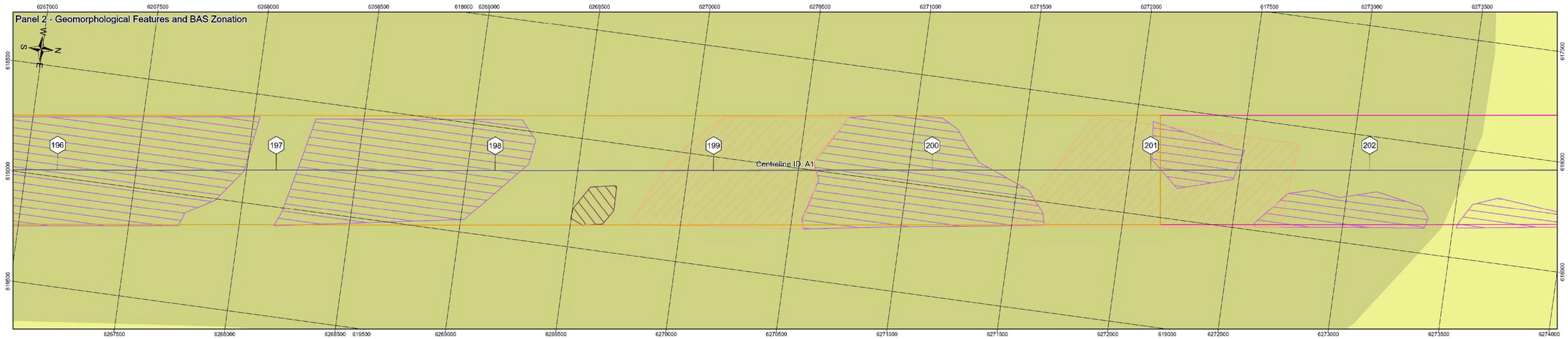
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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Partners in UK offshore wind

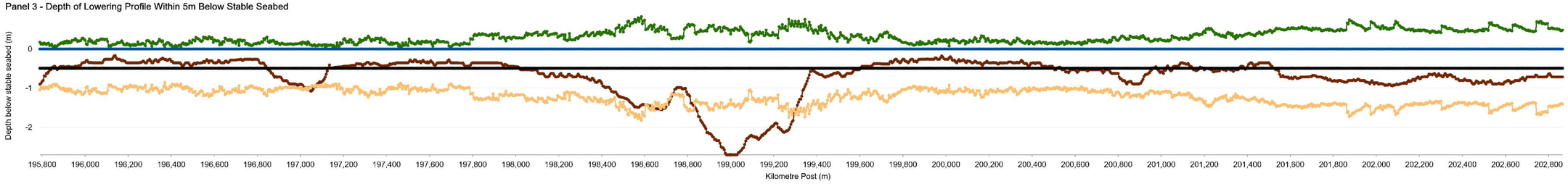
Panel 1 - Bathymetry



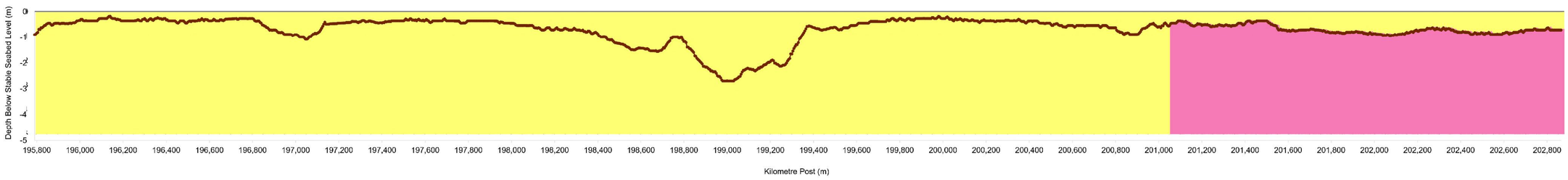
Panel 2 - Geomorphological Features and BAS Zonation



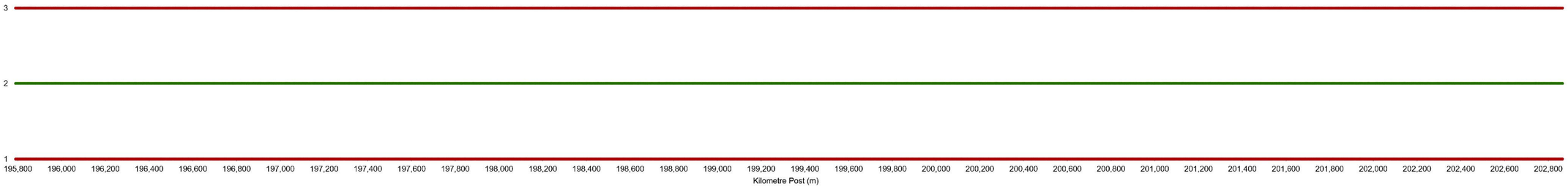
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



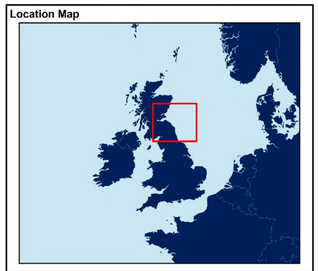
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



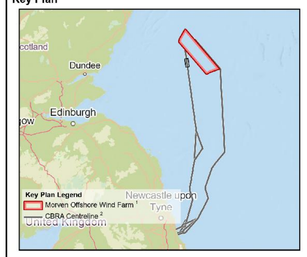
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
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Panel 3
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- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
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- Global Maritime Recommended Depth of Lowering [5]
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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5
- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

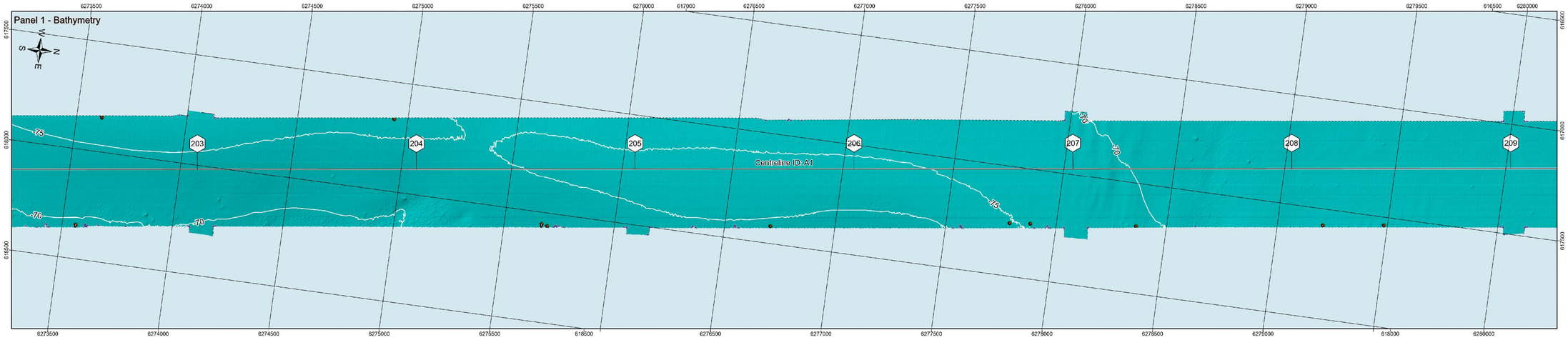
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

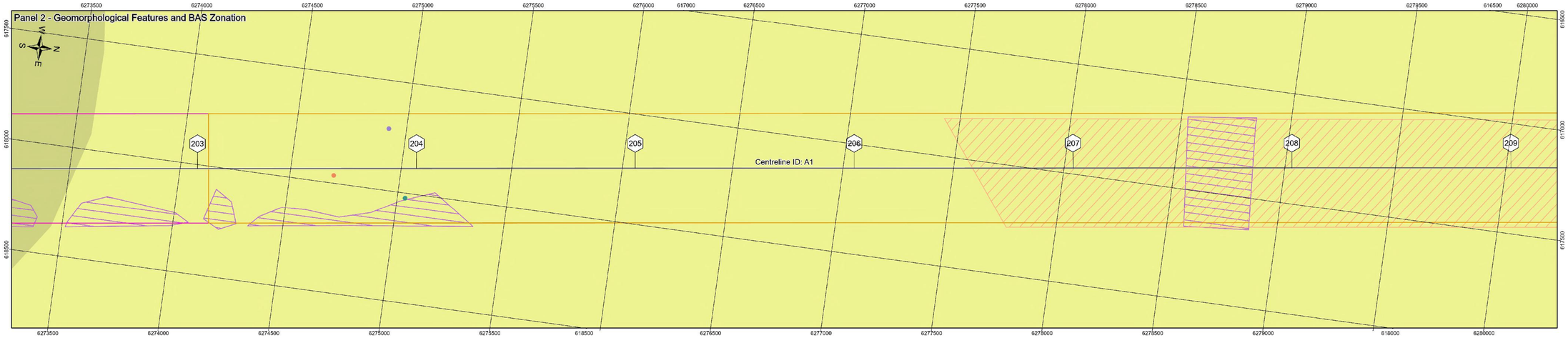
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 32 of 34

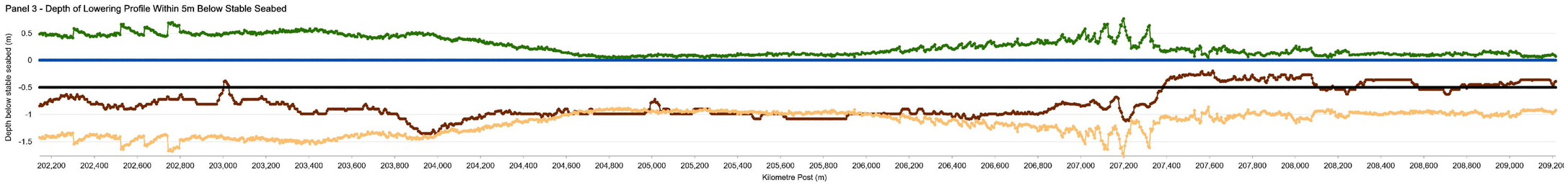
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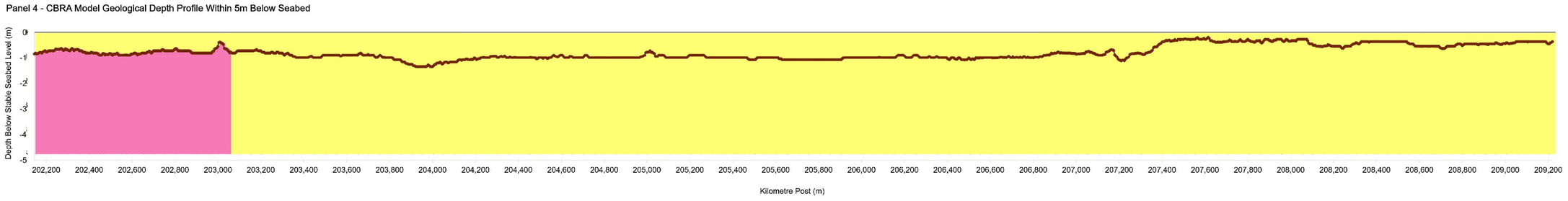
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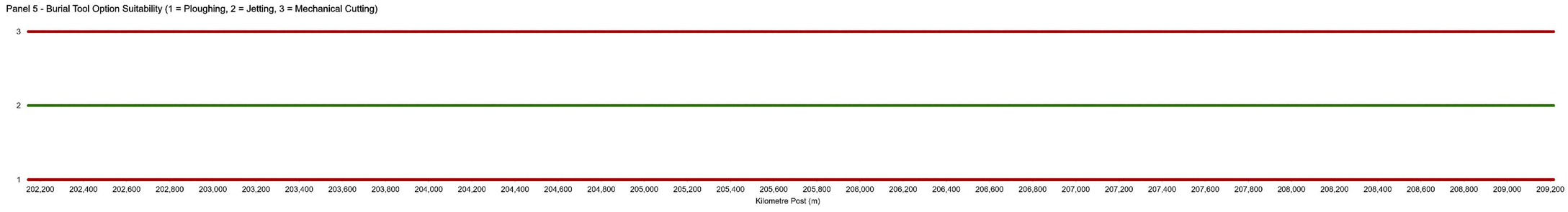
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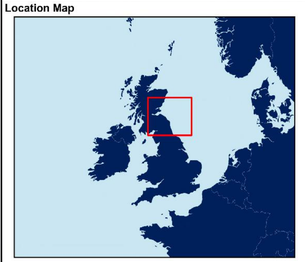




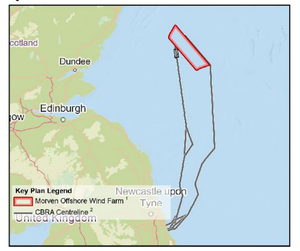




Location Map



Key Plan



Legend

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Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

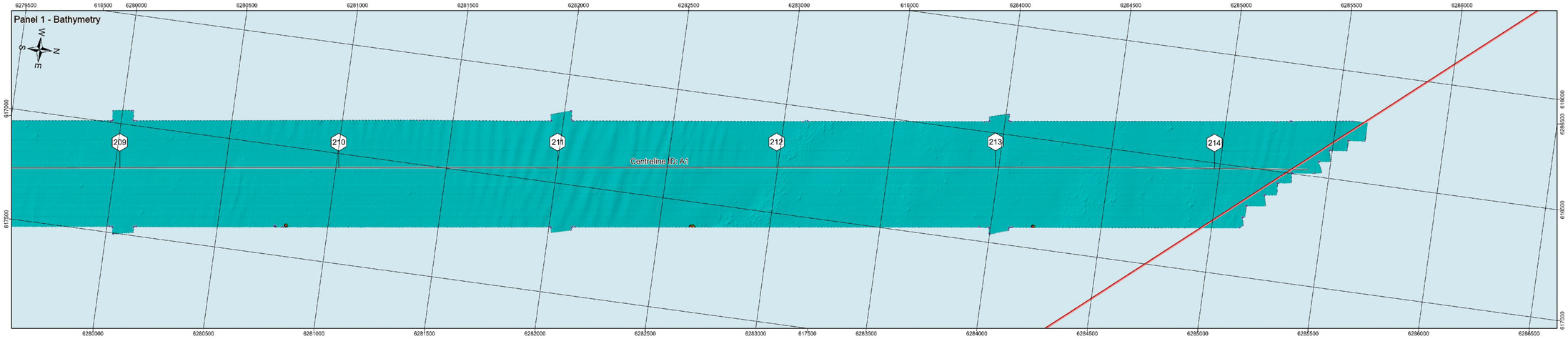
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CBRA Alignment Charts - Centreline ID: A1 - Sheet 33 of 34

Drawing Status
Issue for Review

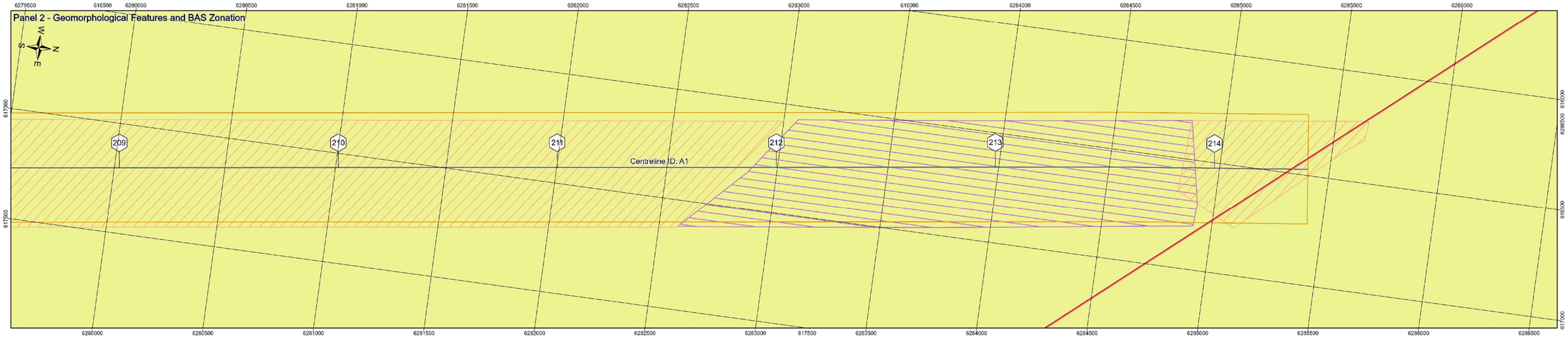
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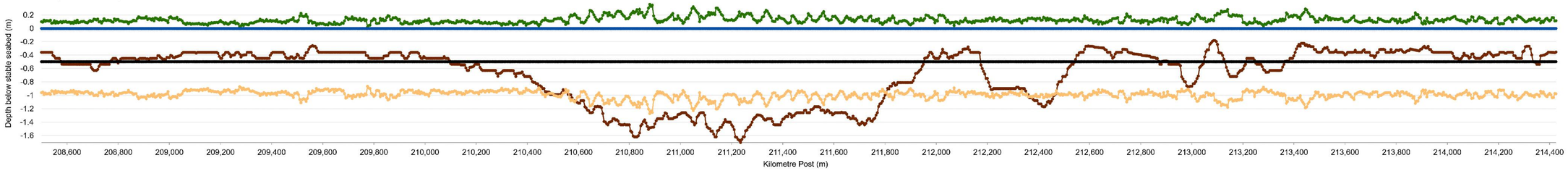
Panel 1 - Bathymetry



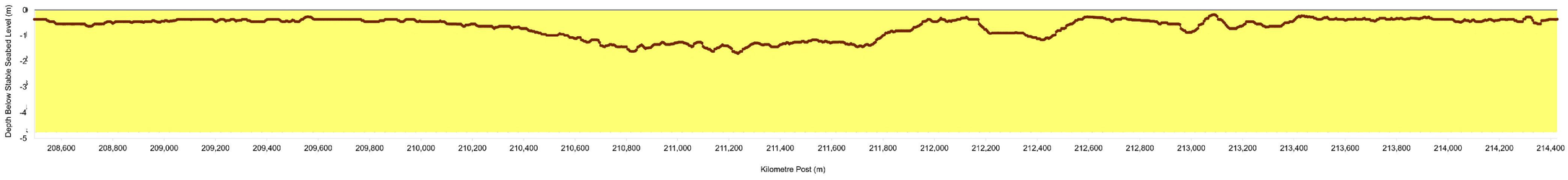
Panel 2 - Geomorphological Features and BAS Zonation



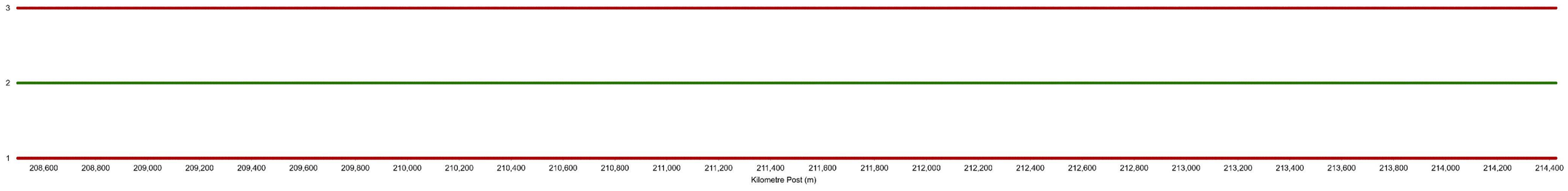
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



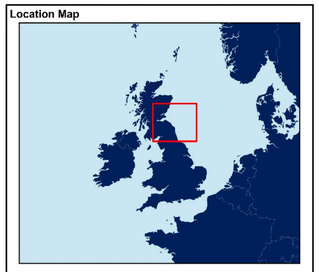
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



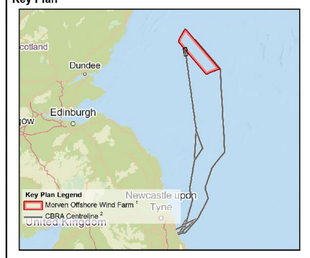
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5
- Suitable [3]
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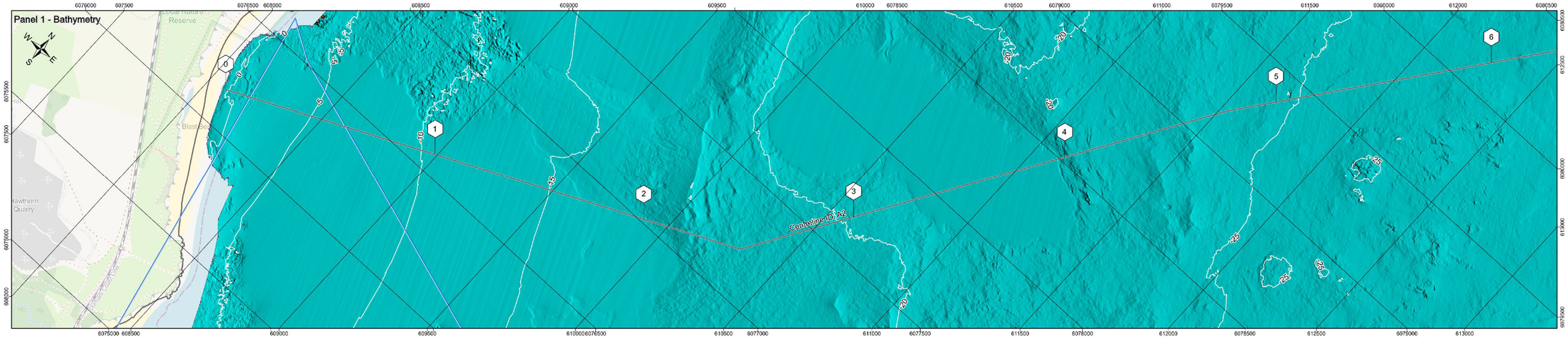
Drawing Title
CBRA Alignment Charts - Centreline ID: A1 - Sheet 34 of 34

Drawing Status
Issue for Review

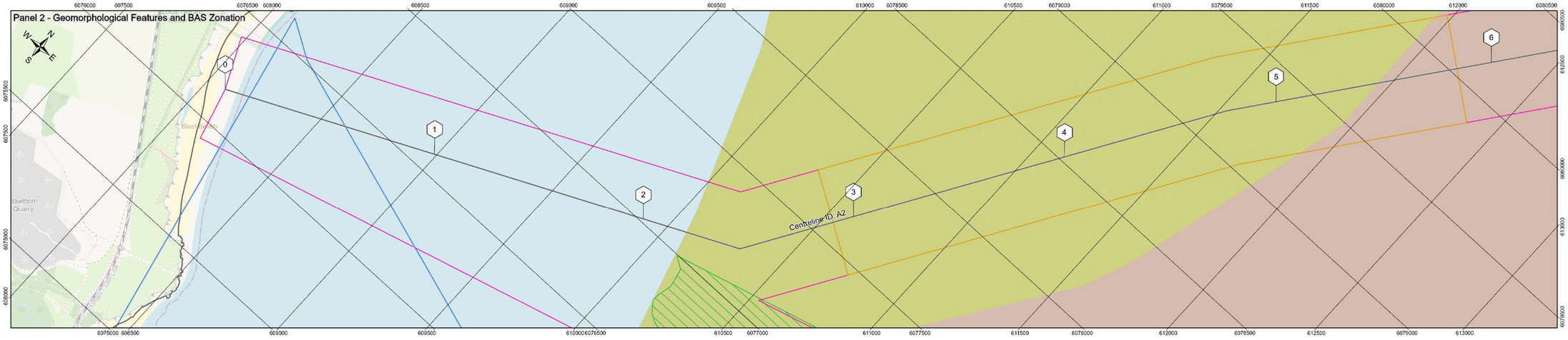
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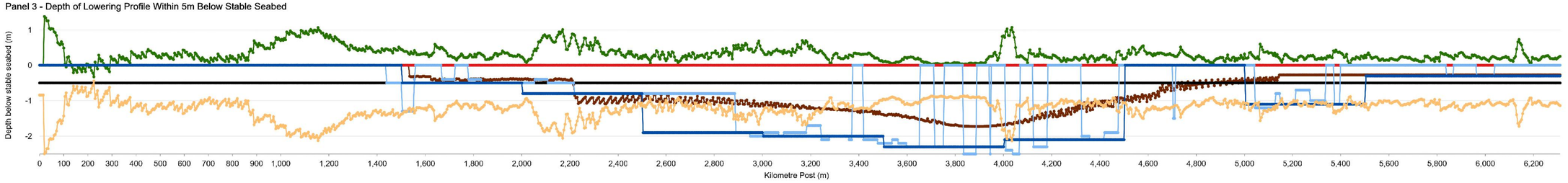
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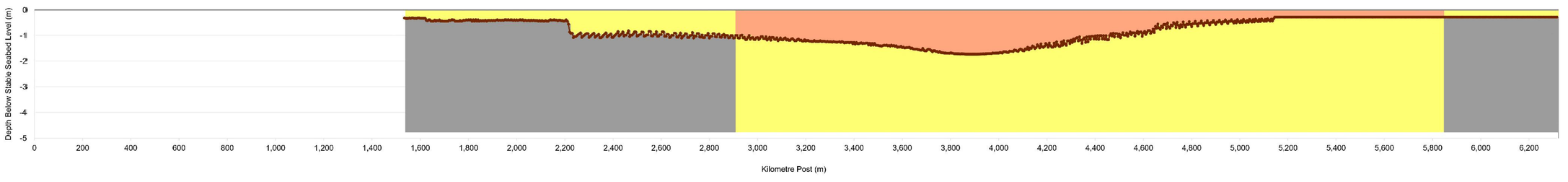
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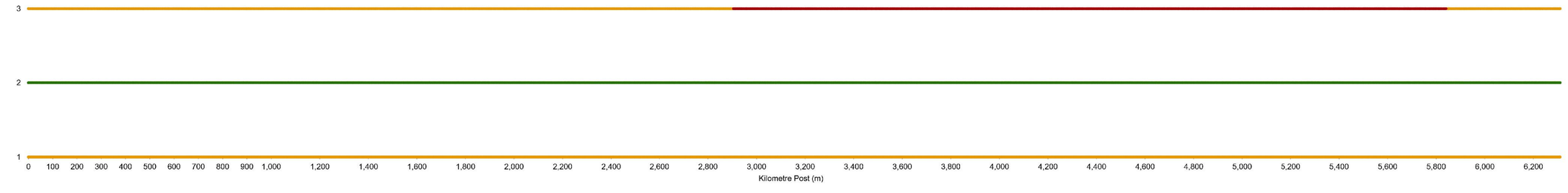
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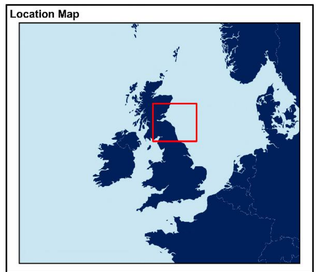
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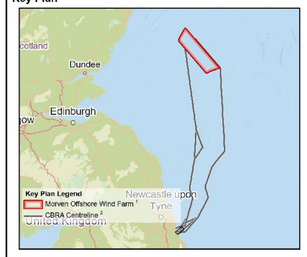
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [4]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
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- SEGL2 Installation Corridor [6]
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [4]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
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Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Latitude of Origin: 0.0000
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Scale Factor: 0.9996
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Project Title
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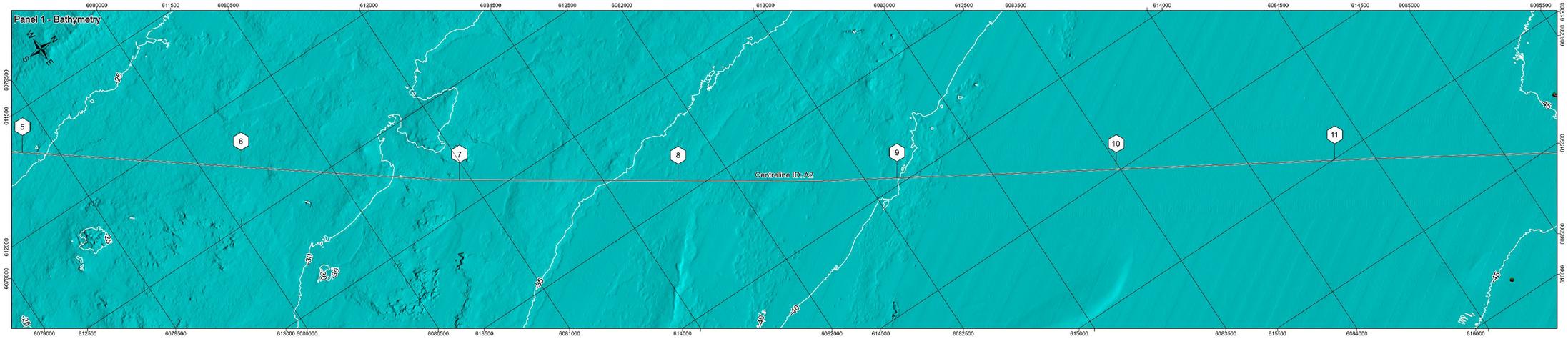
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

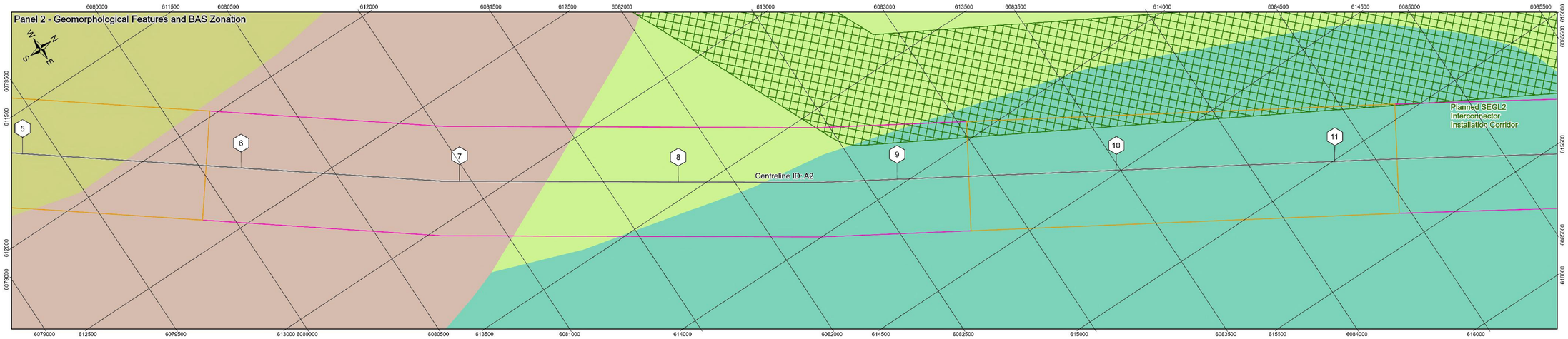
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 1 of 35

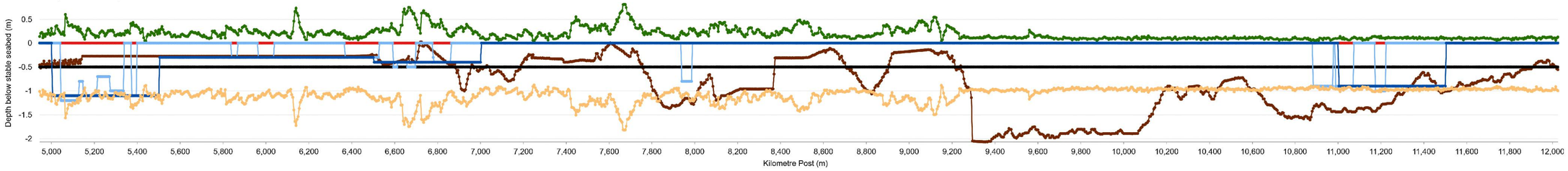
Drawing Status
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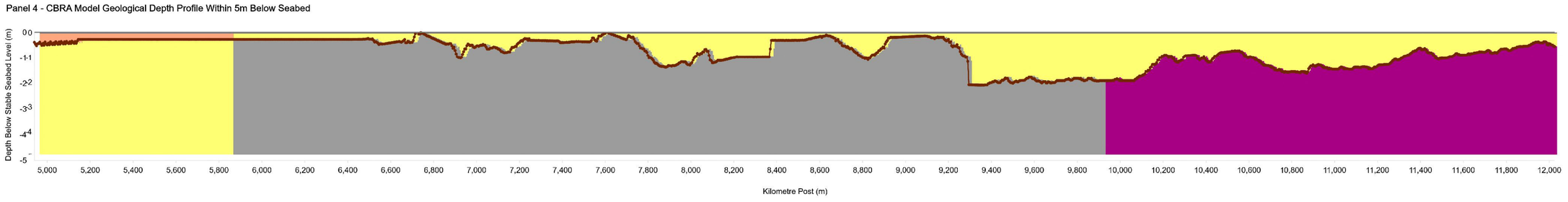
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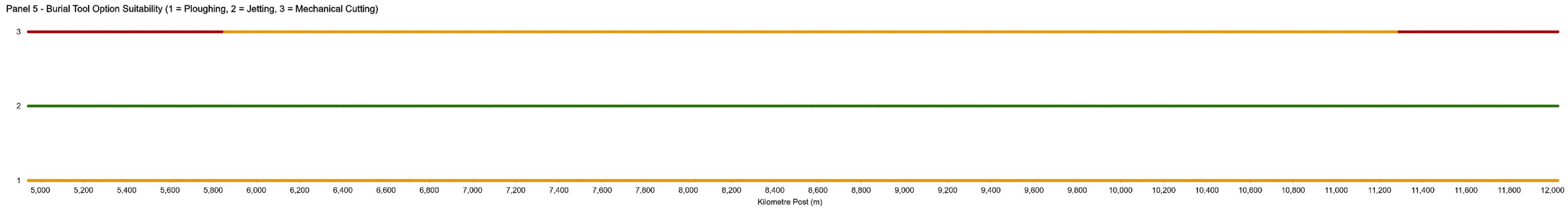
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind



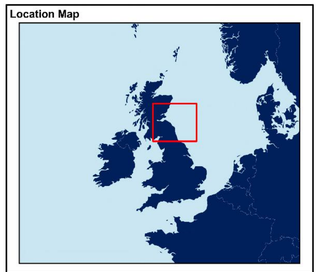




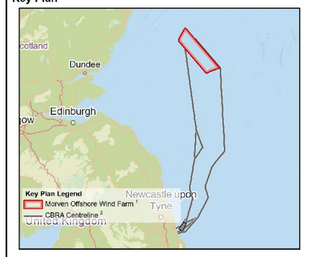




Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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- Suitable [3]
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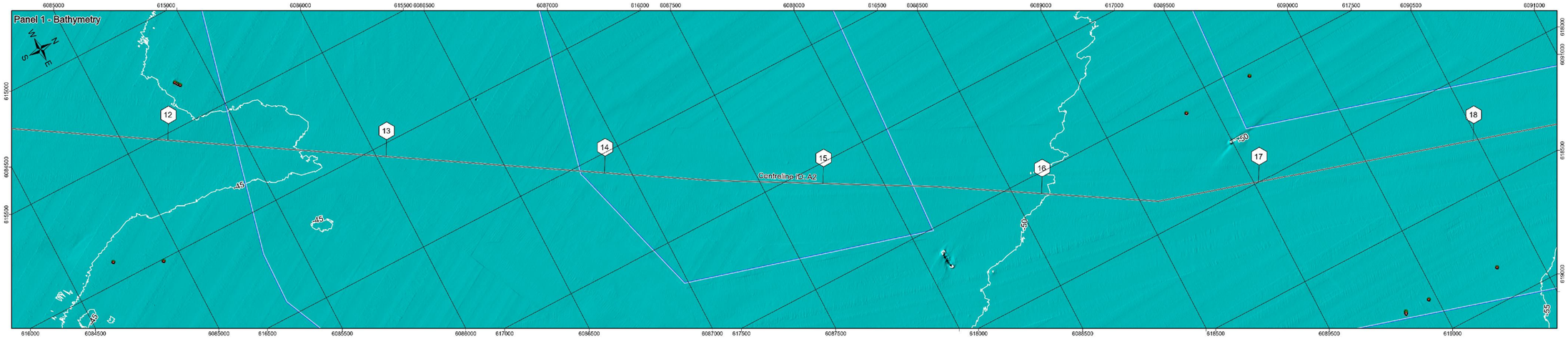
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

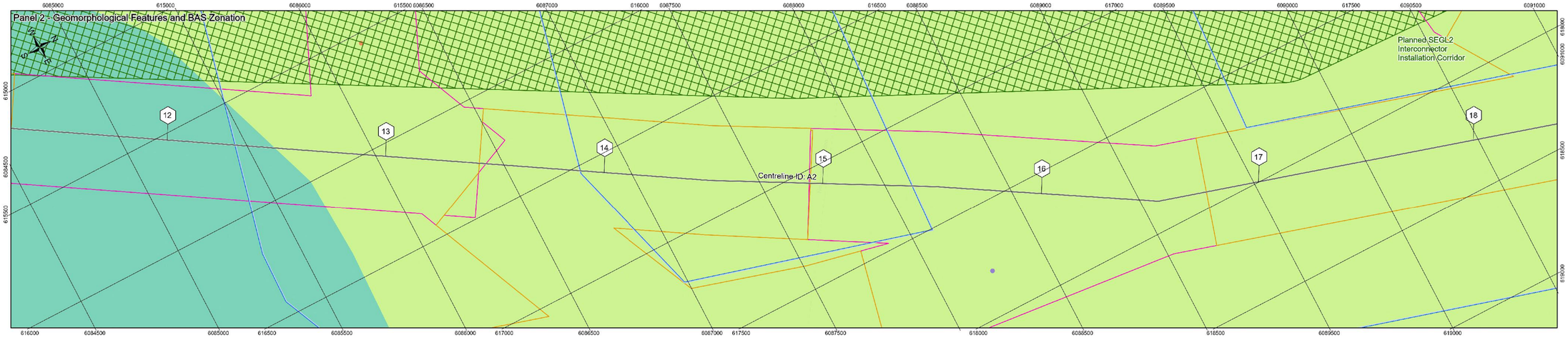
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 2 of 35

Drawing Status
Issue for Review

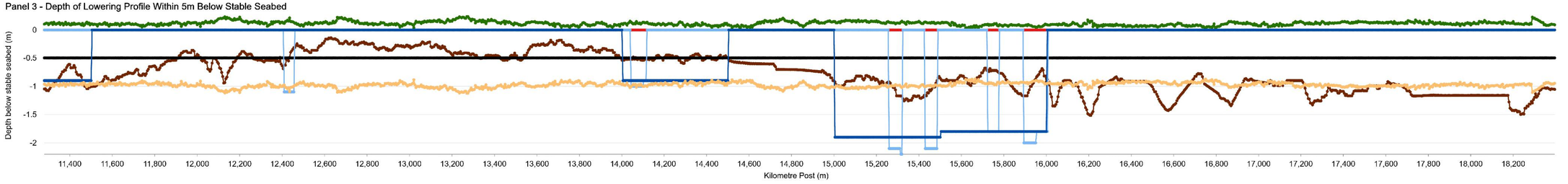
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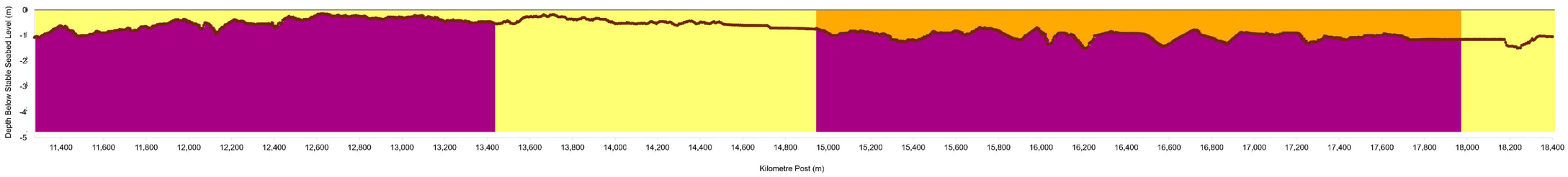




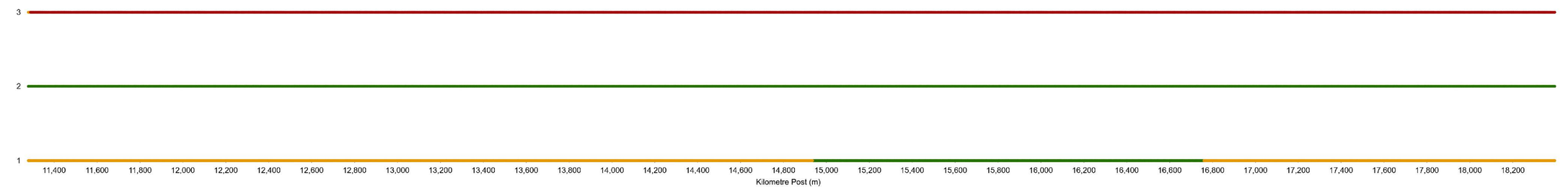
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



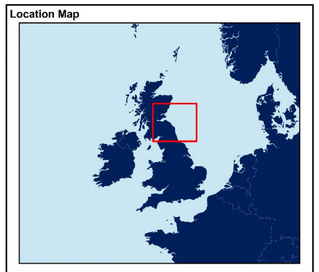
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



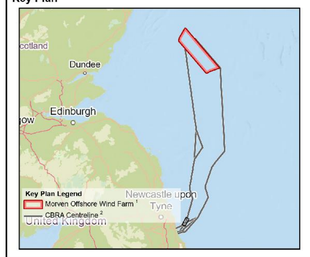
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
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- Water depth contour (5m interval) [5]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [6]
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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [9]
- Possible [9]
- Not Suitable [9]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Projection: Transverse Mercator
Central Meridian: -3.0000
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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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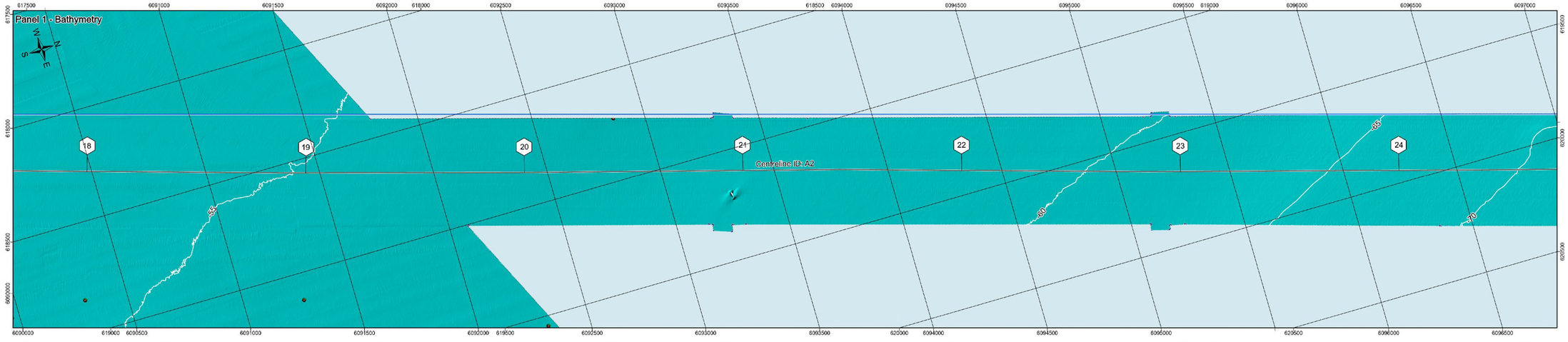
Report Title
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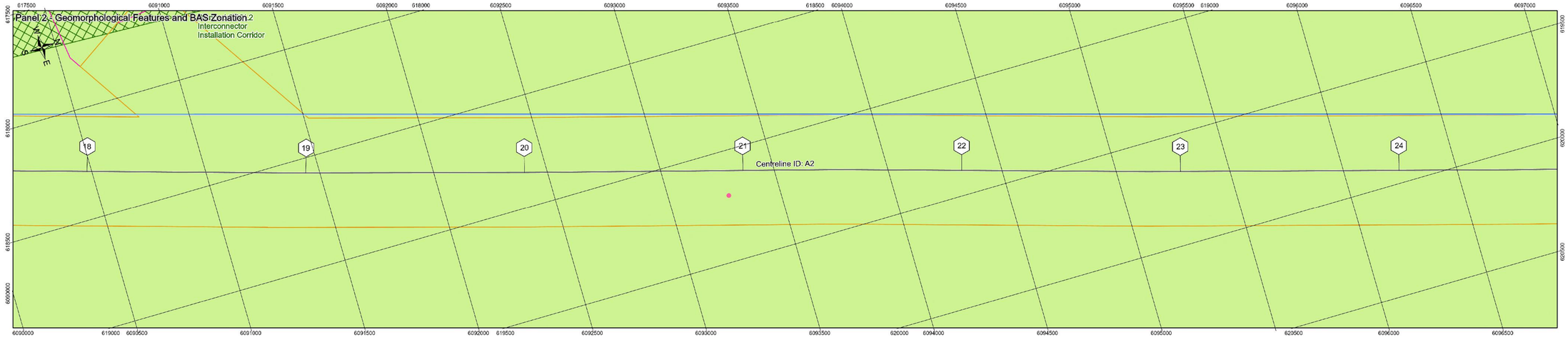
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 3 of 35

Drawing Status
Issue for Review

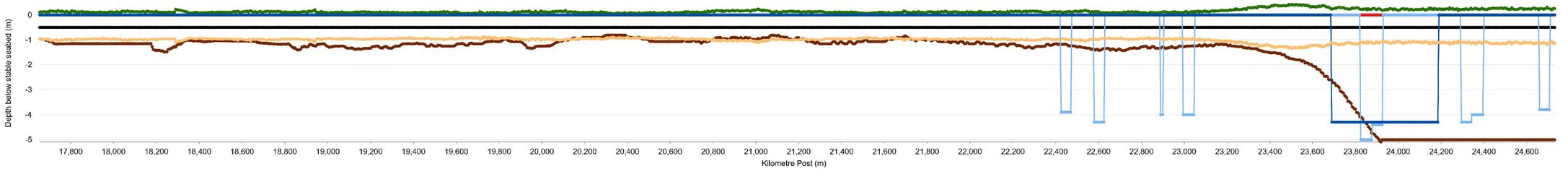
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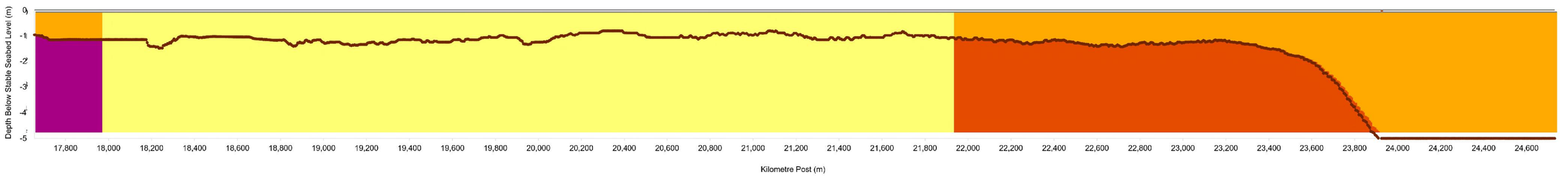




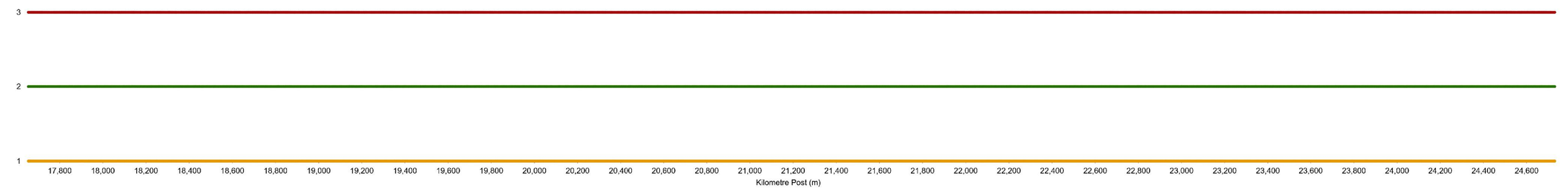
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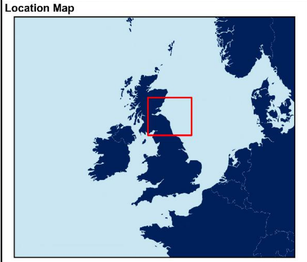
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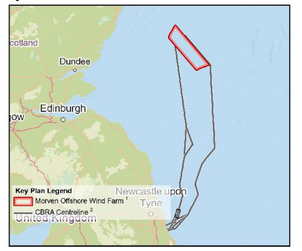
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- Low Strength CLAY (C3)
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Project Title
Morven Offshore Wind Farm

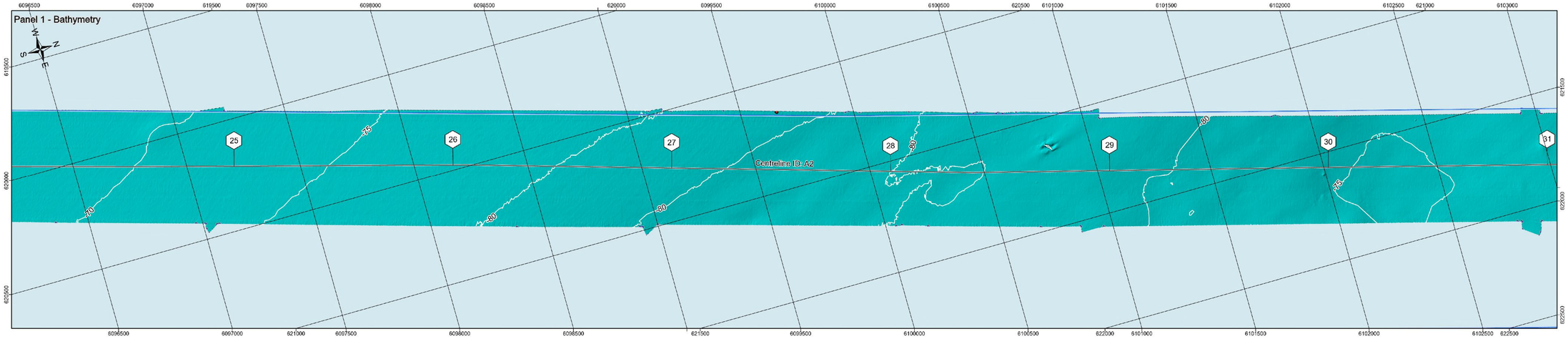
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

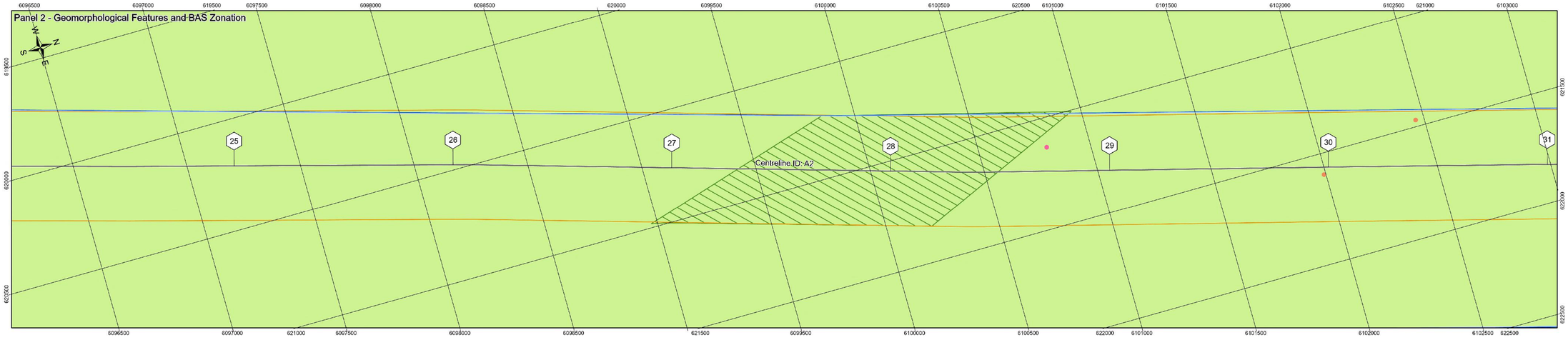
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 4 of 35

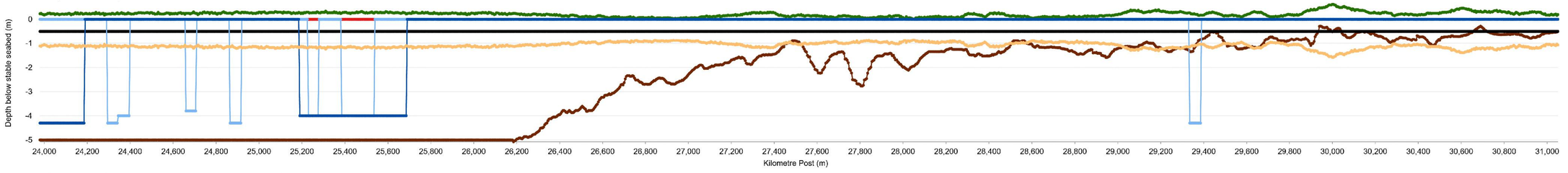
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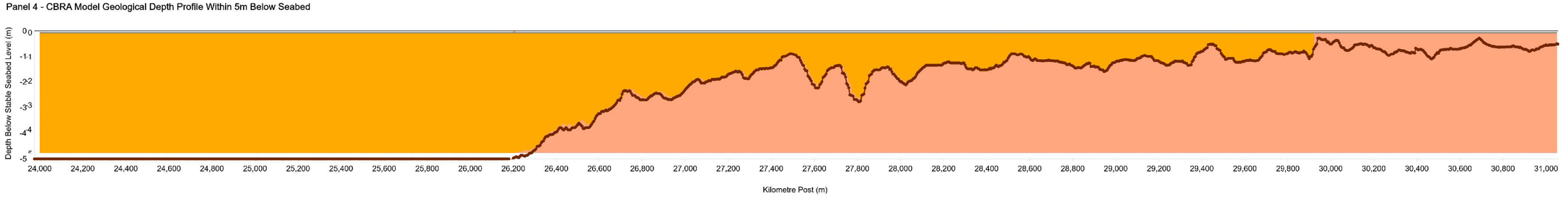
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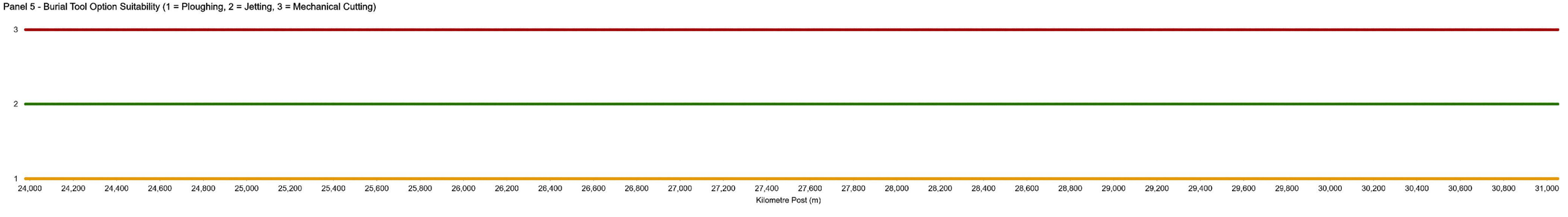
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind



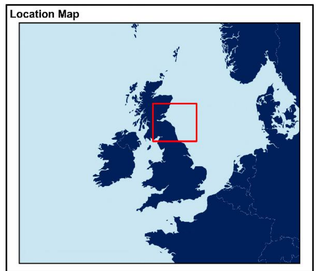




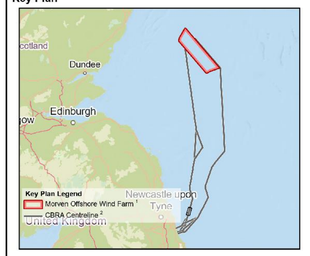




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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Panel 3

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Panel 4

Layer 1 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1c)
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

- Layer 1/Layer 2 Boundary [8]

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
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3. Created by GM, May 2024.
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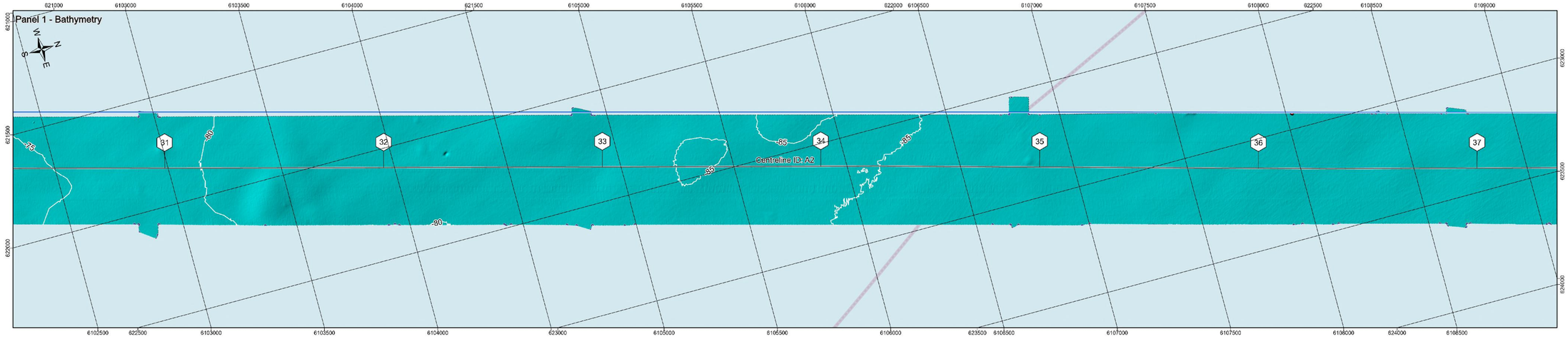
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 5 of 35

Drawing Status
Issue for Review

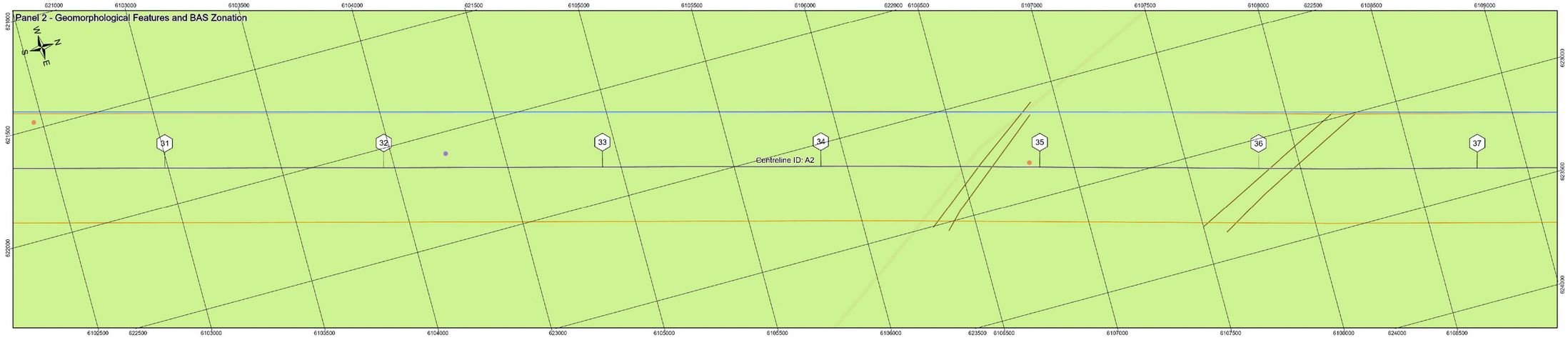
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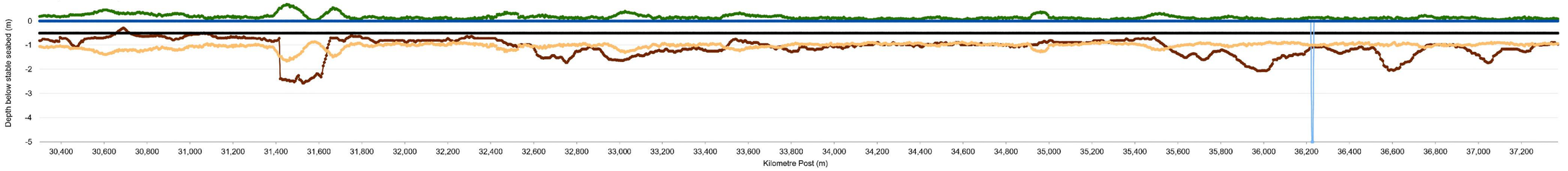
Panel 1 - Bathymetry



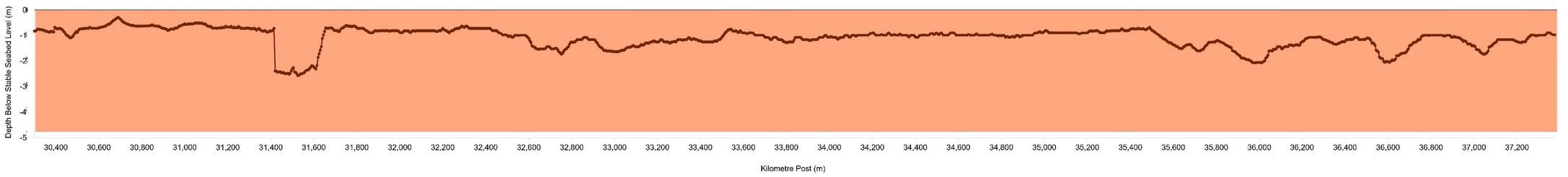
Panel 2 - Geomorphological Features and BAS Zonation



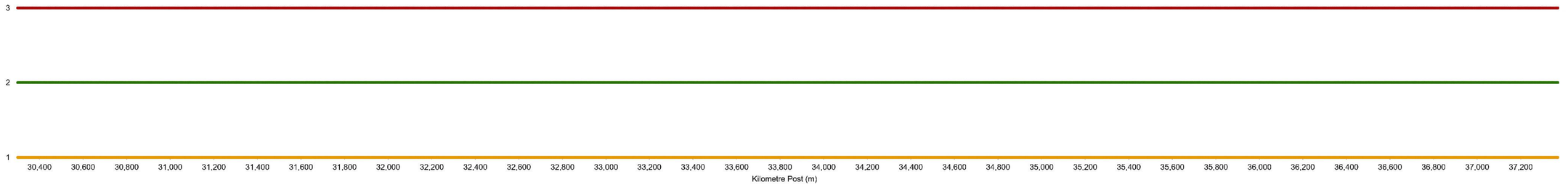
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



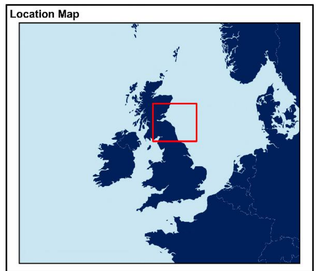
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



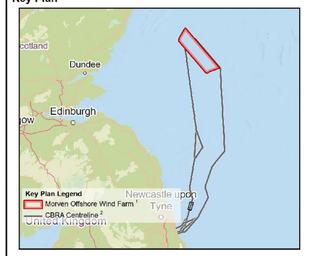
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Depression with boulder/debris
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- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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Panel 5

- Suitable [3]
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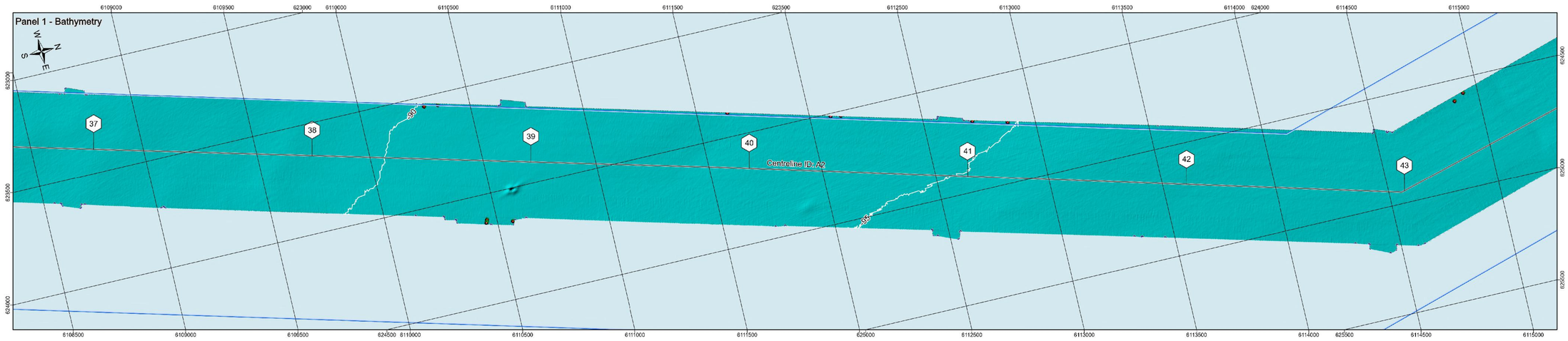
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 6 of 35

Drawing Status
Issue for Review

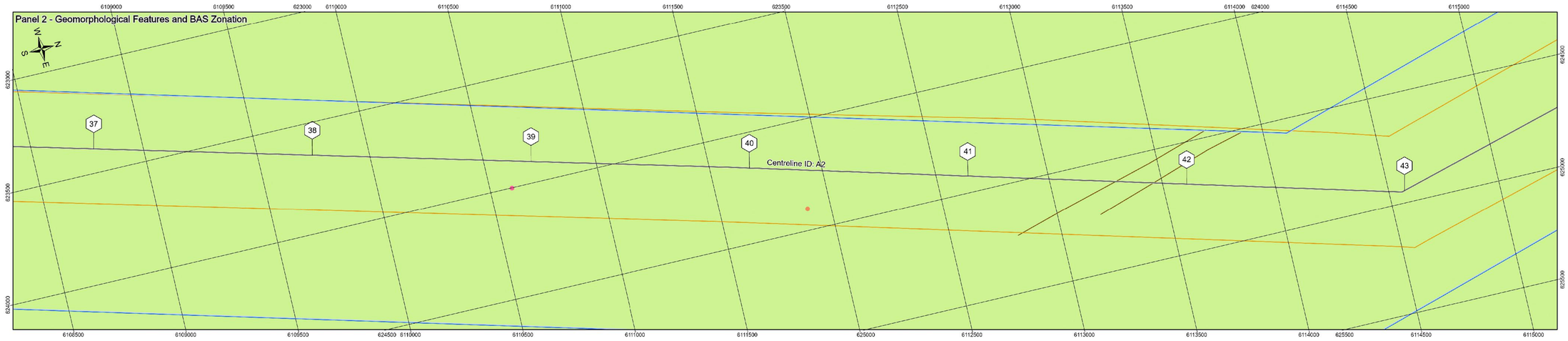
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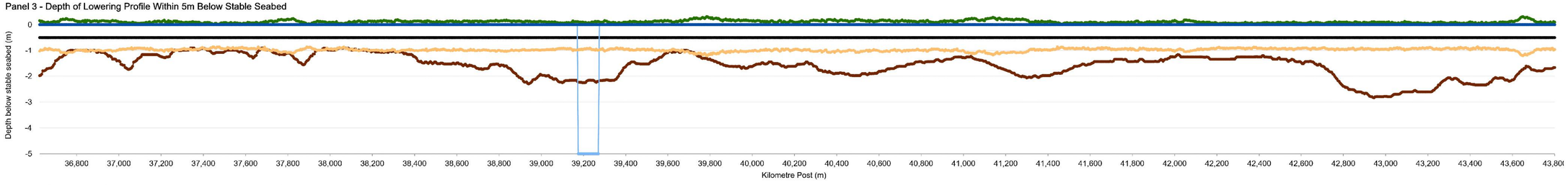
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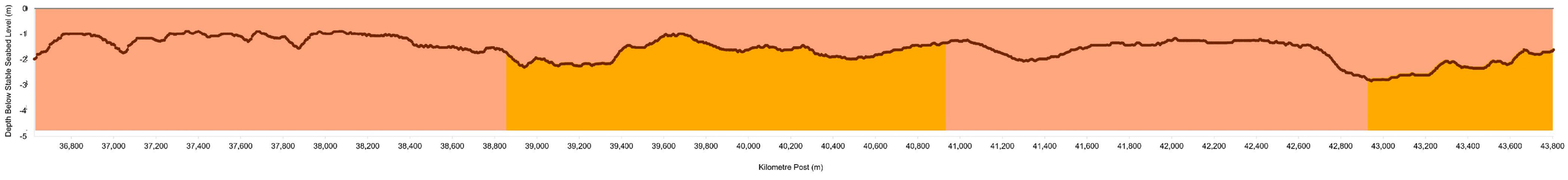
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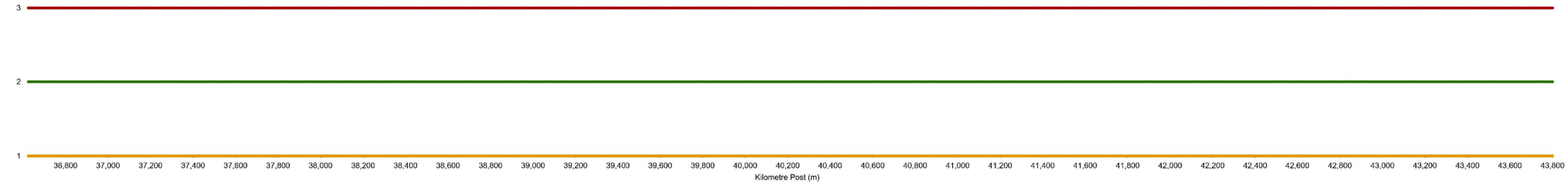
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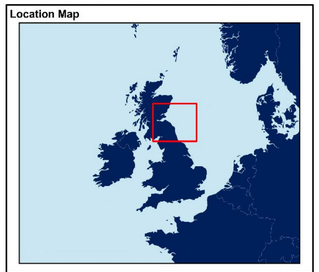
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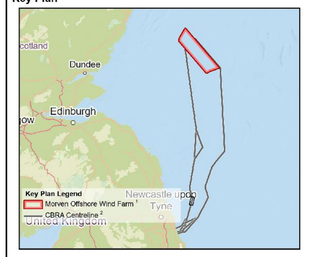
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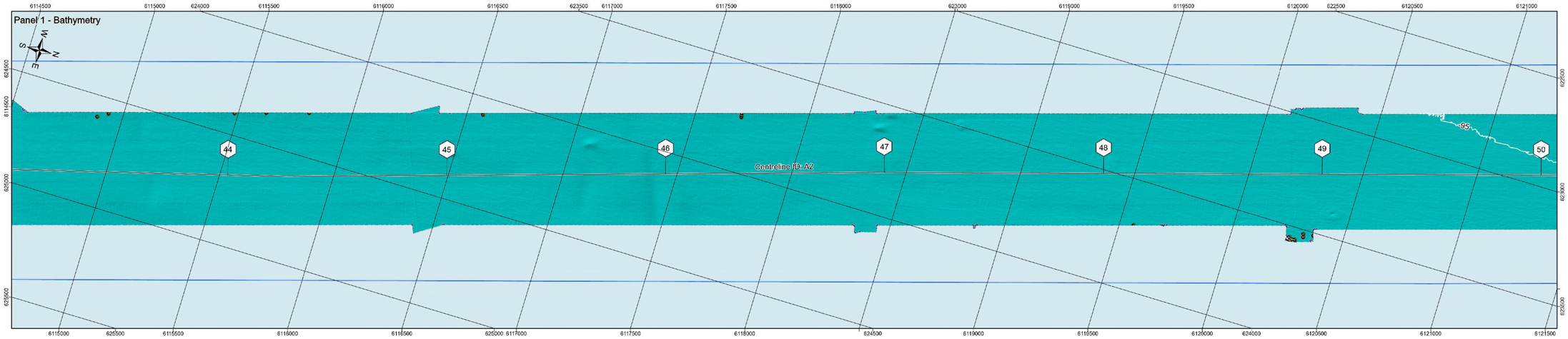
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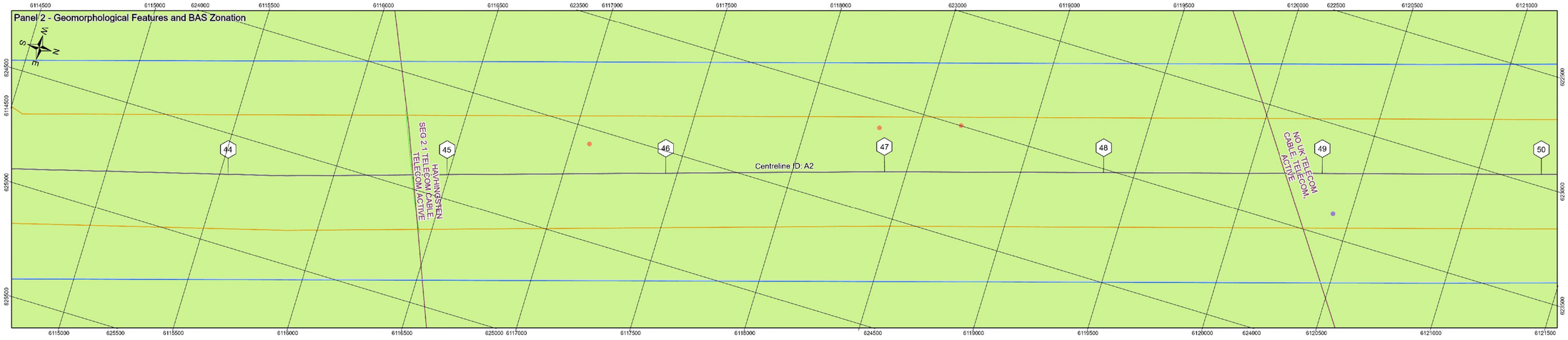
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 7 of 35

Drawing Status
Issue for Review

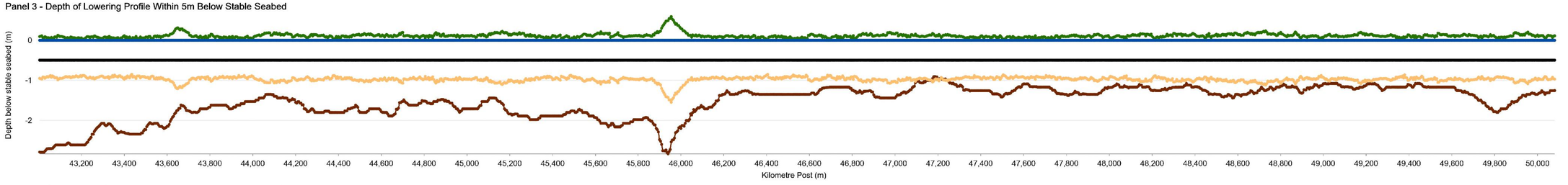
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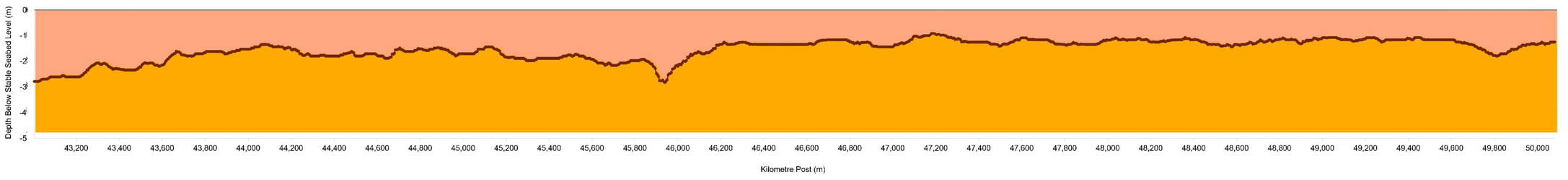




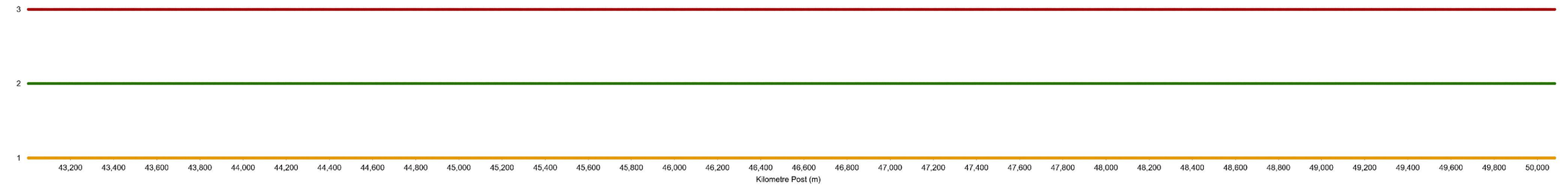
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



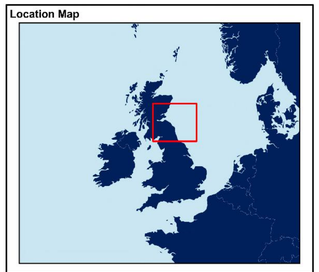
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



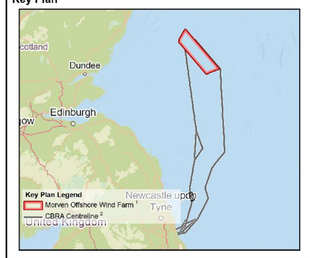
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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Geomorphology [4]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
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- Pipeline
- Travel mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
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Seabed Substrate [4]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
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- SEGL2 Installation Corridor [6]
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- Possible Mobile Bedform Height [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
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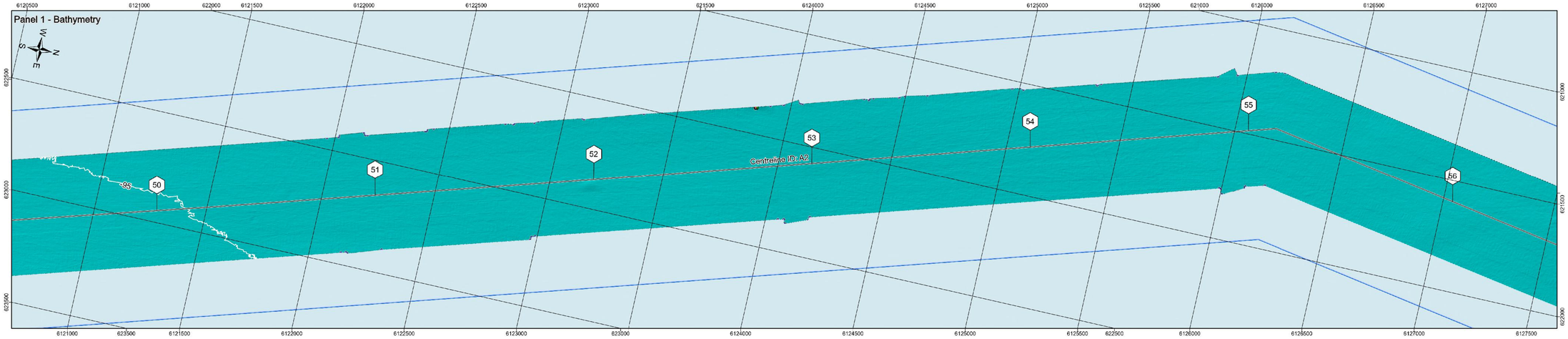
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 8 of 35

Drawing Status
Issue for Review

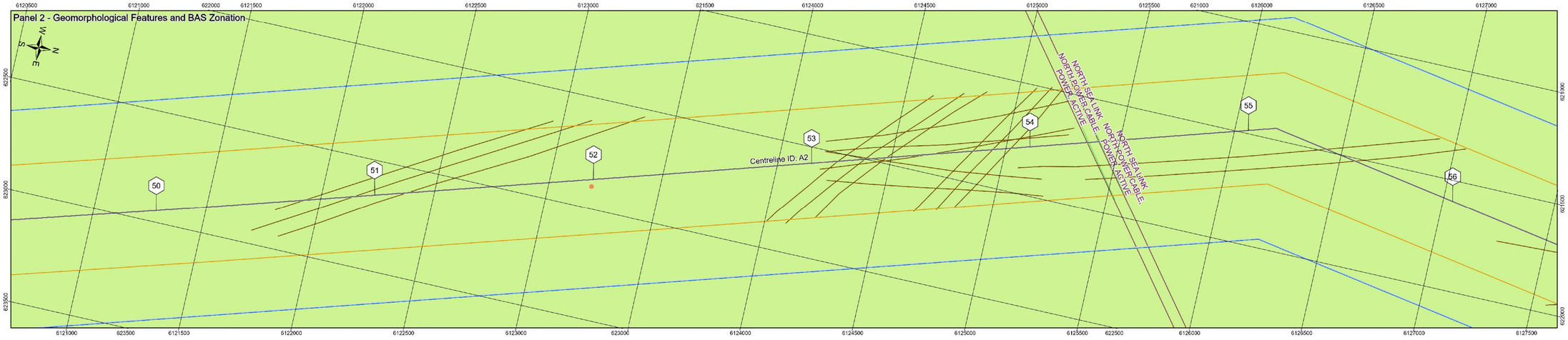
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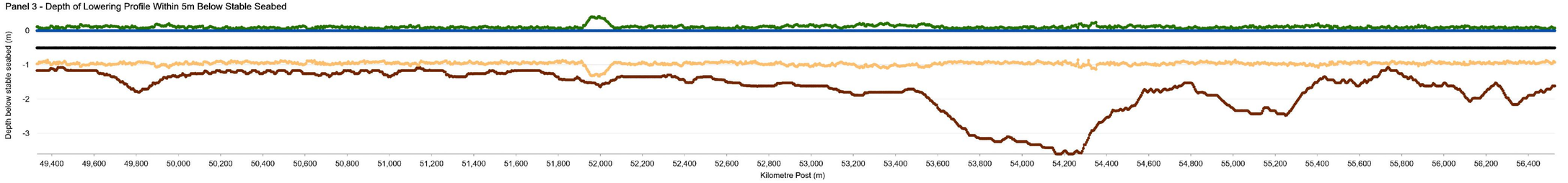
Panel 1 - Bathymetry



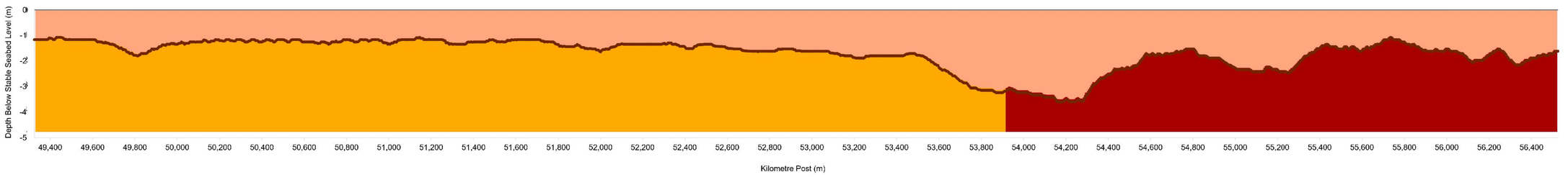
Panel 2 - Geomorphological Features and BAS Zonation



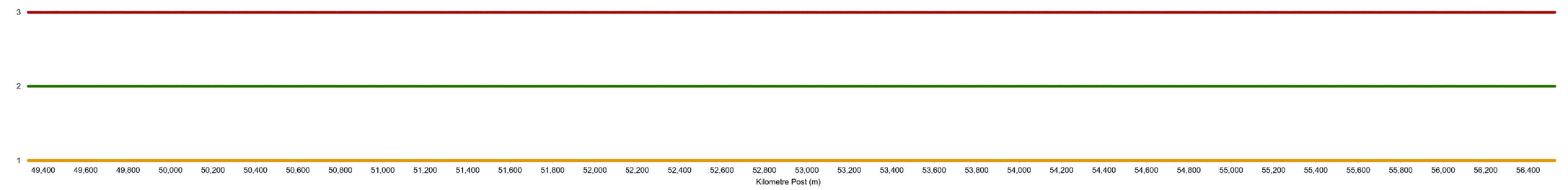
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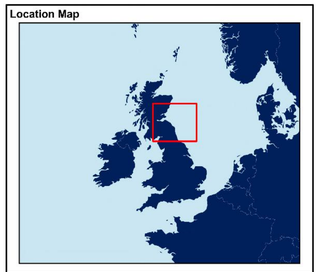
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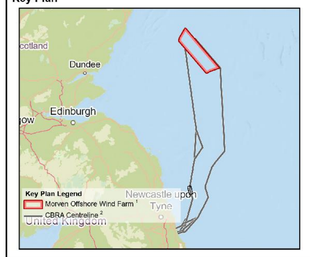
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

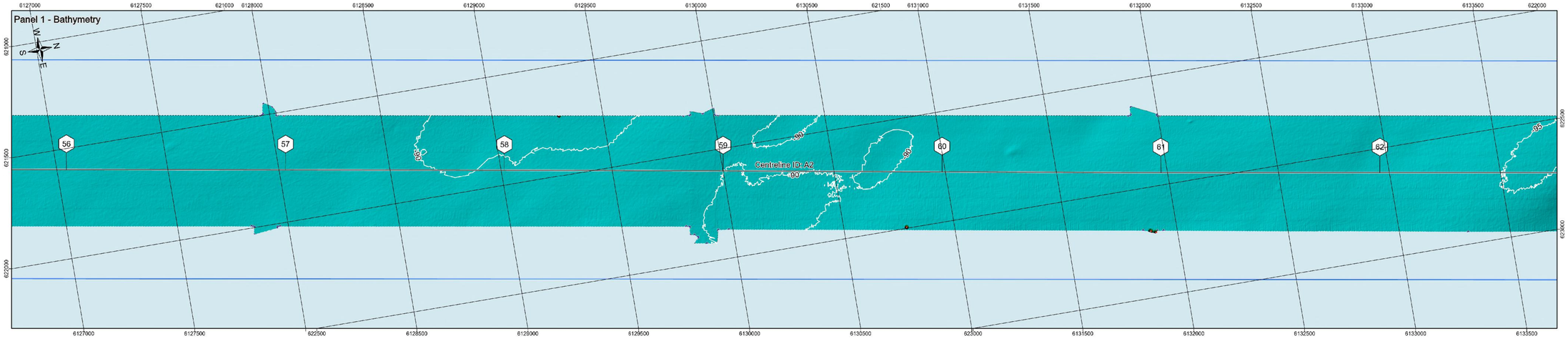
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 9 of 35

Drawing Status
Issue for Review

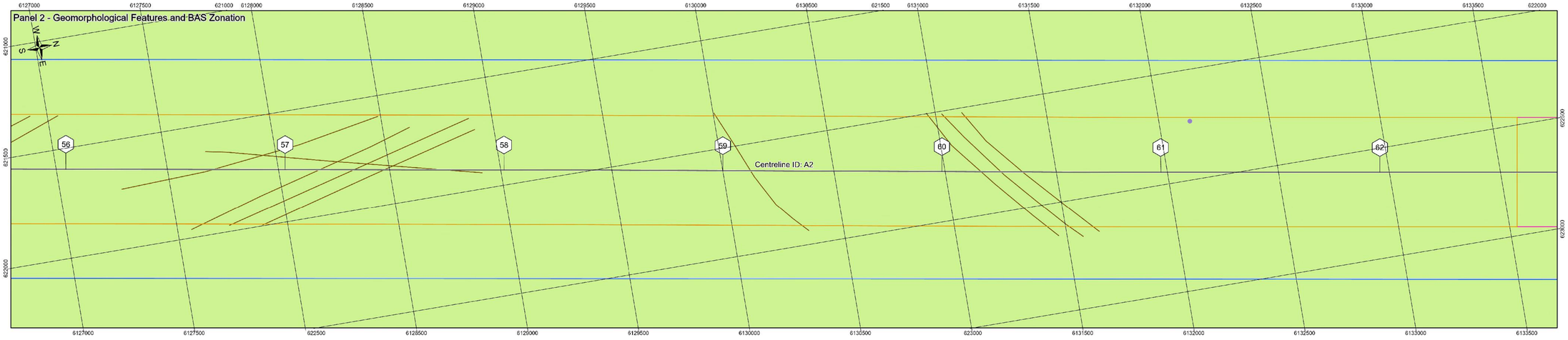
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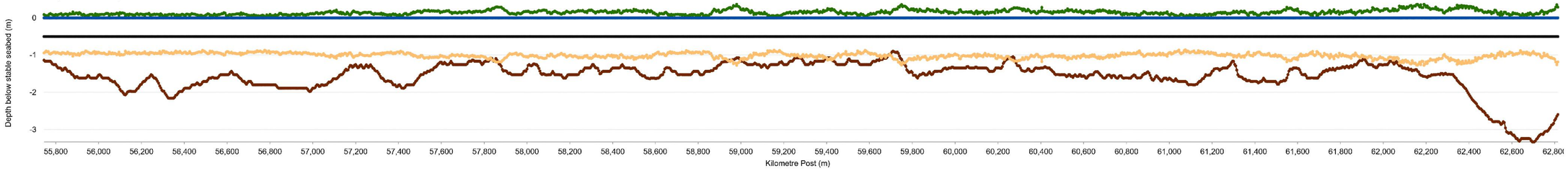
Panel 1 - Bathymetry



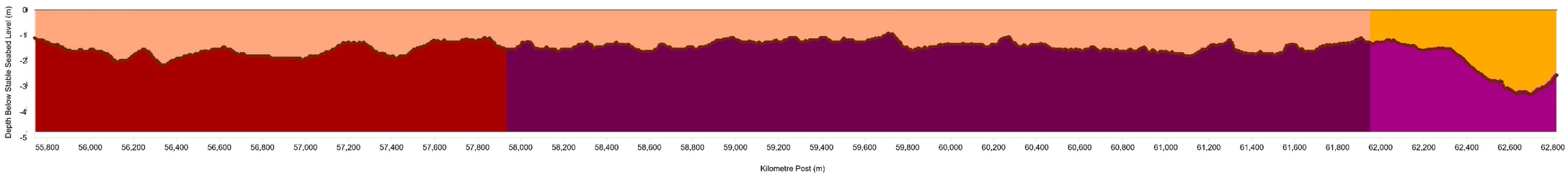
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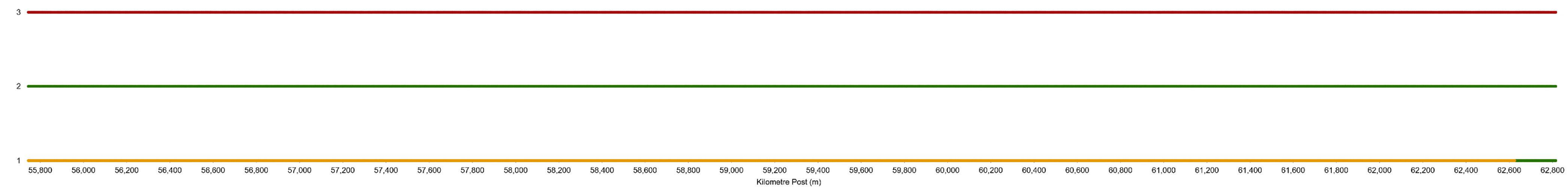
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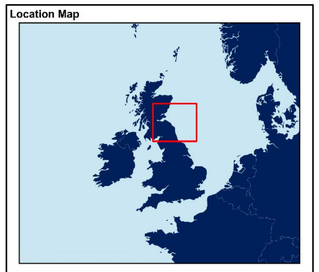
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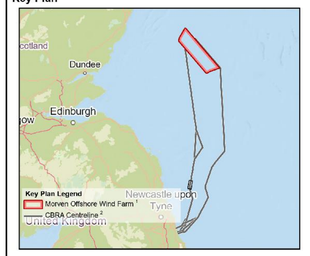
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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- Layer 1/Layer 2 Boundary [8]

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- Suitable [3]
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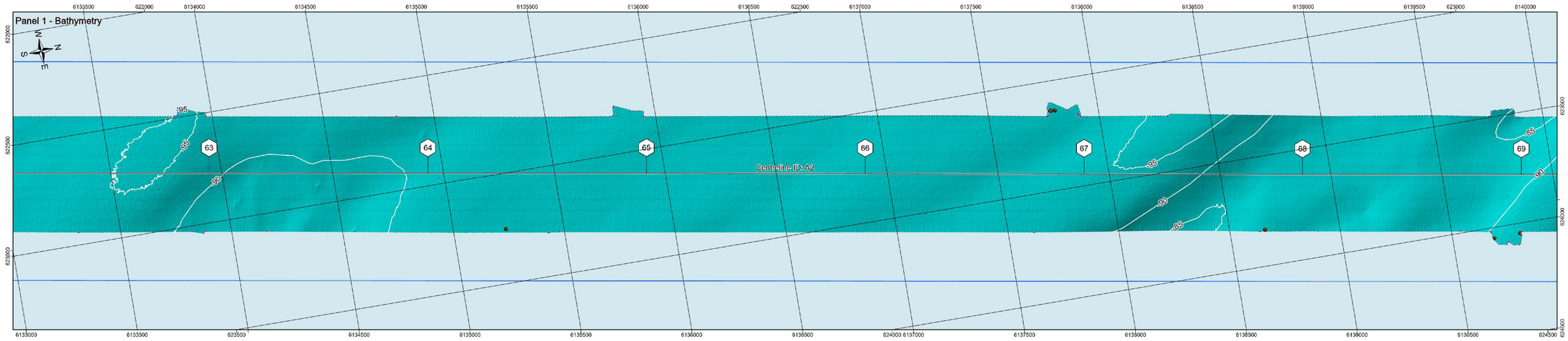
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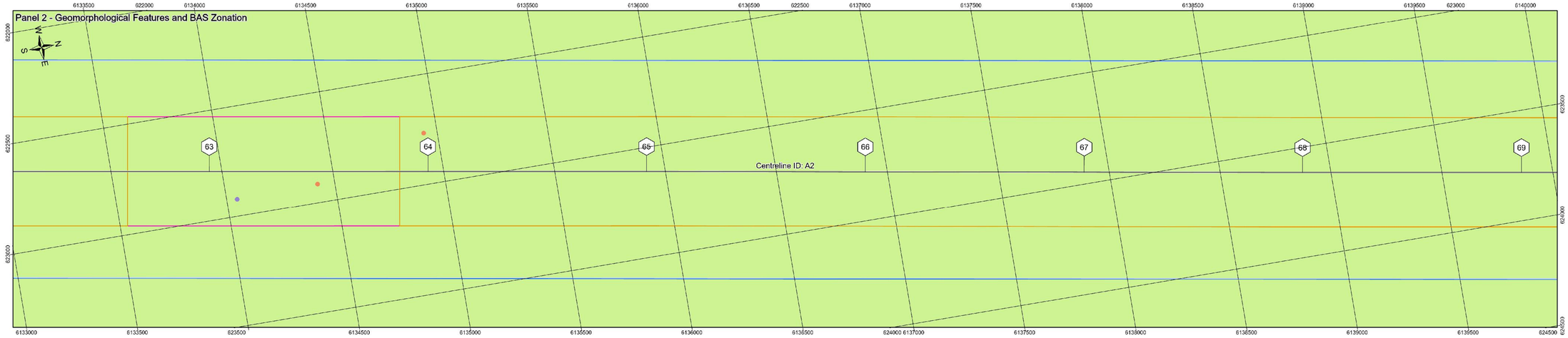
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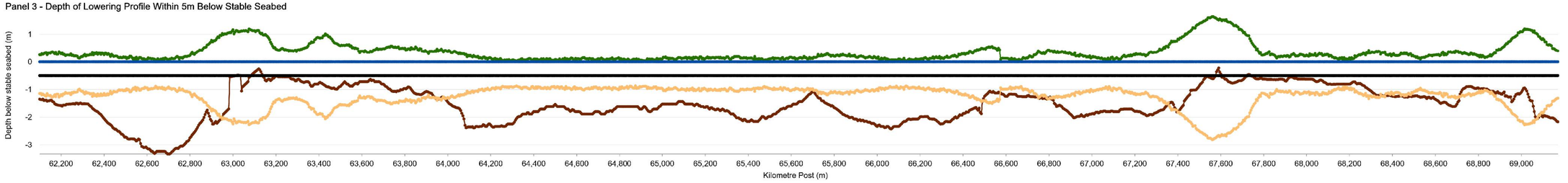
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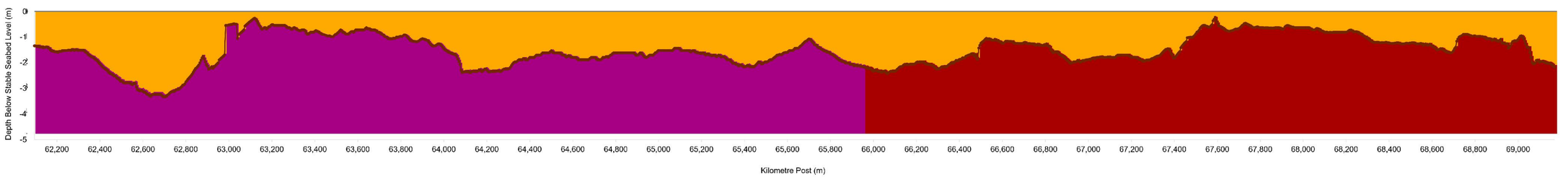
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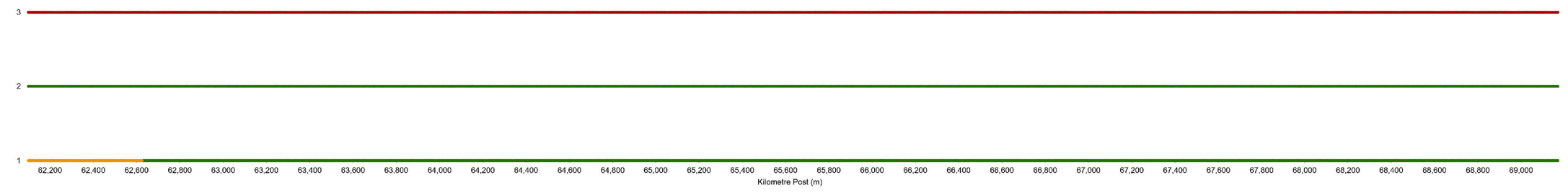
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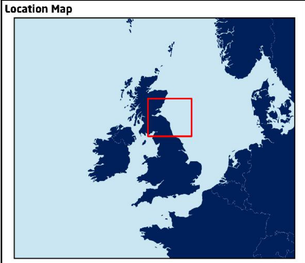
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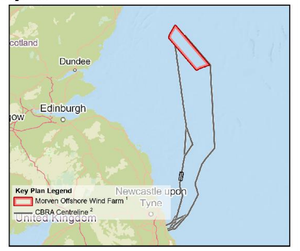
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Longitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Report Title
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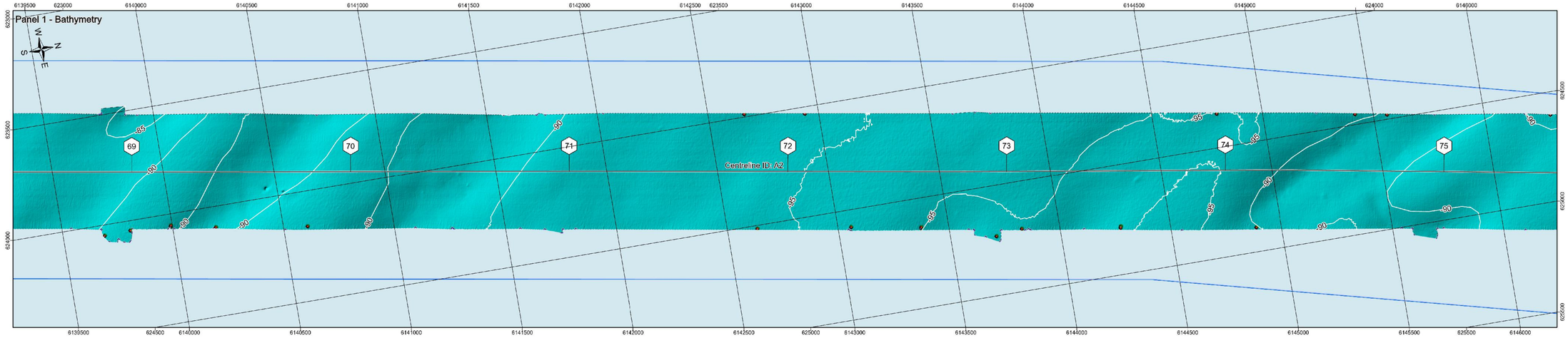
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 11 of 35

Drawing Status
Issue for Review

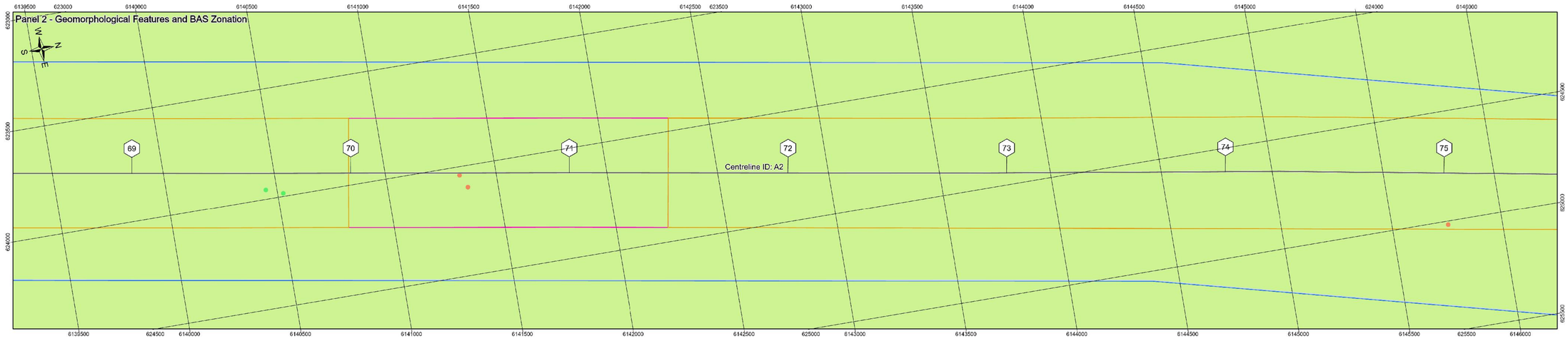
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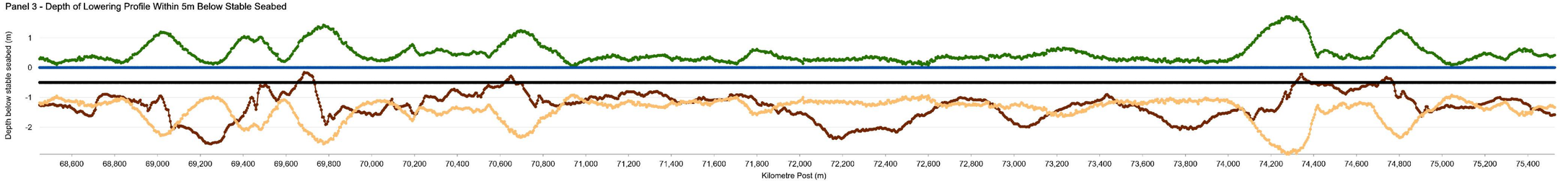
Panel 1 - Bathymetry



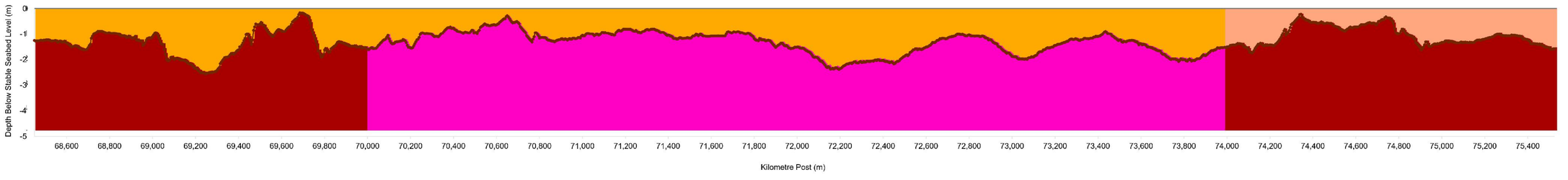
Panel 2 - Geomorphological Features and BAS Zonation



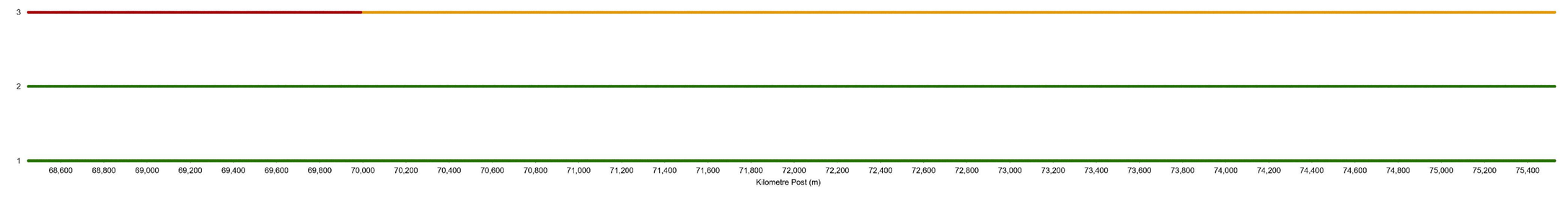
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



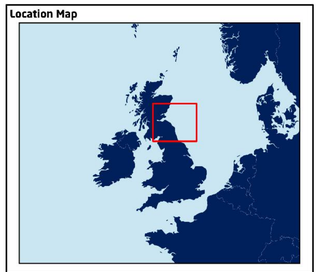
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



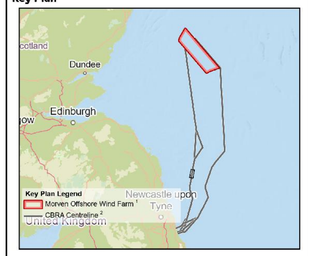
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [2]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [4]
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- Boulder/debris
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- Depression with boulder/debris
- Wreck
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Seabed Substrate [4]
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- 1.2 sandy Mud
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Panel 3

- Possible Mobile Bedform Height [5]
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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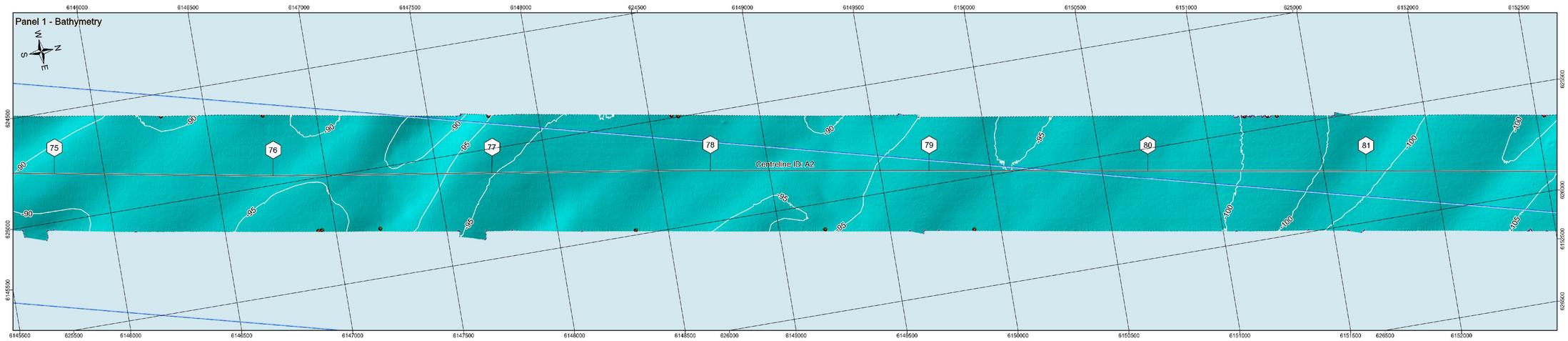
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 12 of 35

Drawing Status
Issue for Review

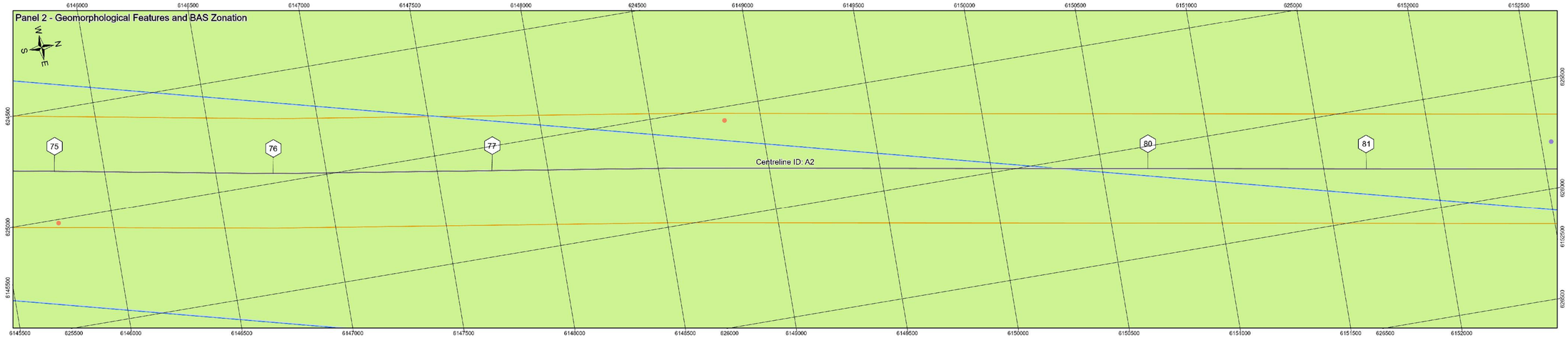
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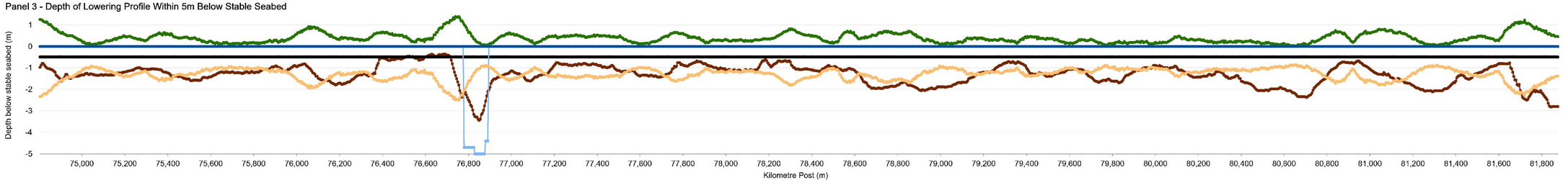
Panel 1 - Bathymetry



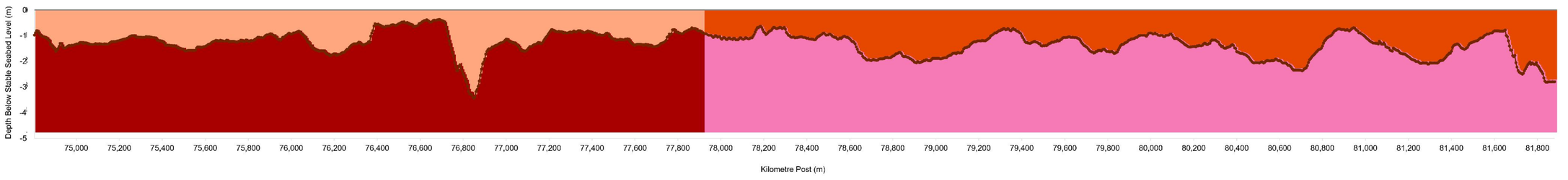
Panel 2 - Geomorphological Features and BAS Zonation



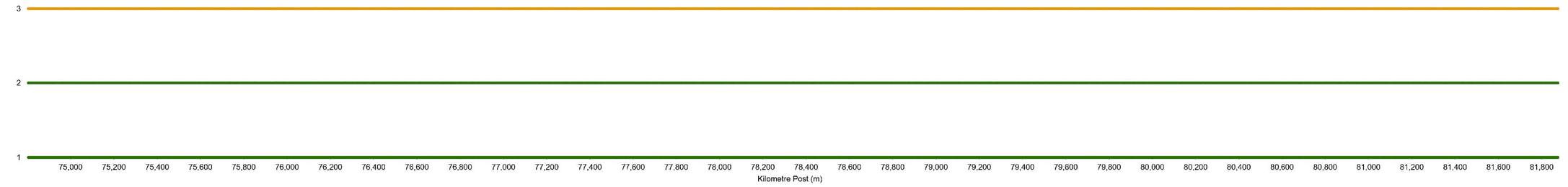
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



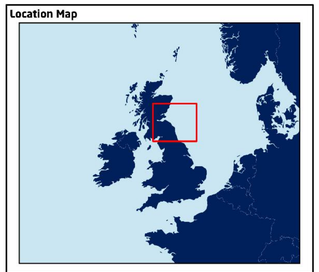
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



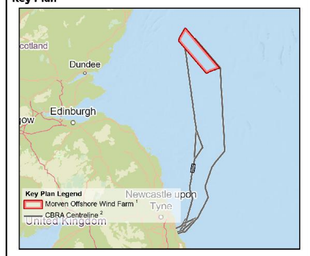
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Key Plan



Legend

Panel 1 & Site Data

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- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
- Possible [3]
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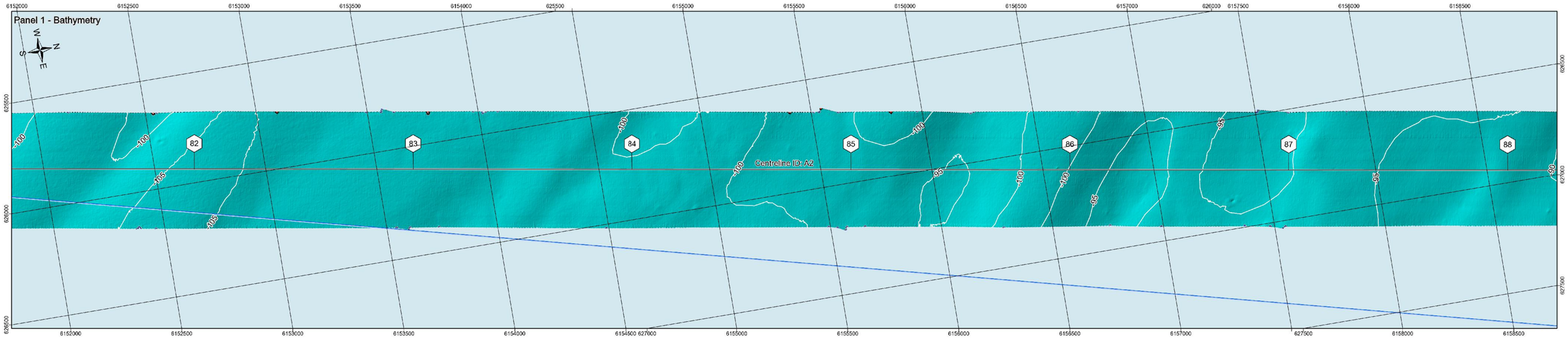
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 13 of 35

Drawing Status
Issue for Review

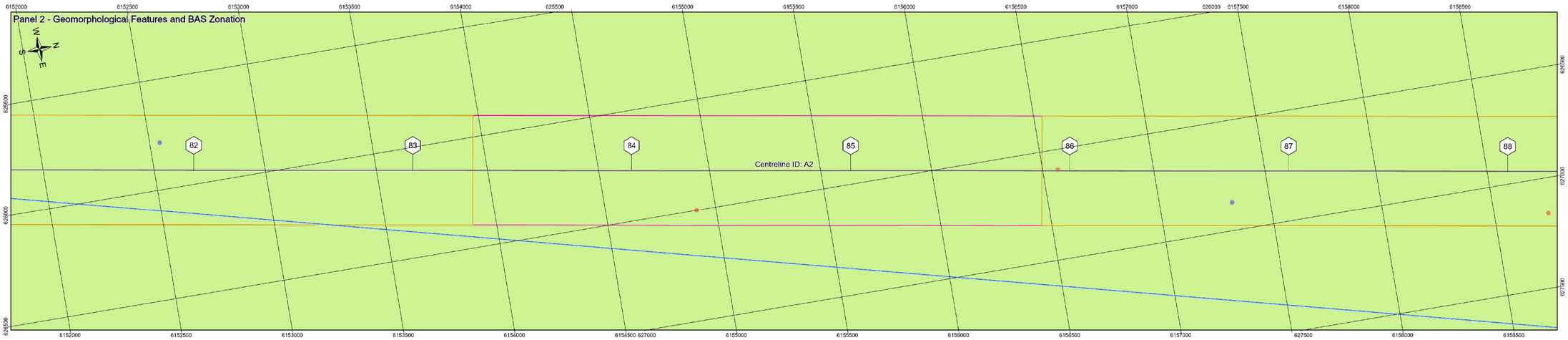
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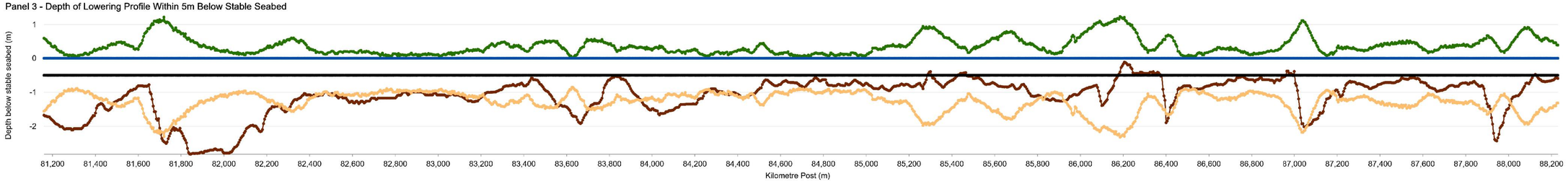
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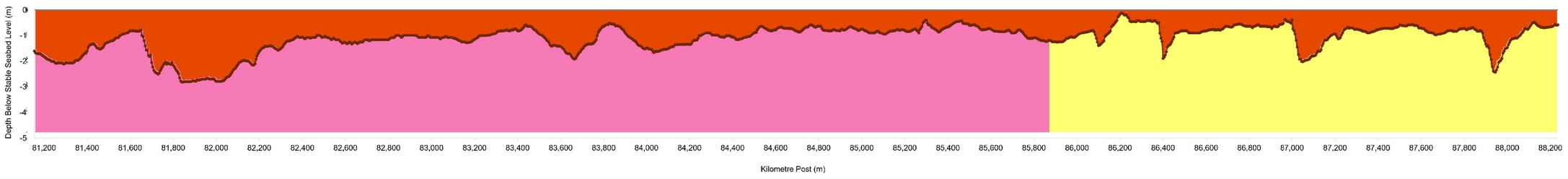
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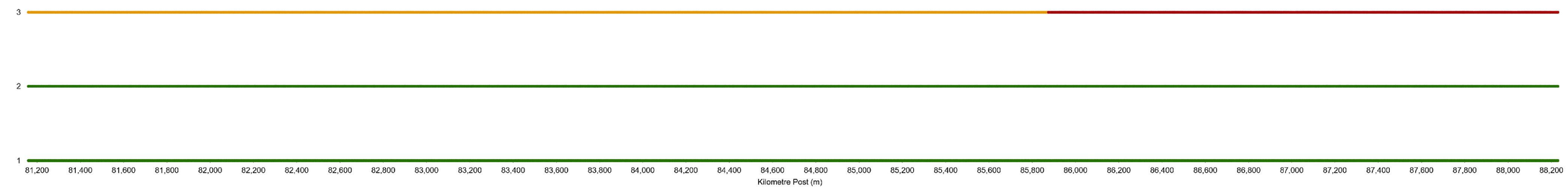
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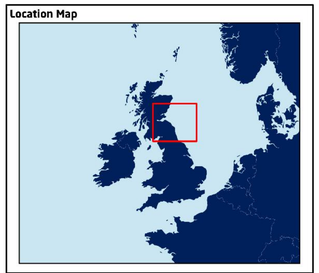
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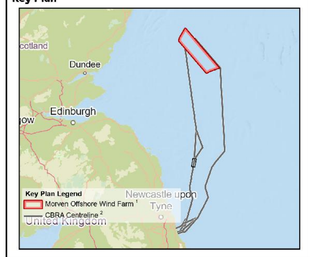
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- Rock (R)
- Layer 1/Layer 2 Boundary [8]

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- SAND (S)
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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- Suitable [3]
- Possible [3]
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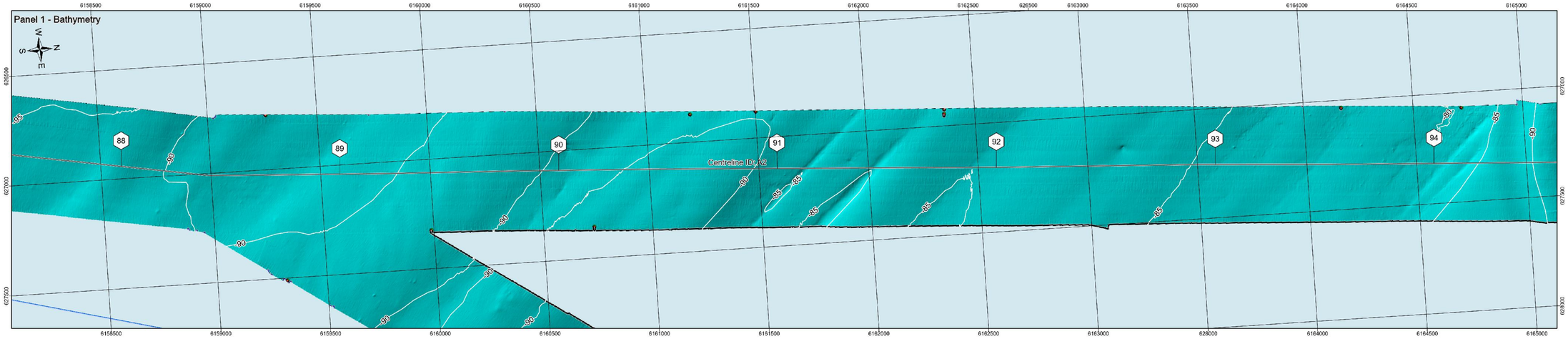
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 14 of 35

Drawing Status
Issue for Review

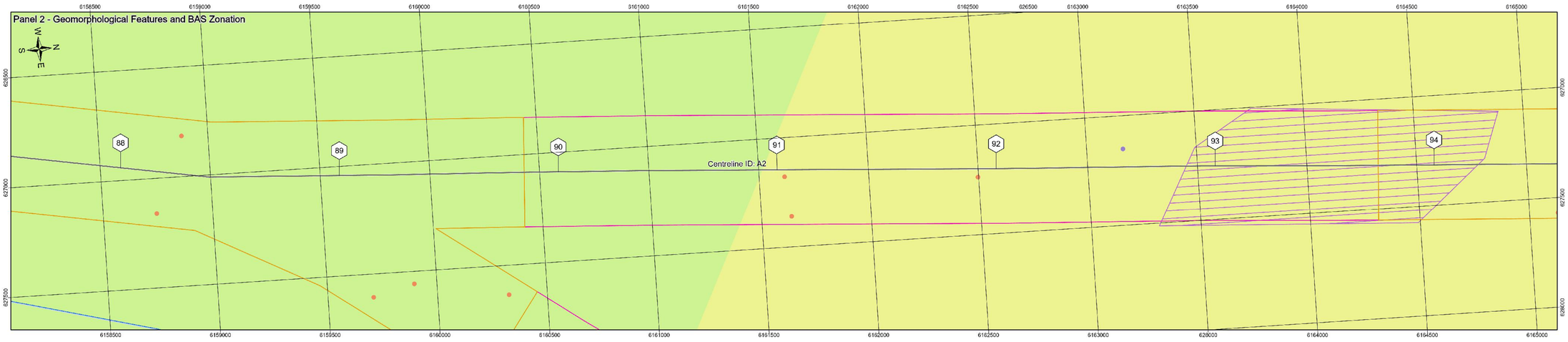
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
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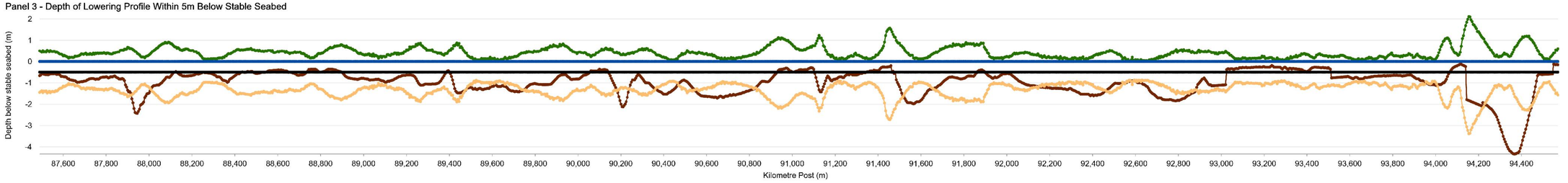
Panel 1 - Bathymetry



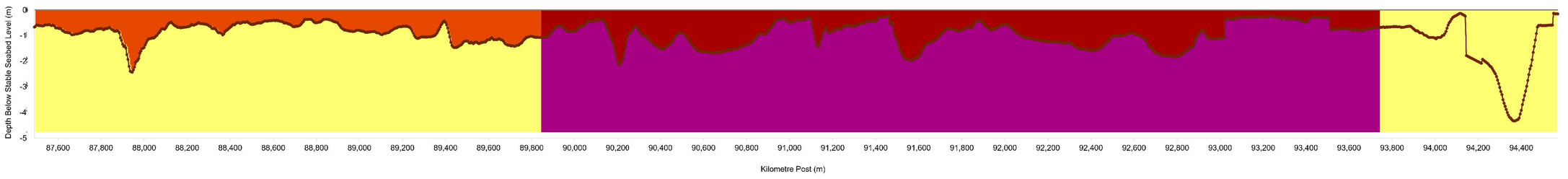
Panel 2 - Geomorphological Features and BAS Zonation



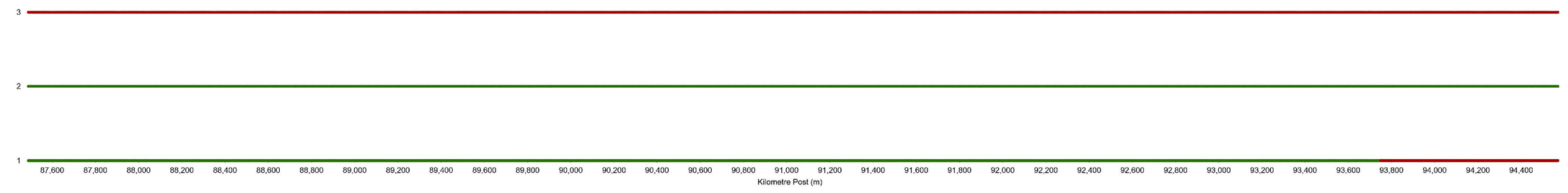
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



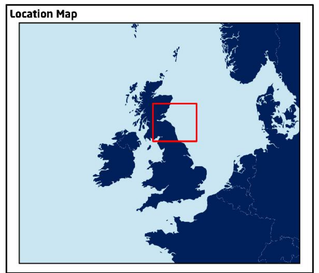
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



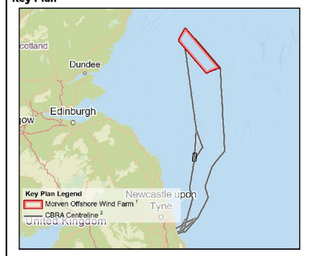
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
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- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
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- Boulder field
- Glacial features
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- 2. Sand
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- SEGL2 Installation Corridor [6]
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [6]
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- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [4]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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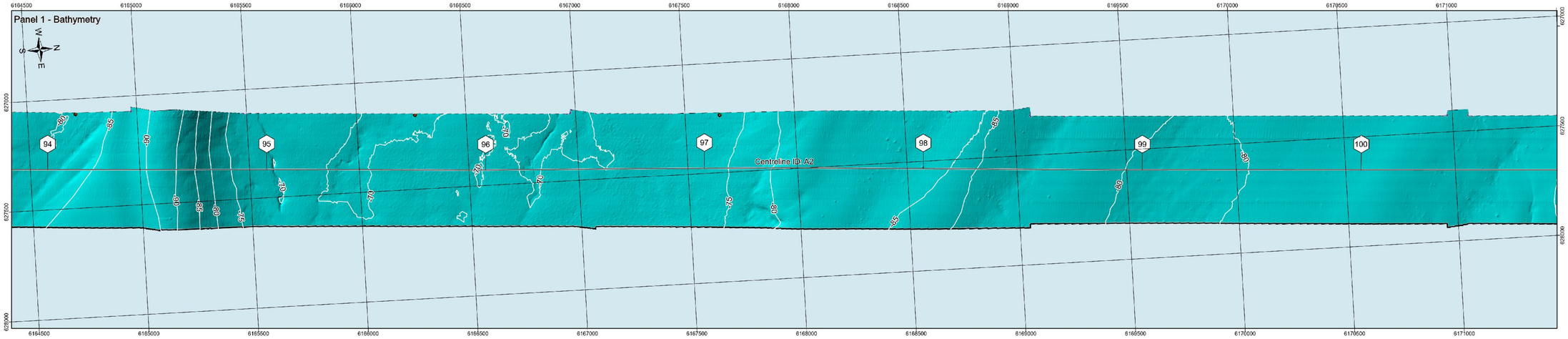
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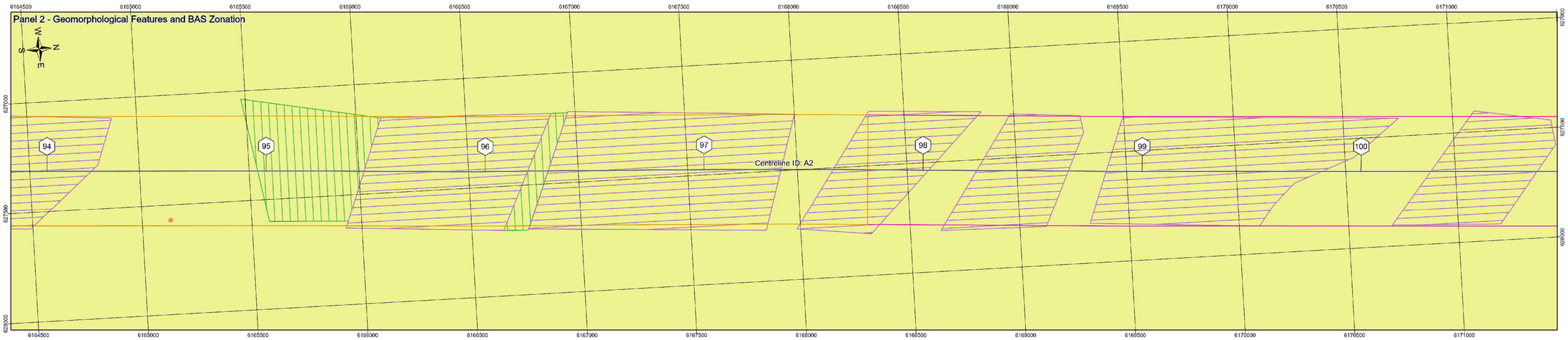
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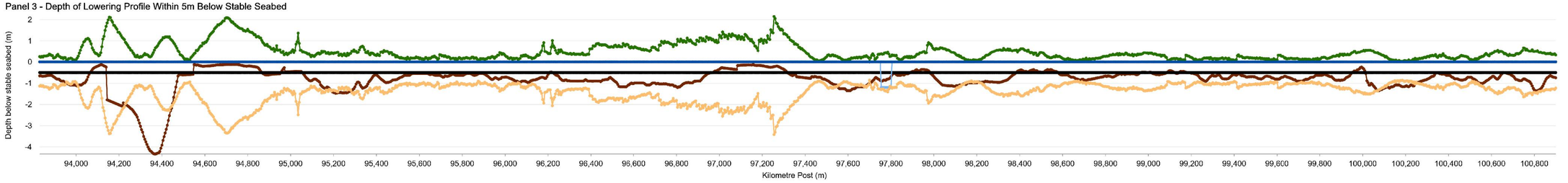
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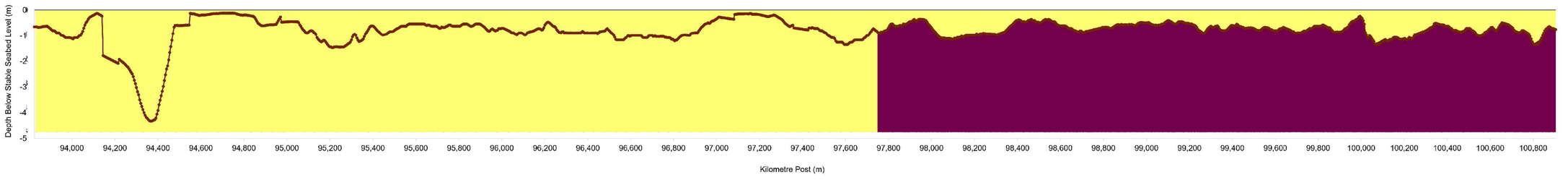
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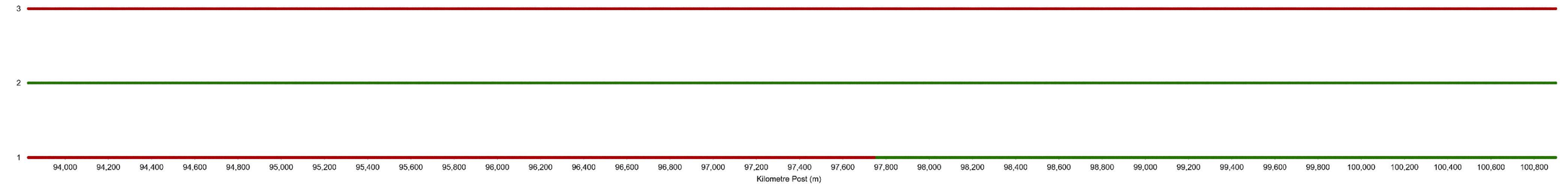
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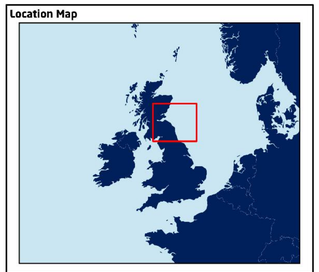
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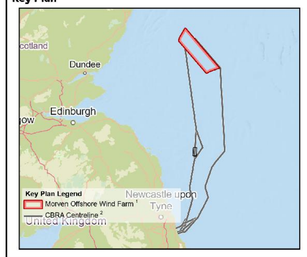
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Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

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- Suitable [3]
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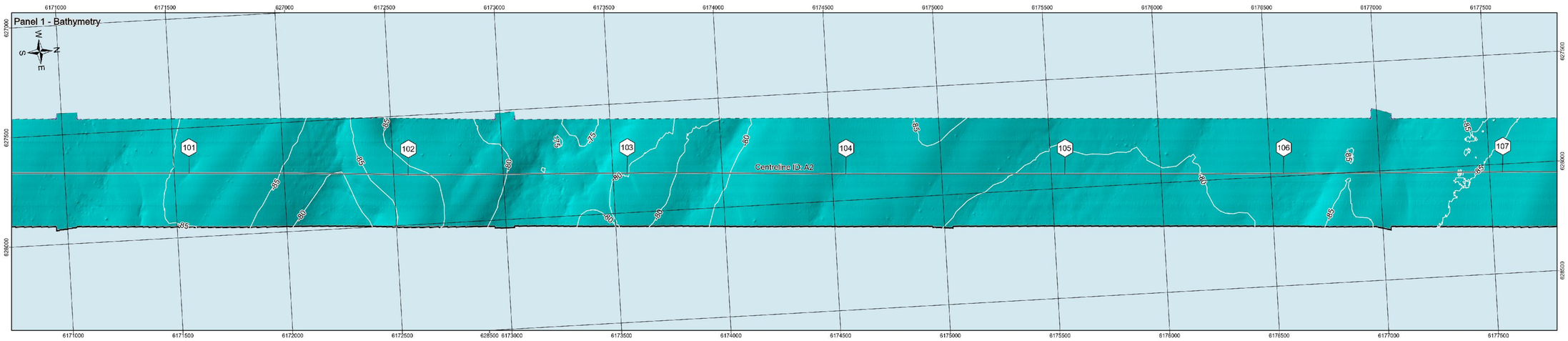
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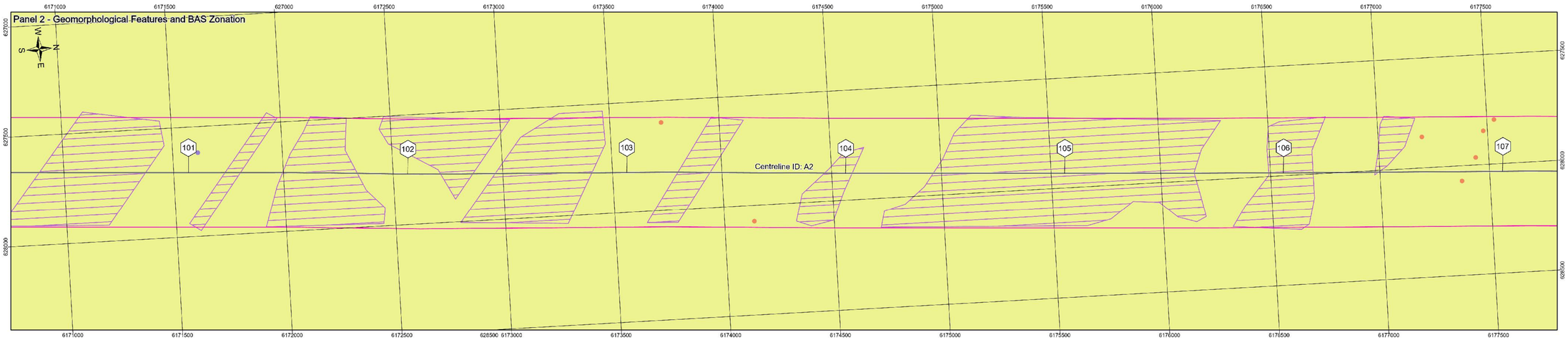
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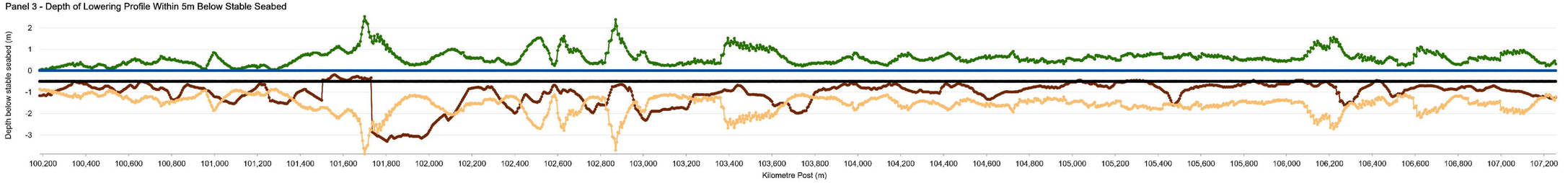
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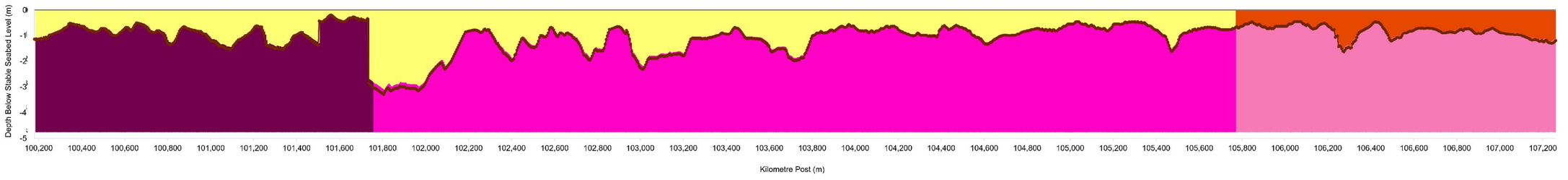




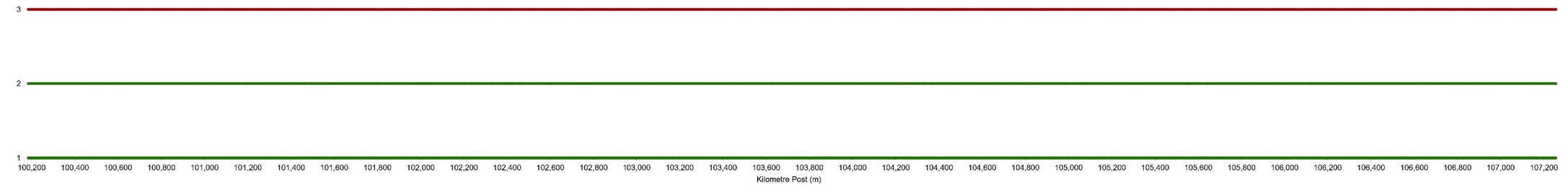
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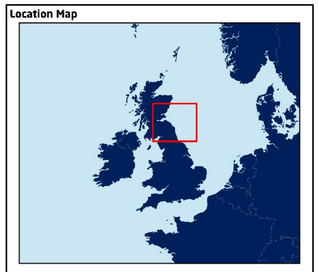
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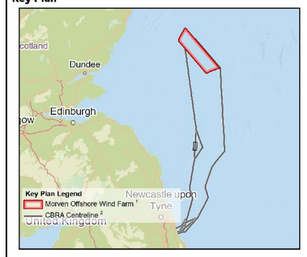
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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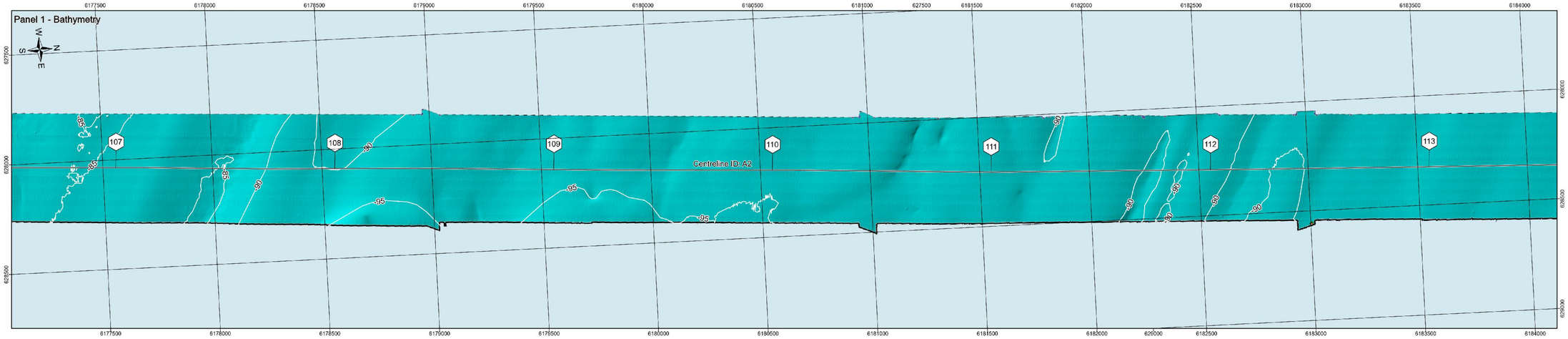
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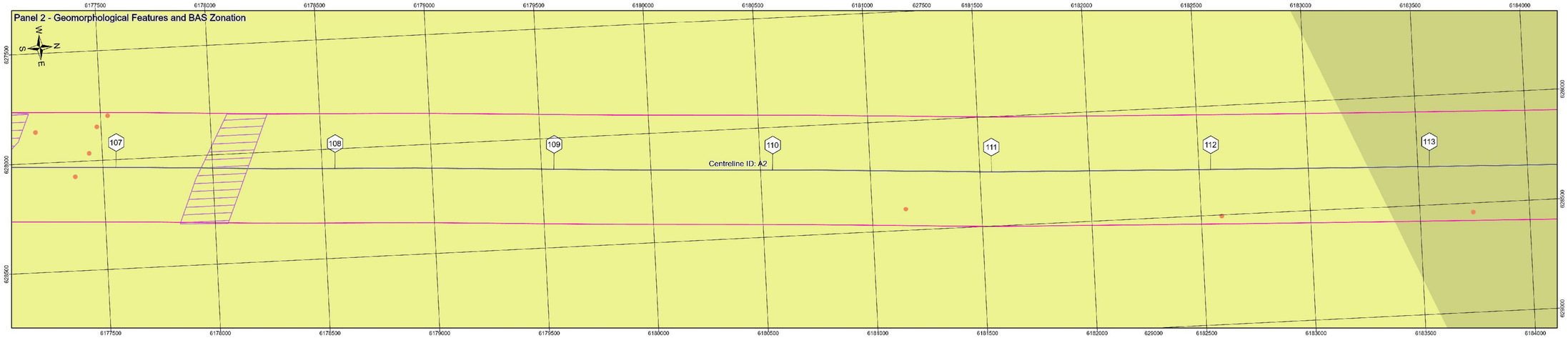
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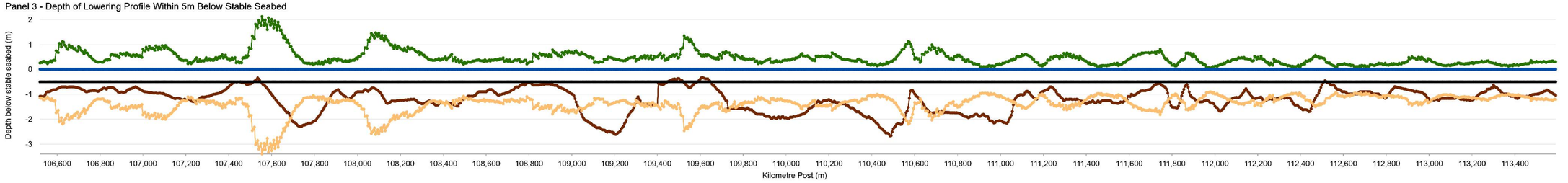
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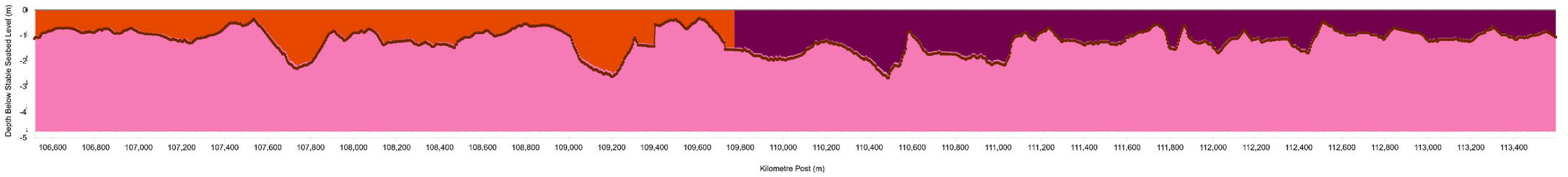
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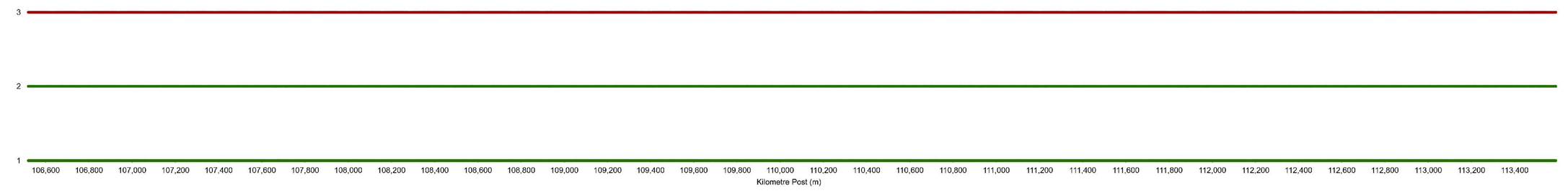
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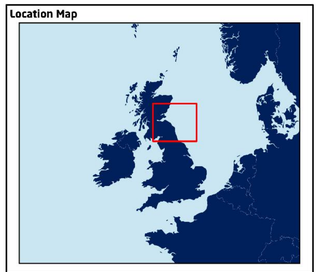
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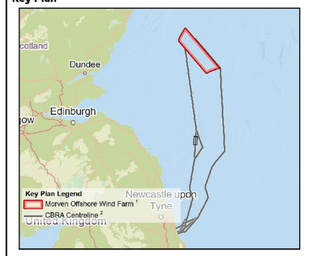
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
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- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
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- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
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- Thin sediment cover
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Panel 4

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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5
- Suitable [3]
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Revision Status

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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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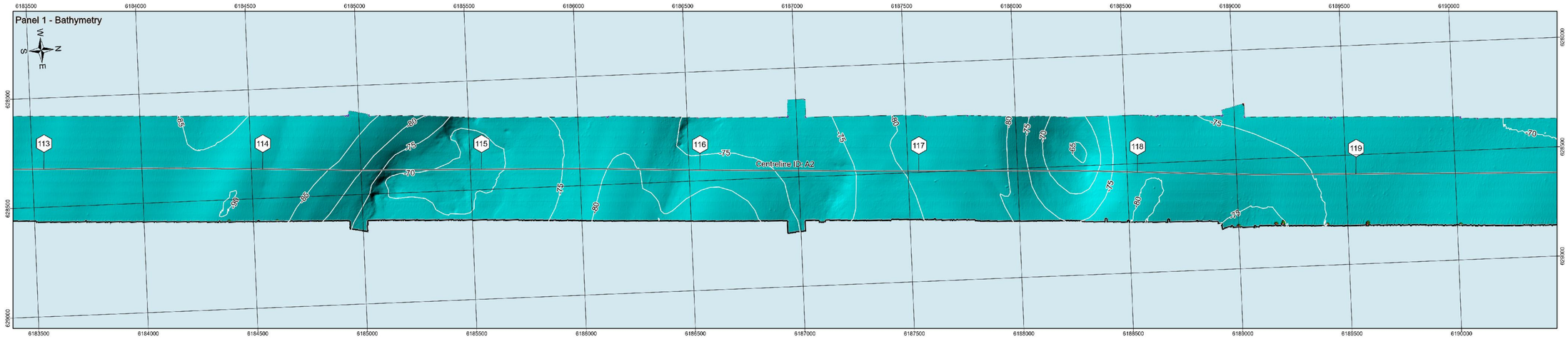
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 18 of 35

Drawing Status
Issue for Review

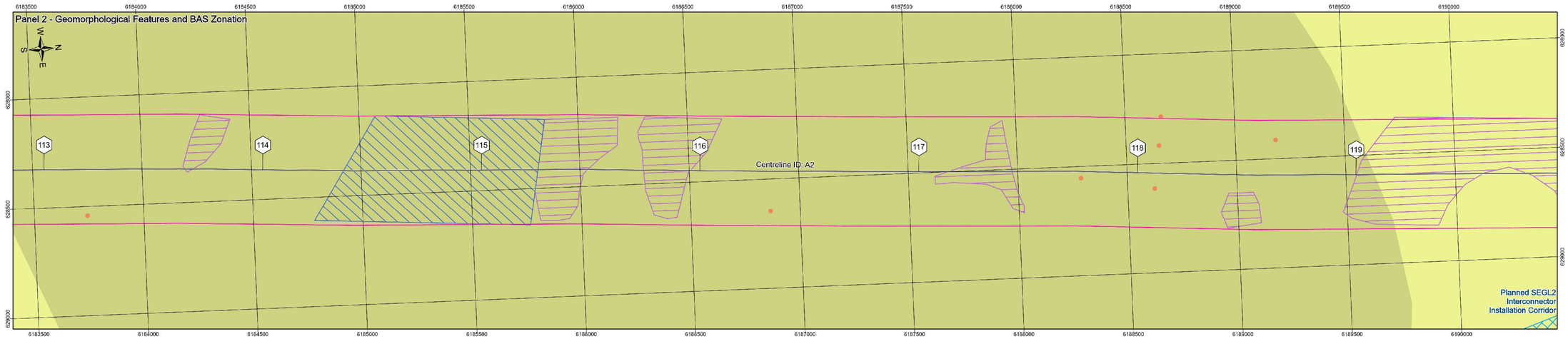
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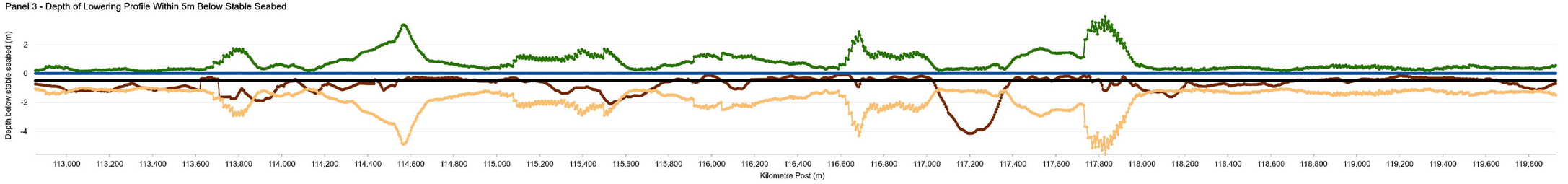
Panel 1 - Bathymetry



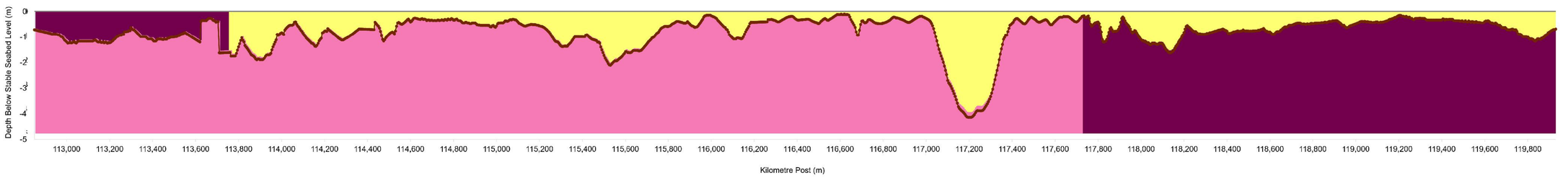
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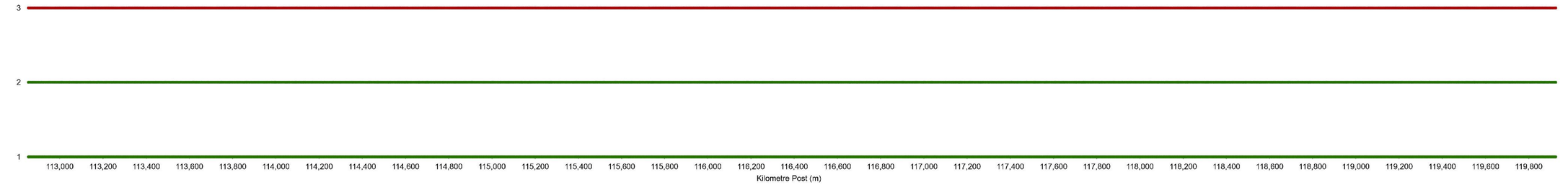
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



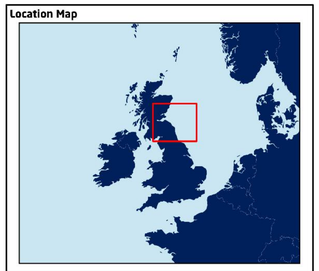
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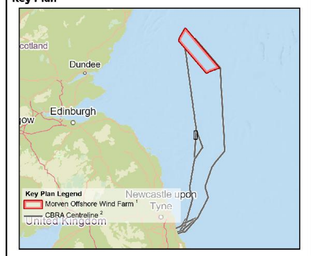
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
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Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5
- Suitable [3]
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

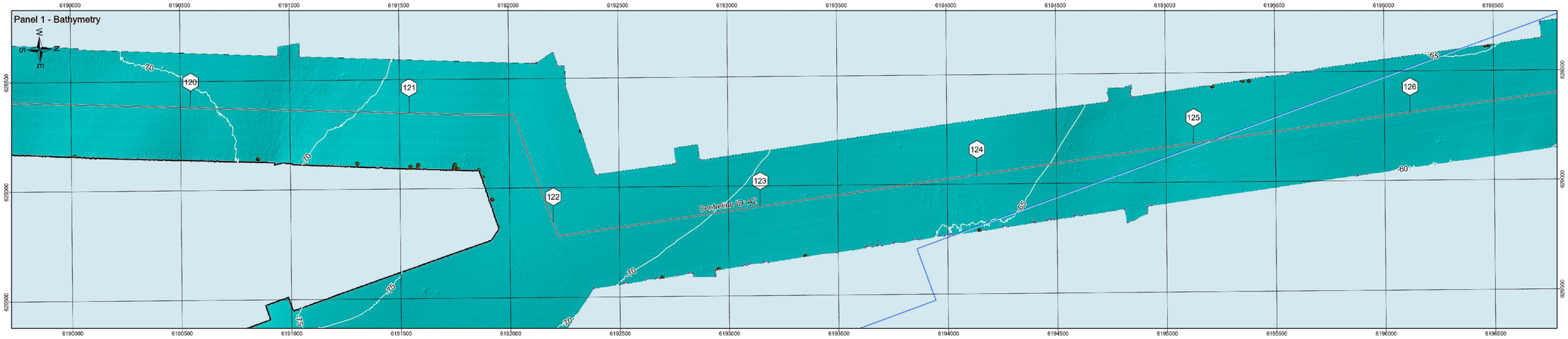
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 19 of 35

Drawing Status
Issue for Review

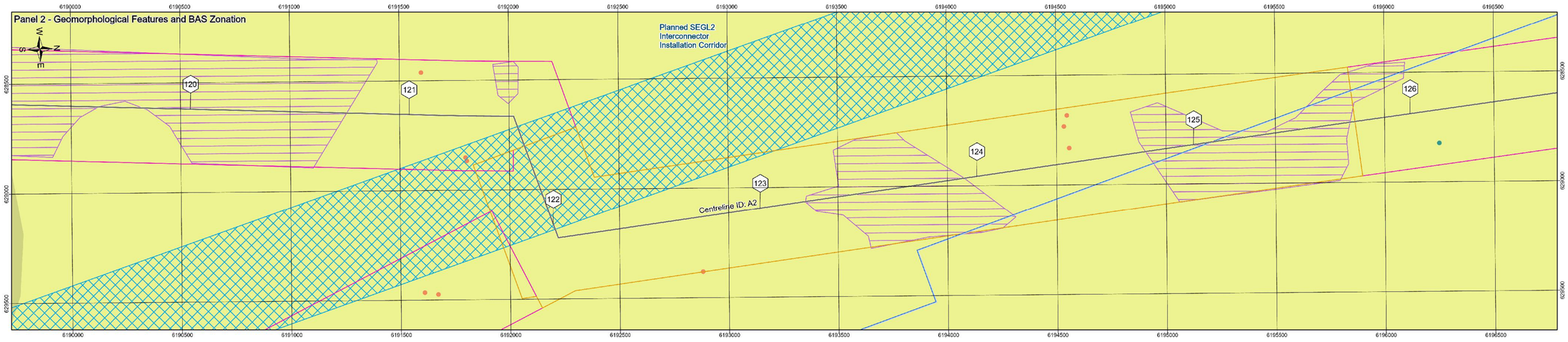
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GLOBAL MARITIME — EnBW bp — Partners in UK offshore wind

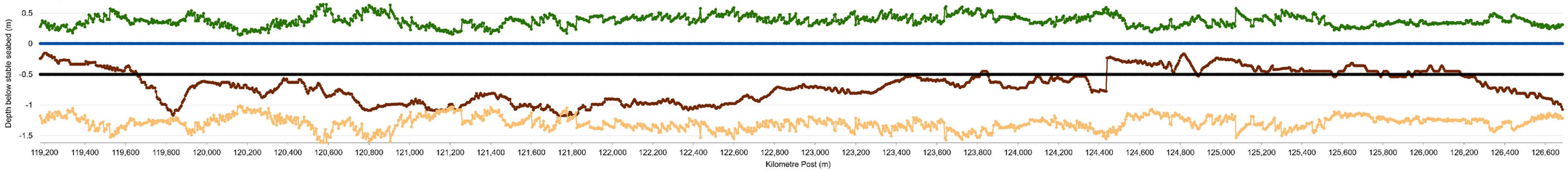
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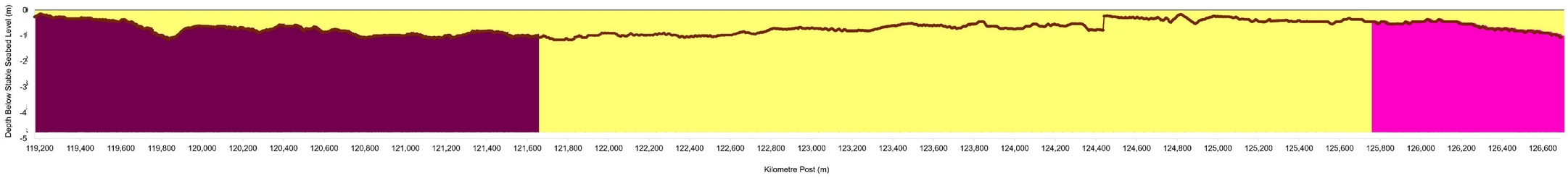
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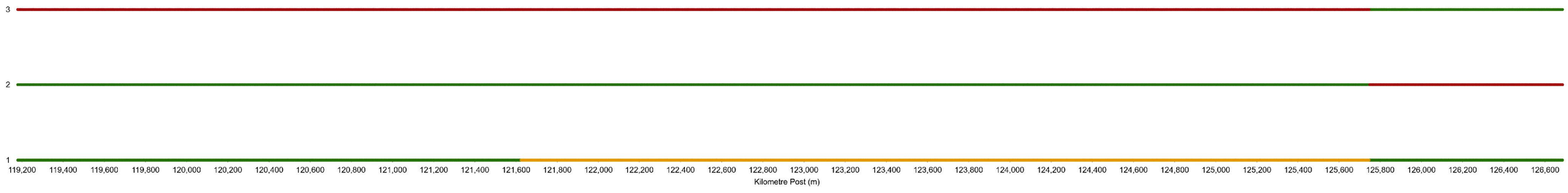
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



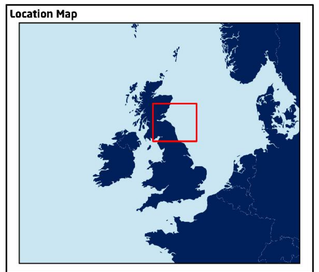
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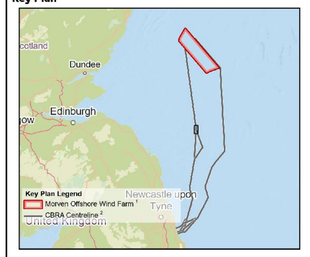
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Legend

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- Extremely High Strength CLAY (C7)
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- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
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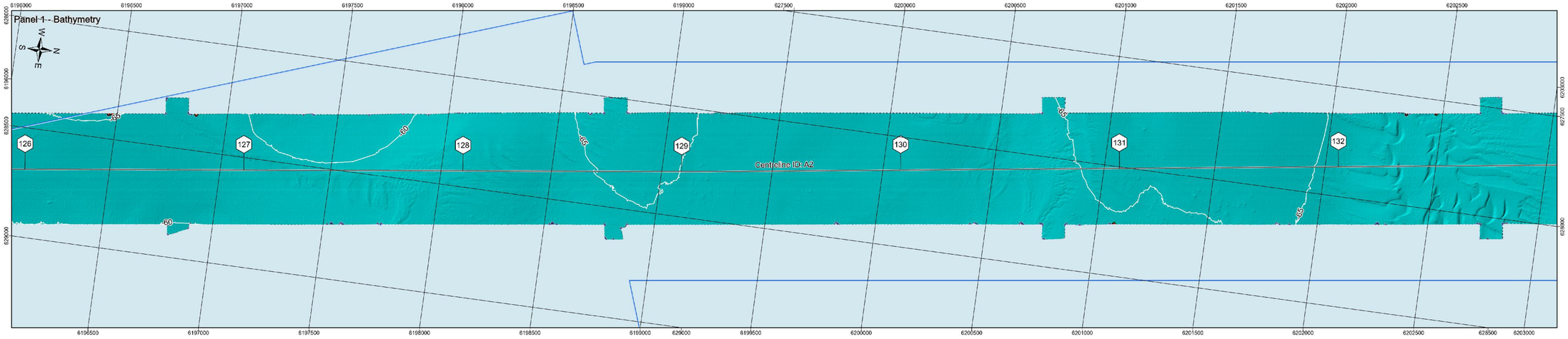
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Morven Offshore Wind Farm Cable Burial Risk Assessment

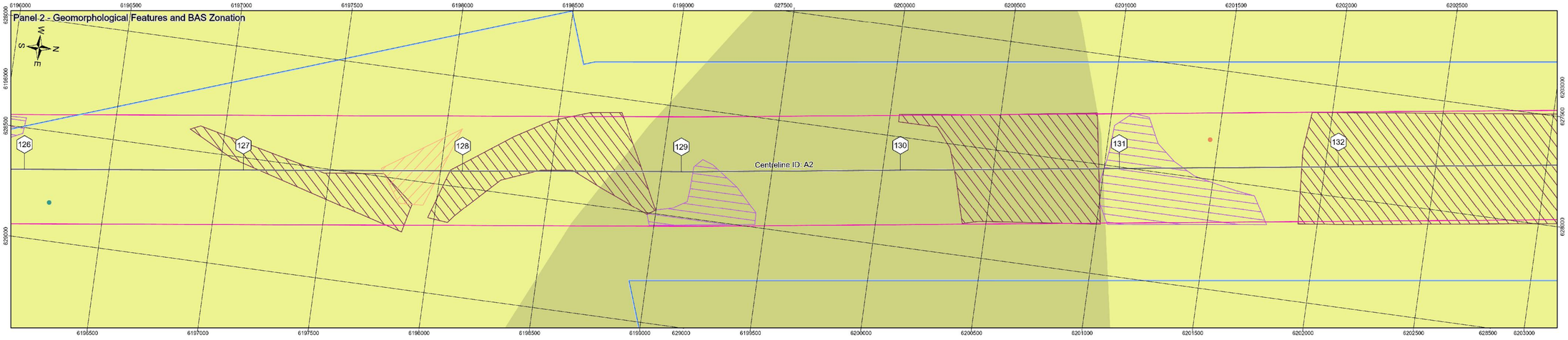
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 20 of 35

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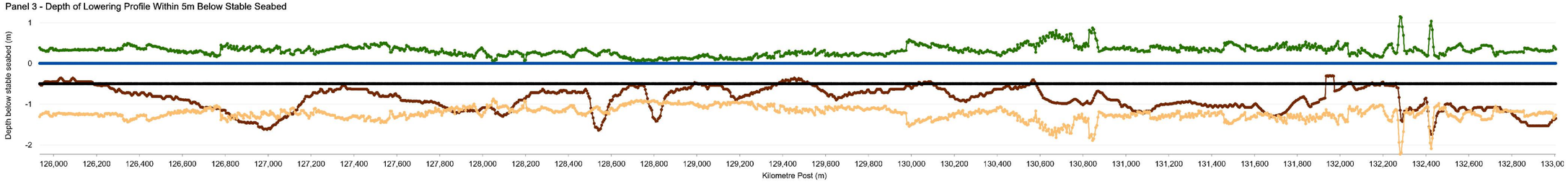
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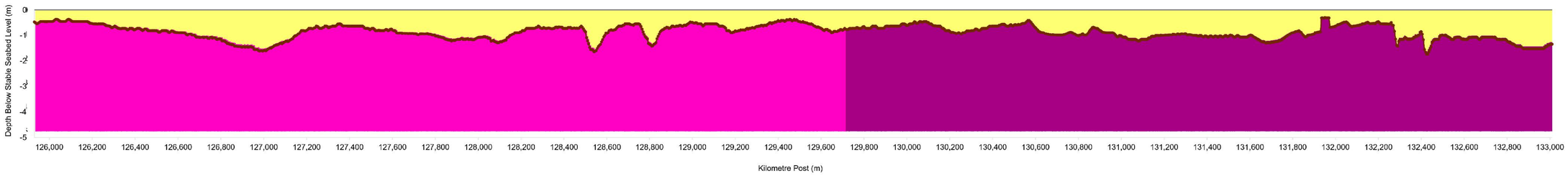




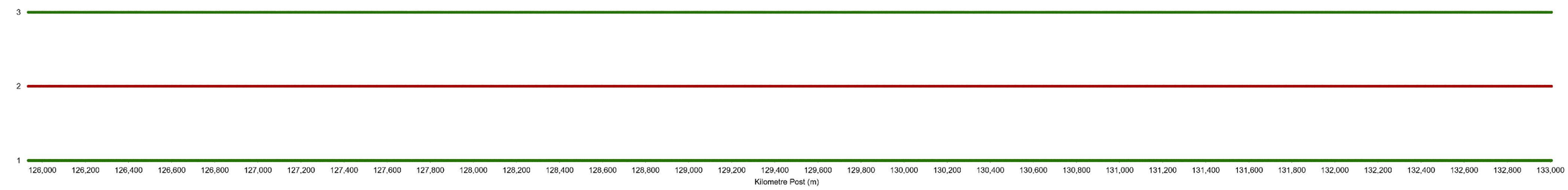
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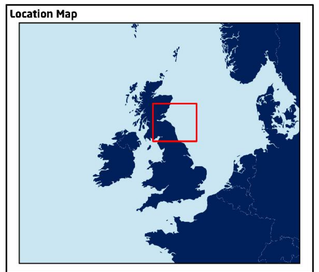
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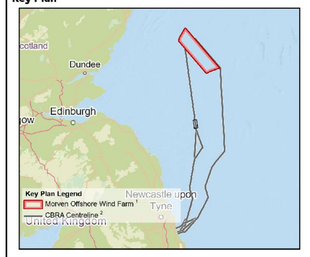
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Vertical Reference: Lowest Astronomical Tide (LAT)

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Latitude of Origin: 0.0000
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Scale Factor: 0.9996
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Map Units: Meter

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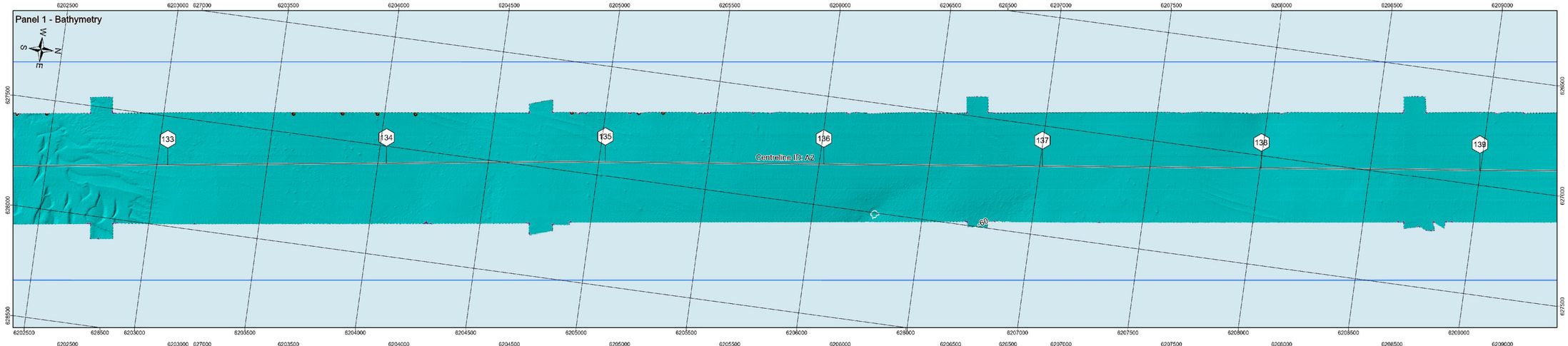
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 21 of 35

Drawing Status
Issue for Review

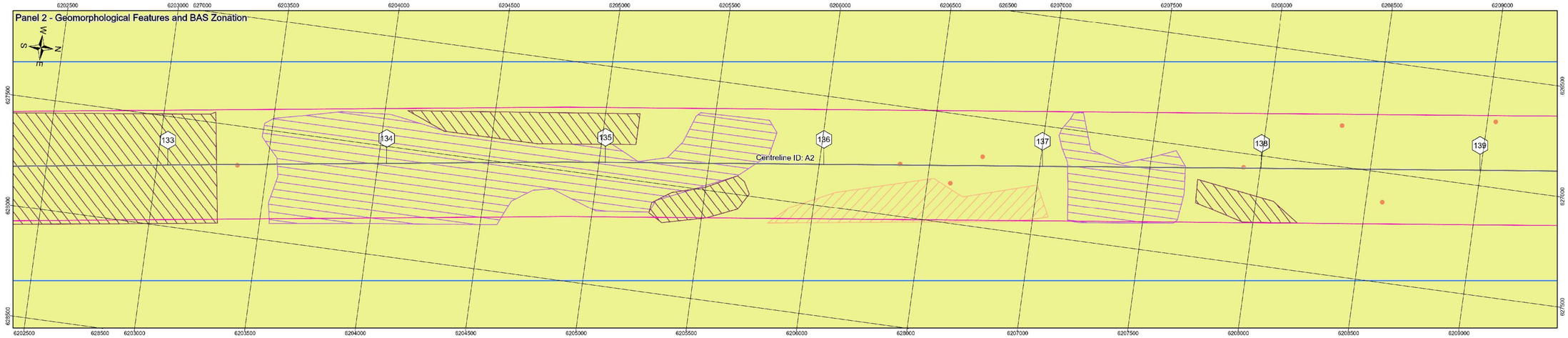
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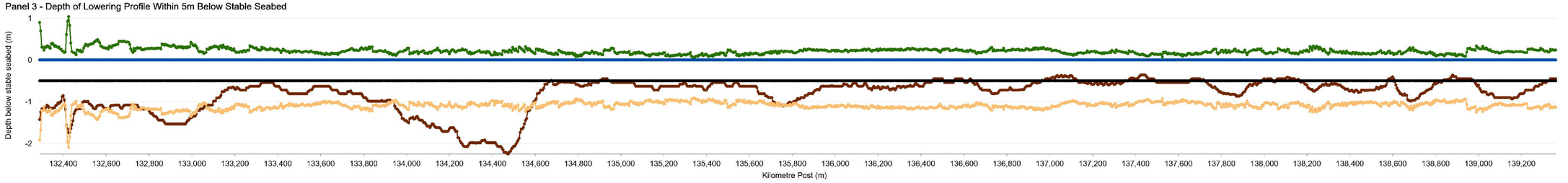
Panel 1 - Bathymetry



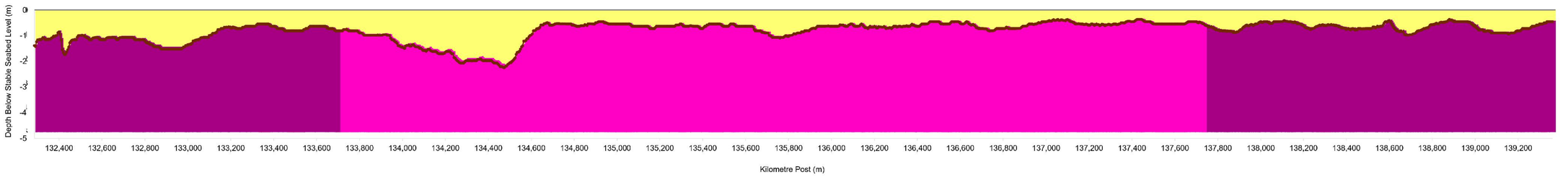
Panel 2 - Geomorphological Features and BAS Zonation



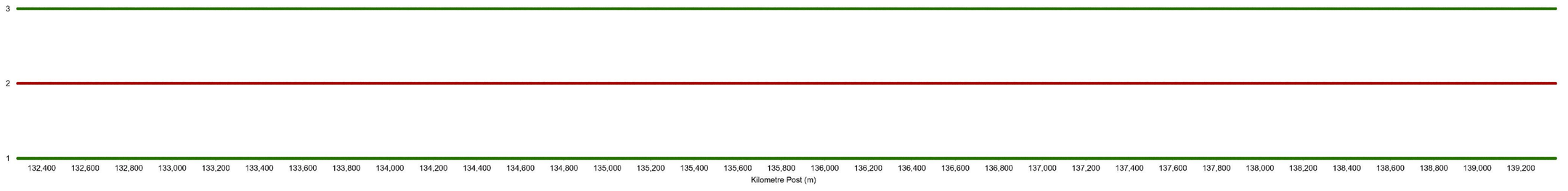
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



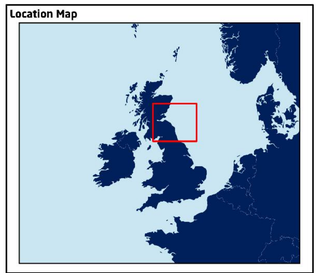
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



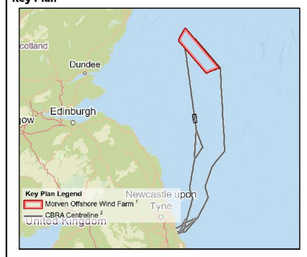
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [9]
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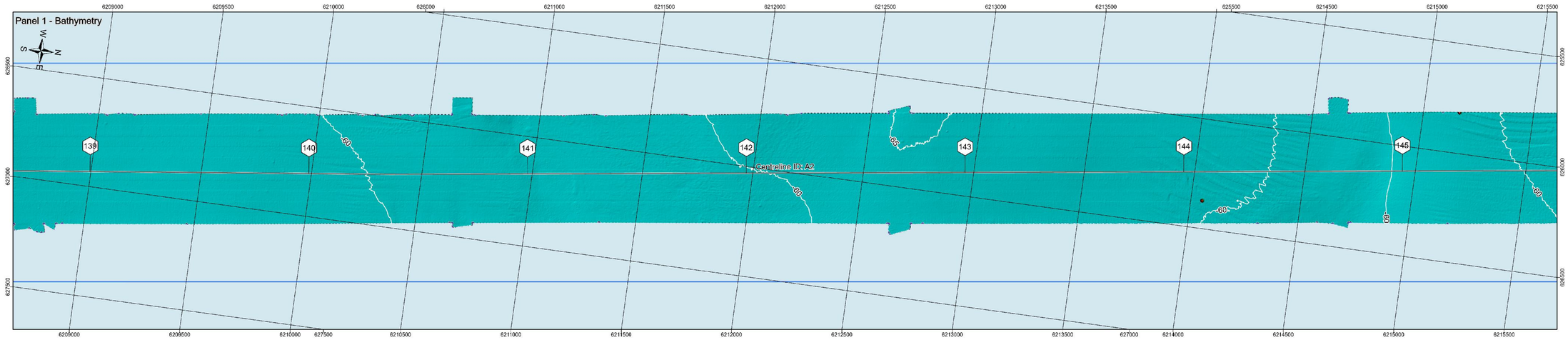
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 22 of 35

Drawing Status
Issue for Review

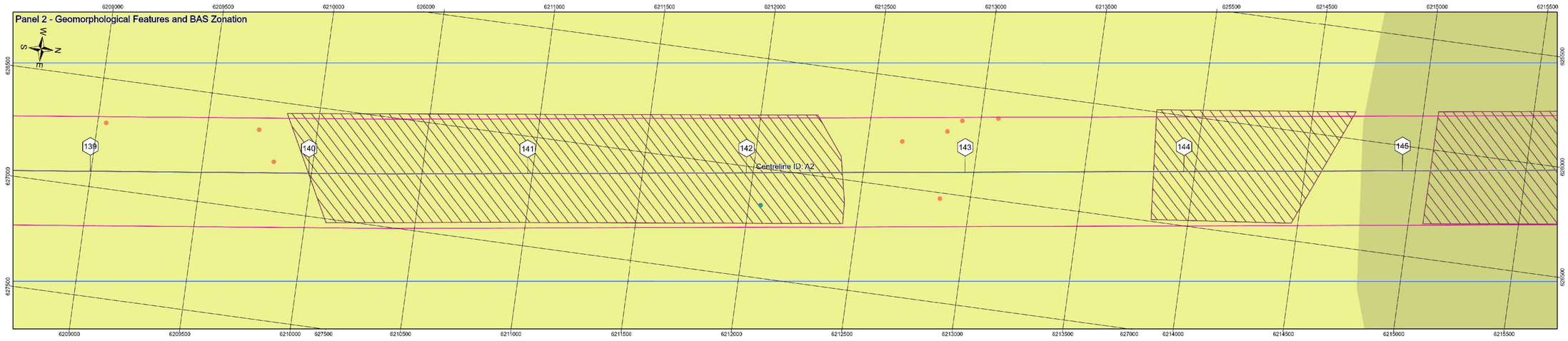
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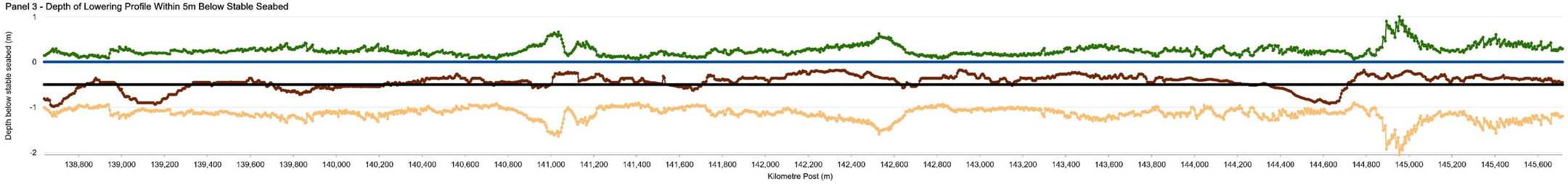
Panel 1 - Bathymetry



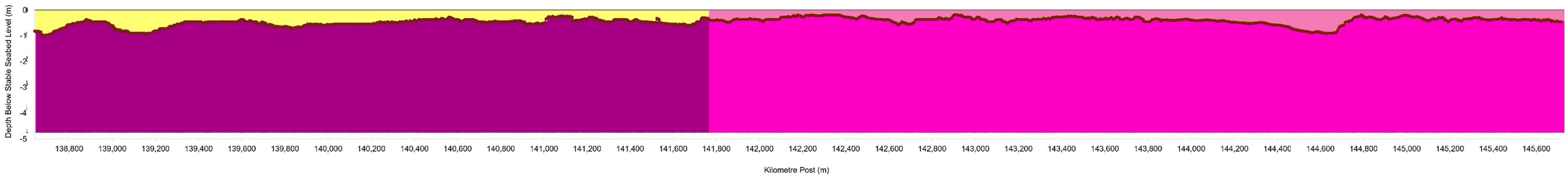
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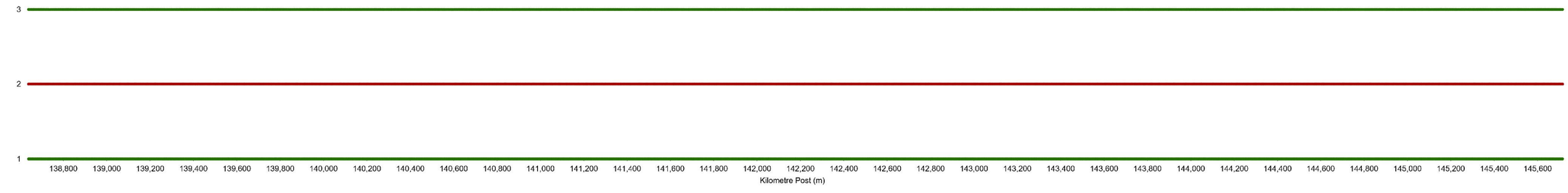
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



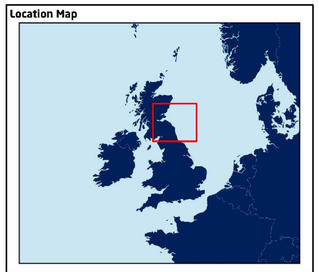
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



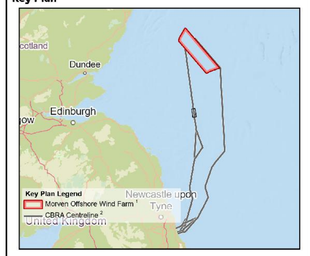
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Key Plan



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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 23 of 35

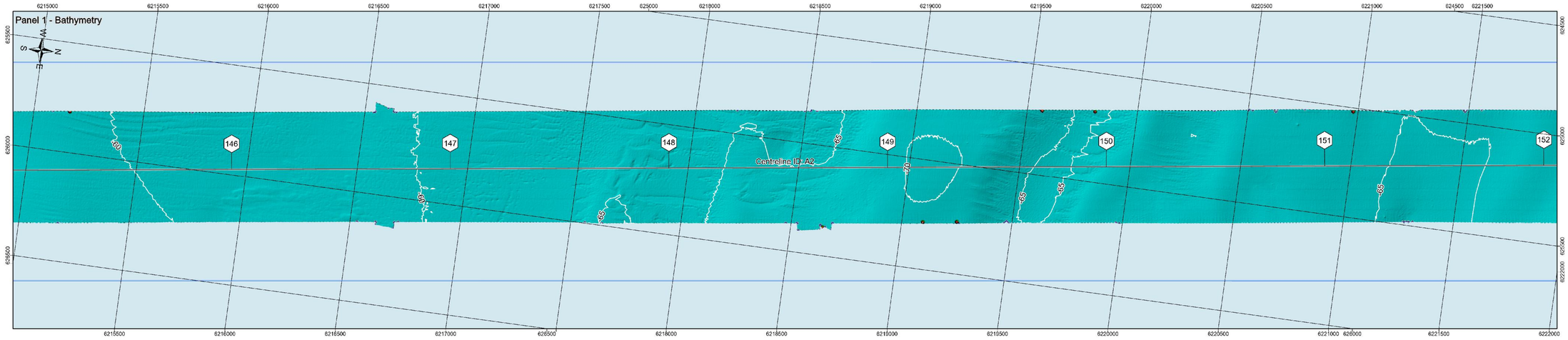
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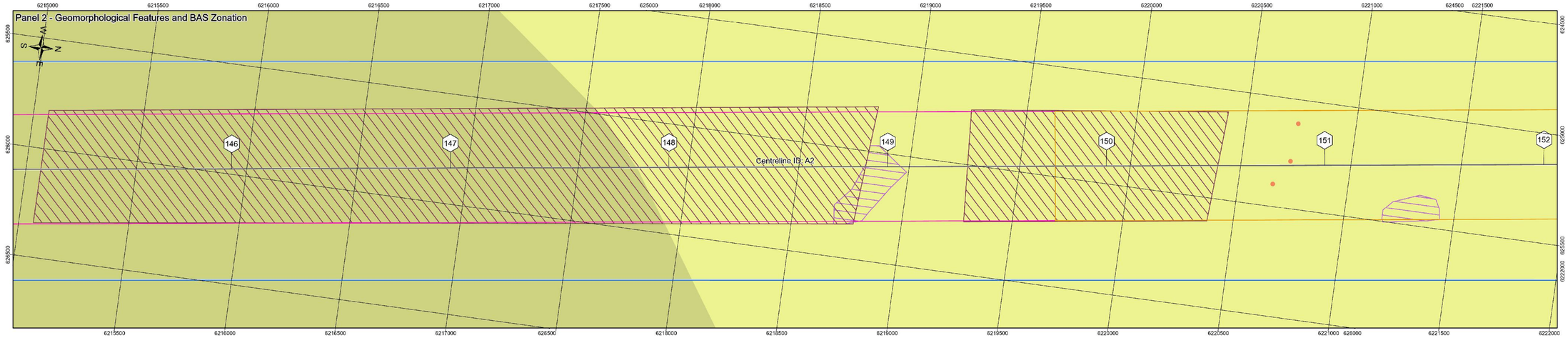
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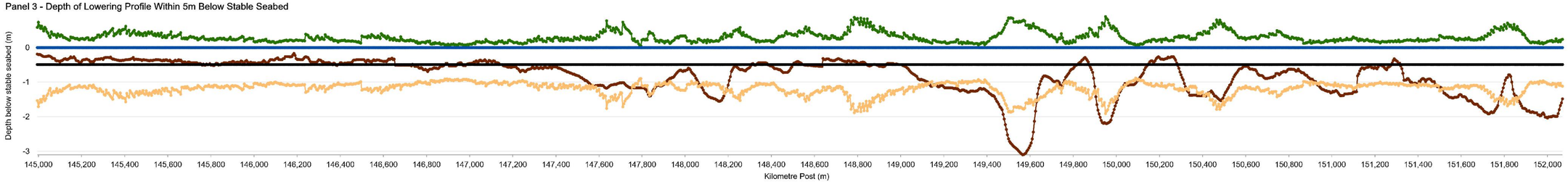
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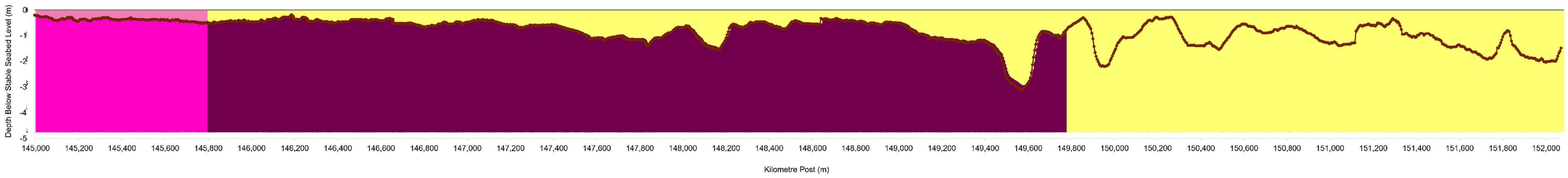
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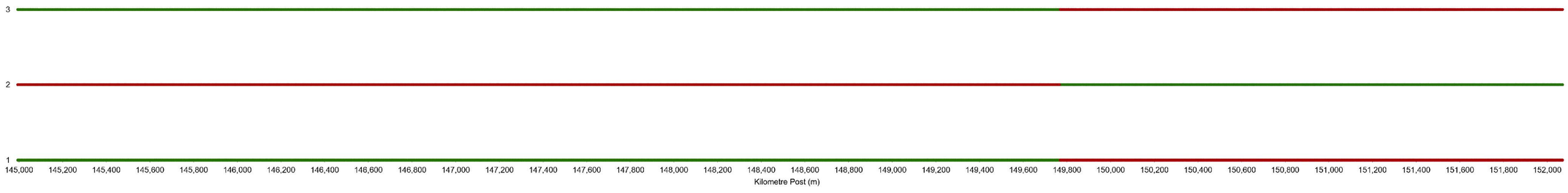
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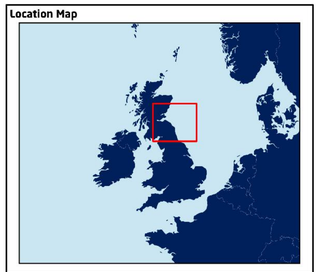
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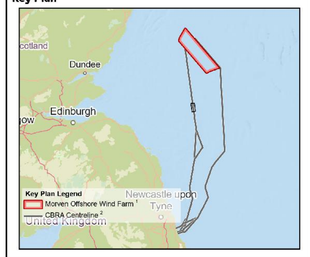
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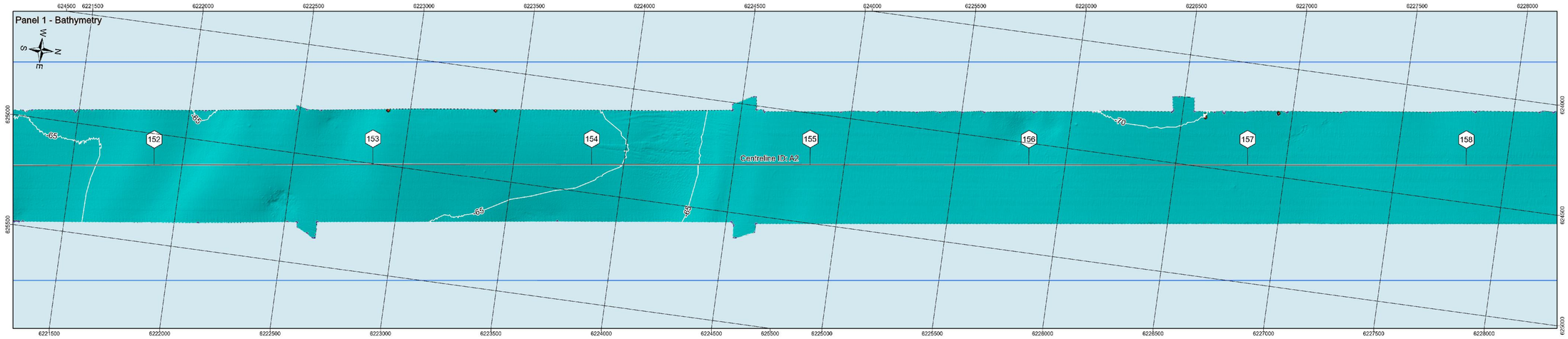
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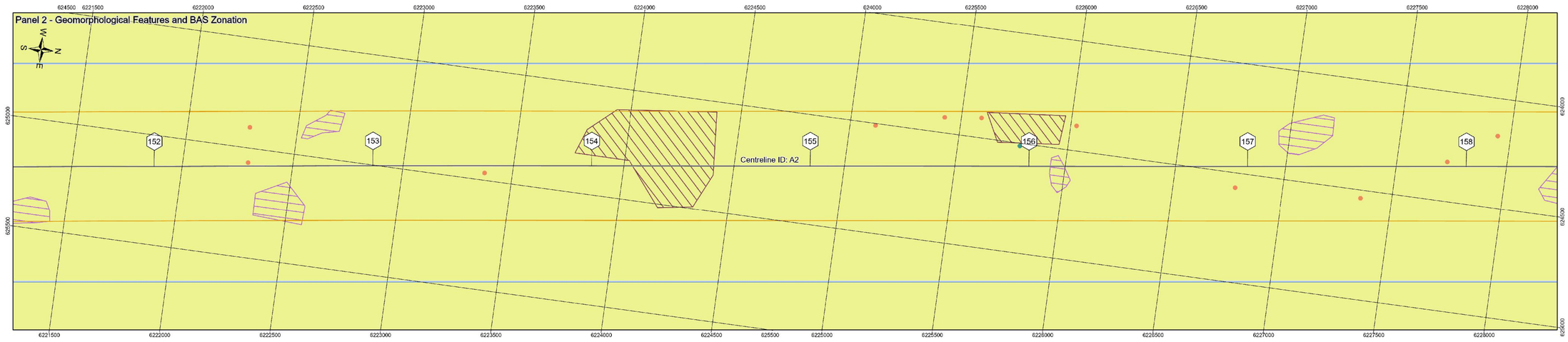
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GLOBAL MARITIME — EnBW — bp
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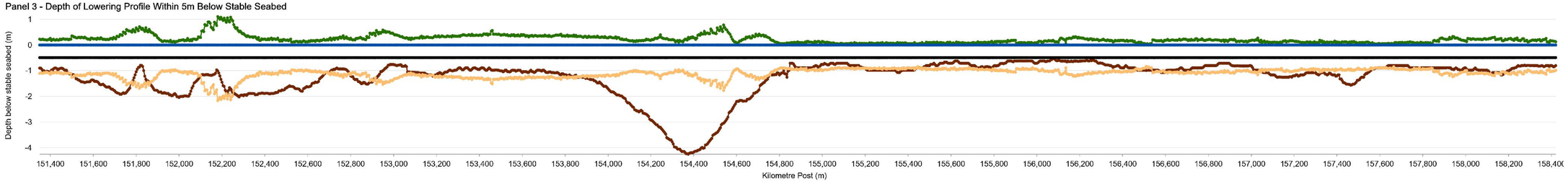
Panel 1 - Bathymetry



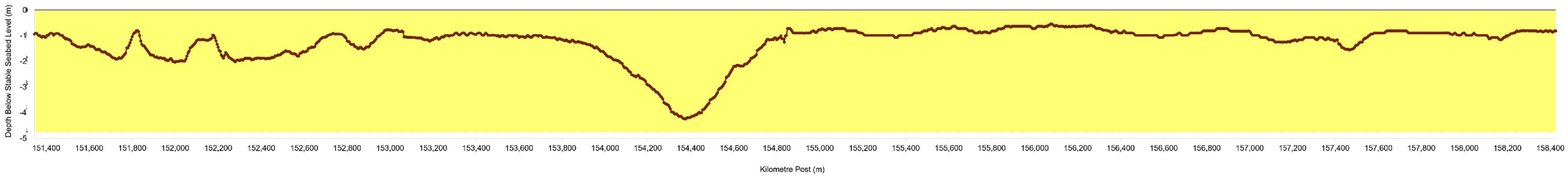
Panel 2 - Geomorphological Features and BAS Zonation



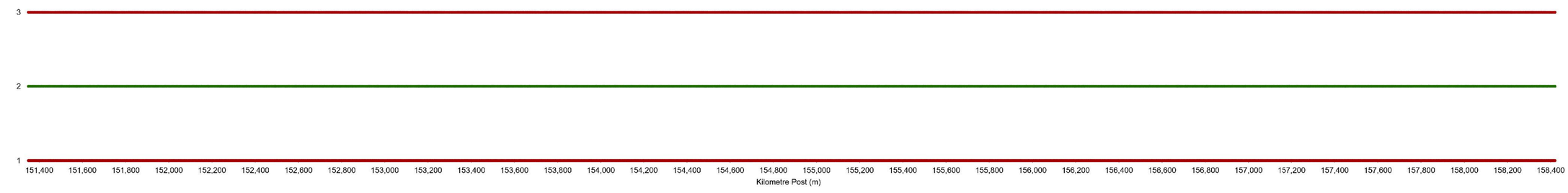
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



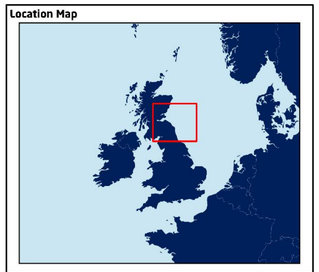
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



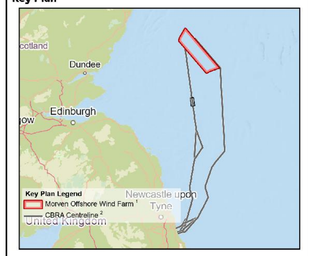
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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- Target Trench Depth [1]

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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

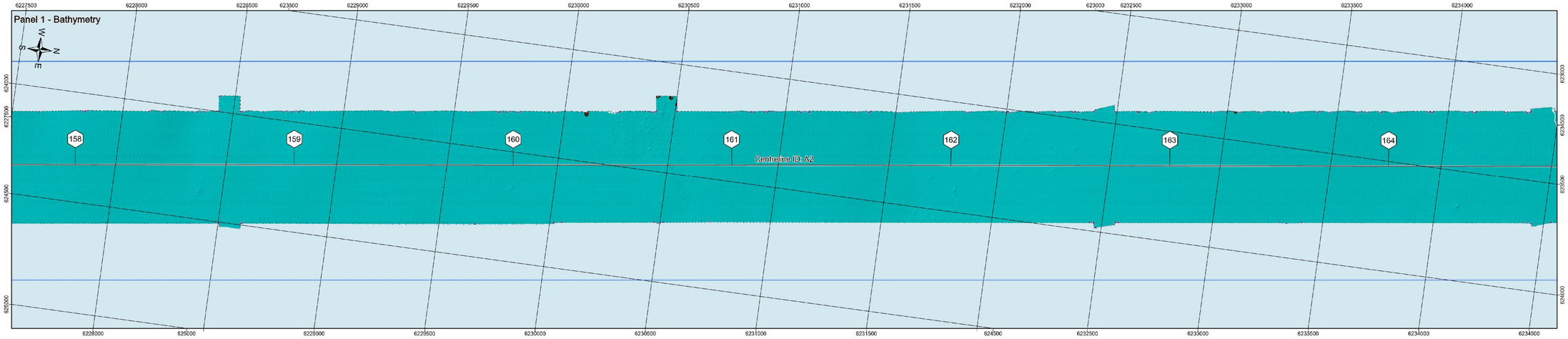
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 25 of 35

Drawing Status
Issue for Review

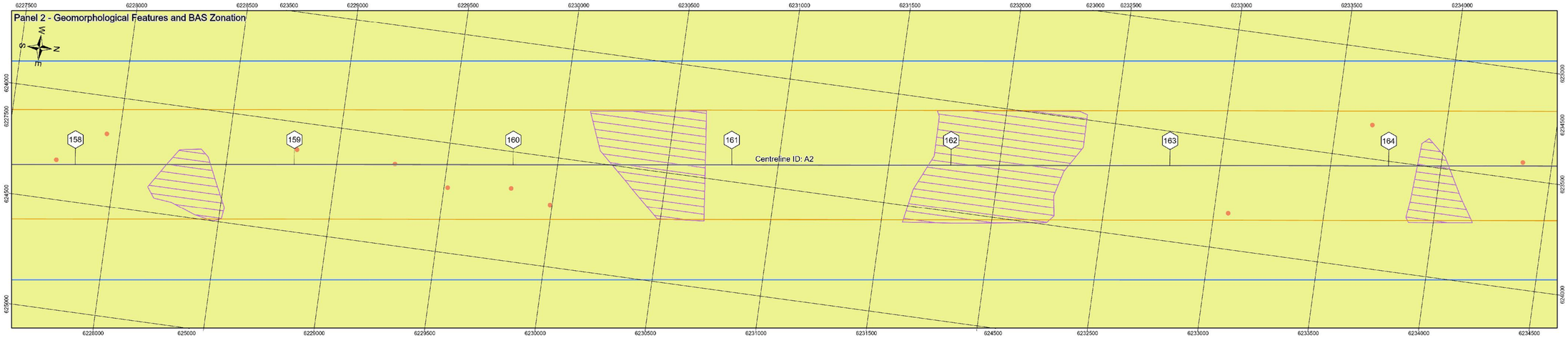
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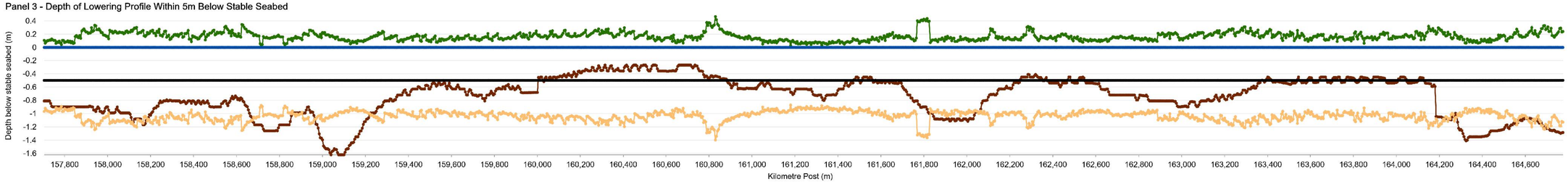
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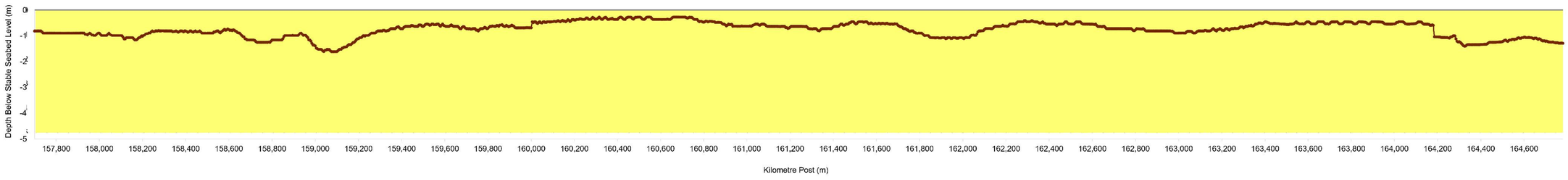
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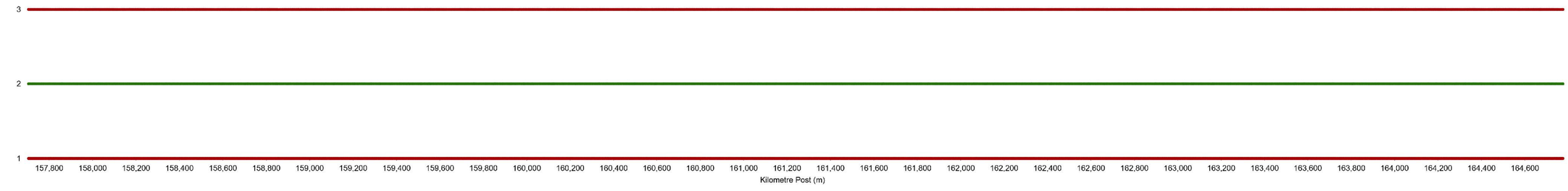
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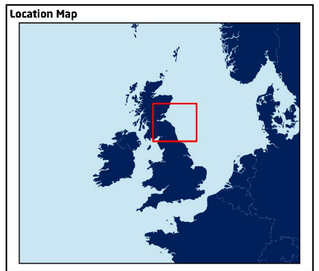
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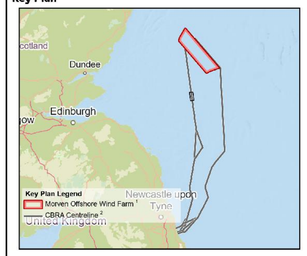
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

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- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

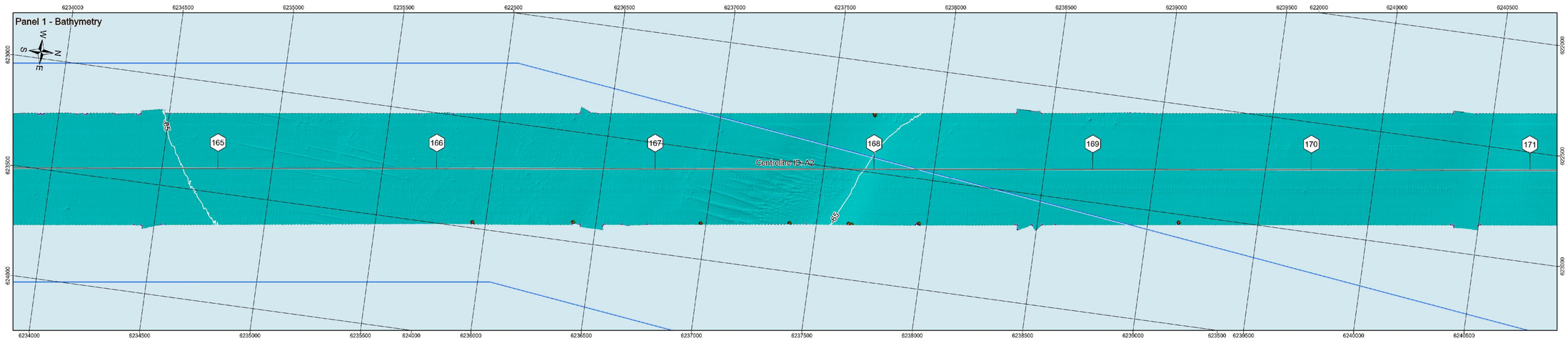
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 26 of 35

Drawing Status
Issue for Review

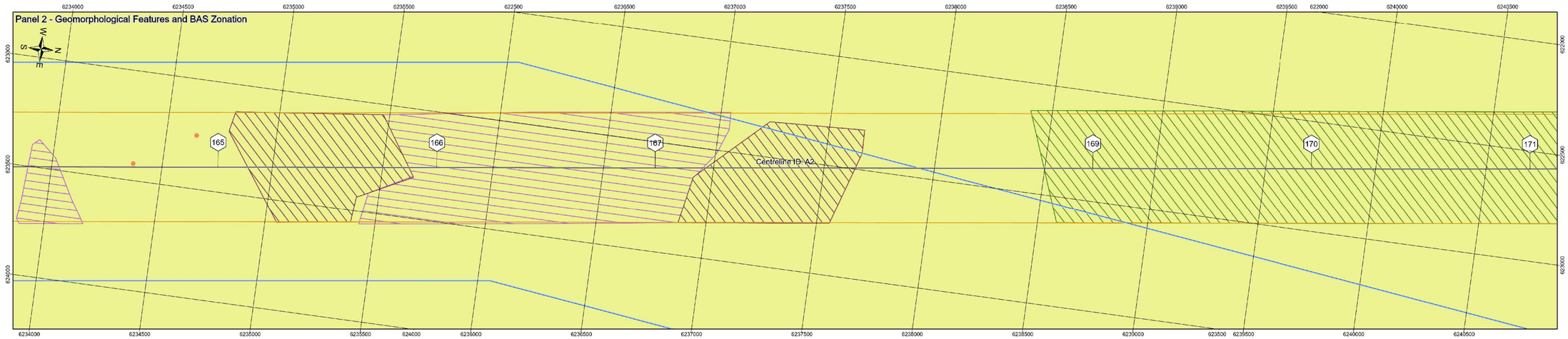
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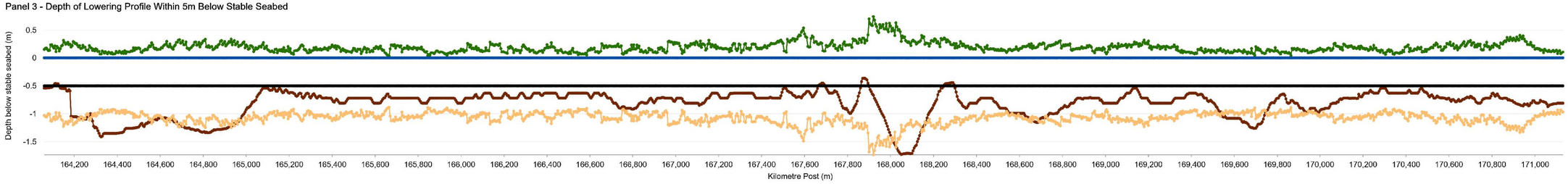
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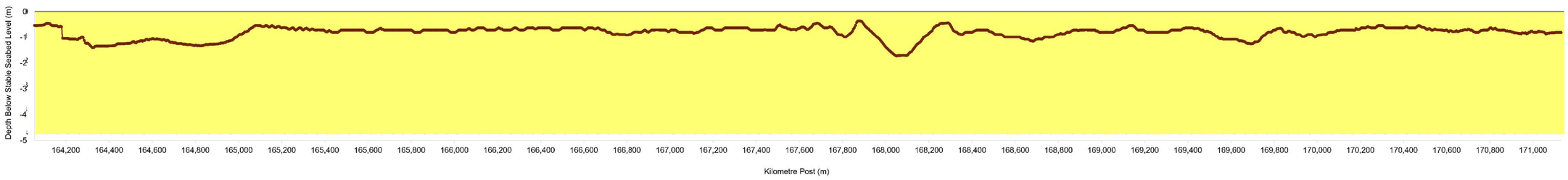
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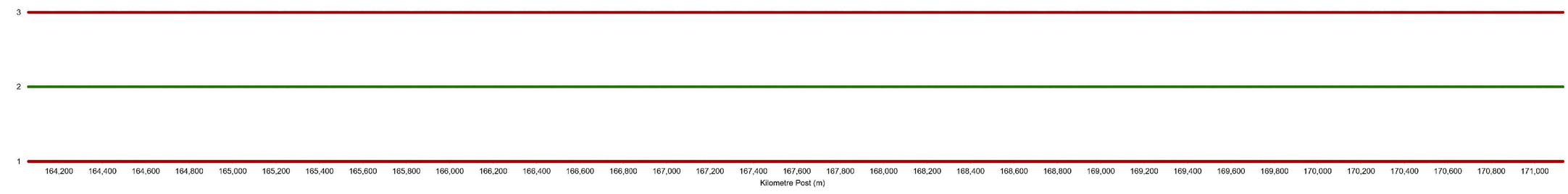
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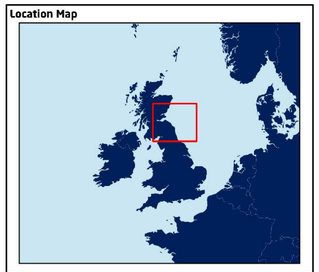
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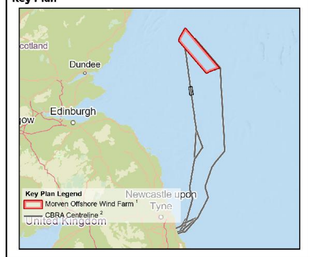
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Rock (R)	
Layer 1/Layer 2 Boundary [8]	

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- Suitable [3]
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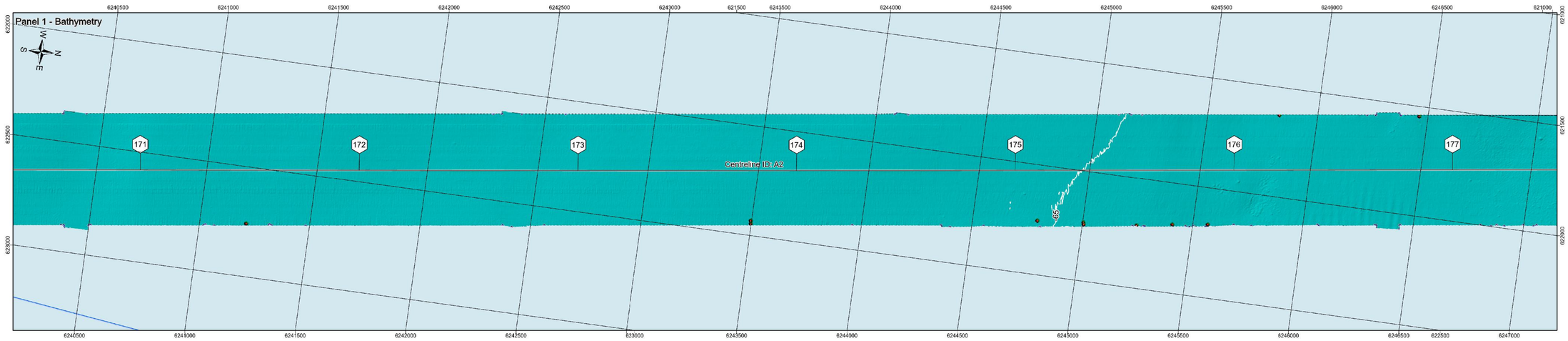
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

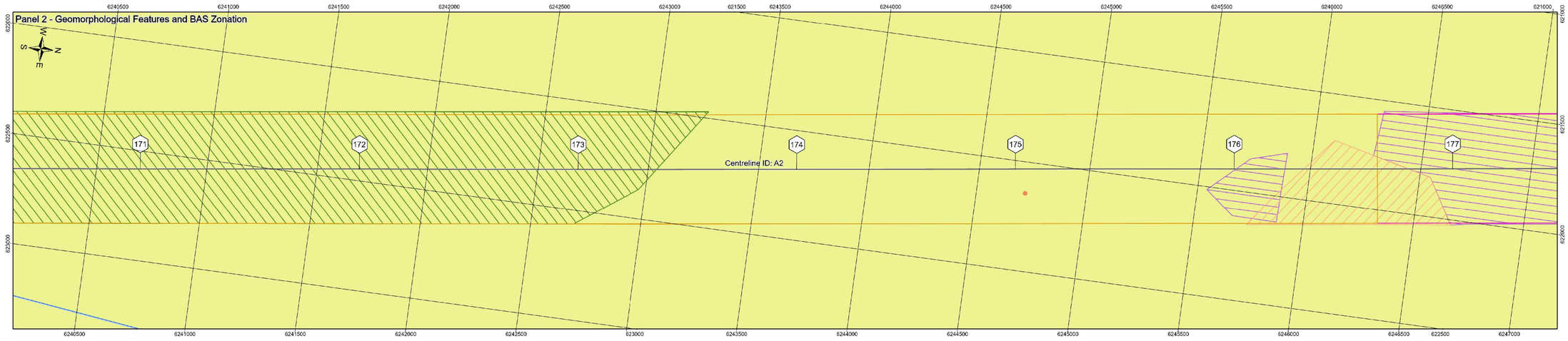
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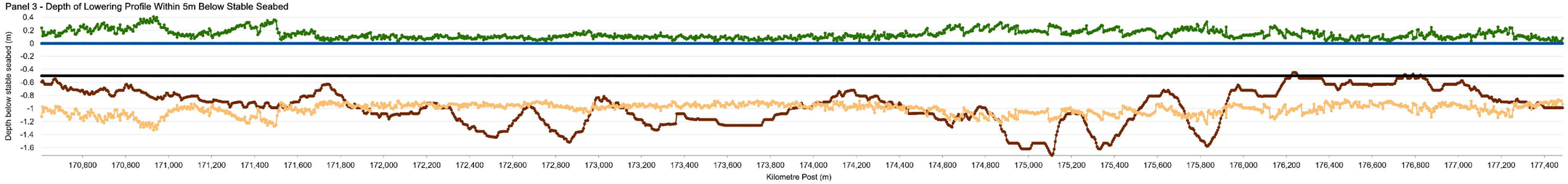
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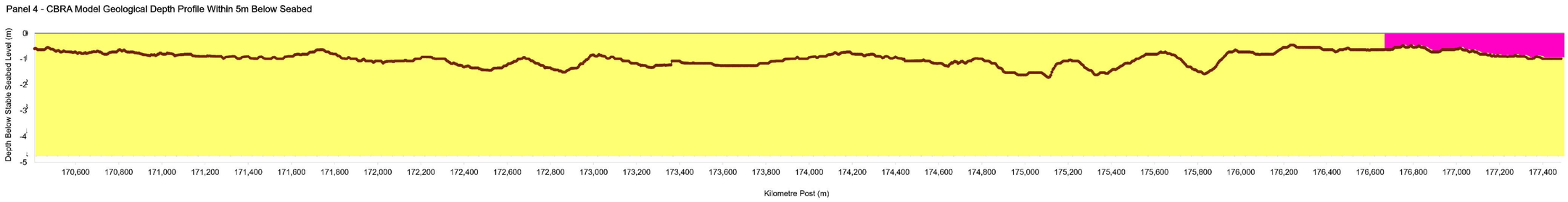
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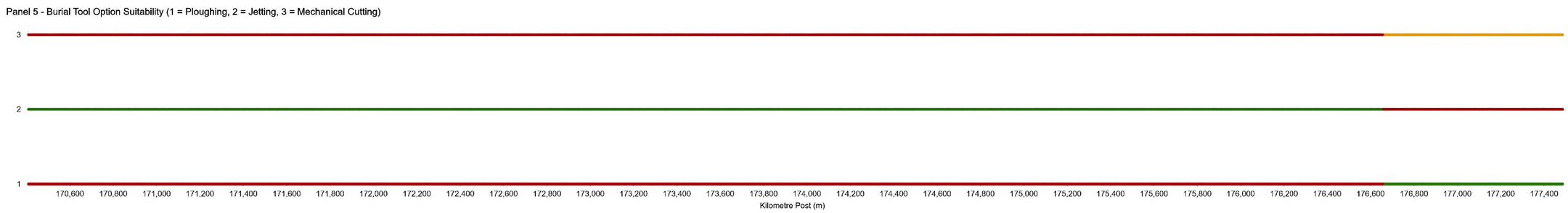
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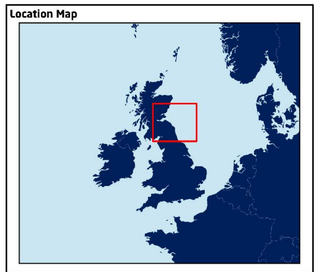




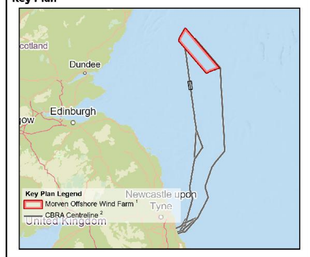




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- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

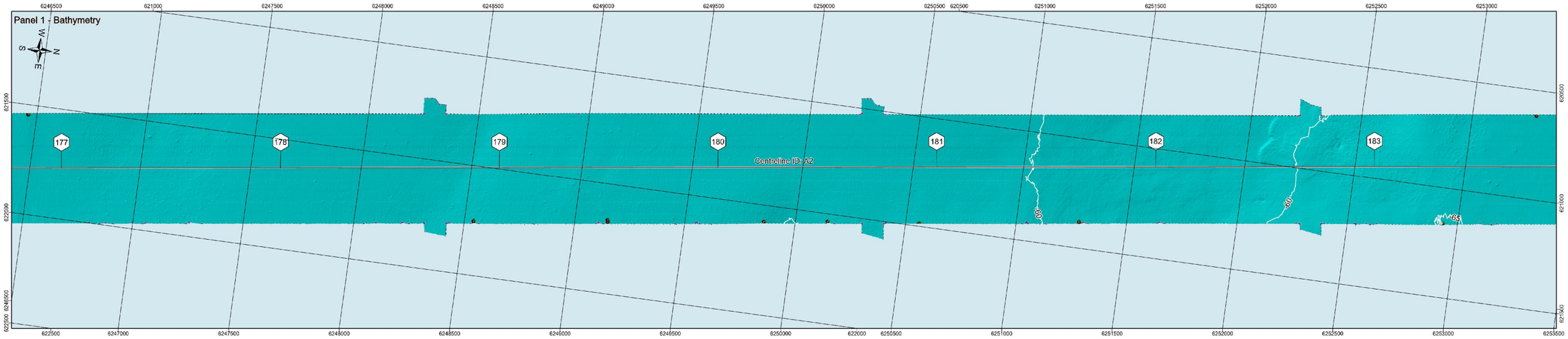
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 28 of 35

Drawing Status
Issue for Review

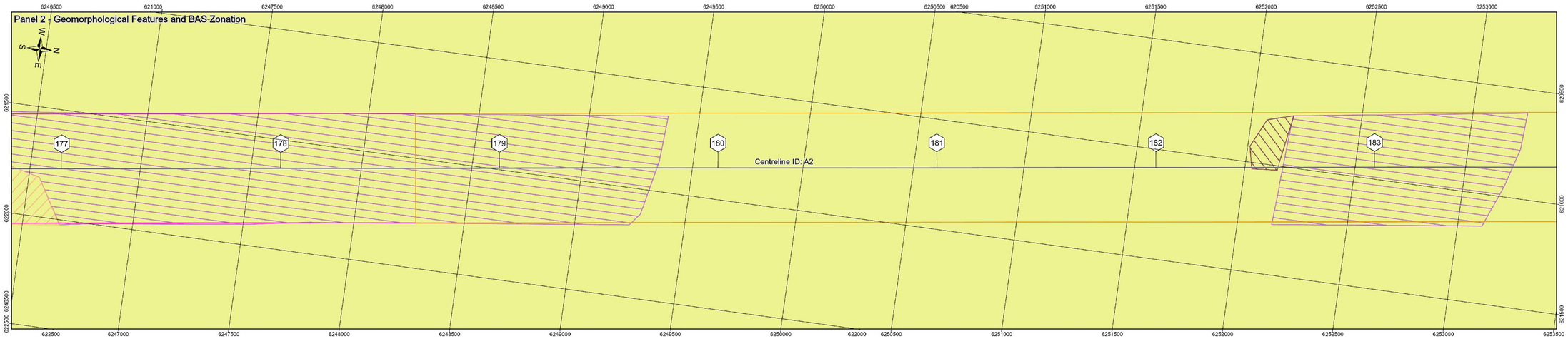
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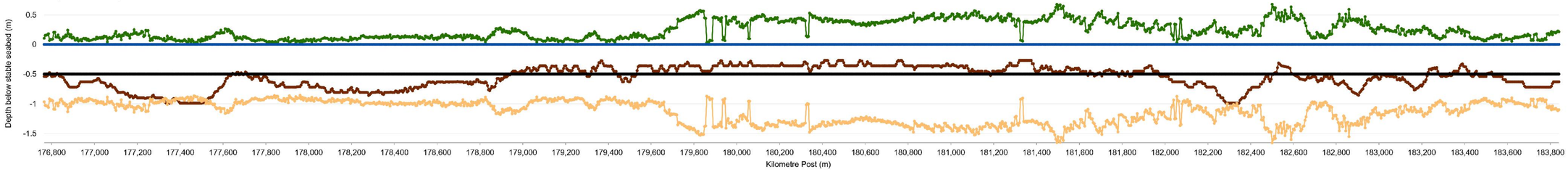
Panel 1 - Bathymetry



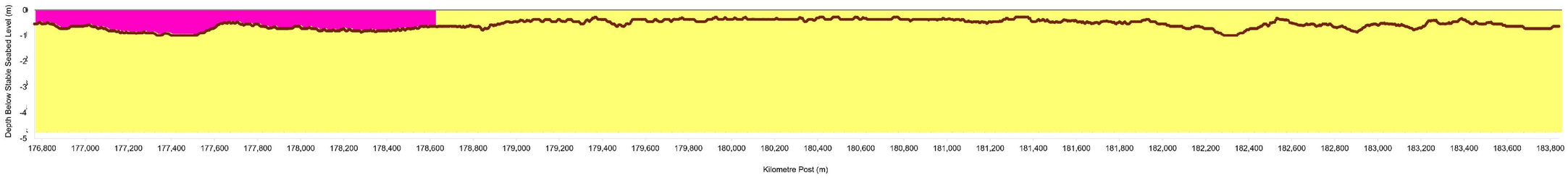
Panel 2 - Geomorphological Features and BAS Zonation



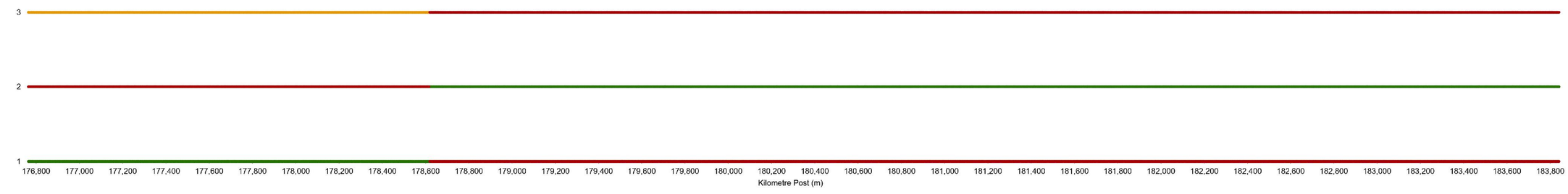
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



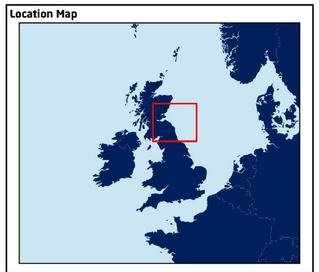
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



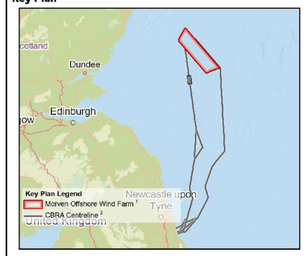
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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BAS Zone Classification [3]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [4]	

Panel 5

- Suitable [3]
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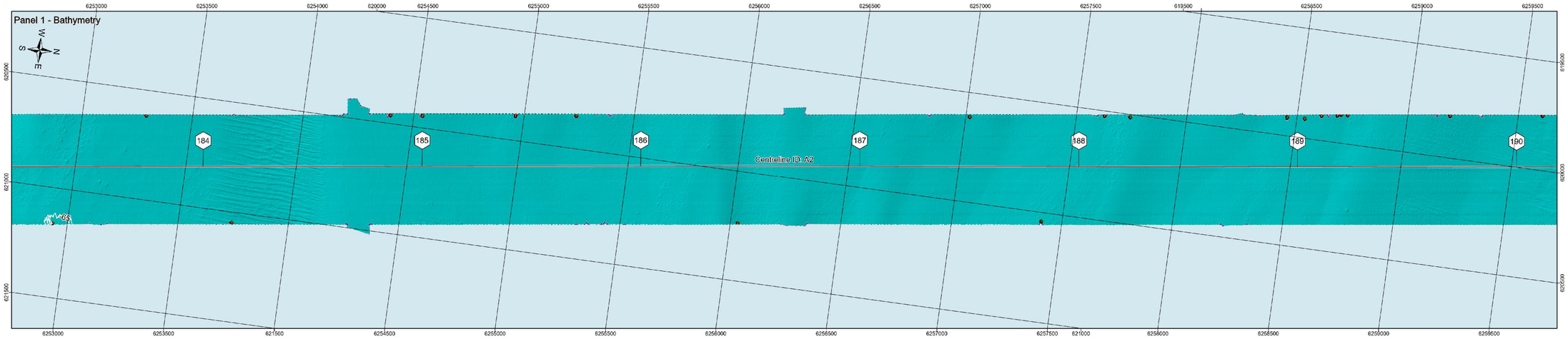
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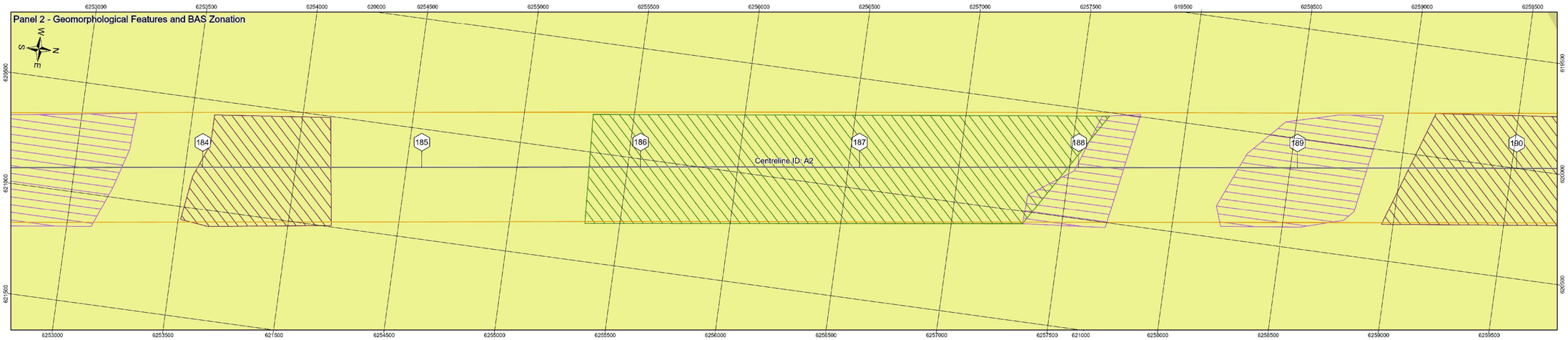
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 29 of 35

Drawing Status
Issue for Review

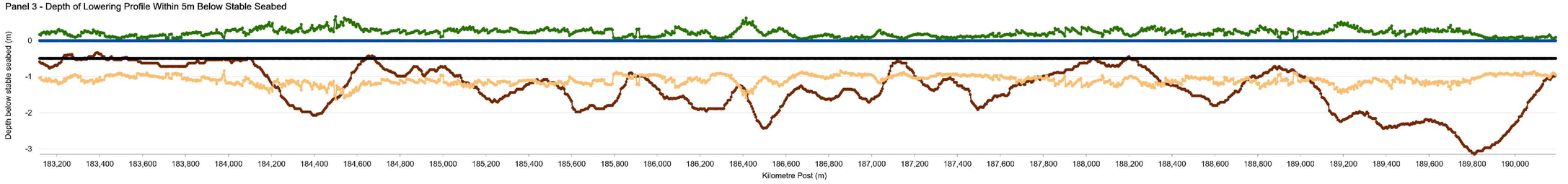
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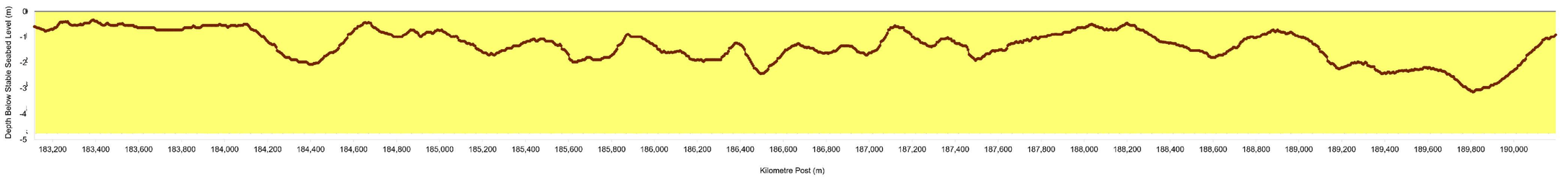




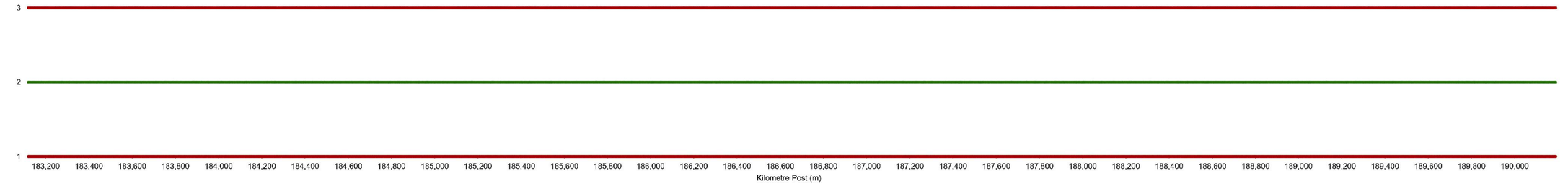
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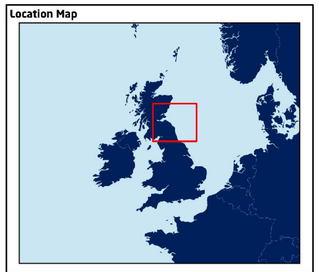
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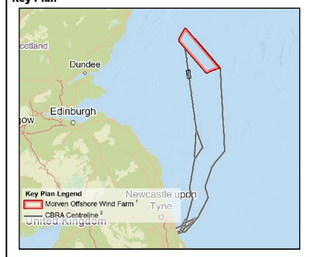
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
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- Very Low Strength CLAY (C2)
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Panel 5

- Suitable [3]
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Revision Status

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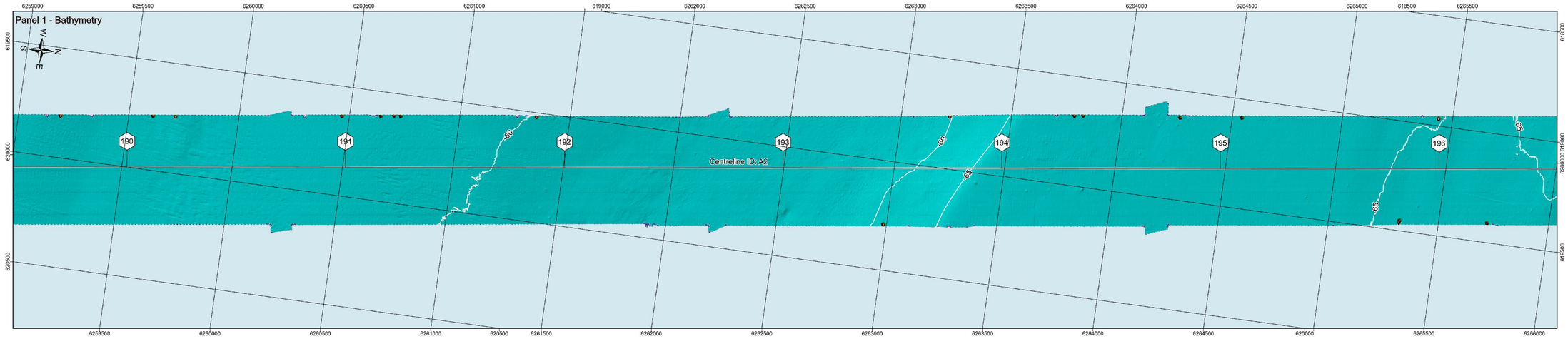
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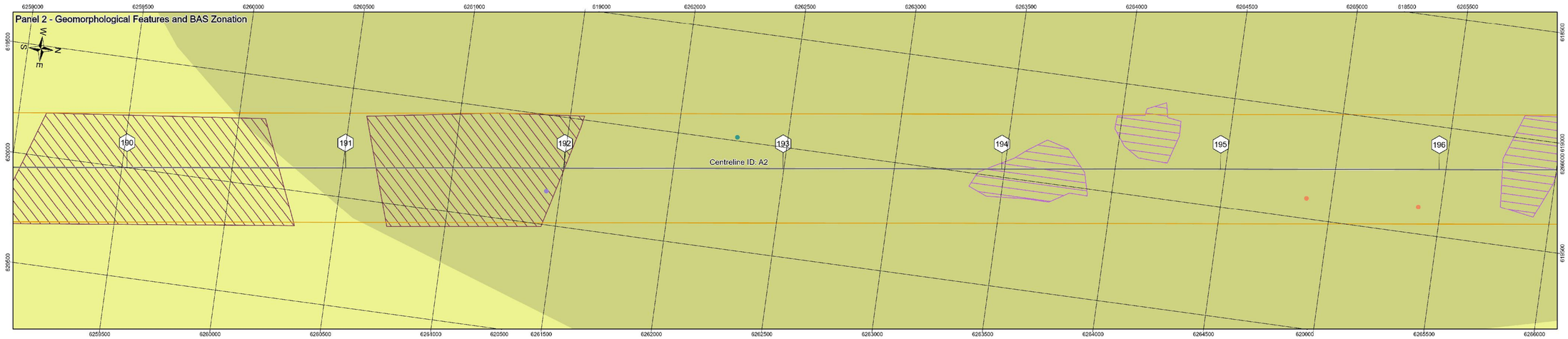
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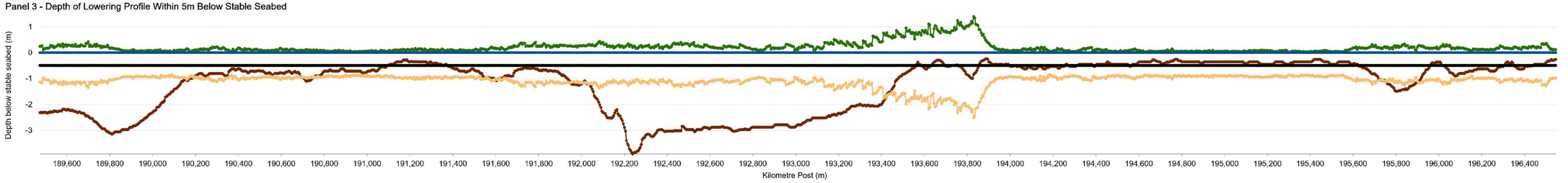
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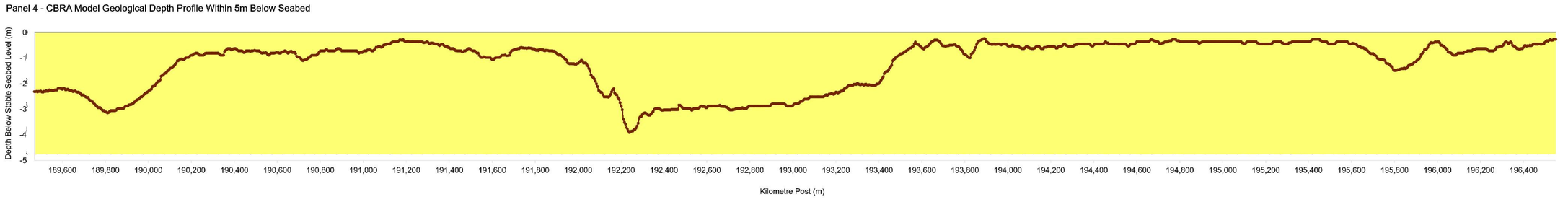
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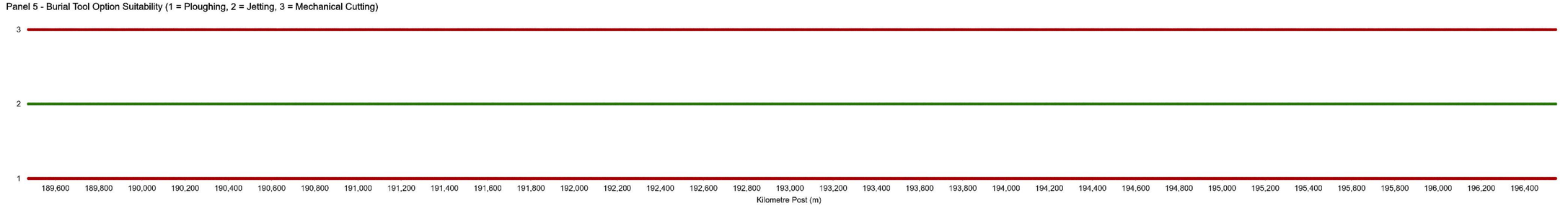
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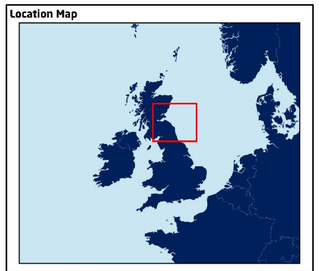




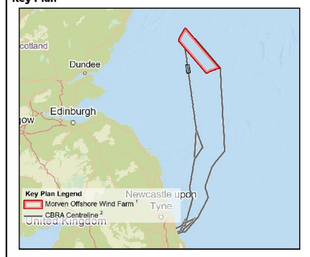




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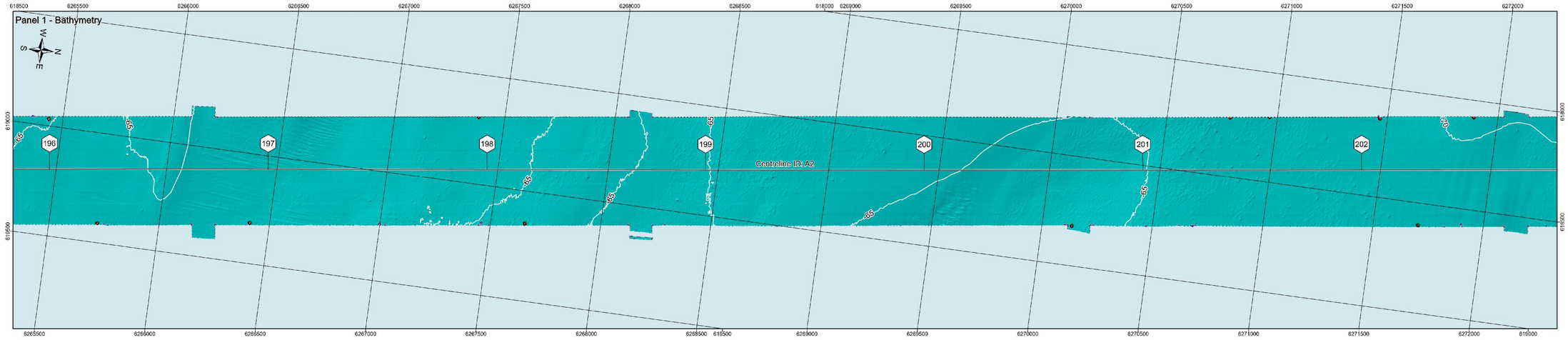
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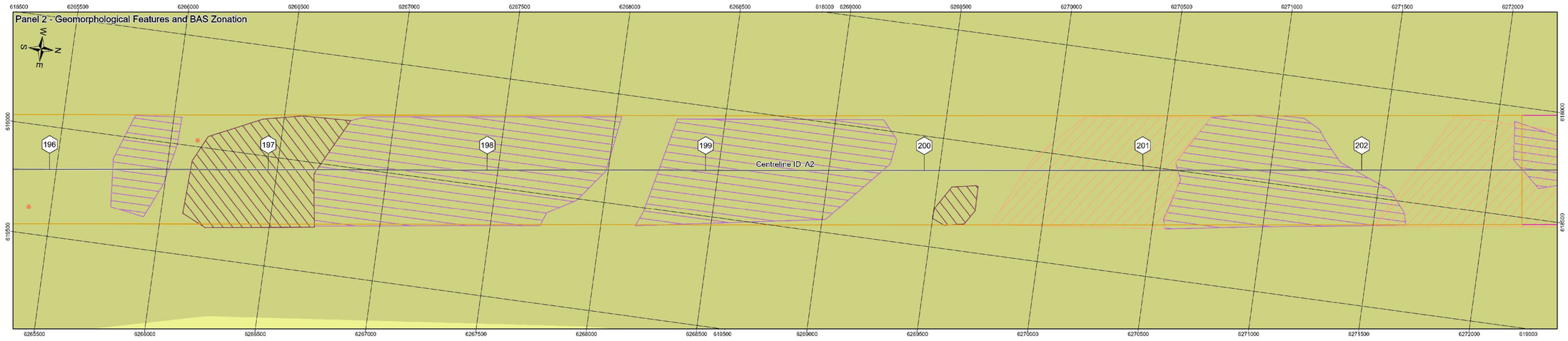
Drawing Title
CBRA Alignment Charts - Centreline ID: A2 - Sheet 31 of 35

Drawing Status
Issue for Review

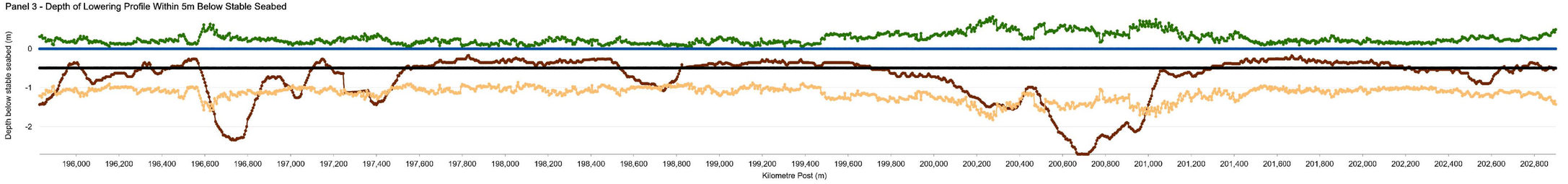
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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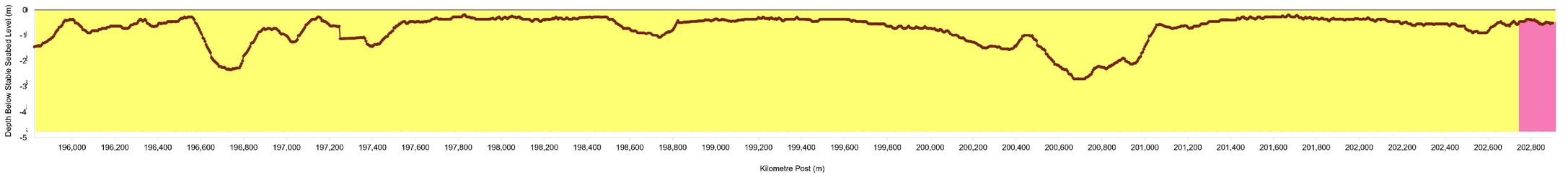




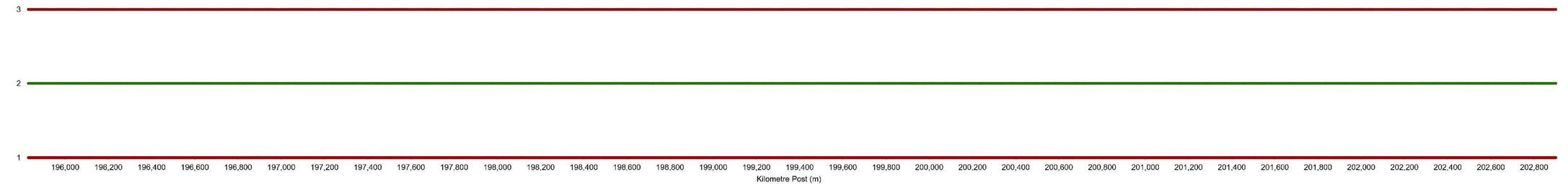
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



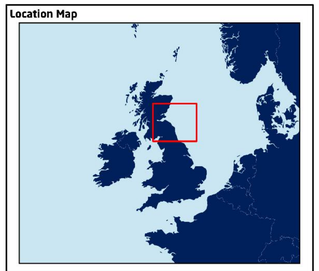
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



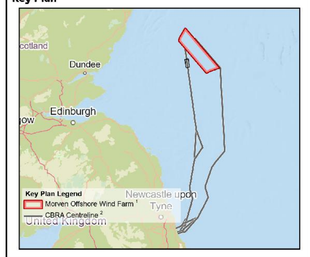
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Key Plan



Legend

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- Layer 1/Layer 2 Boundary [5]

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Panel 5

- Suitable [3]
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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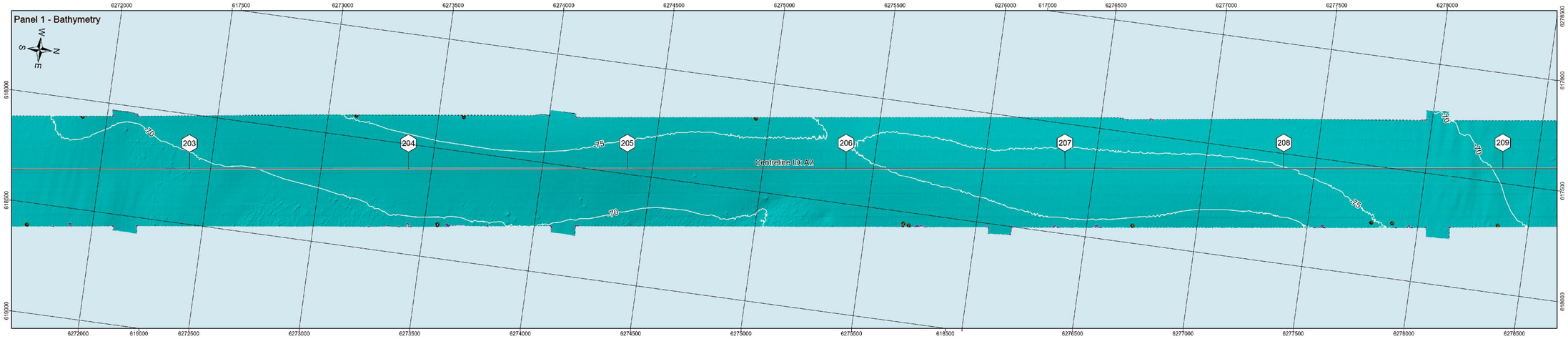
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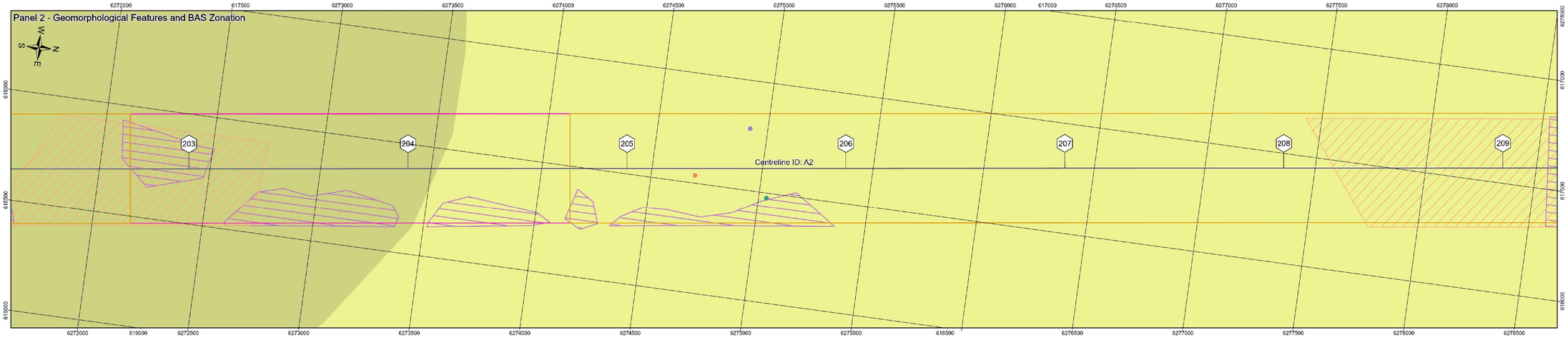
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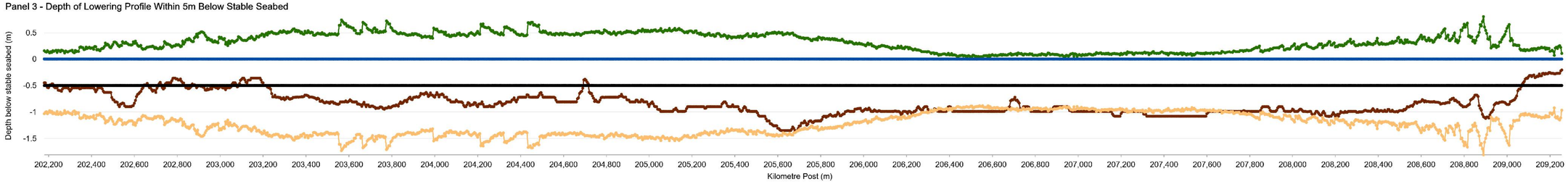
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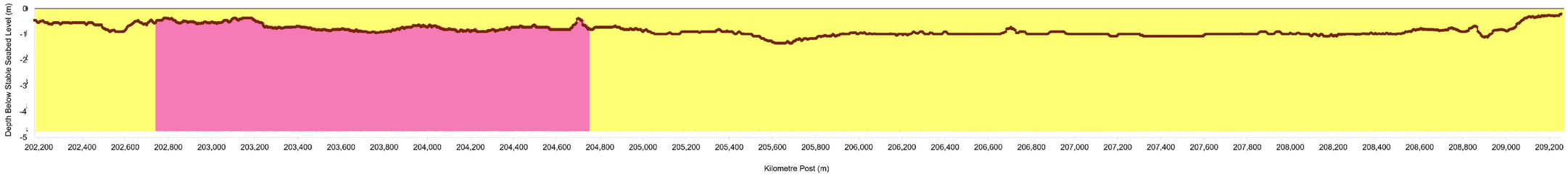
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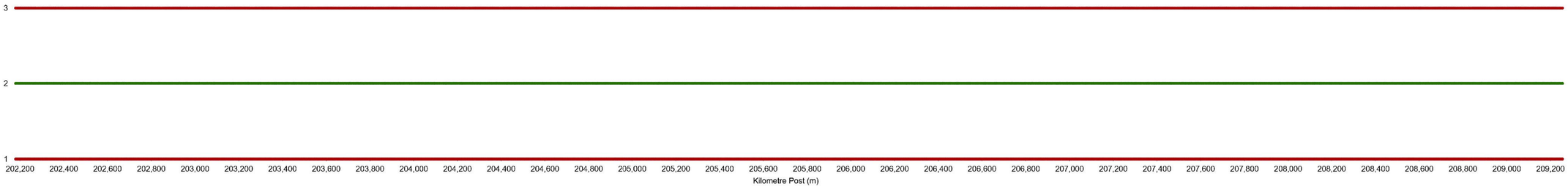
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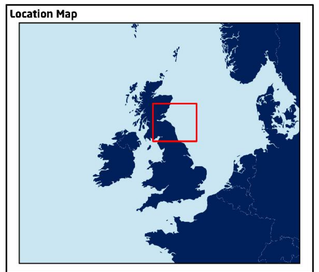
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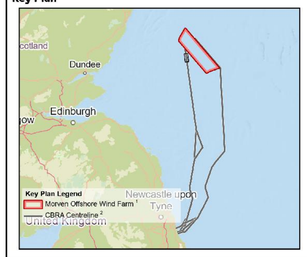
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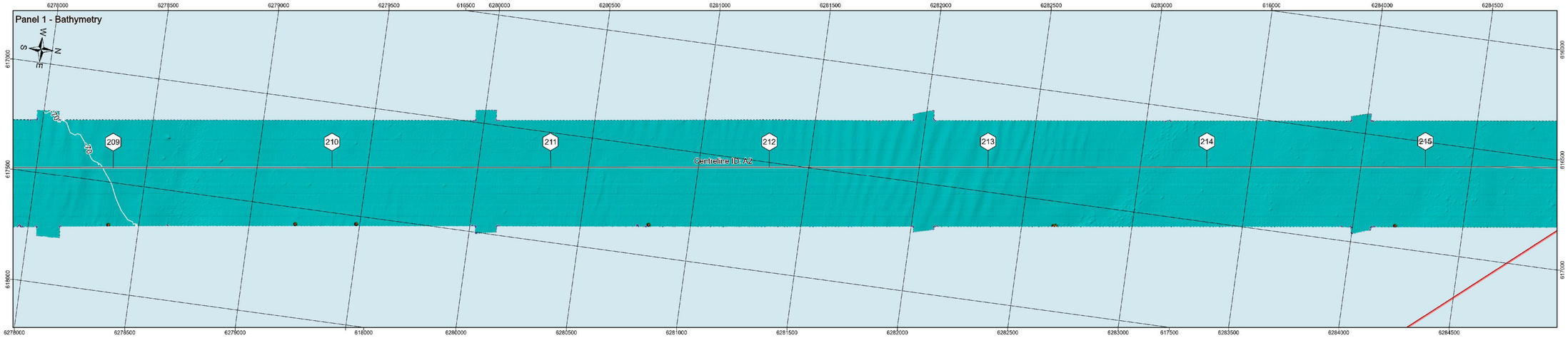
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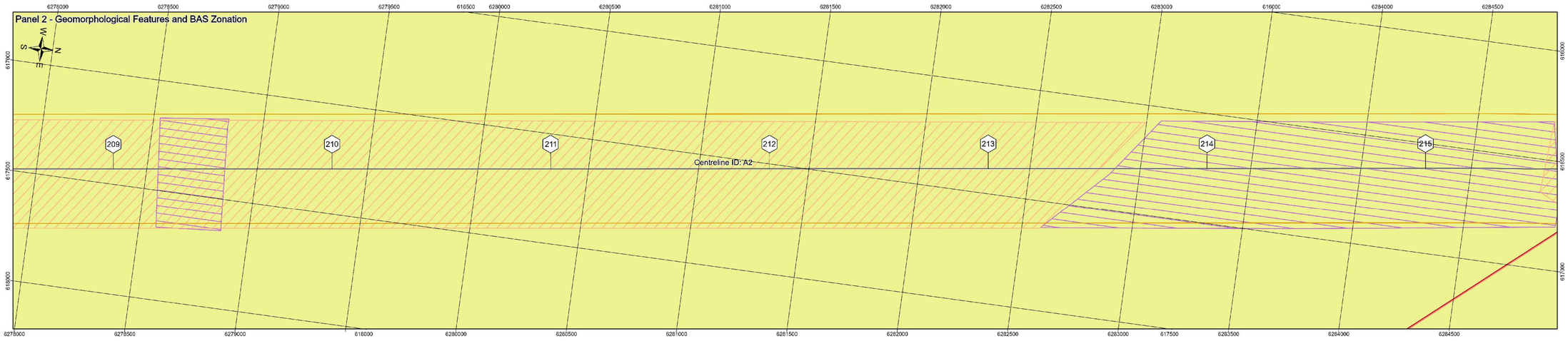
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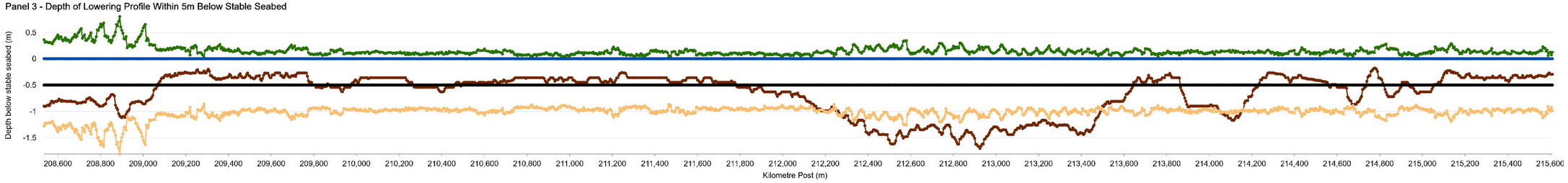
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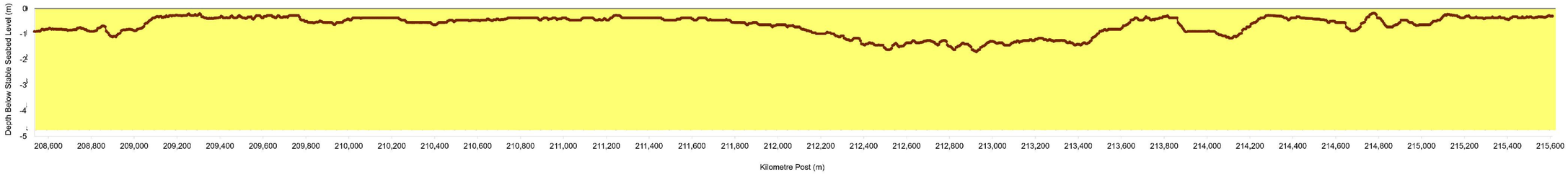
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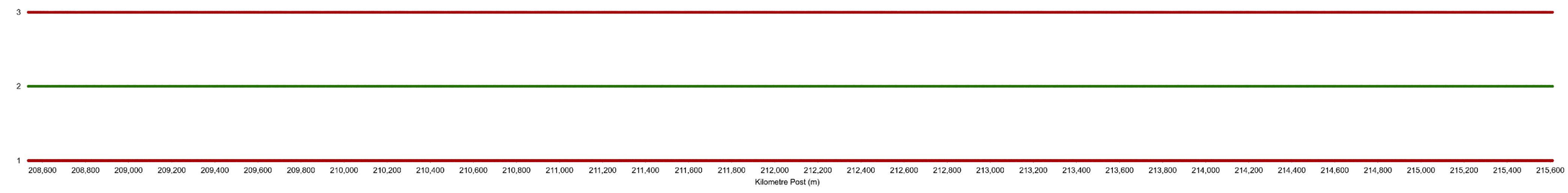
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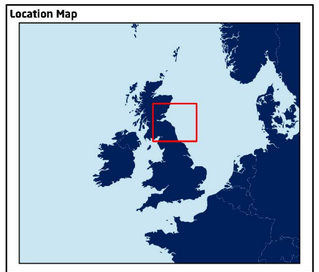
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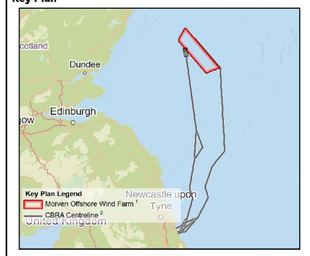
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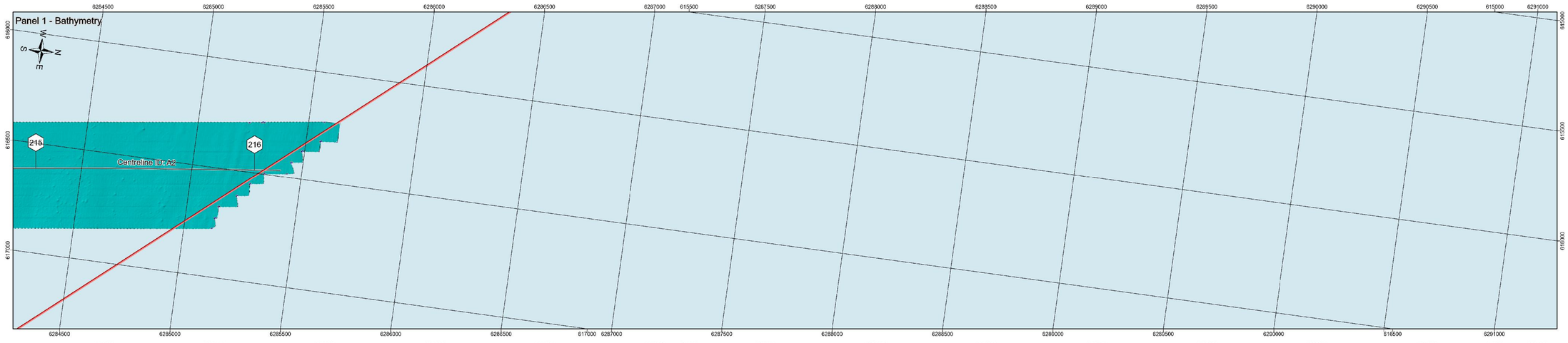
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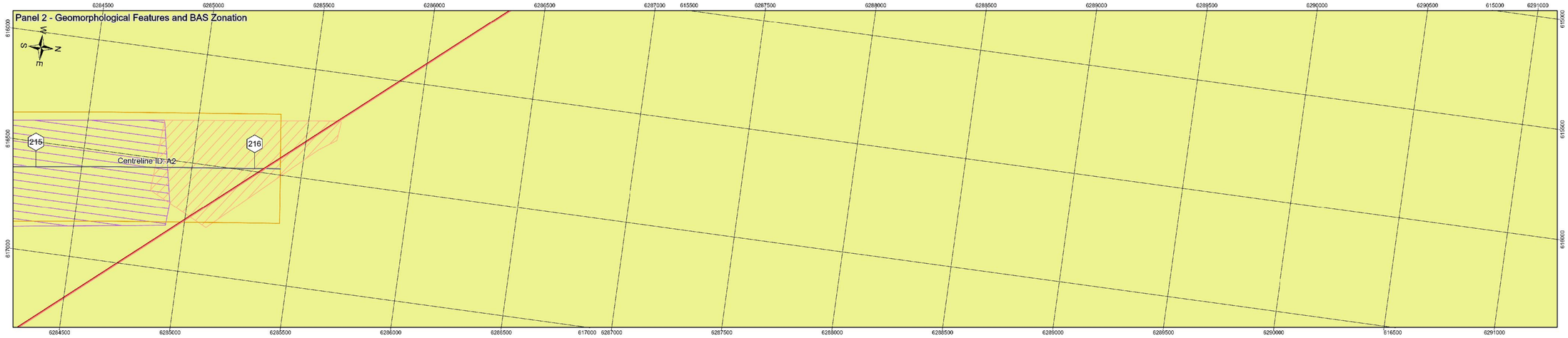
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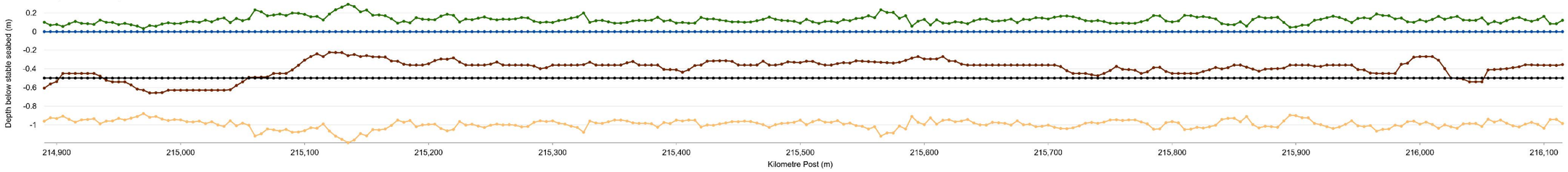
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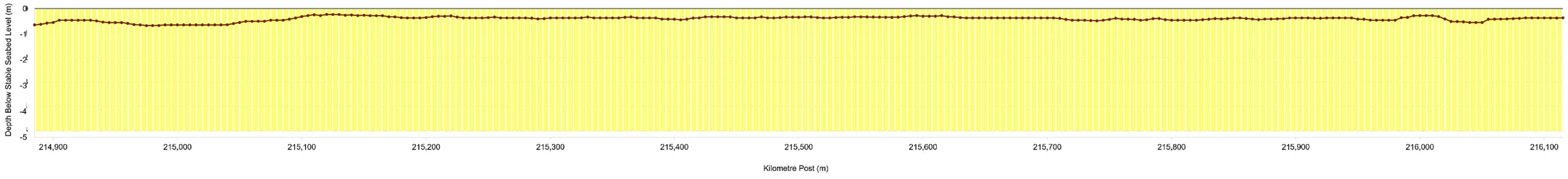
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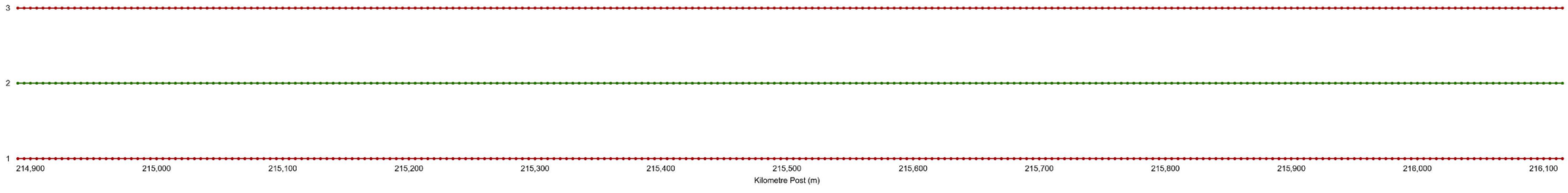
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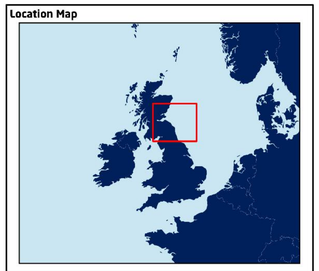
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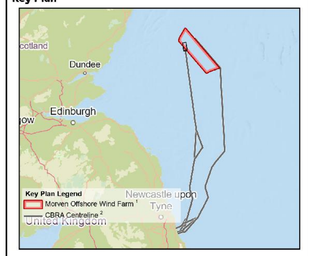
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- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]

Panel 2

BAS Zone Classification [3]
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- Sand or C1 - C3

Geomorphology [4]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [4]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
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- SEGL2 Installation Corridor [6]
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Panel 3
- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5
- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Longitude of Origin: 0.0000
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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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Project Title
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Report Title
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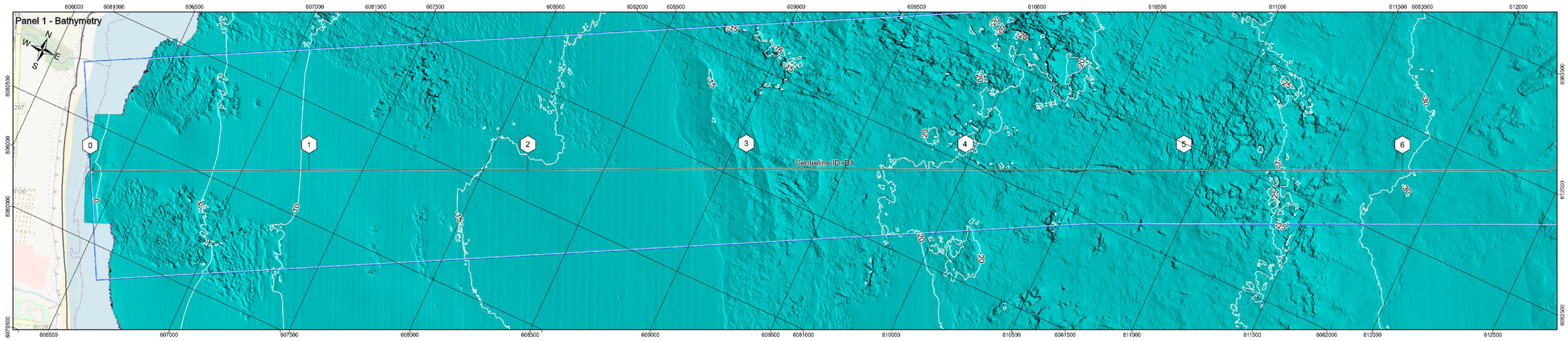
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CBRA Alignment Charts - Centreline ID: A2 - Sheet 35 of 35

Drawing Status
Issue for Review

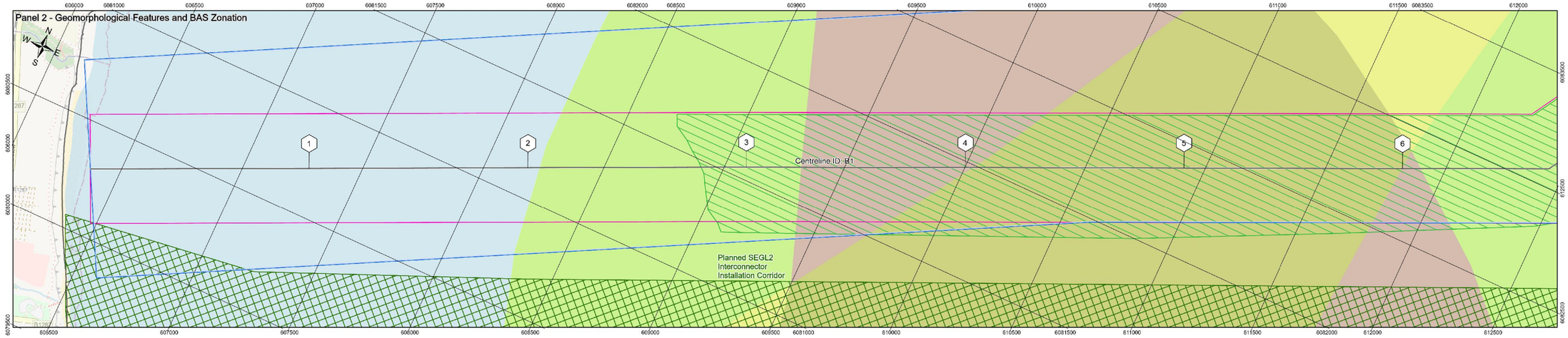
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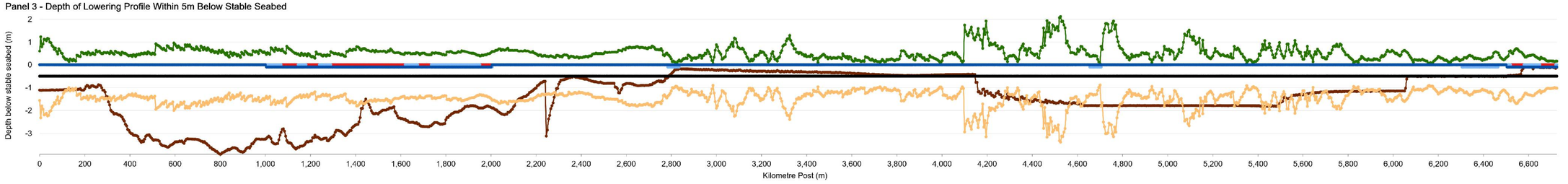
Panel 1 - Bathymetry



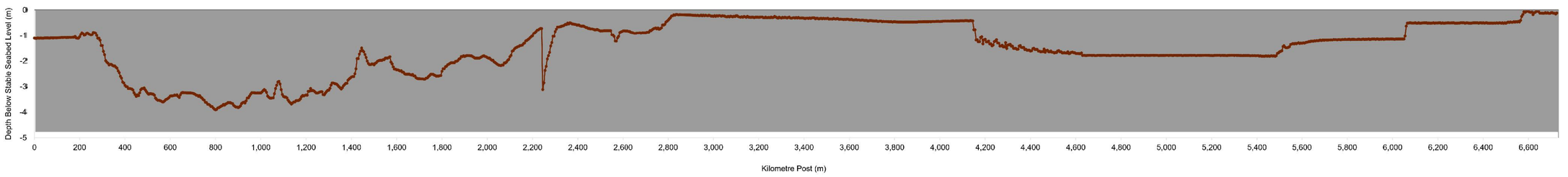
Panel 2 - Geomorphological Features and BAS Zonation



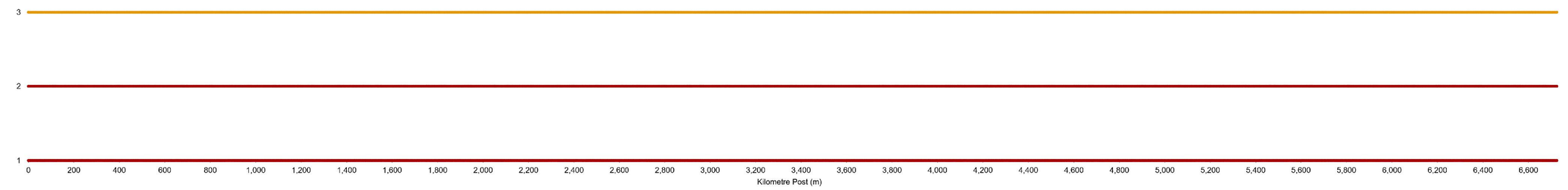
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



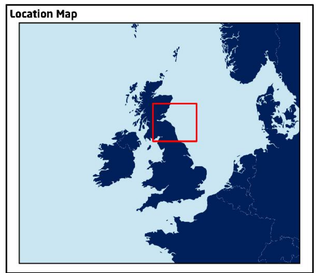
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



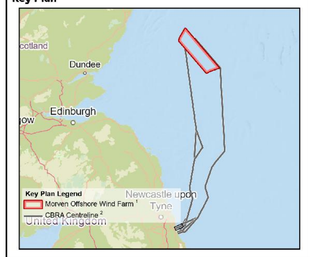
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	

- Layer 1/Layer 2 Boundary [9]

Panel 5

- Suitable [3]
- Possible [3]
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

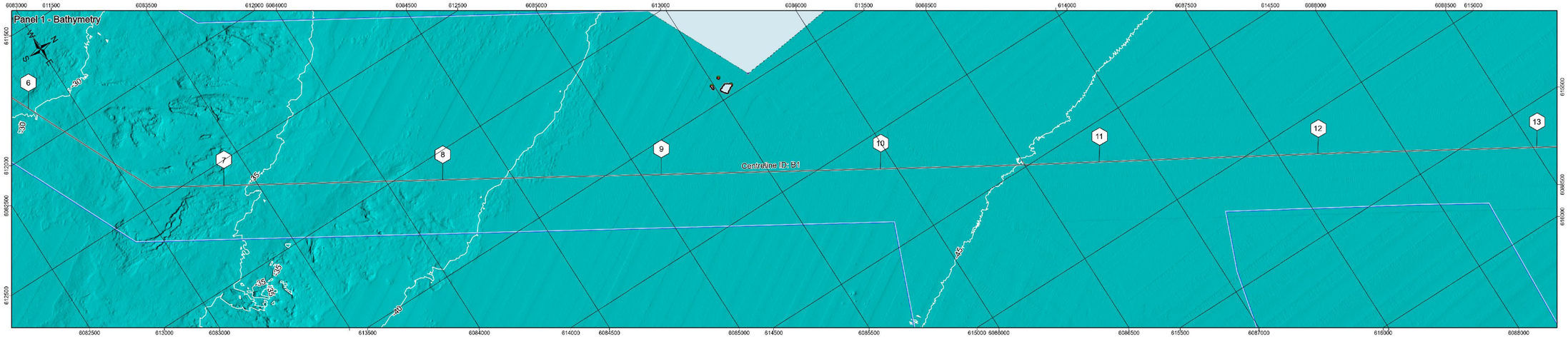
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 1 of 36

Drawing Status
Issue for Review

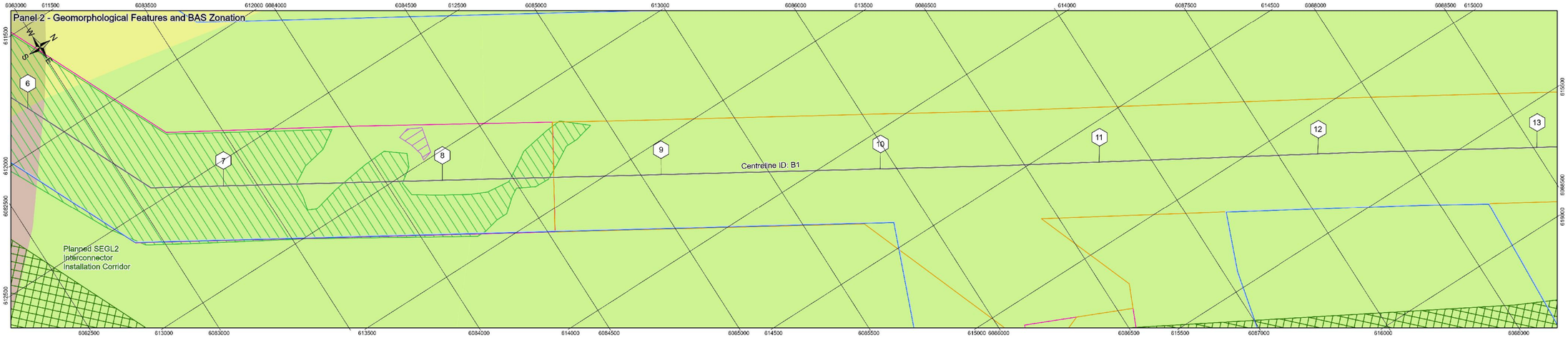
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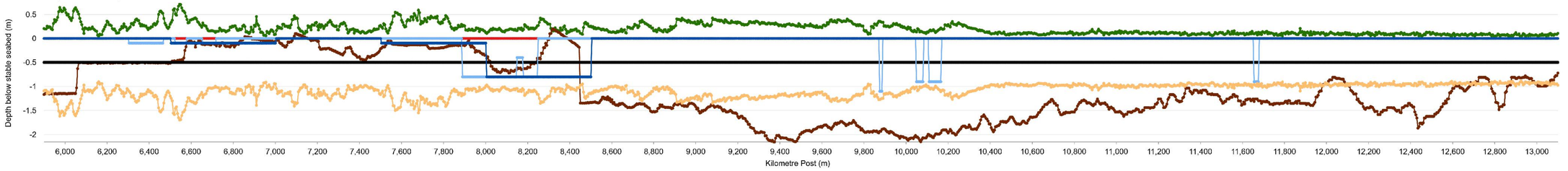
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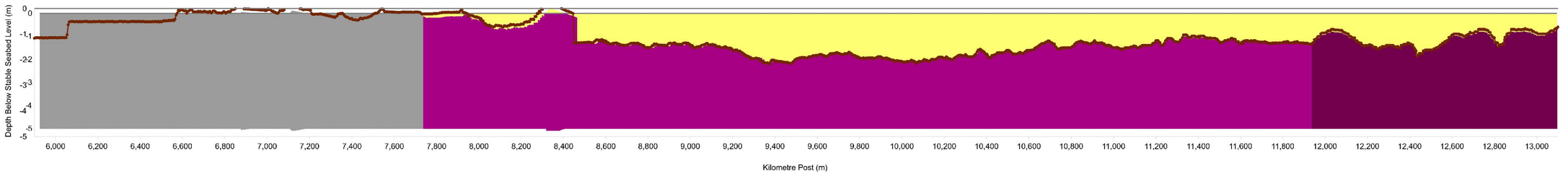
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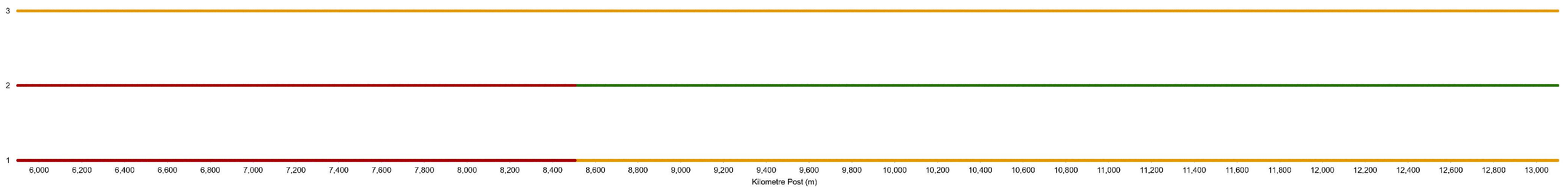
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



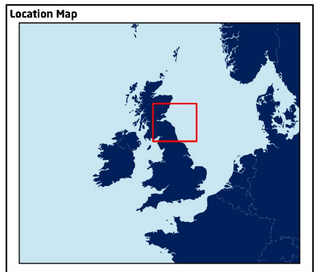
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



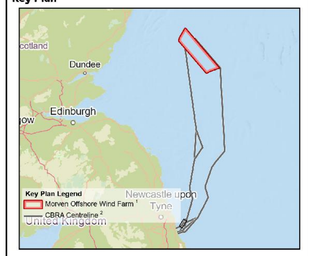
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [4]
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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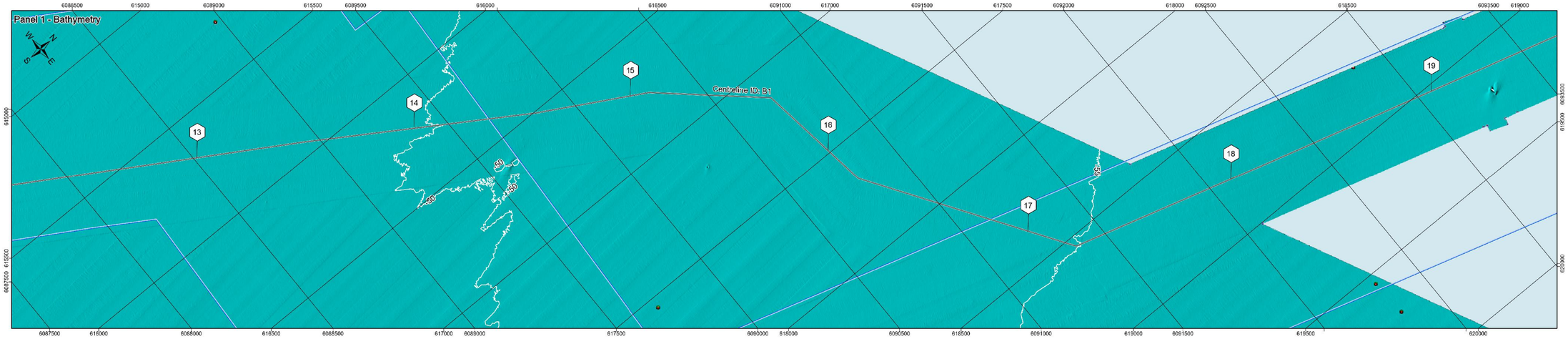
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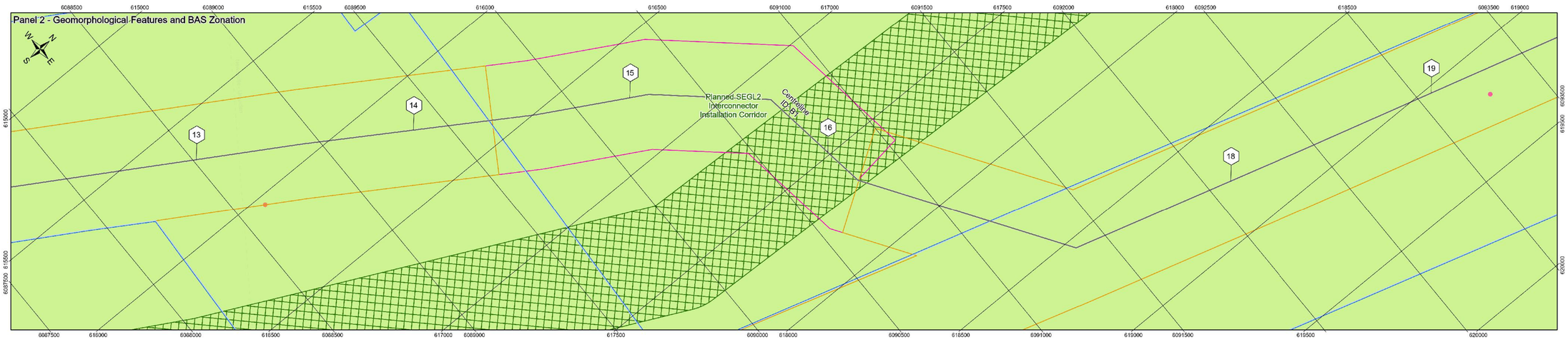
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 2 of 36

Drawing Status
Issue for Review

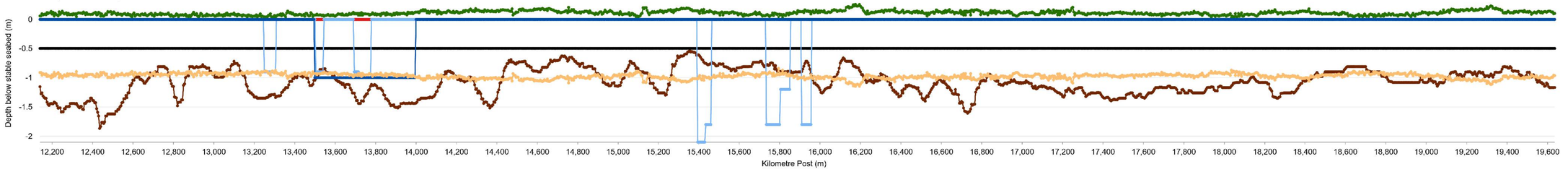
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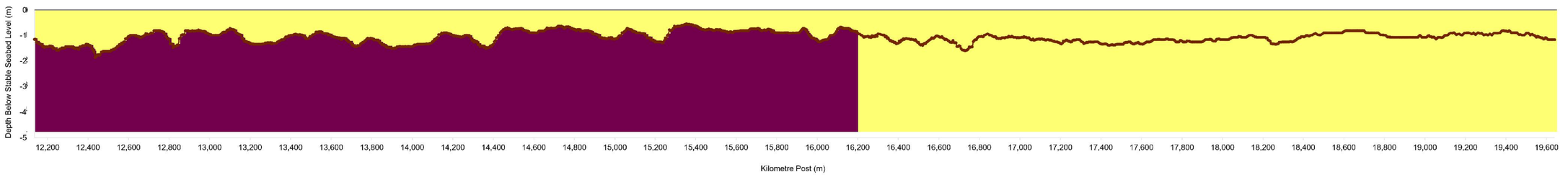




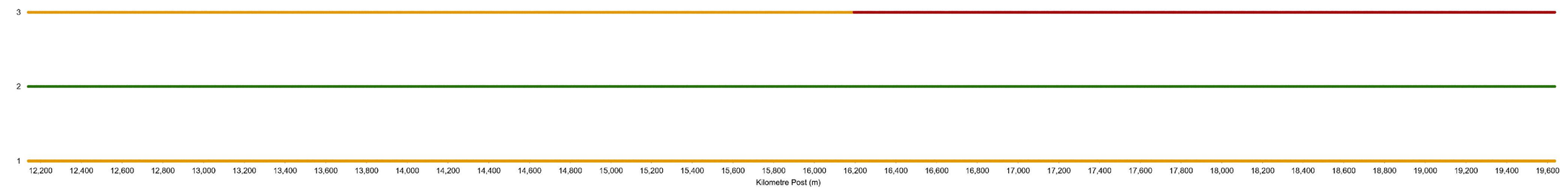
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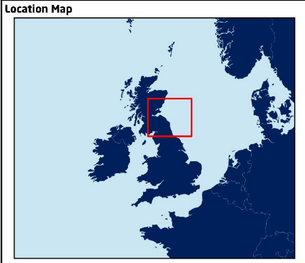
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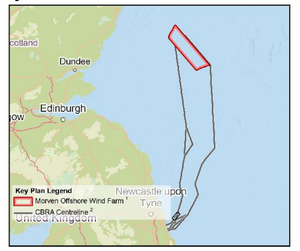
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

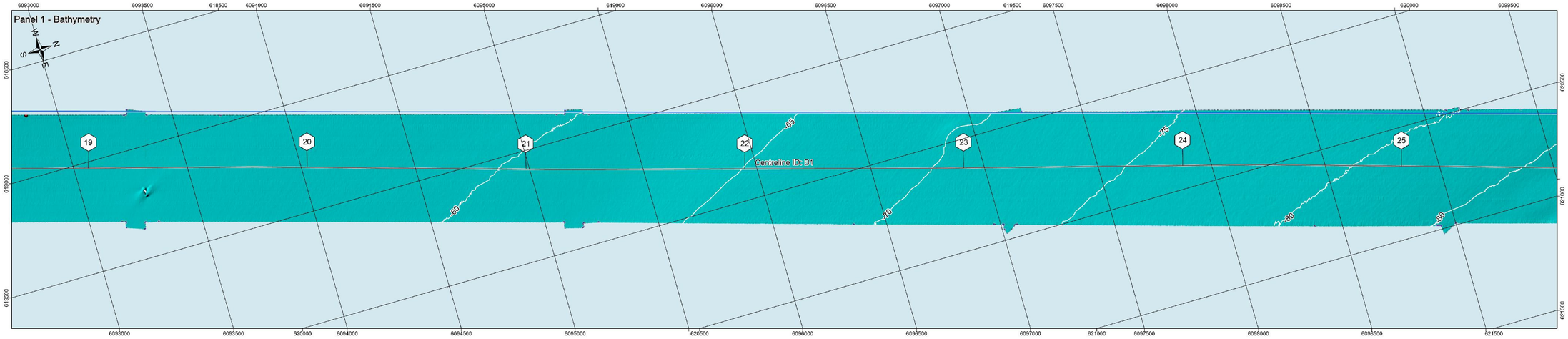
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Morven Offshore Wind Farm Cable Burial Risk Assessment

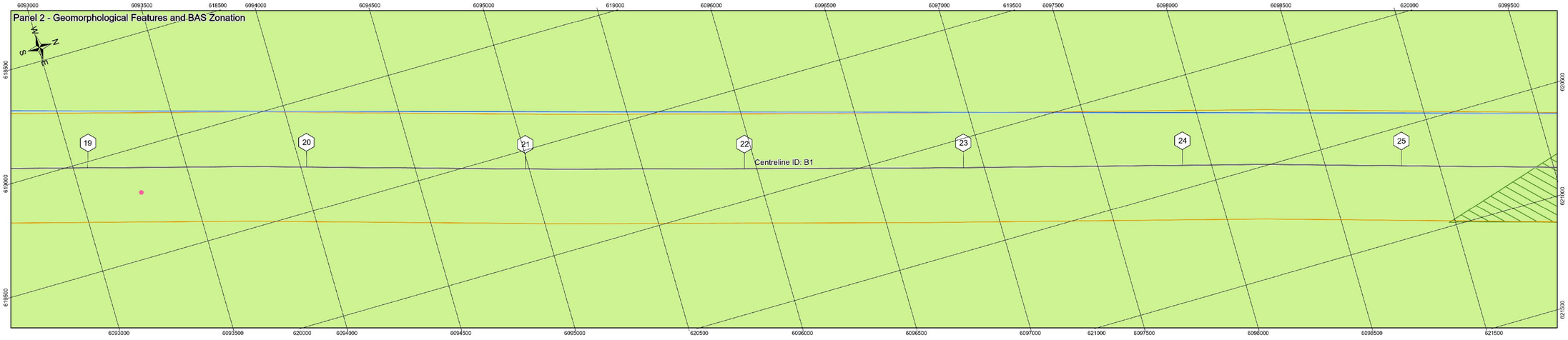
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 3 of 36

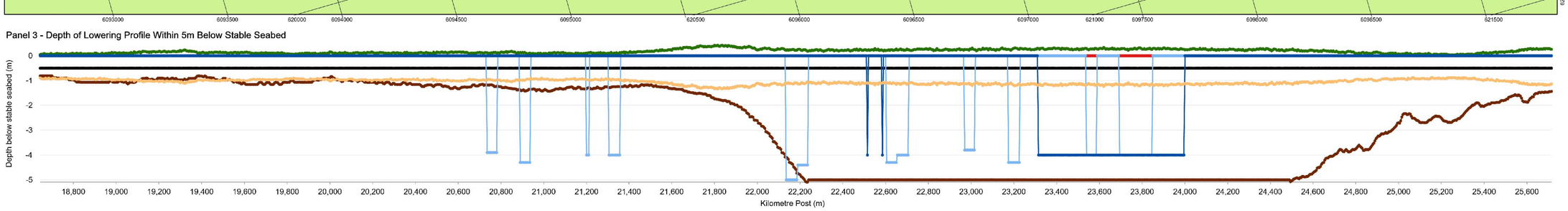
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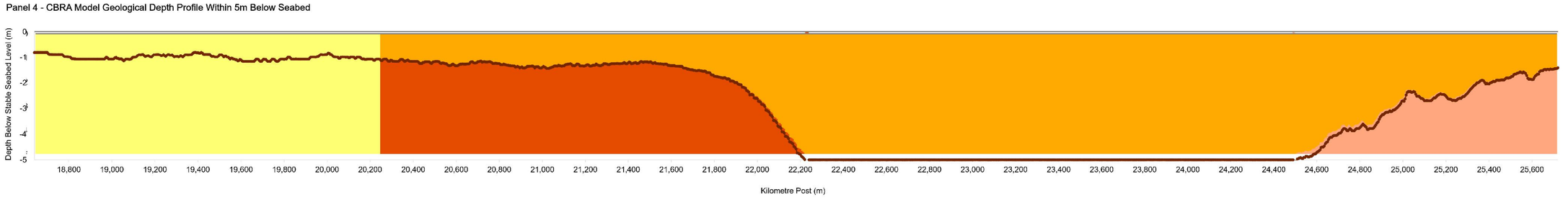
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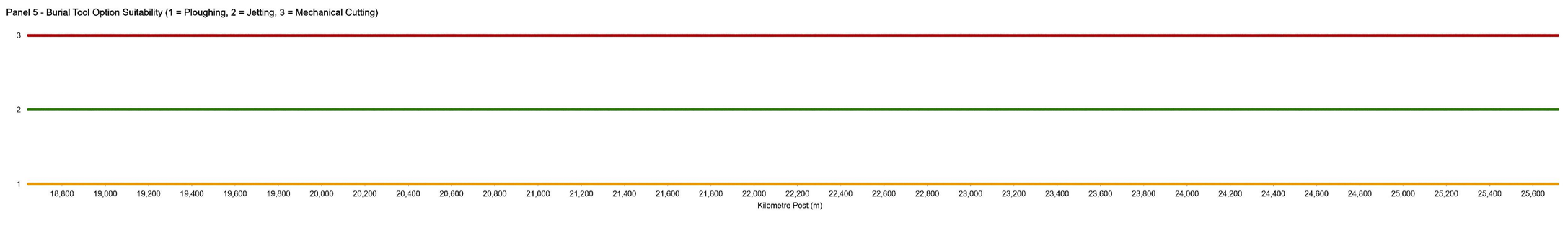
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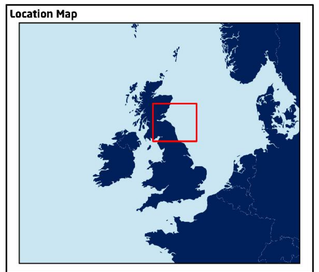




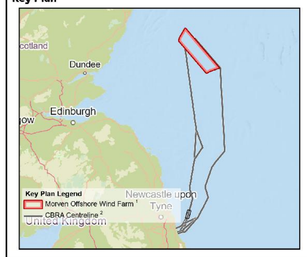




Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Depression with boulder/debris
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
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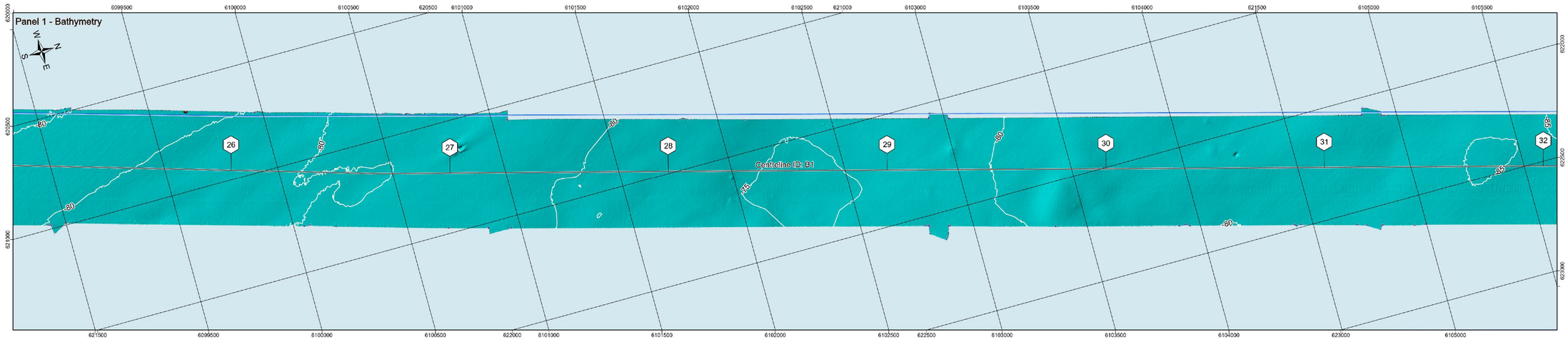
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 4 of 36

Drawing Status
Issue for Review

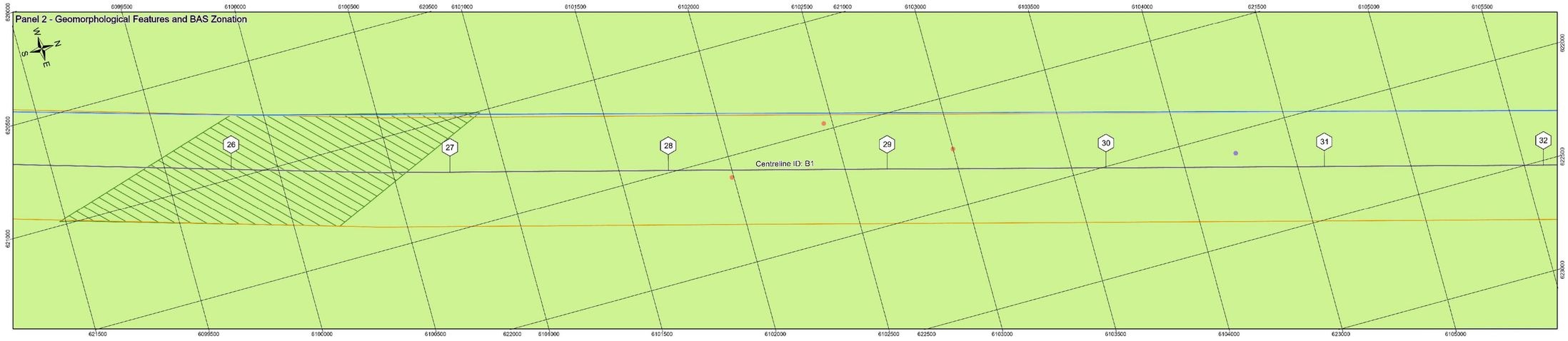
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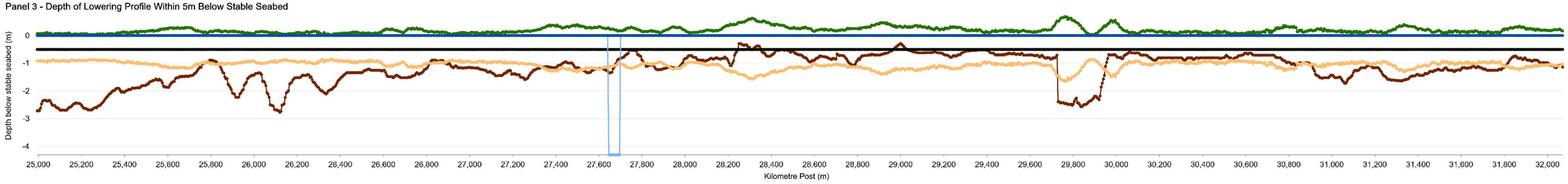
Panel 1 - Bathymetry



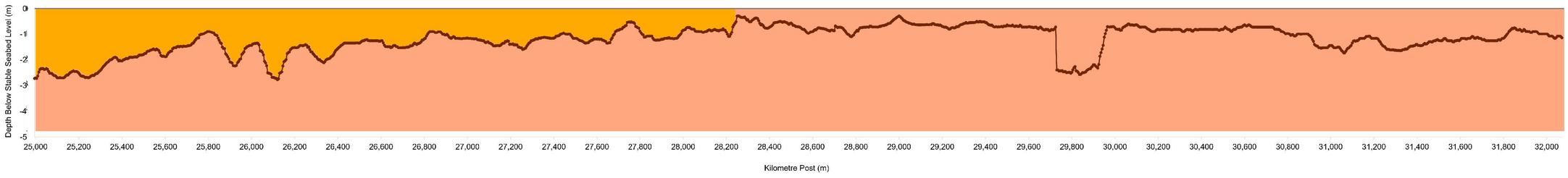
Panel 2 - Geomorphological Features and BAS Zonation



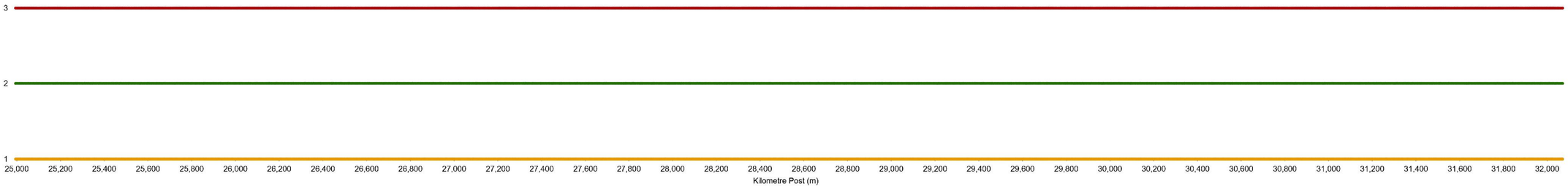
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



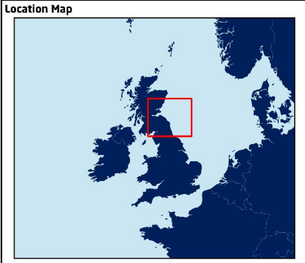
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



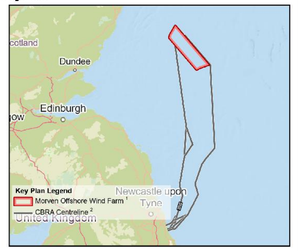
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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Vertical Reference: Lowest Astronomical Tide (LAT)

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Morven Offshore Wind Farm

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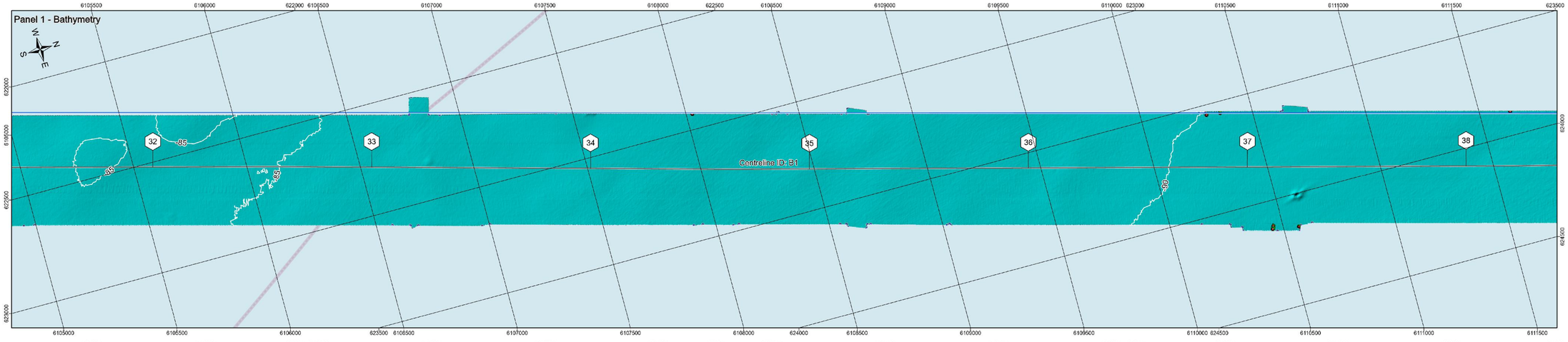
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Drawing Status
Issue for Review

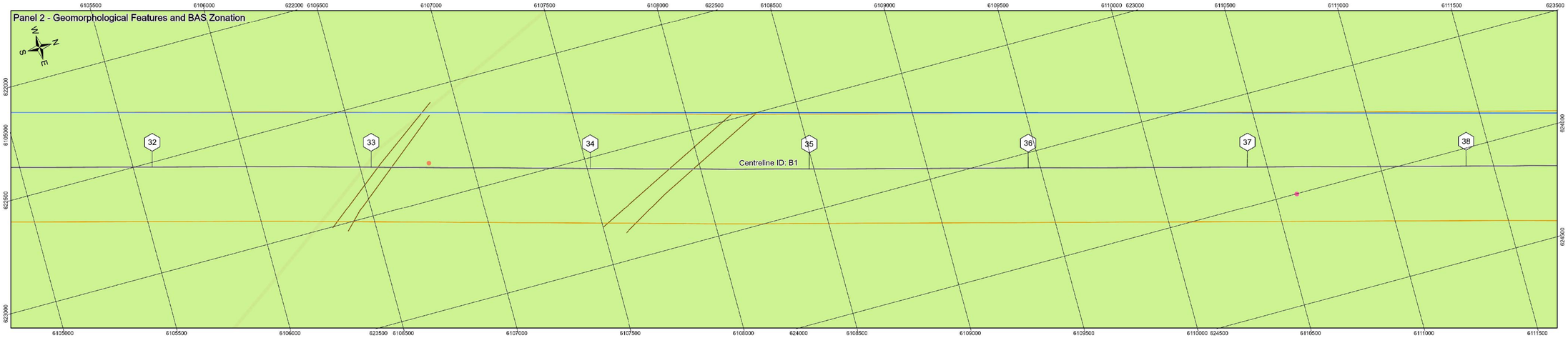
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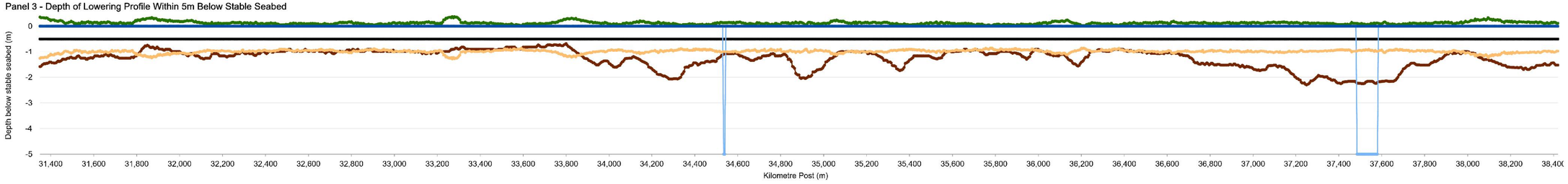
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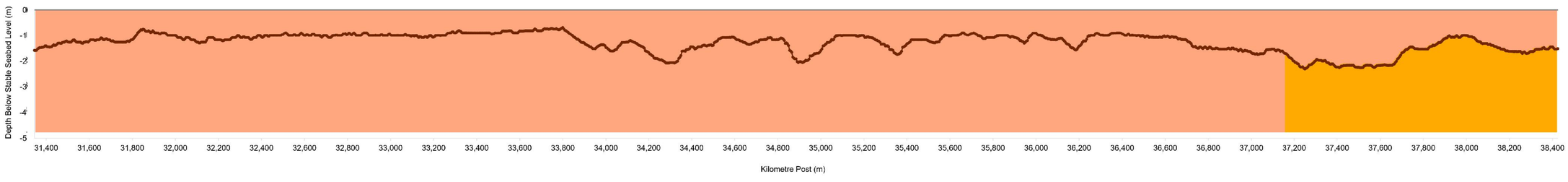
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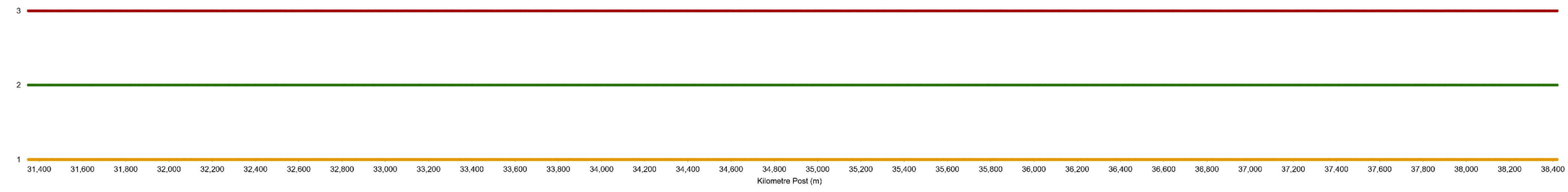
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



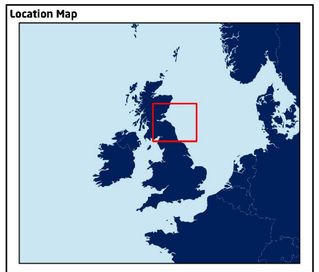
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



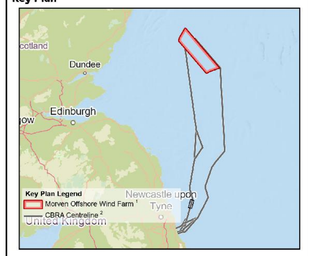
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Rock (R)	
Layer 1/Layer 2 Boundary [8]	

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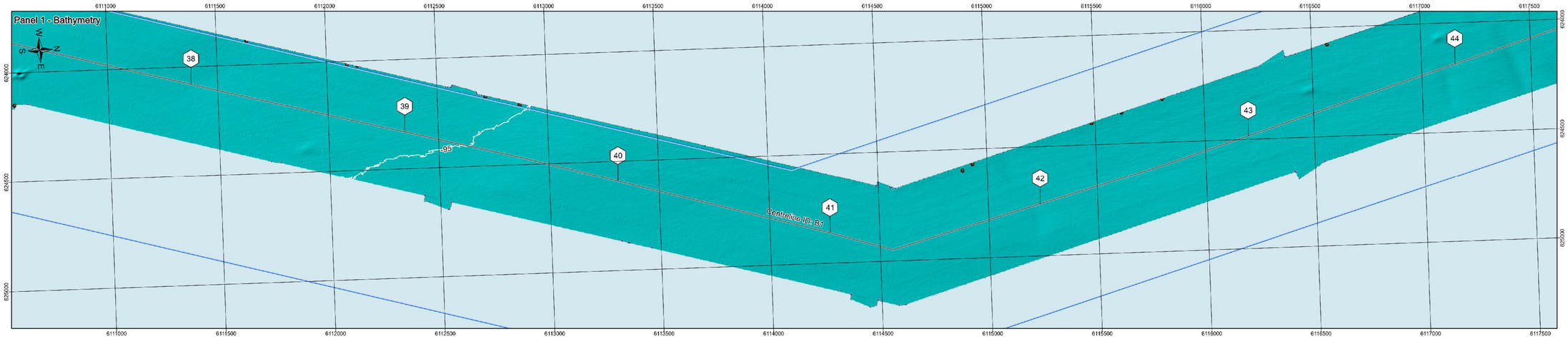
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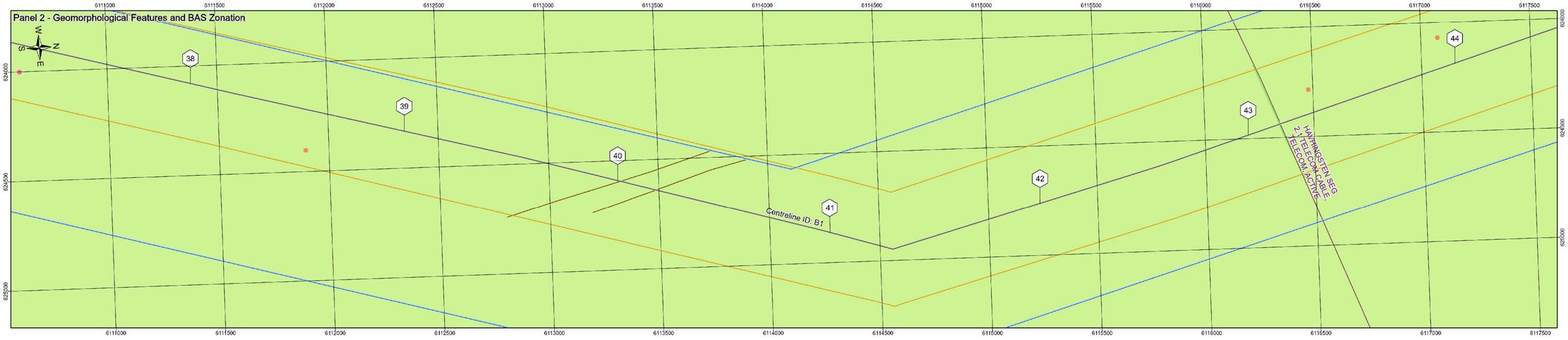
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 6 of 36

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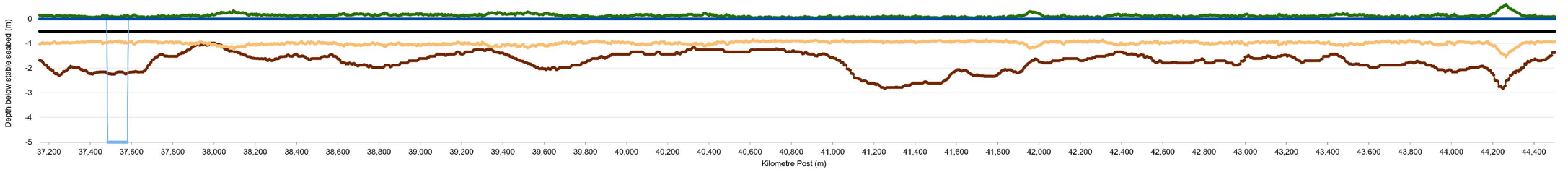
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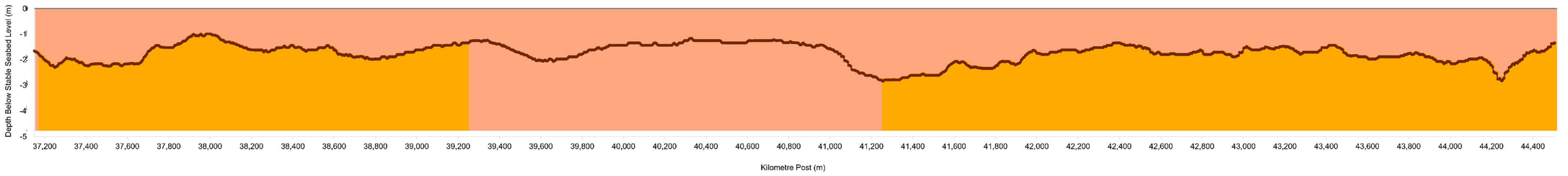




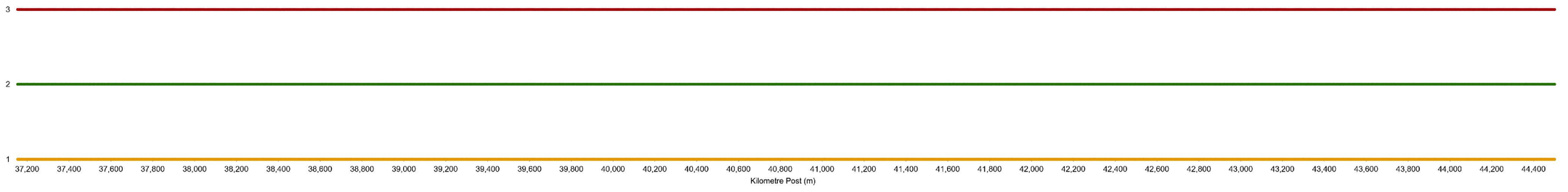
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



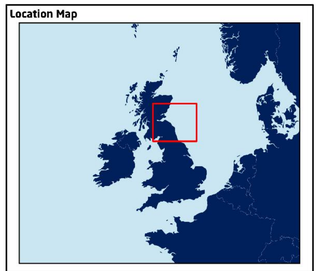
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



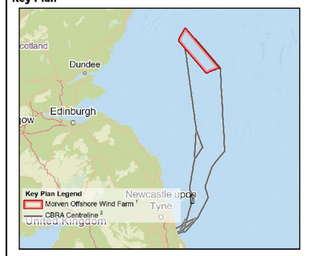
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Travel mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
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Panel 3

- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [9]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

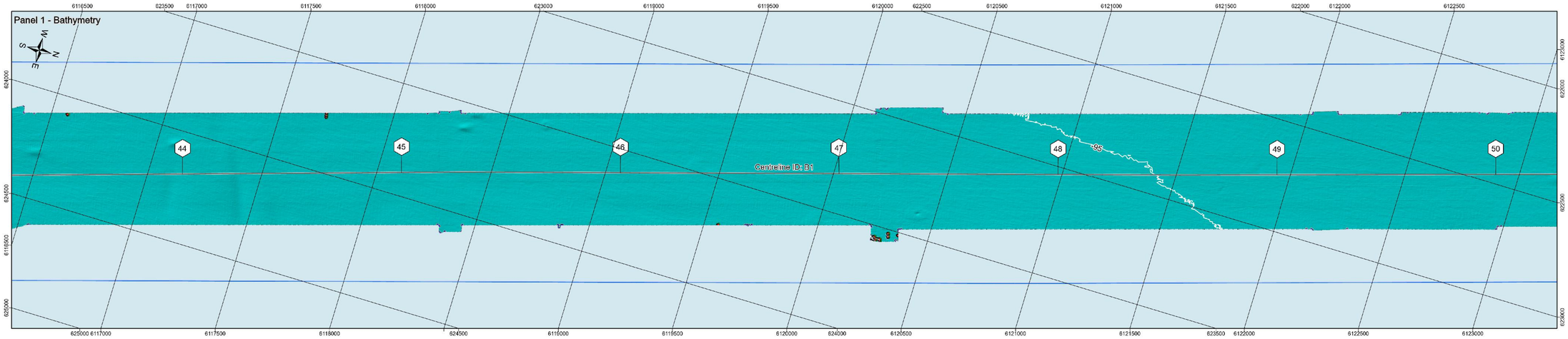
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

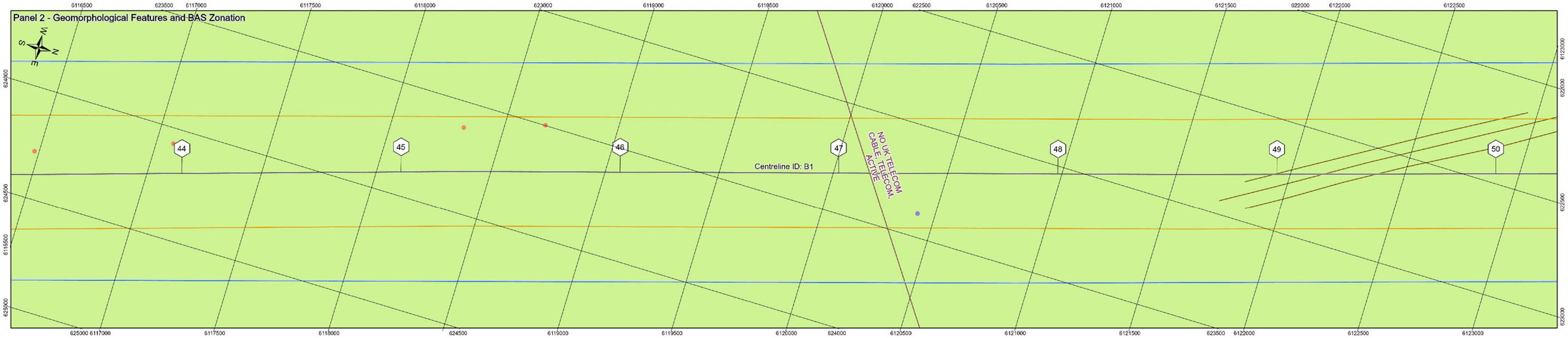
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 7 of 36

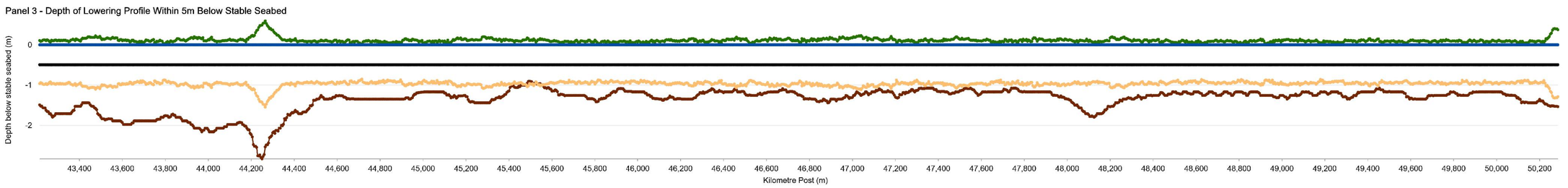
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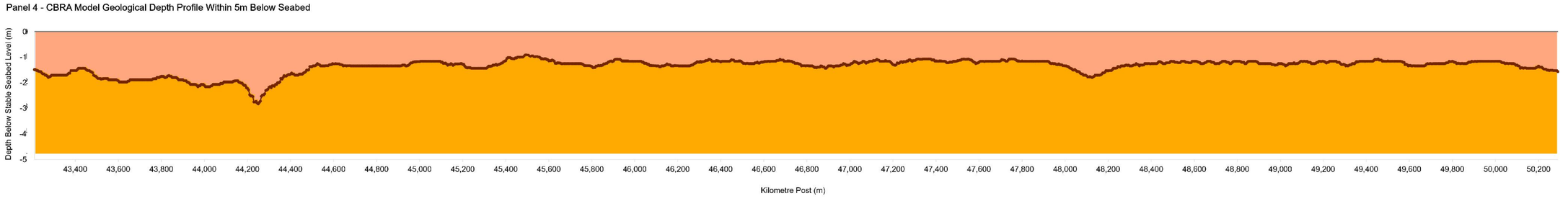
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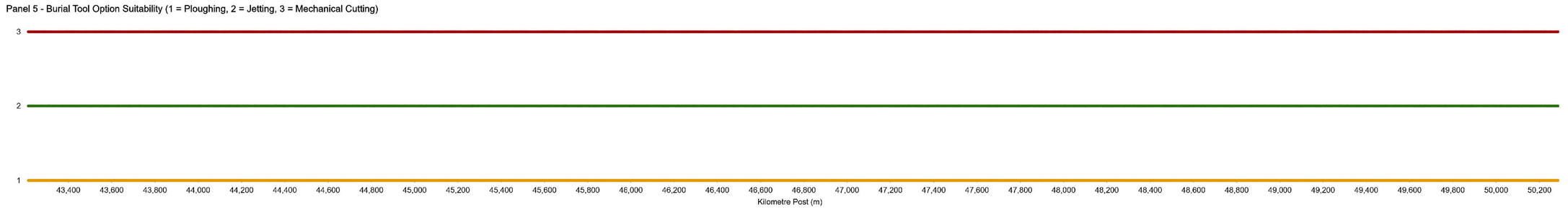
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind



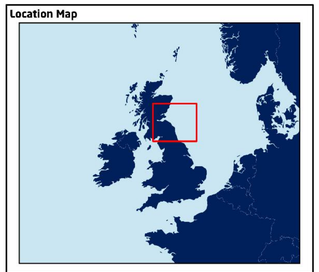




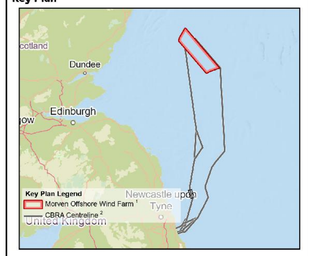




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Legend

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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Longitude of Center: 0.0000
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Azimuth: 0.0000
Map Units: Meter

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Morven Offshore Wind Farm

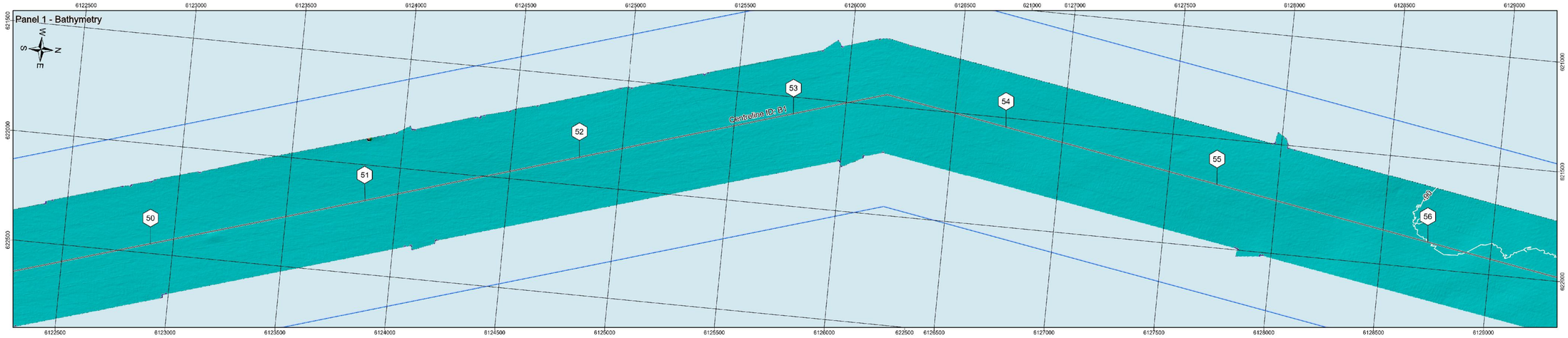
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

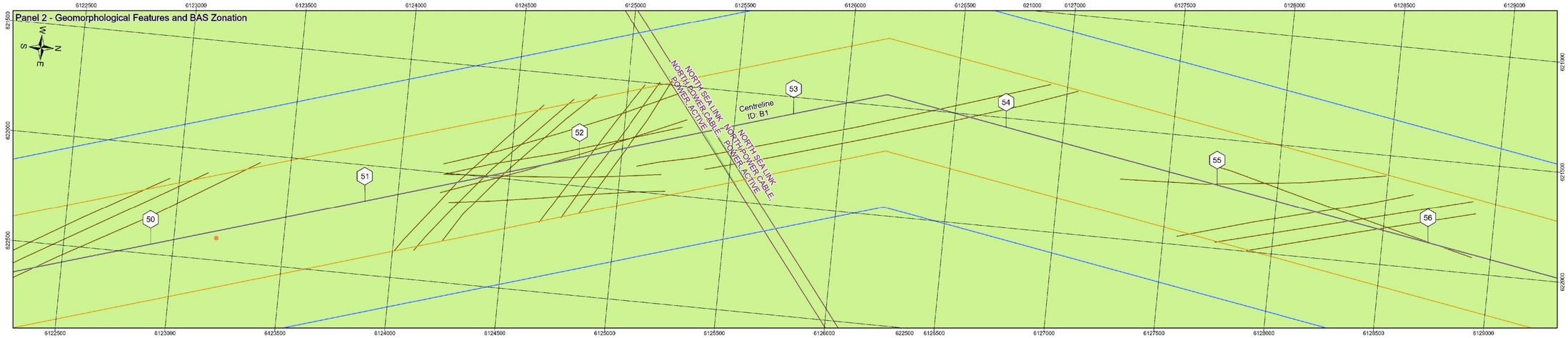
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 8 of 36

Drawing Status
Issue for Review

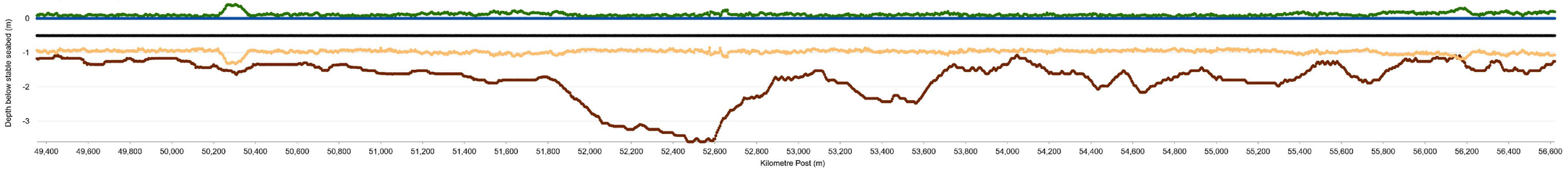
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GLOBAL MARITIME — EnBW — bp
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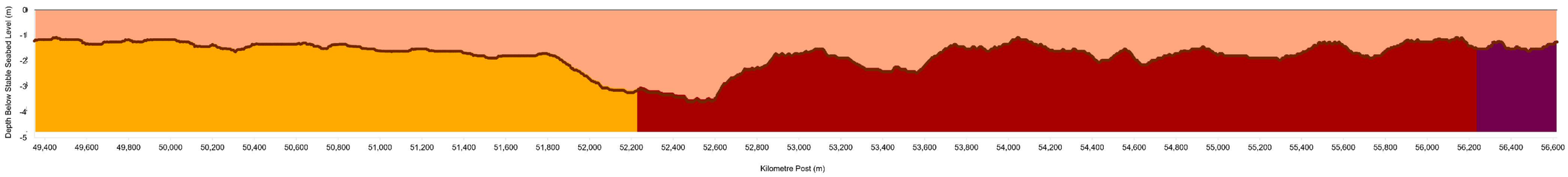




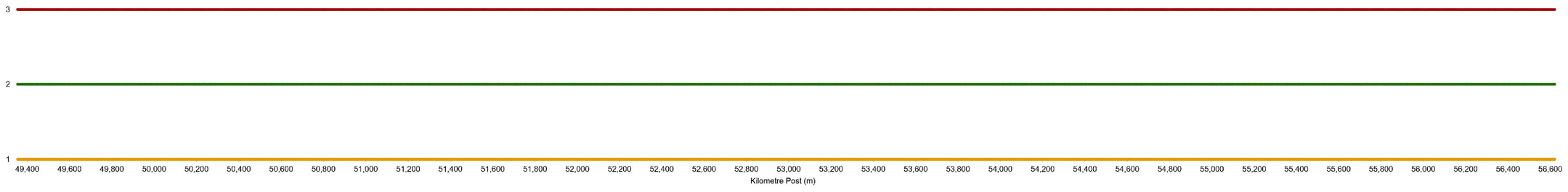
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



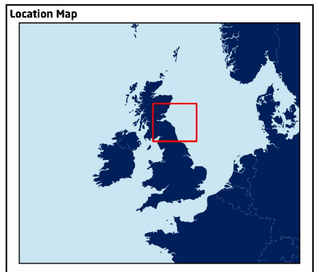
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



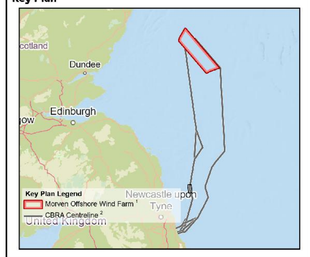
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
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Revision Status

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Project Title
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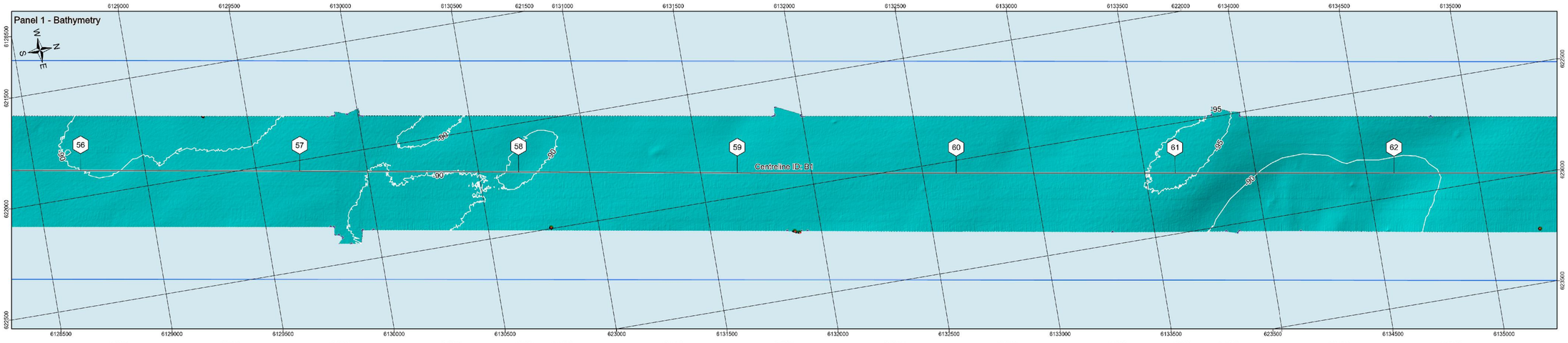
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

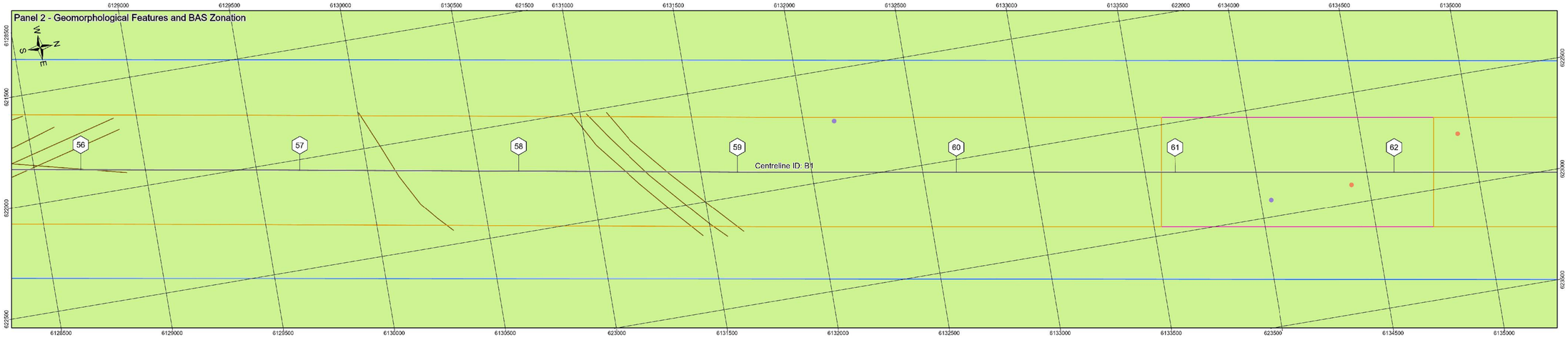
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 9 of 36

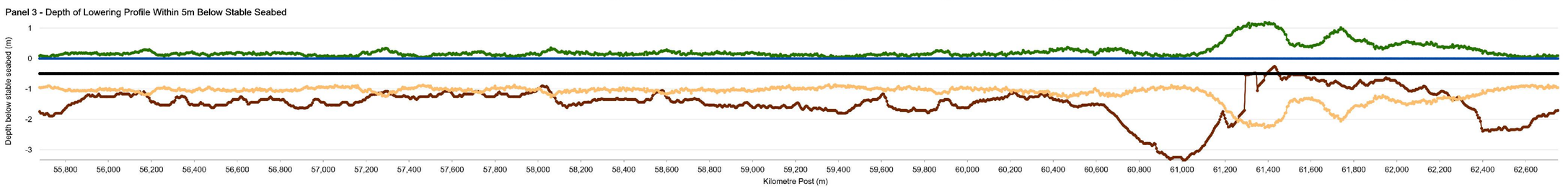
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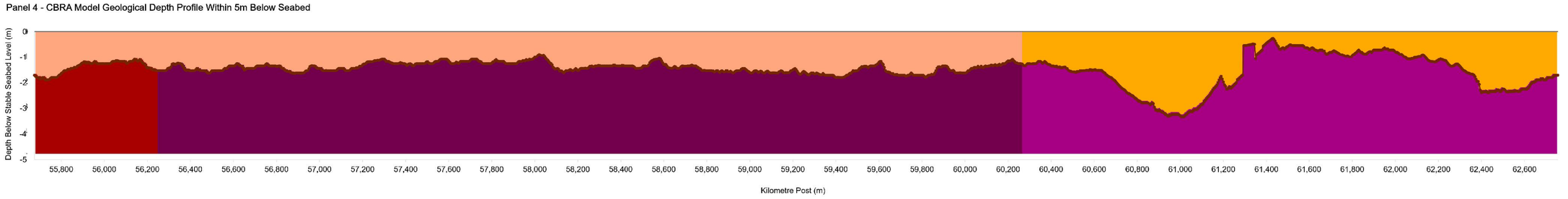
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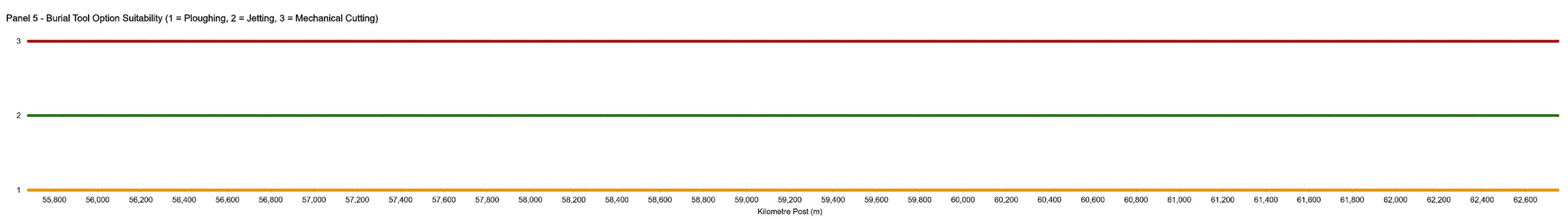
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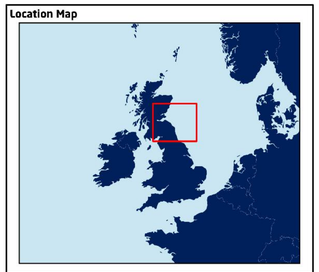




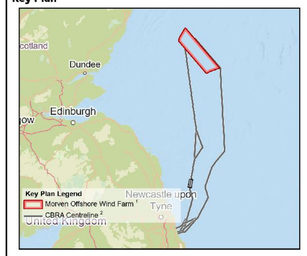




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- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

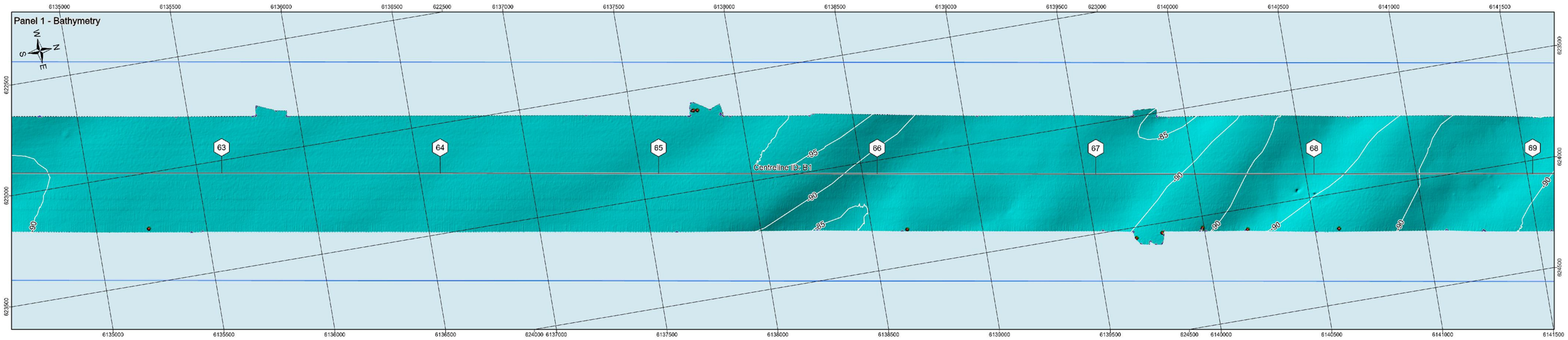
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 10 of 36

Drawing Status
Issue for Review

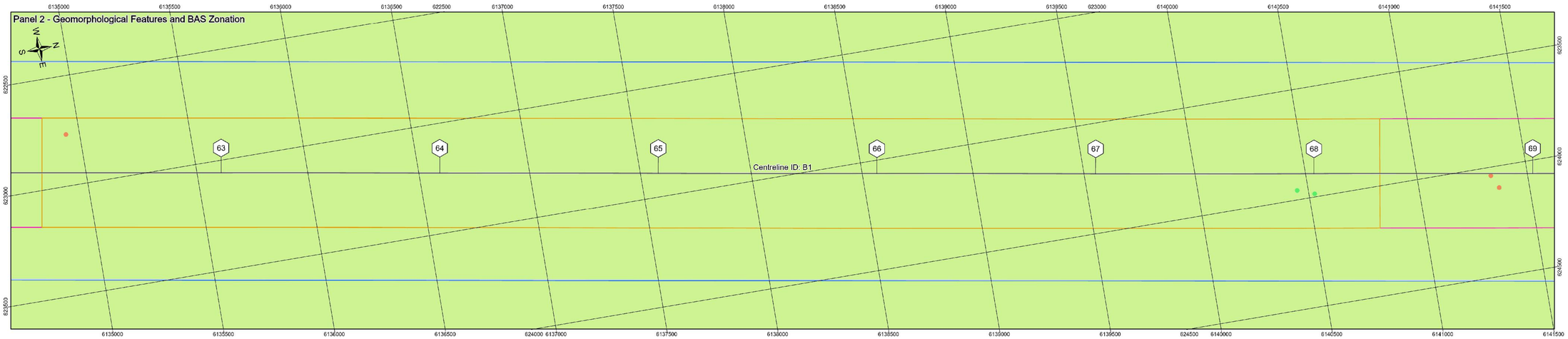
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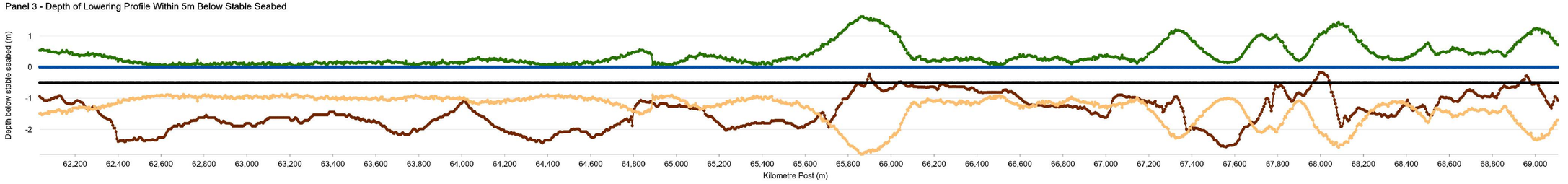
Panel 1 - Bathymetry



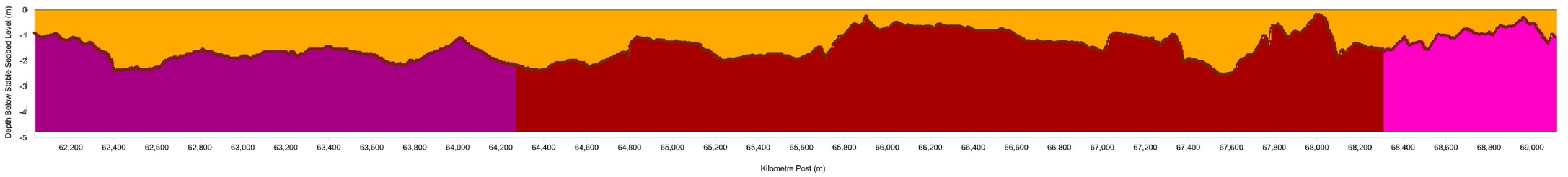
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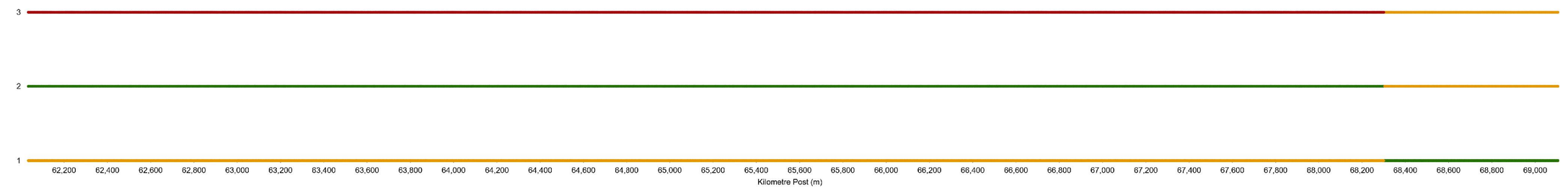
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



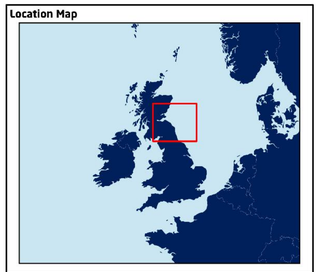
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



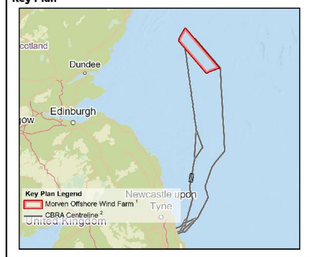
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Kilometre Post (1km Interval) [2]
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BAS Zone Classification [3]
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- Boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

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- Extremely Low Strength CLAY (C1c)
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
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Panel 5

- Suitable [3]
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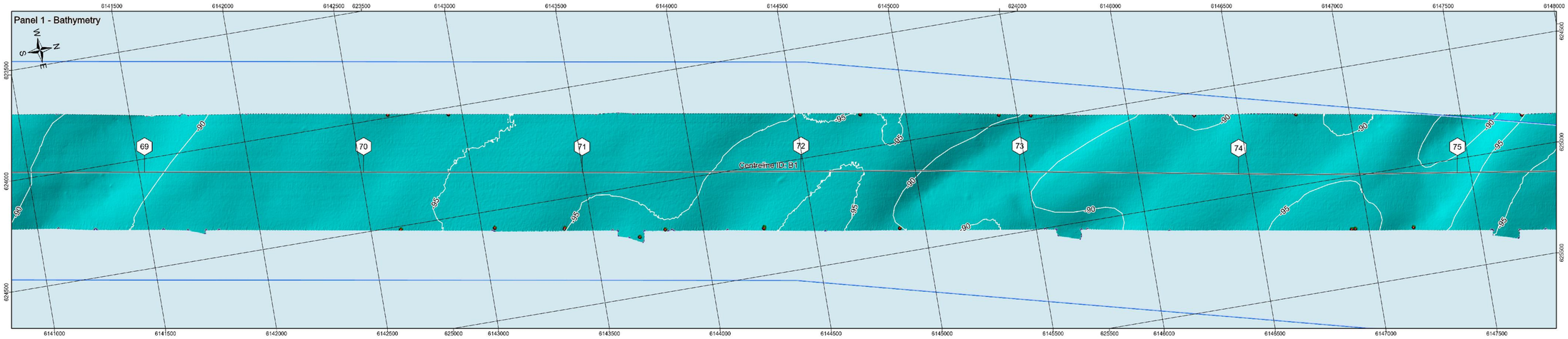
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

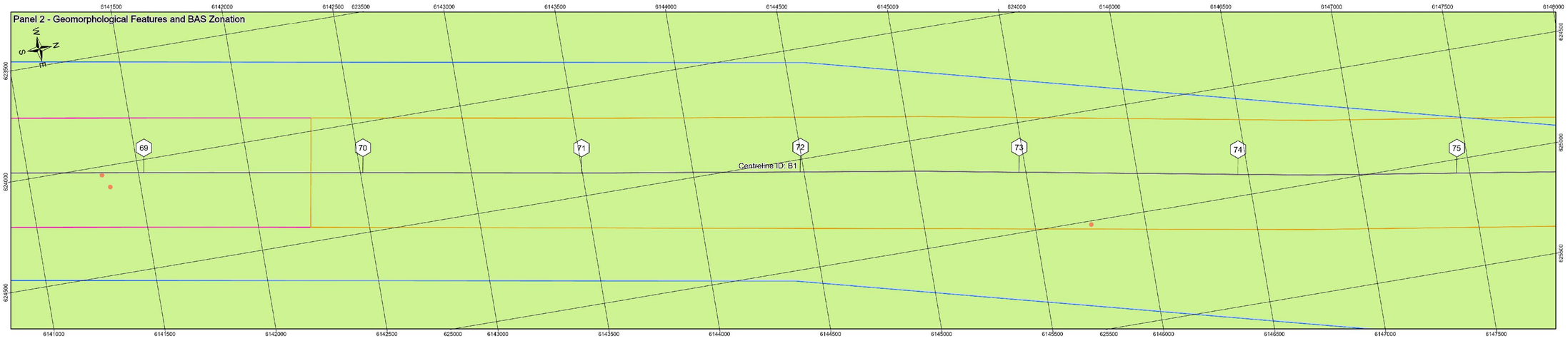
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 11 of 36

Drawing Status
Issue for Review

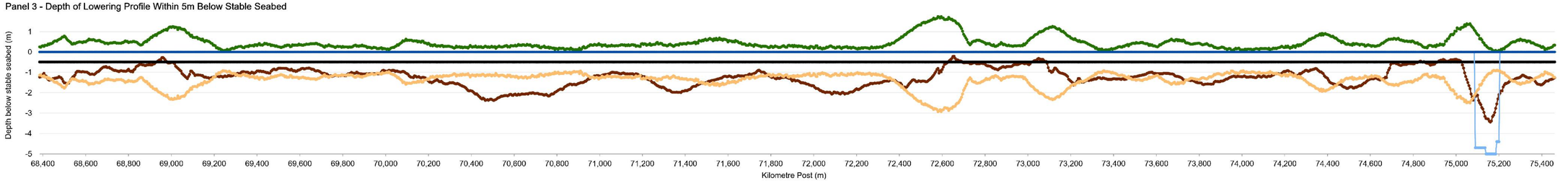
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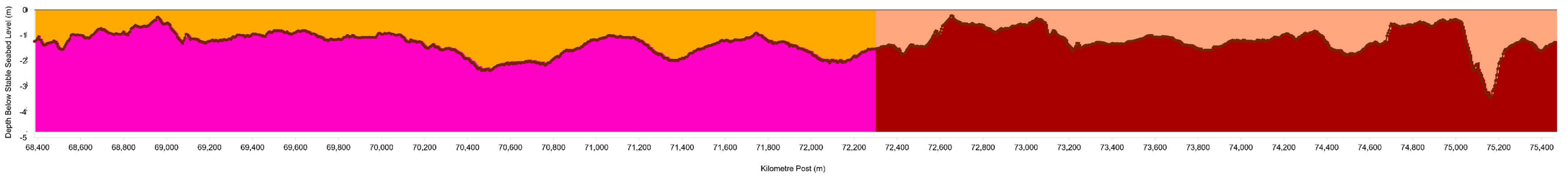




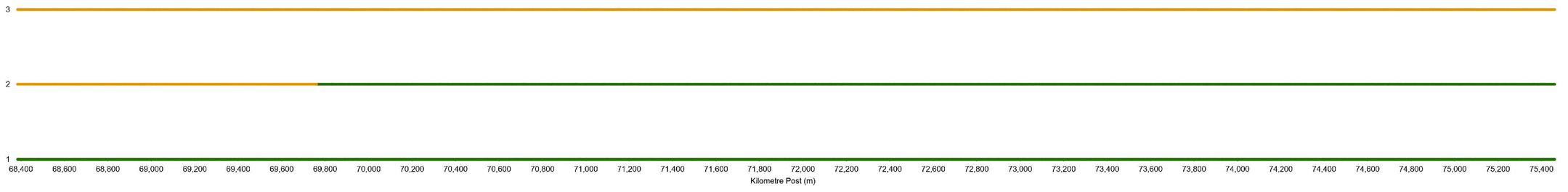
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



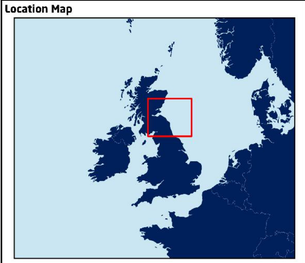
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



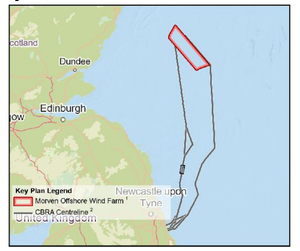
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Revision Status

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Scale @ A1: 1:10,000
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Morven Offshore Wind Farm Cable Burial Risk Assessment

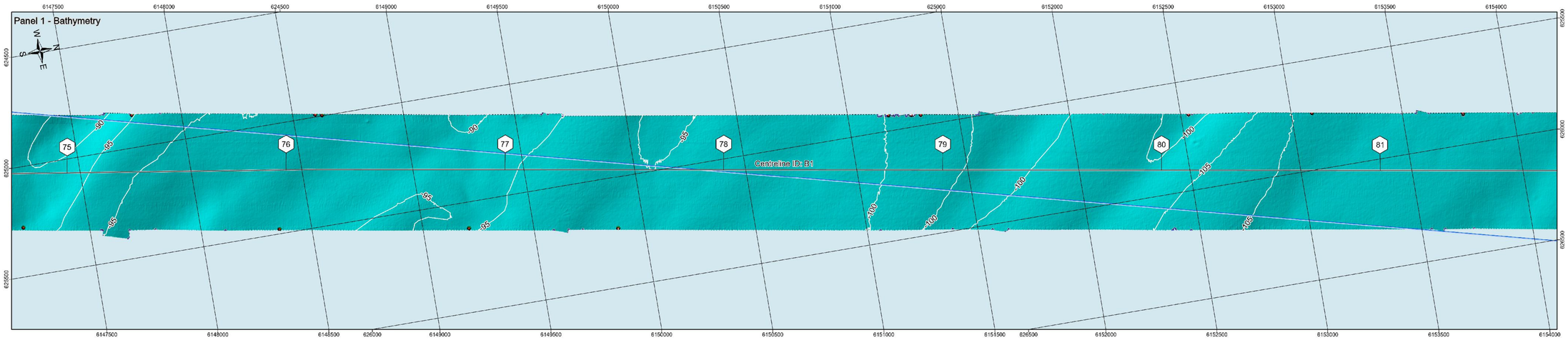
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 12 of 36

Drawing Status
Issue for Review

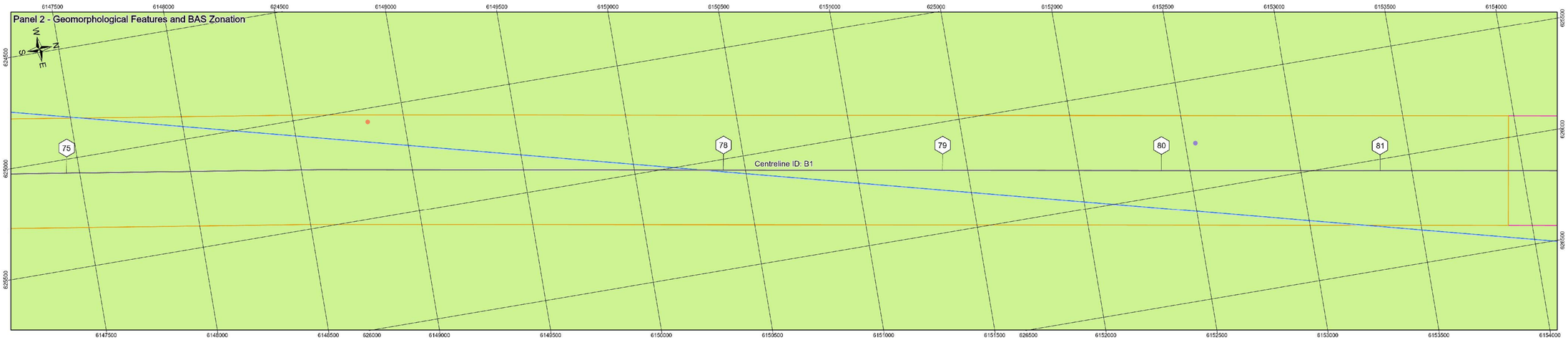
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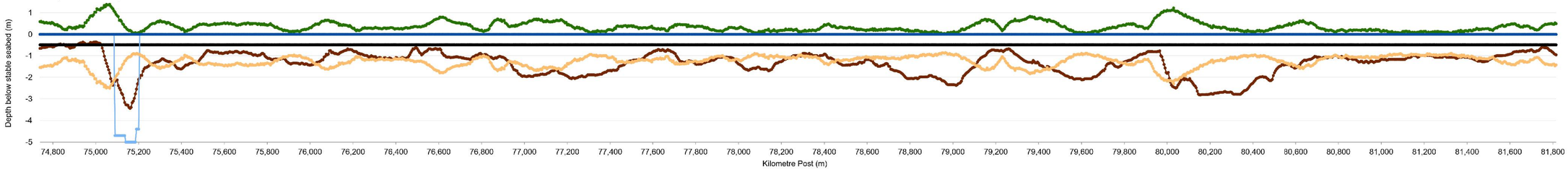
Panel 1 - Bathymetry



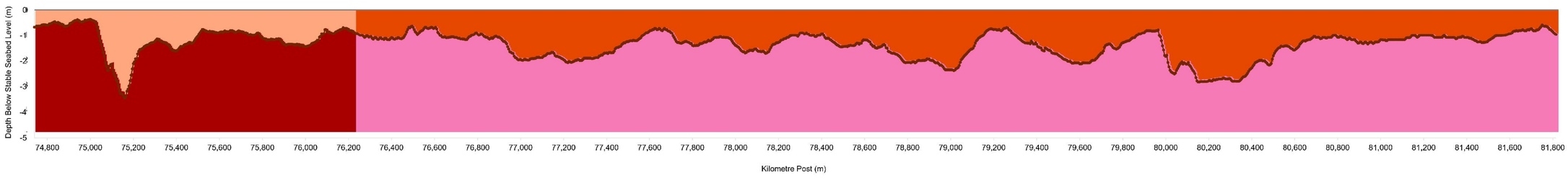
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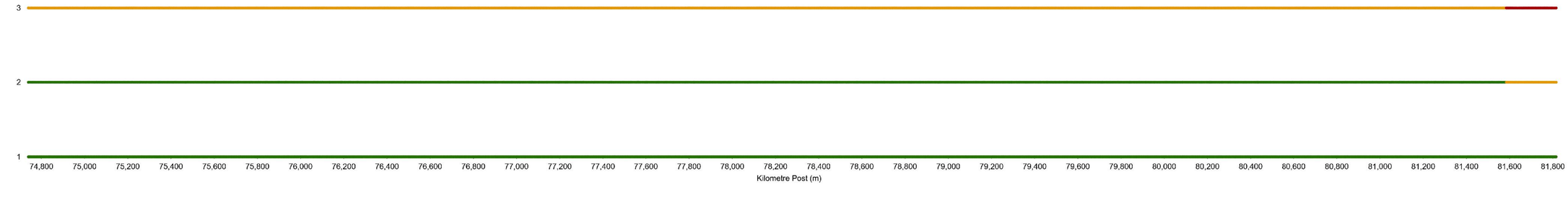
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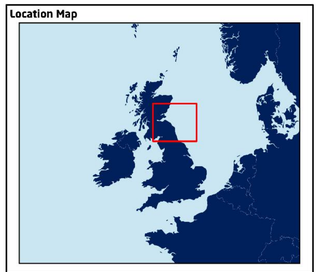
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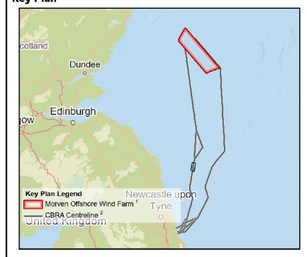
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
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Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
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- Suitable [3]
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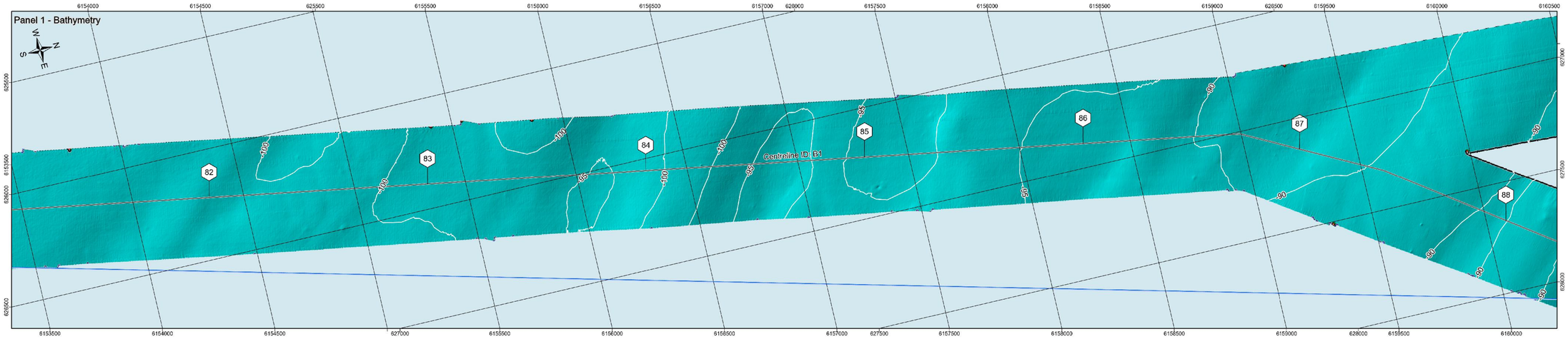
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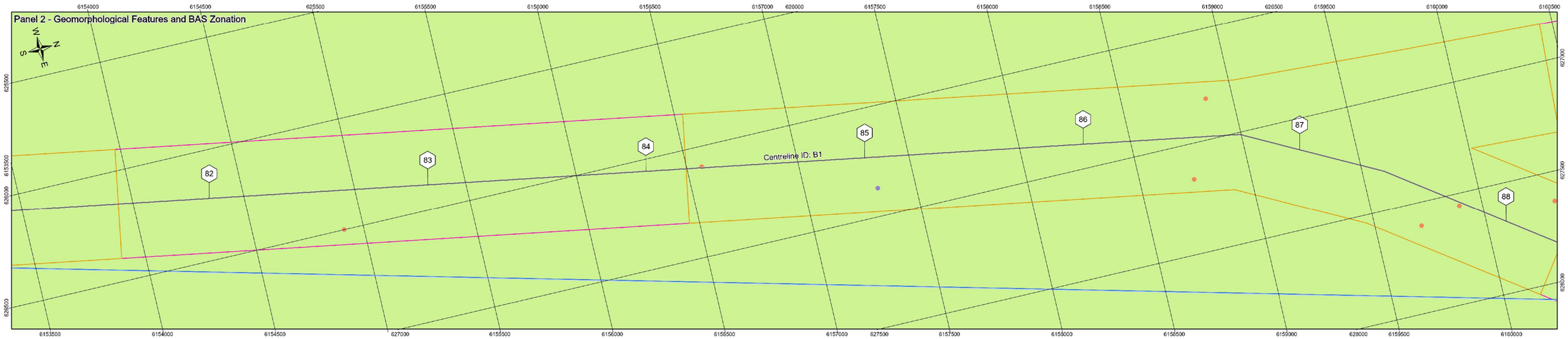
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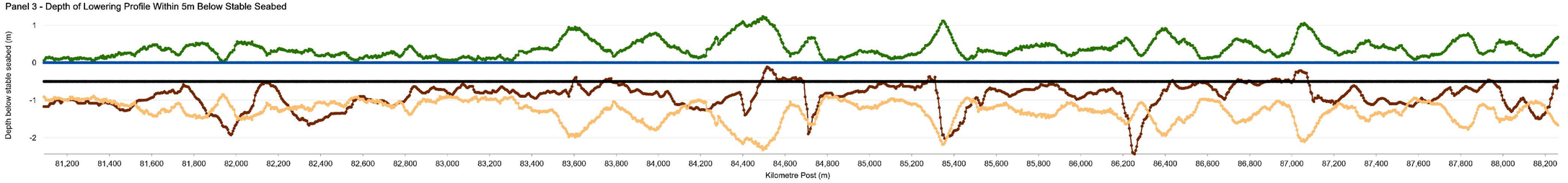
Panel 1 - Bathymetry



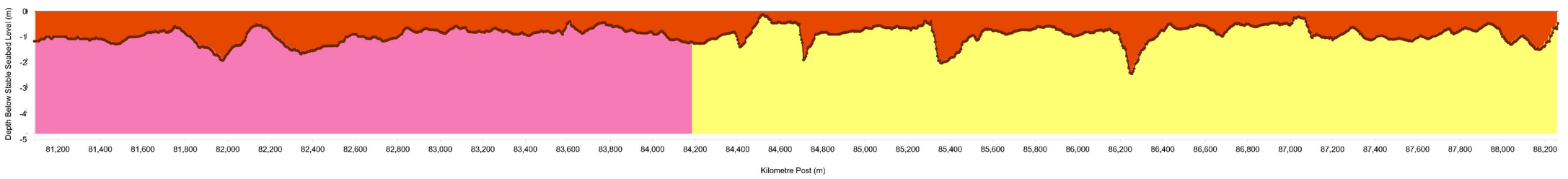
Panel 2 - Geomorphological Features and BAS Zonation



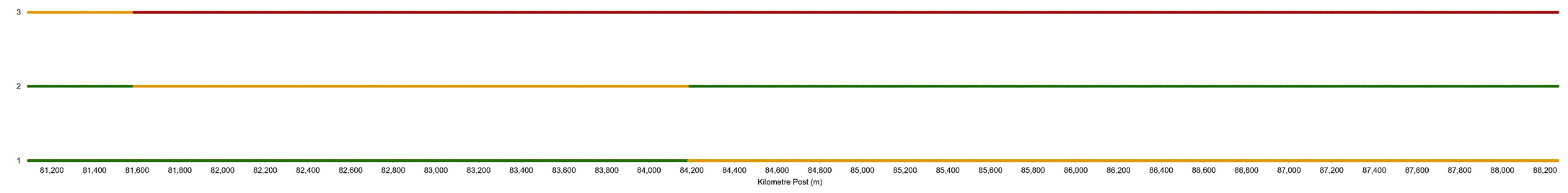
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



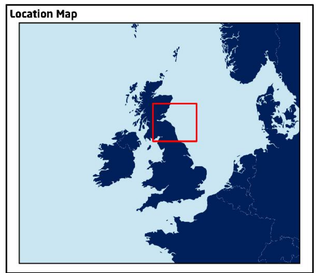
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



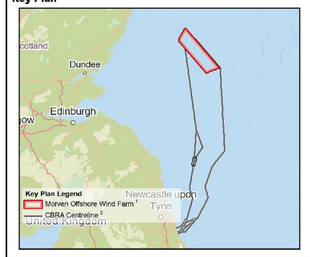
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Datum: European 1950
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0 100 200 m

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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
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Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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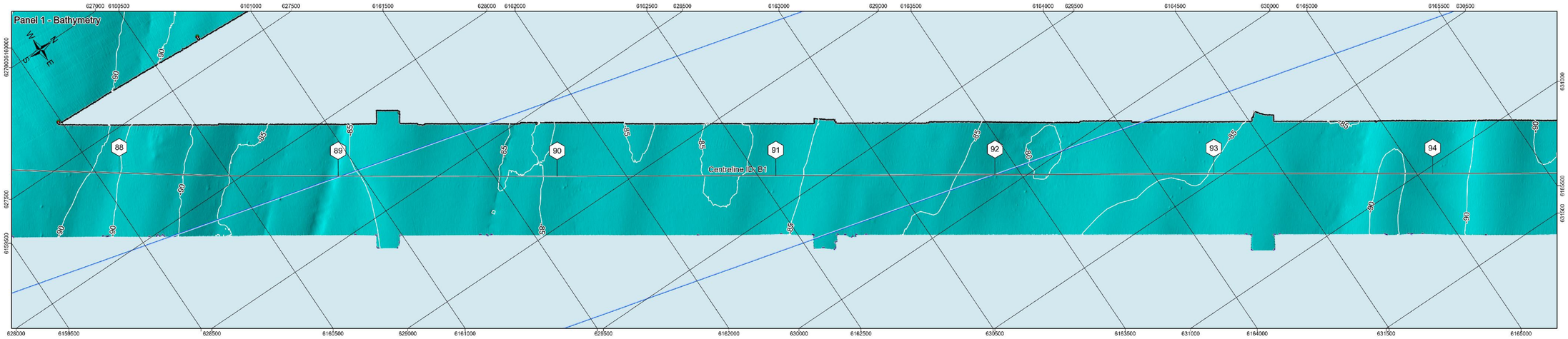
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

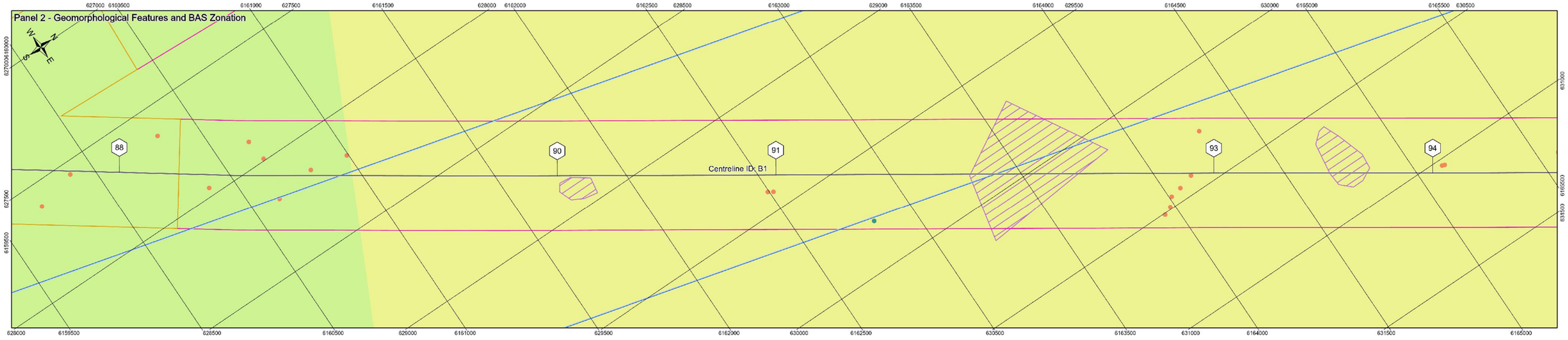
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 14 of 36

Drawing Status
Issue for Review

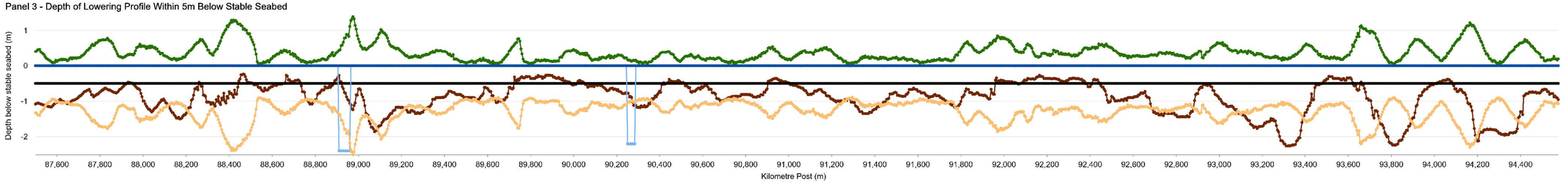
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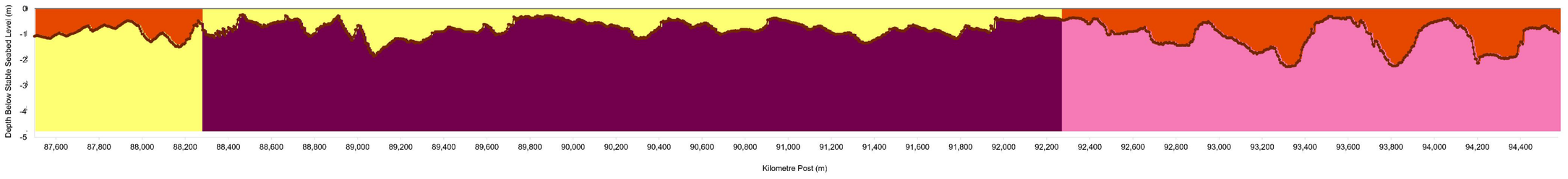




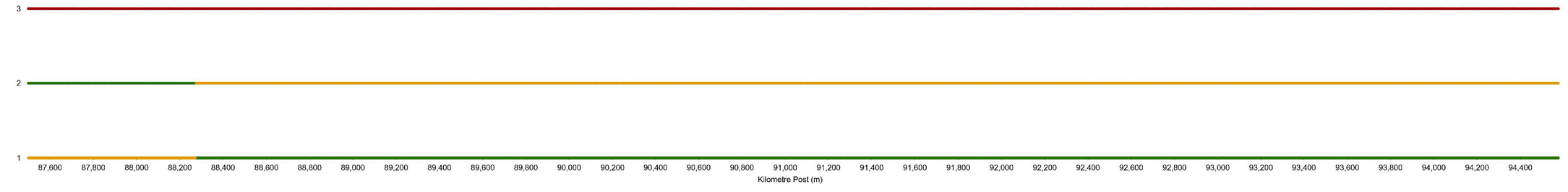
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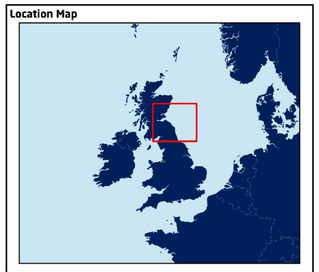
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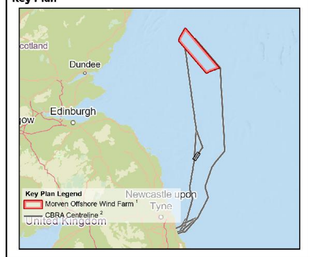
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
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Morven Offshore Wind Farm

Report Title
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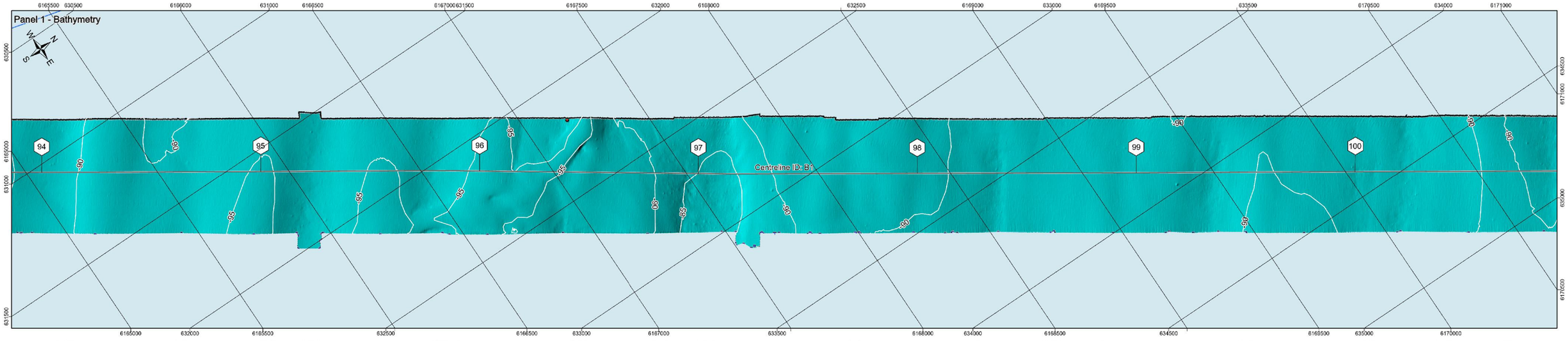
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 15 of 36

Drawing Status
Issue for Review

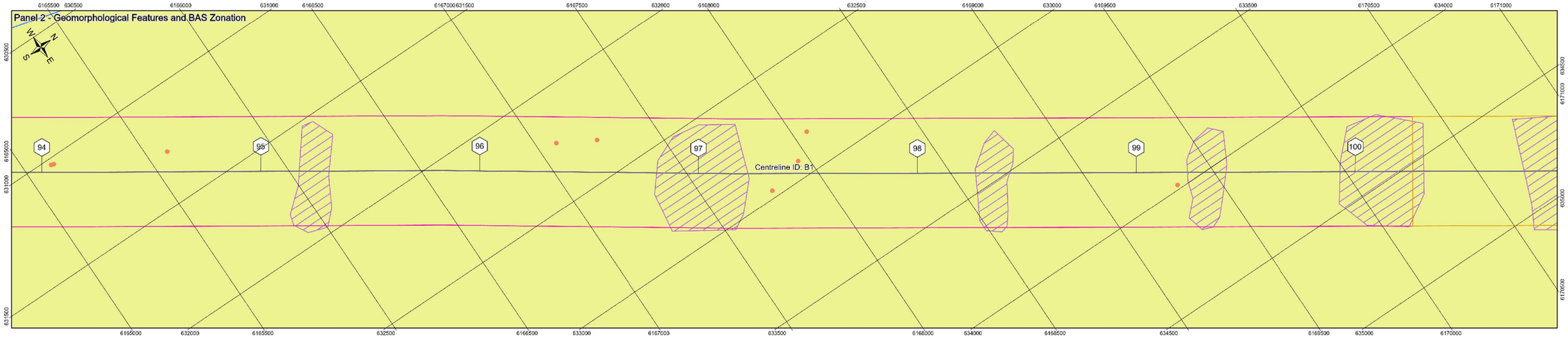
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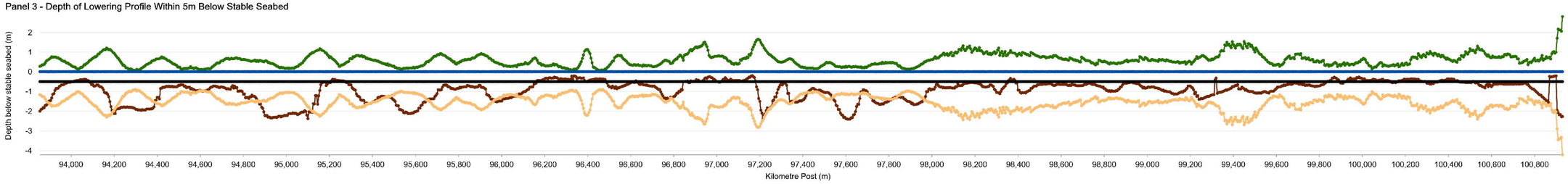
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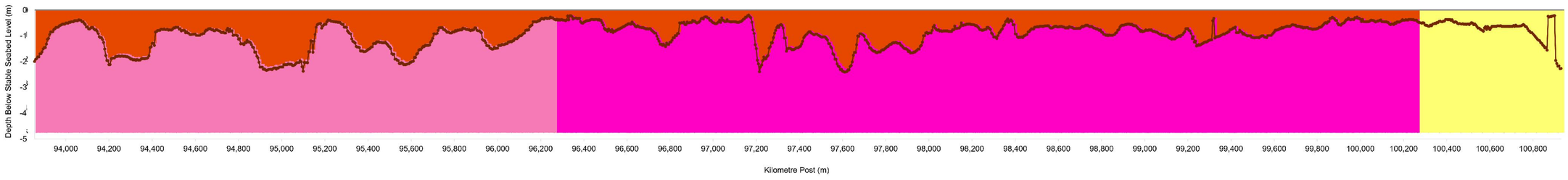
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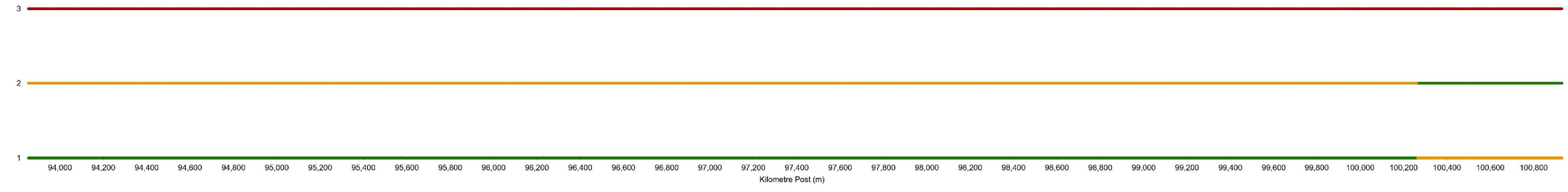
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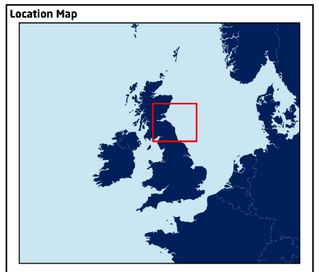
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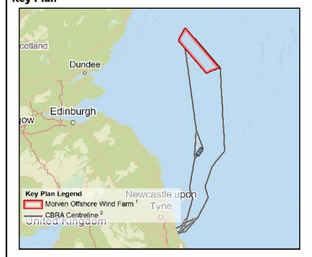
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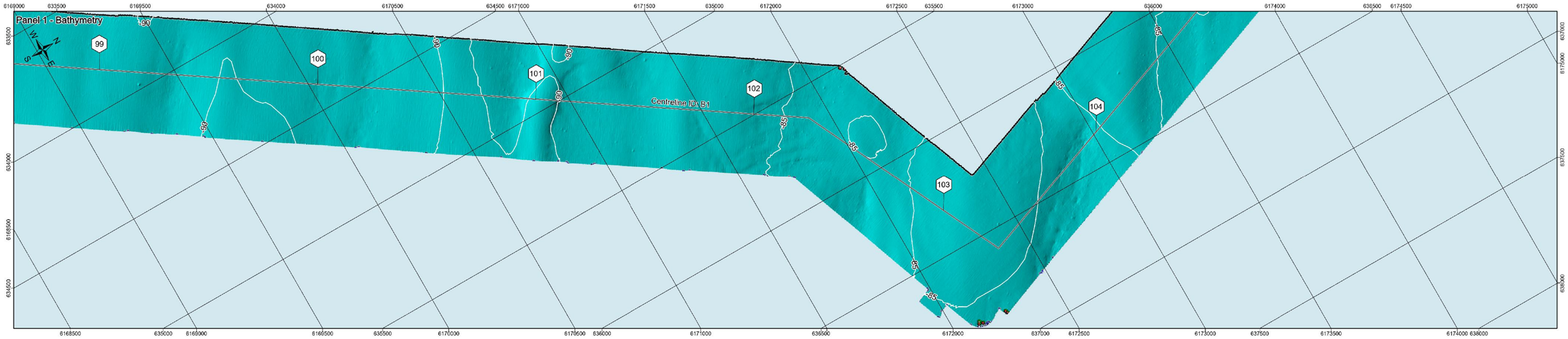
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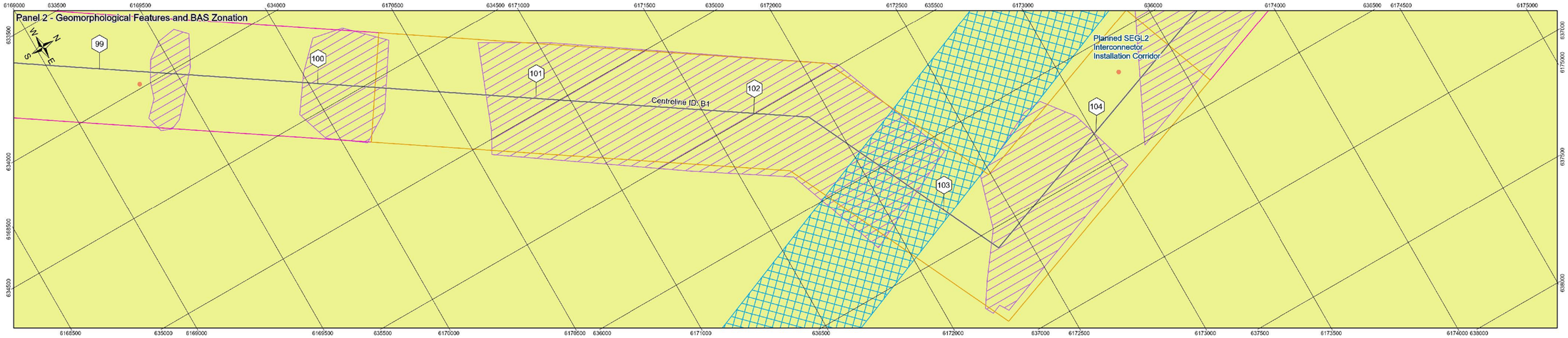
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 16 of 36

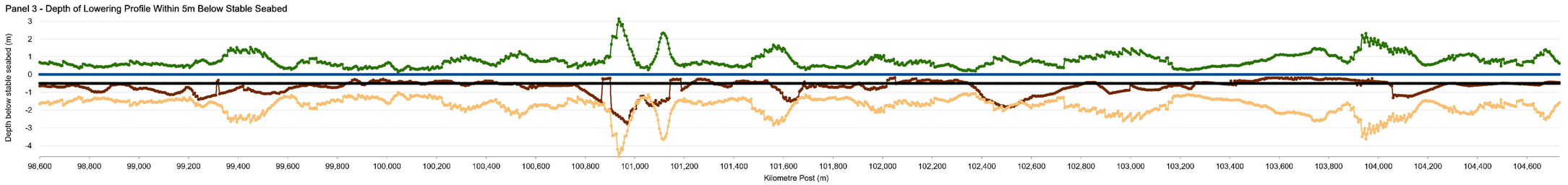
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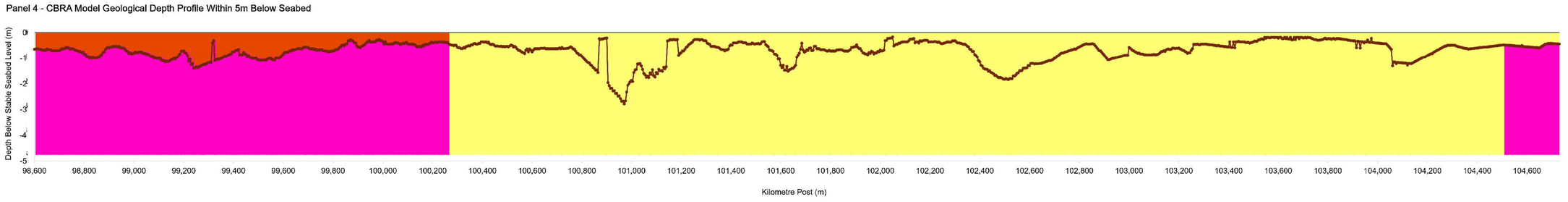
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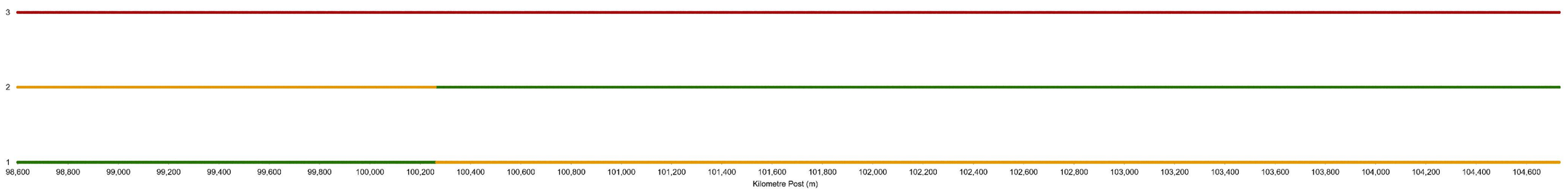
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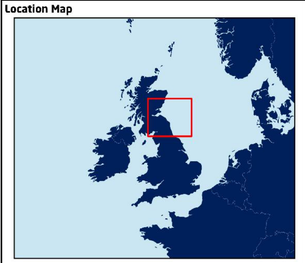




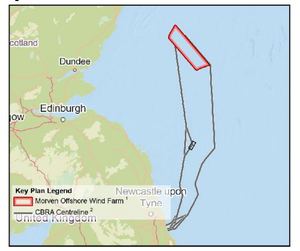




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- Possible Mobile Bedform Height [5]
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Panel 4

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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
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- Low Strength CLAY (C3)
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- High Strength CLAY (C5)
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- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Suitable [3]
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Report Title
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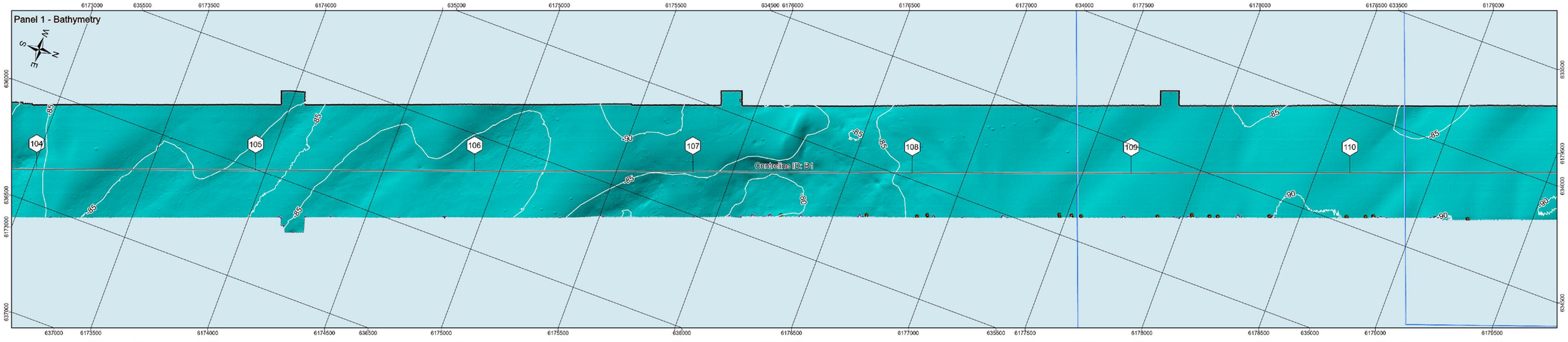
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 17 of 36

Drawing Status
Issue for Review

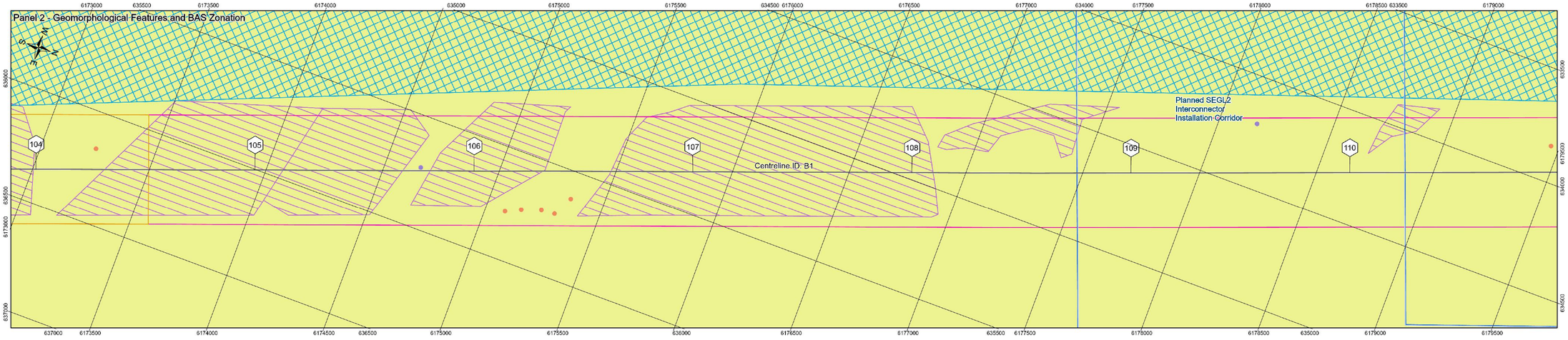
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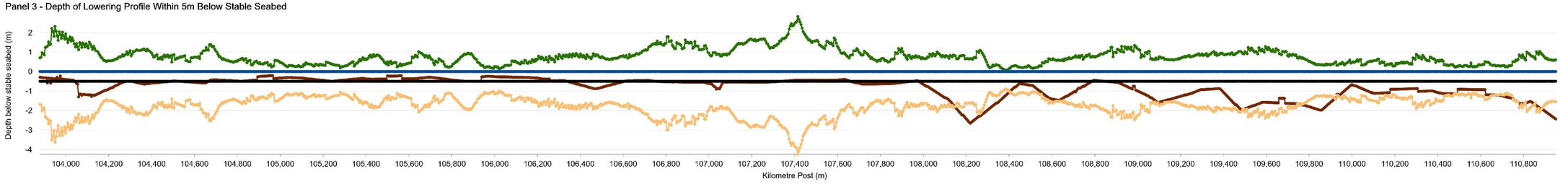
Panel 1 - Bathymetry



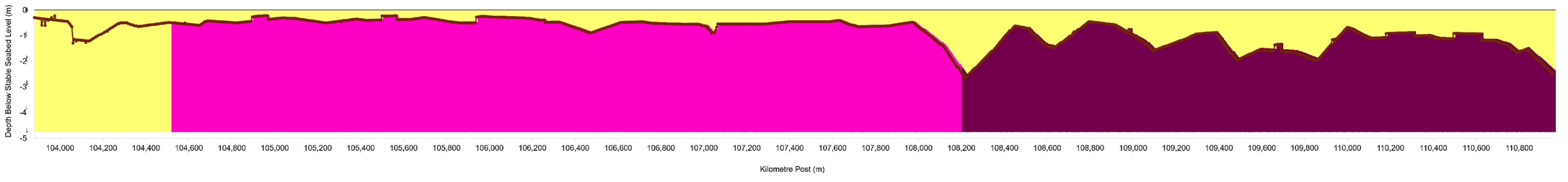
Panel 2 - Geomorphological Features and BAS Zonation



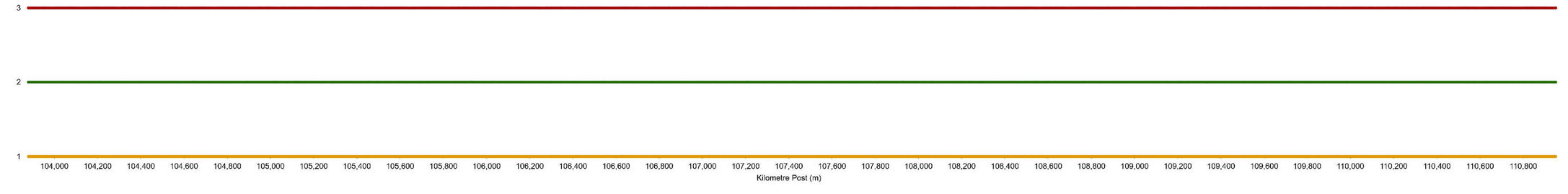
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



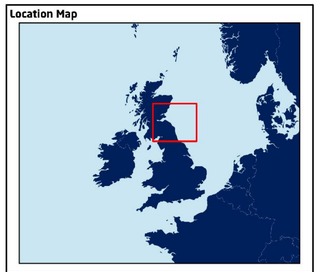
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



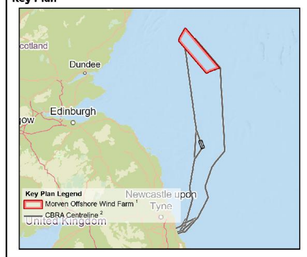
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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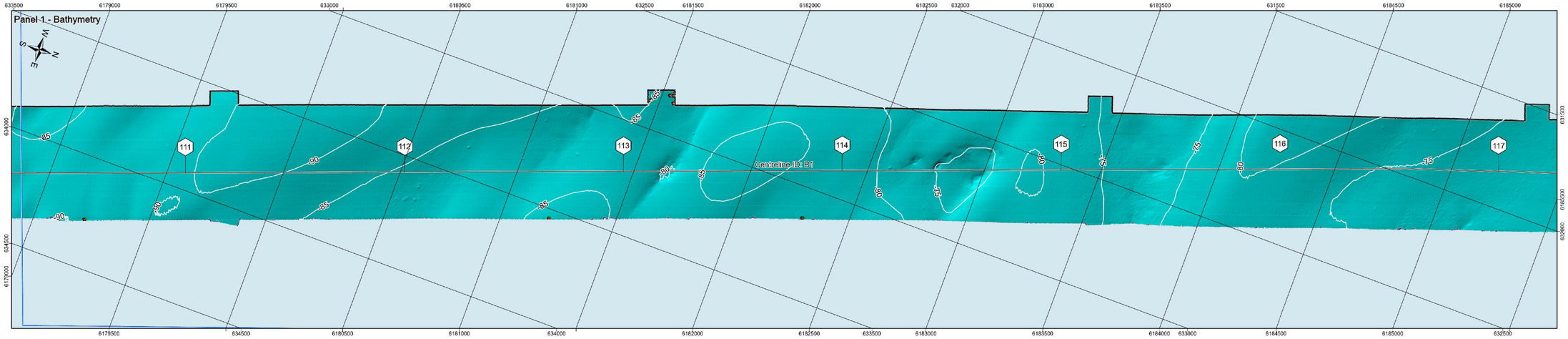
Report Title
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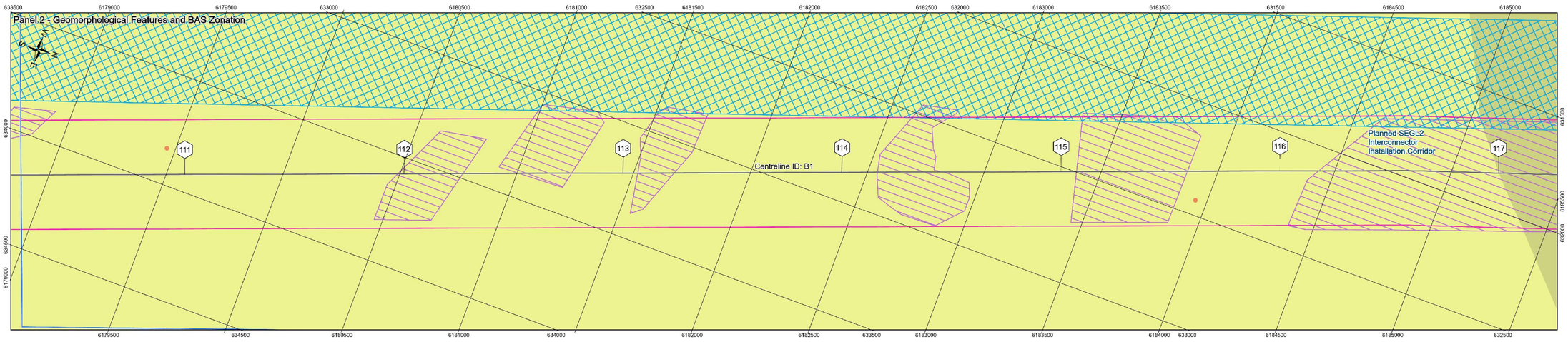
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 18 of 36

Drawing Status
Issue for Review

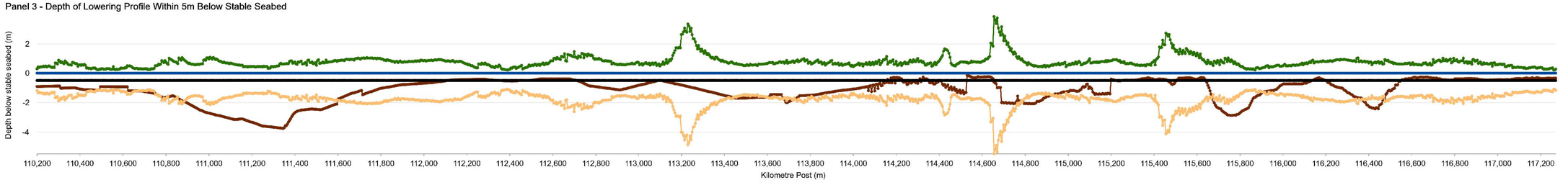
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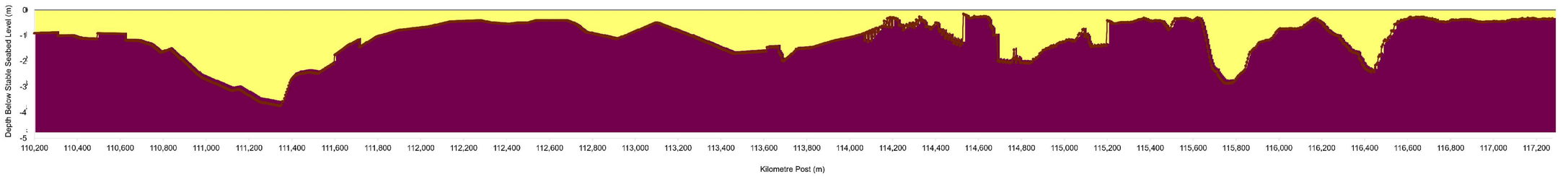




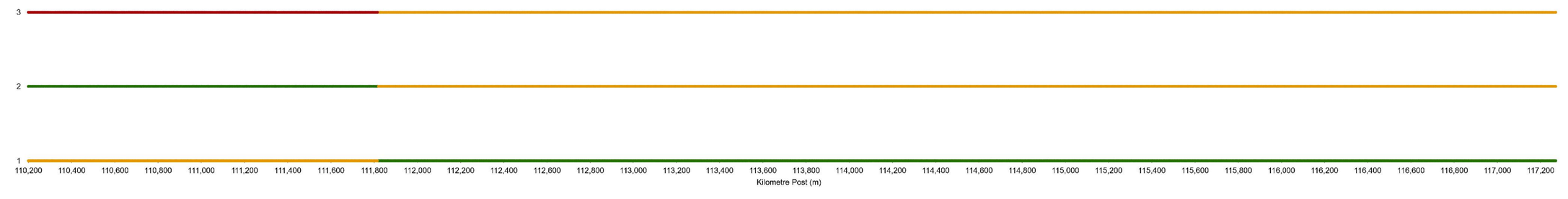
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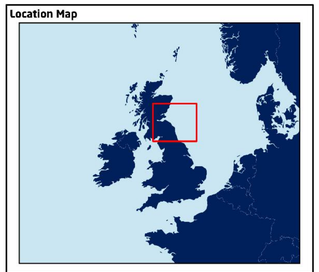
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



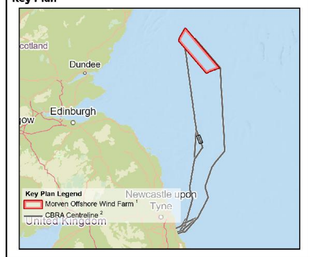
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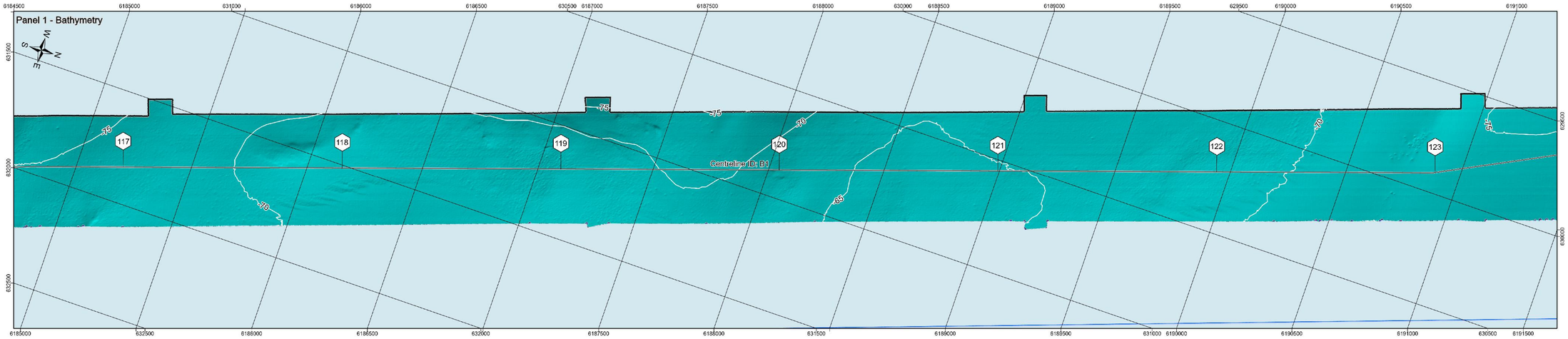
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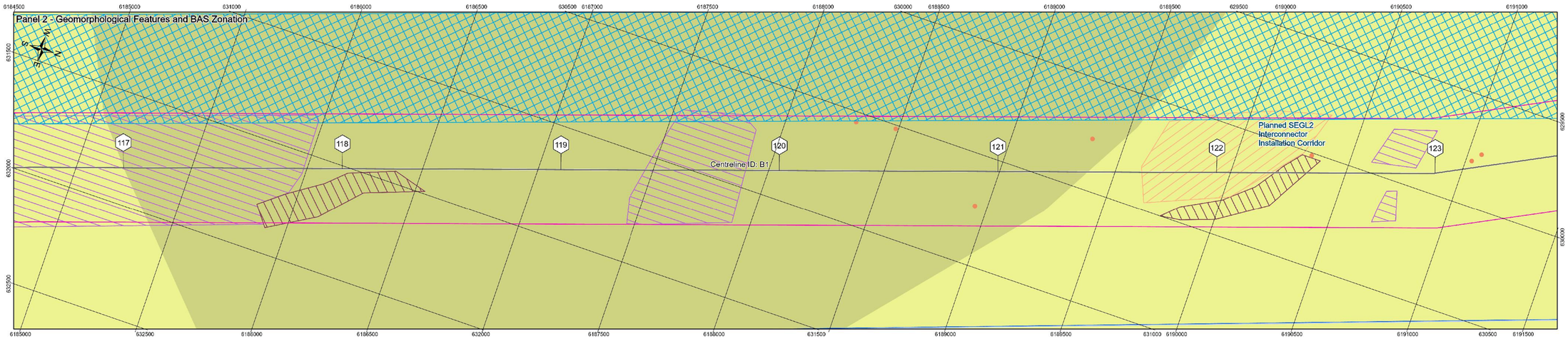
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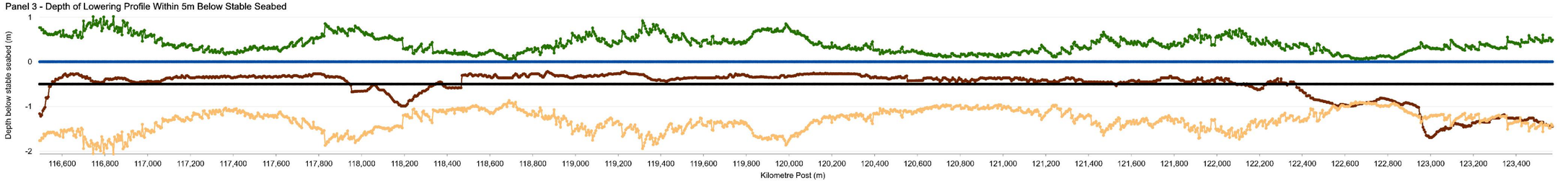
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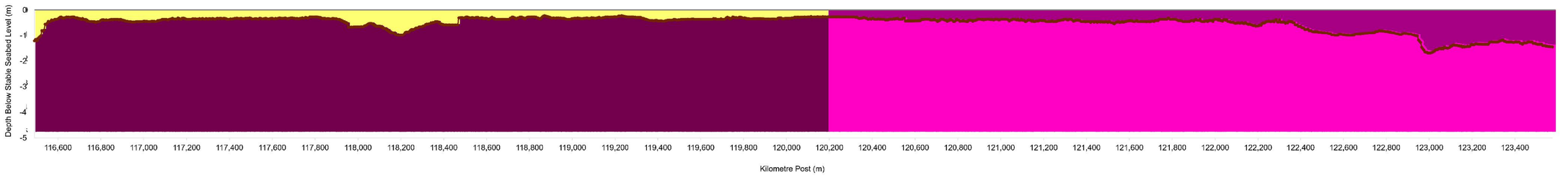
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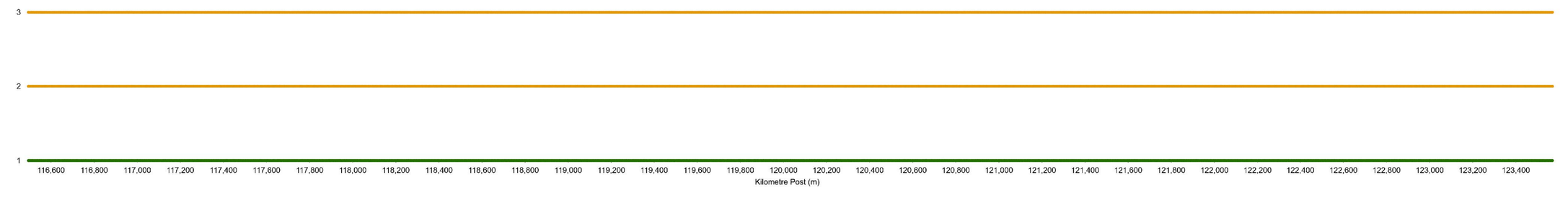
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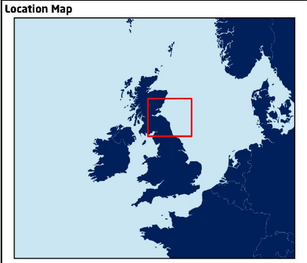




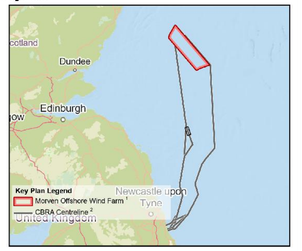




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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

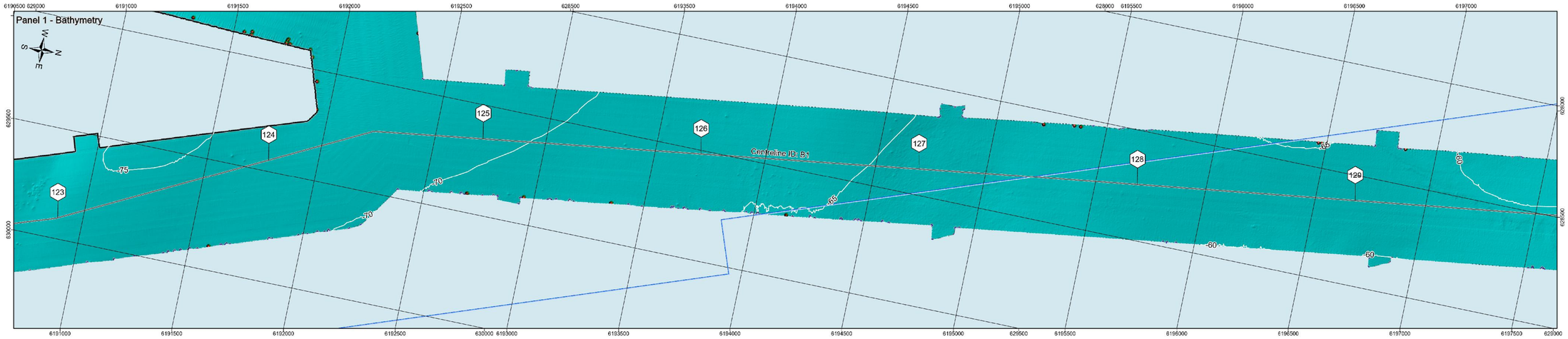
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 20 of 36

Drawing Status
Issue for Review

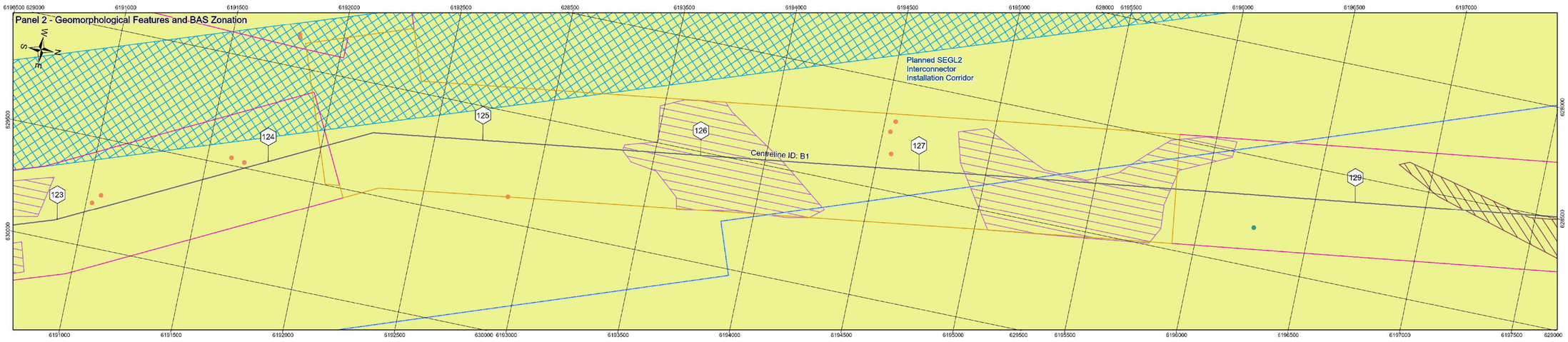
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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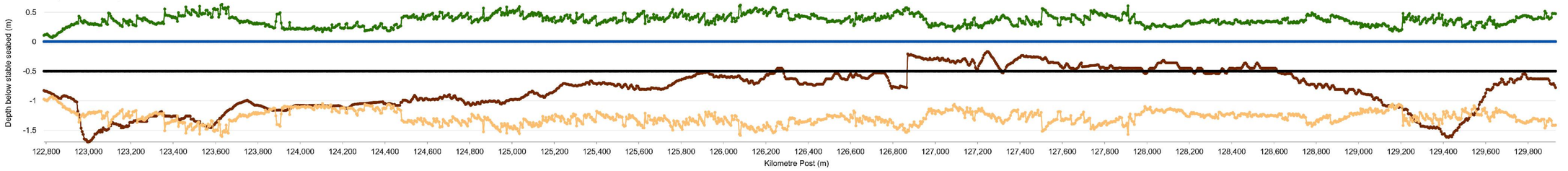
Panel 1 - Bathymetry



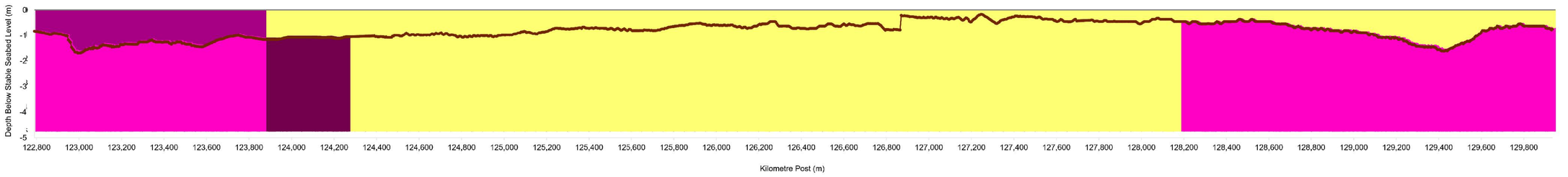
Panel 2 - Geomorphological Features and BAS Zonation



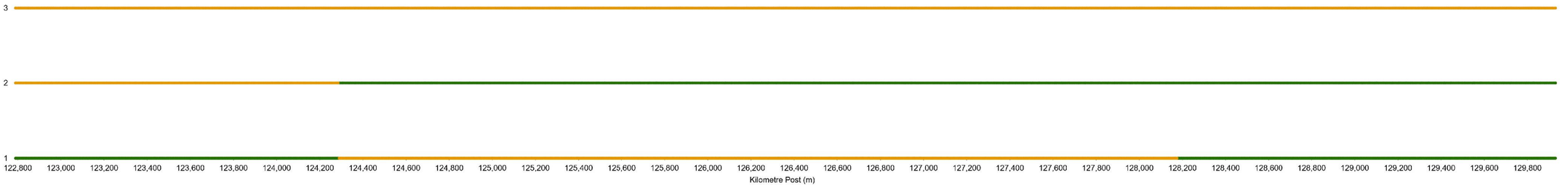
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



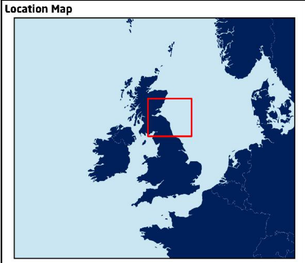
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



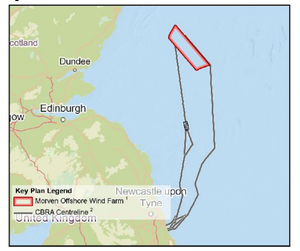
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
- 10. Unpublic data
- SEGL2 Installation Corridor [6]
- SEGL1 Installation Corridor [6]
- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
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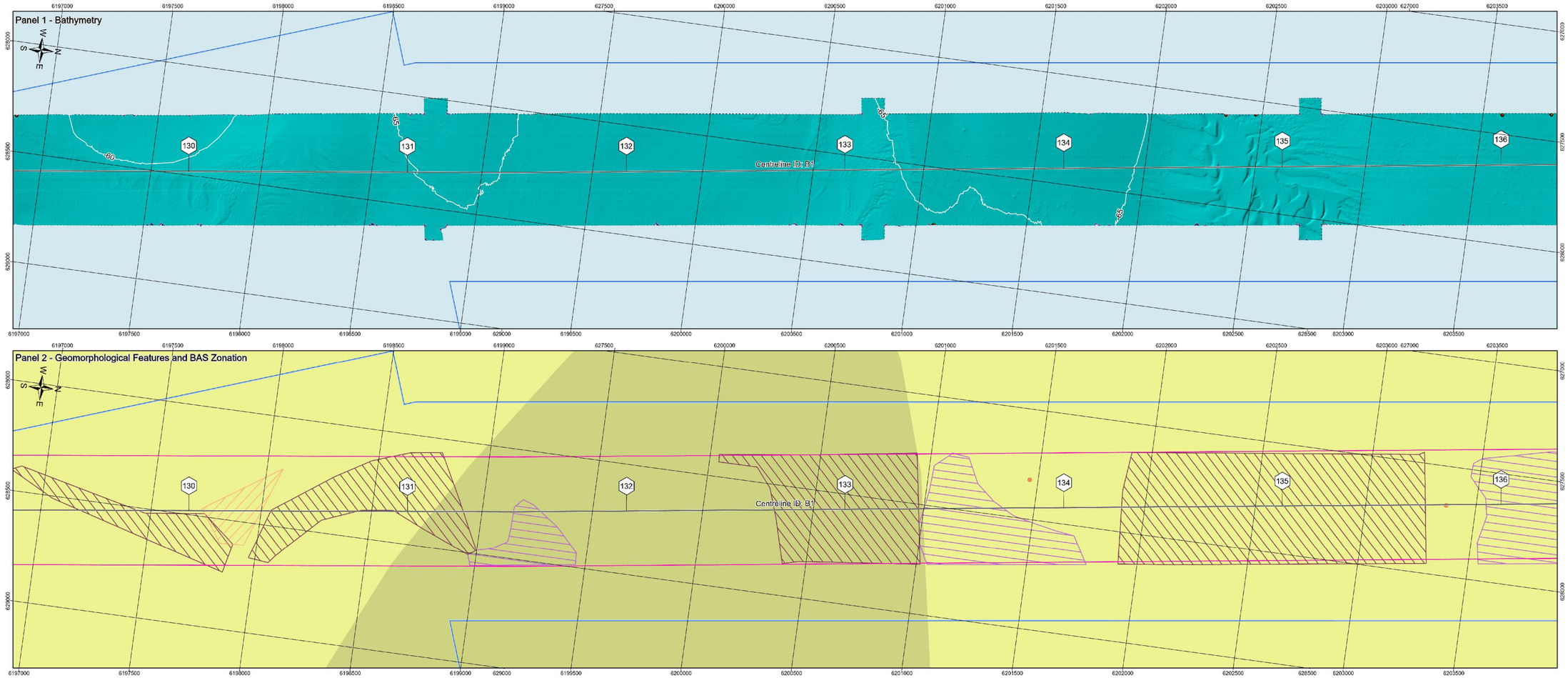
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 21 of 36

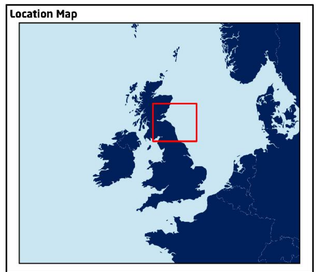
Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

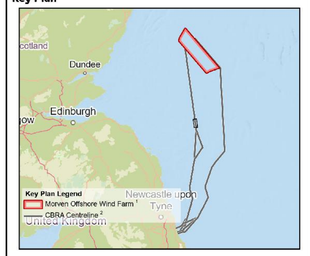
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

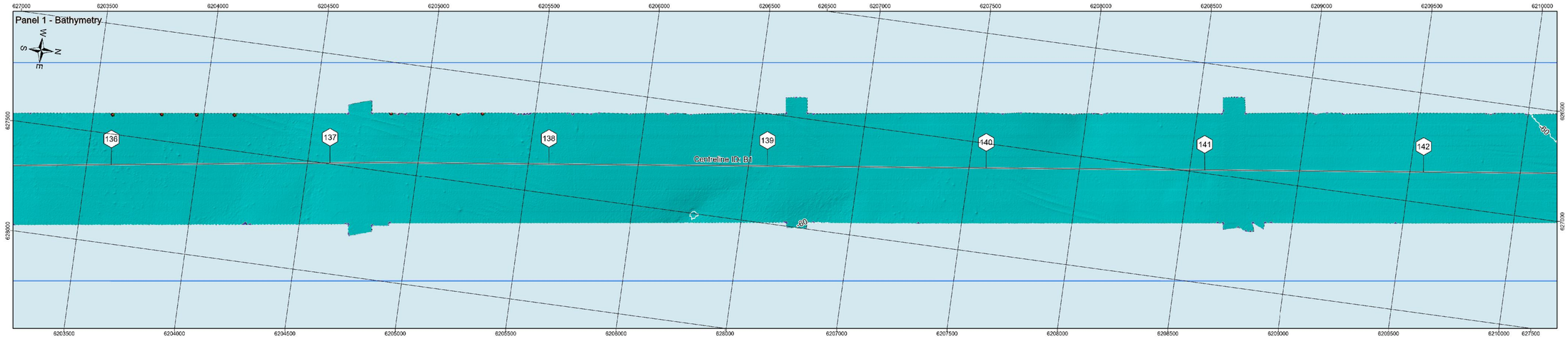
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Drawing Status
Issue for Review

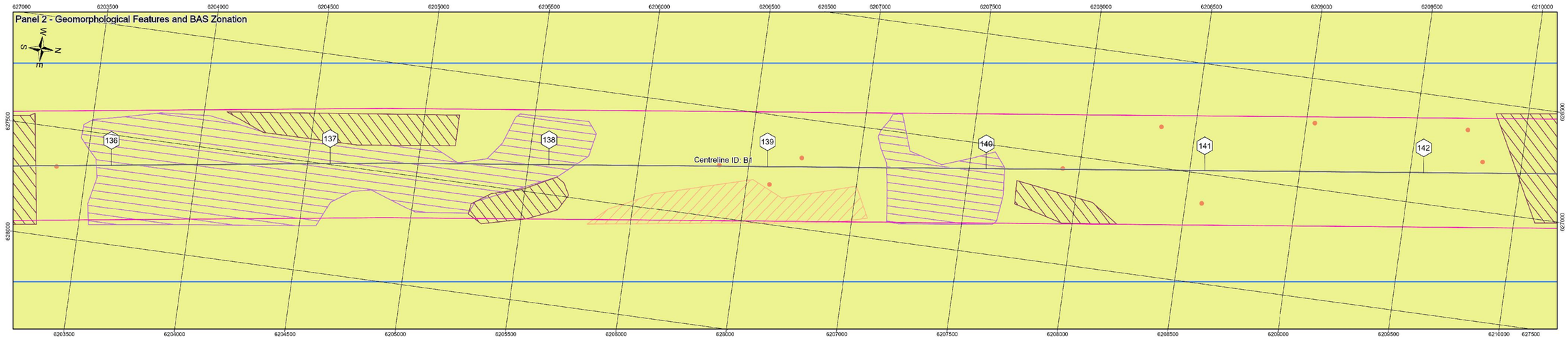
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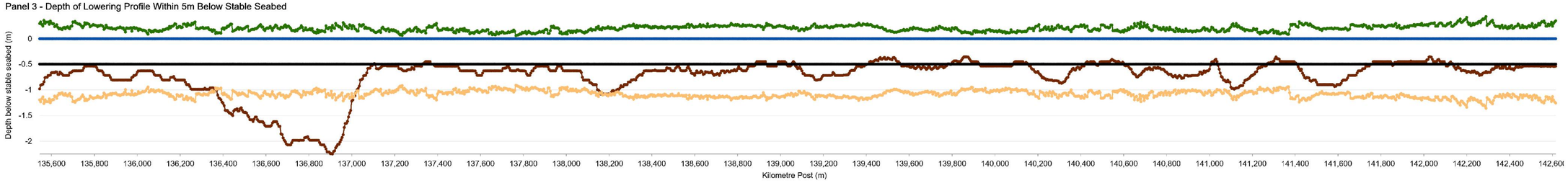
Panel 1 - Bathymetry



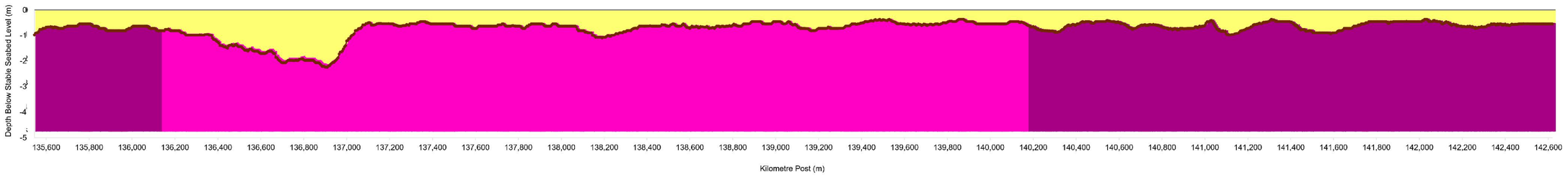
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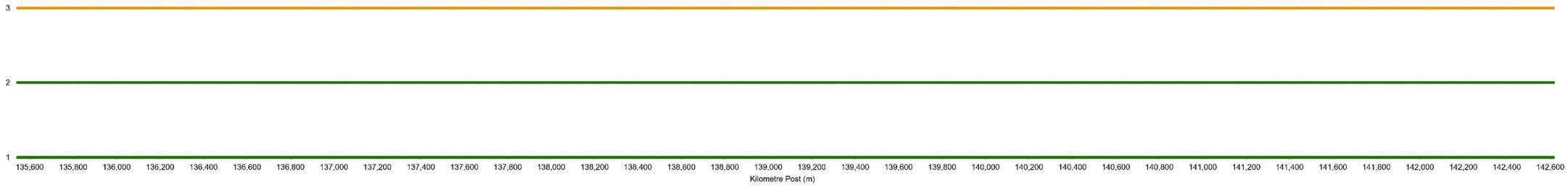
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



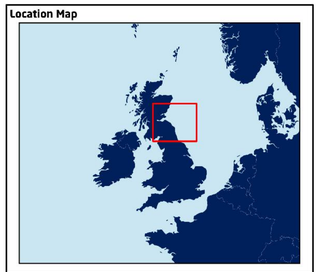
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



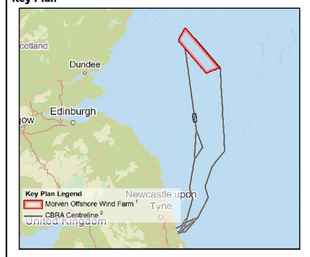
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Panel 4

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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
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Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
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Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
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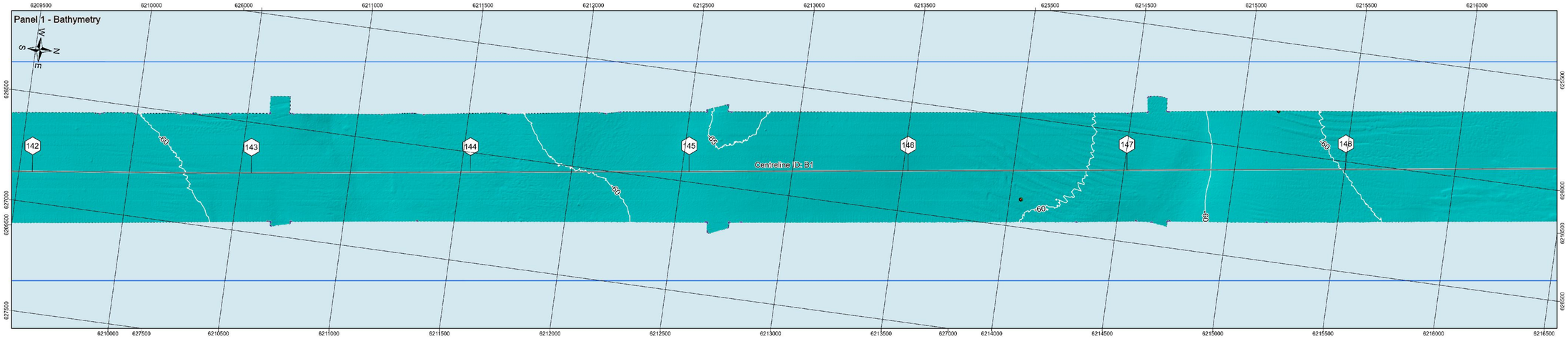
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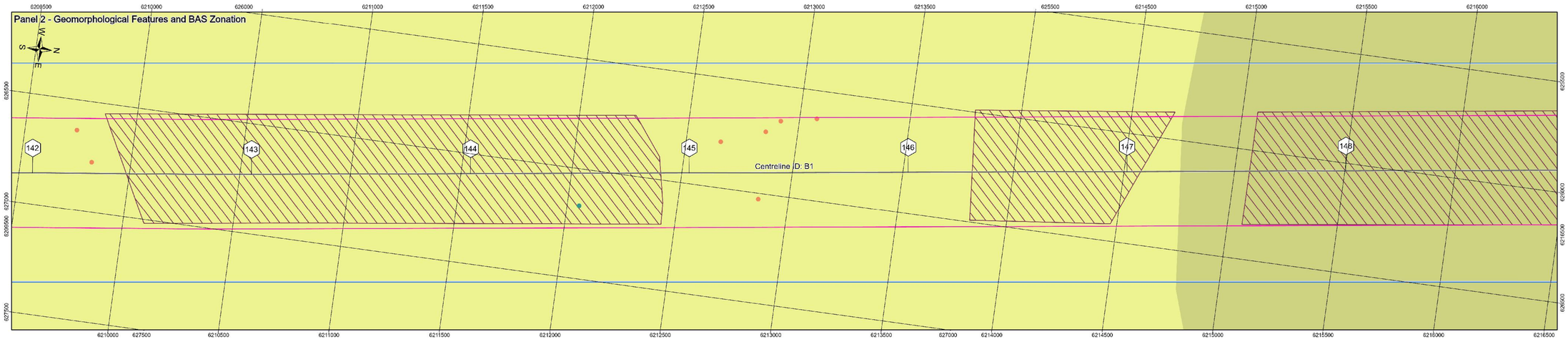
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 23 of 36

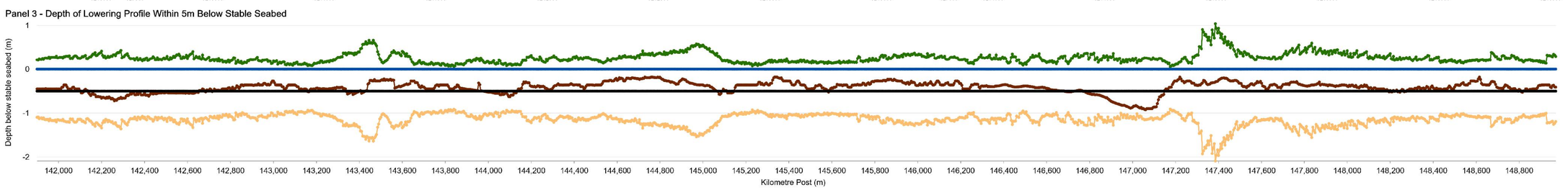
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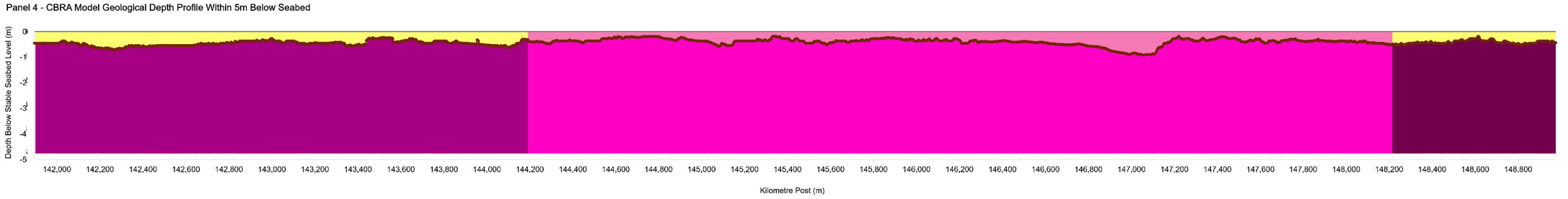
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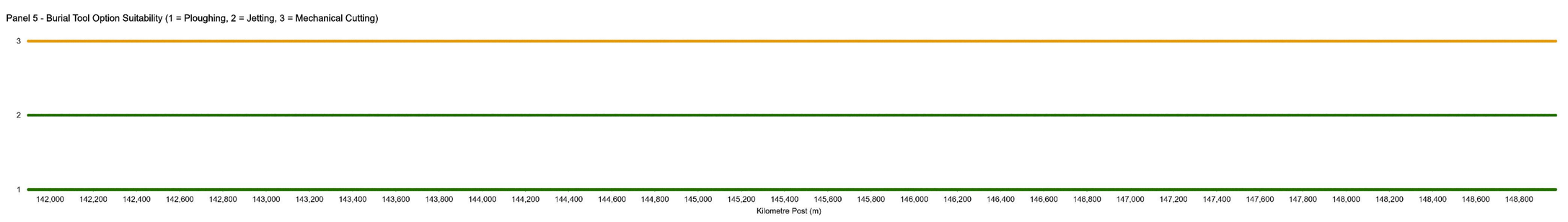
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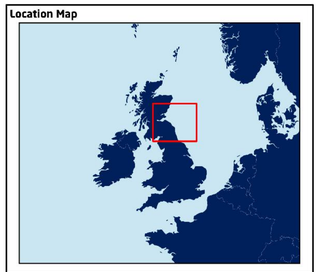




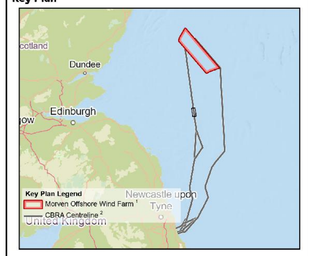




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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

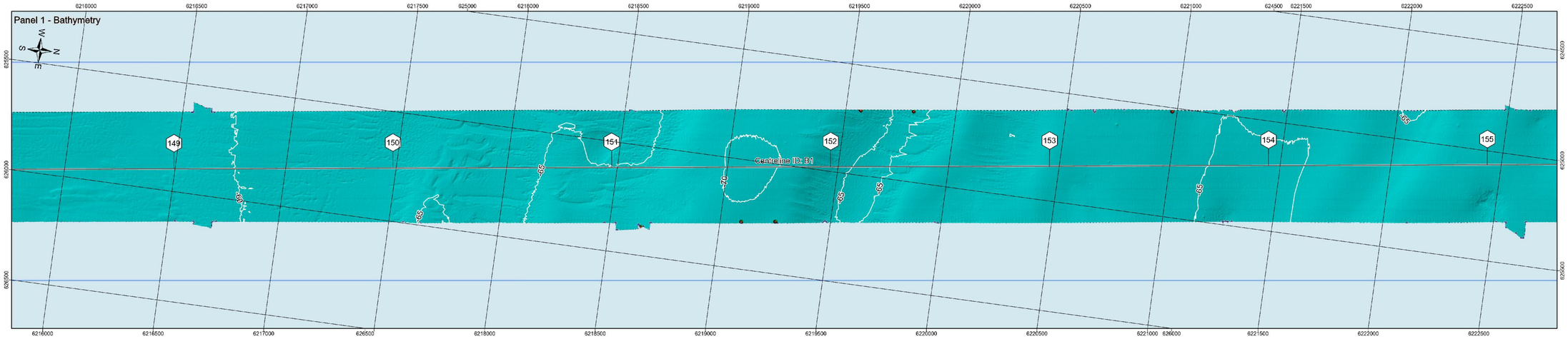
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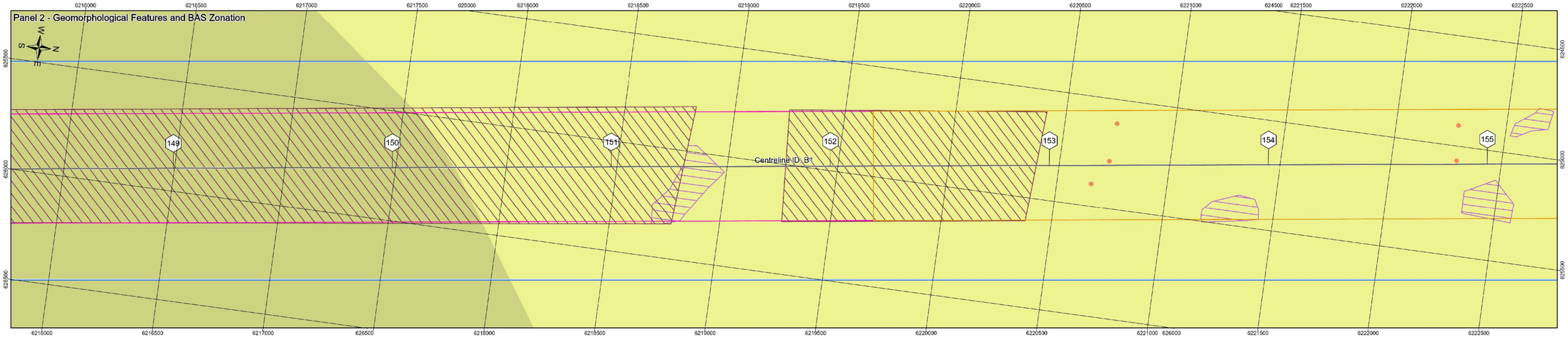
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 24 of 36

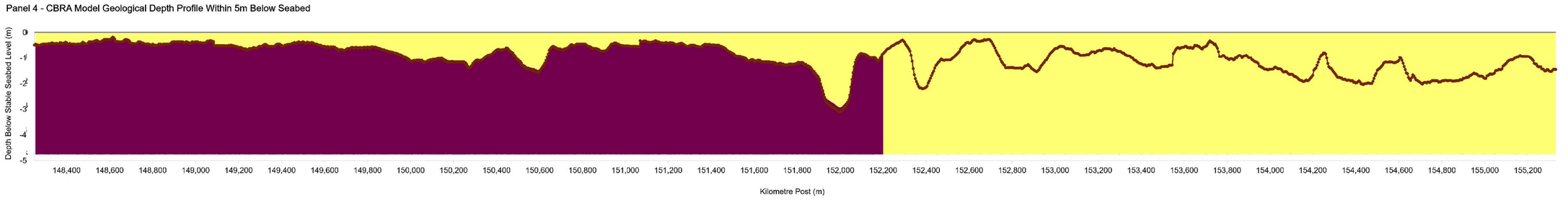
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Issue for Review

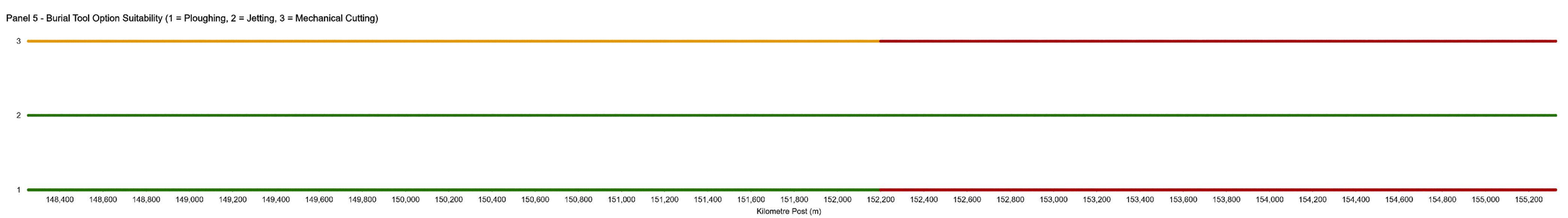
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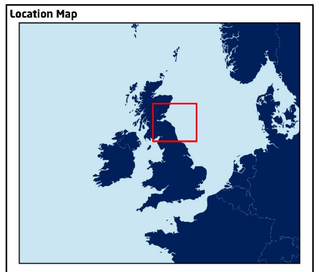




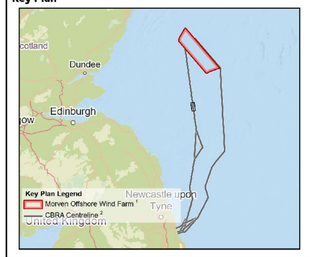




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
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- Scouring
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Panel 3

- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [9]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
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- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
- Possible [3]
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Longitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

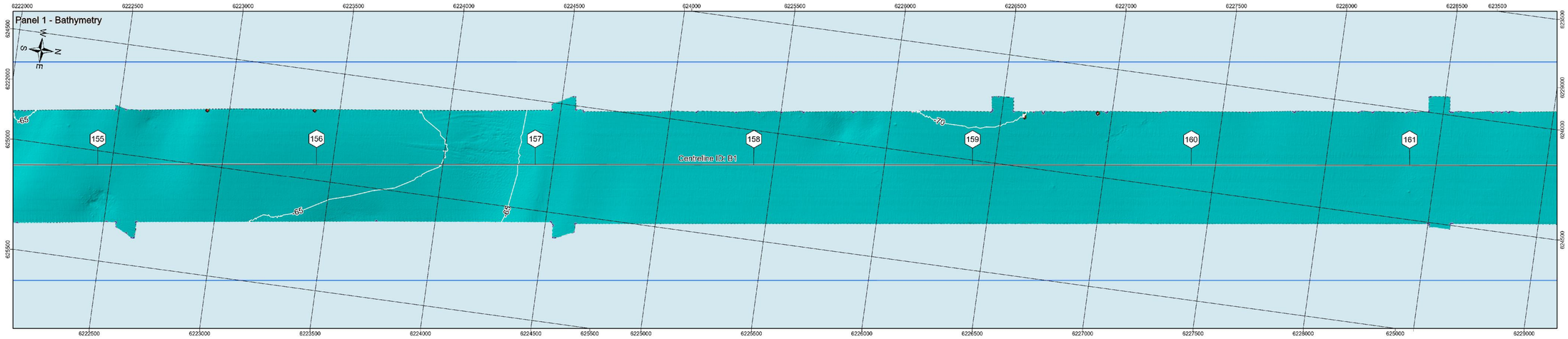
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 25 of 36

Drawing Status
Issue for Review

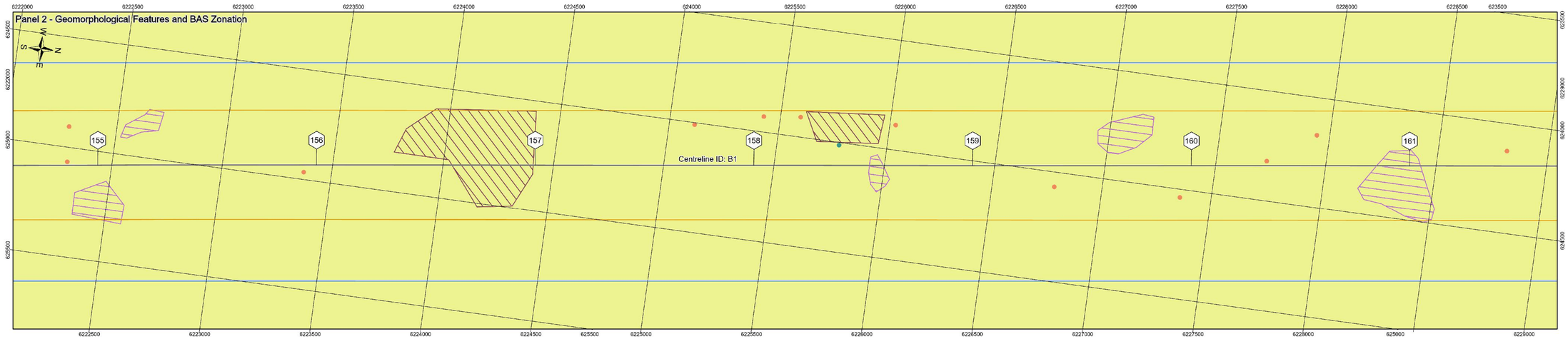
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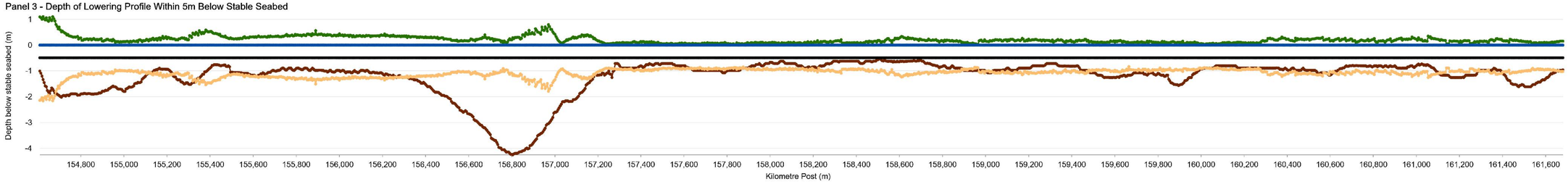
Panel 1 - Bathymetry



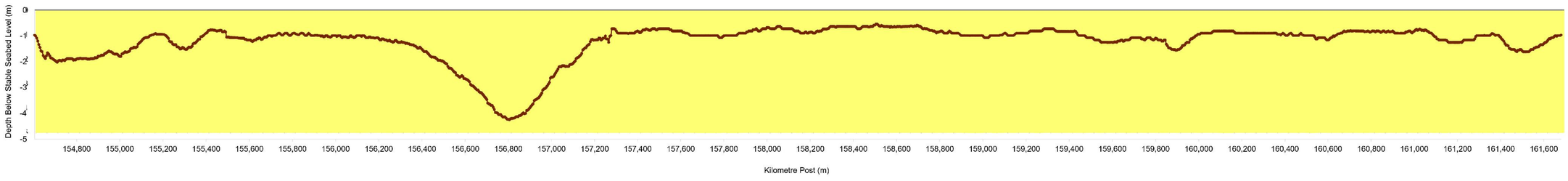
Panel 2 - Geomorphological Features and BAS Zonation



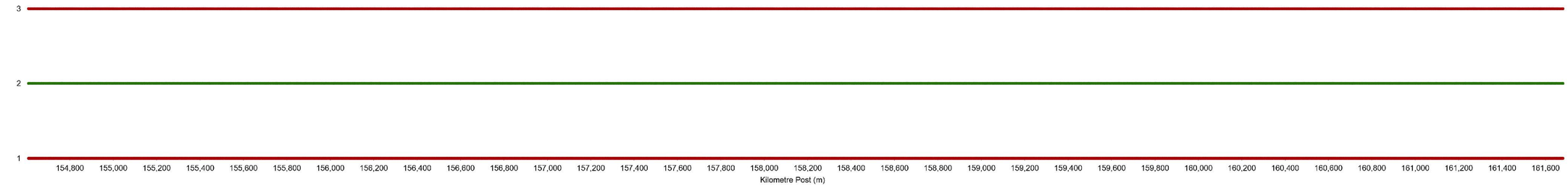
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



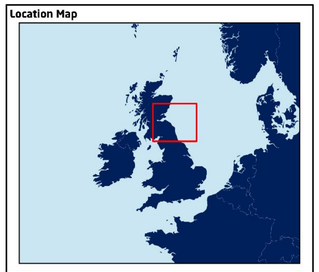
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



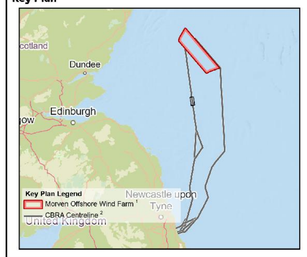
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
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- Proposed 1000m Survey Corridor [3]
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Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

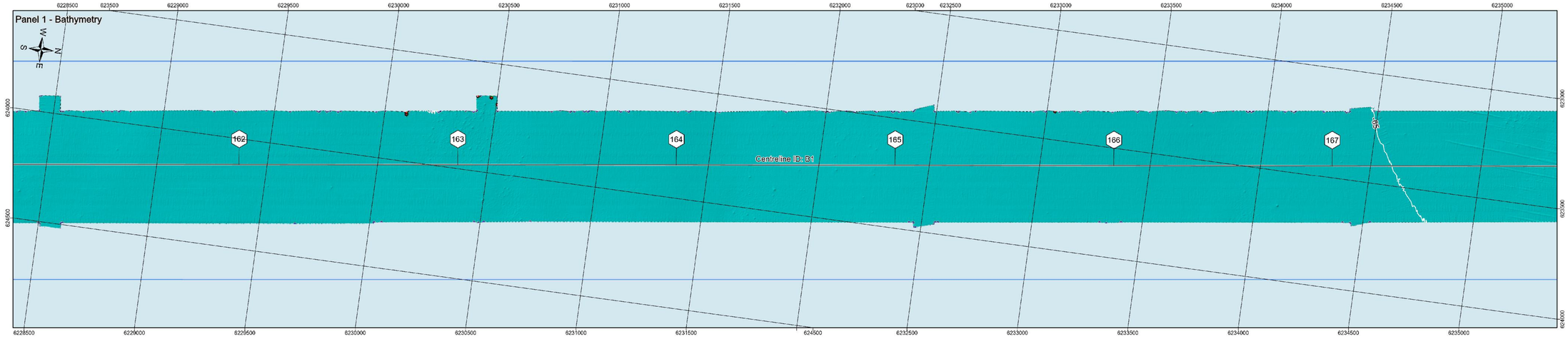
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 26 of 36

Drawing Status
Issue for Review

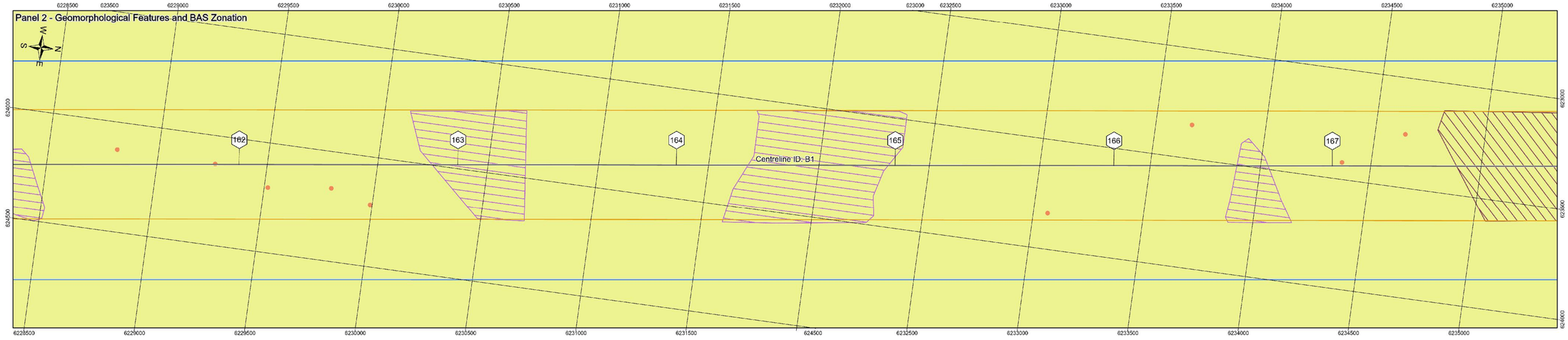
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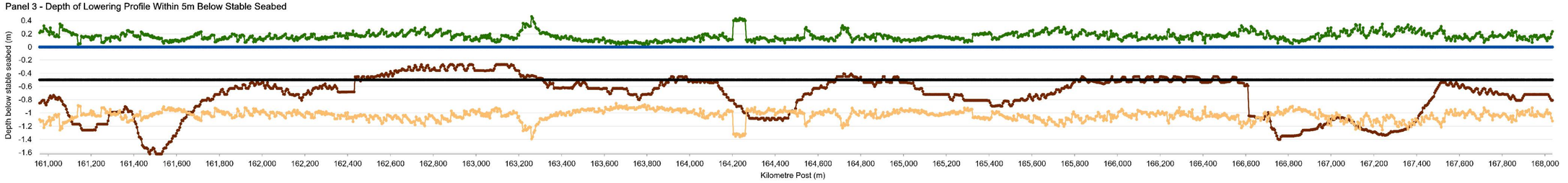
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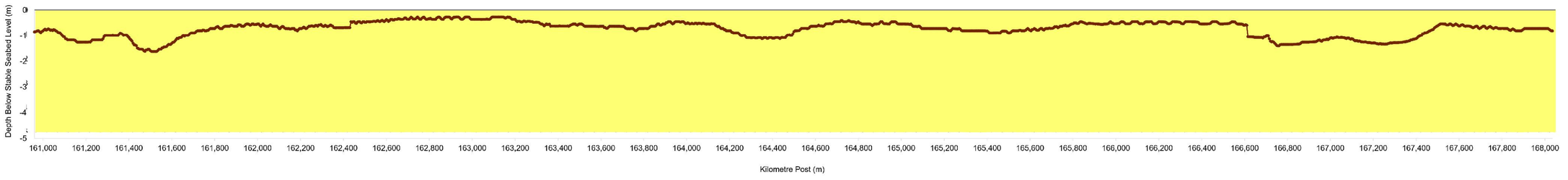
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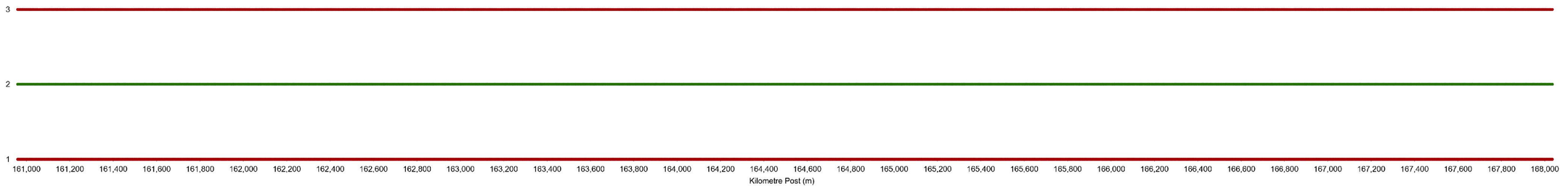
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



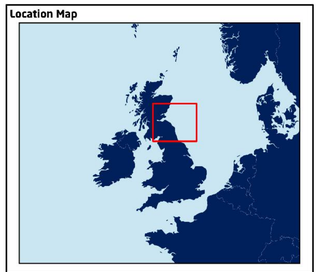
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



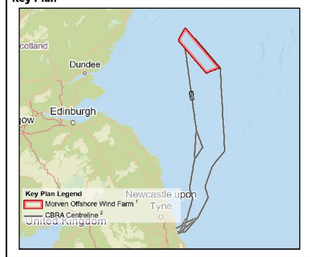
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Location Map



Key Plan



Legend

Panel 1 & Site Data

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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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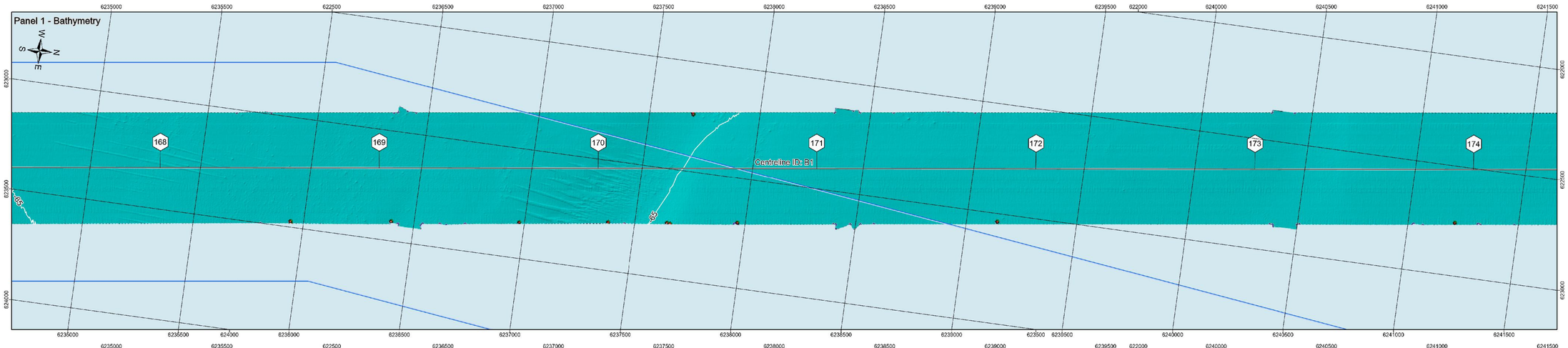
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 27 of 36

Drawing Status
Issue for Review

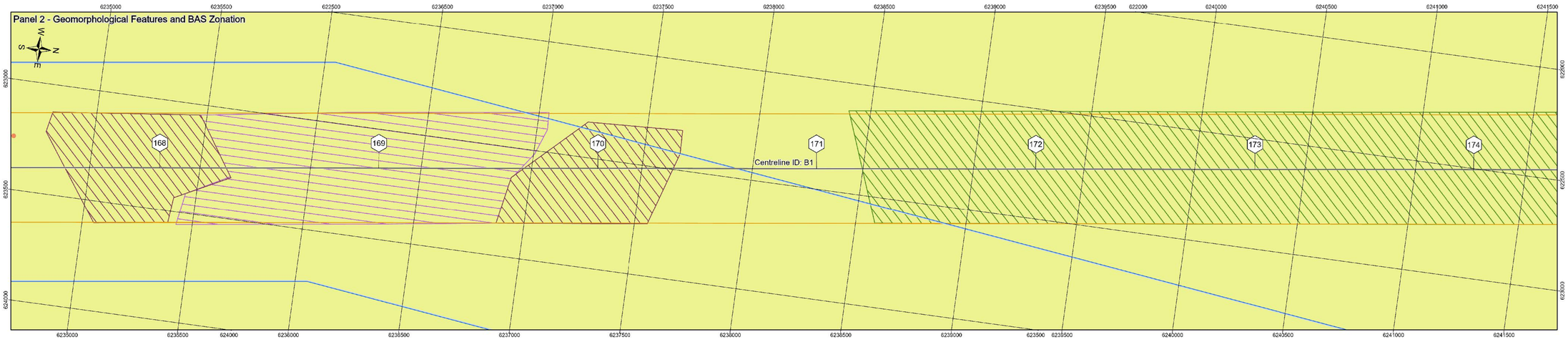
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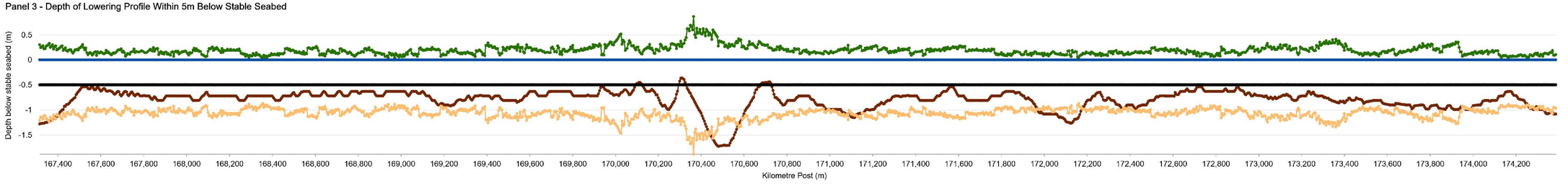
Panel 1 - Bathymetry



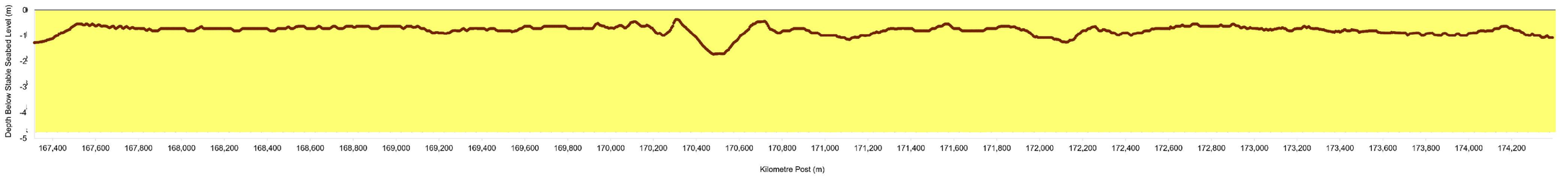
Panel 2 - Geomorphological Features and BAS Zonation



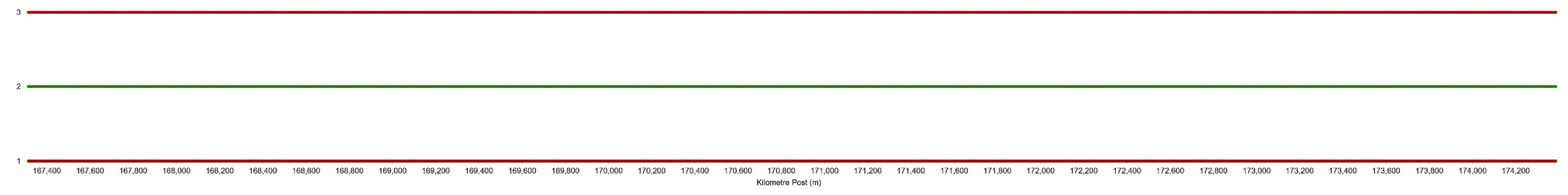
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



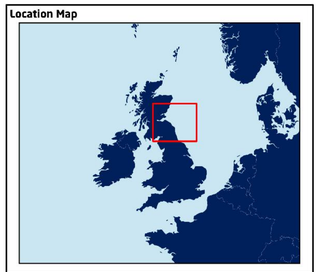
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



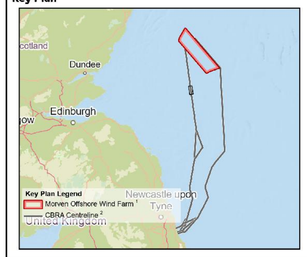
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
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- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

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BAS Zone Classification [3]
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Geomorphology [8]
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- Boulder/debris
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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
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Panel 5

- Suitable [3]
- Possible [3]
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Notes:
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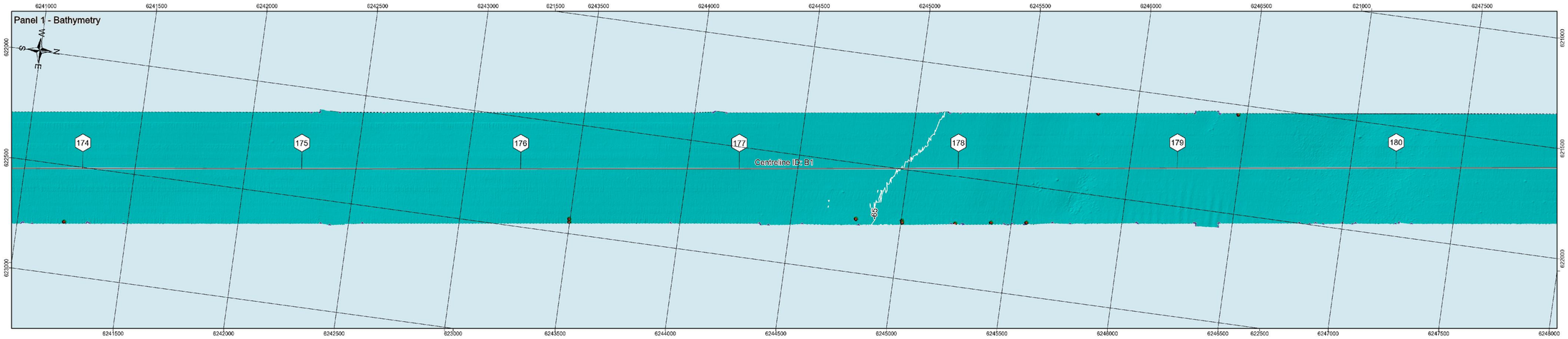
Report Title
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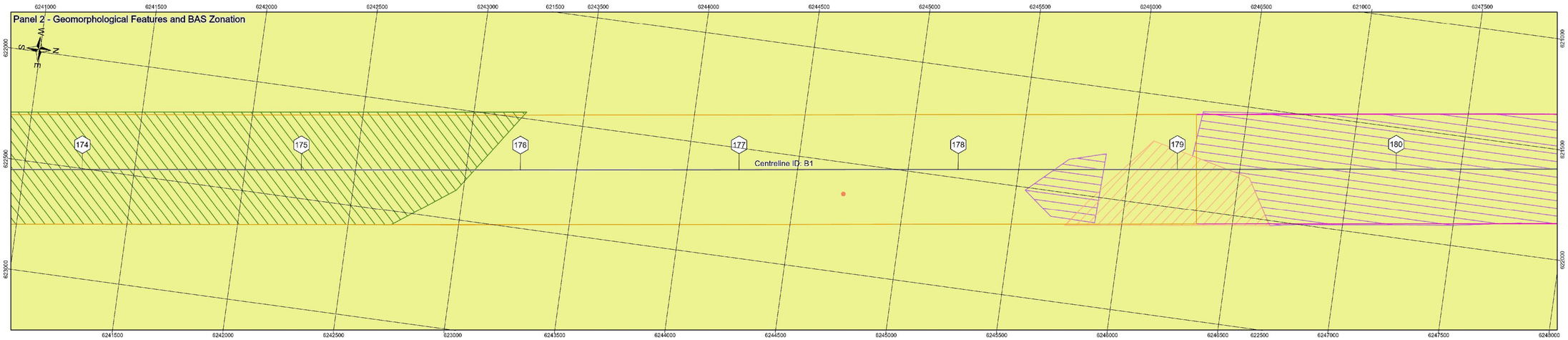
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 28 of 36

Drawing Status
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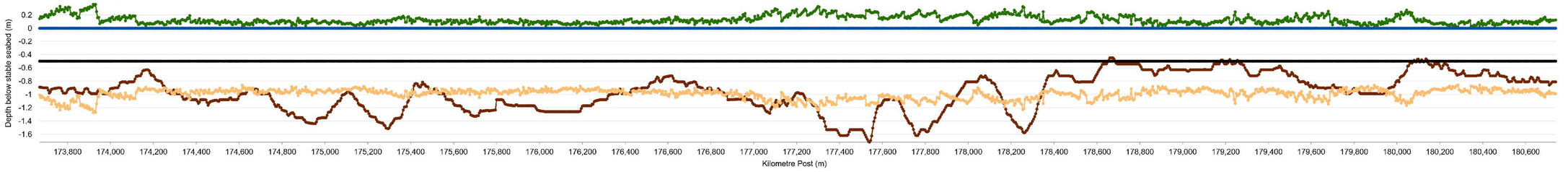
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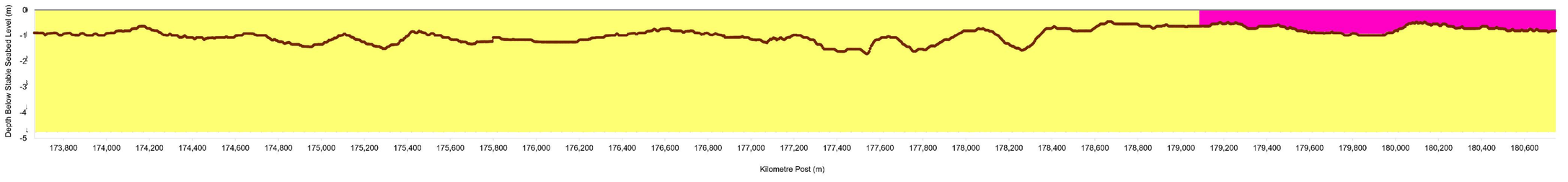




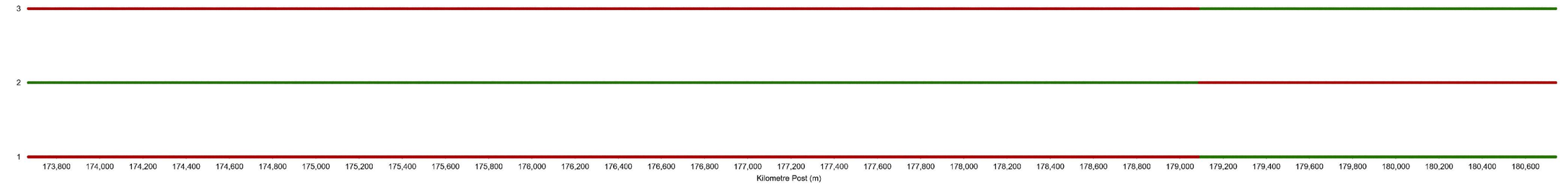
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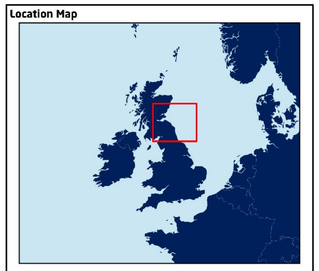
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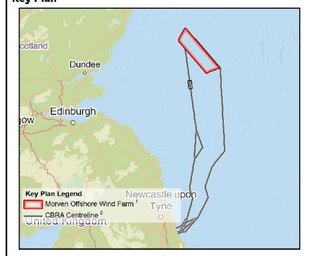
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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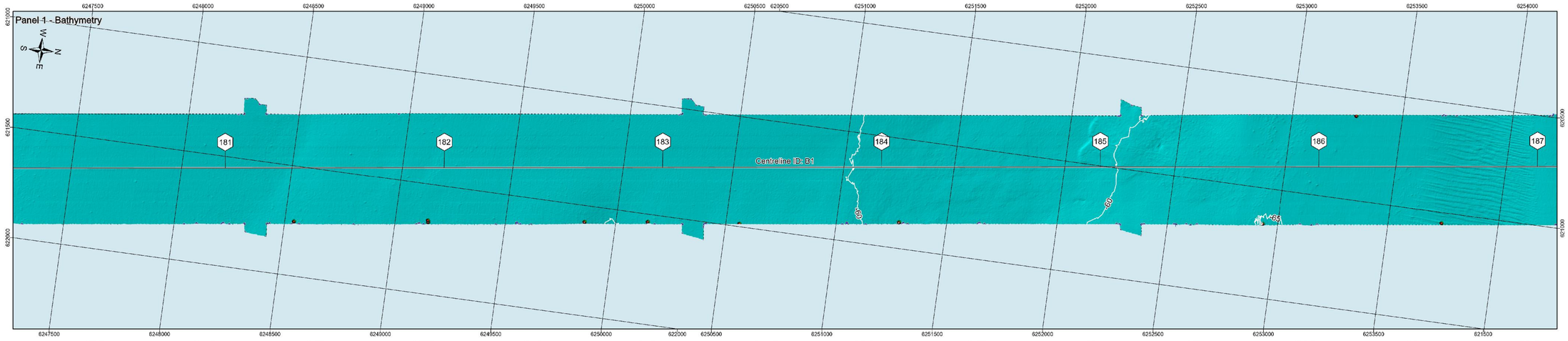
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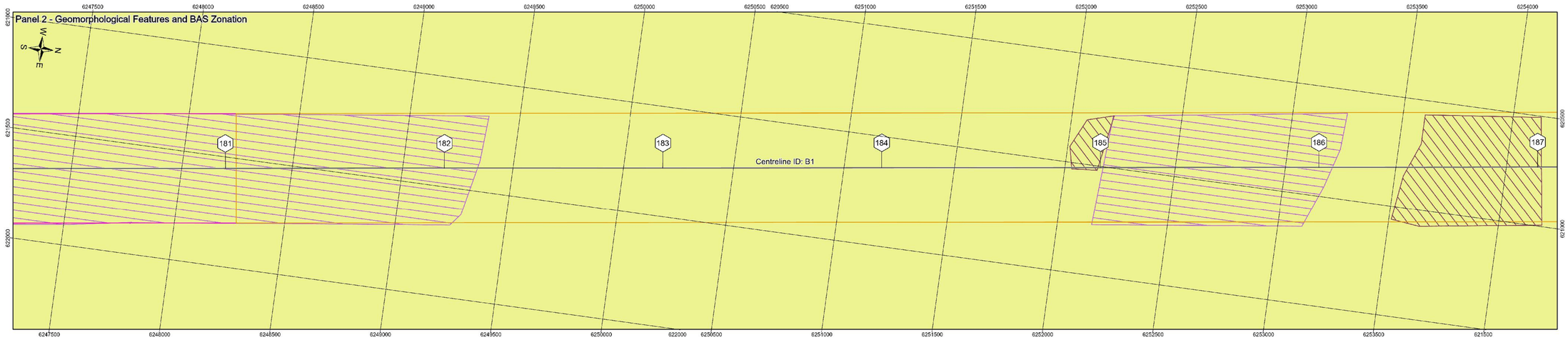
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 29 of 36

Drawing Status
Issue for Review

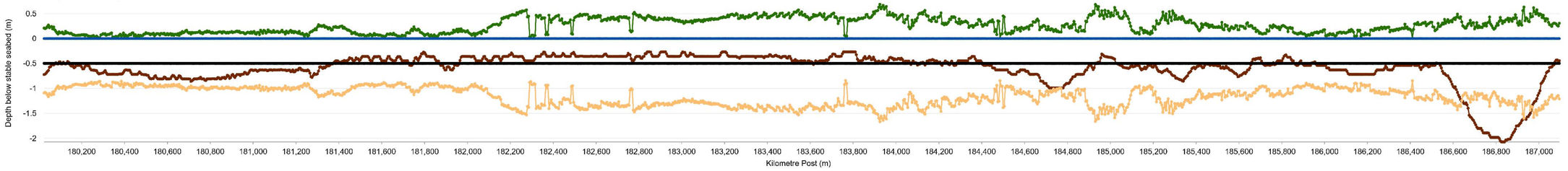
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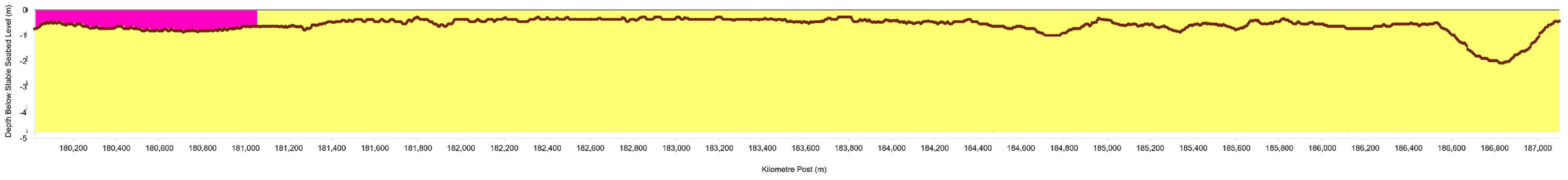




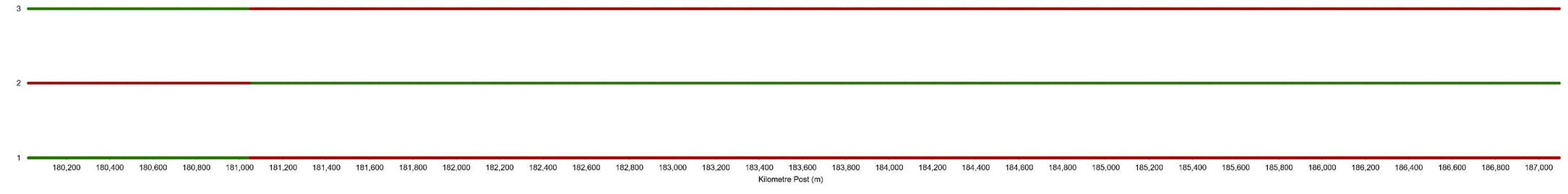
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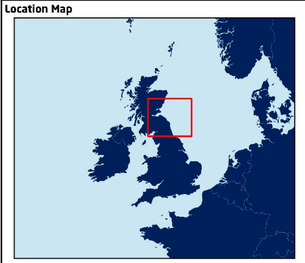
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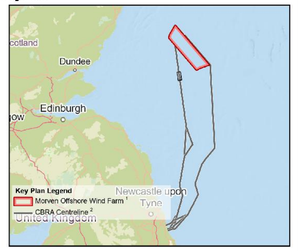
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Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
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Rock (R)	
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- Suitable [3]
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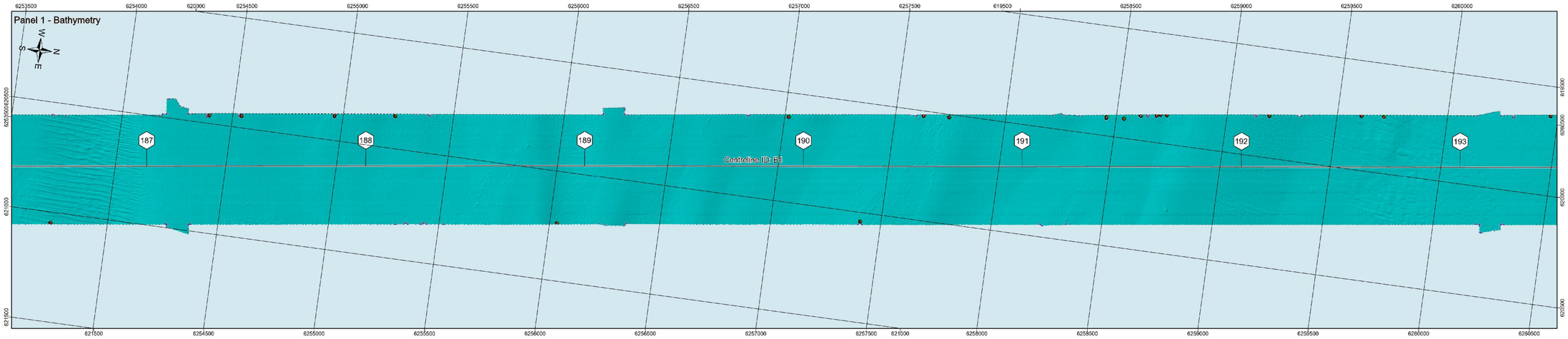
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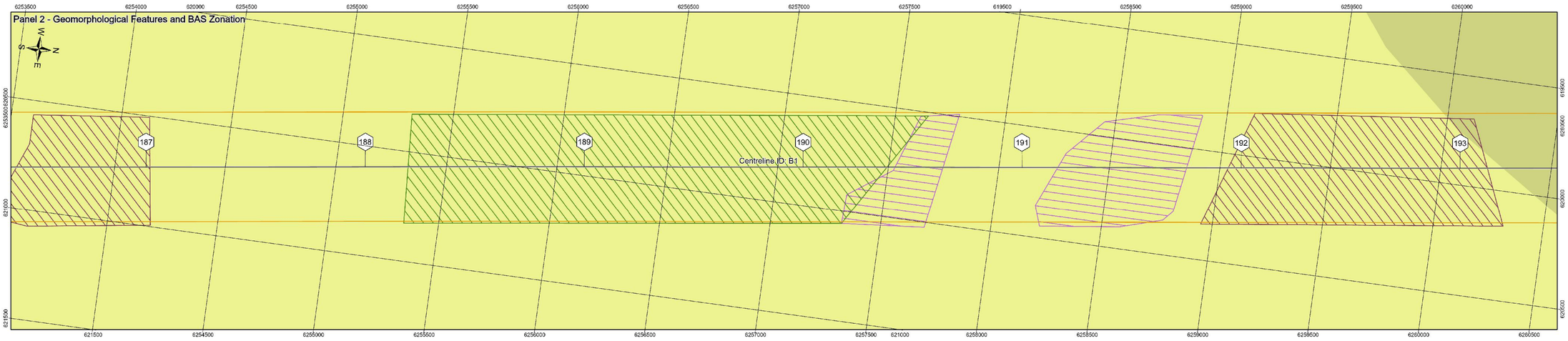
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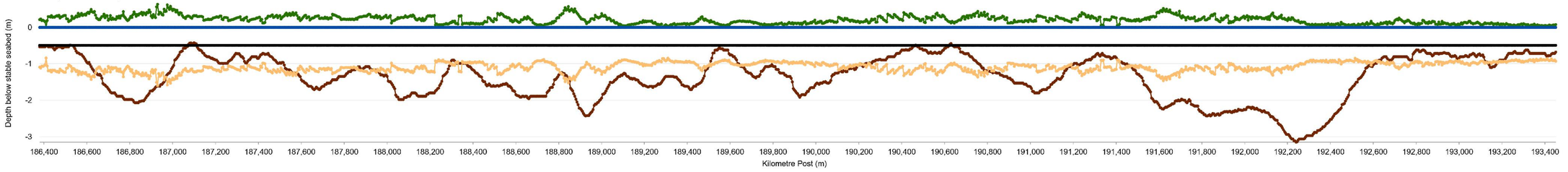
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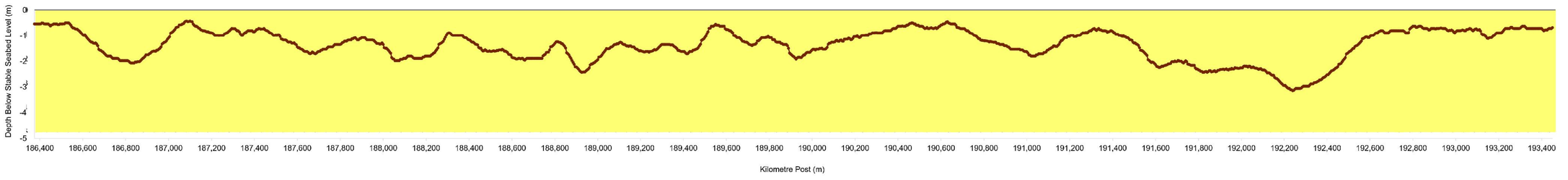




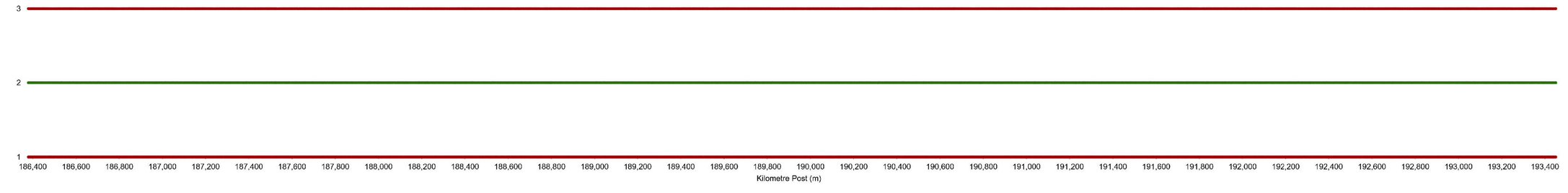
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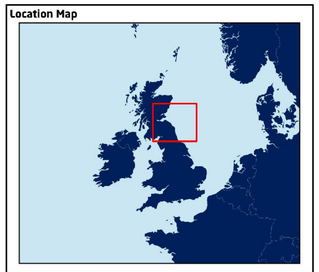
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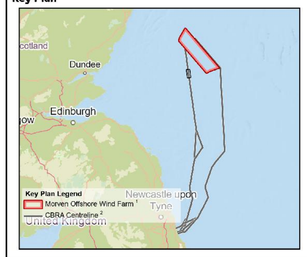
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- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
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- SEGL2 Installation Corridor [6]
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [5]
- Layer 1/Layer 2 Boundary [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [5]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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0 100 200 m

Spatial Reference
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Scale Factor: 0.9996
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Map Units: Meter

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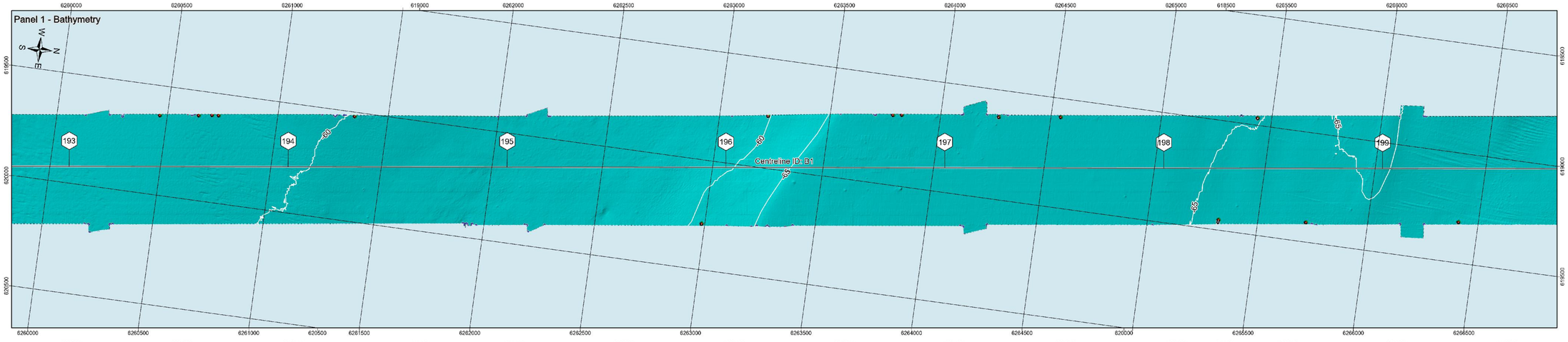
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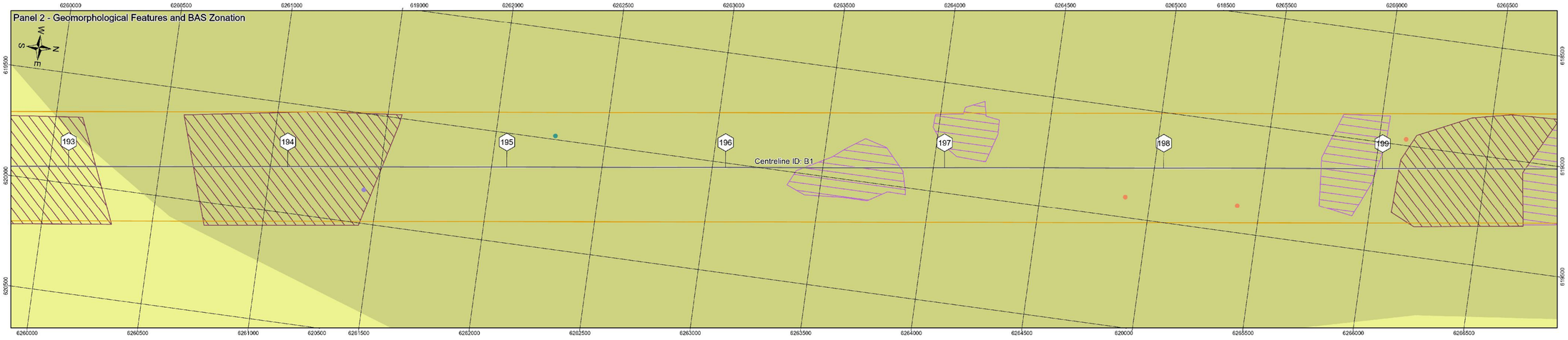
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 31 of 36

Drawing Status
Issue for Review

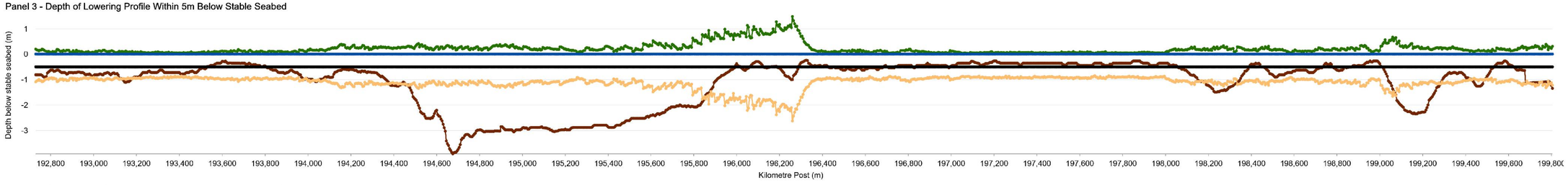
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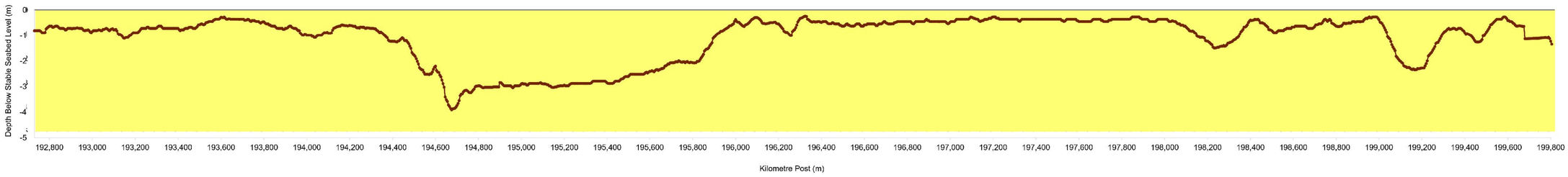




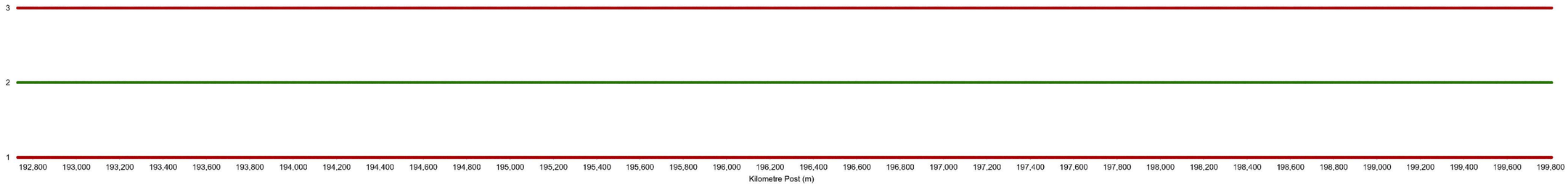
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



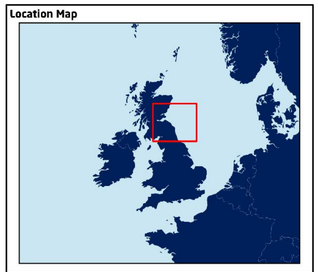
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



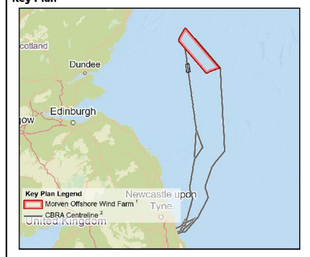
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
- Possible [3]
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Morven Offshore Wind Farm

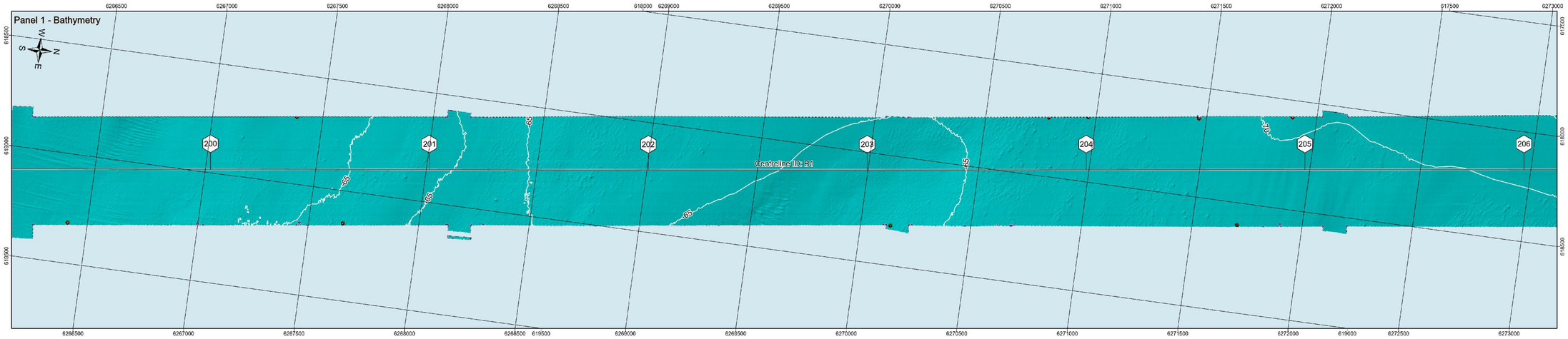
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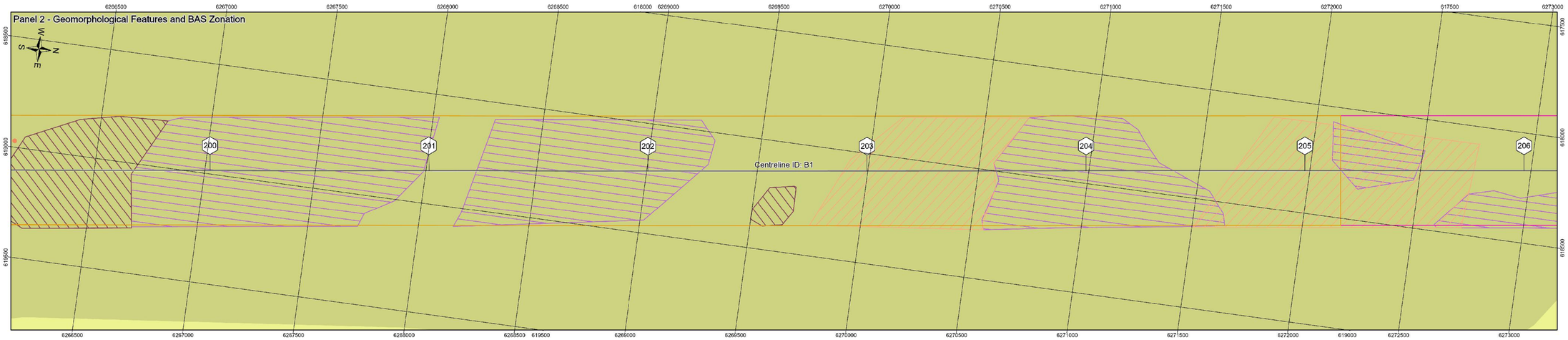
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 32 of 36

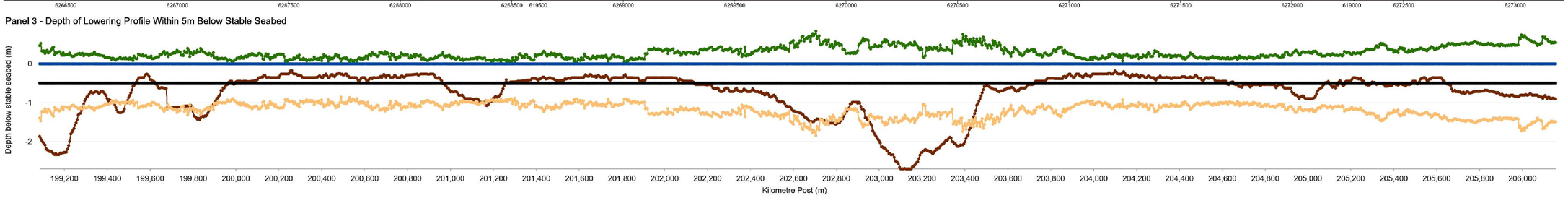
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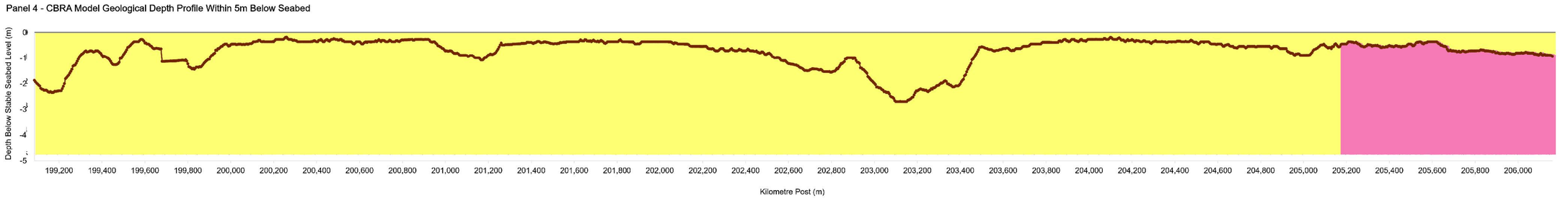
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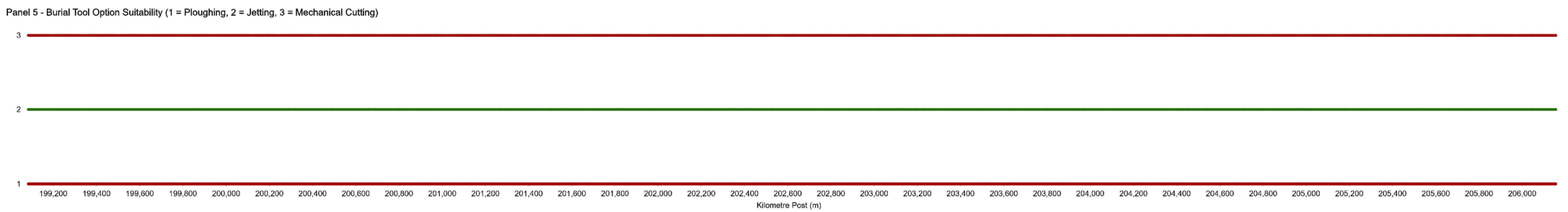
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Partners in UK offshore wind



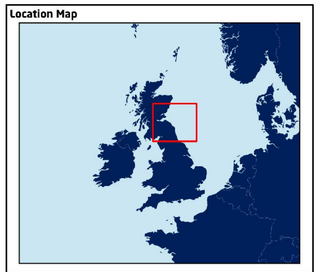




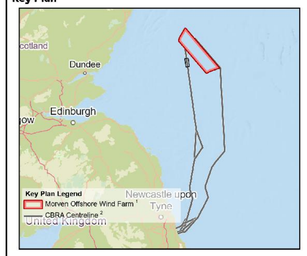




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Kilometre Post (1km Interval) [2]
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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
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- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
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- Very Low Strength CLAY (C2)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Map Units: Meter

Notes:
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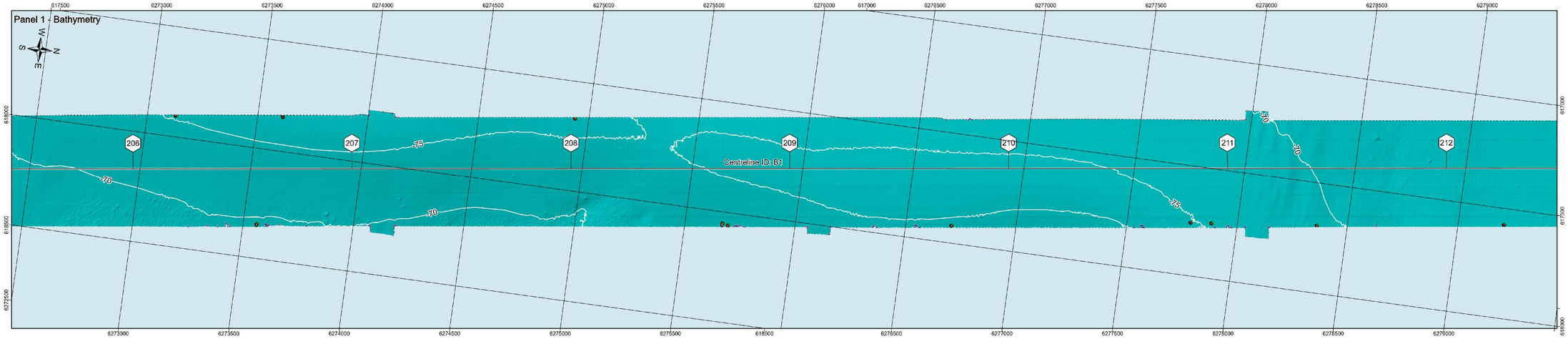
Report Title
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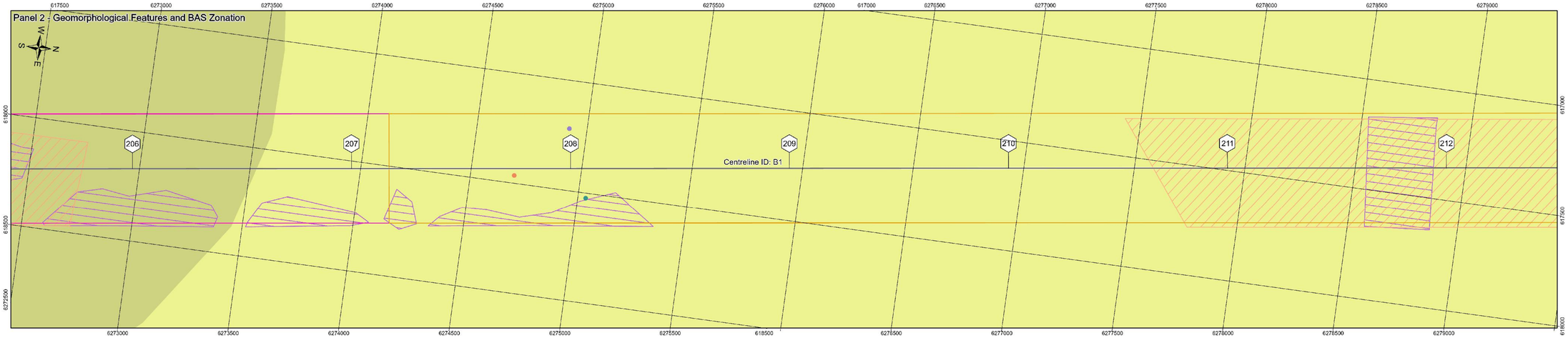
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 33 of 36

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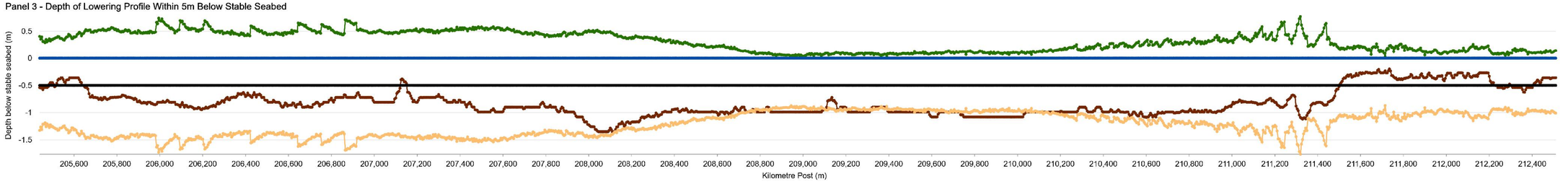
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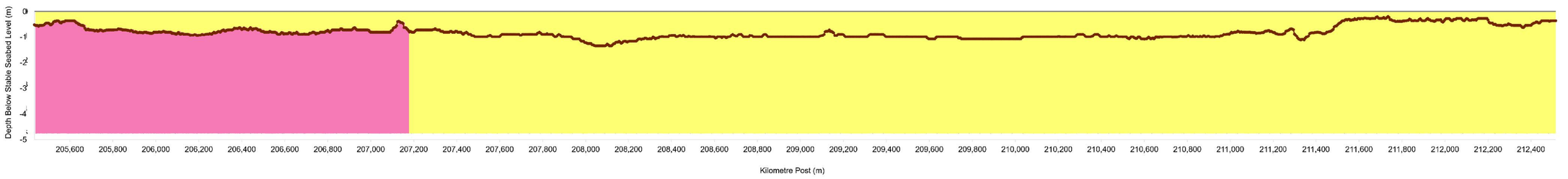




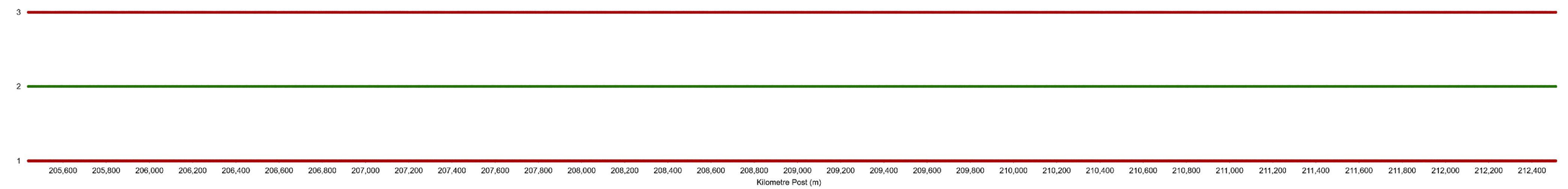
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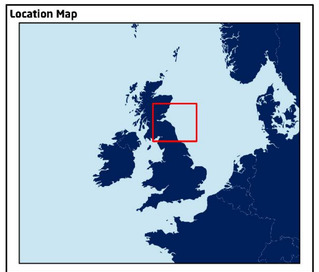
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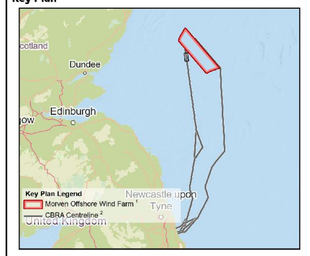
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Morven Offshore Wind Farm Cable Burial Risk Assessment

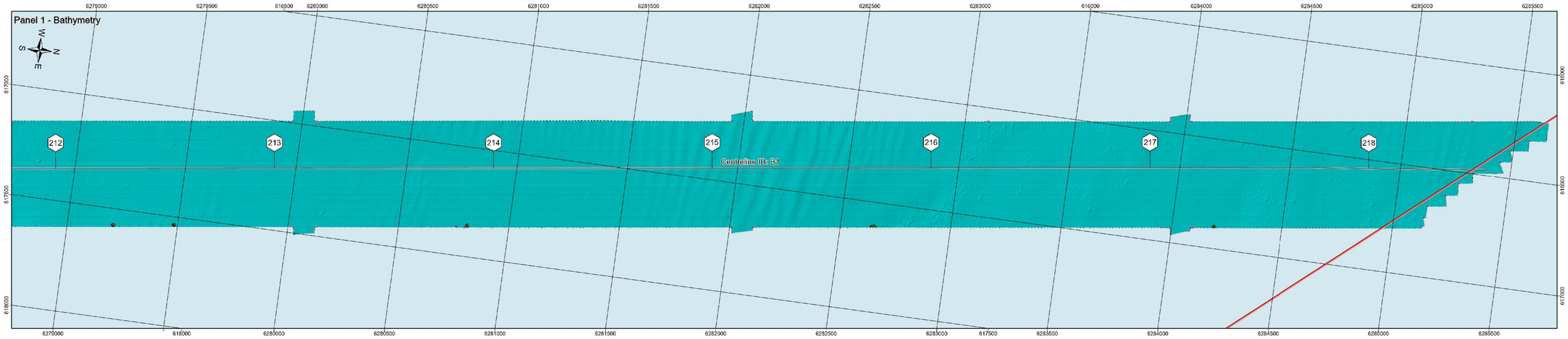
Drawing Title
CBRA Alignment Charts - Centreline ID: B1 - Sheet 34 of 36

Drawing Status
Issue for Review

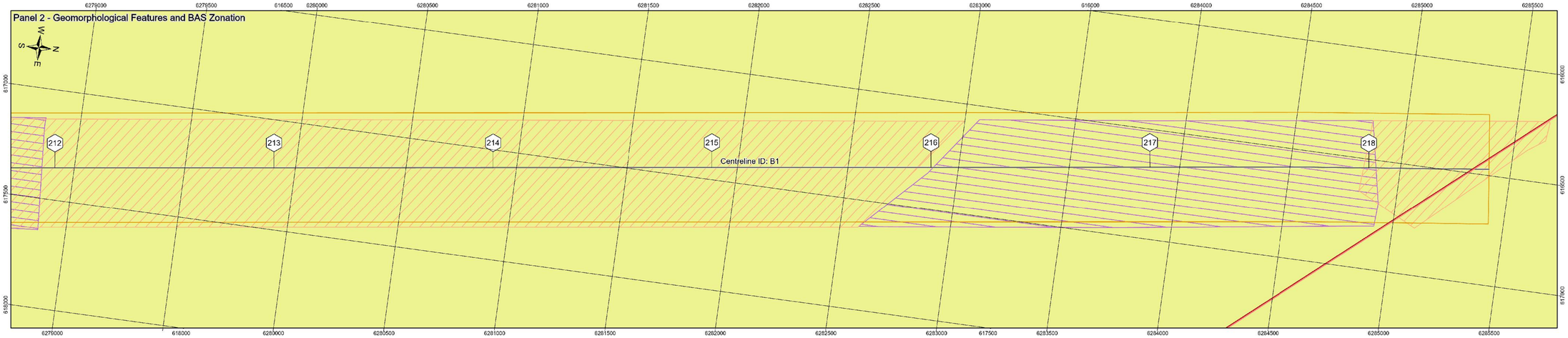
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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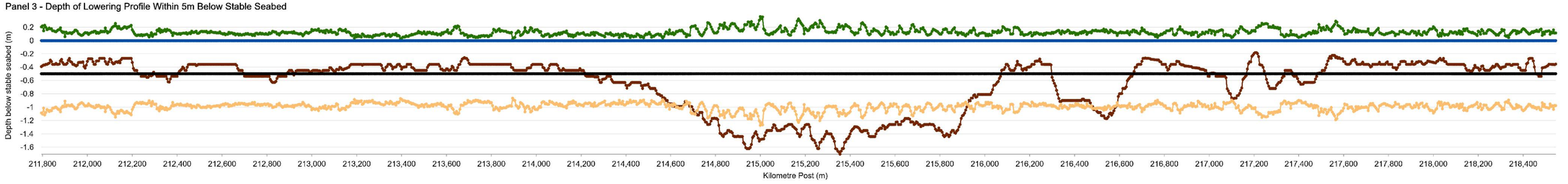
Panel 1 - Bathymetry



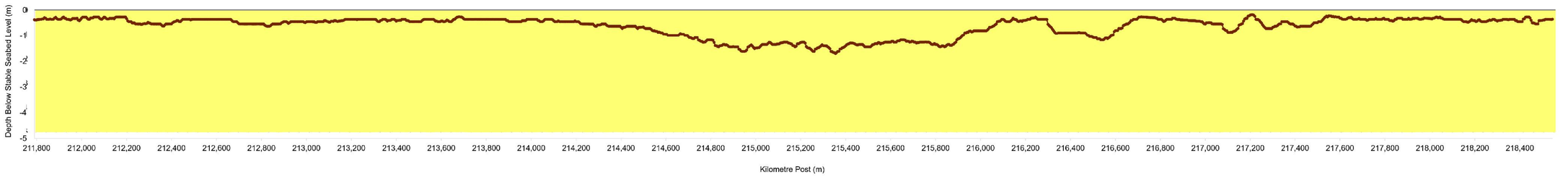
Panel 2 - Geomorphological Features and BAS Zonation



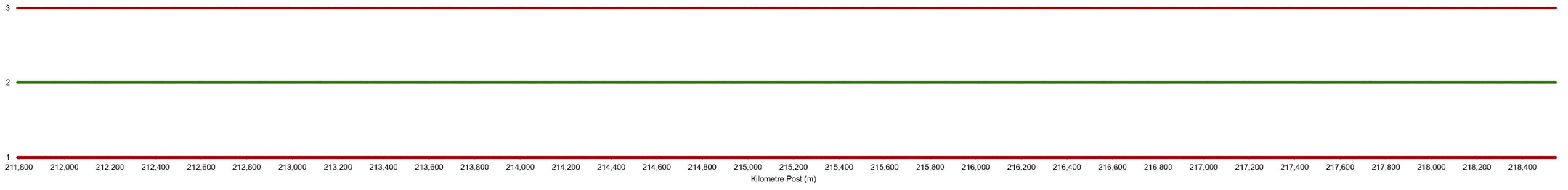
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



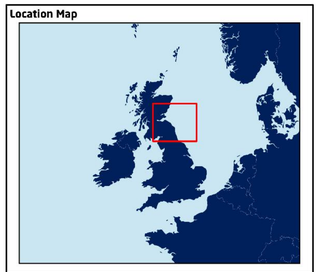
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



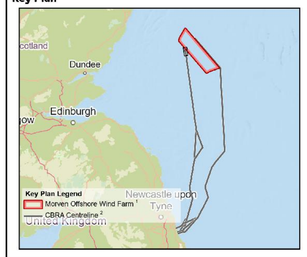
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]

Panel 2

BAS Zone Classification [3]
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Geomorphology [4]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Bedrock outcrop
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- Scouring
- Thin sediment cover
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- SEGL2 Installation Corridor [6]
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Panel 3
- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [9]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5
- Suitable [3]
- Possible [3]
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Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Morven Offshore Wind Farm

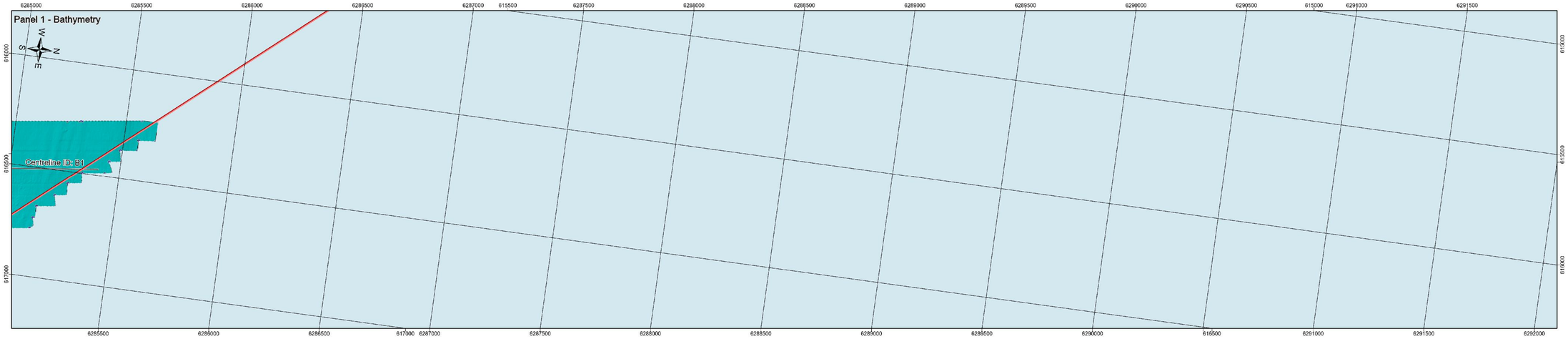
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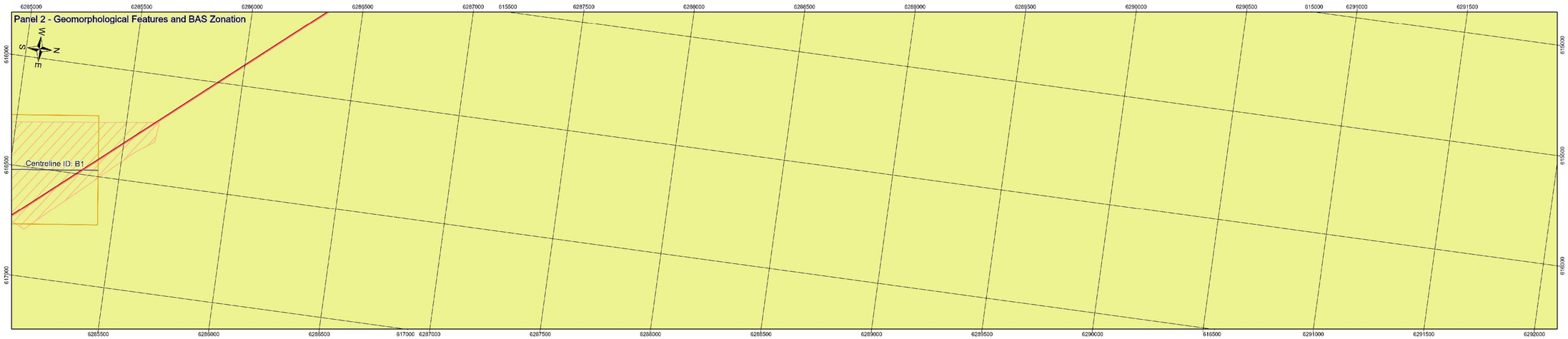
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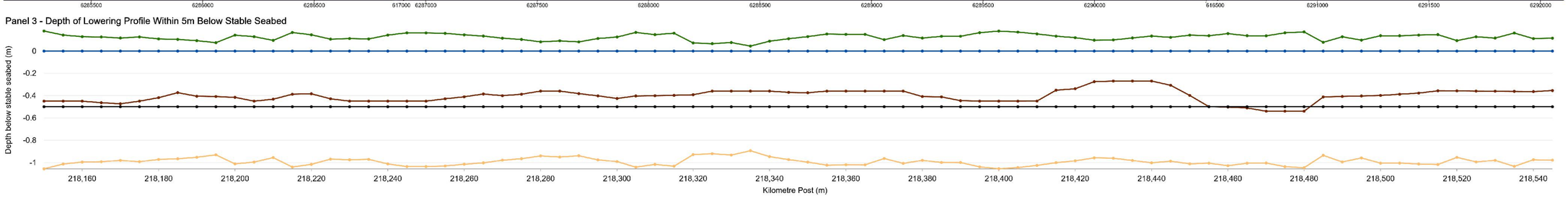
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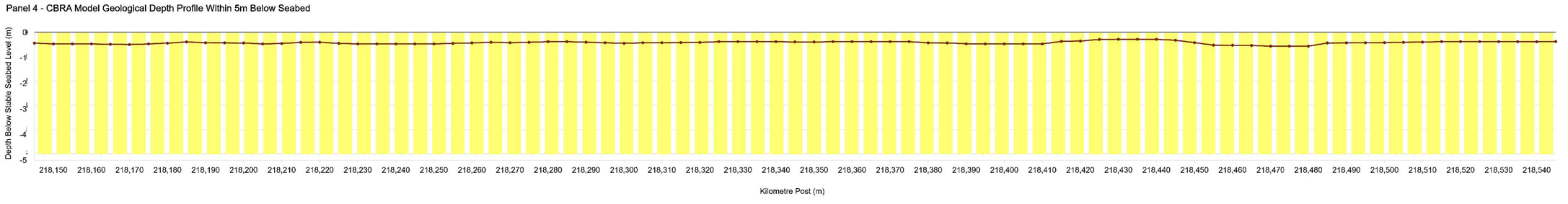
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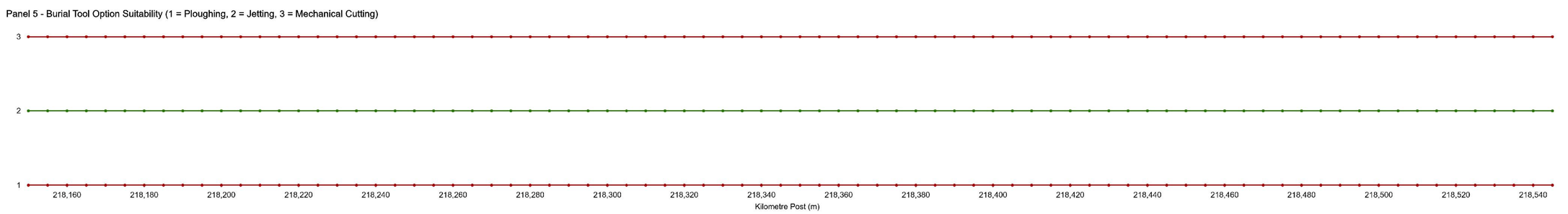
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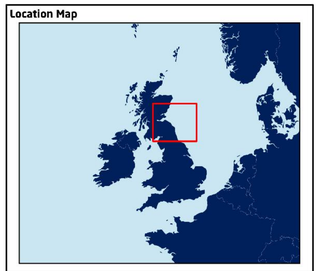




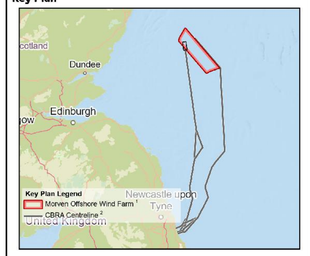




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Key Plan



Legend

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- Redline Boundary [1]

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- Layer 1/Layer 2 Boundary [8]

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- Suitable [3]
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Map Units: Meter

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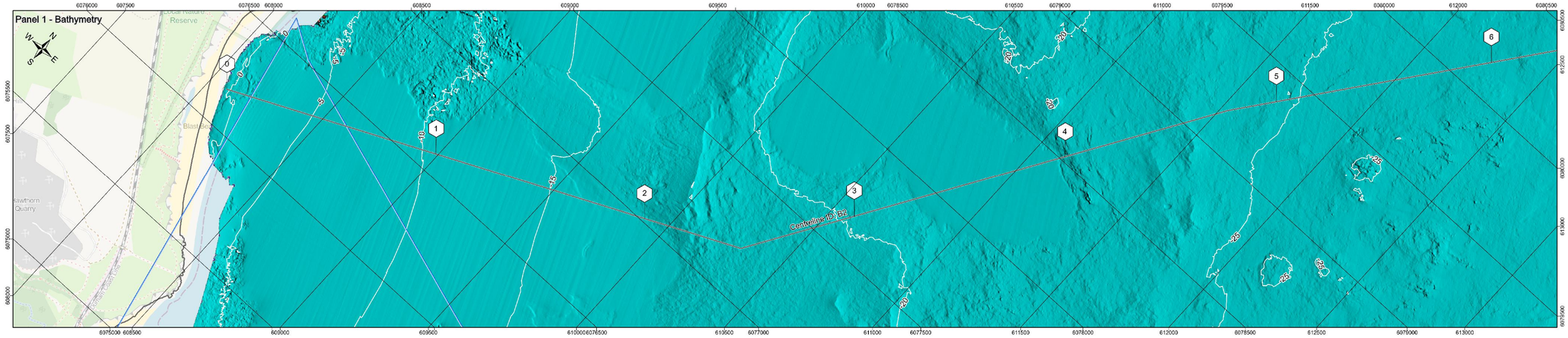
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CBRA Alignment Charts - Centreline ID: B1 - Sheet 36 of 36

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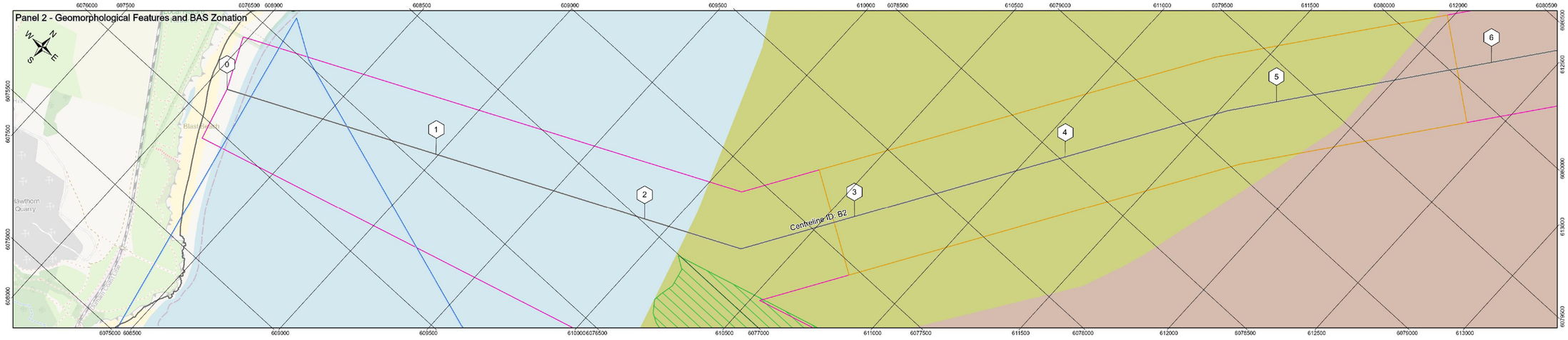
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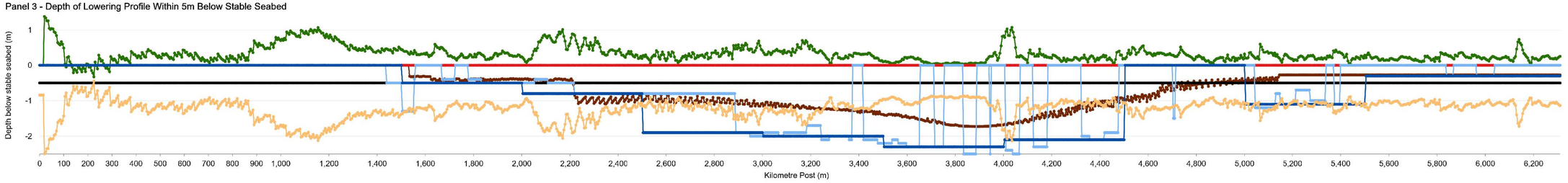
Panel 1 - Bathymetry



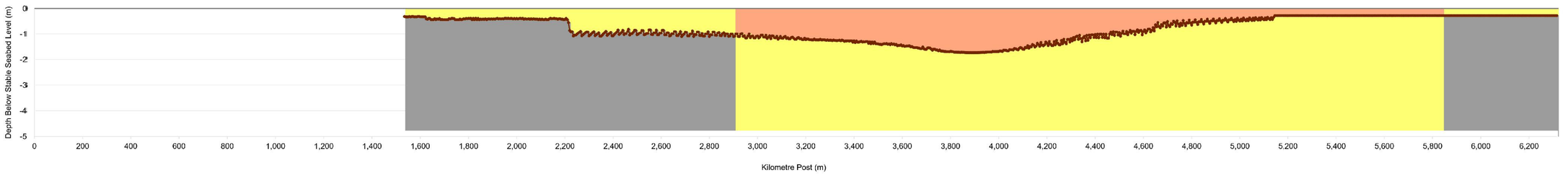
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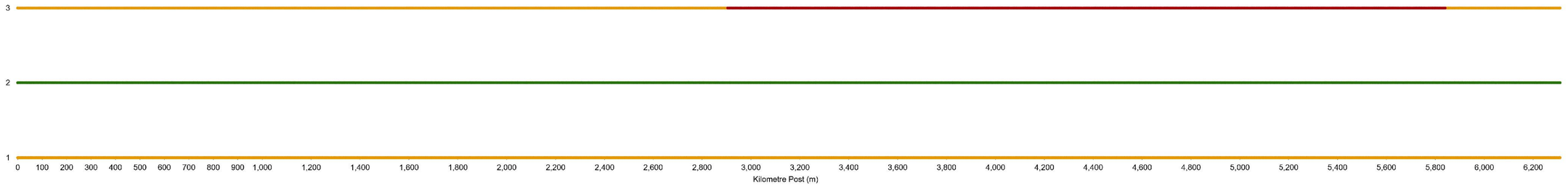
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



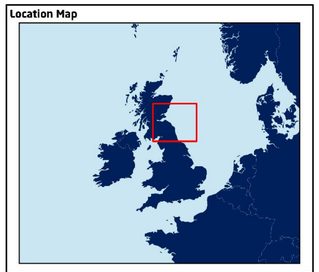
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



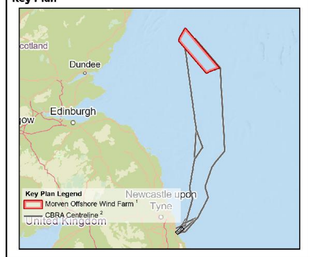
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Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

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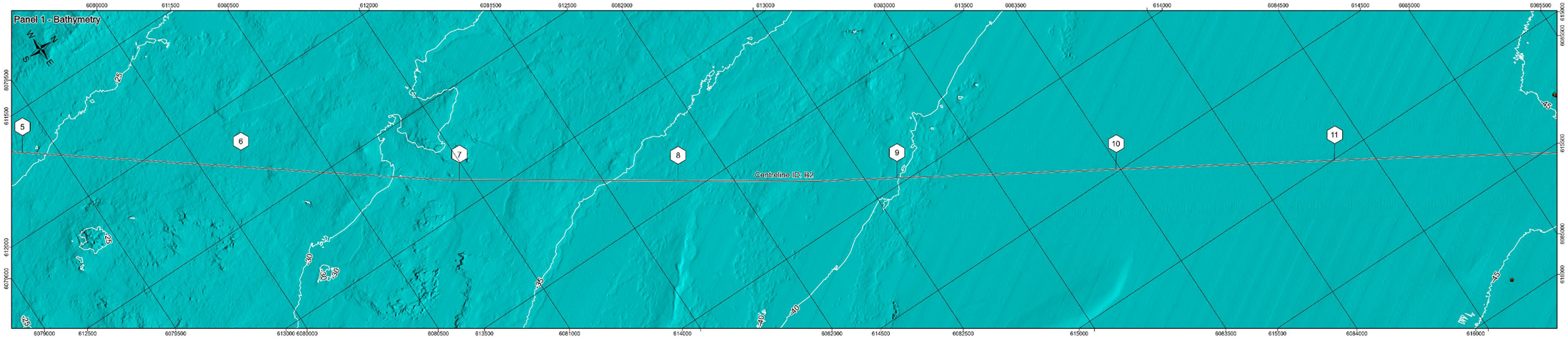
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 1 of 36

Drawing Status
Issue for Review

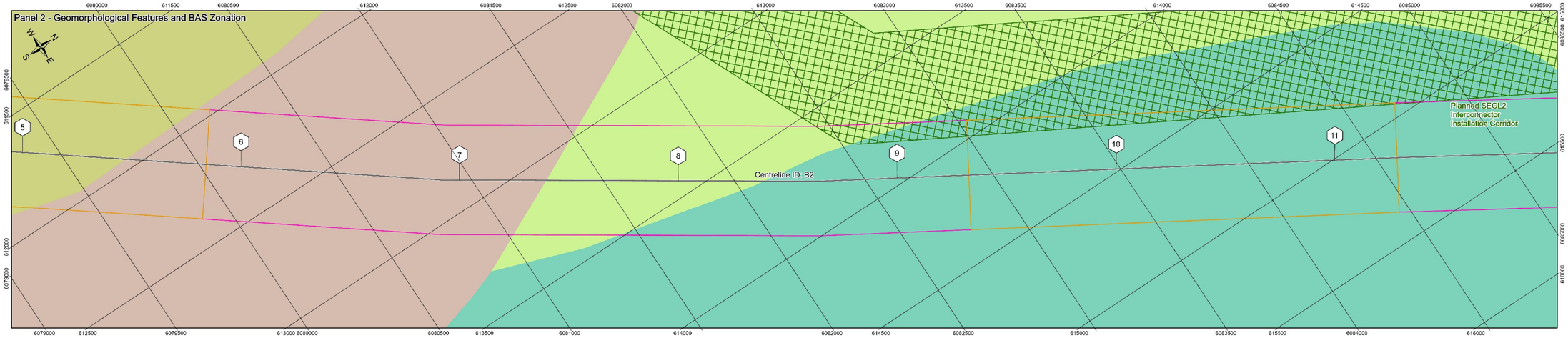
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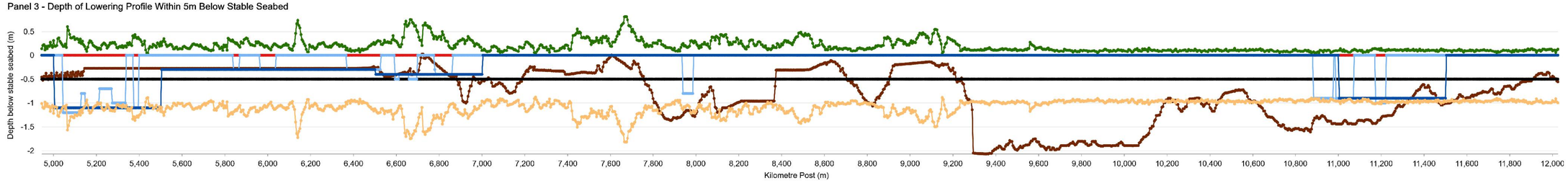
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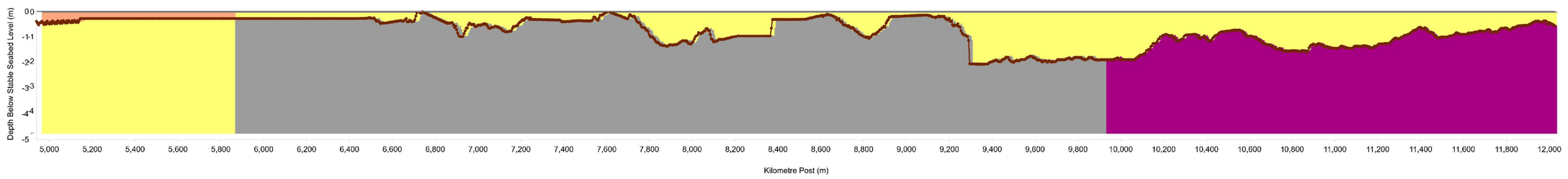
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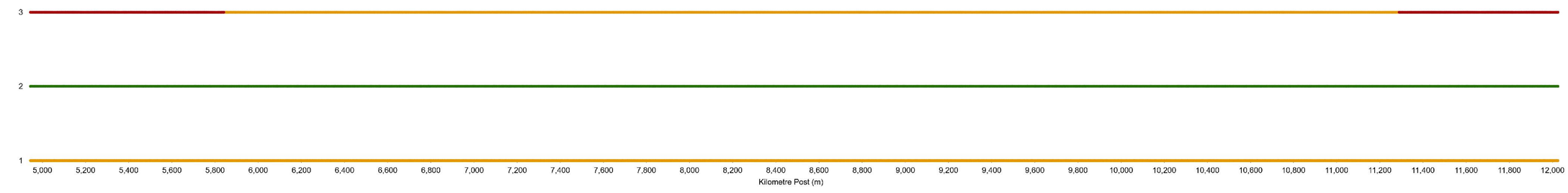
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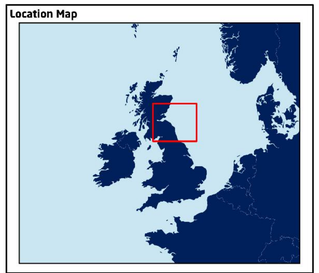
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



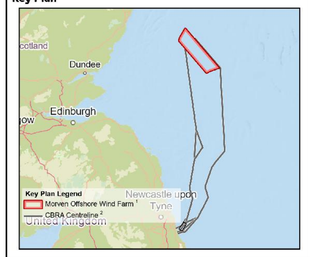
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m interval) [8]

Panel 2

BAS Zone Classification [3]
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- Sand or C1 - C3

Geomorphology [6]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
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- Scouring
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Seabed Substrate [7]
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [5]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Longitude of Origin: 0.0000
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Scale Factor: 0.9996
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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

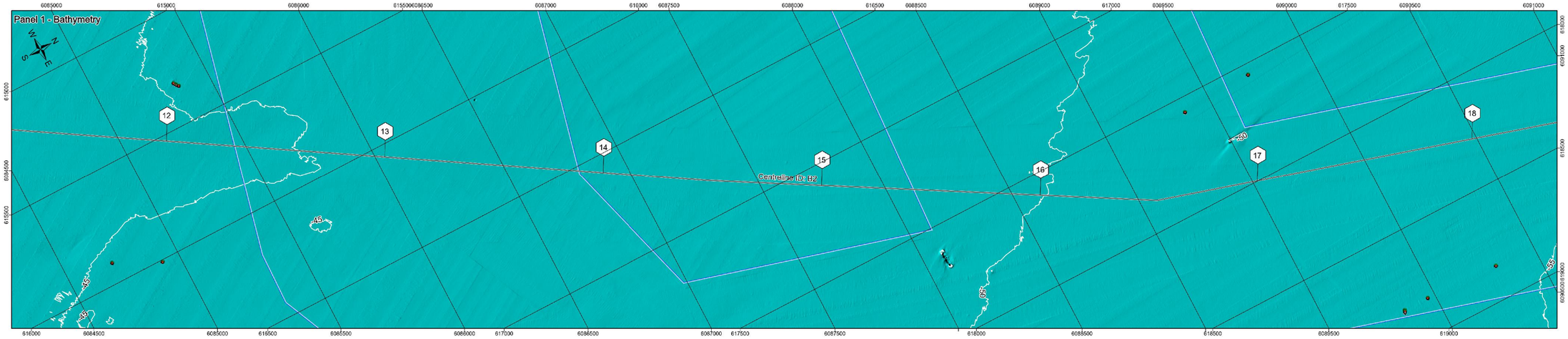
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 2 of 36

Drawing Status
Issue for Review

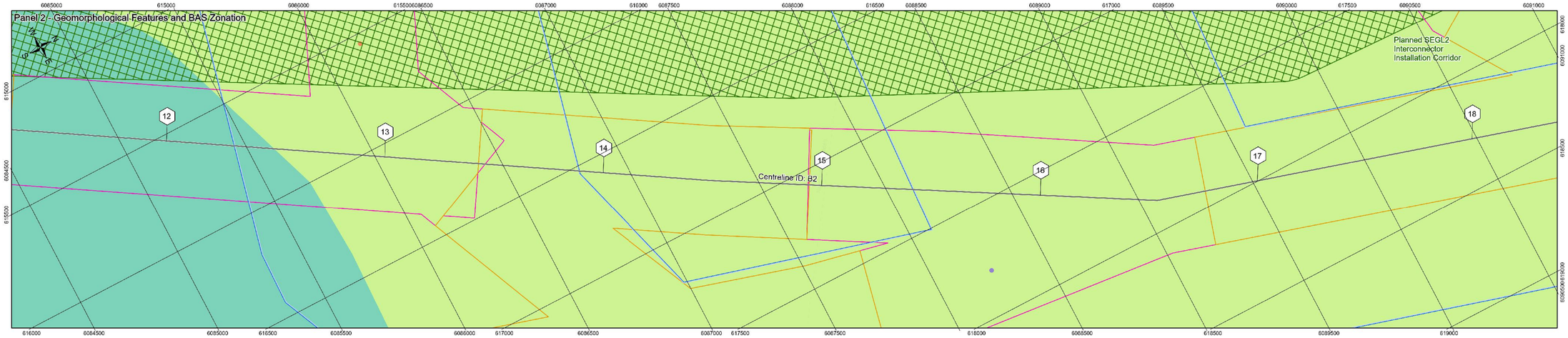
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GLOBAL MARITIME — EnBW bp — Partners in UK offshore wind

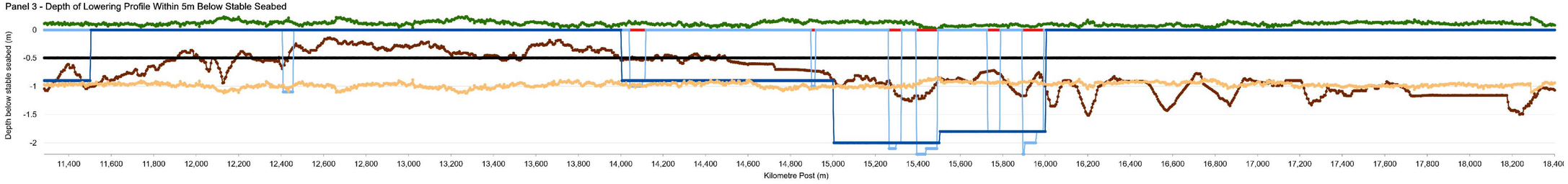
Panel 1 - Bathymetry



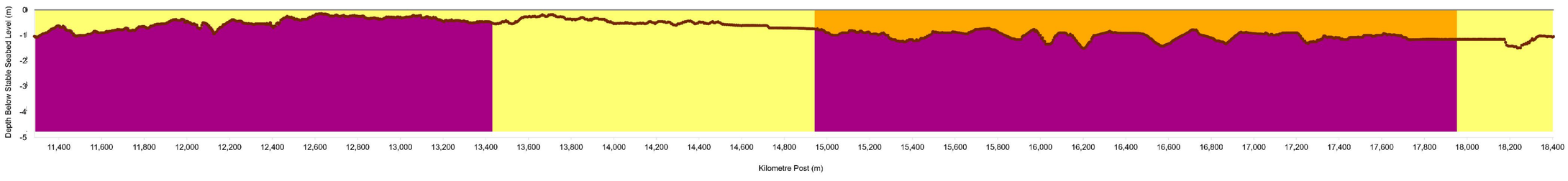
Panel 2 - Geomorphological Features and BAS Zonation



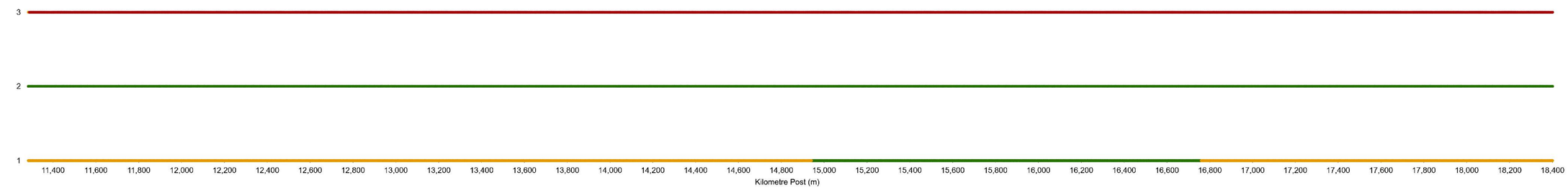
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



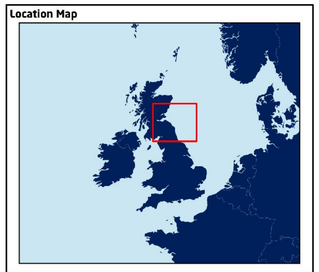
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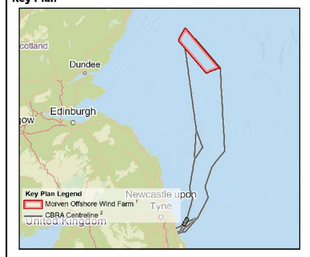
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
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Morven Offshore Wind Farm

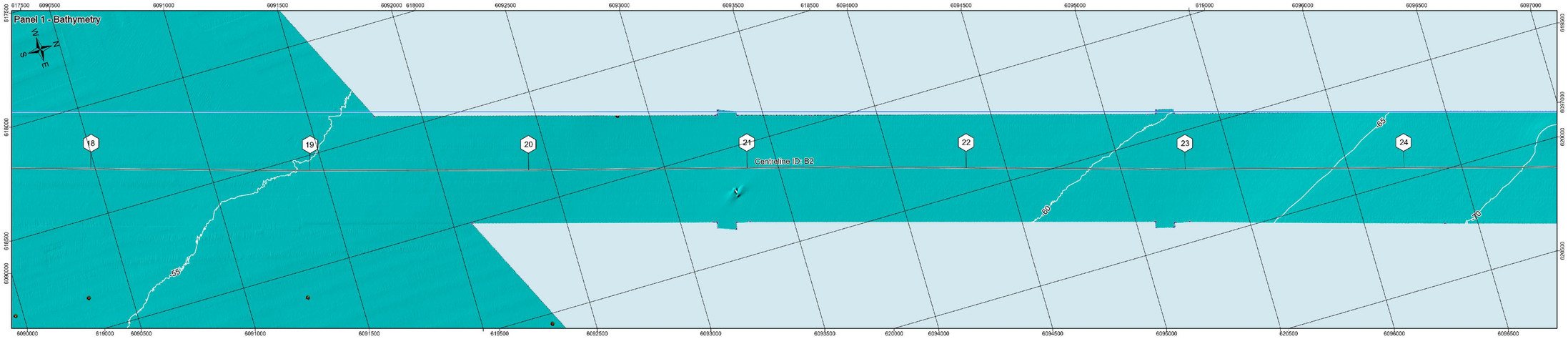
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

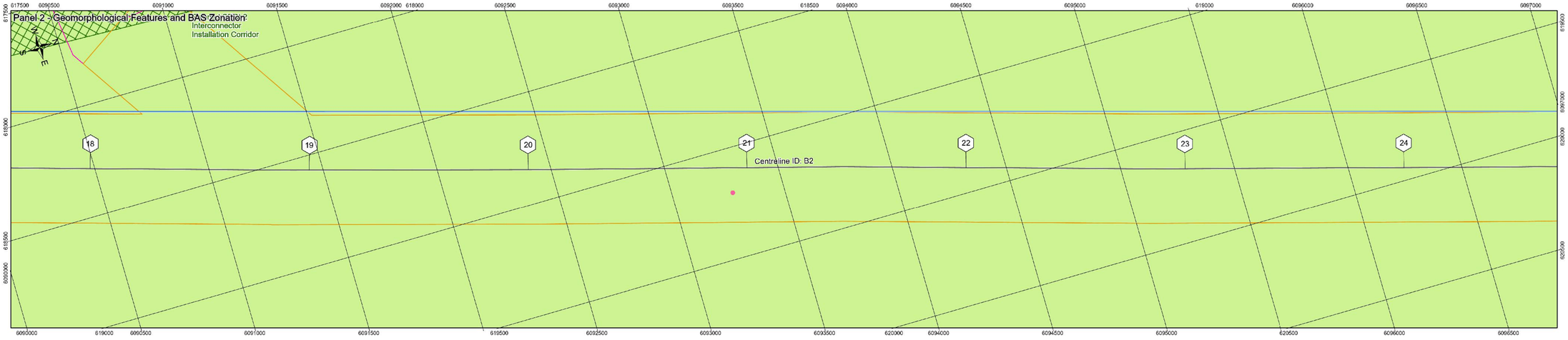
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 3 of 36

Drawing Status
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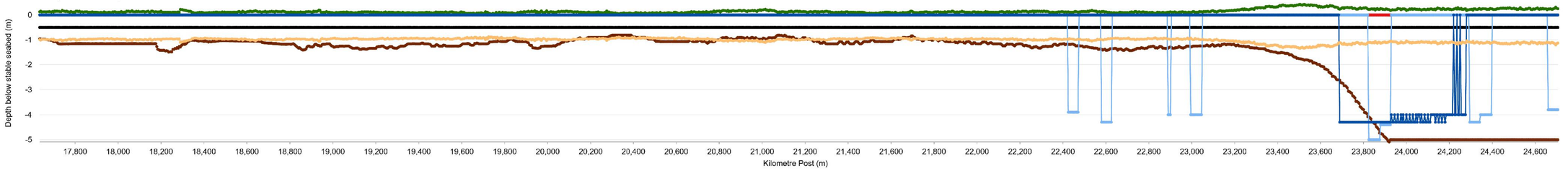
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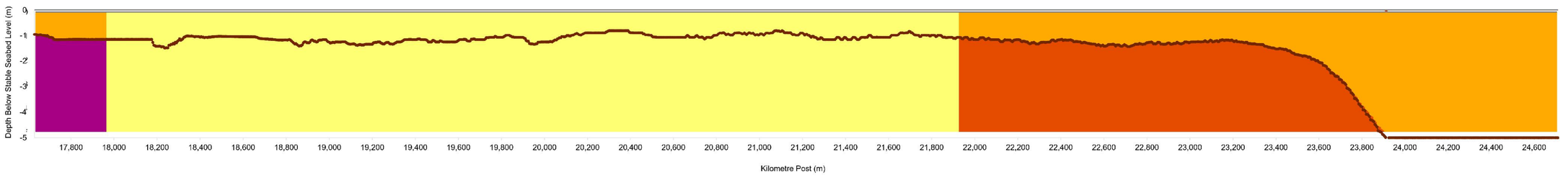




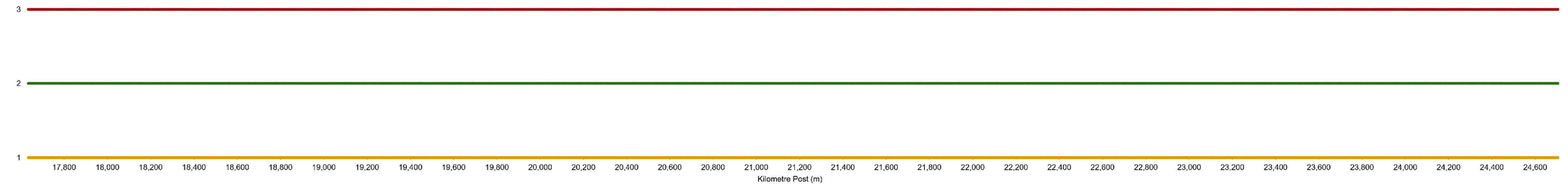
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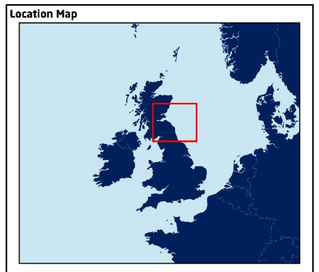
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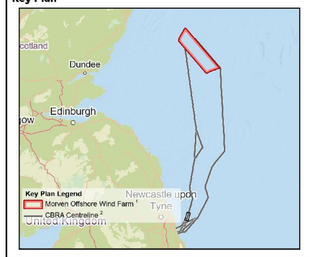
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- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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- Suitable [3]
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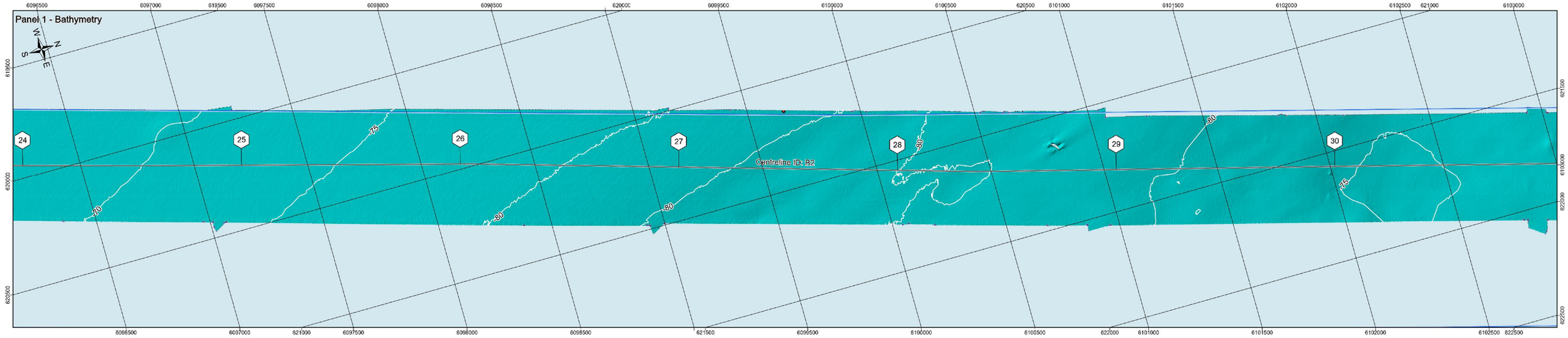
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 4 of 36

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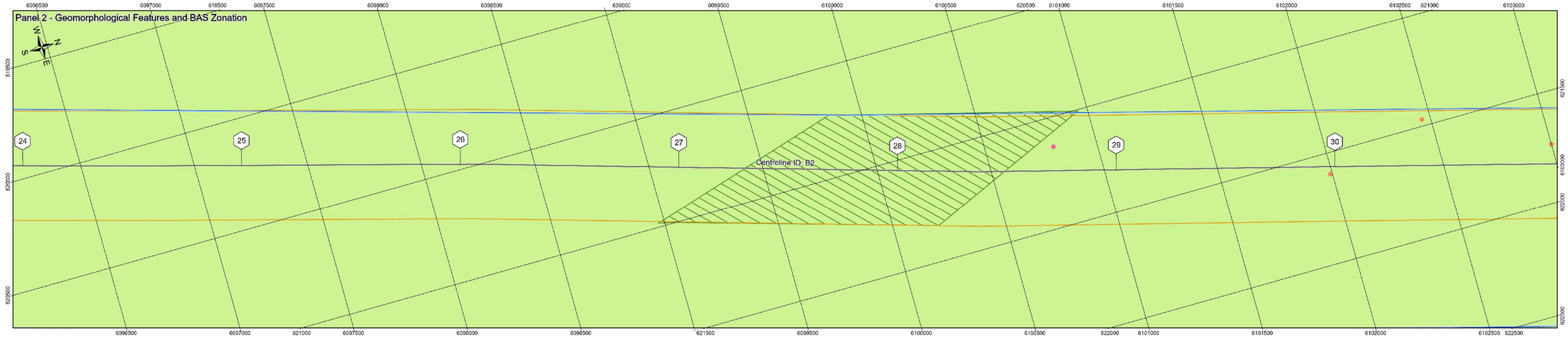
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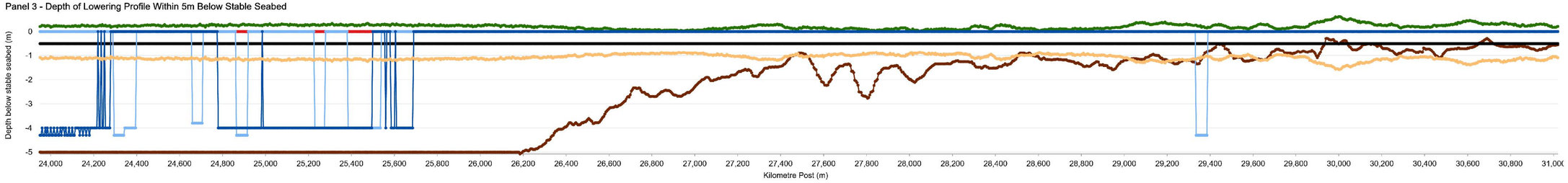
Panel 1 - Bathymetry



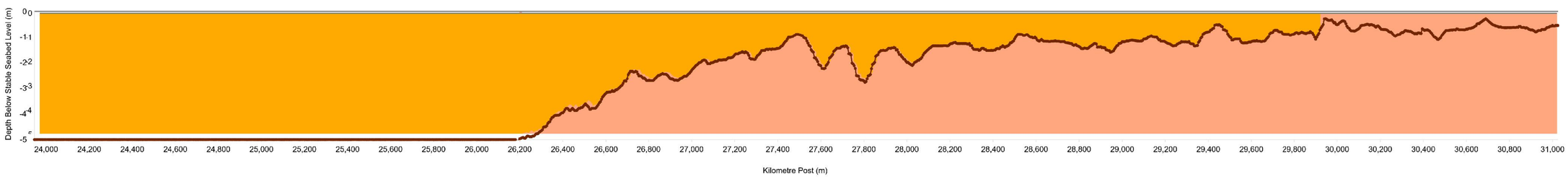
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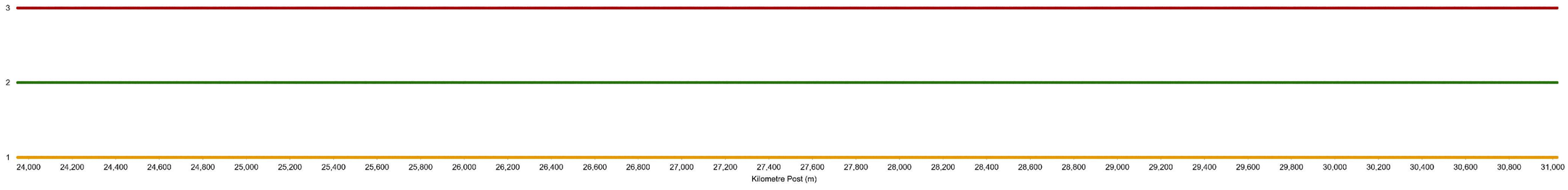
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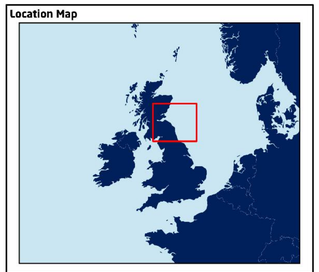
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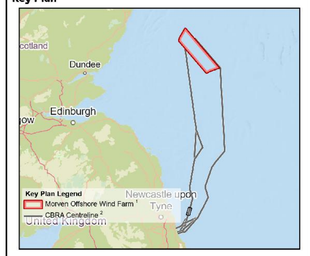
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

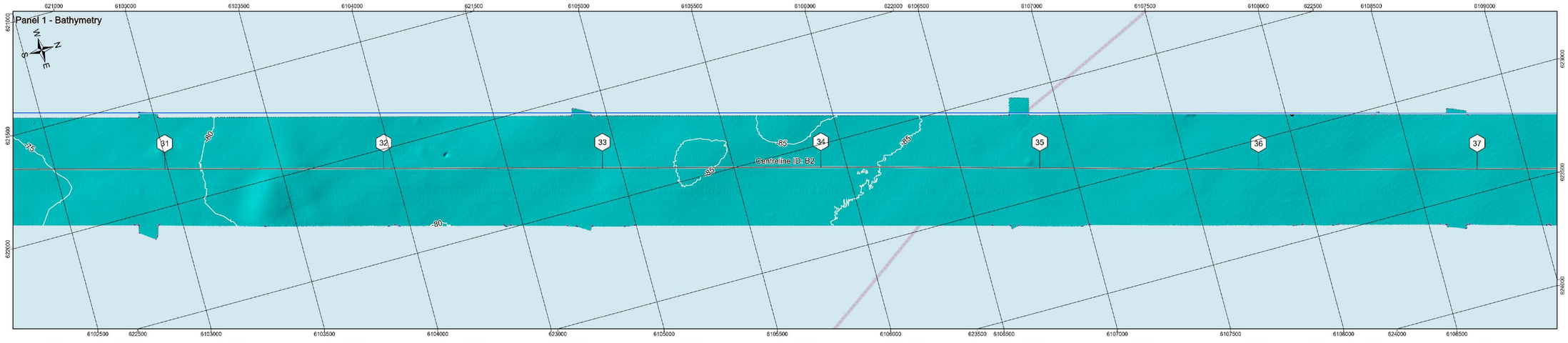
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 5 of 36

Drawing Status
Issue for Review

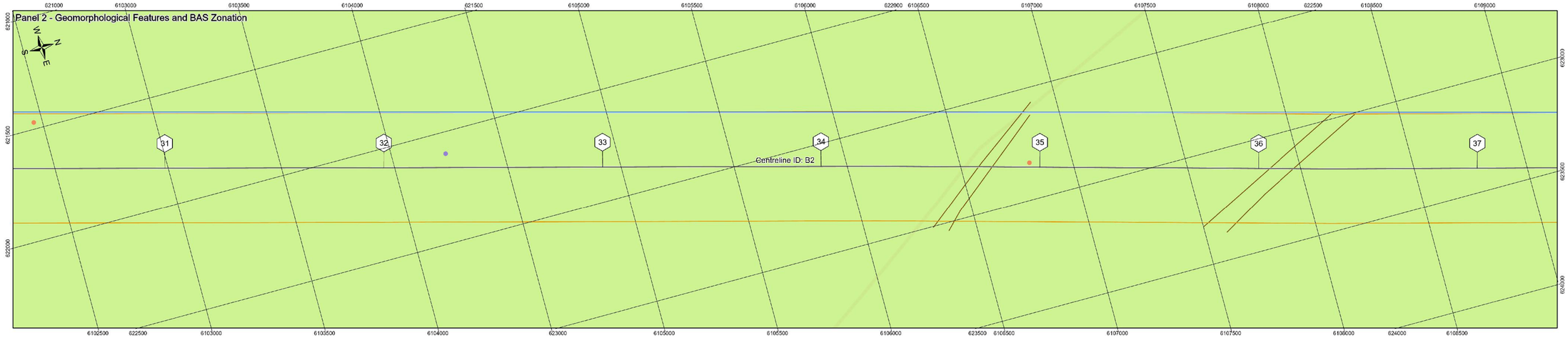
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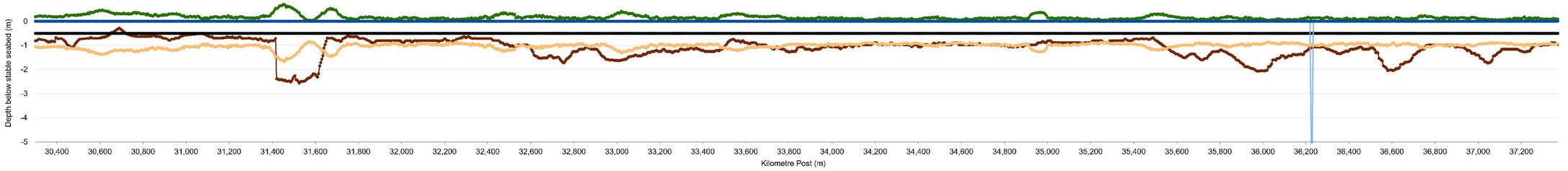
Panel 1 - Bathymetry



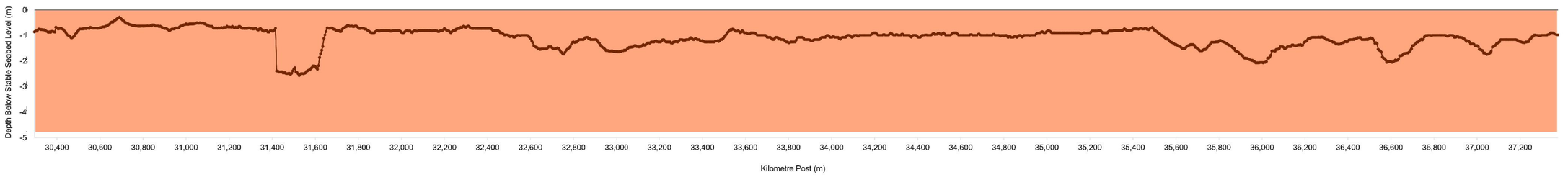
Panel 2 - Geomorphological Features and BAS Zonation



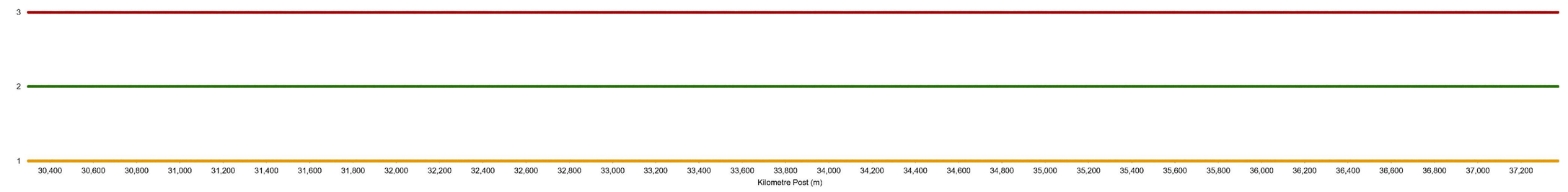
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



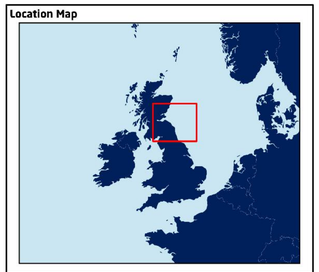
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



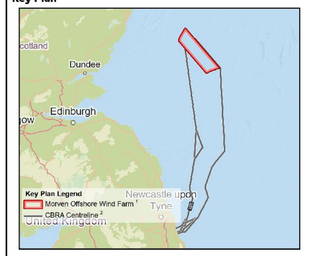
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
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BAS Zone Classification [3]
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- Depression
- Depression with boulder/debris
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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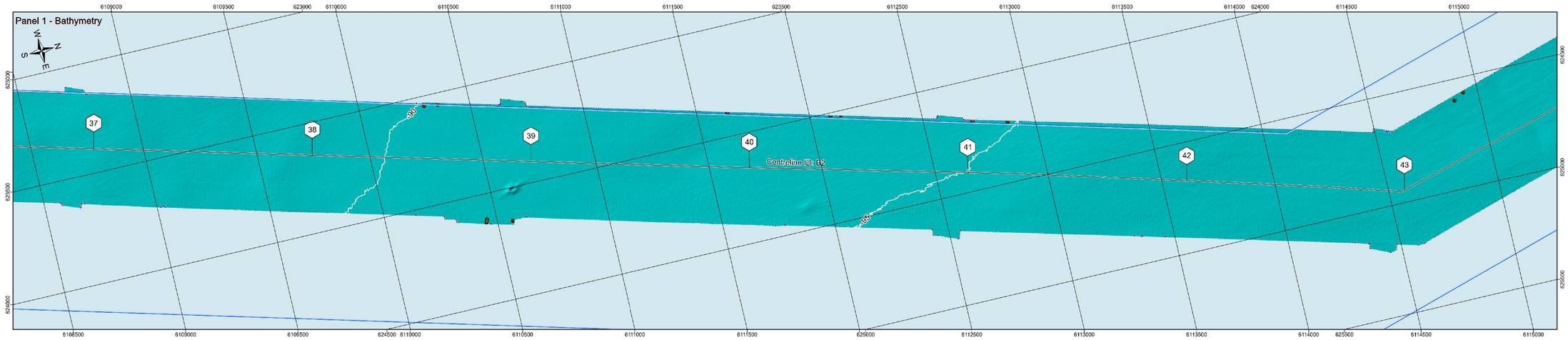
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 6 of 36

Drawing Status
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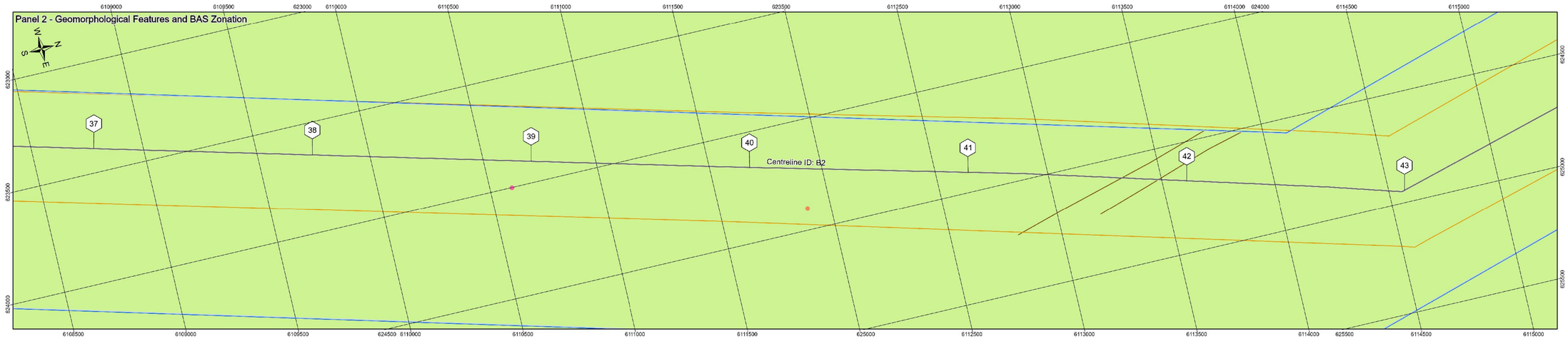
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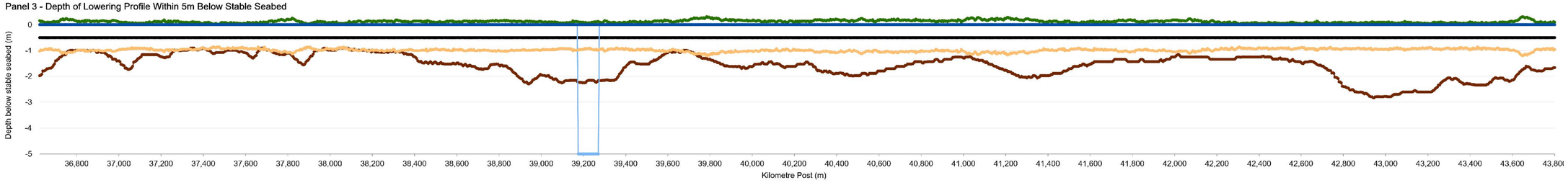
Panel 1 - Bathymetry



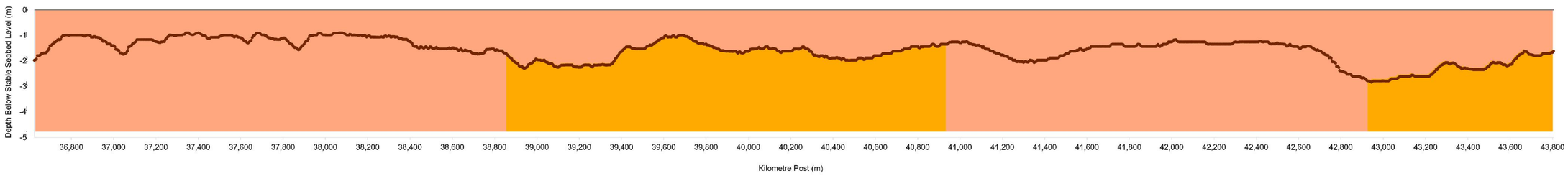
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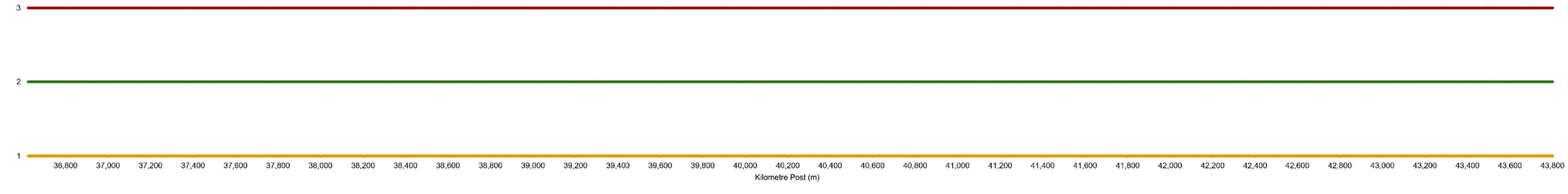
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



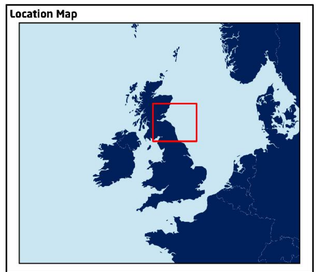
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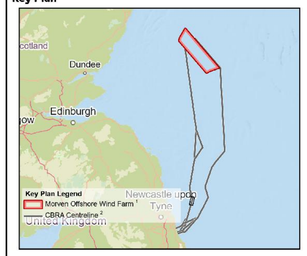
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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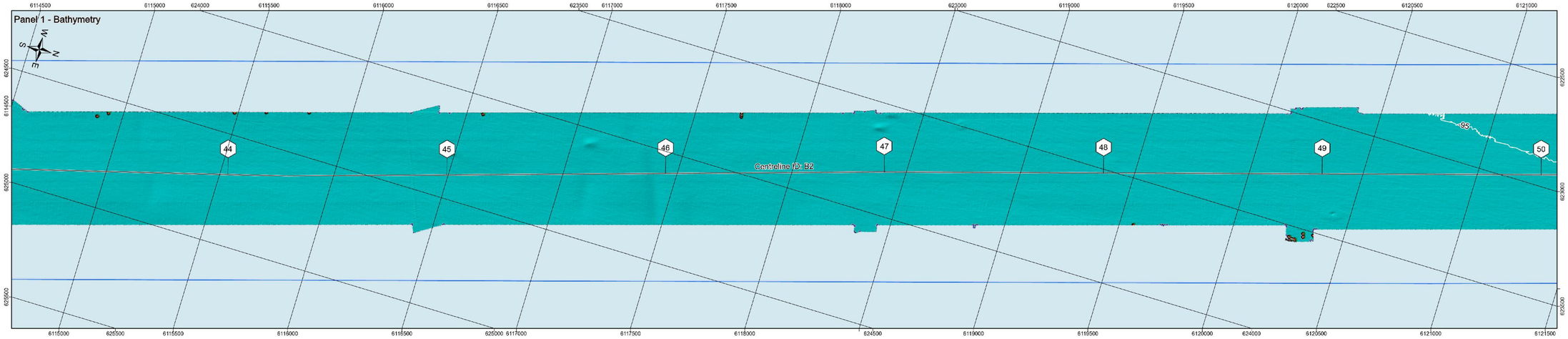
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 7 of 36

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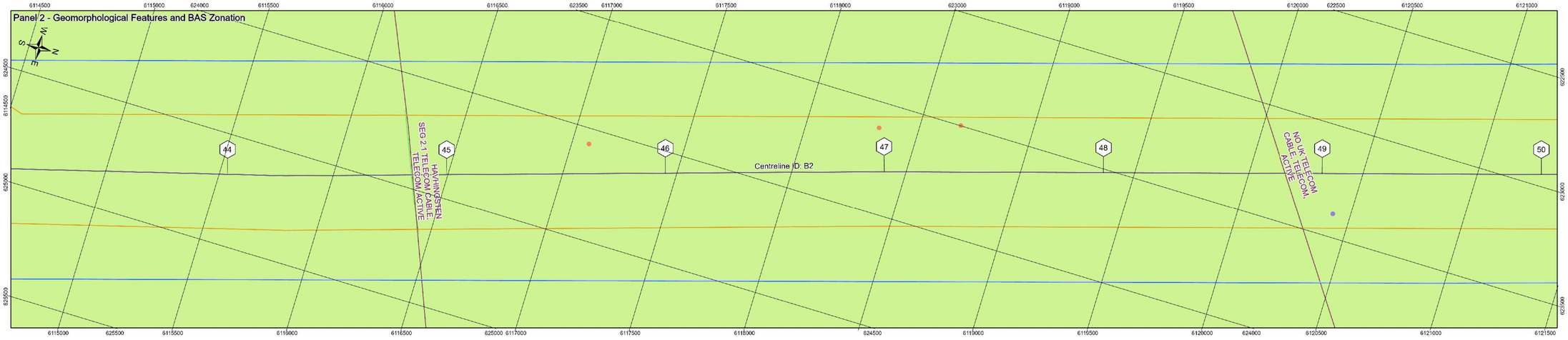
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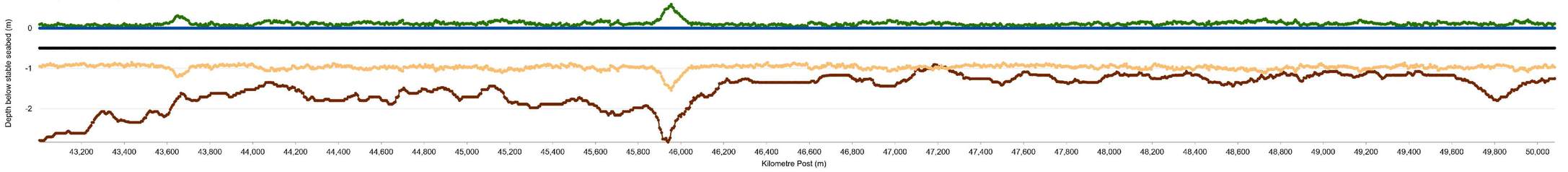
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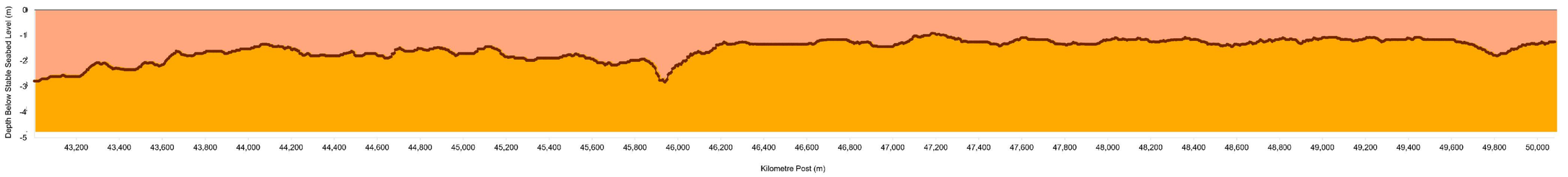
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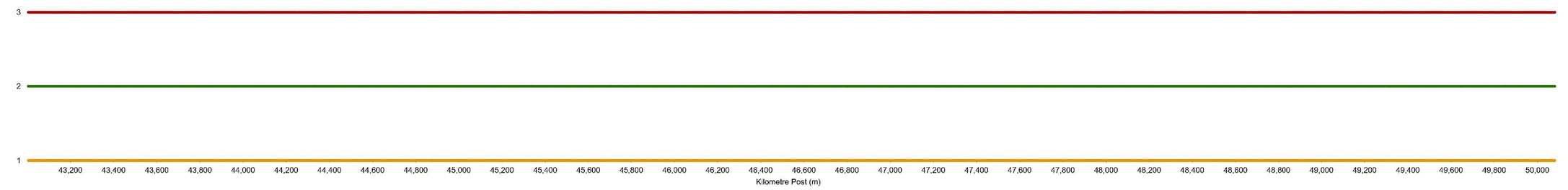
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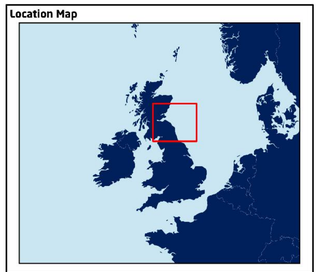
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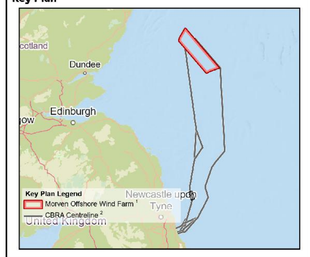
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High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

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- Suitable [3]
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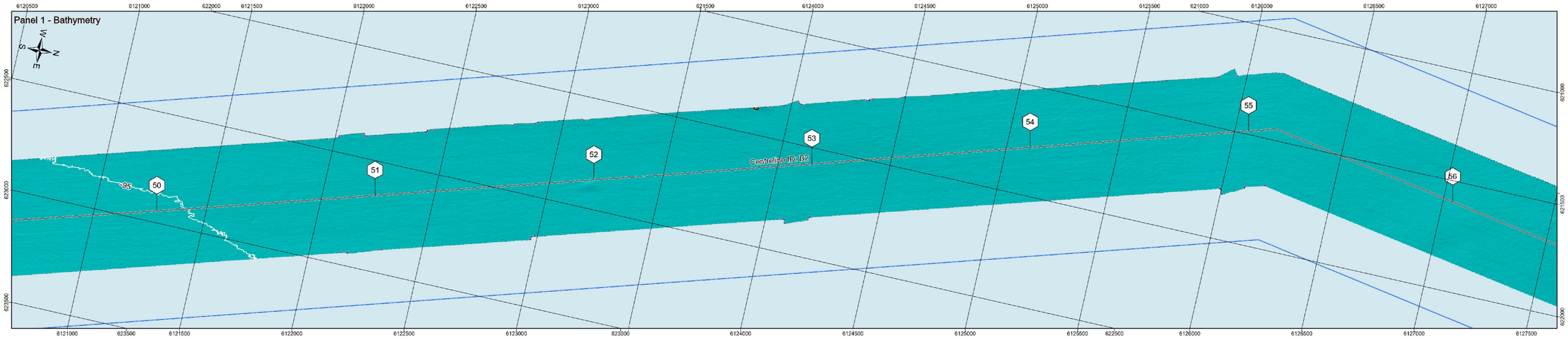
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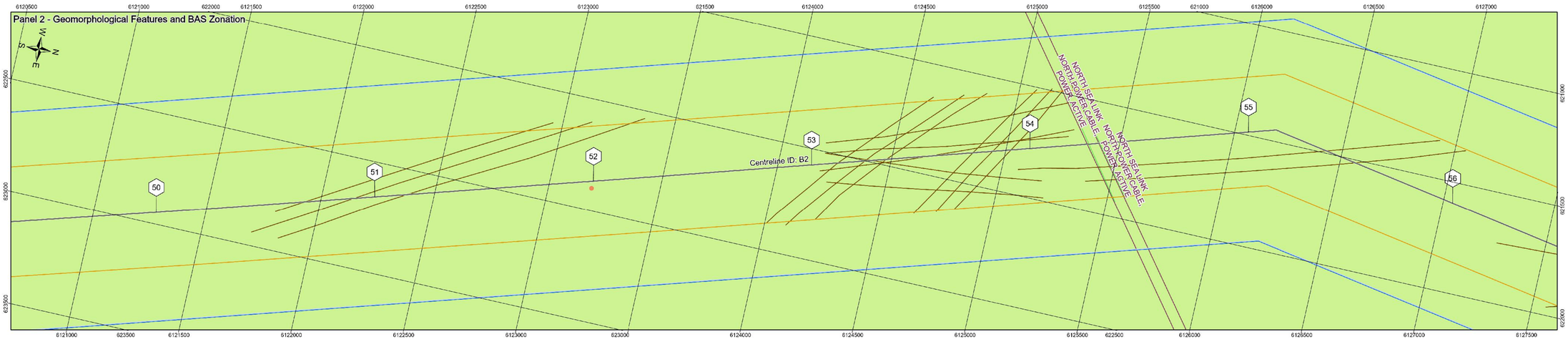
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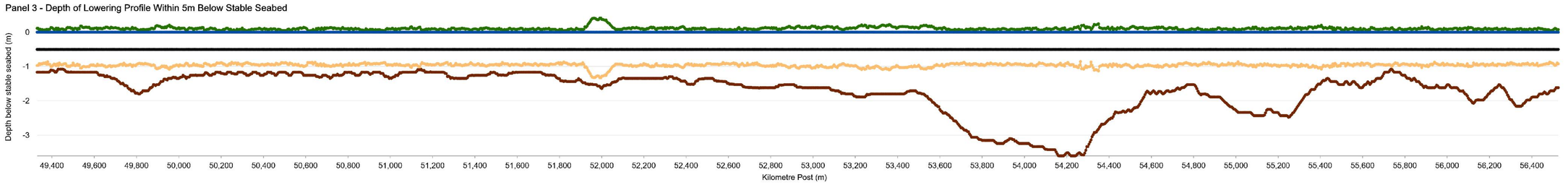
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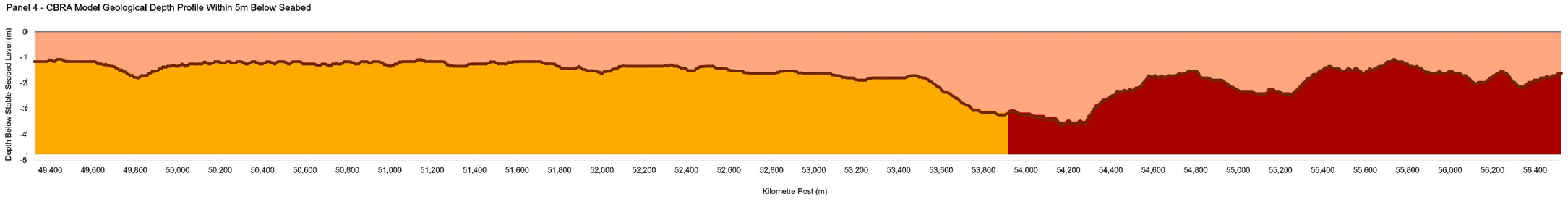
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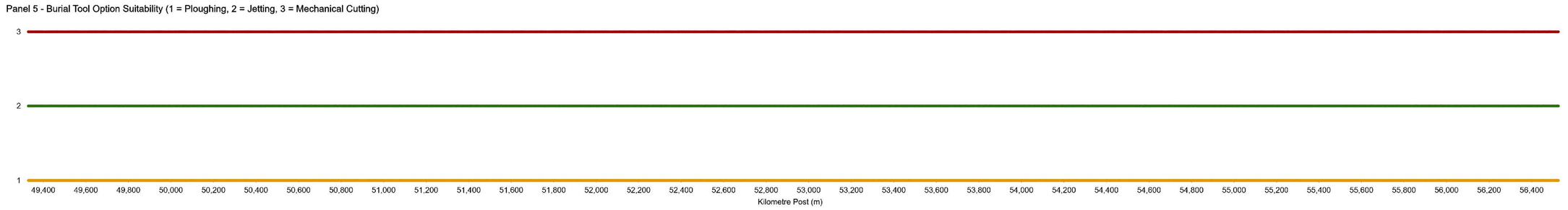
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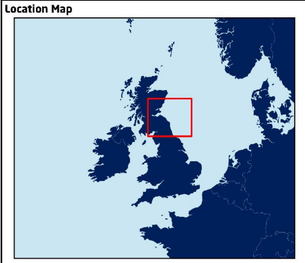




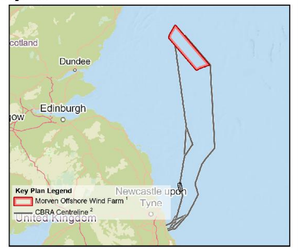




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [2]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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- Extremely High Strength CLAY (C7)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Vertical Reference: Lowest Astronomical Tide (LAT)

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Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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2. Created by GM, March 2024.
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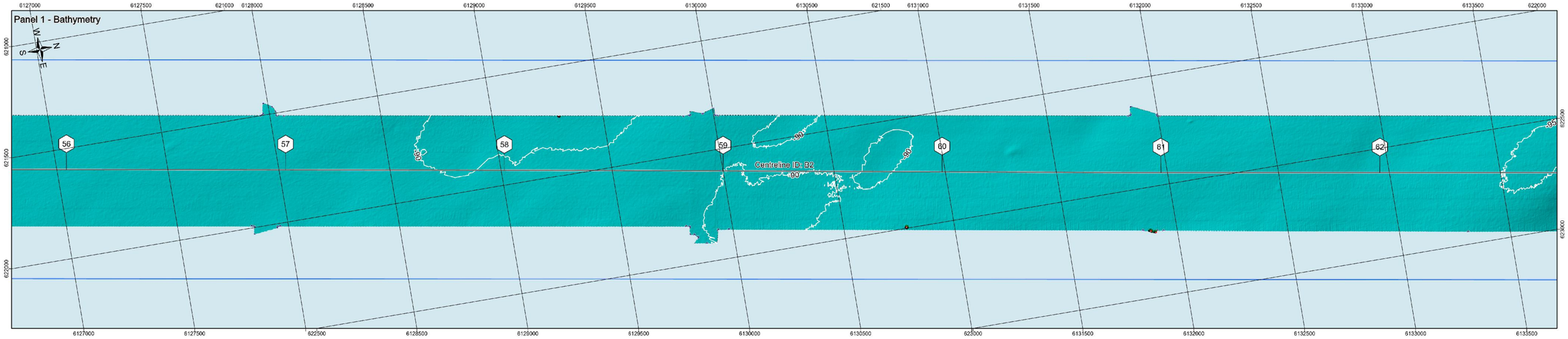
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 9 of 36

Drawing Status
Issue for Review

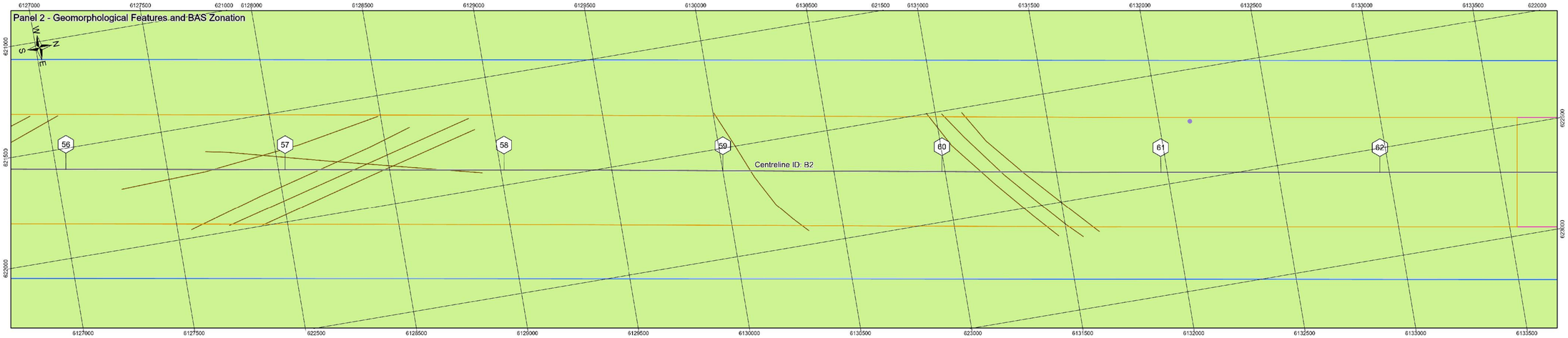
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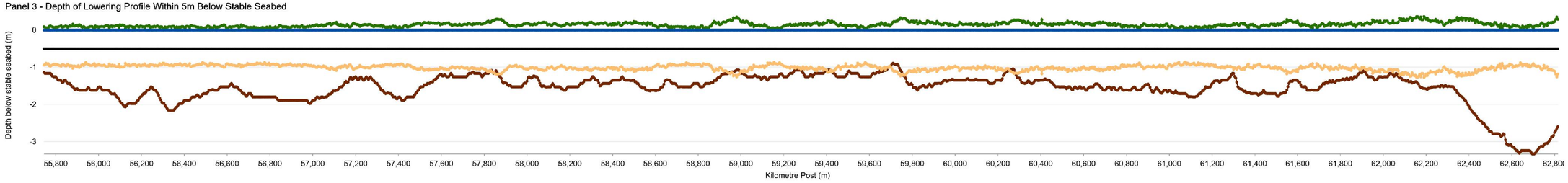
Panel 1 - Bathymetry



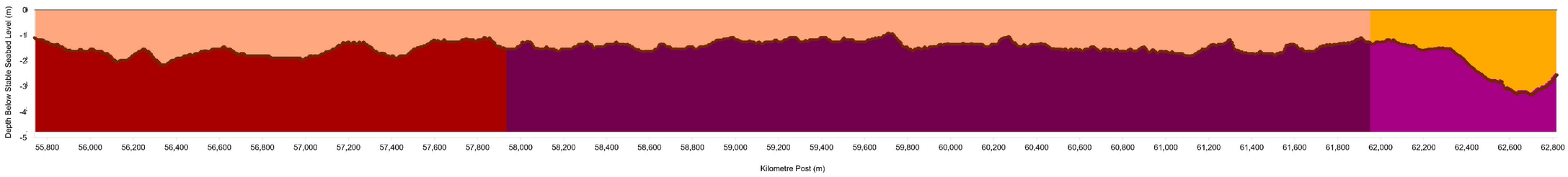
Panel 2 - Geomorphological Features and BAS Zonation



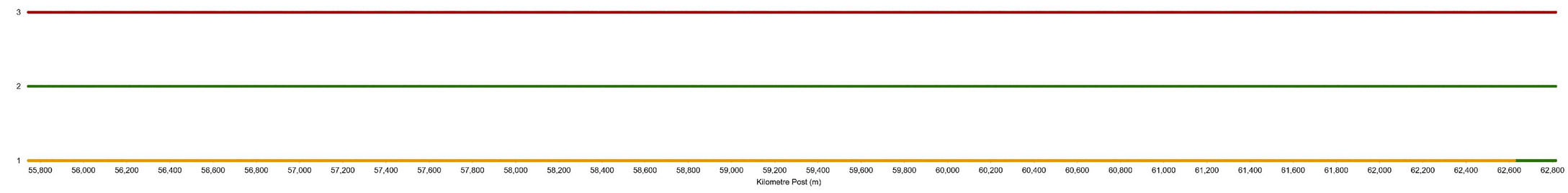
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



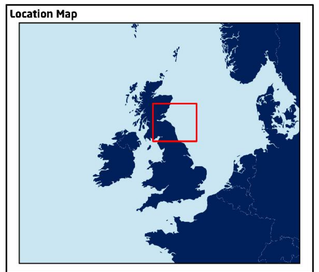
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



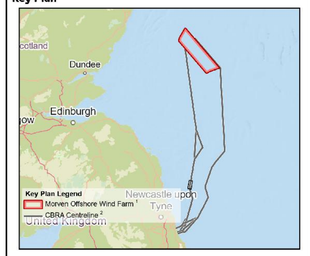
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

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Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

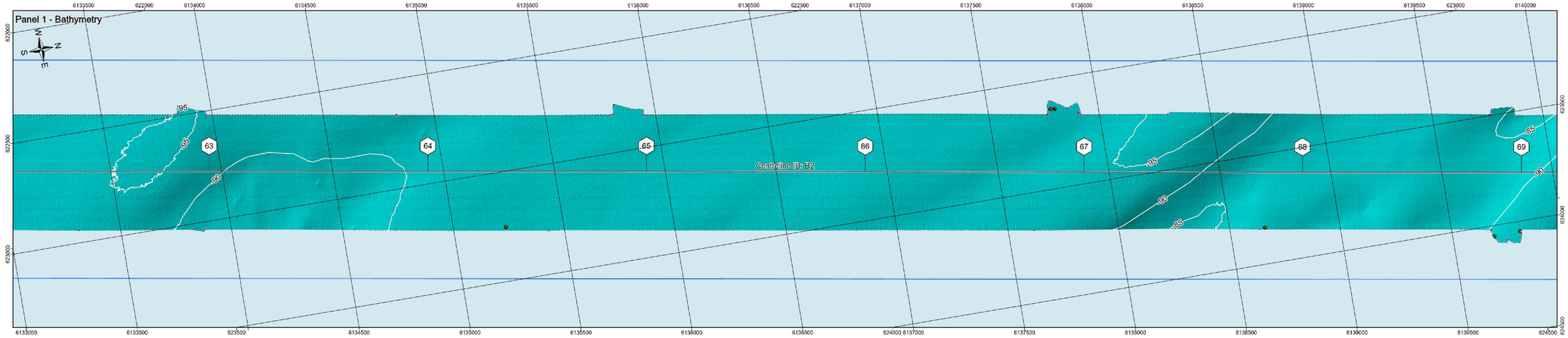
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 10 of 36

Drawing Status
Issue for Review

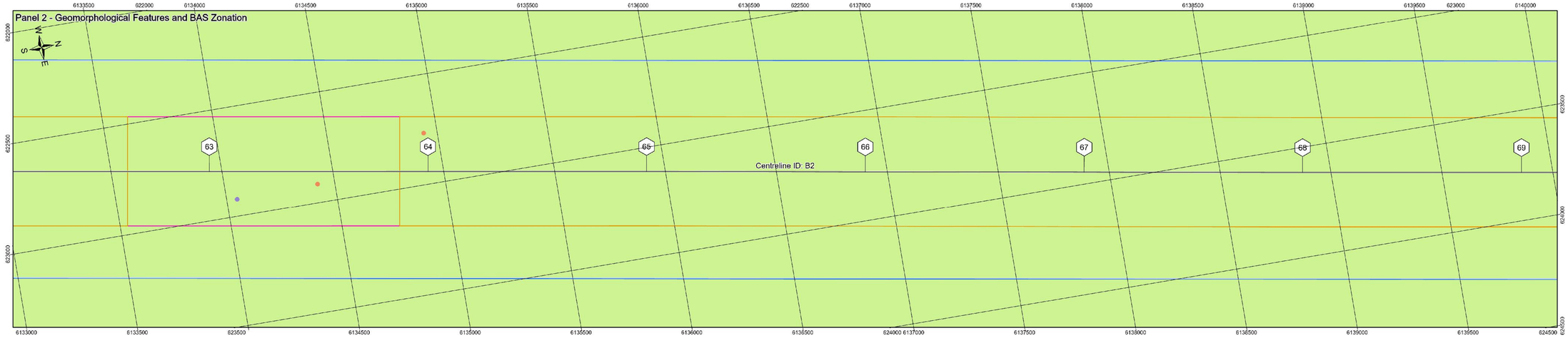
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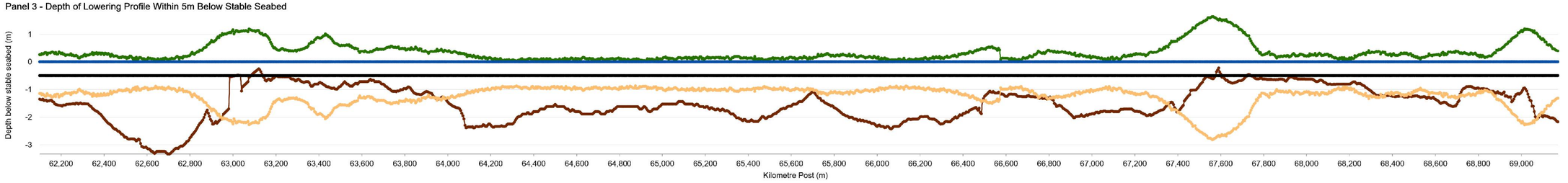
Panel 1 - Bathymetry



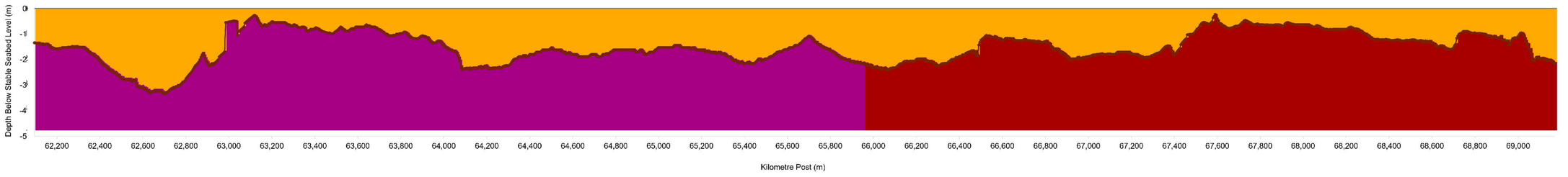
Panel 2 - Geomorphological Features and BAS Zonation



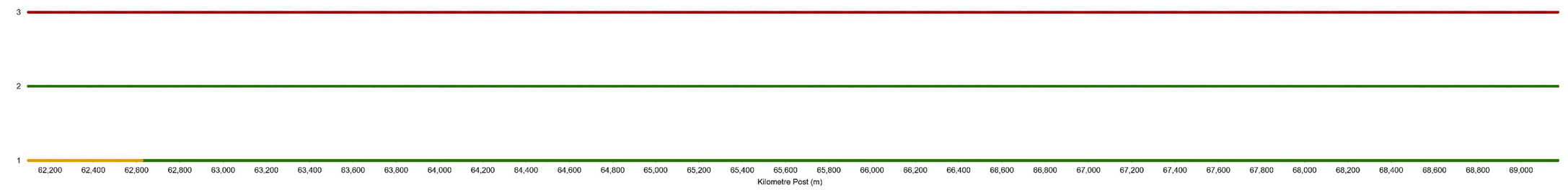
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



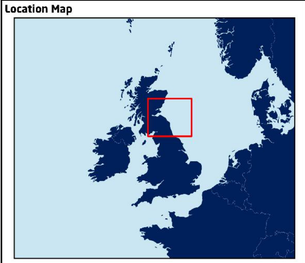
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



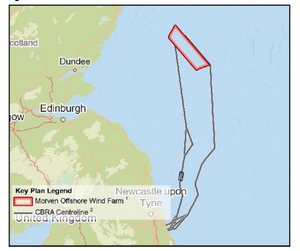
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

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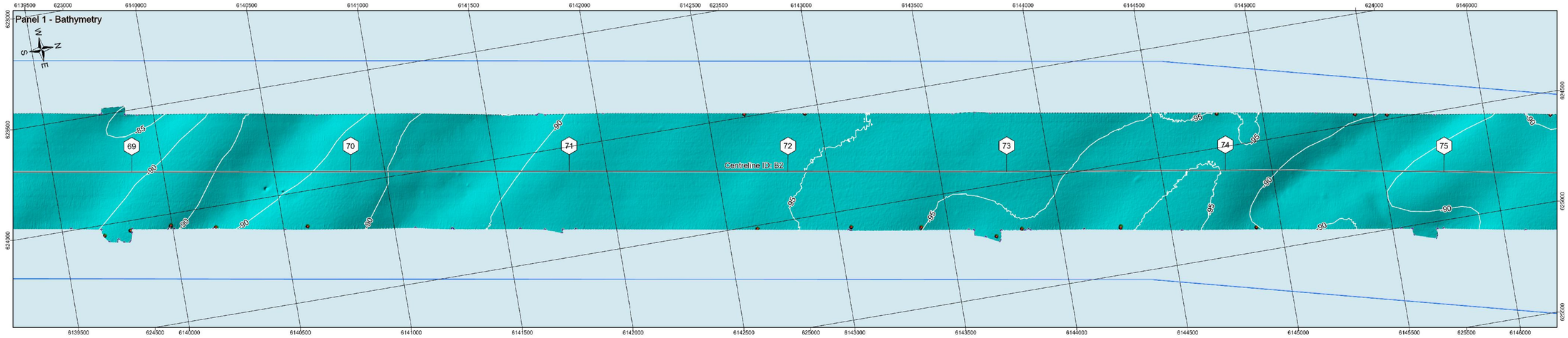
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 11 of 36

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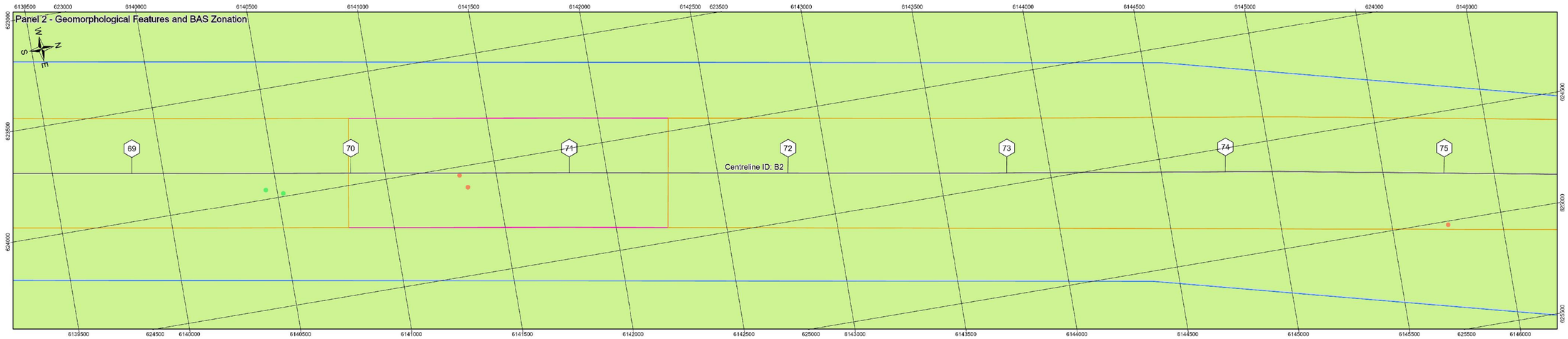
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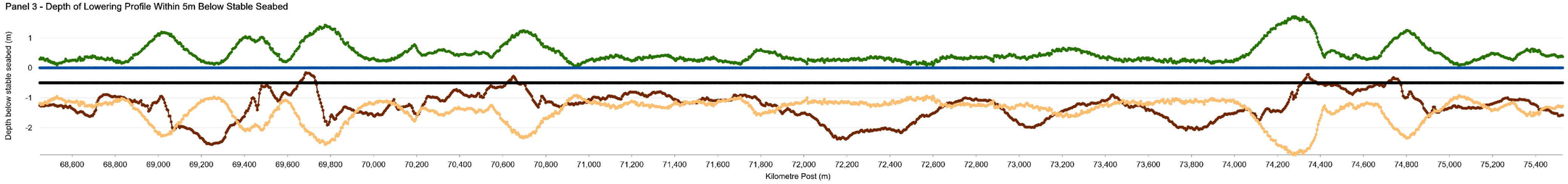
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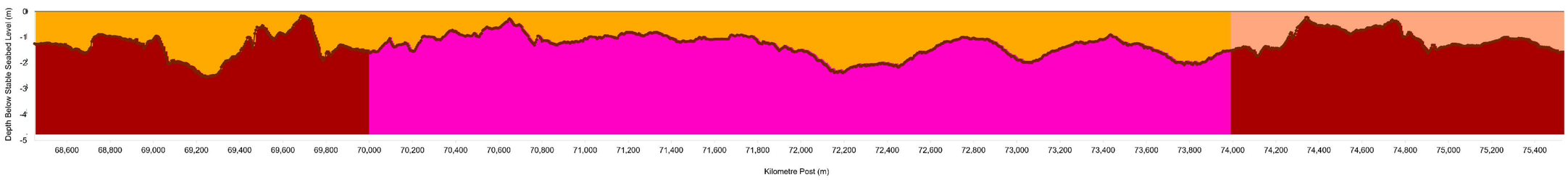
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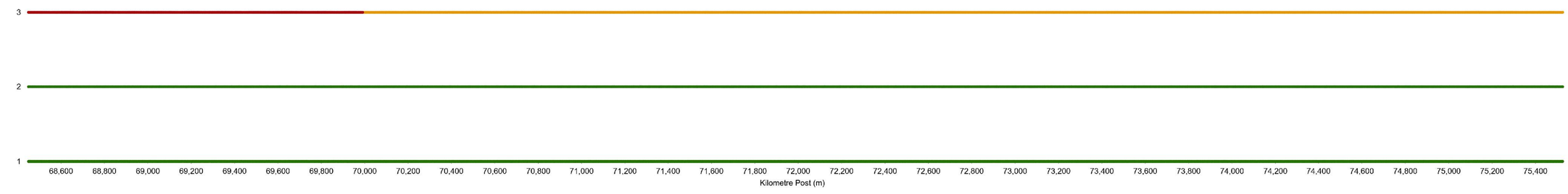
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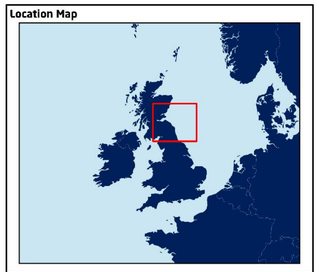
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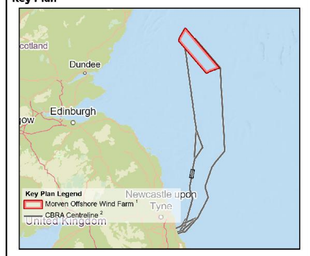
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [9]
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Panel 4

Layer 1 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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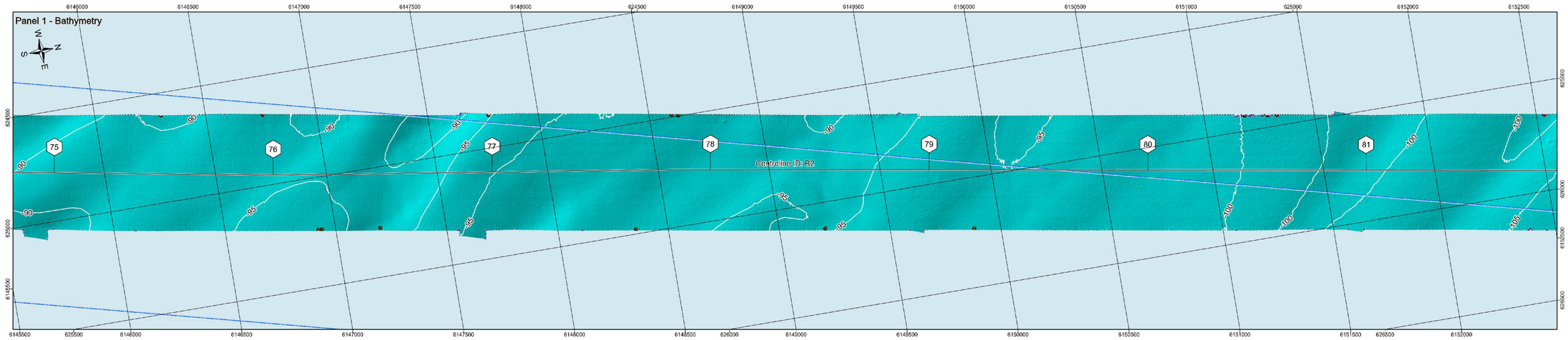
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 12 of 36

Drawing Status
Issue for Review

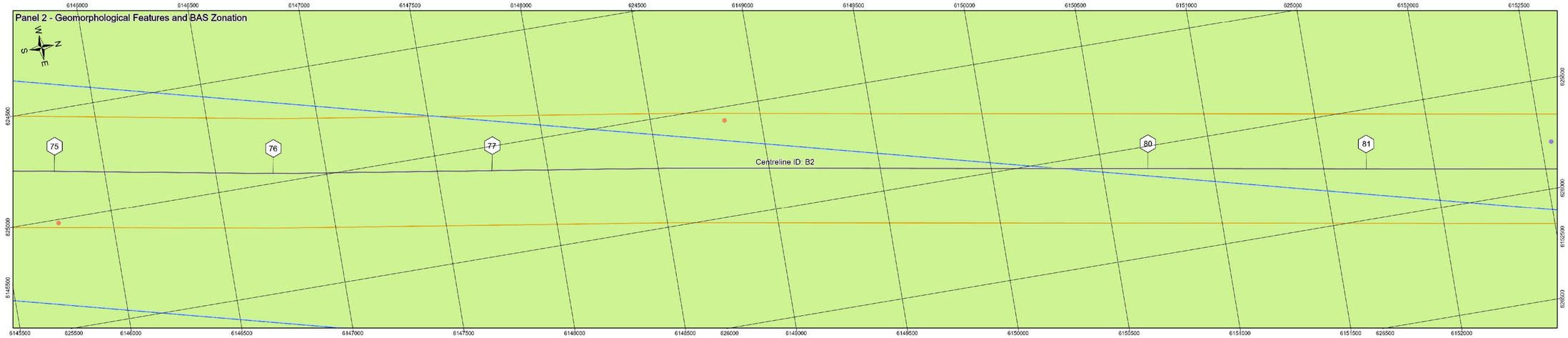
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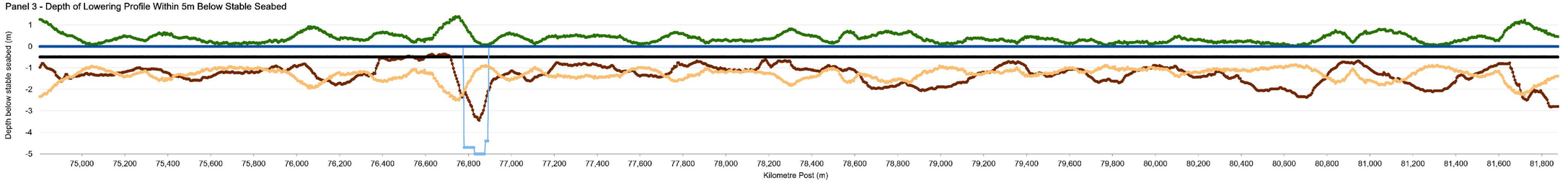
Panel 1 - Bathymetry



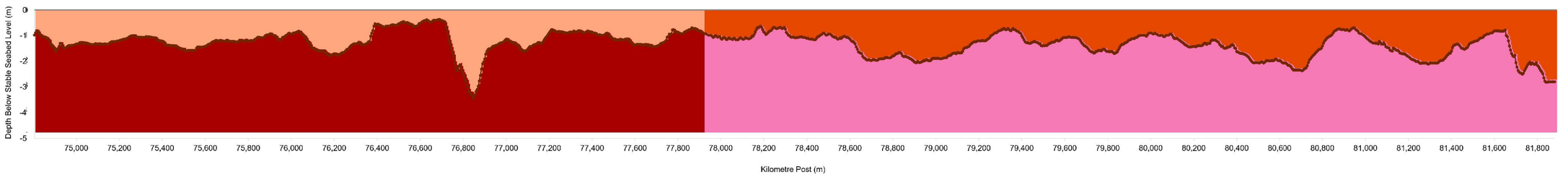
Panel 2 - Geomorphological Features and BAS Zonation



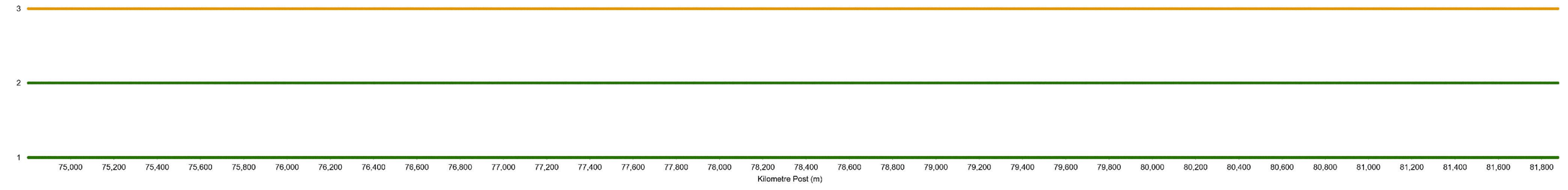
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



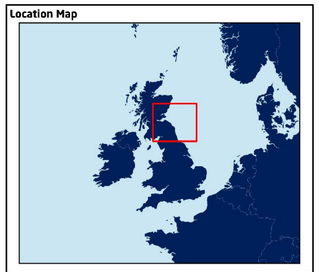
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



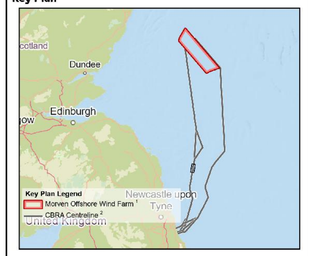
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
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Layer 1/Layer 2 Boundary [8]	

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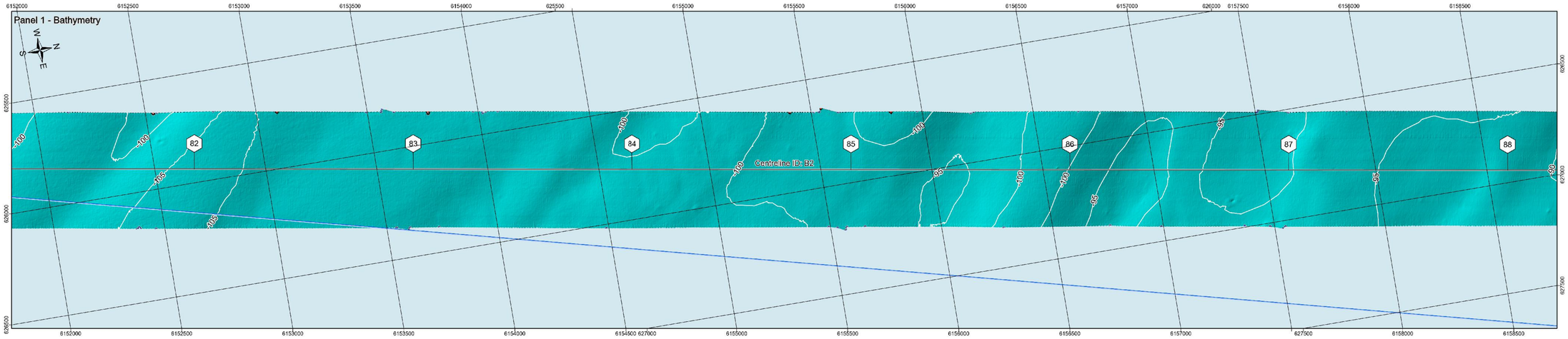
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 13 of 36

Drawing Status
Issue for Review

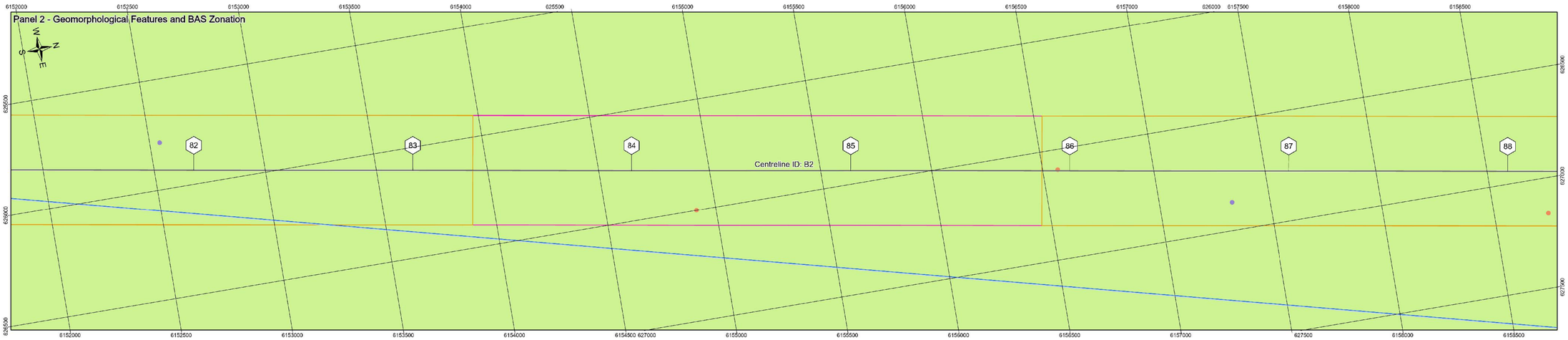
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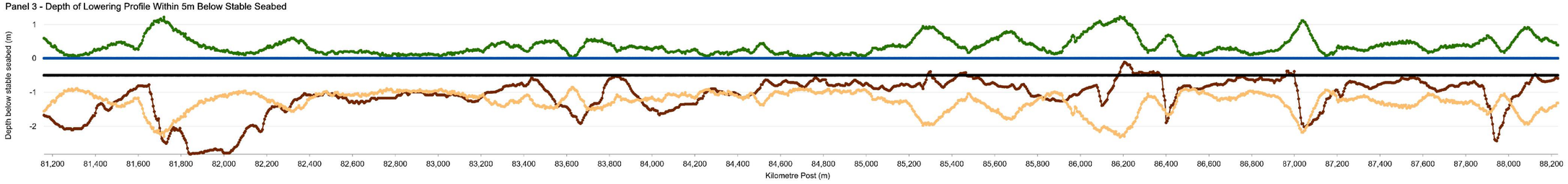
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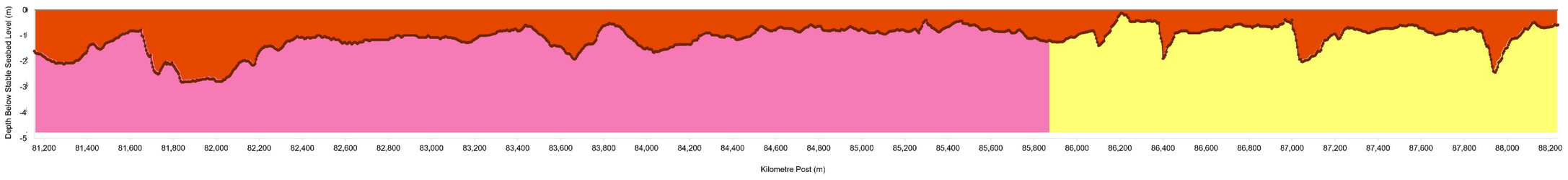
Panel 2 - Geomorphological Features and BAS Zonation



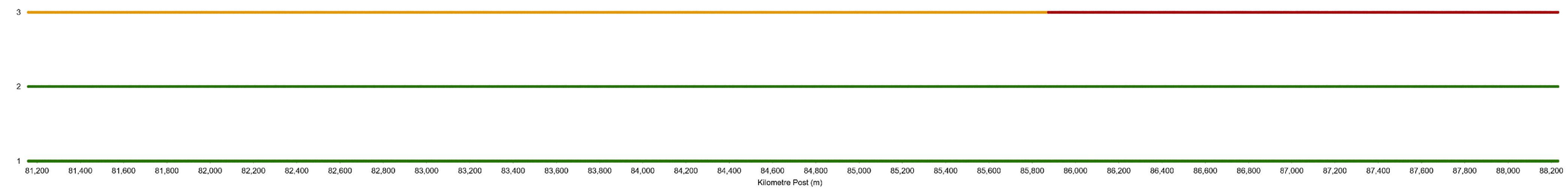
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



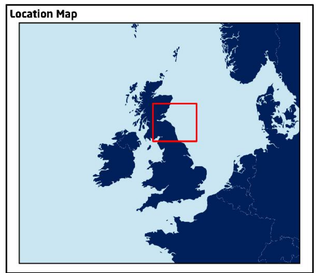
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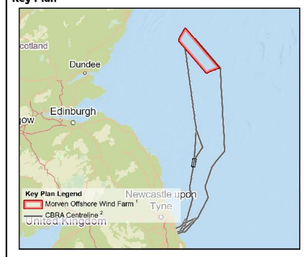
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Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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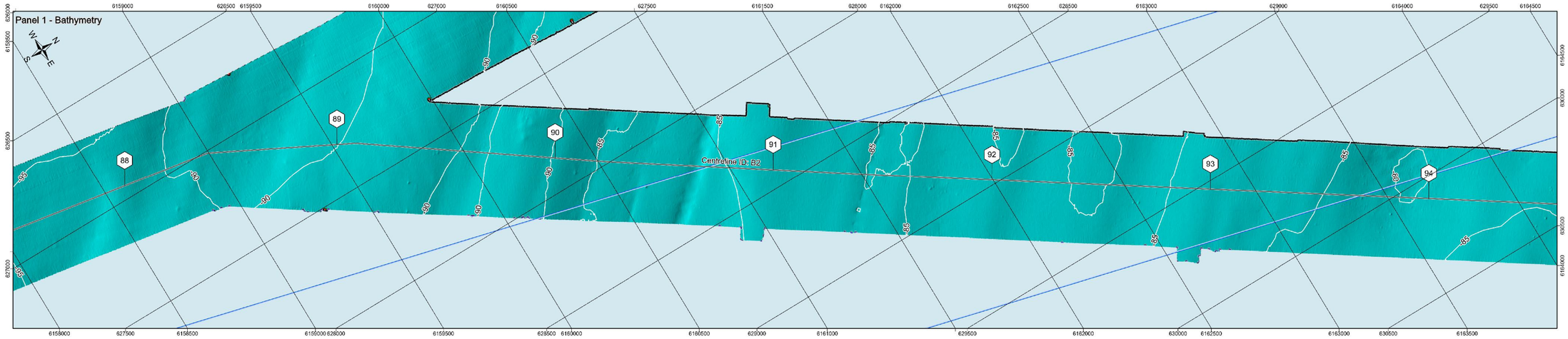
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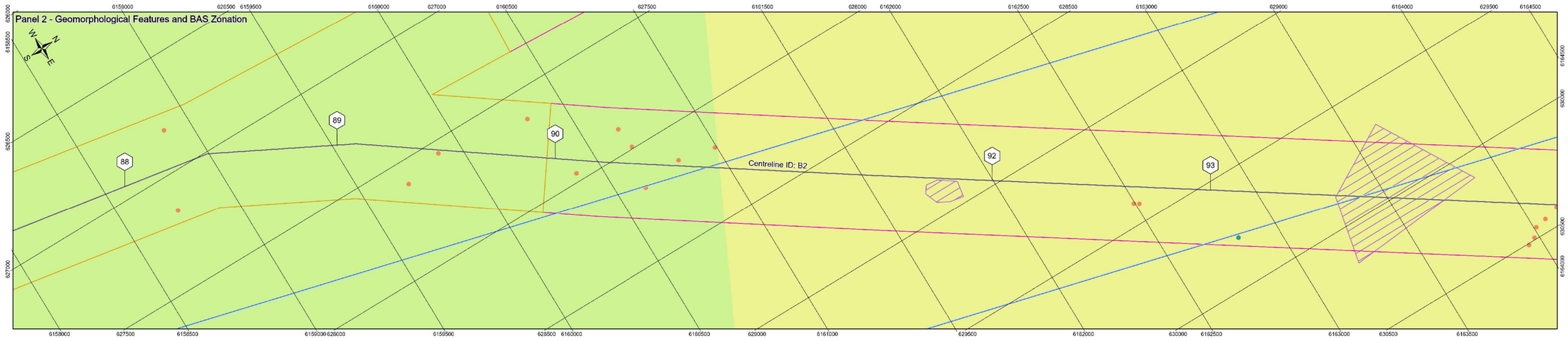
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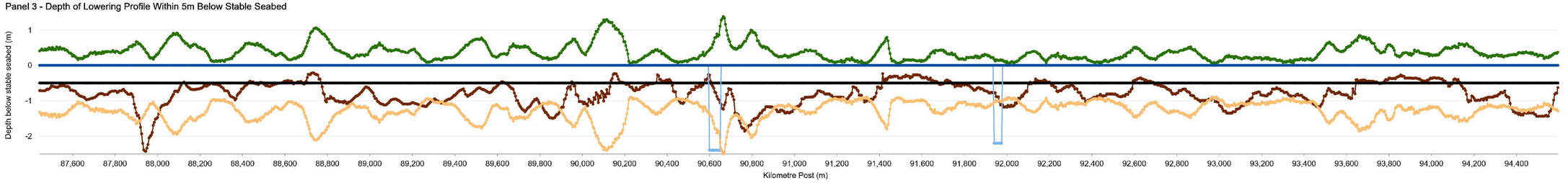
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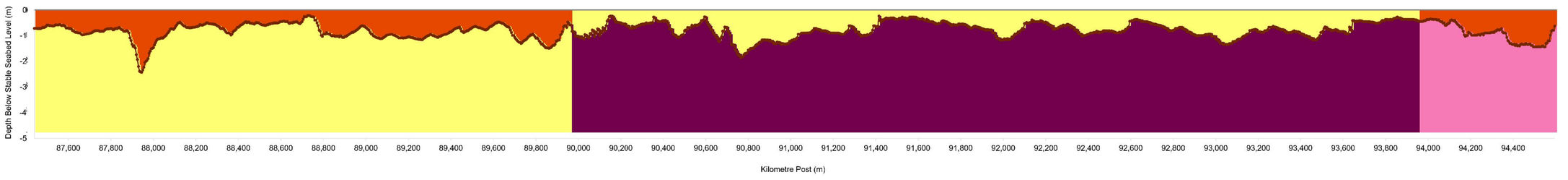
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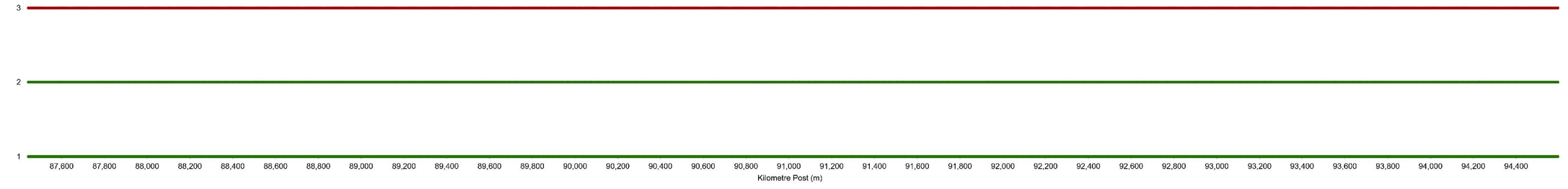
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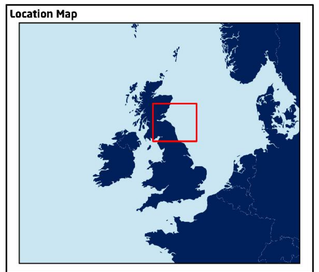
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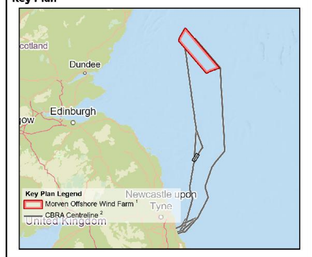
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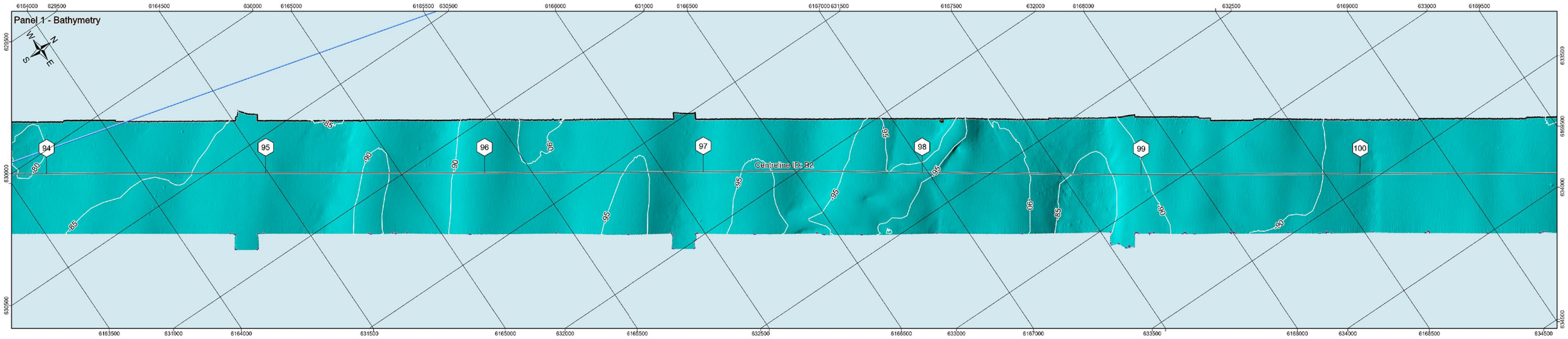
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

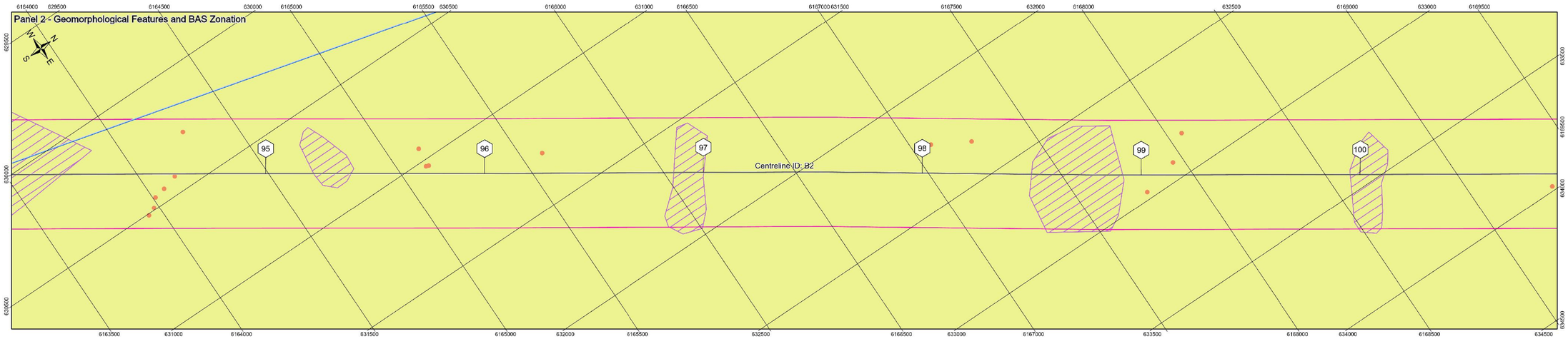
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 15 of 36

Drawing Status
Issue for Review

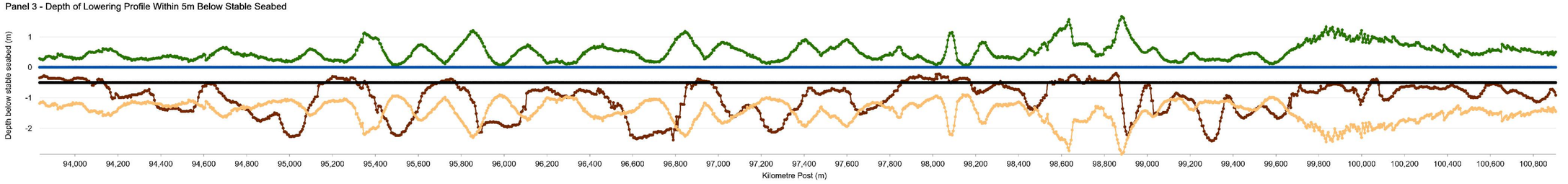
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

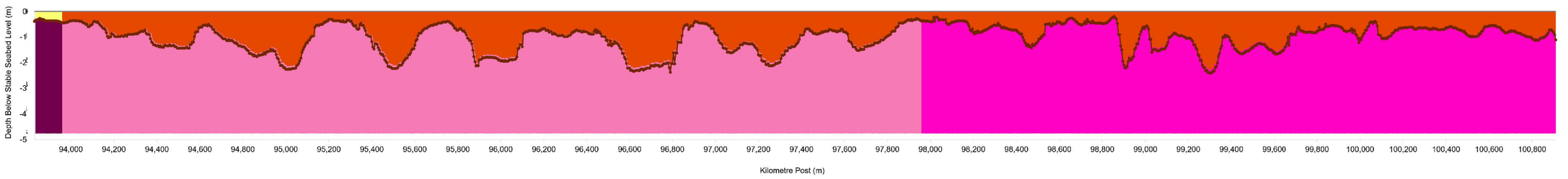




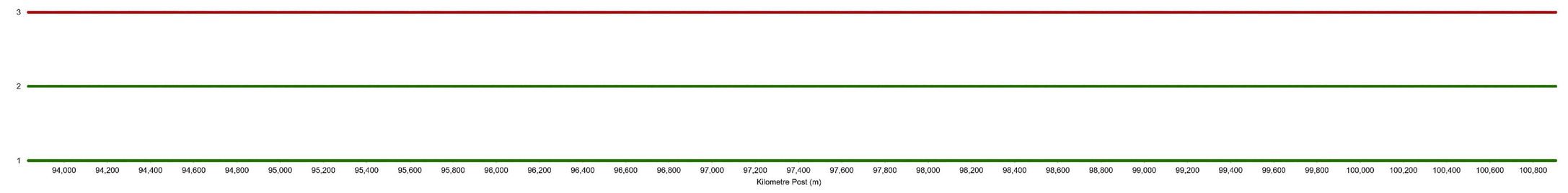
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



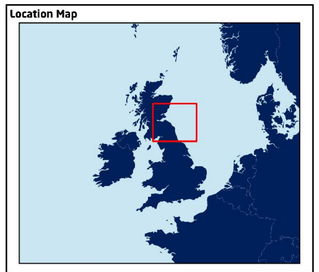
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



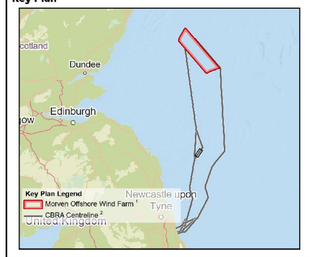
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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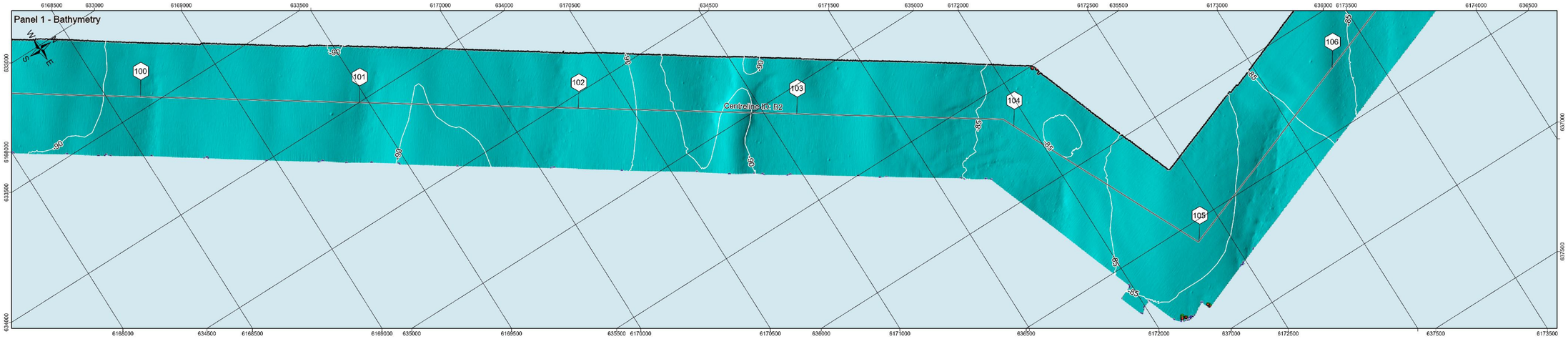
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 16 of 36

Drawing Status
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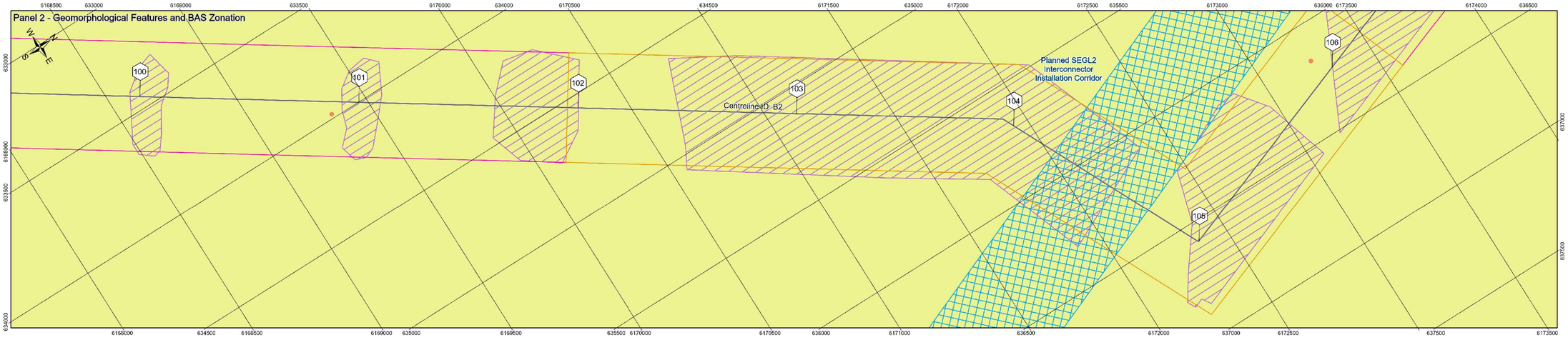
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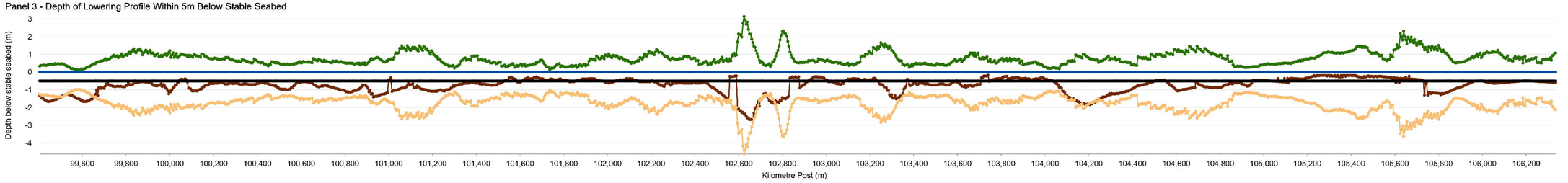
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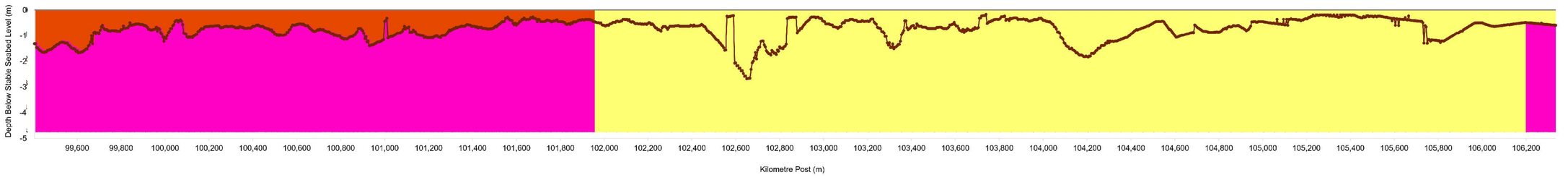
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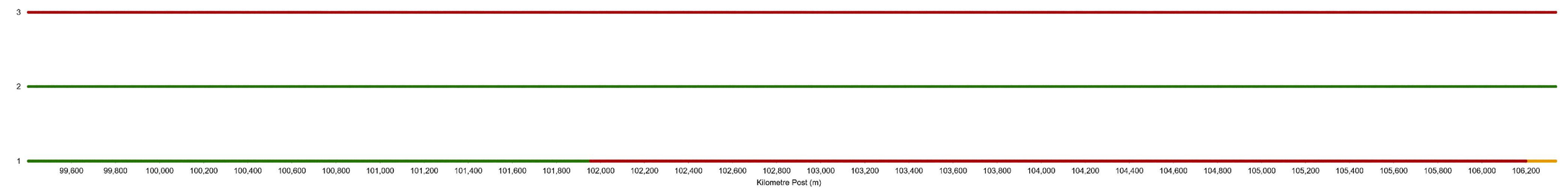
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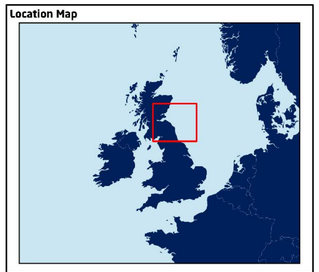
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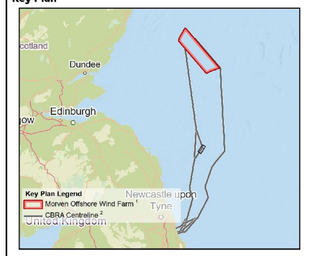
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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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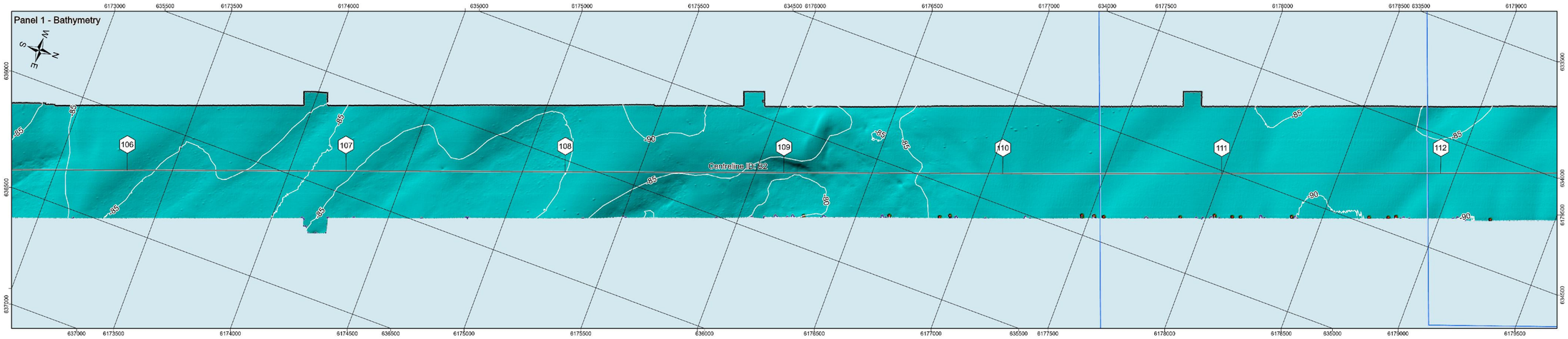
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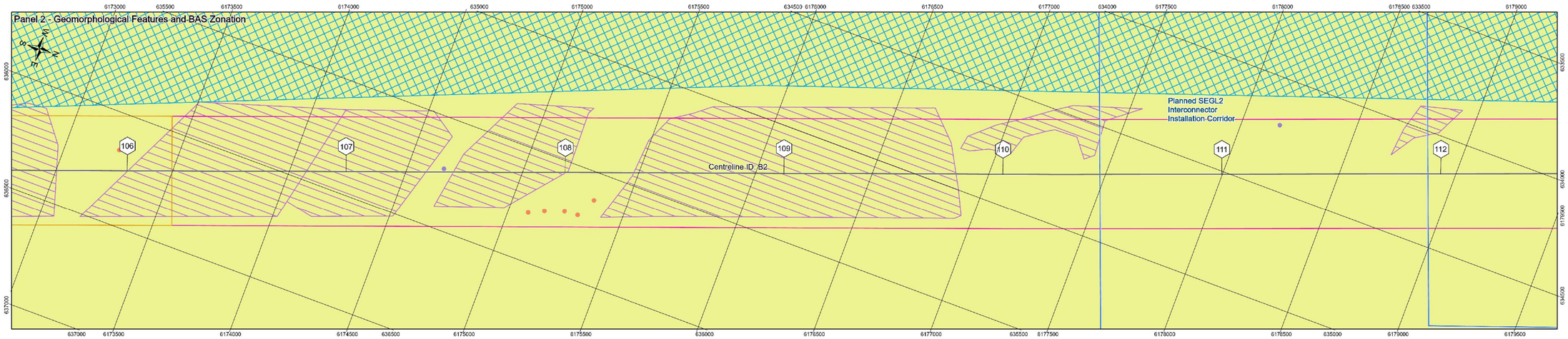
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 17 of 36

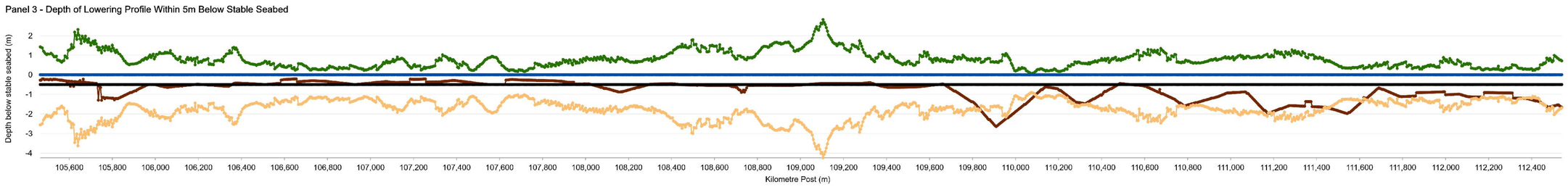
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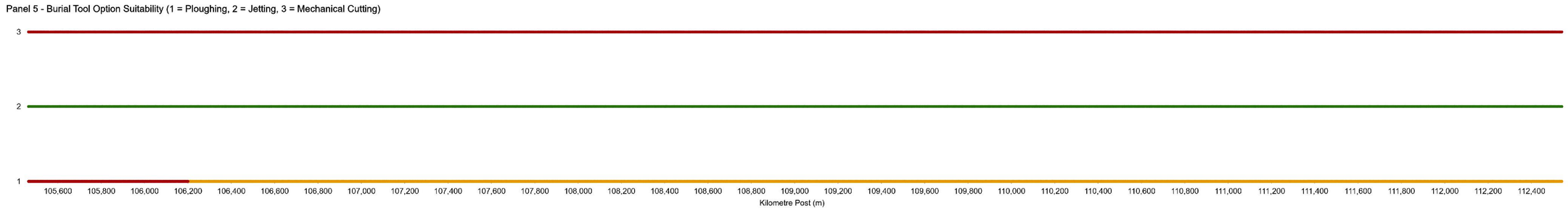
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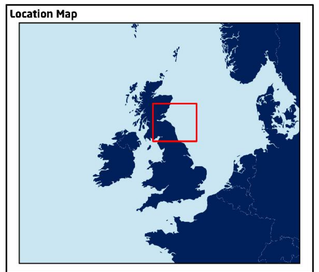




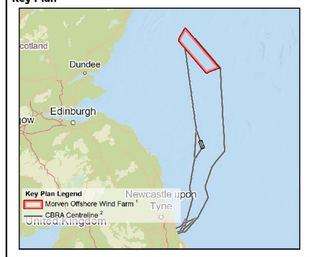




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- Suitable [3]
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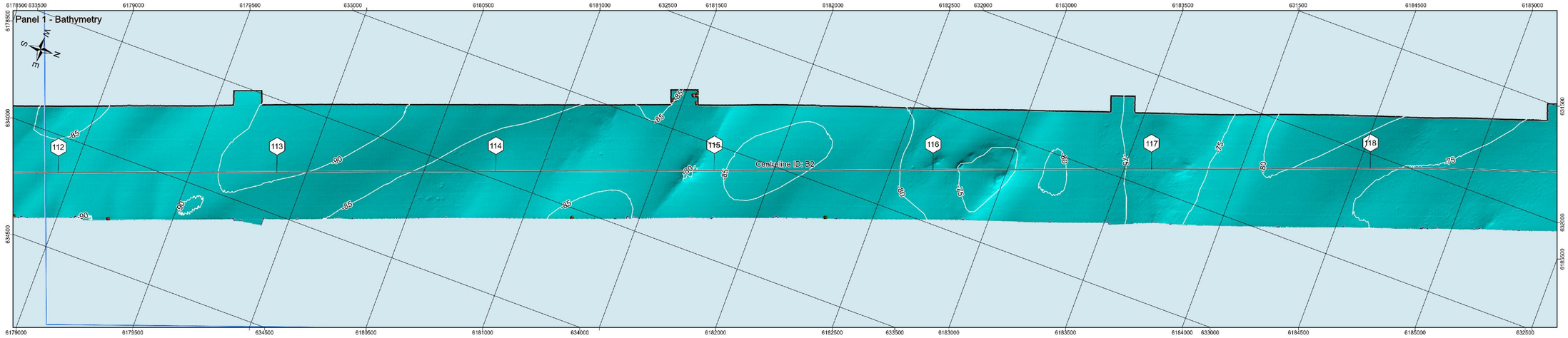
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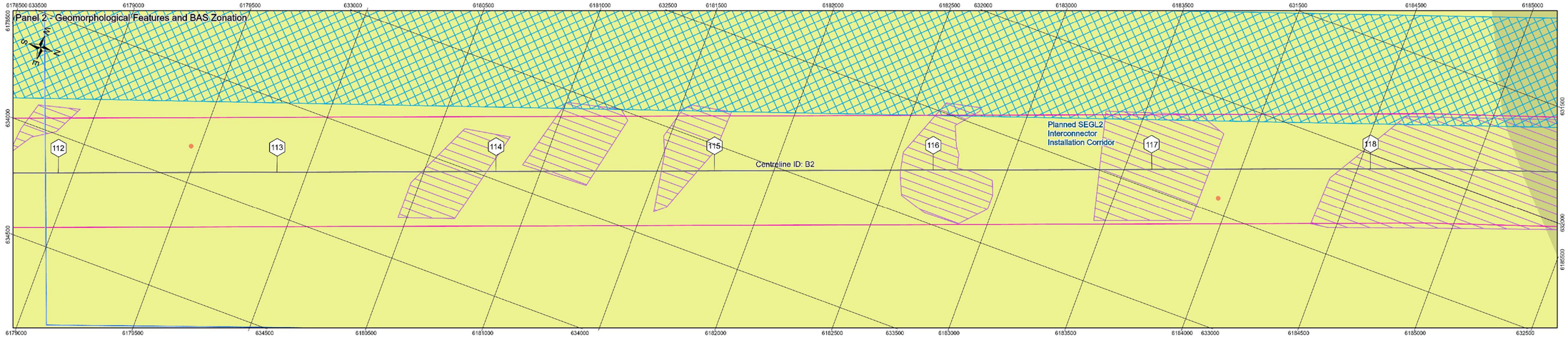
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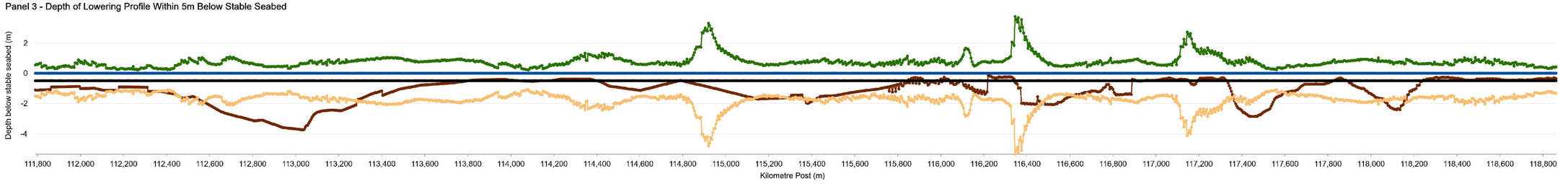
Panel 1 - Bathymetry



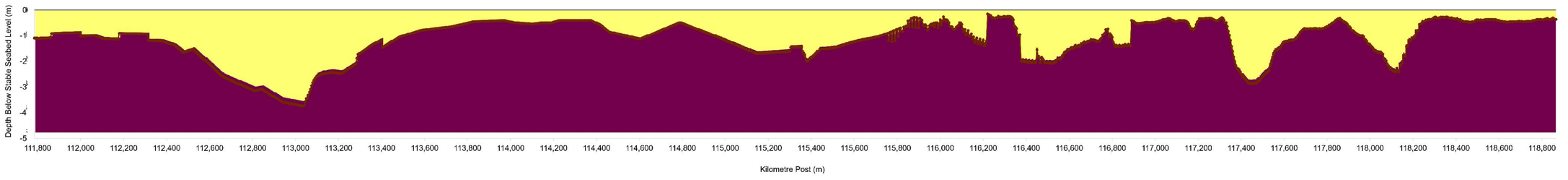
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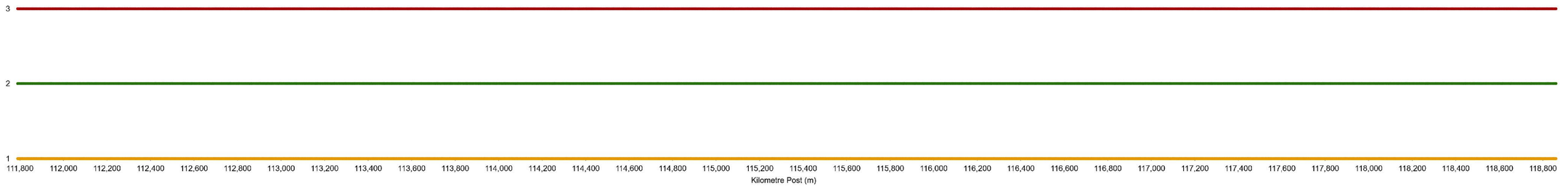
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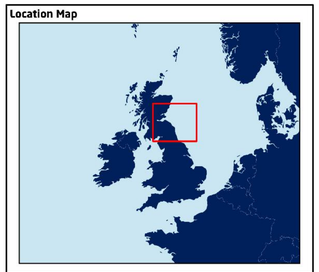
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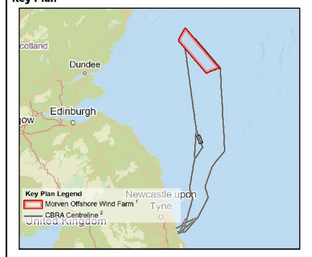
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- Water depth contour (5m interval) [5]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [6]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
- 10. Unpublic data
- SEGL2 Installation Corridor [6]
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [9]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Project Title
Morven Offshore Wind Farm

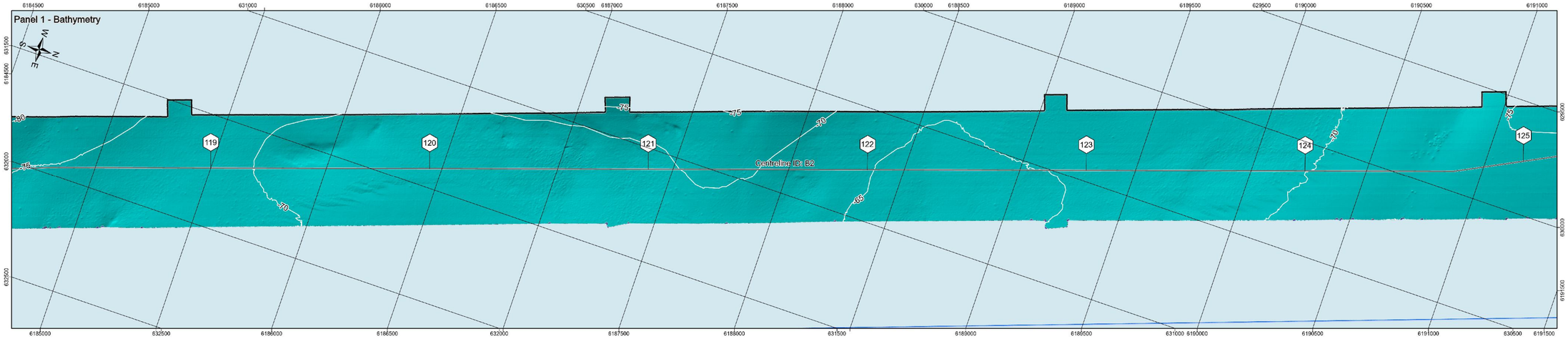
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

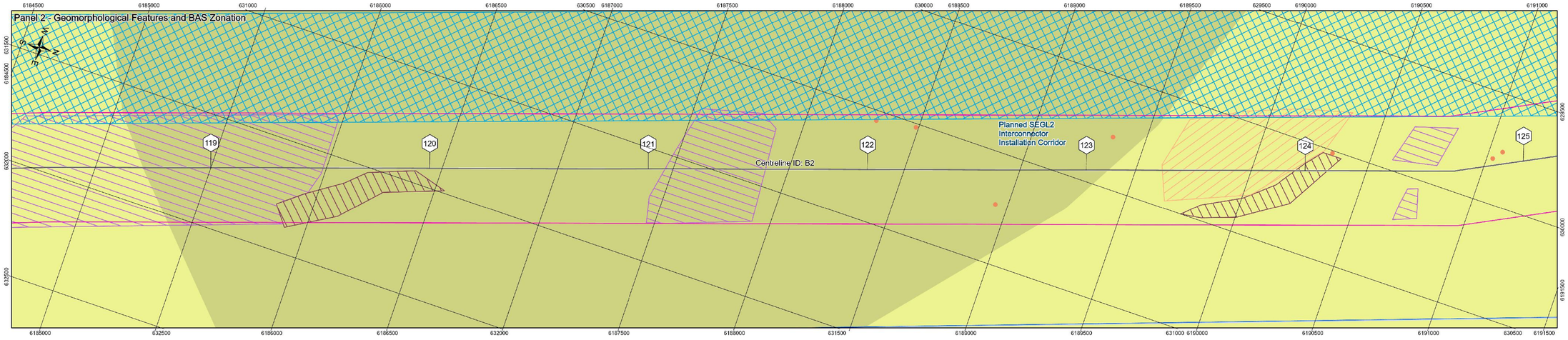
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 19 of 36

Drawing Status
Issue for Review

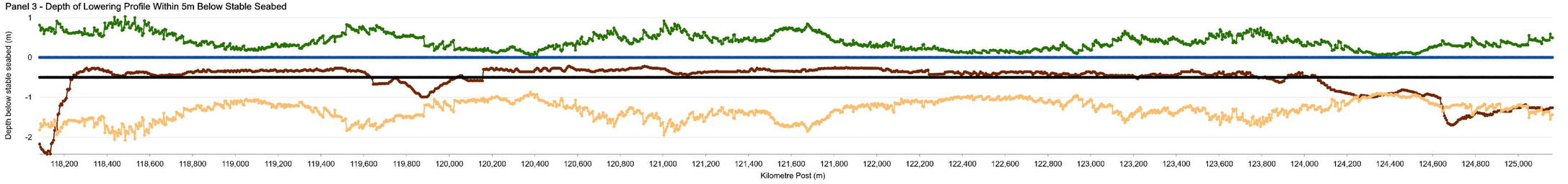
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW bp — Partners in UK offshore wind

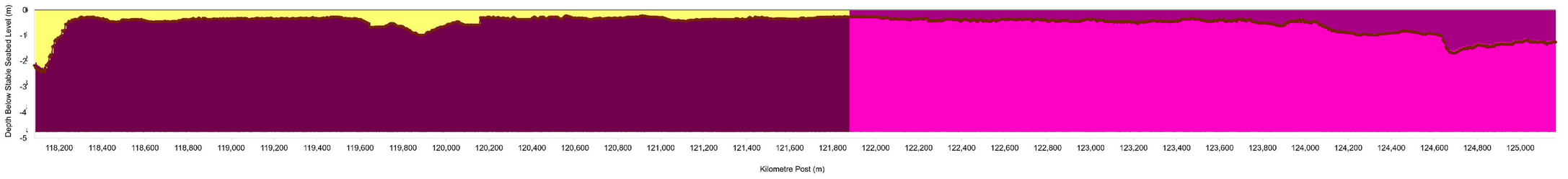




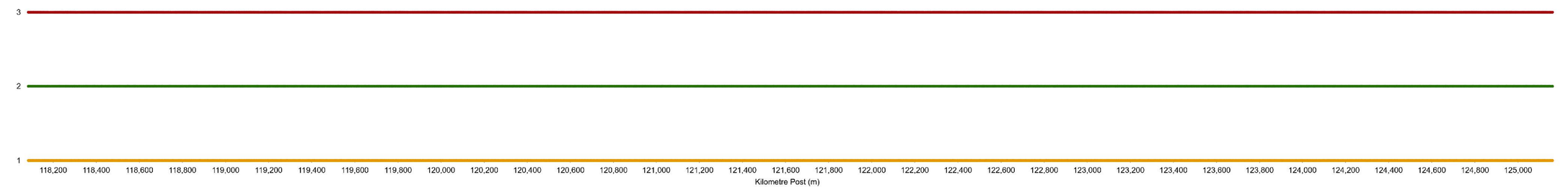
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



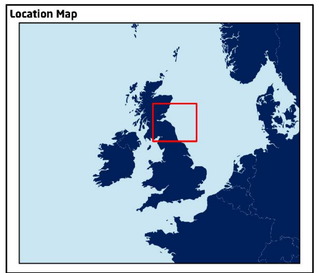
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



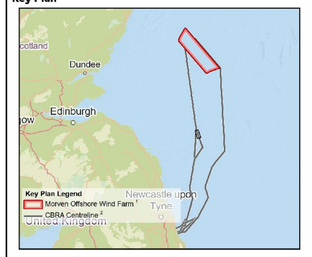
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Extremely High Strength CLAY (C7)
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- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

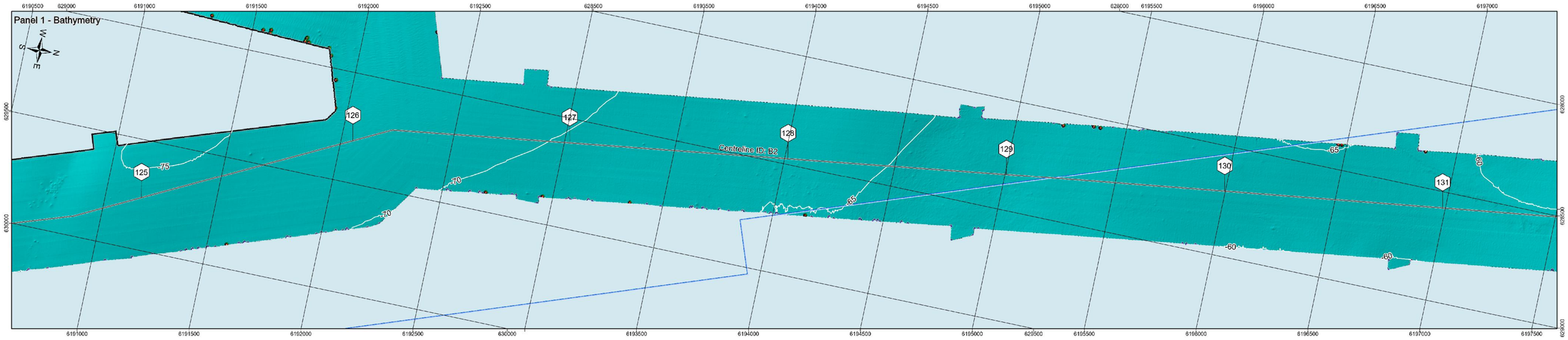
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 20 of 36

Drawing Status
Issue for Review

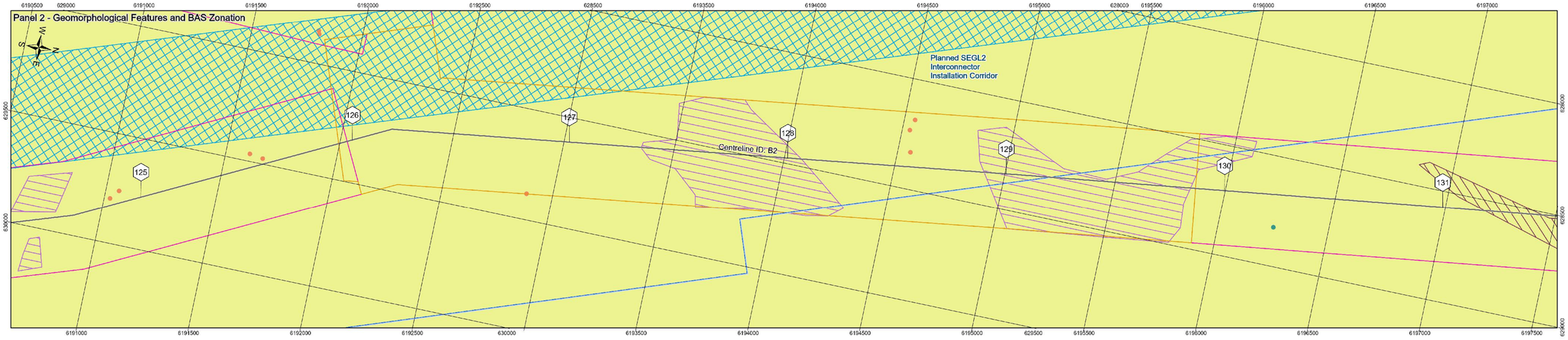
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GLOBAL MARITIME — EnBW bp
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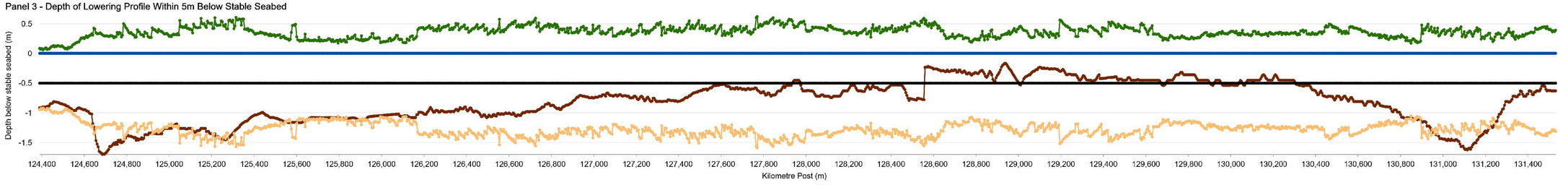
Panel 1 - Bathymetry



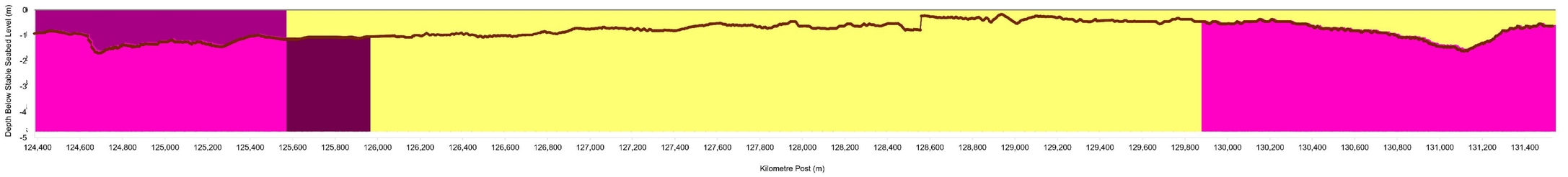
Panel 2 - Geomorphological Features and BAS Zonation



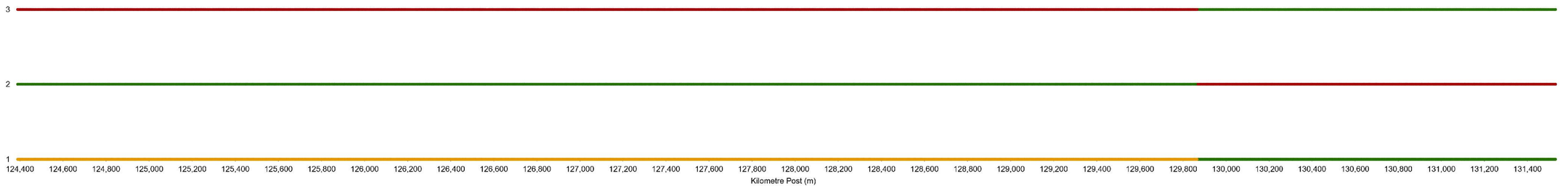
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



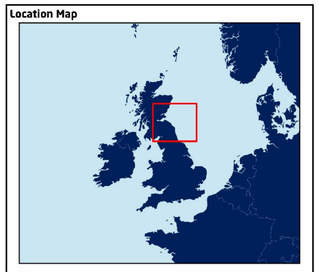
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



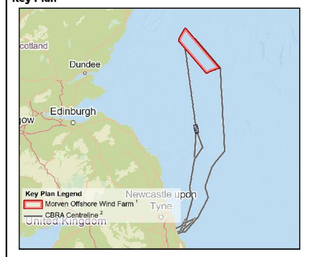
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



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Panel 1 & Site Data

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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5
- Suitable [3]
- Possible [3]
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Revision Status

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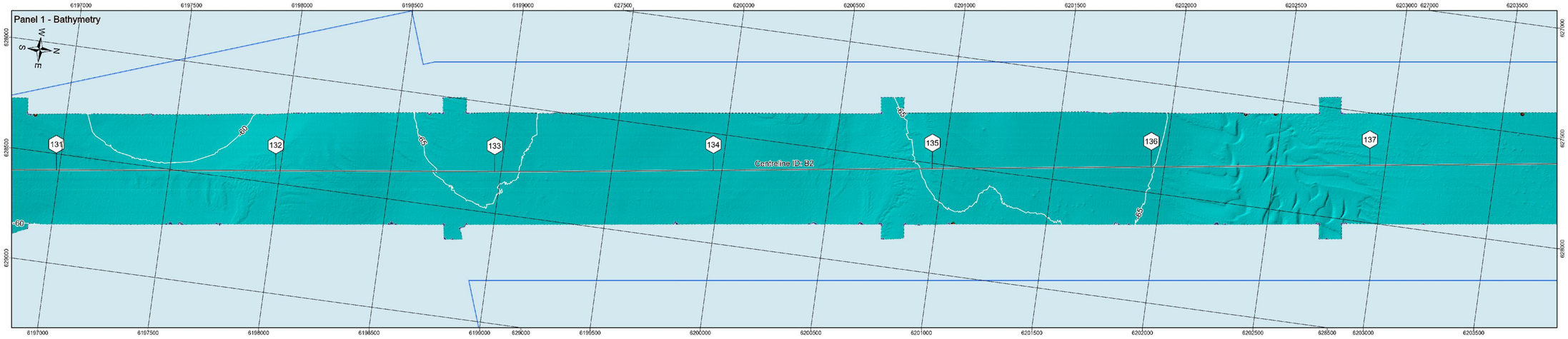
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 21 of 36

Drawing Status
Issue for Review

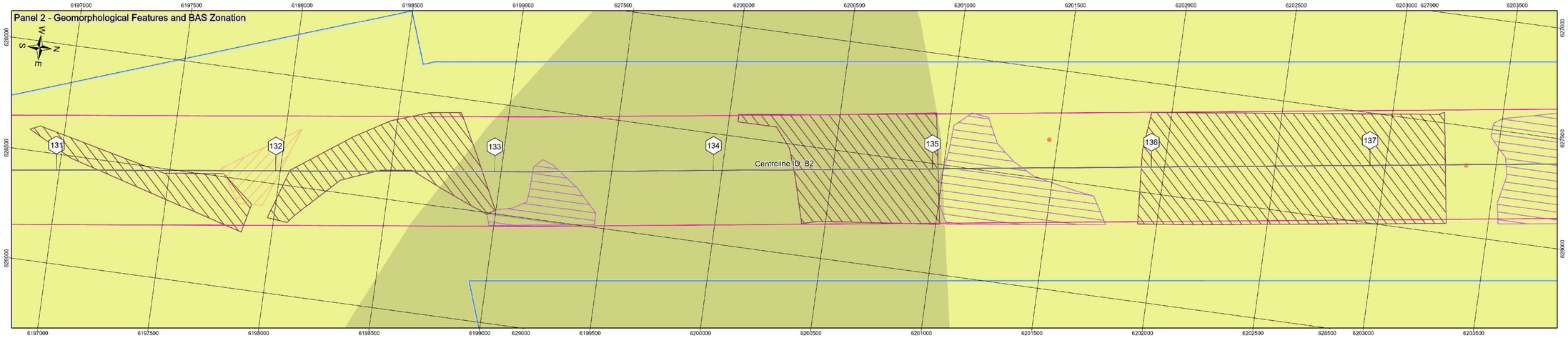
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GLOBAL MARITIME — EnBW — bp
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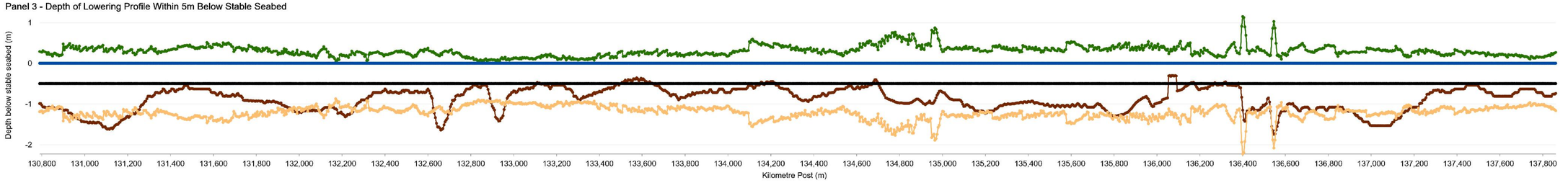
Panel 1 - Bathymetry



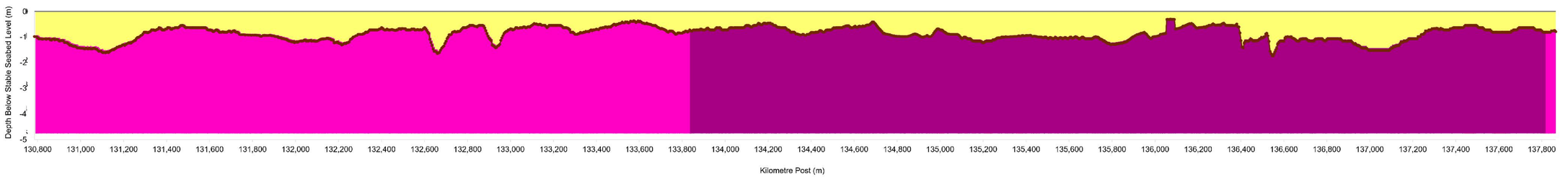
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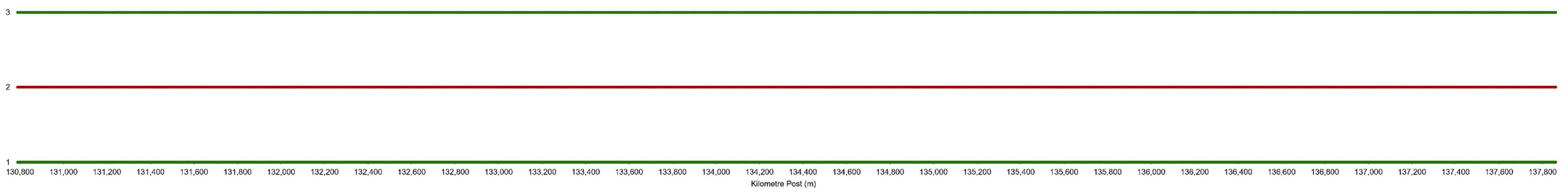
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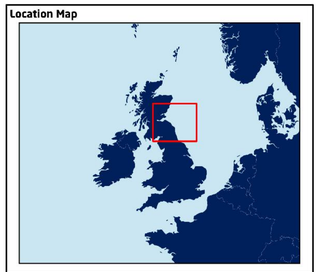
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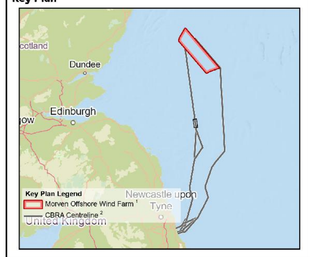
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
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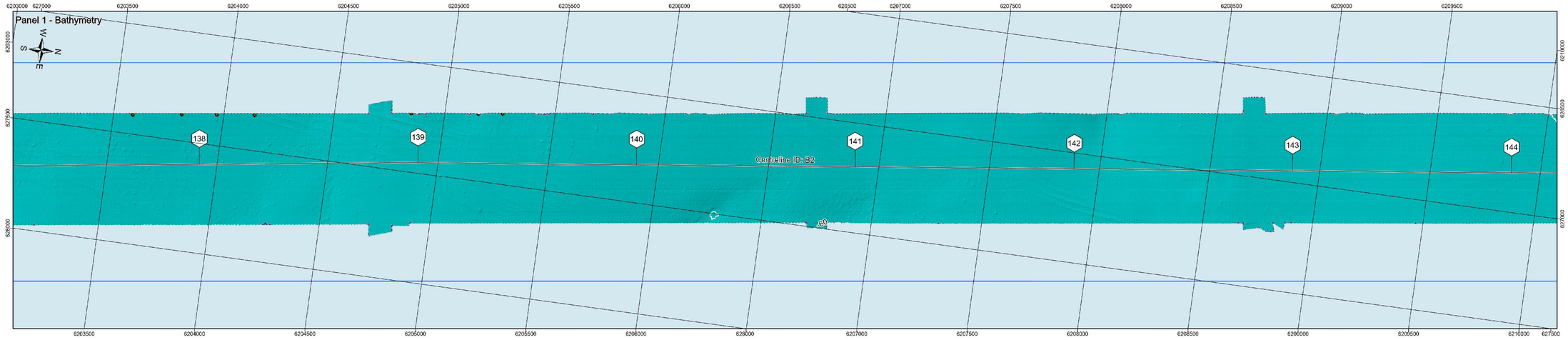
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 22 of 36

Drawing Status
Issue for Review

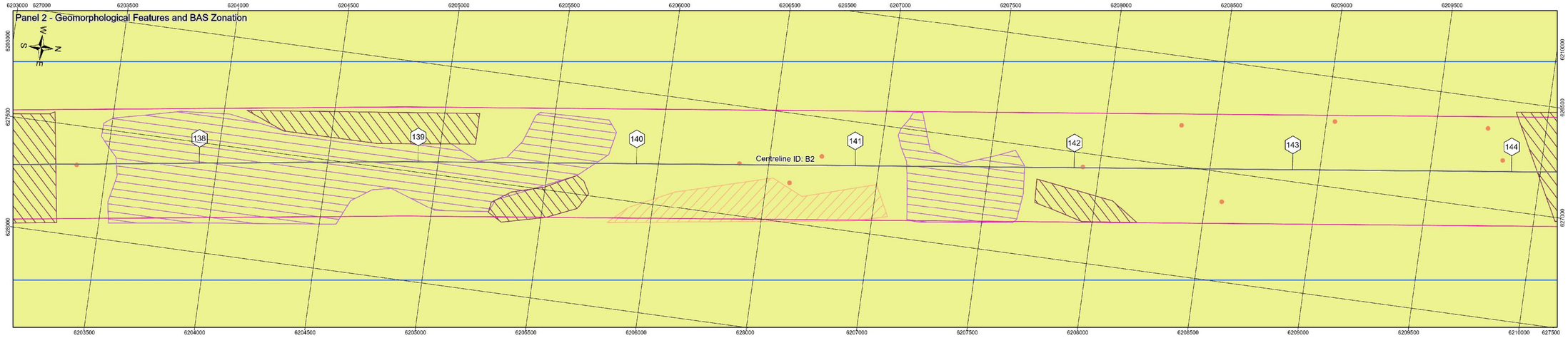
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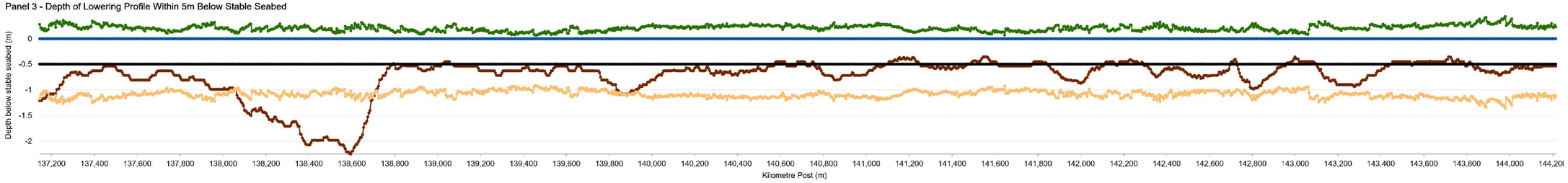
Panel 1 - Bathymetry



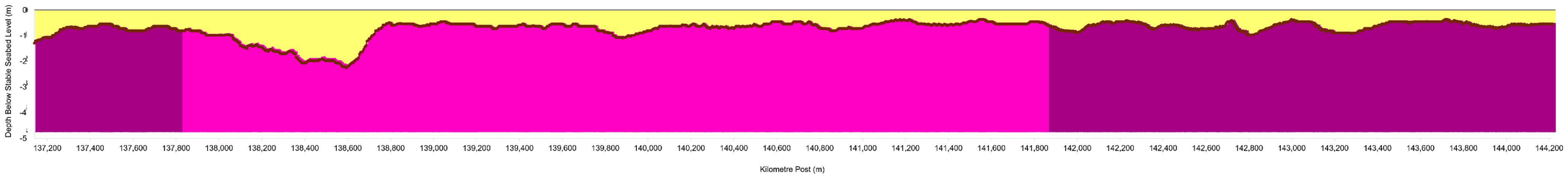
Panel 2 - Geomorphological Features and BAS Zonation



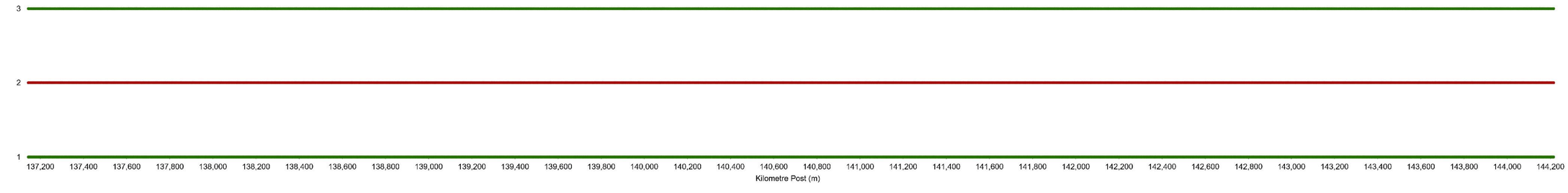
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



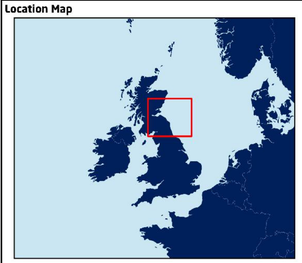
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



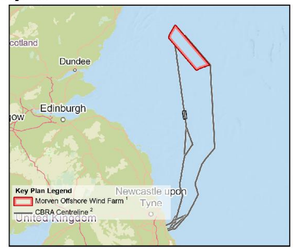
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
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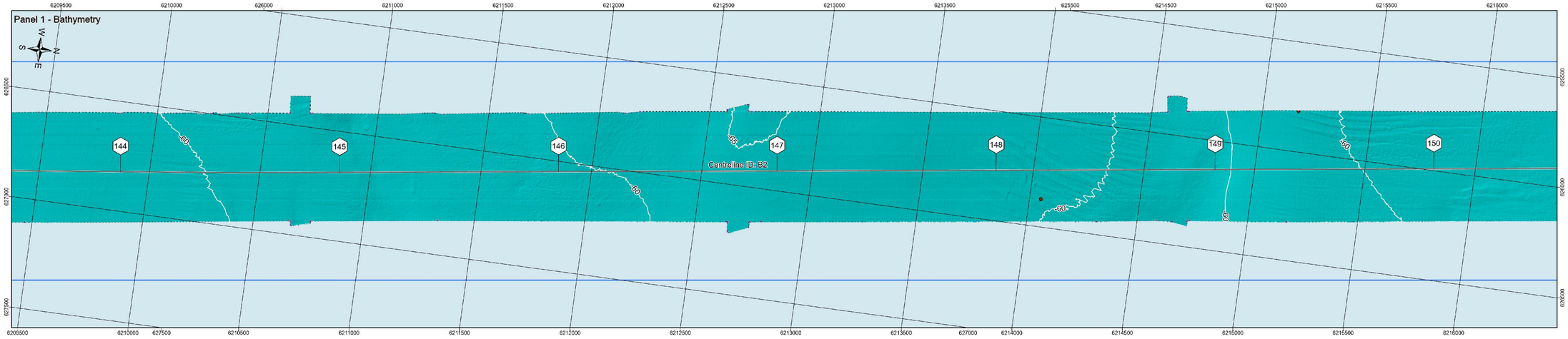
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 23 of 36

Drawing Status
Issue for Review

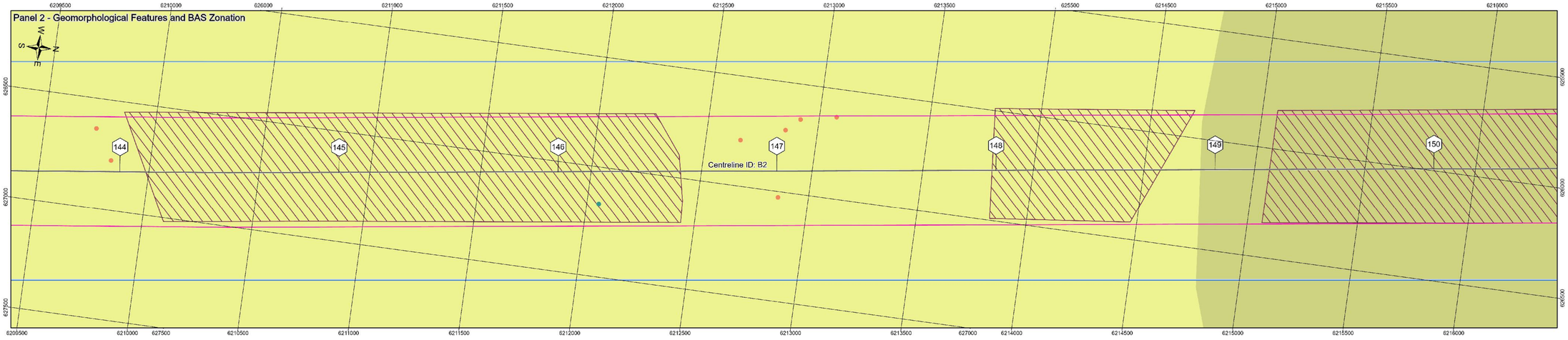
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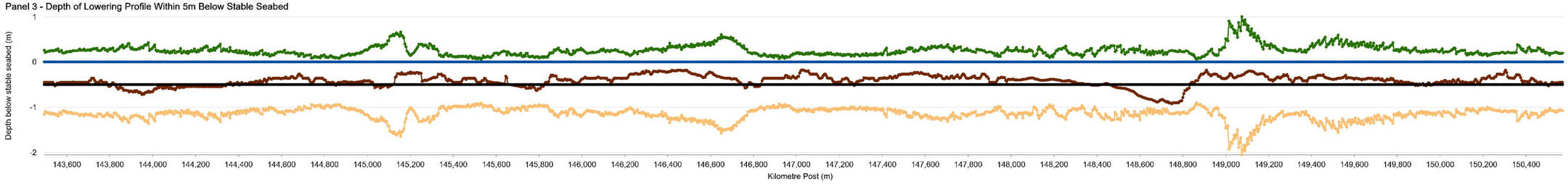
Panel 1 - Bathymetry



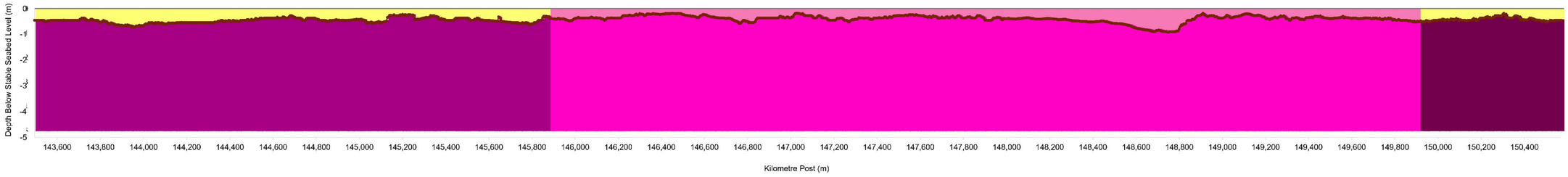
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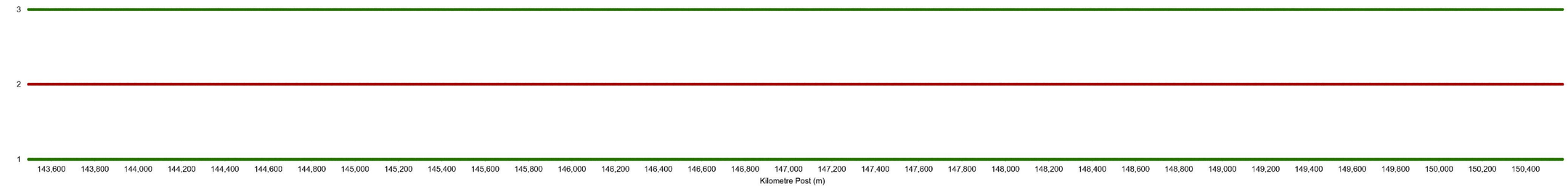
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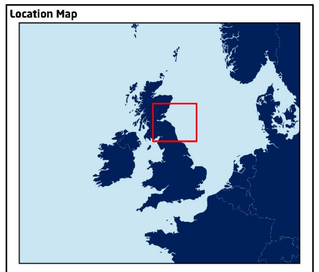
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



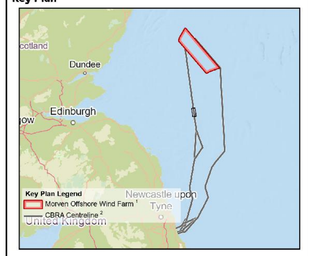
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Legend

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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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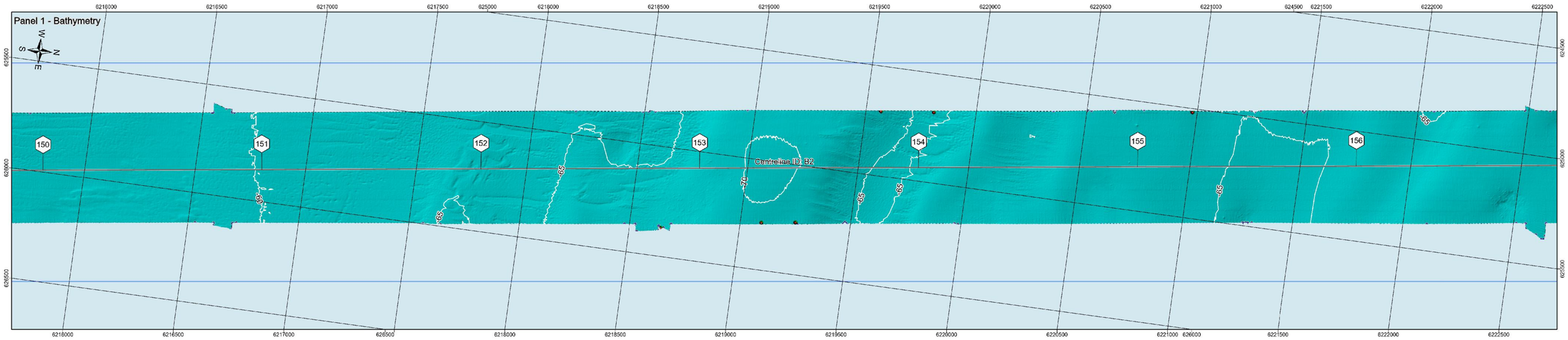
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 24 of 36

Drawing Status
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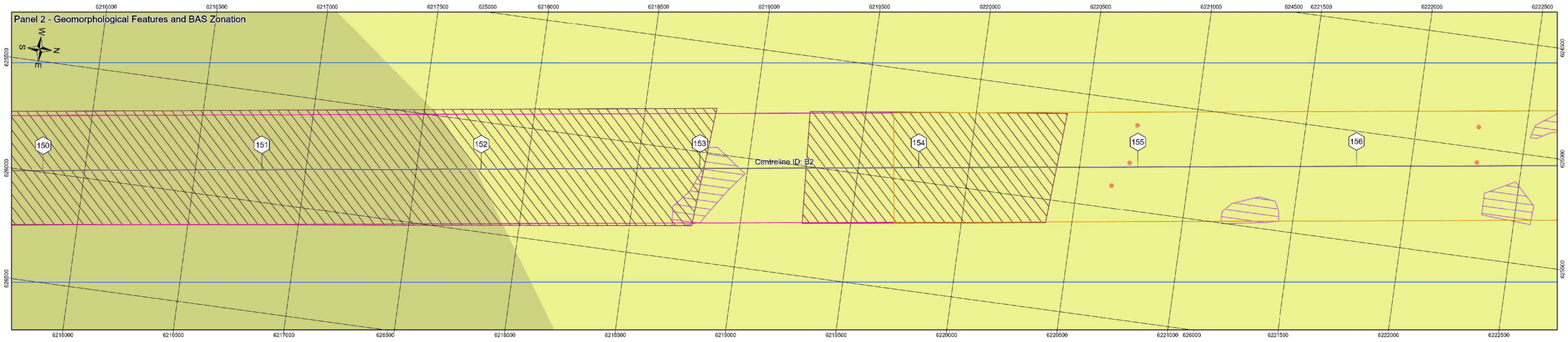
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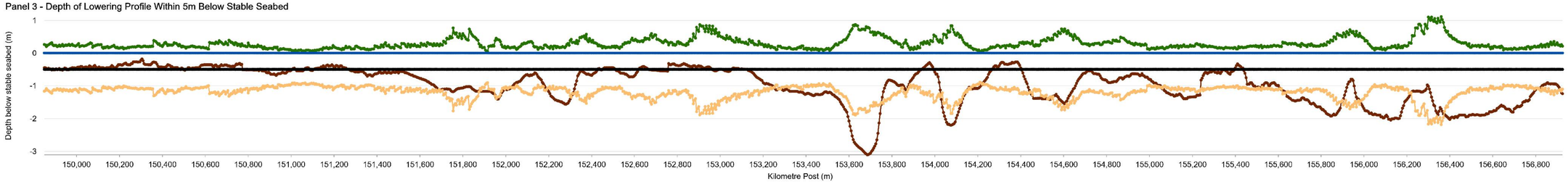
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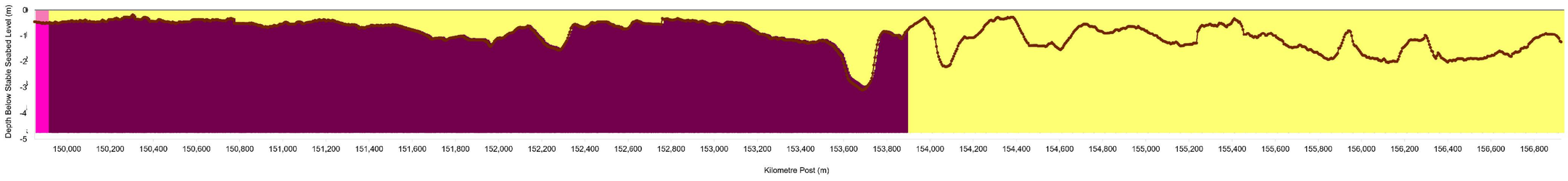
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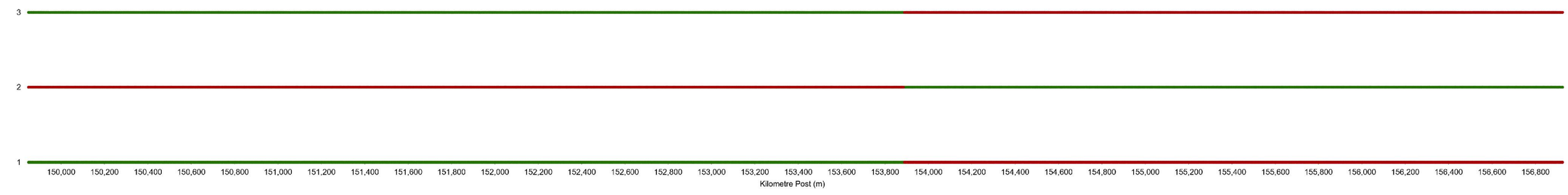
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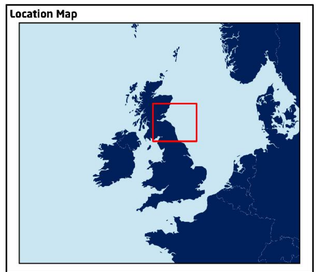
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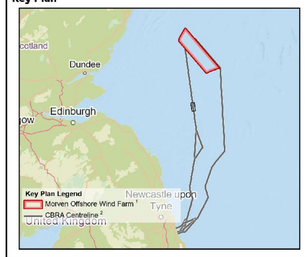
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Layer 1/Layer 2 Boundary [8]	

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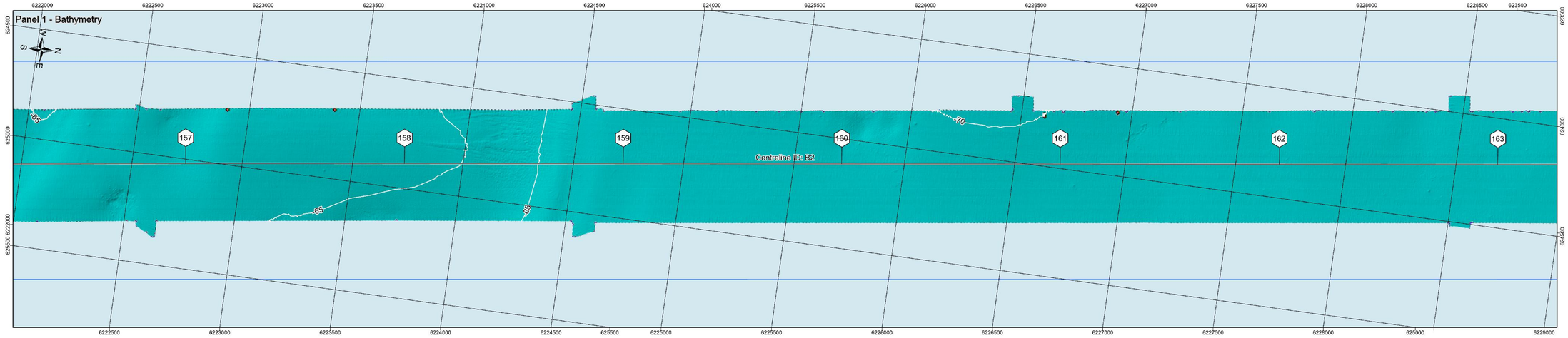
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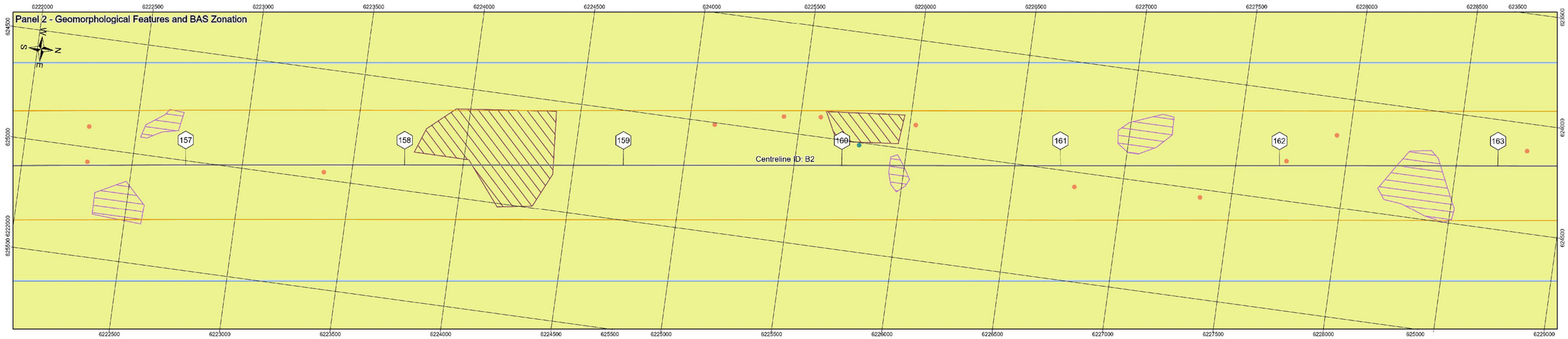
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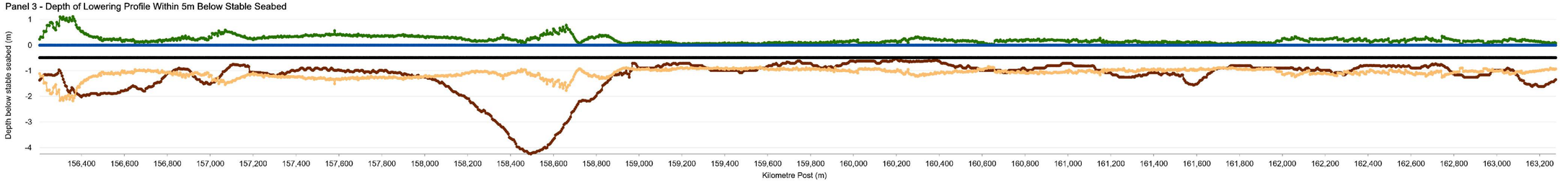
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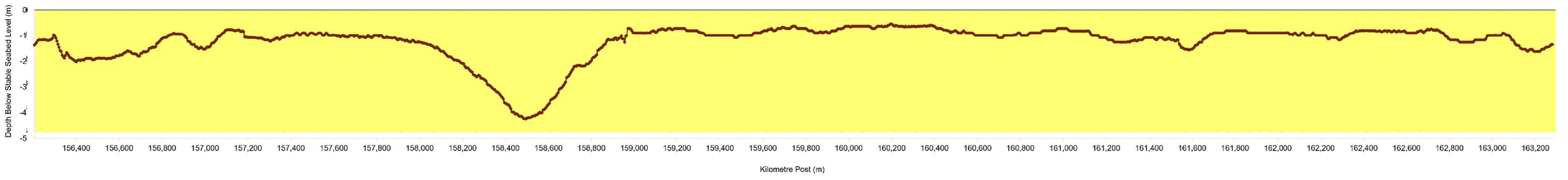
Panel 2 - Geomorphological Features and BAS Zonation



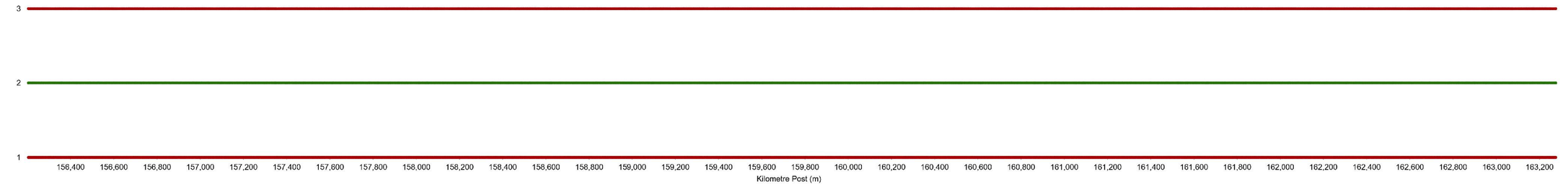
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



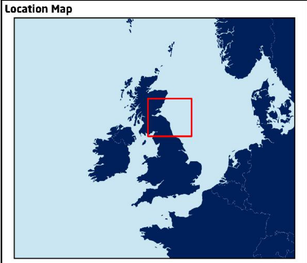
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



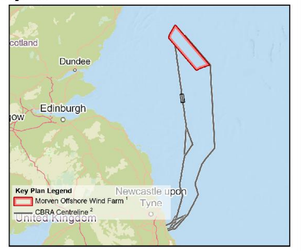
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



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- Boulder/debris
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- Depression with boulder/debris
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
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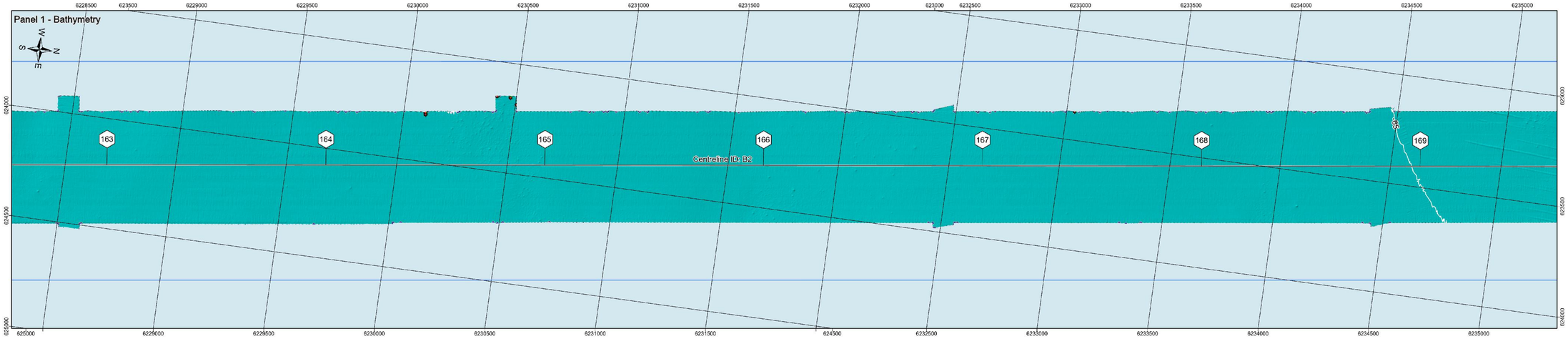
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 26 of 36

Drawing Status
Issue for Review

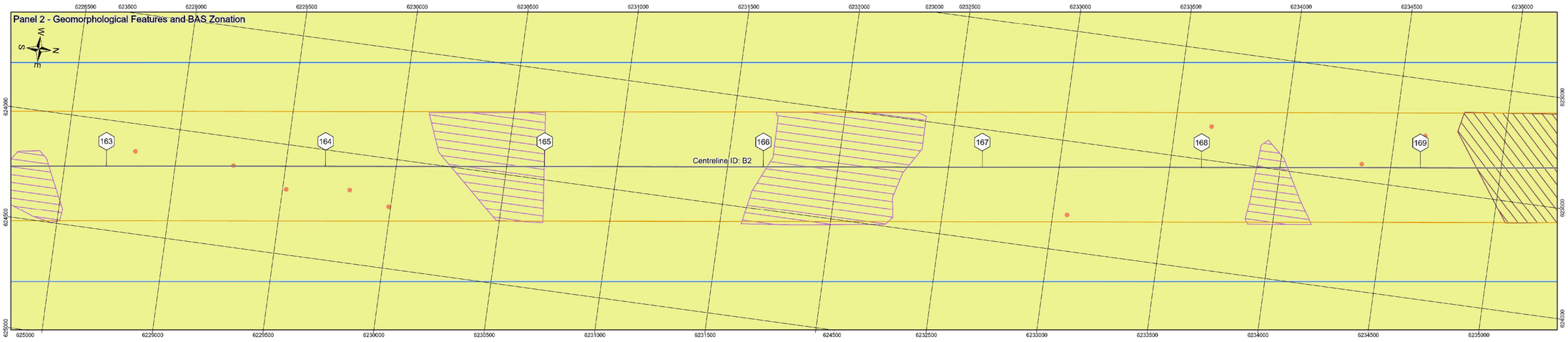
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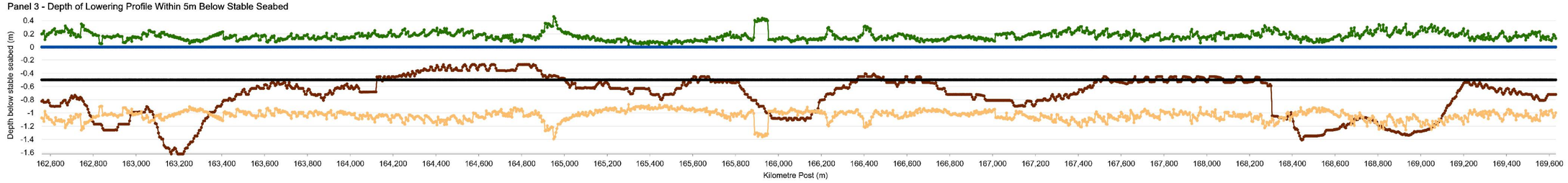
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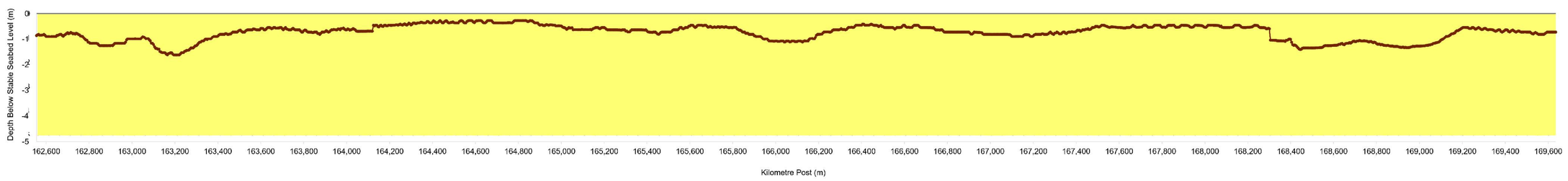
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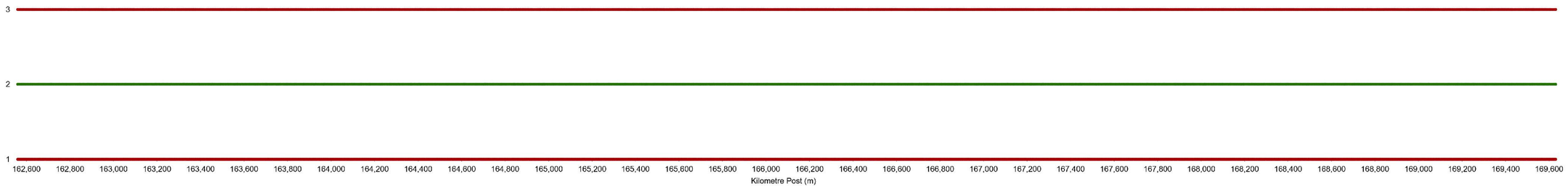
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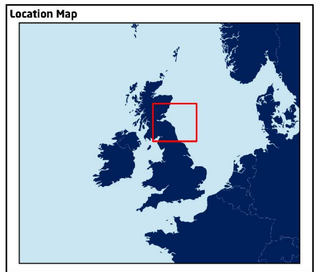
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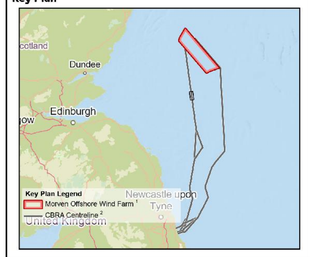
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
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Panel 5

- Suitable [3]
- Possible [3]
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Morven Offshore Wind Farm

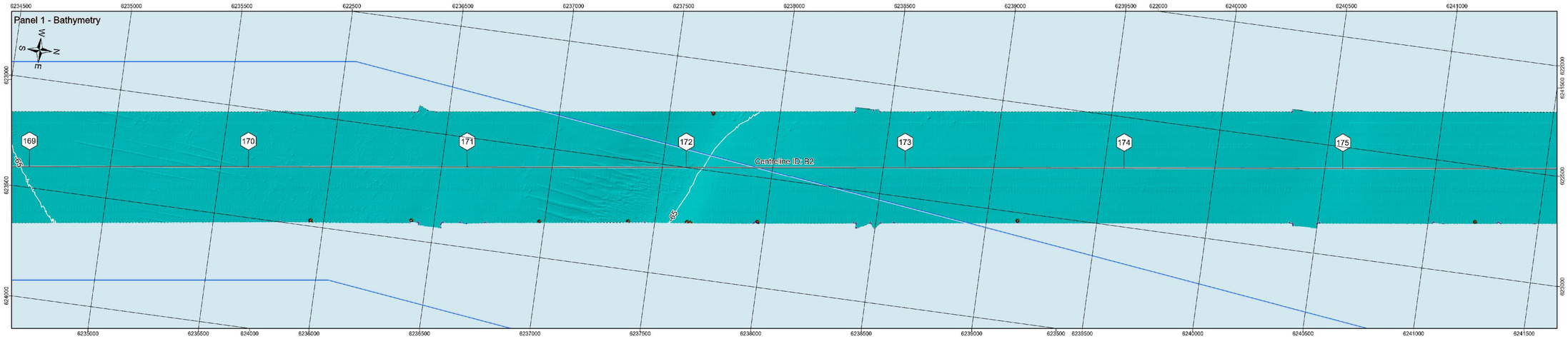
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Morven Offshore Wind Farm Cable Burial Risk Assessment

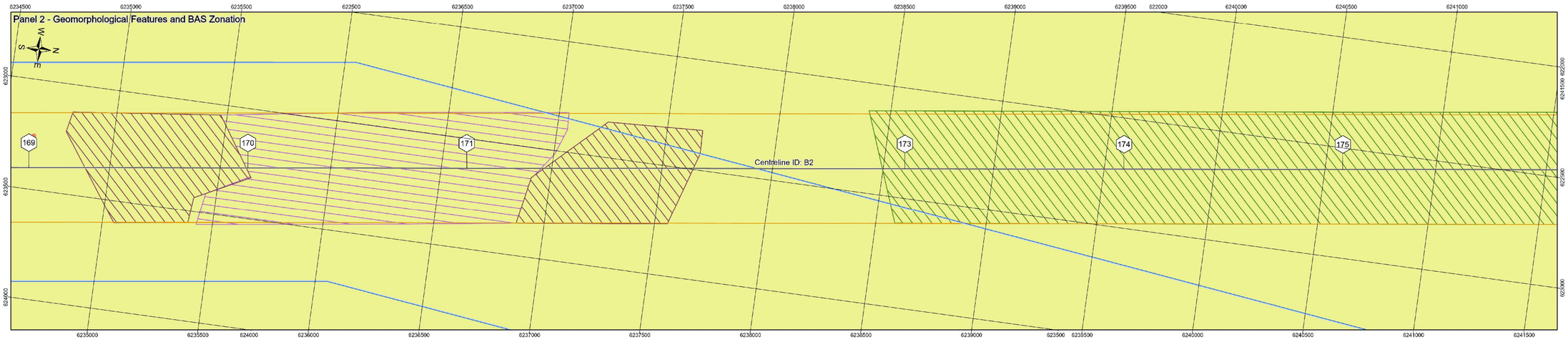
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 27 of 36

Drawing Status
Issue for Review

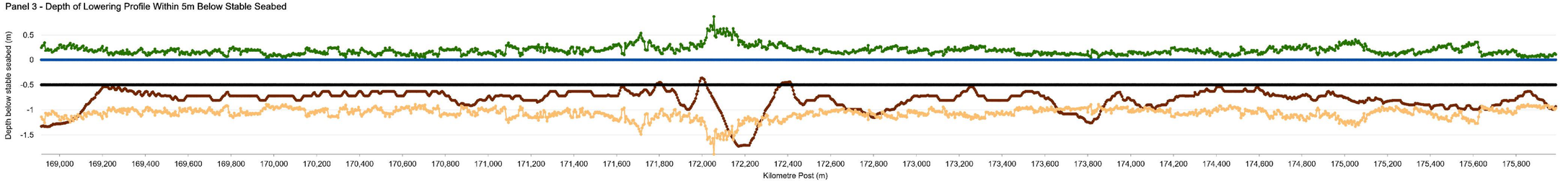
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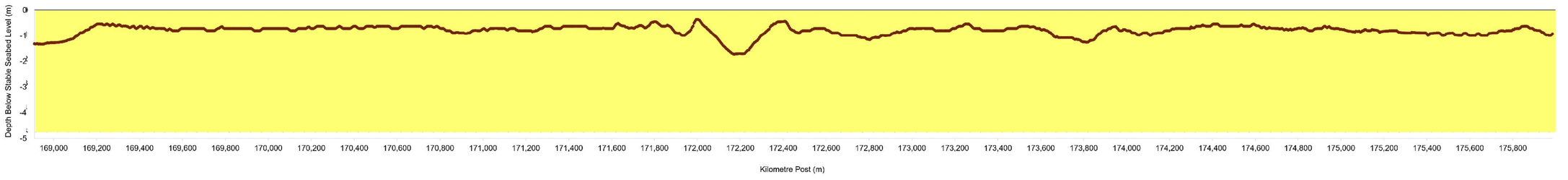




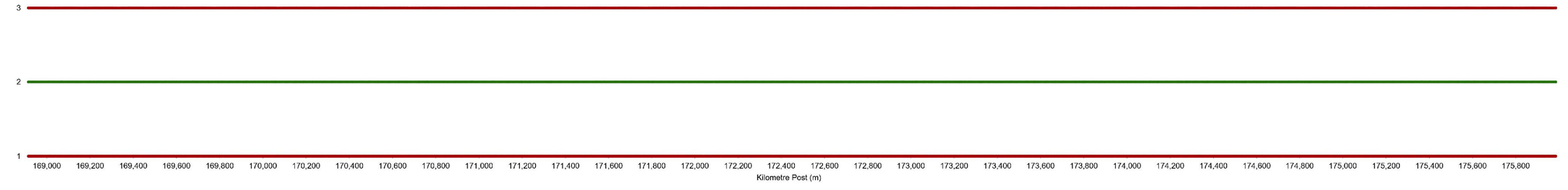
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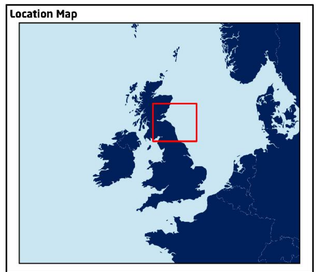
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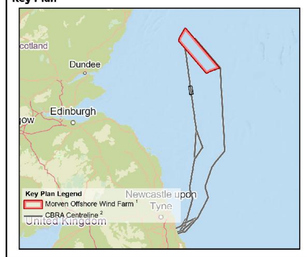
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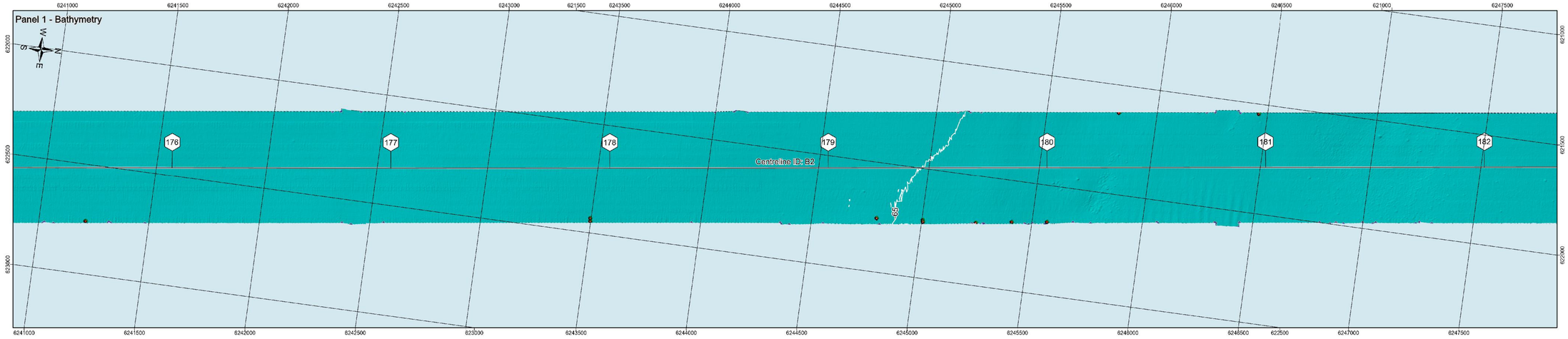
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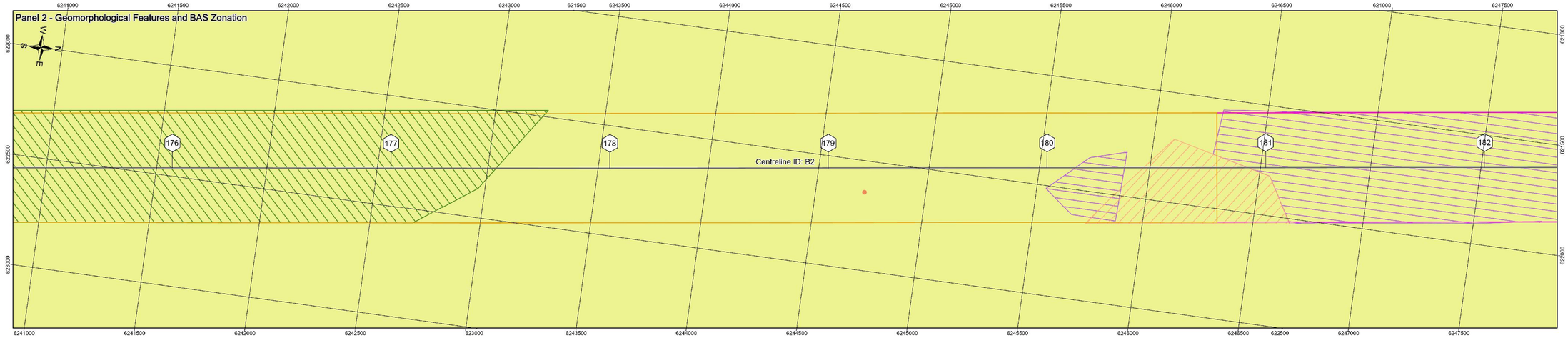
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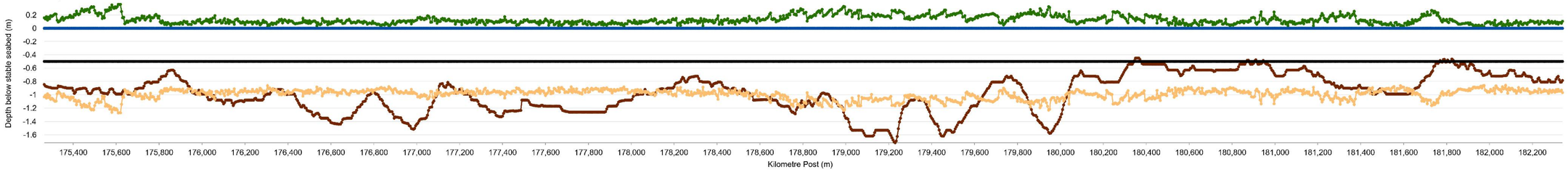
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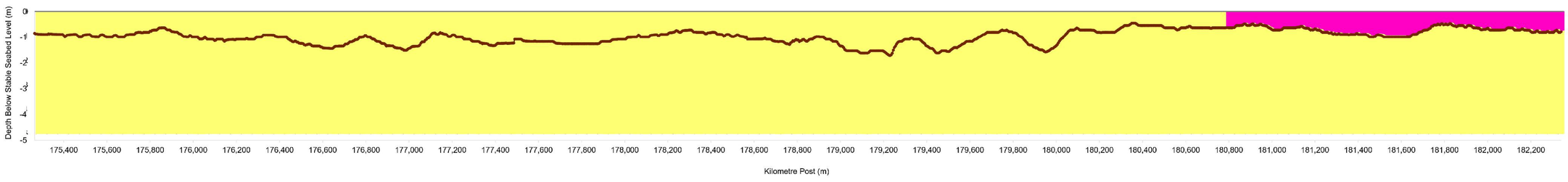
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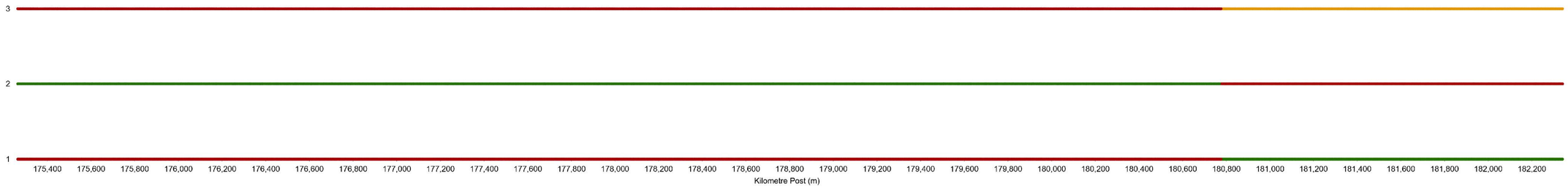
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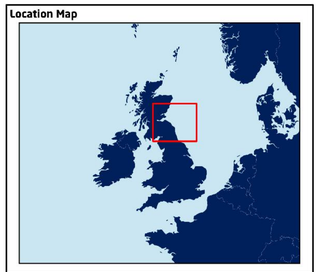
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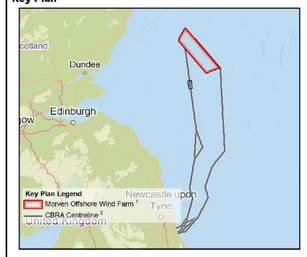
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [5]
- Layer 1/Layer 2 Boundary [9]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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10. Source: ESCA, April 2024.

Project Title
Morven Offshore Wind Farm

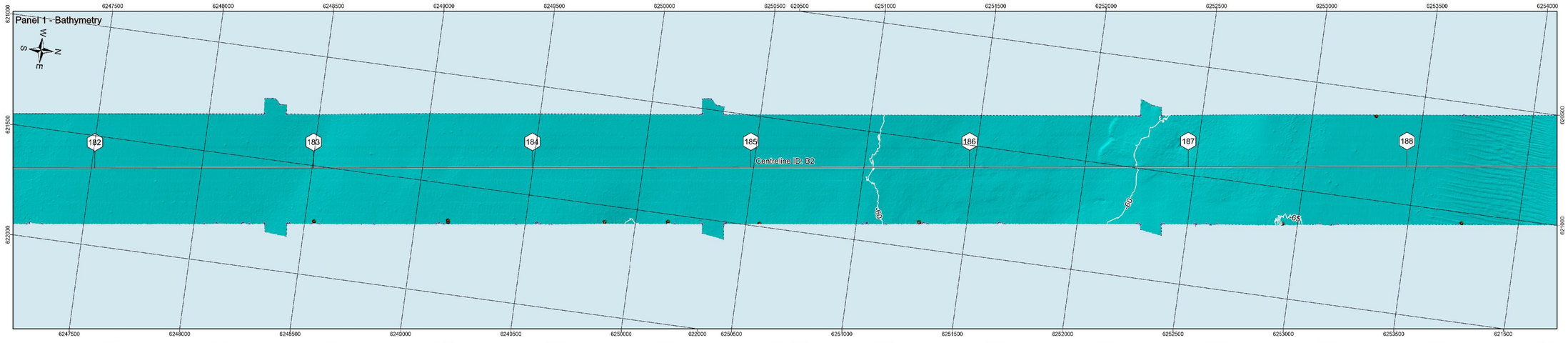
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

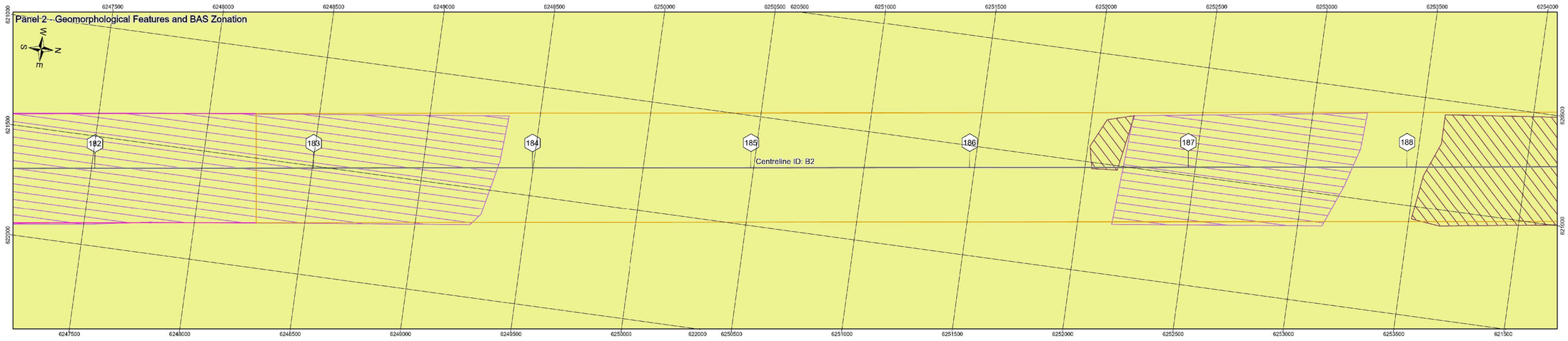
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 29 of 36

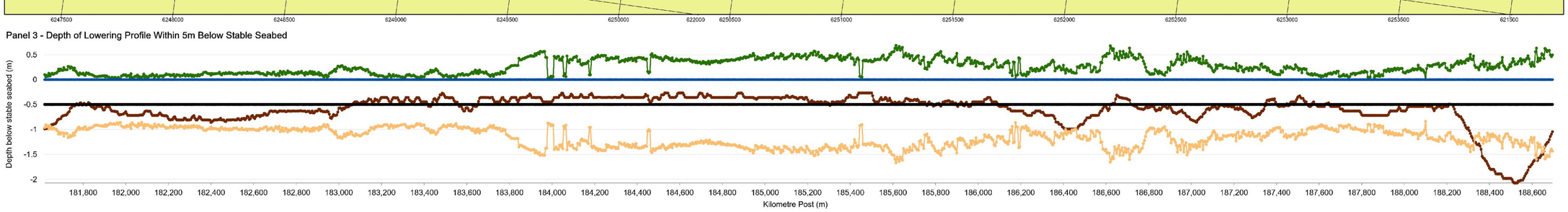
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Issue for Review

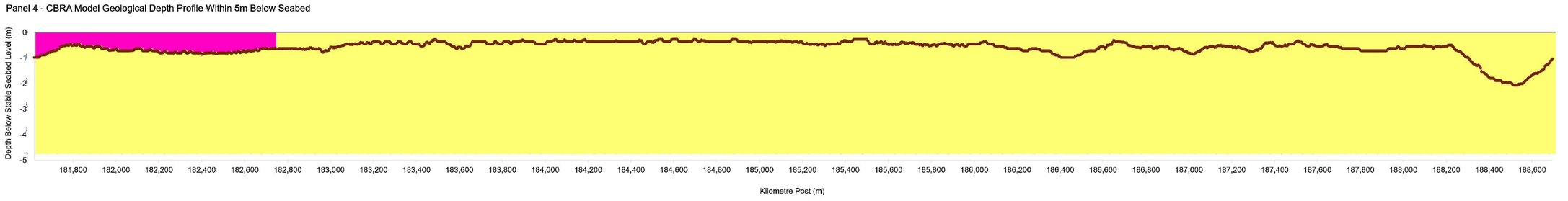
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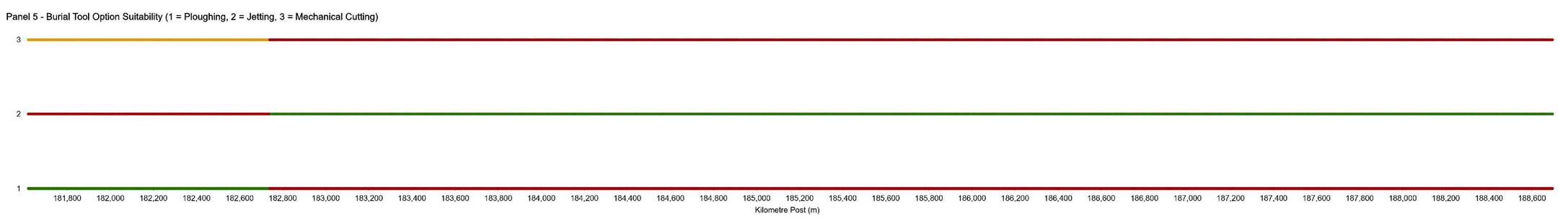
GLOBAL MARITIME — EnBW — bp
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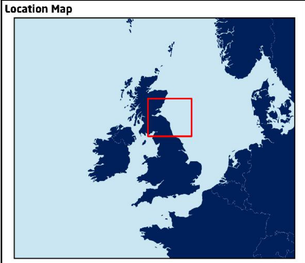




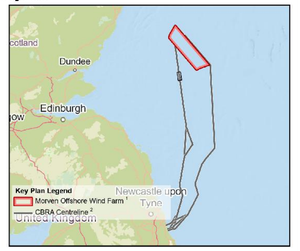




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
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Seabed Substrate [7]
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- 1.2 sandy Mud
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- Global Maritime Recommended Depth of Lowering [9]
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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

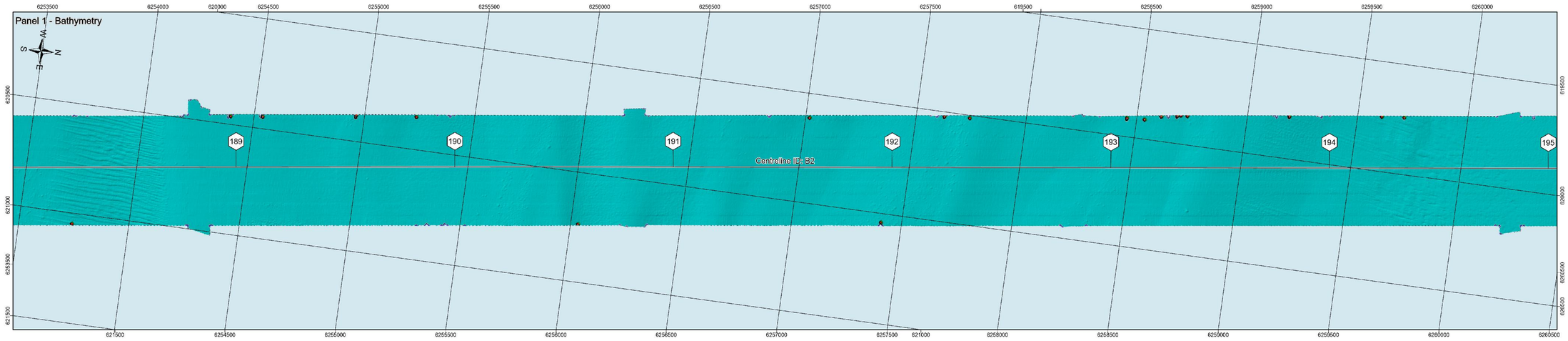
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 30 of 36

Drawing Status
Issue for Review

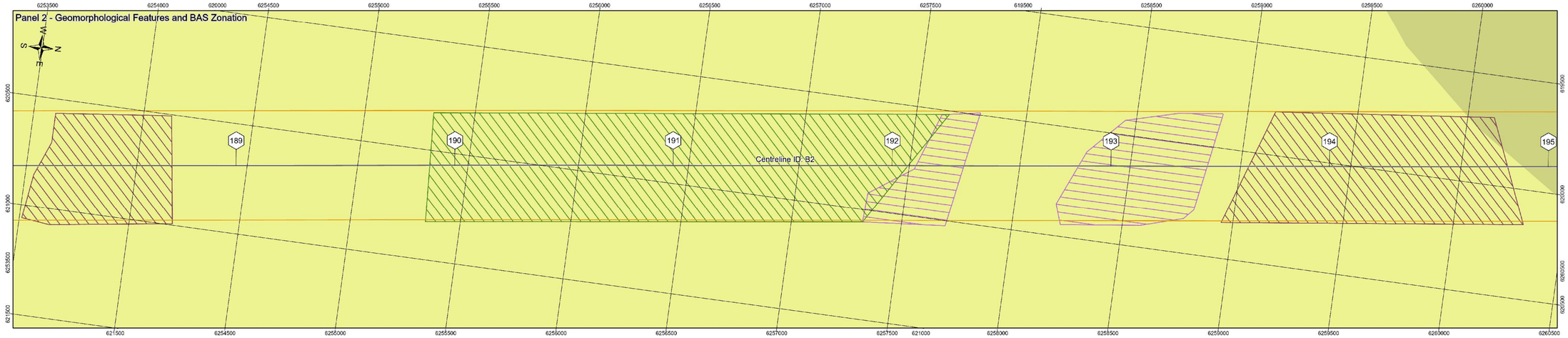
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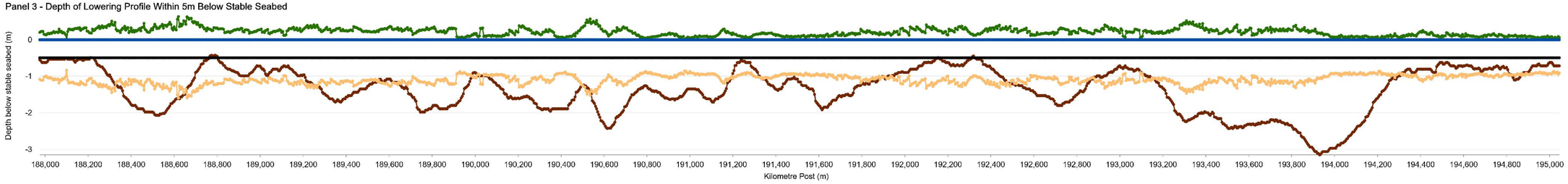
Panel 1 - Bathymetry



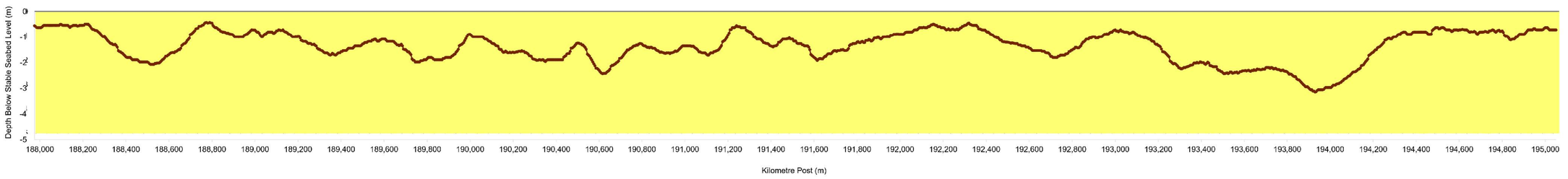
Panel 2 - Geomorphological Features and BAS Zonation



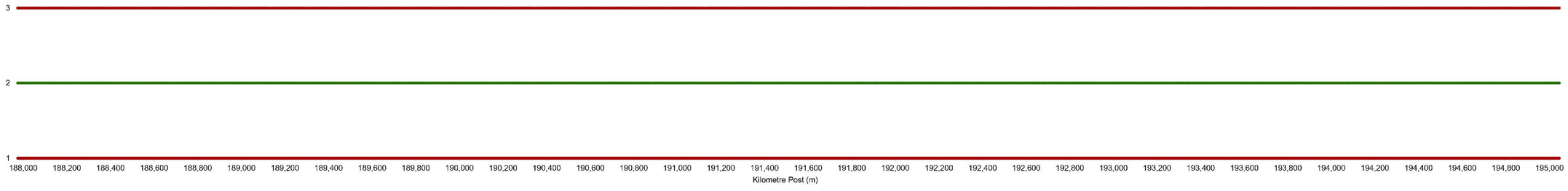
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



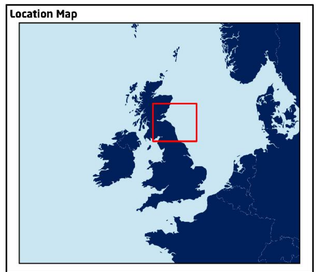
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



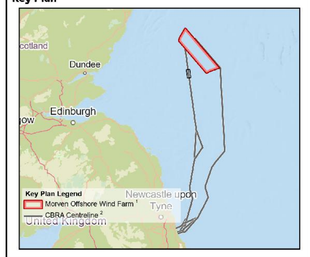
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]

Panel 2

BAS Zone Classification [3]
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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Map Units: Meter

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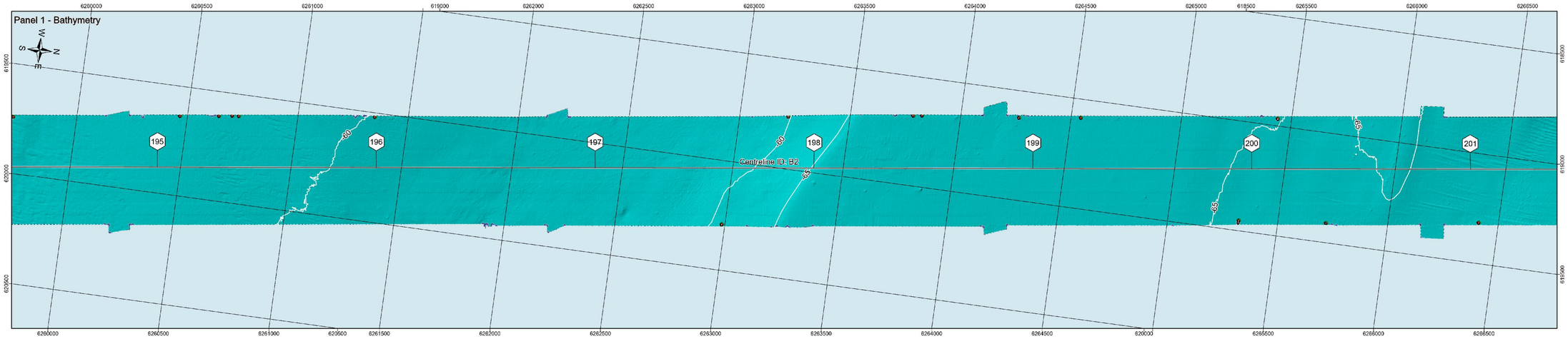
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

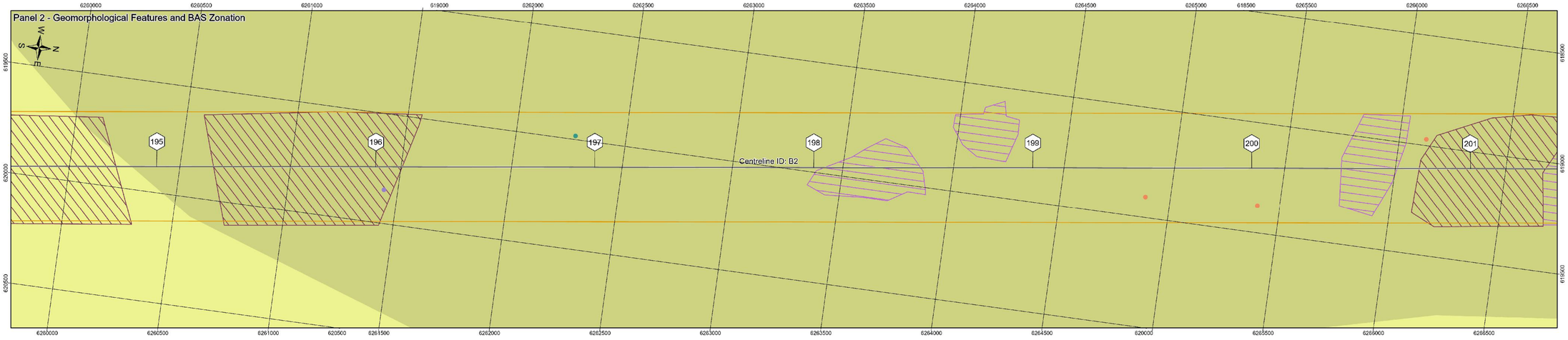
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CBRA Alignment Charts - Centreline ID: B2 - Sheet 31 of 36

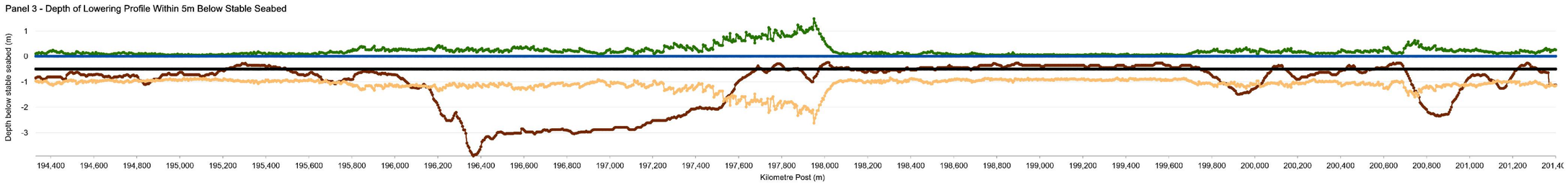
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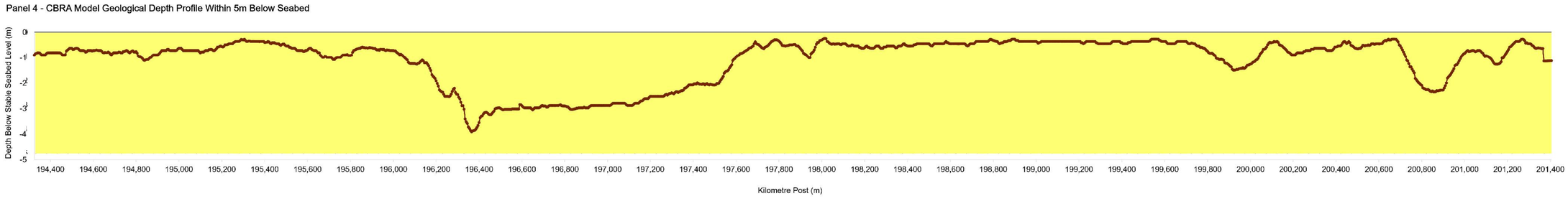
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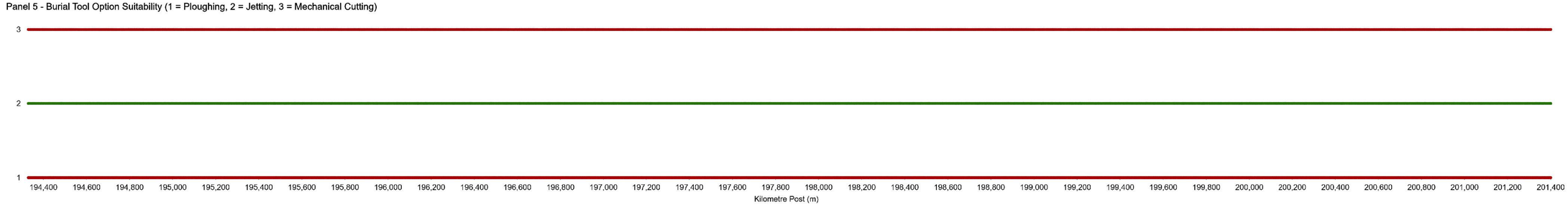
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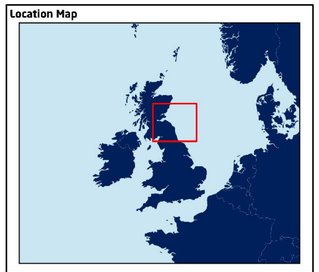




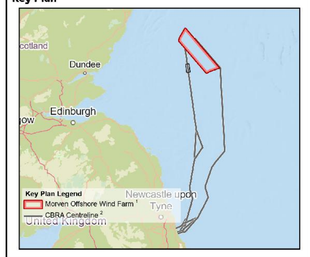




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
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Panel 2

BAS Zone Classification [3]
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Geomorphology [6]
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- Depression with boulder/debris
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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- Suitable [3]
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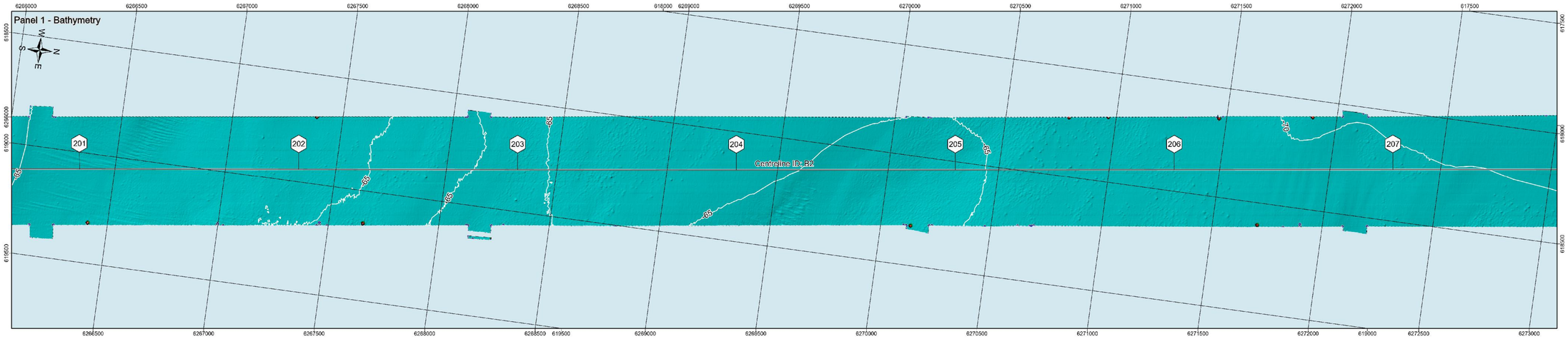
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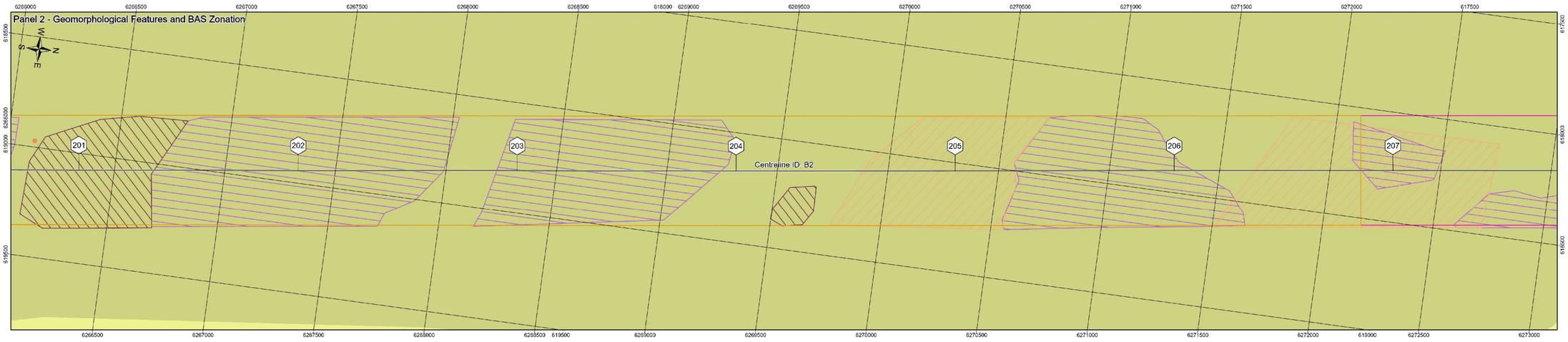
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 32 of 36

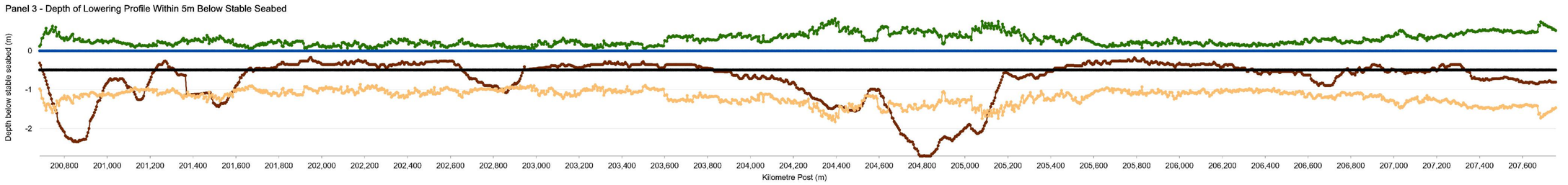
Drawing Status
Issue for Review

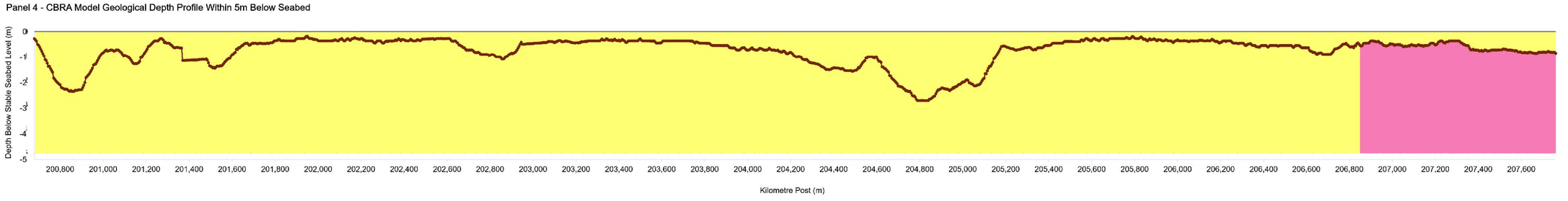
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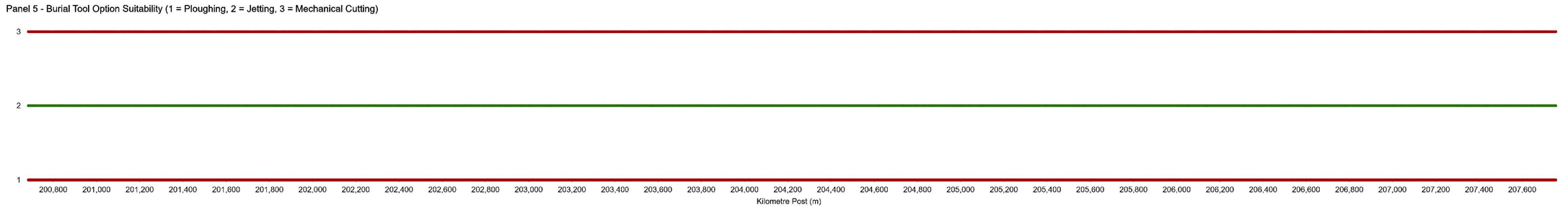
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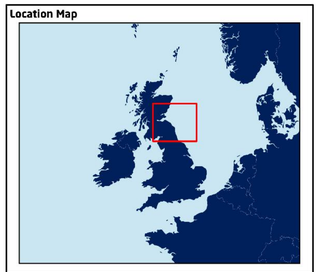




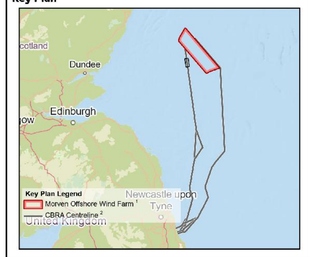




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- 1.2 sandy Mud
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Panel 3

- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [8]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
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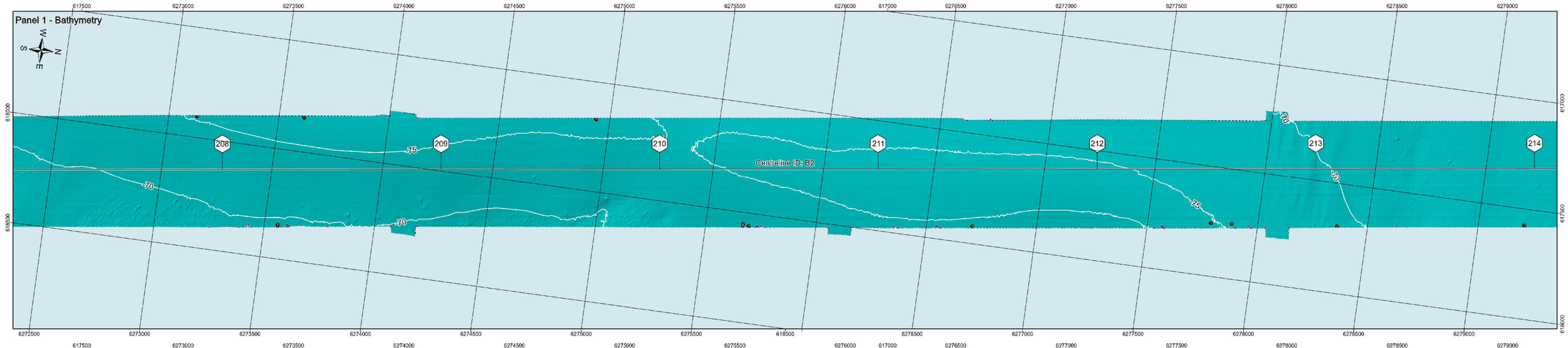
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

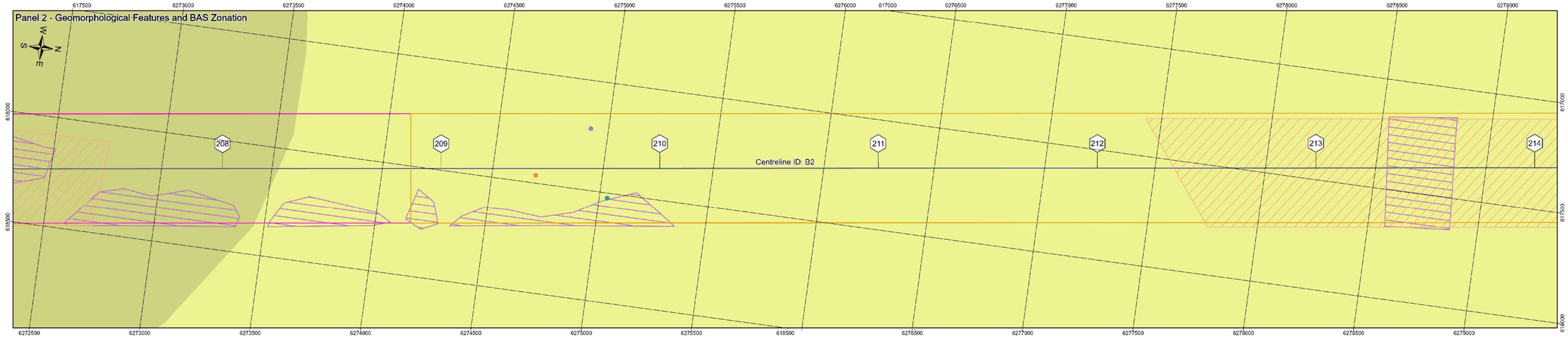
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 33 of 36

Drawing Status
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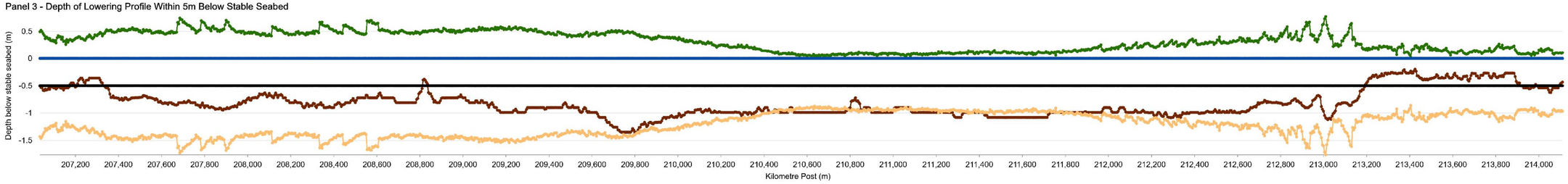
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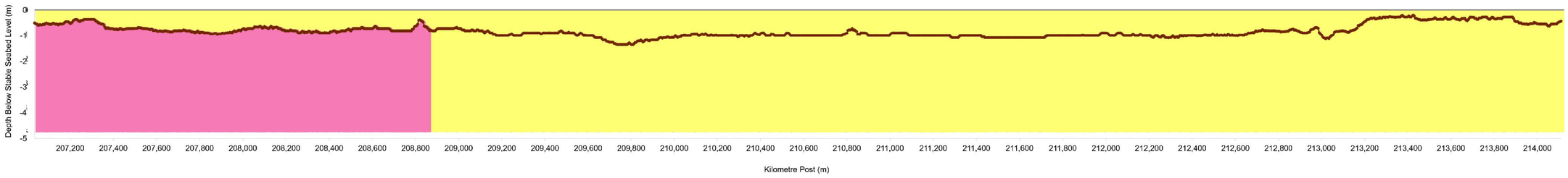




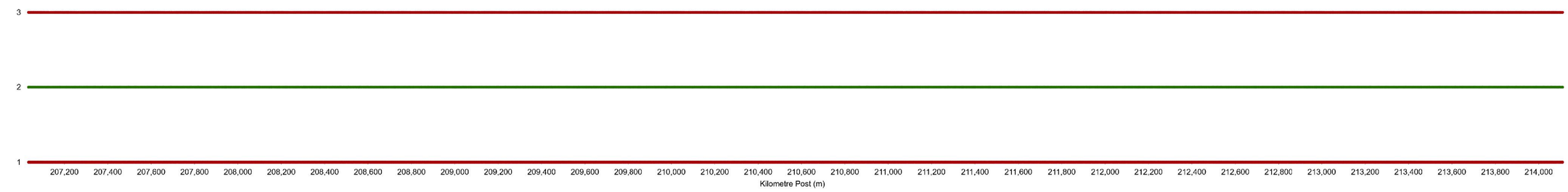
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



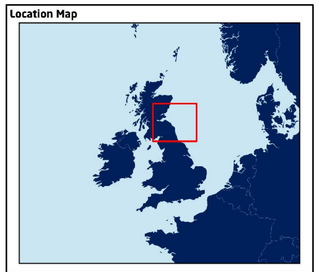
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



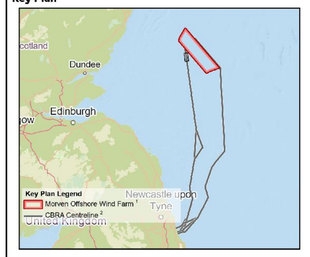
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

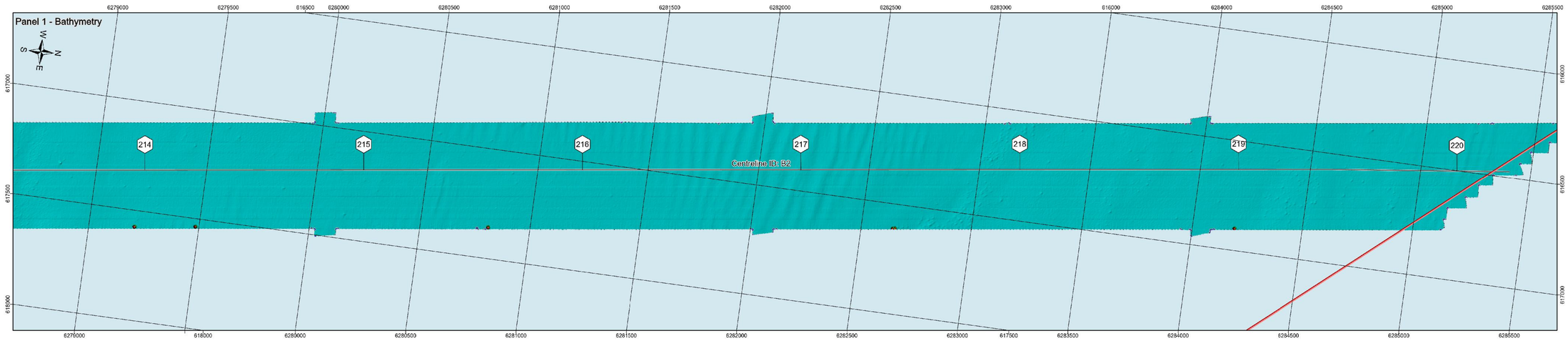
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 34 of 36

Drawing Status
Issue for Review

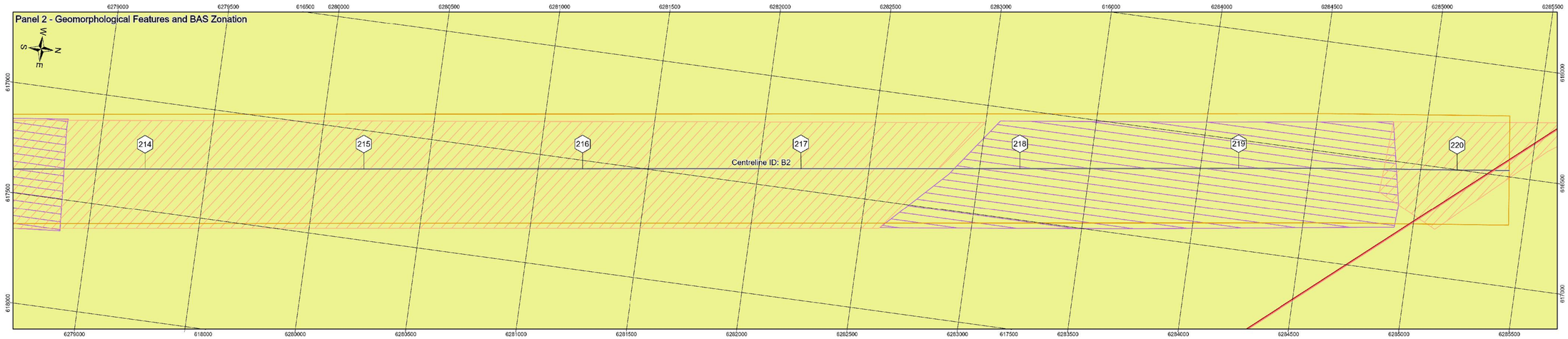
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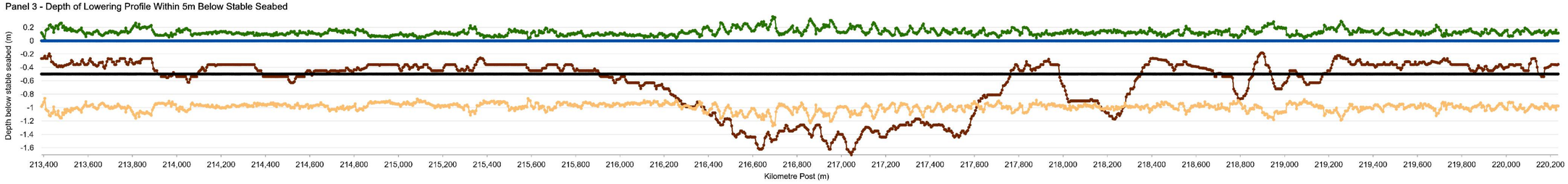
Panel 1 - Bathymetry



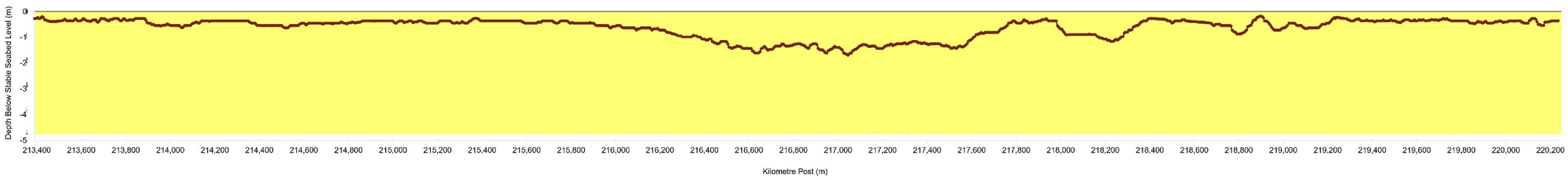
Panel 2 - Geomorphological Features and BAS Zonation



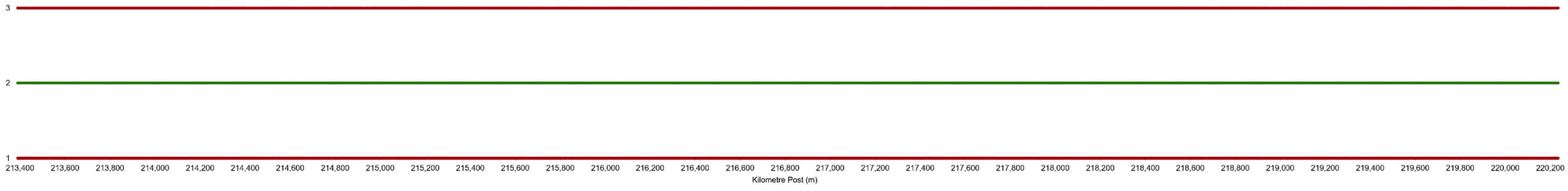
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



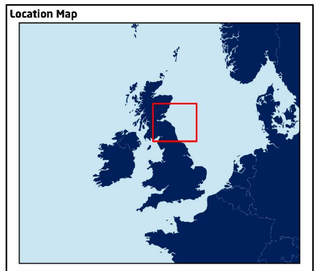
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



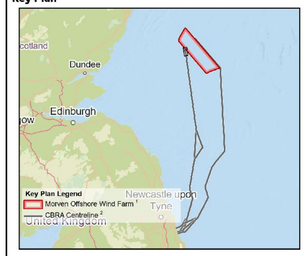
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

Panel 1 & Site Data

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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
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- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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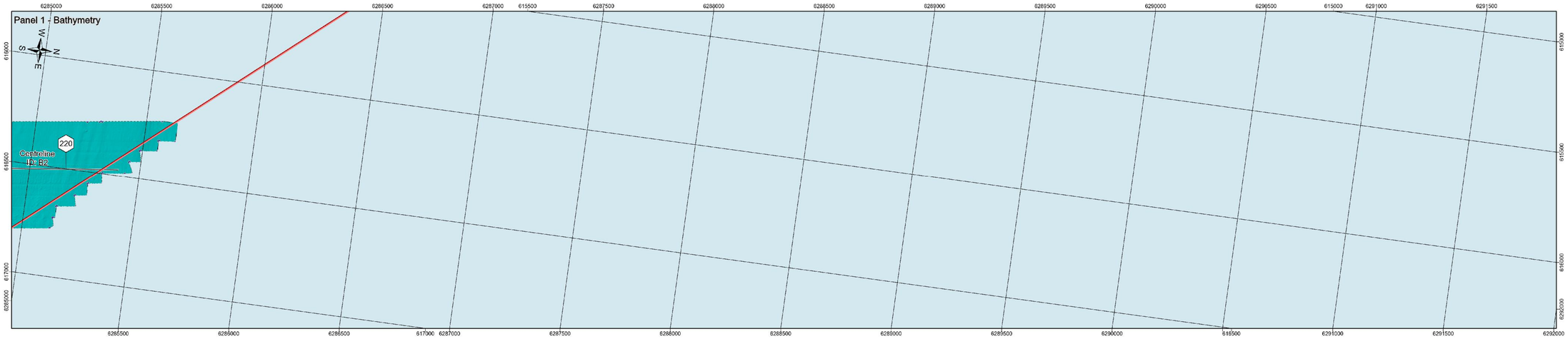
Report Title
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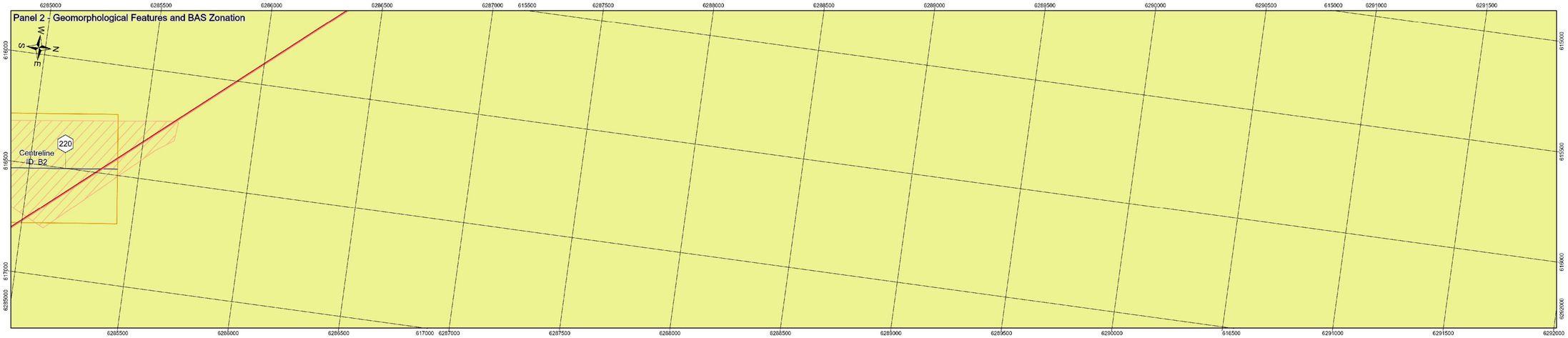
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 35 of 36

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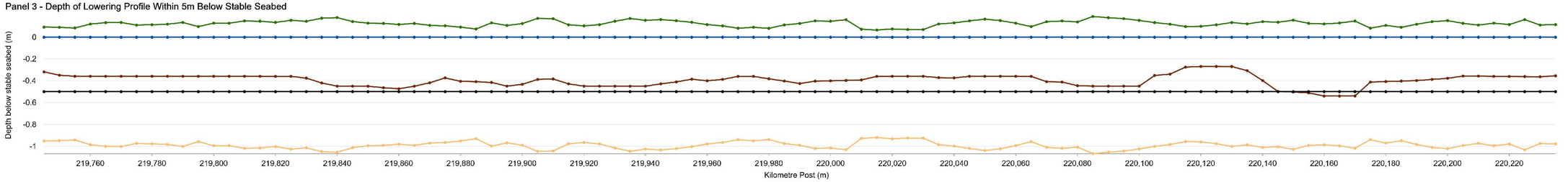
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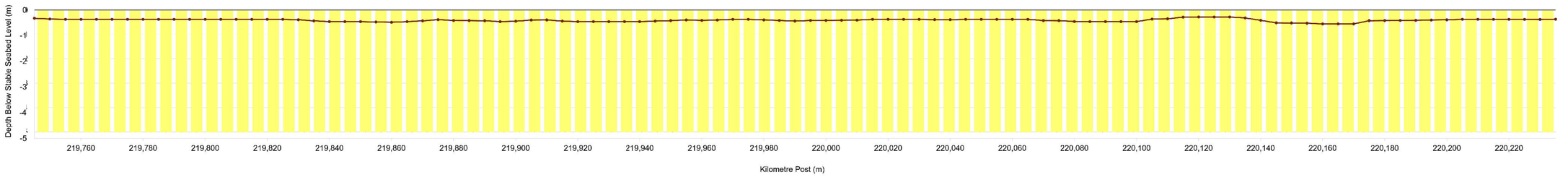




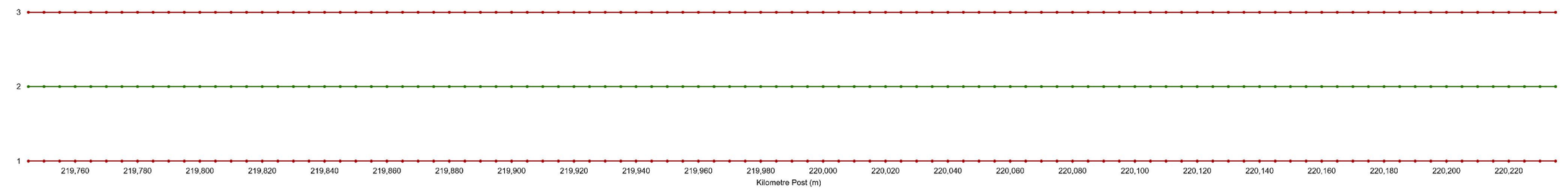
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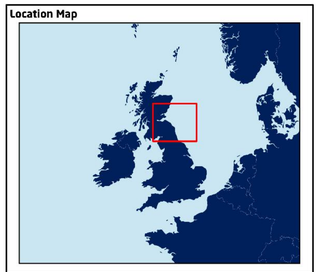
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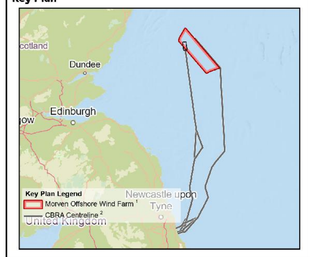
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- SEGL2 Installation Corridor [6]
- SEGL1 Installation Corridor [6]
- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [5]
- Layer 1/Layer 2 Boundary [9]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

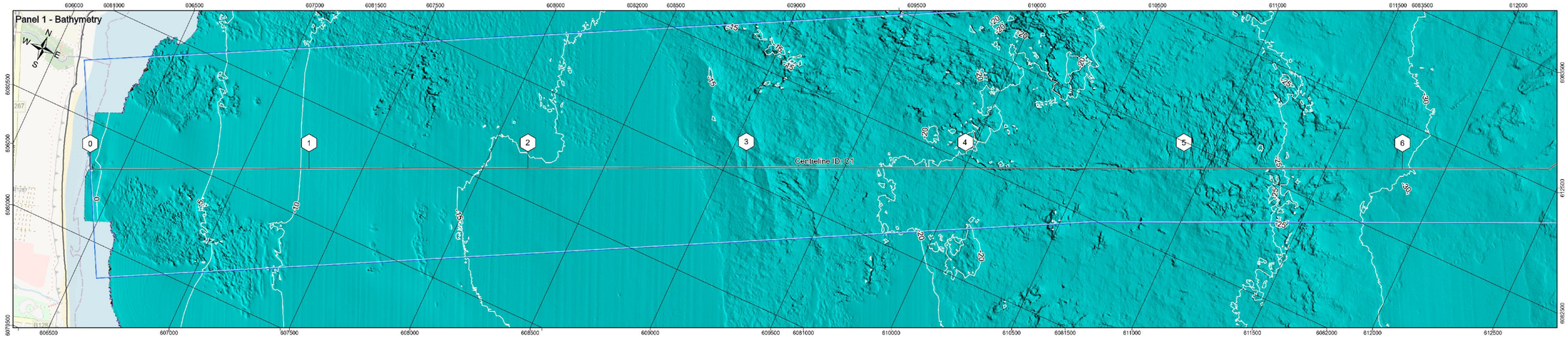
Drawing Title
CBRA Alignment Charts - Centreline ID: B2 - Sheet 36 of 36

Drawing Status
Issue for Review

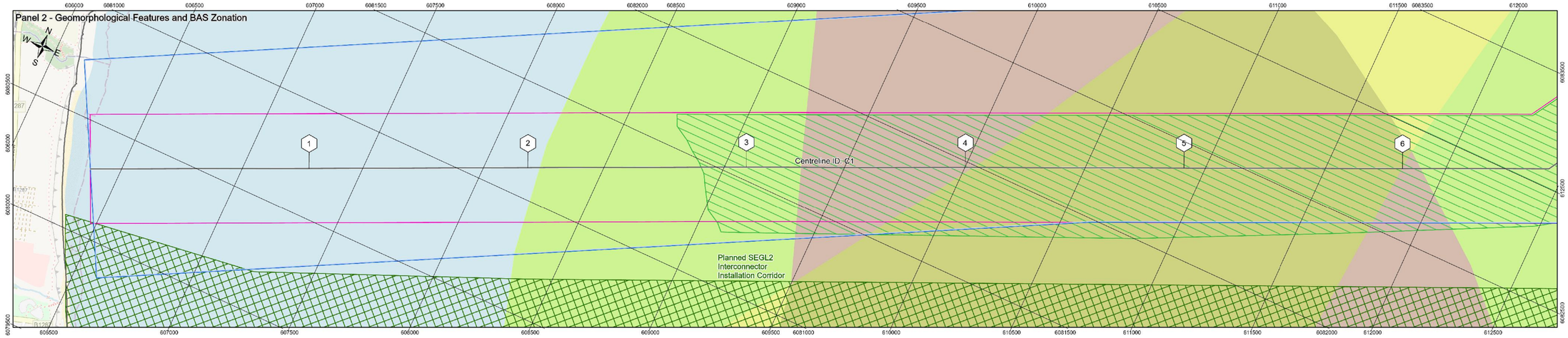
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GLOBAL MARITIME — EnBW — bp
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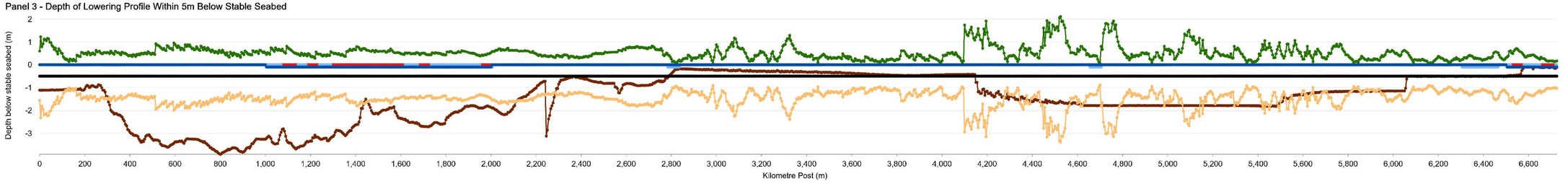
Panel 1 - Bathymetry



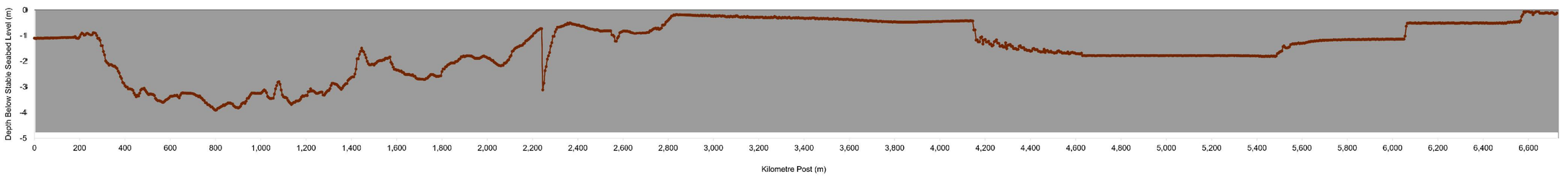
Panel 2 - Geomorphological Features and BAS Zonation



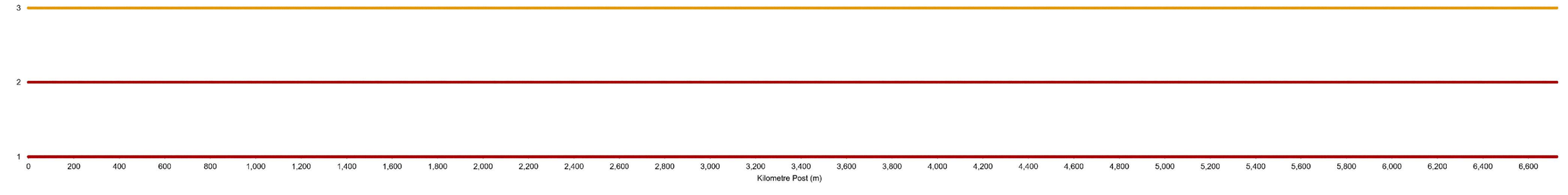
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



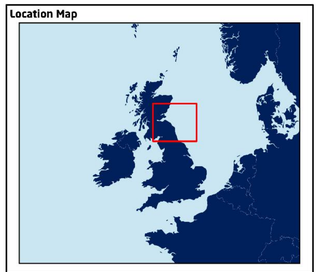
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



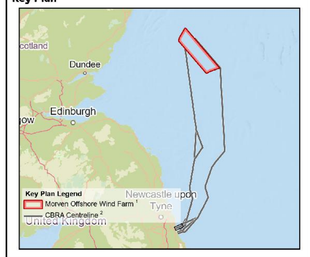
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
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BAS Zone Classification [3]
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- Depression with boulder/debris
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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

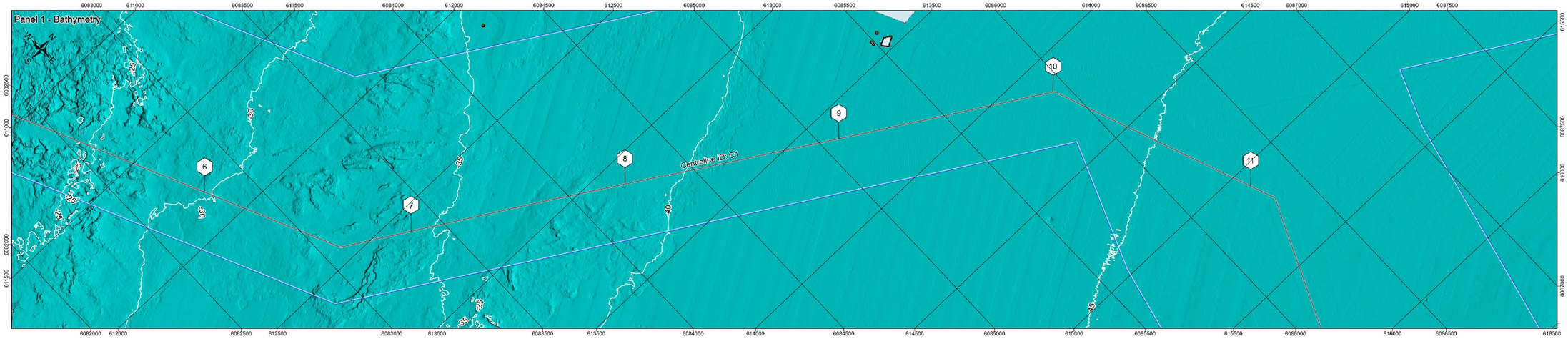
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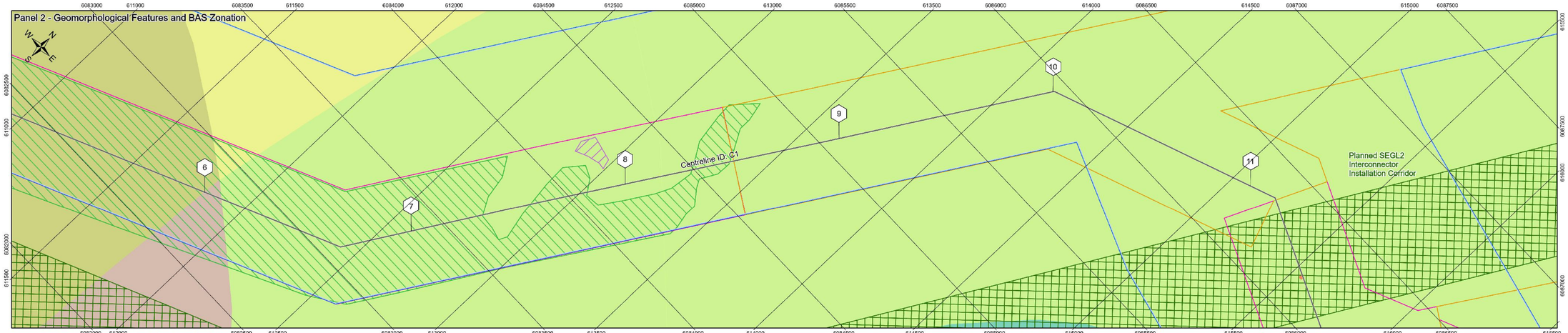
Spatial Reference
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GCS: GCS European 1950
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Projection: Transverse Mercator
Central Meridian: -3.0000
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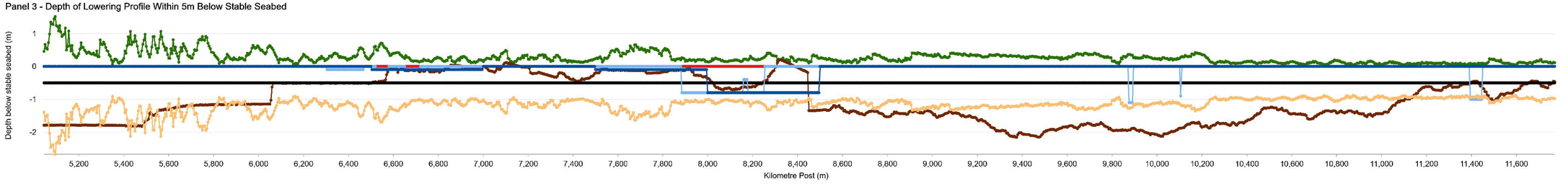
Project Title	Morven Offshore Wind Farm
Report Title	Morven Offshore Wind Farm Cable Burial Risk Assessment
Drawing Title	CBRA Alignment Charts - Centreline ID: C1 - Sheet 1 of 41
Drawing Status	Issue for Review
Drawing Number	GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

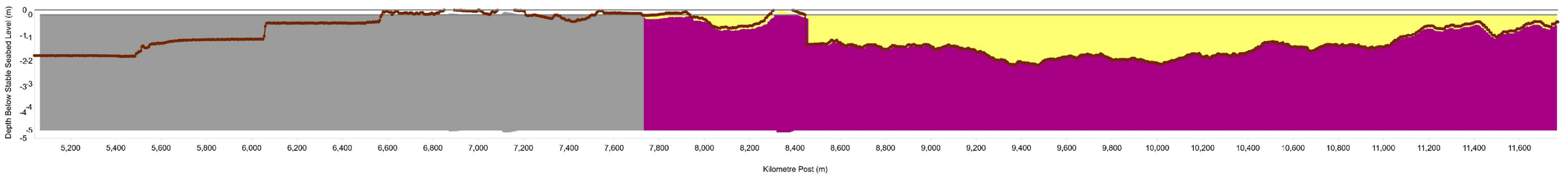




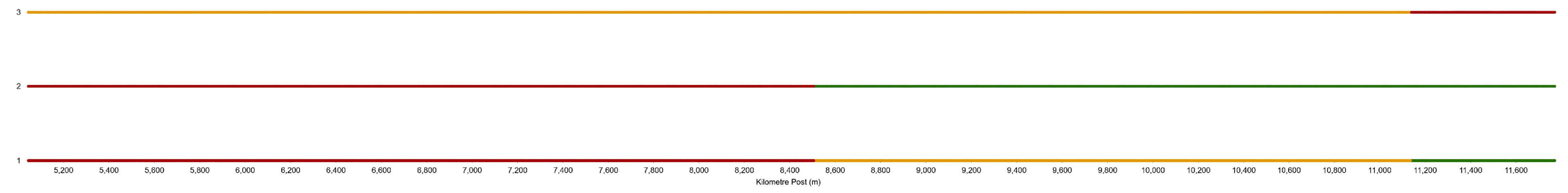
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



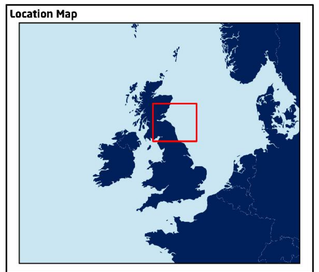
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



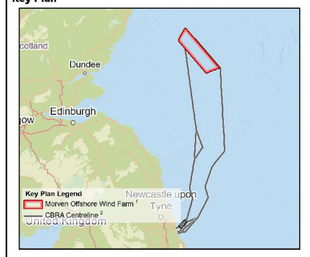
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Legend

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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

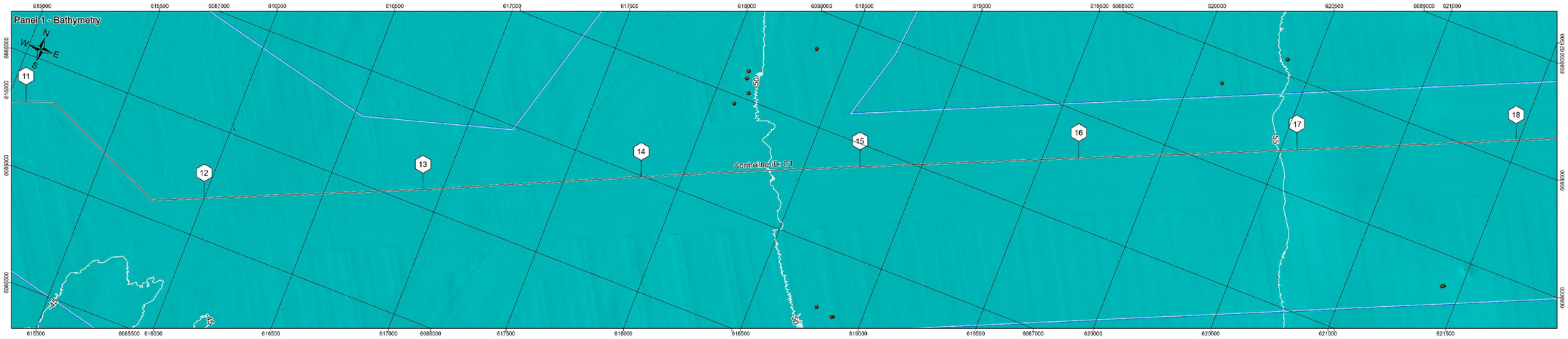
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

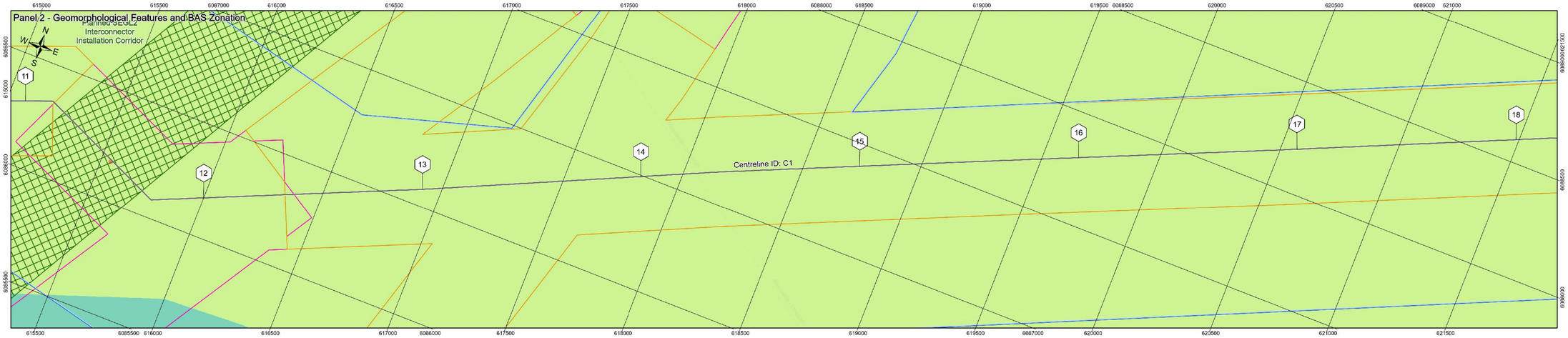
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 2 of 41

Drawing Status
Issue for Review

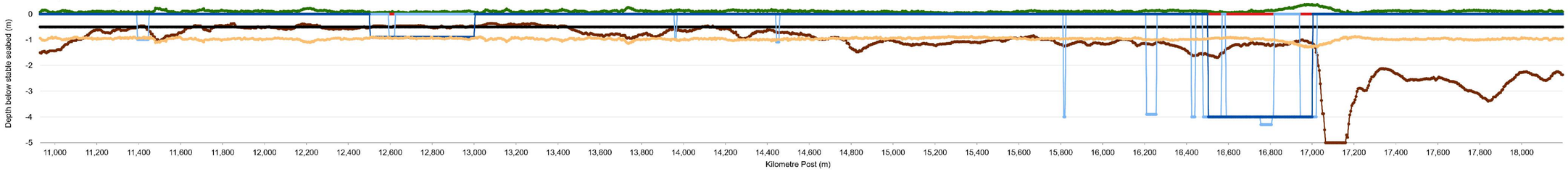
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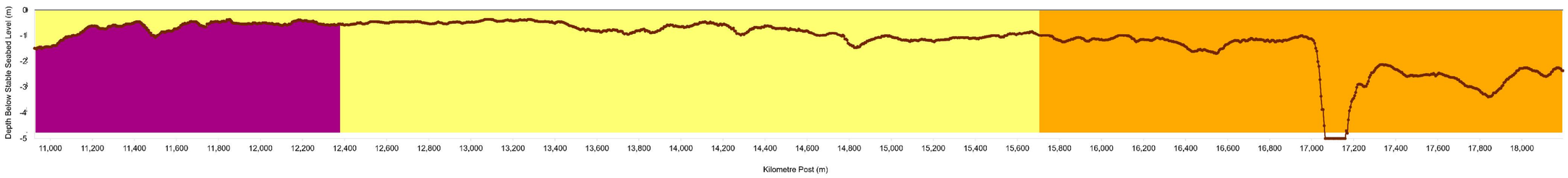




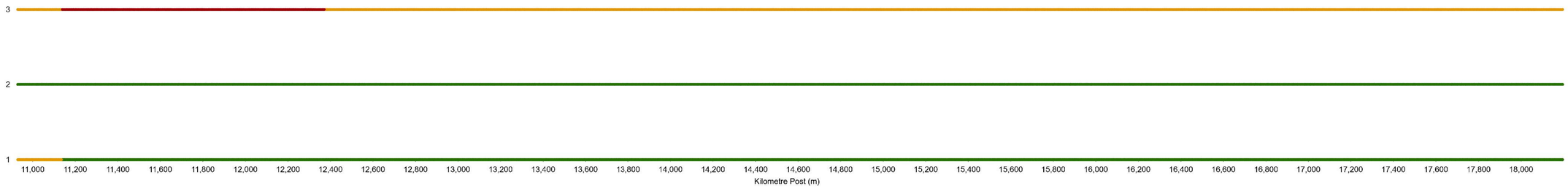
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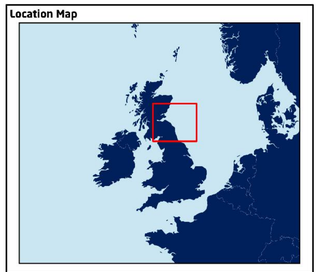
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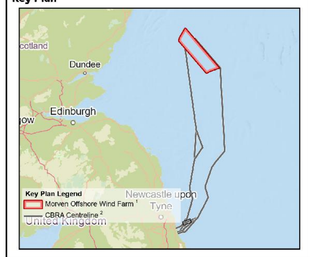
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

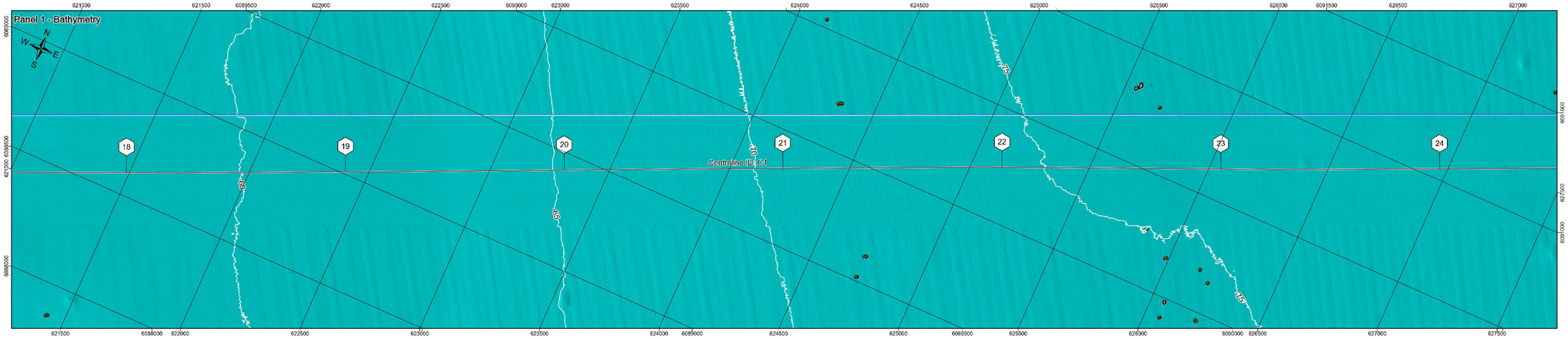
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 3 of 41

Drawing Status
Issue for Review

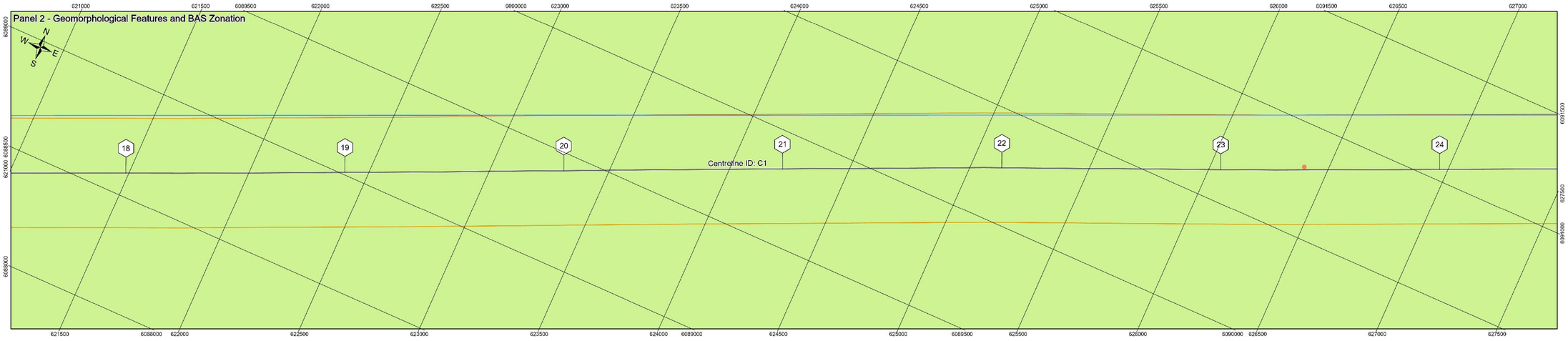
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
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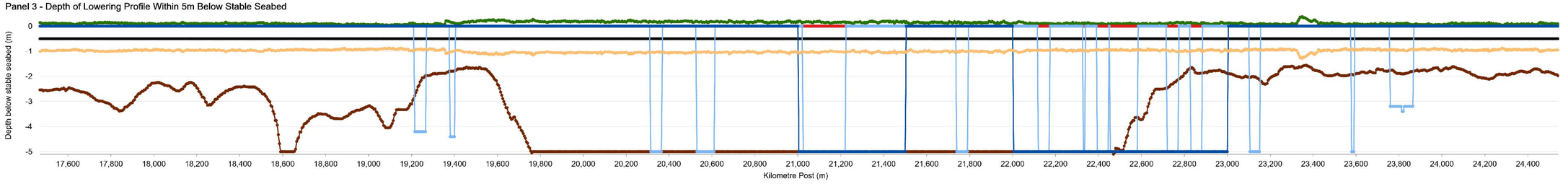
Panel 1 - Bathymetry



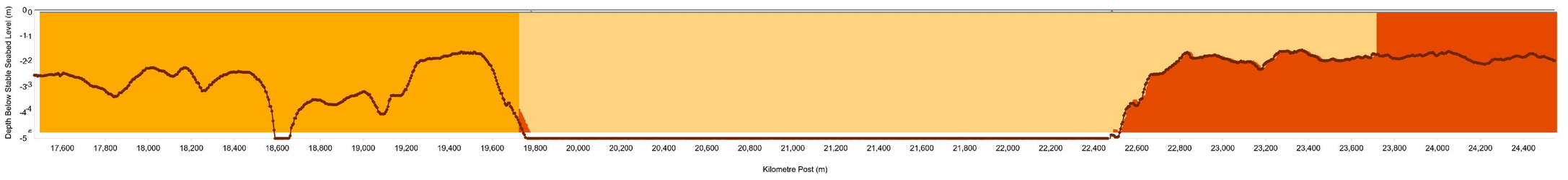
Panel 2 - Geomorphological Features and BAS Zonation



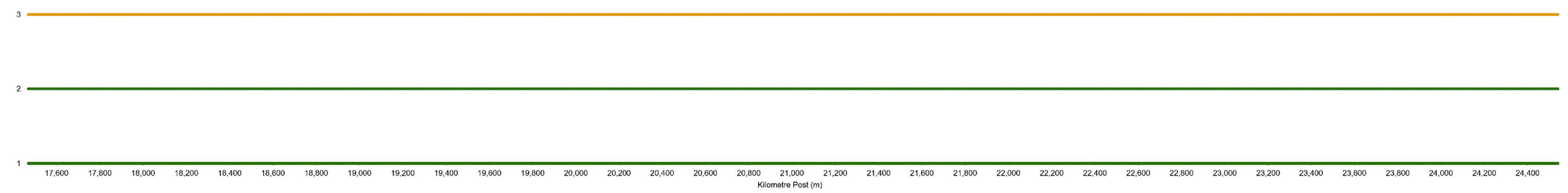
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



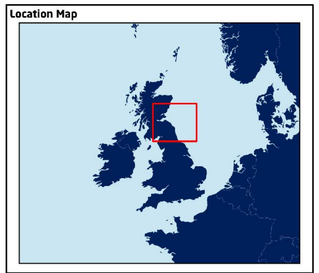
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



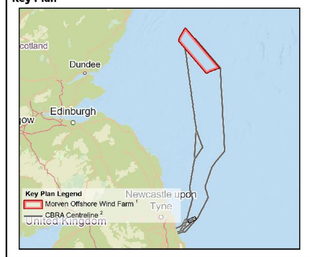
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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- Extremely High Strength CLAY (C7)
- Rock (R)

- Layer 1/Layer 2 Boundary [4]

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
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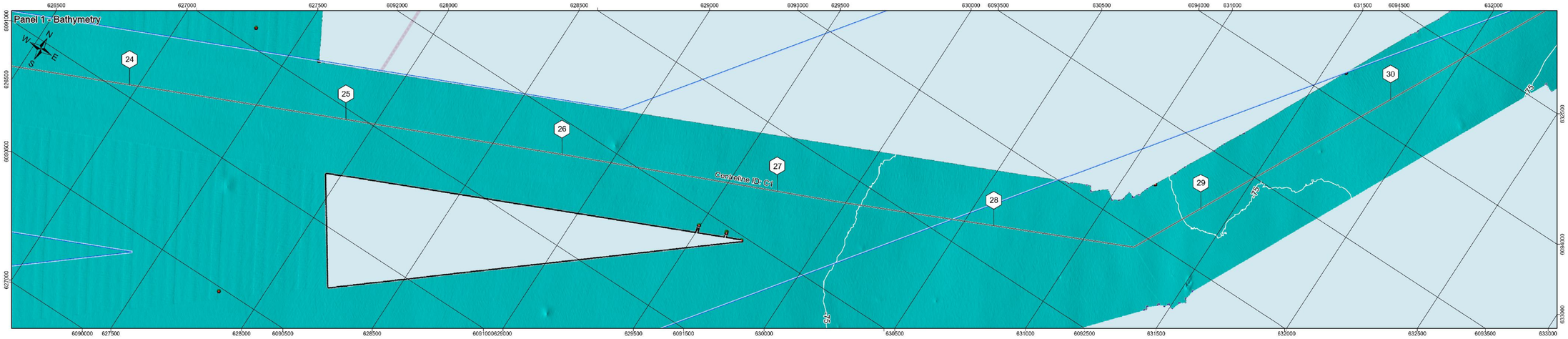
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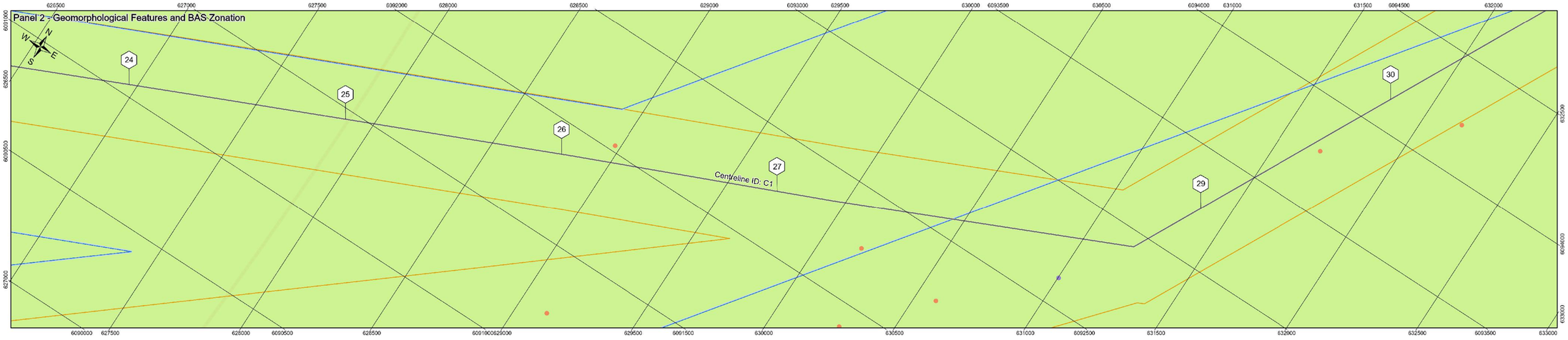
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 4 of 41

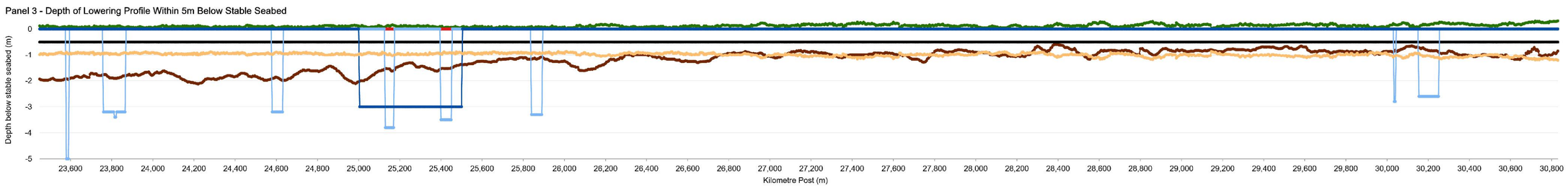
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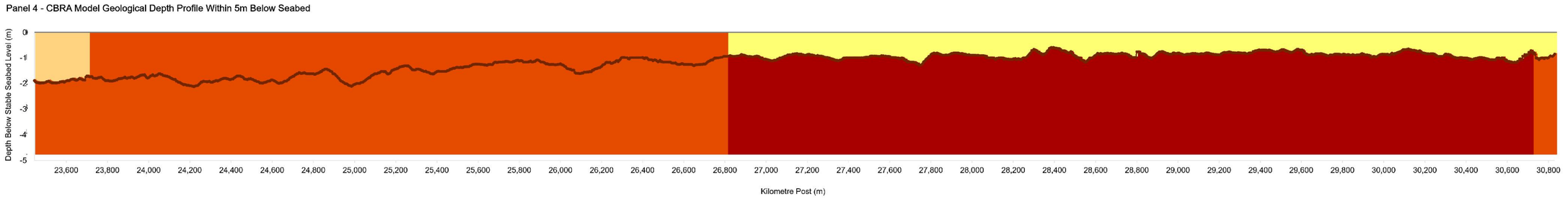
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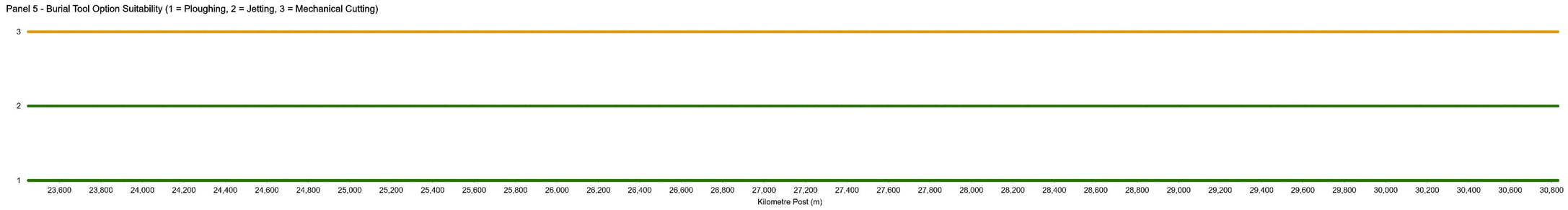
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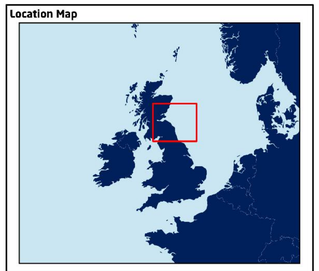




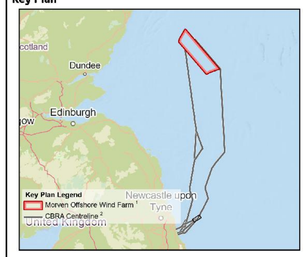




Location Map



Key Plan



Legend

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- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

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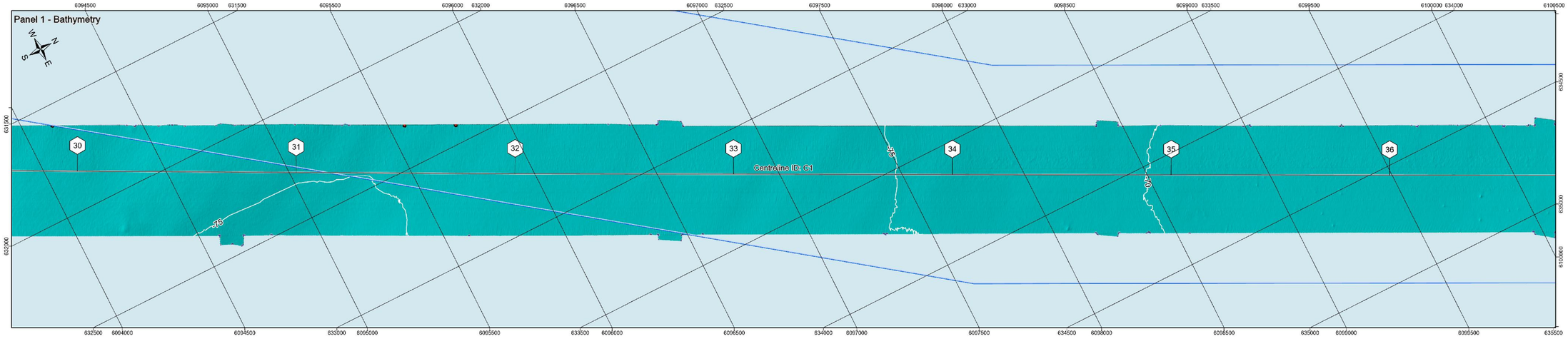
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Drawing Status
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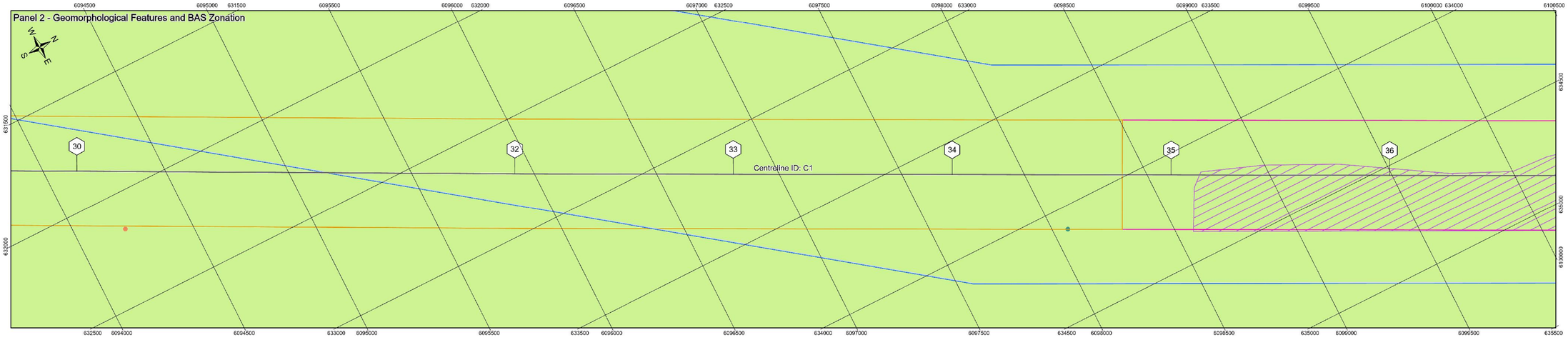
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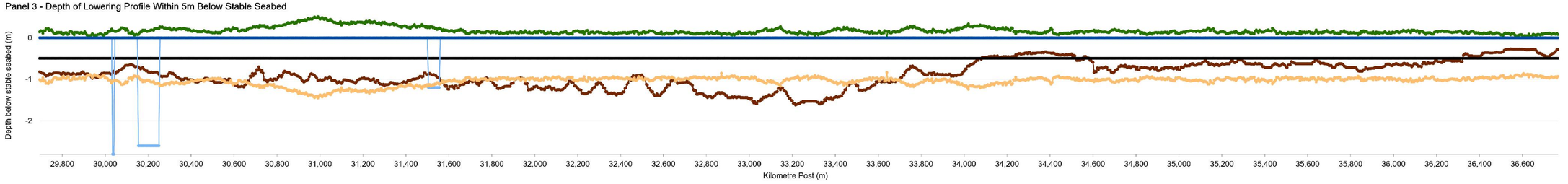
Panel 1 - Bathymetry



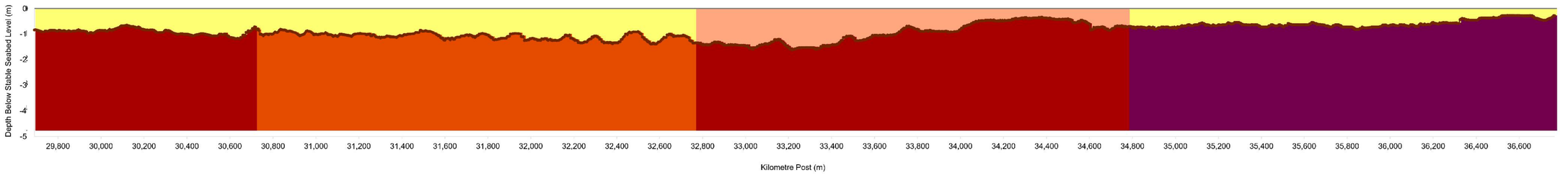
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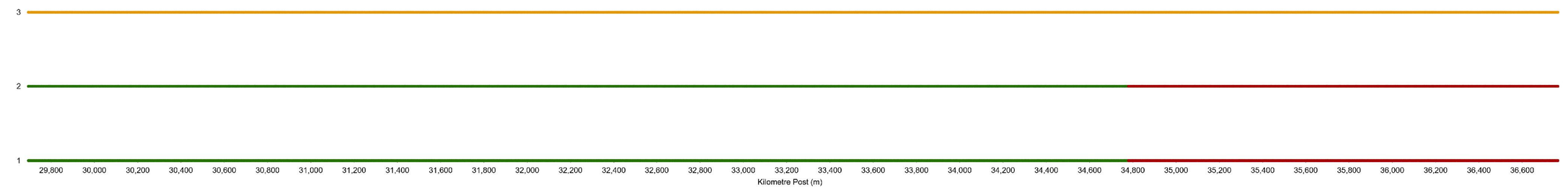
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



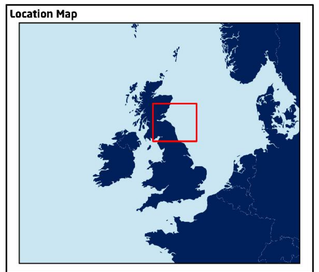
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



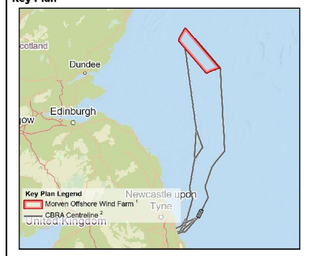
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High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

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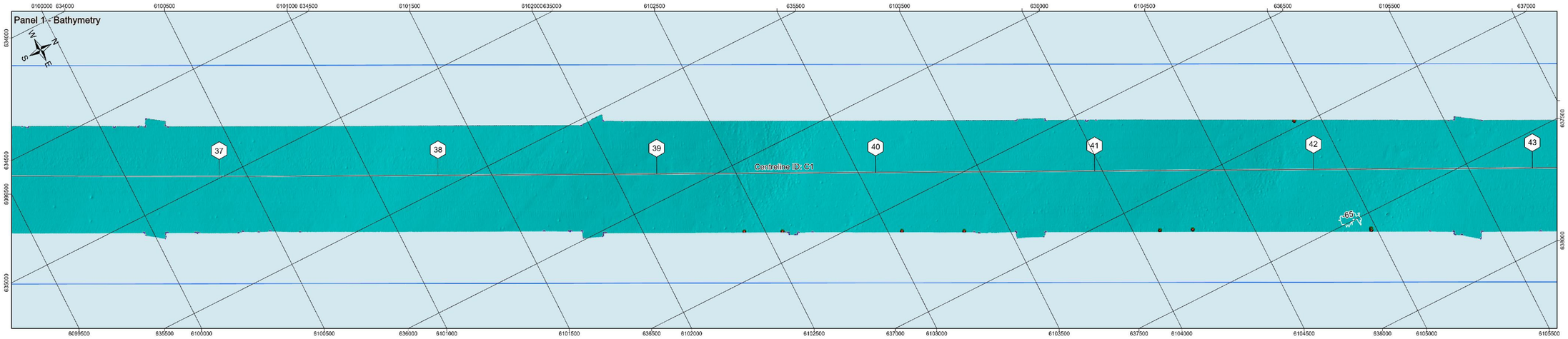
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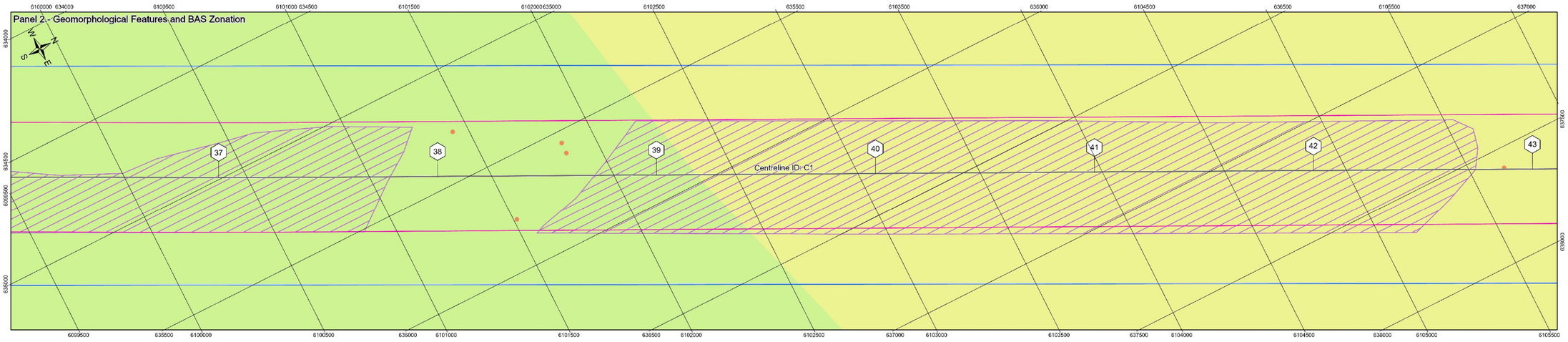
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 6 of 41

Drawing Status
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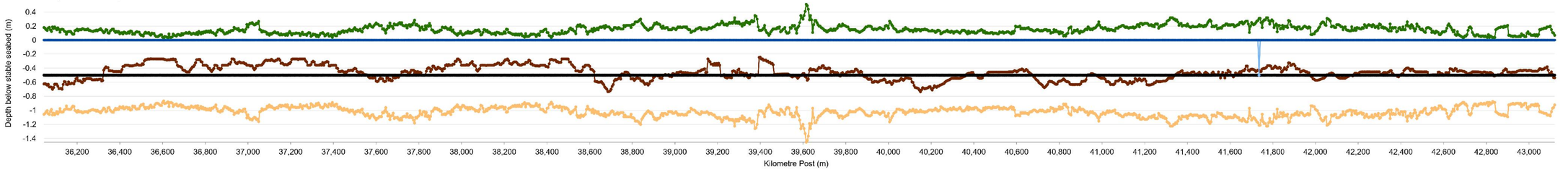
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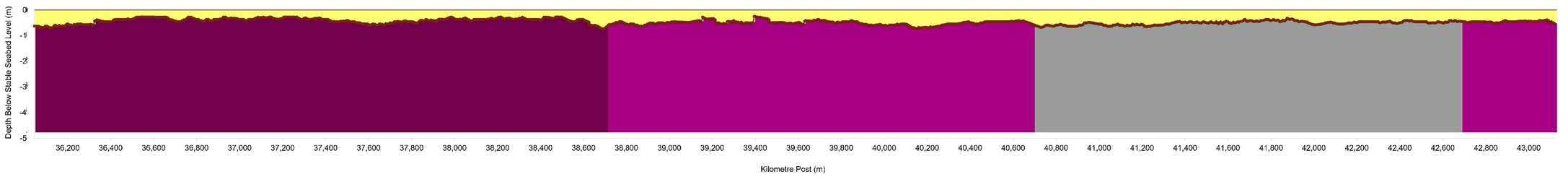




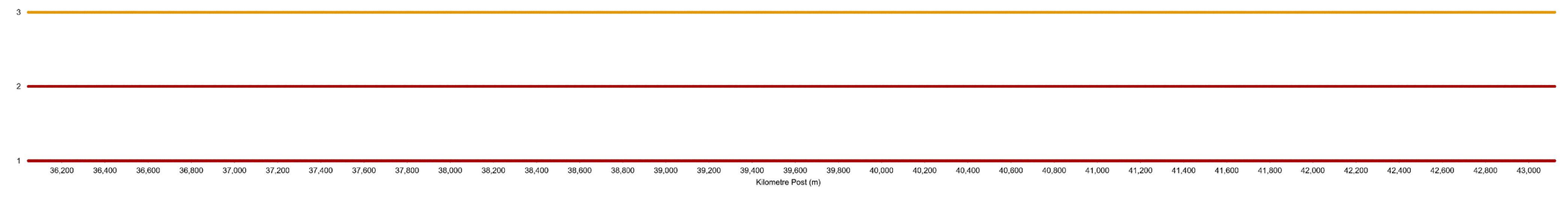
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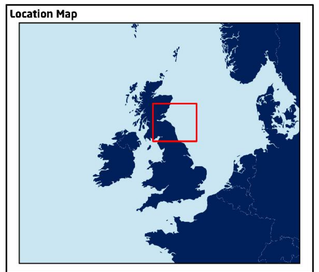
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



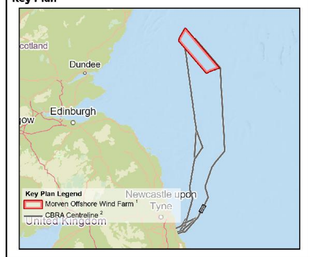
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
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- Boulder/debris
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- Depression with boulder/debris
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- Travel mark
- Bedrock outcrop
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
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- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
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Panel 5

- Suitable [3]
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Revision Status

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Scale @ A1: 1:10,000
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Latitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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Project Title
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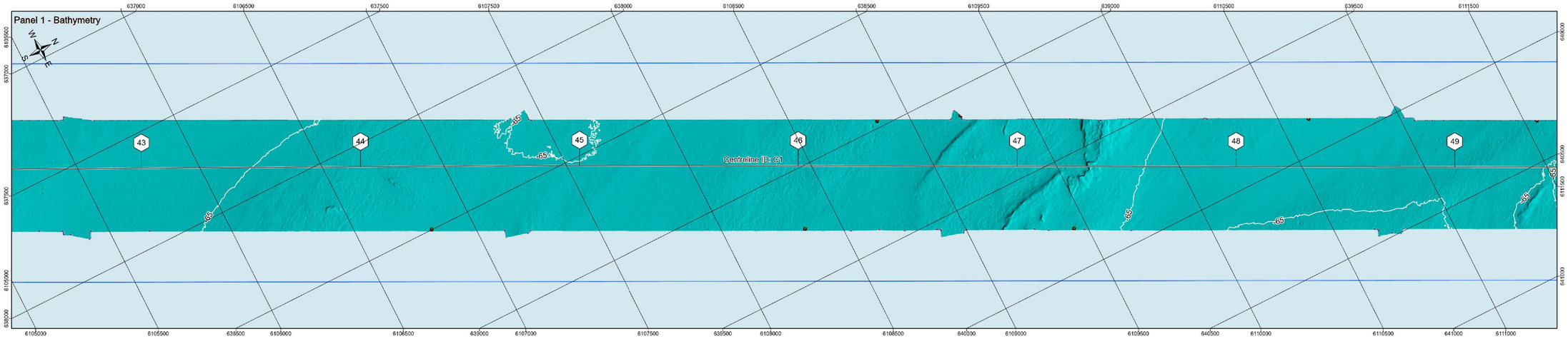
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

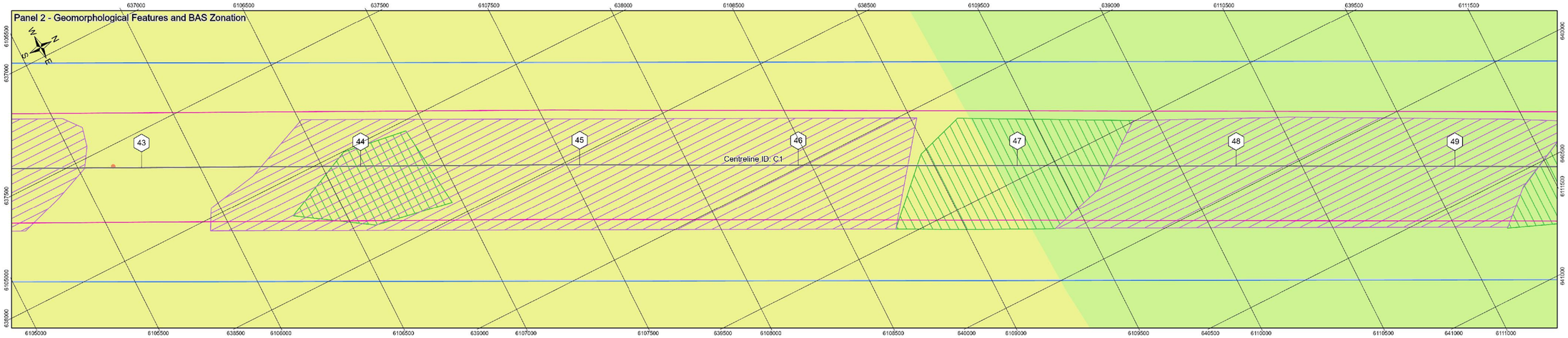
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 7 of 41

Drawing Status
Issue for Review

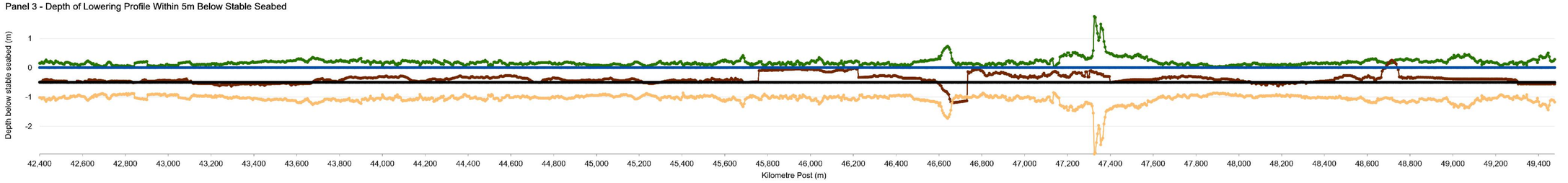
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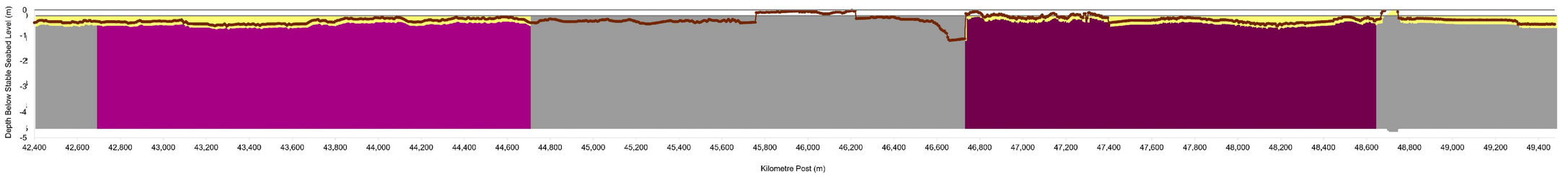




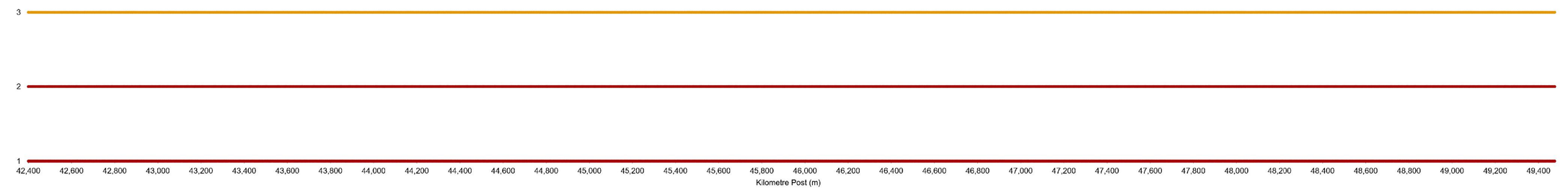
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



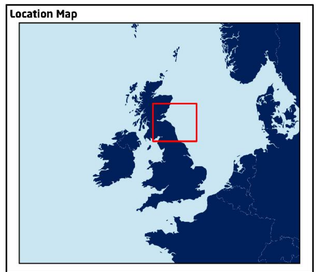
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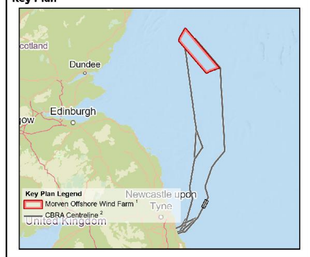
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Morven Offshore Wind Farm

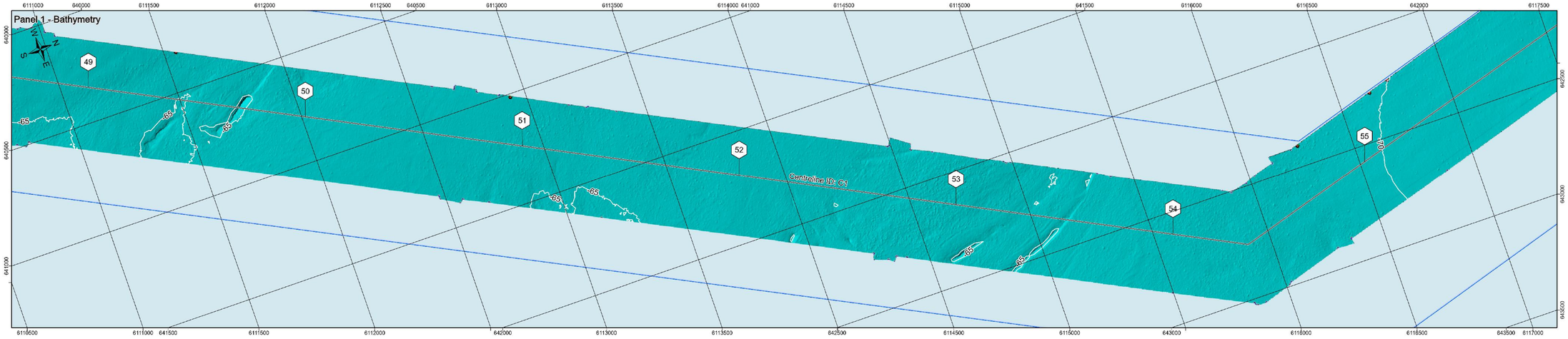
Report Title
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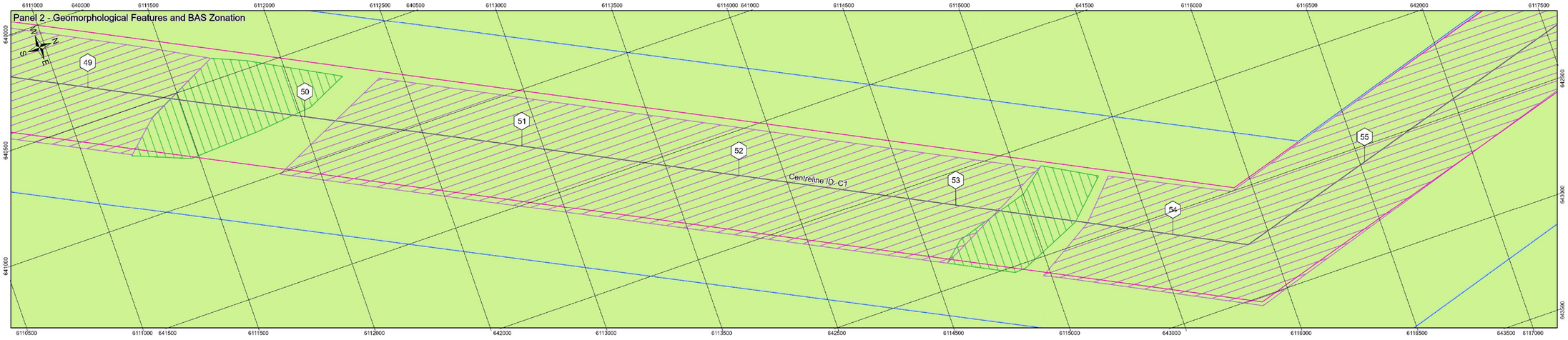
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 8 of 41

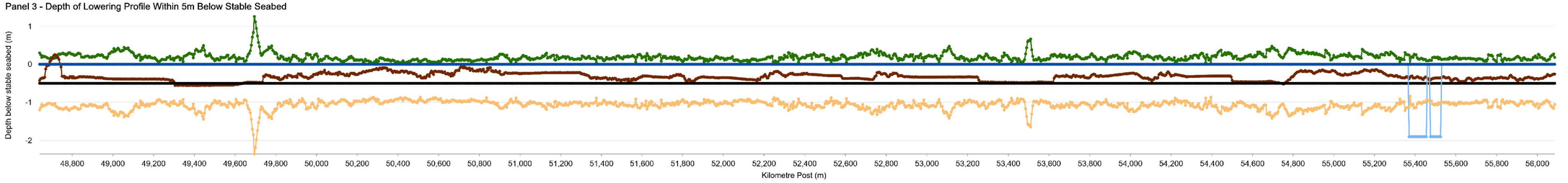
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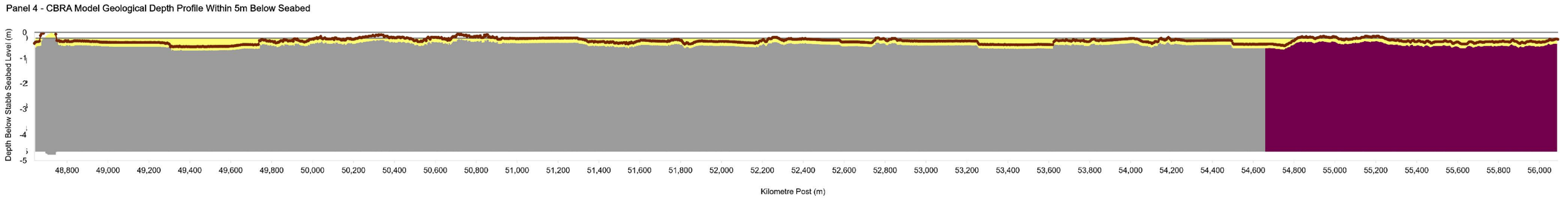
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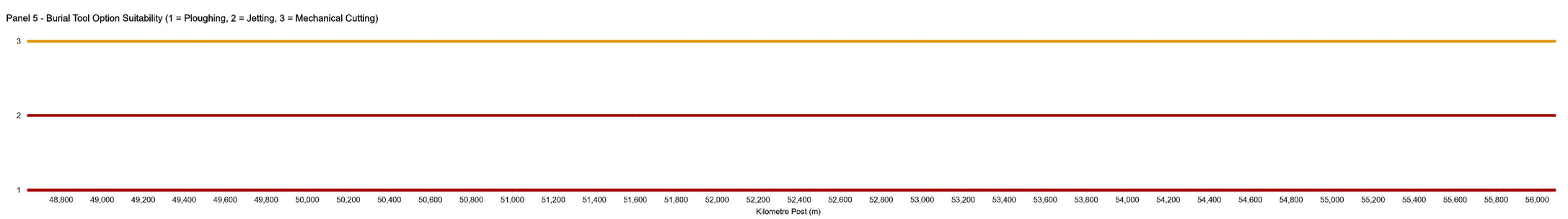
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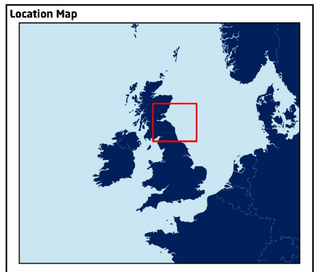




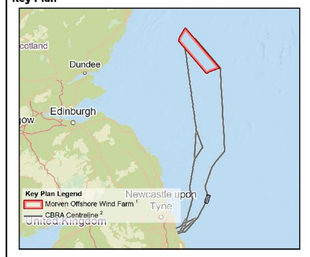




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Key Plan



Legend

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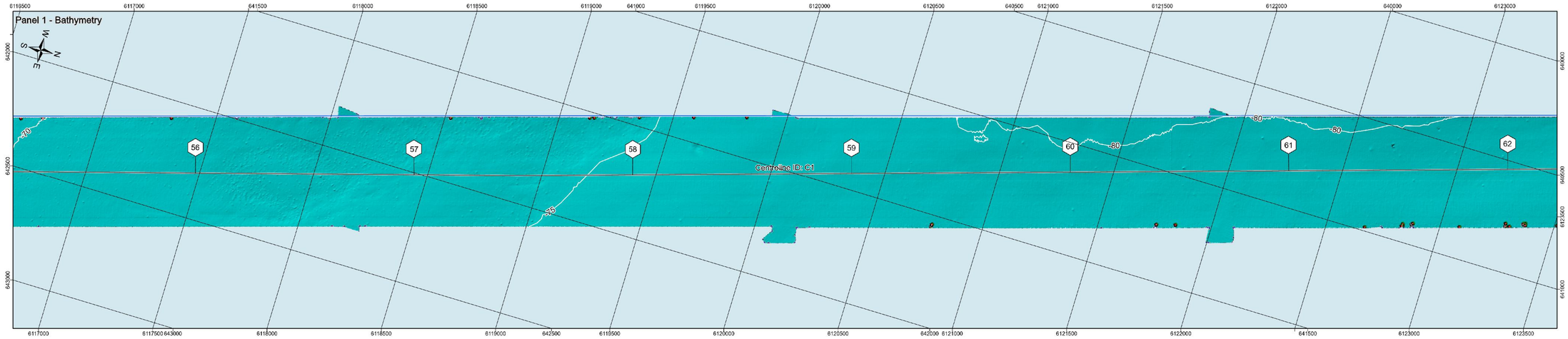
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CBRA Alignment Charts - Centreline ID: C1 - Sheet 9 of 41

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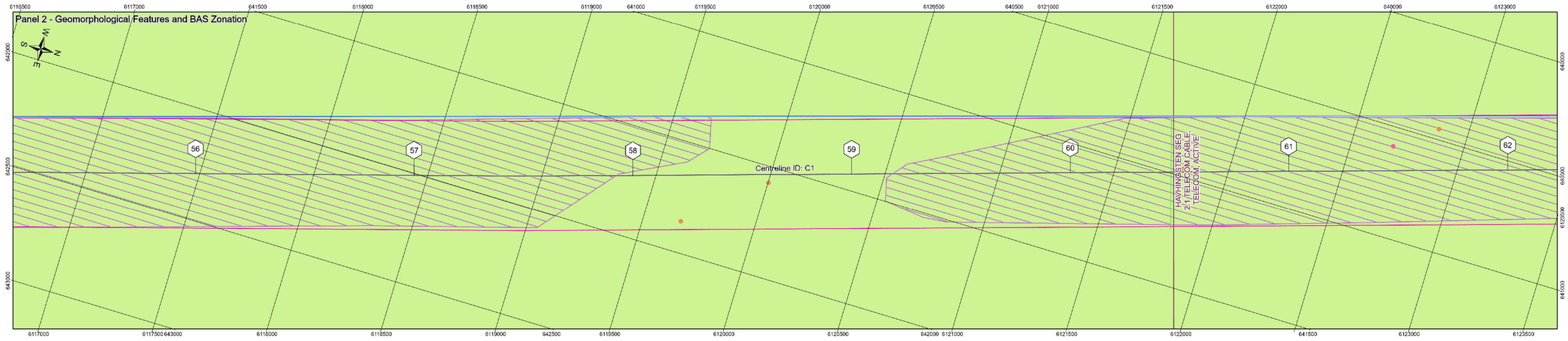
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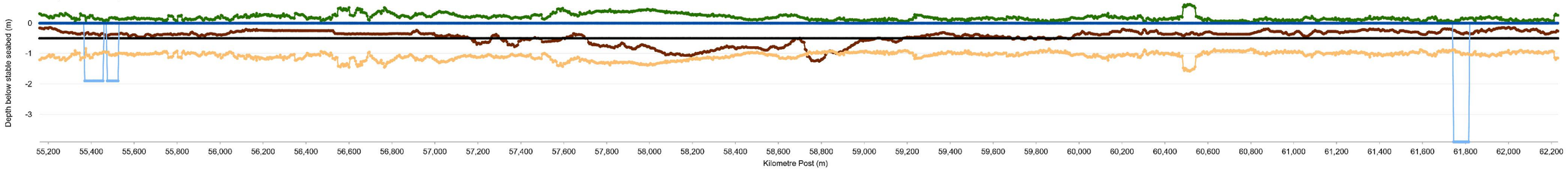
Panel 1 - Bathymetry



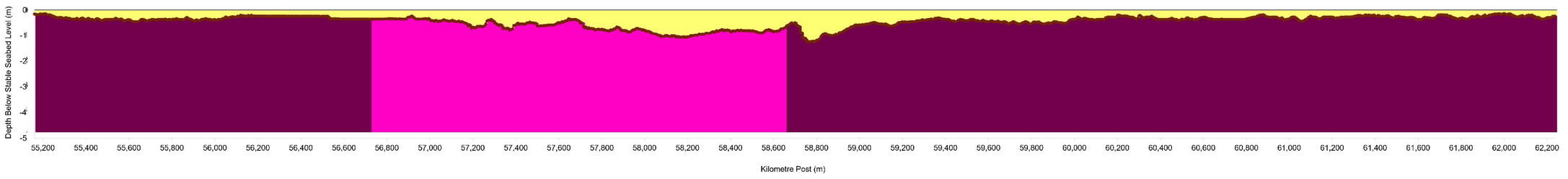
Panel 2 - Geomorphological Features and BAS Zonation



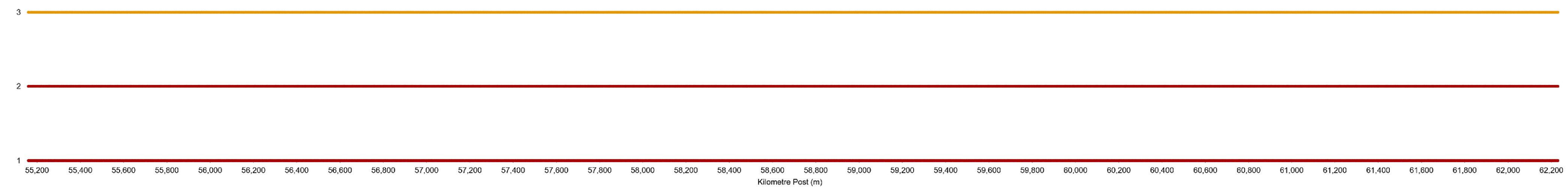
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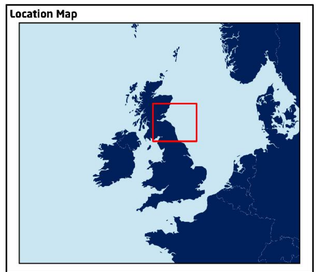
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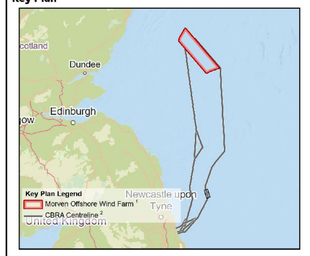
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Latitude of Origin: 0.0000
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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 10 of 41

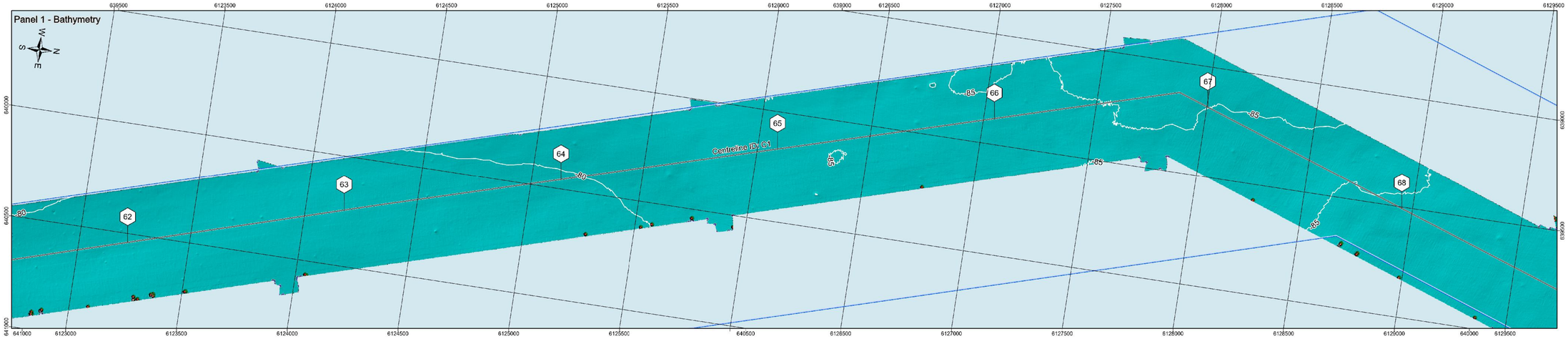
Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

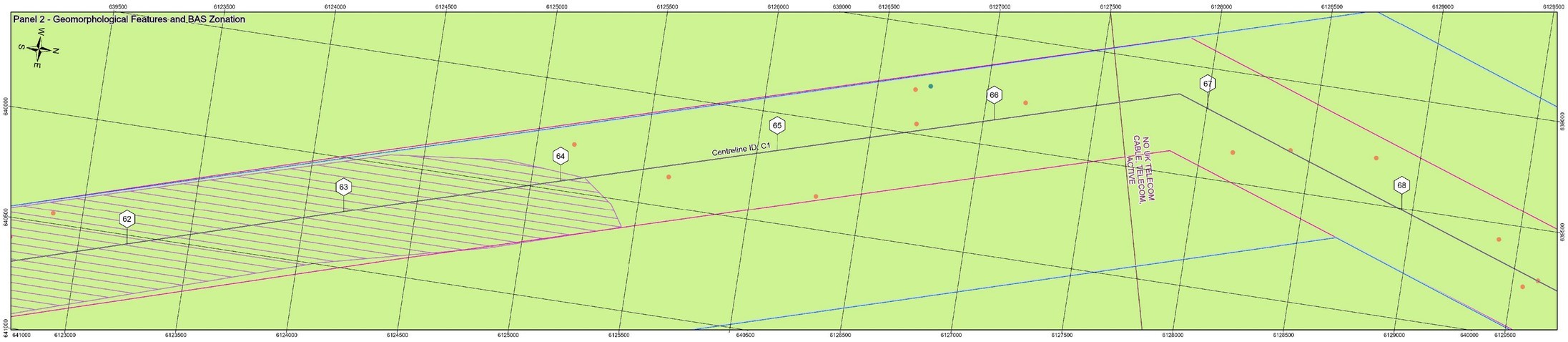
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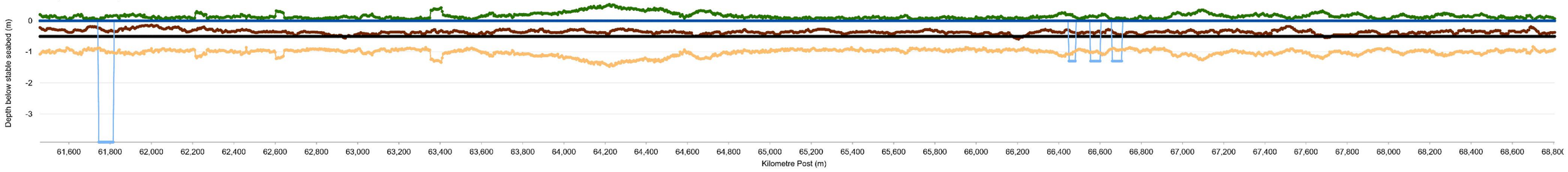
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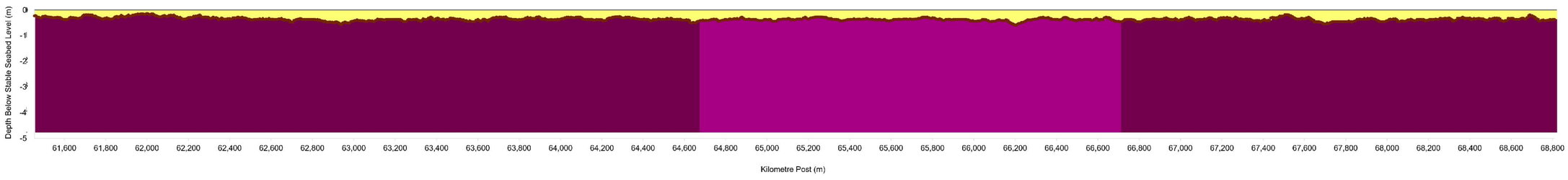
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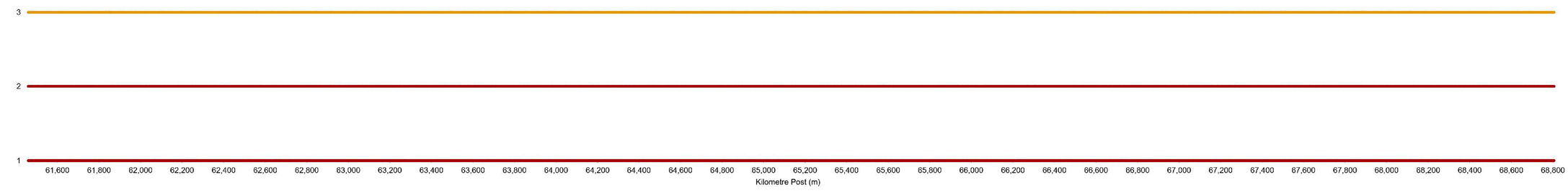
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



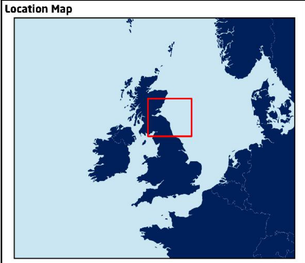
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



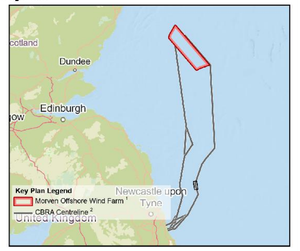
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
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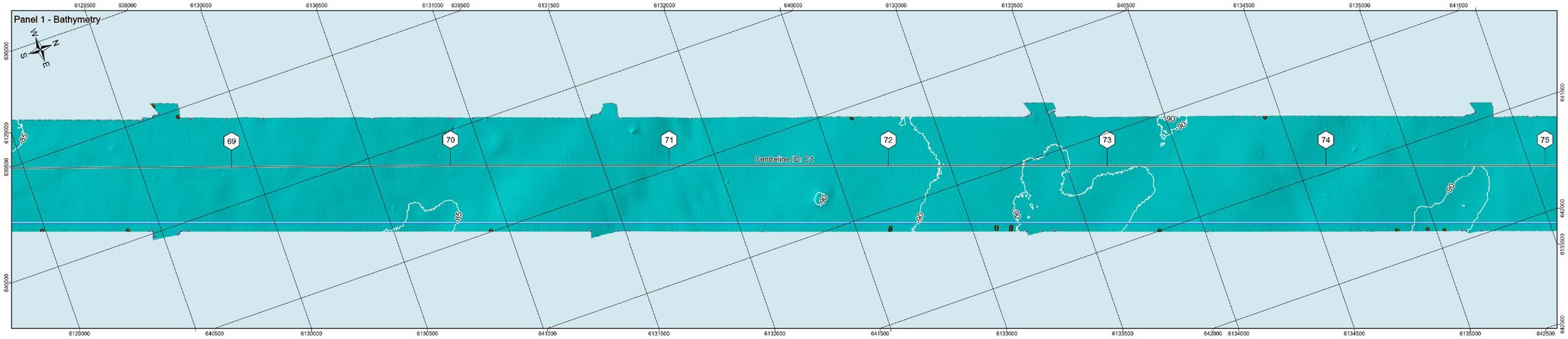
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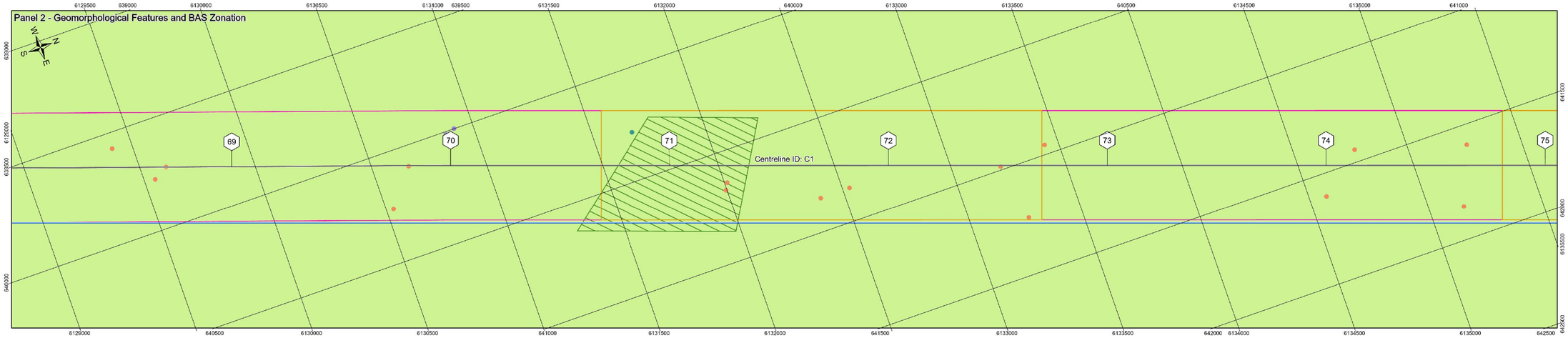
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 11 of 41

Drawing Status
Issue for Review

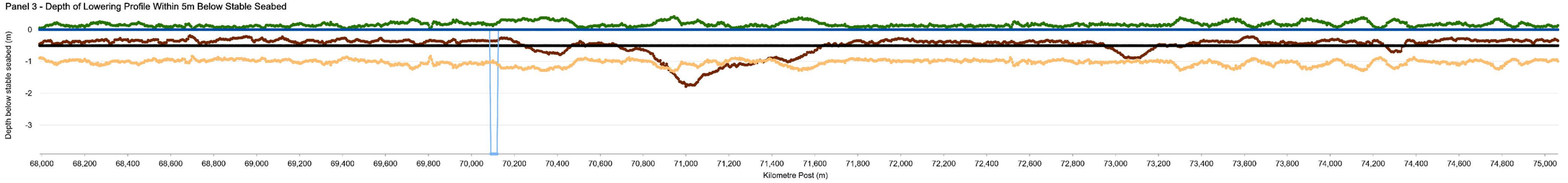
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GLOBAL MARITIME — EnBW — bp
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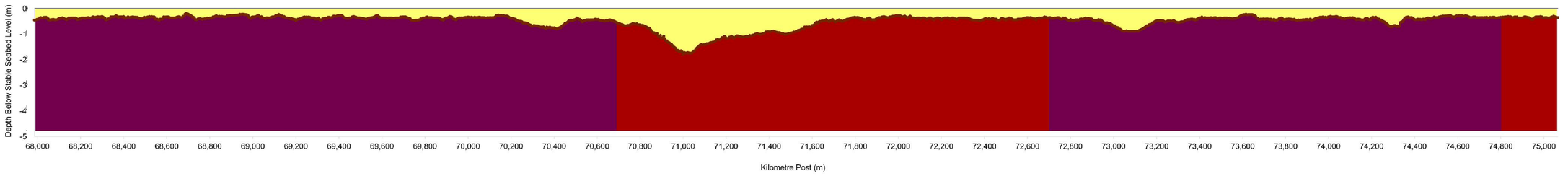




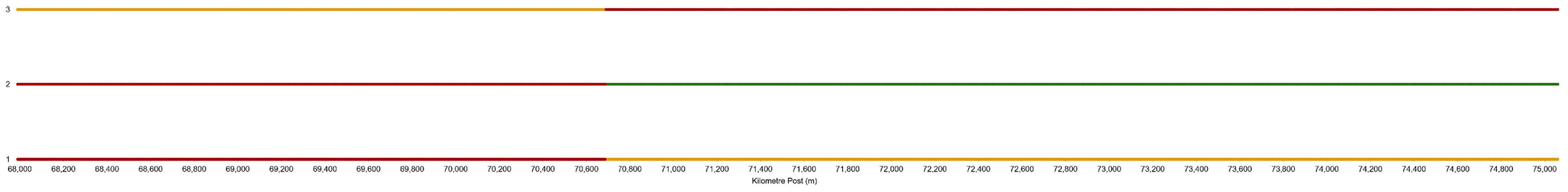
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



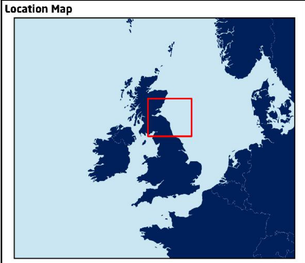
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



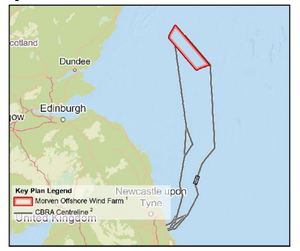
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Key Plan



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- Boulder/debris
- Depression
- Depression with boulder/debris
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Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
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Revision Status

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Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 12 of 41

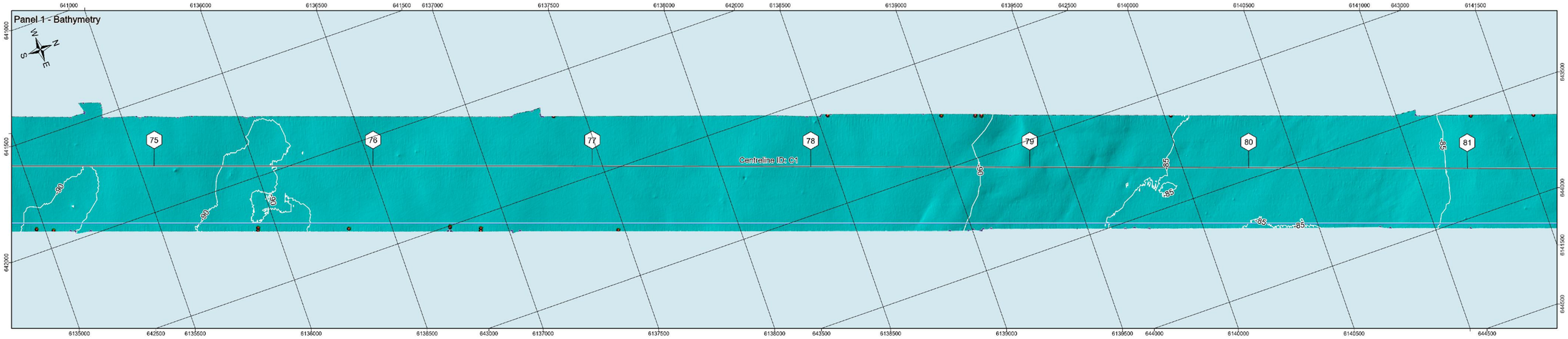
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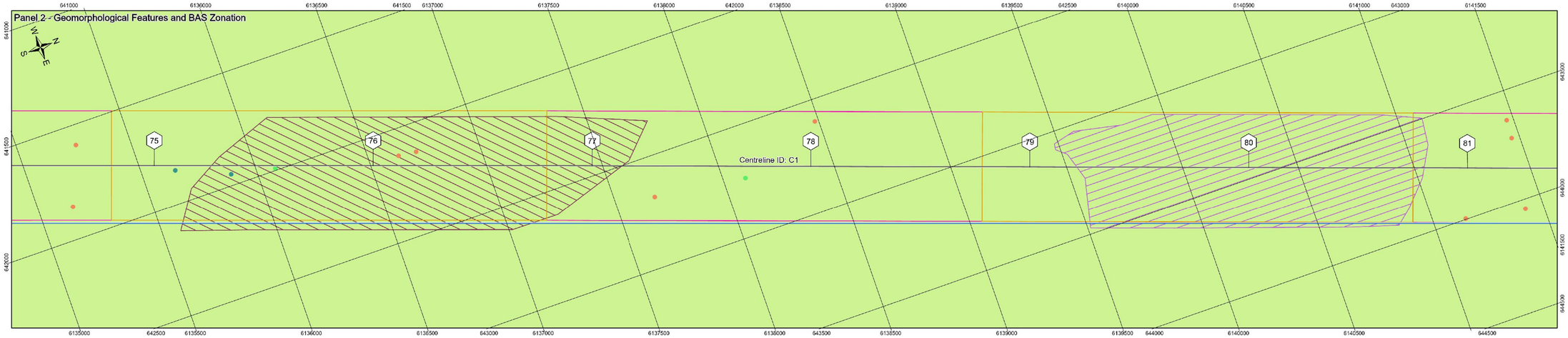
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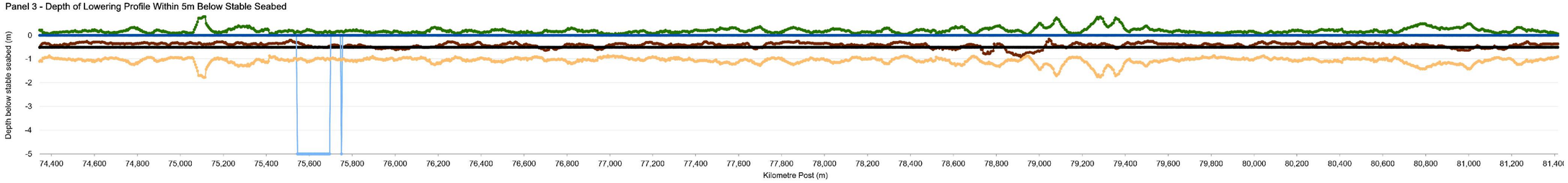
Panel 1 - Bathymetry



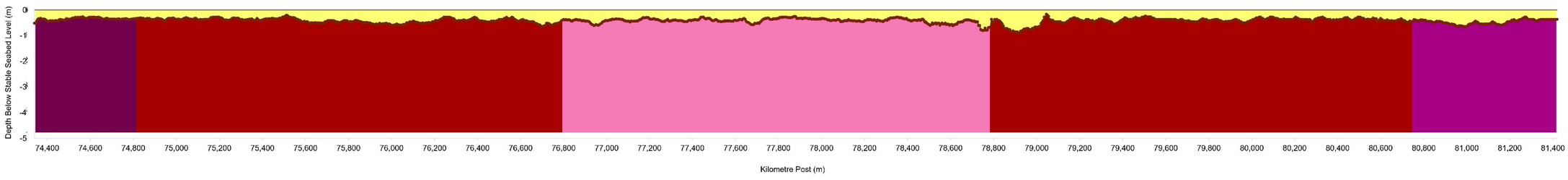
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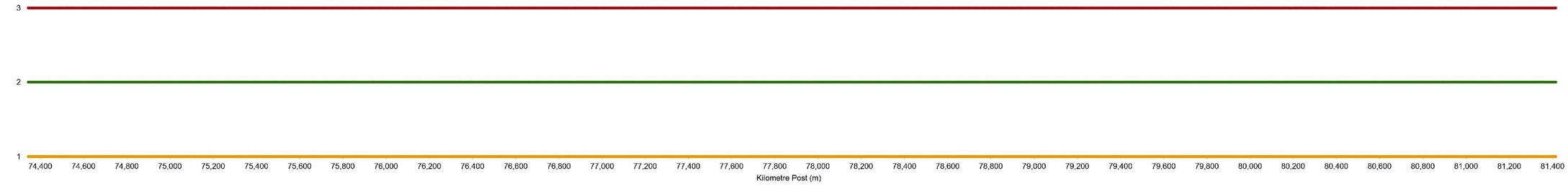
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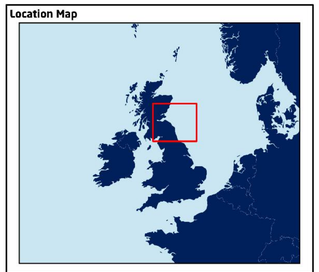
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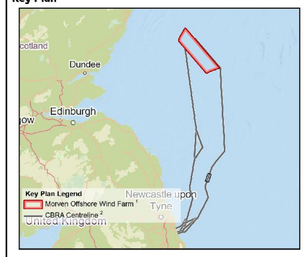
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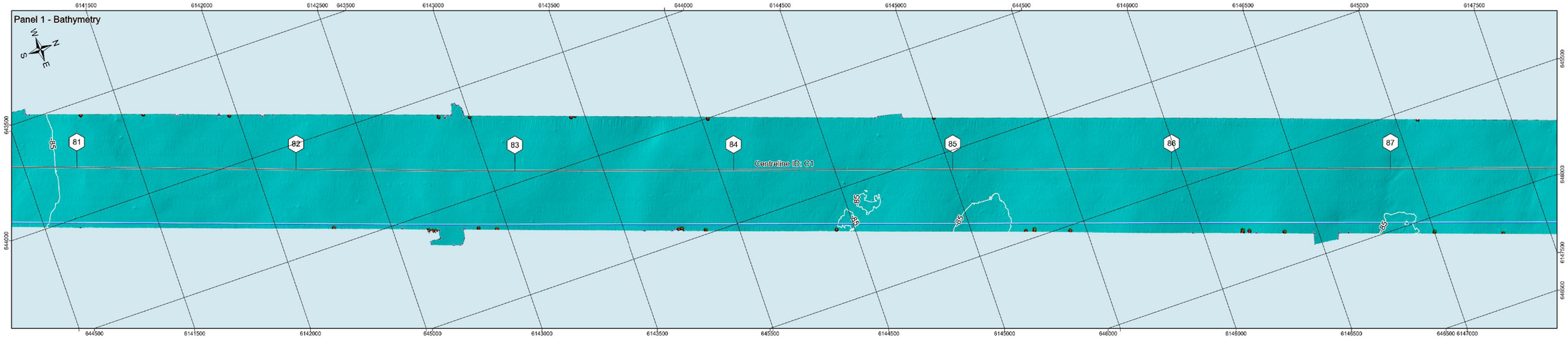
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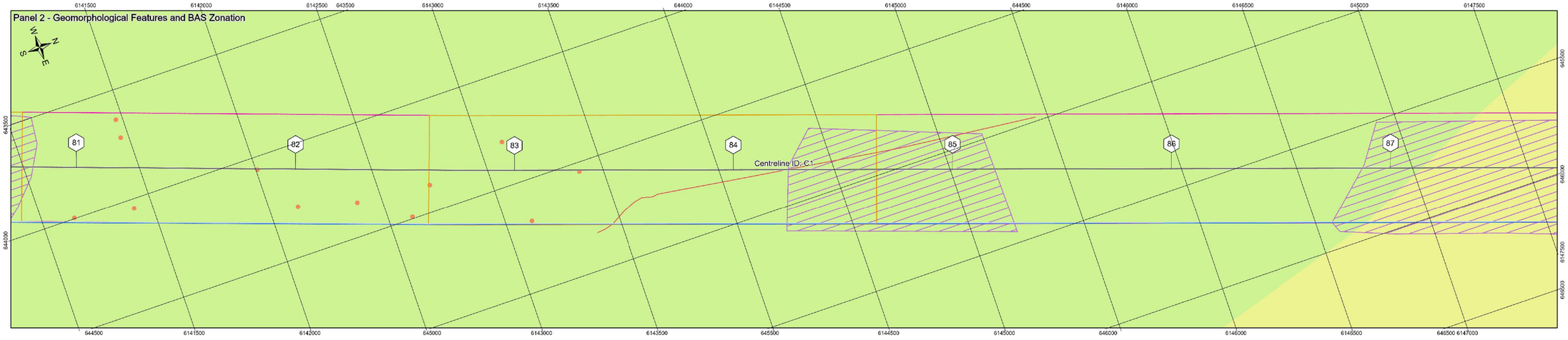
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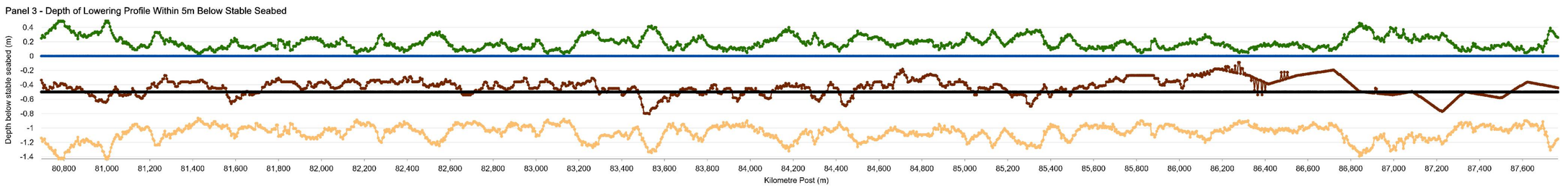
Drawing Status
Issue for Review

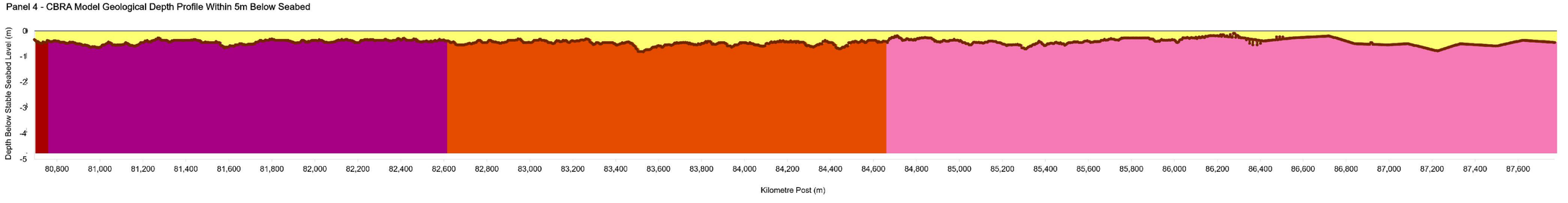
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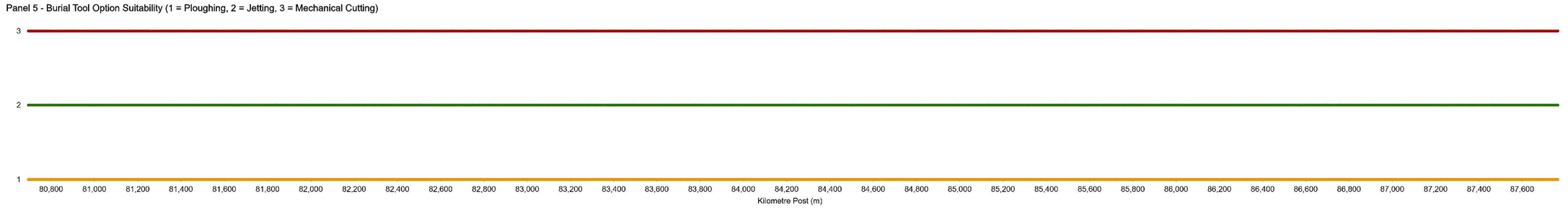
GLOBAL MARITIME — EnBW bp — Partners in UK offshore wind



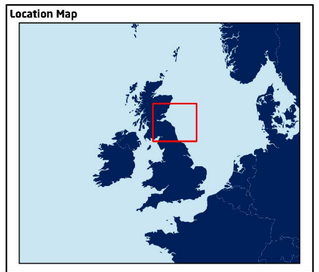




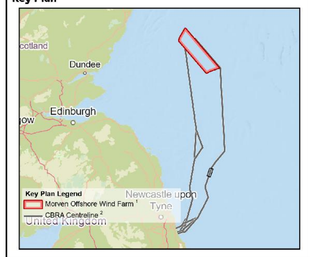




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Proposed 1000m Survey Corridor [3]
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- Water depth contour (5m interval) [5]

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- Boulder/debris
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- Depression with boulder/debris
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- Pipeline
- Trawl mark
- Bedrock outcrop
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Layer 2 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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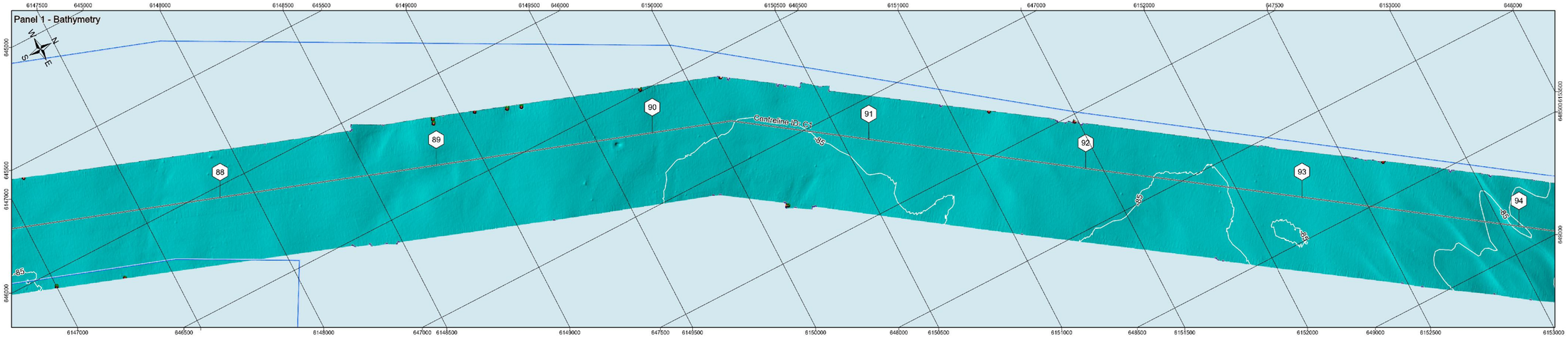
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

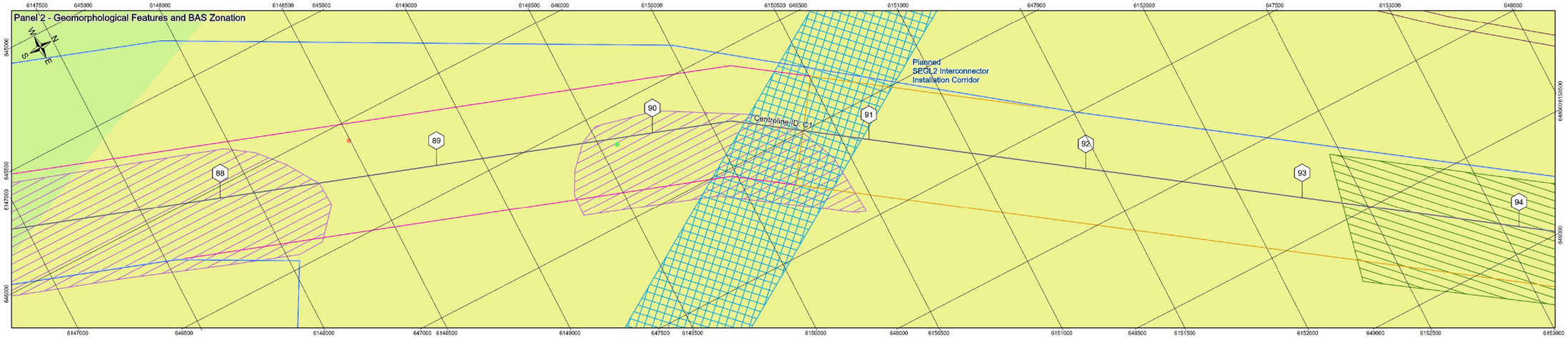
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 14 of 41

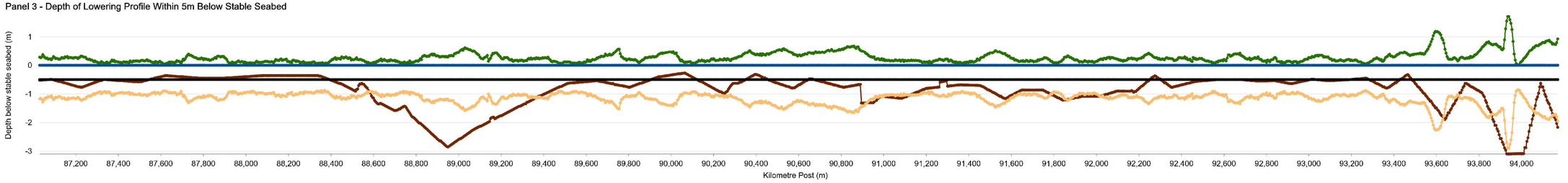
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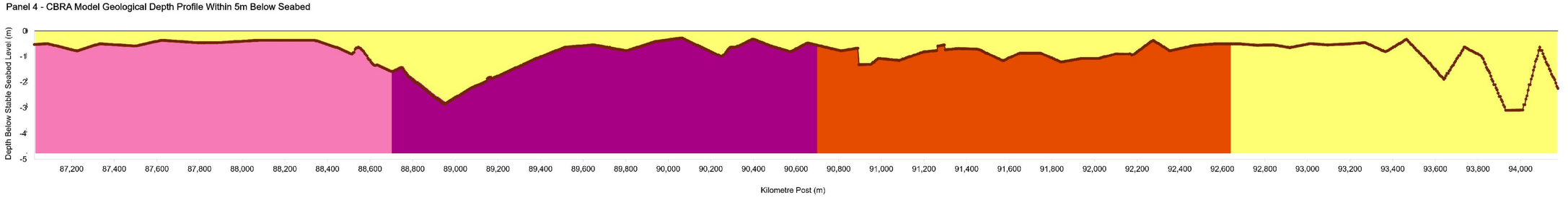
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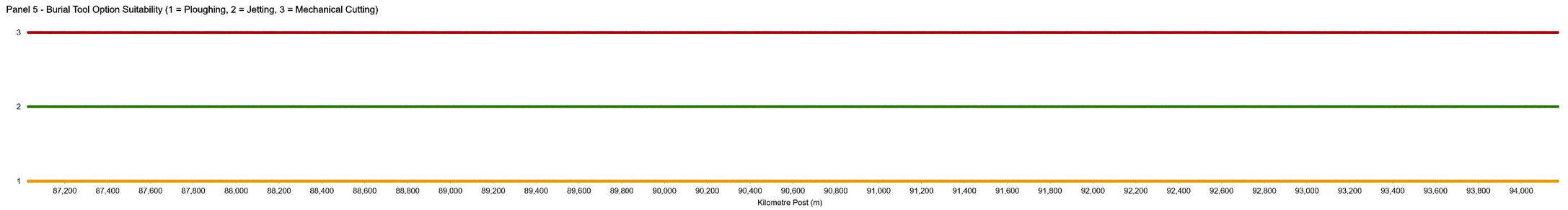
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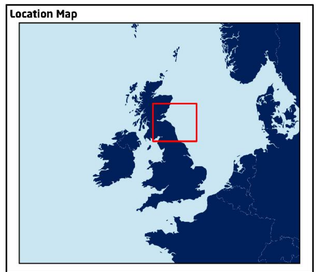




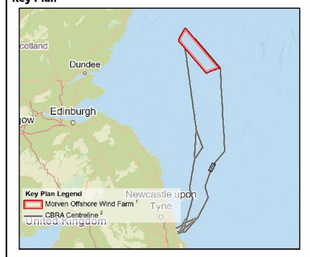




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- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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Morven Offshore Wind Farm

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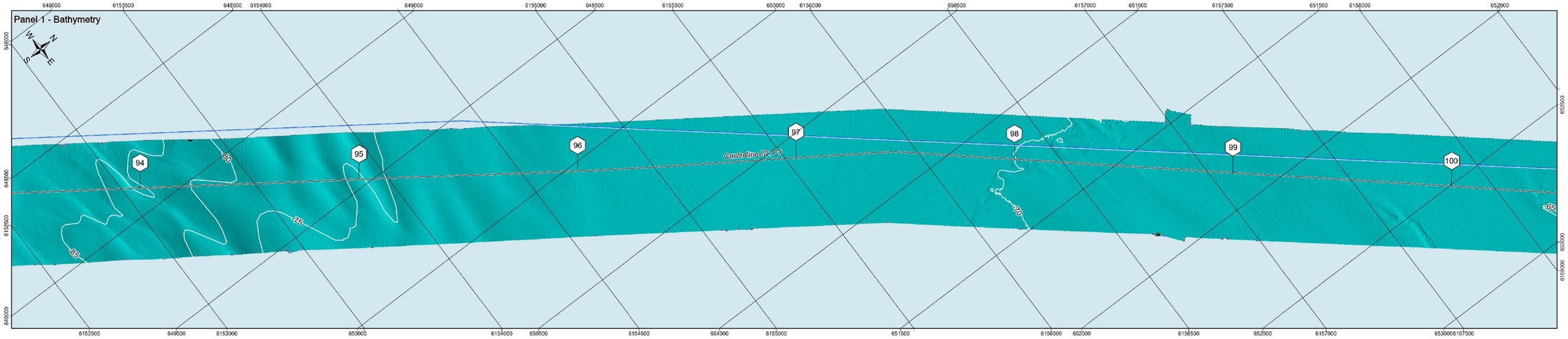
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CBRA Alignment Charts - Centreline ID: C1 - Sheet 15 of 41

Drawing Status
Issue for Review

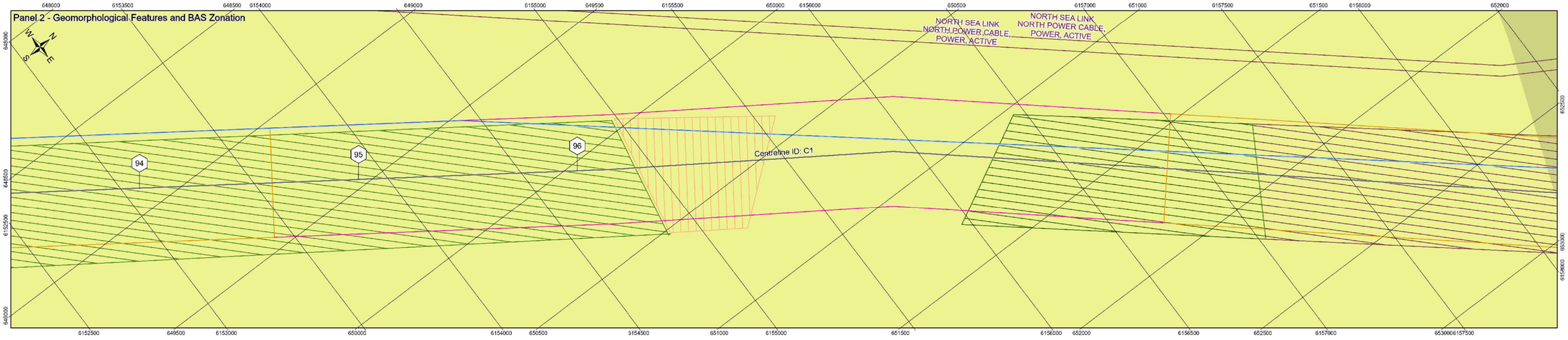
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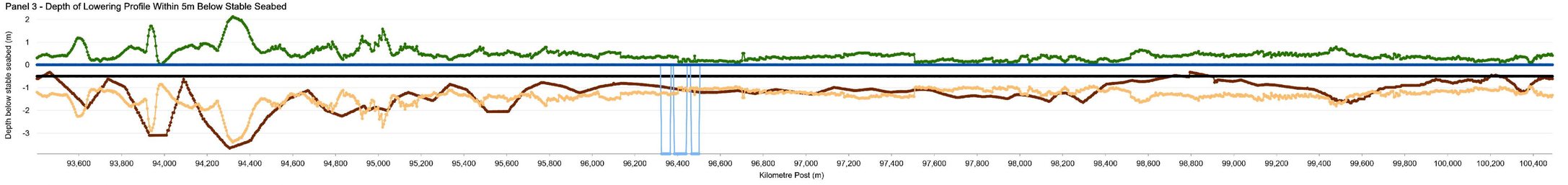
Panel 1 - Bathymetry



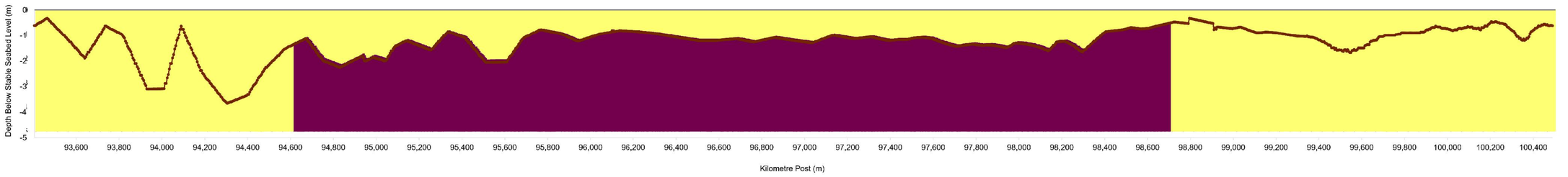
Panel 2 - Geomorphological Features and BAS Zonation



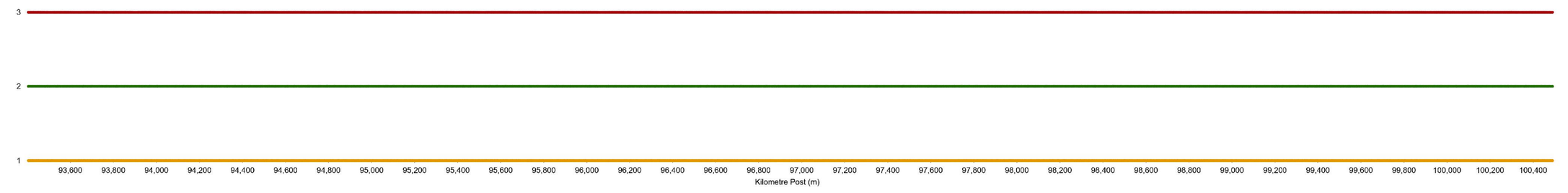
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



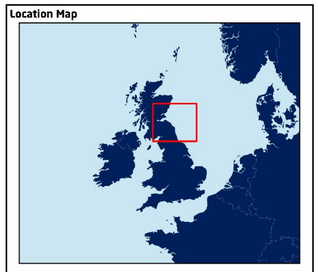
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



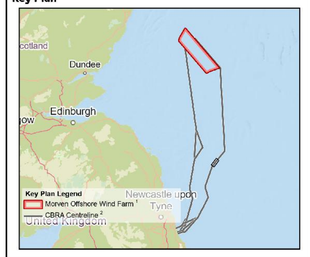
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



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Legend

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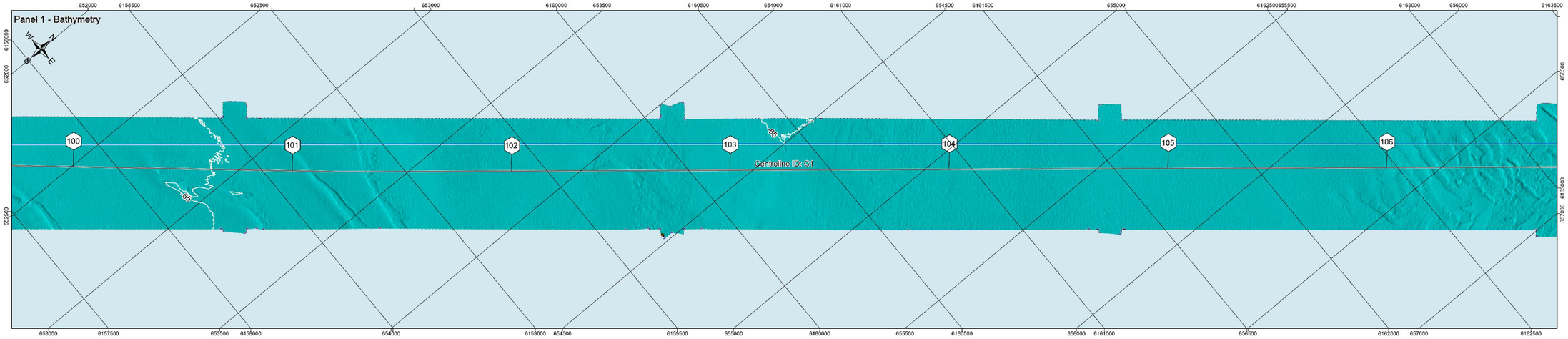
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 16 of 41

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Issue for Review

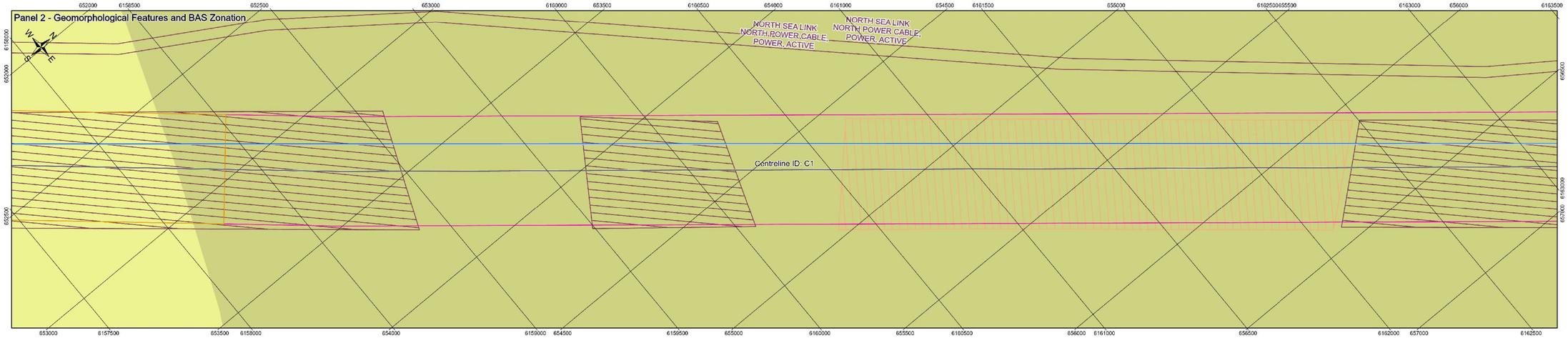
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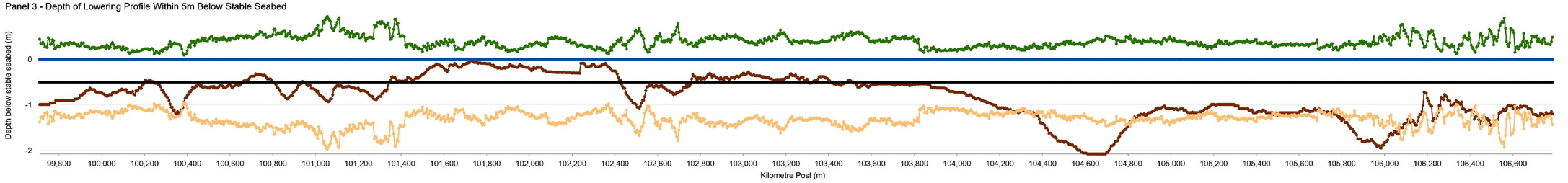
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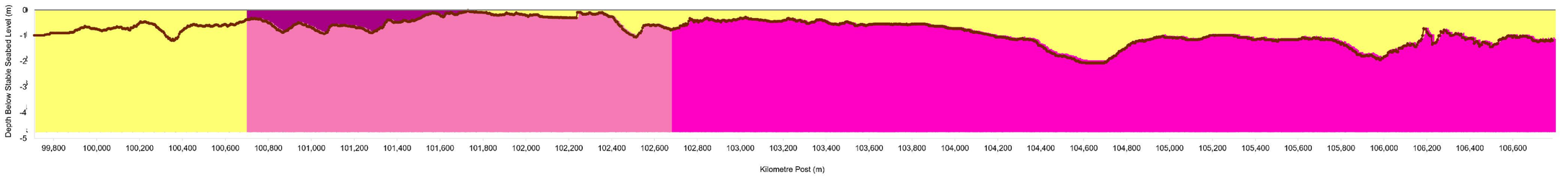
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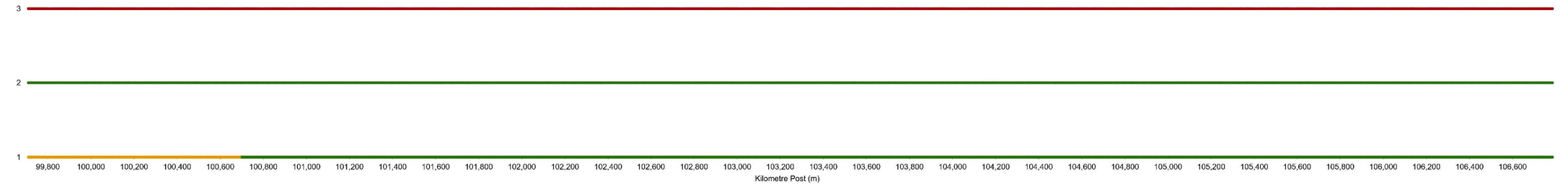
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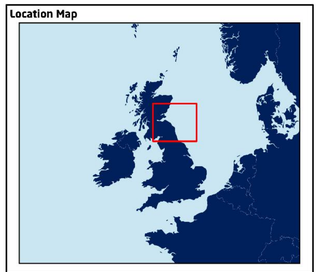
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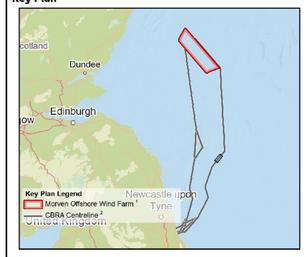
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

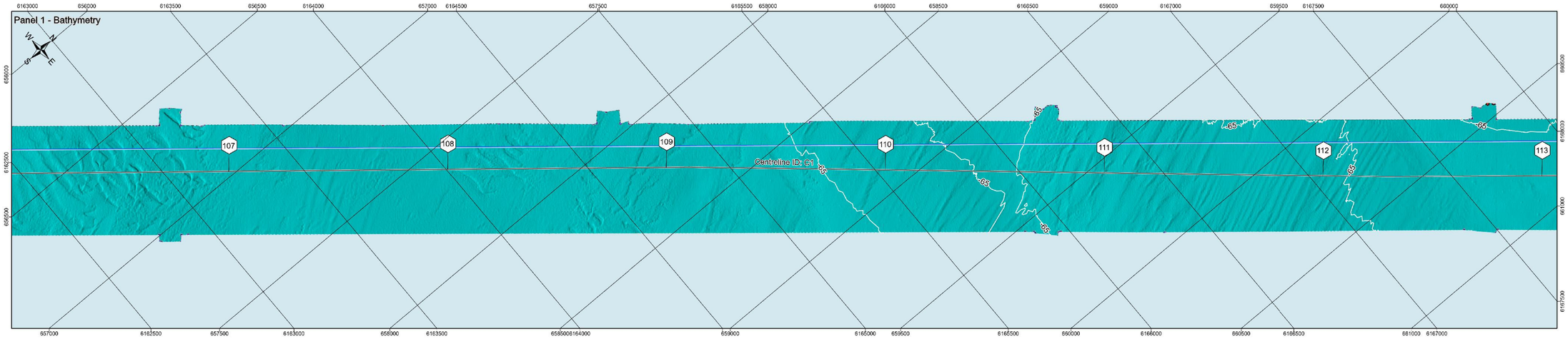
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 17 of 41

Drawing Status
Issue for Review

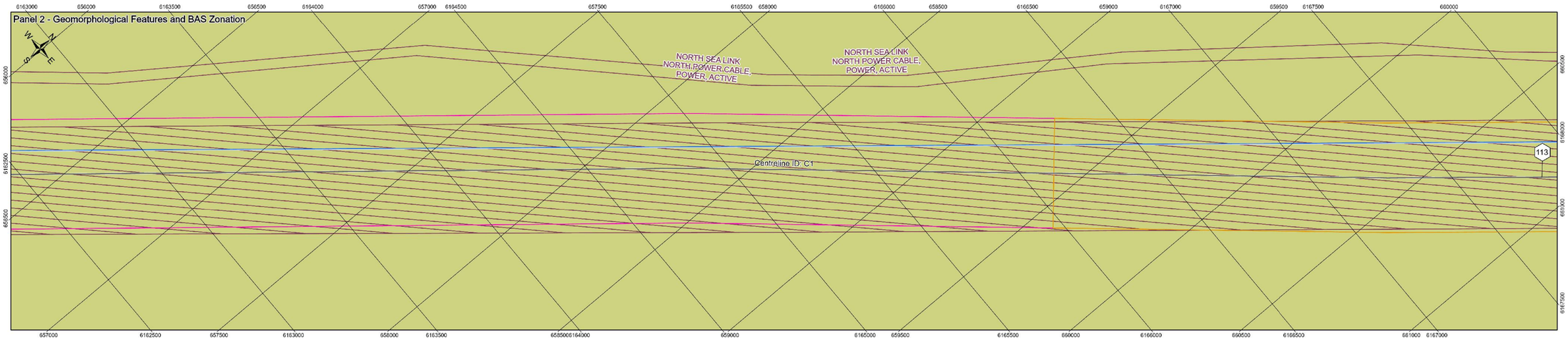
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GLOBAL MARITIME — EnBW — bp
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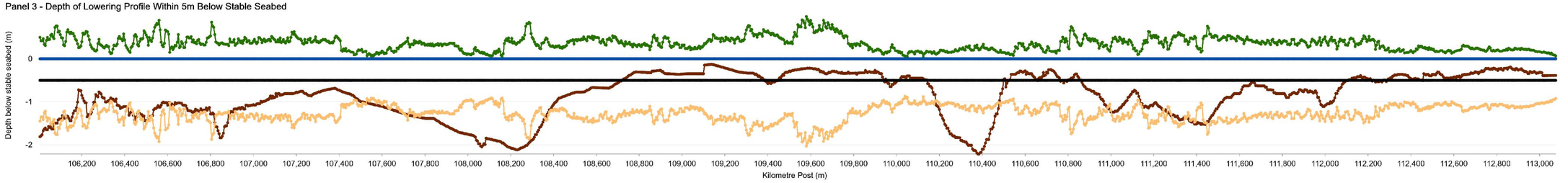
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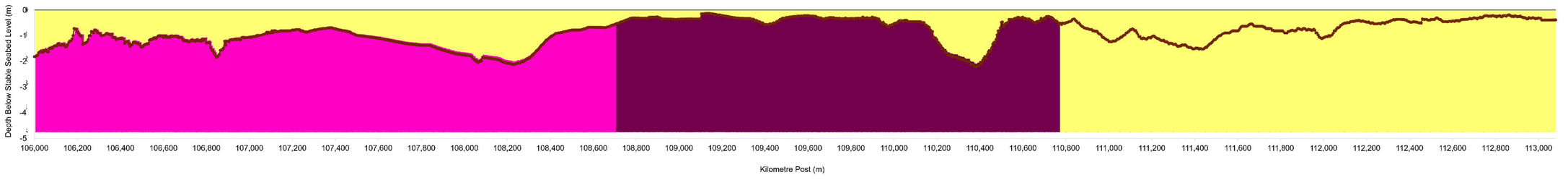
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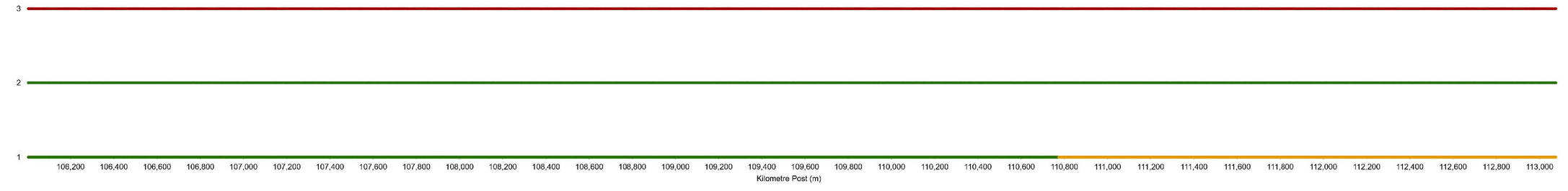
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



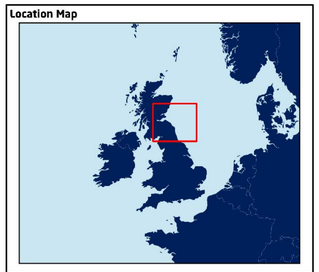
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



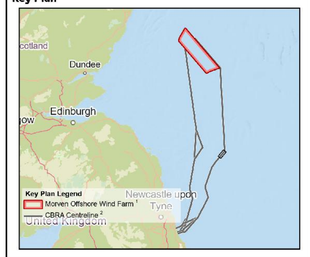
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Location Map



Key Plan



Legend

Panel 1 & Site Data

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BAS Zone Classification [3]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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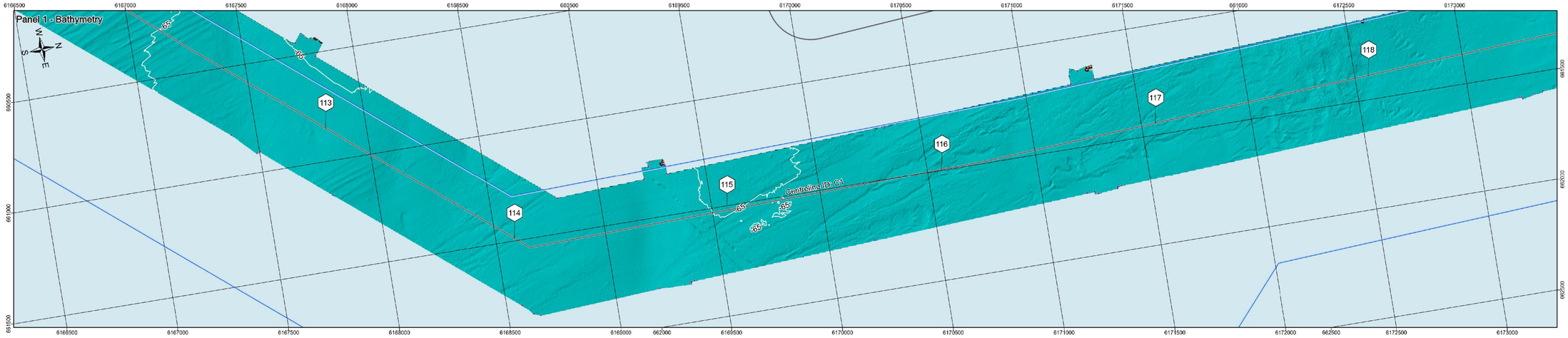
Report Title
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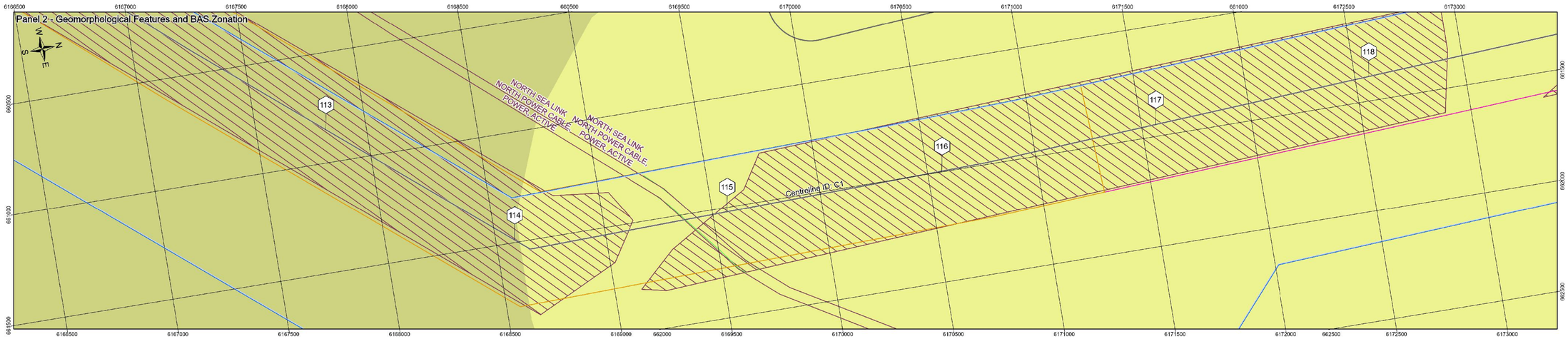
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 18 of 41

Drawing Status
Issue for Review

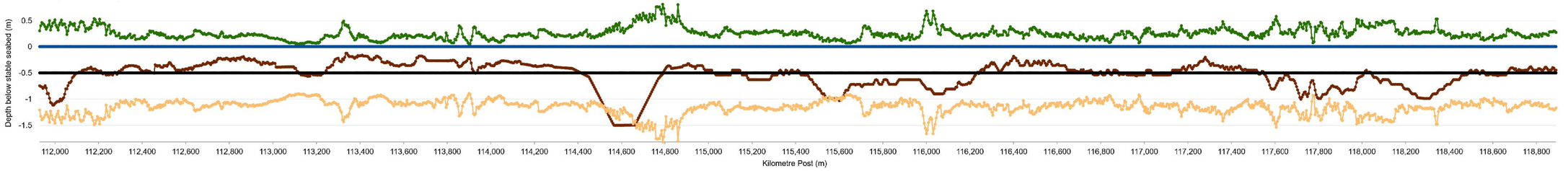
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GLOBAL MARITIME — EnBW bp
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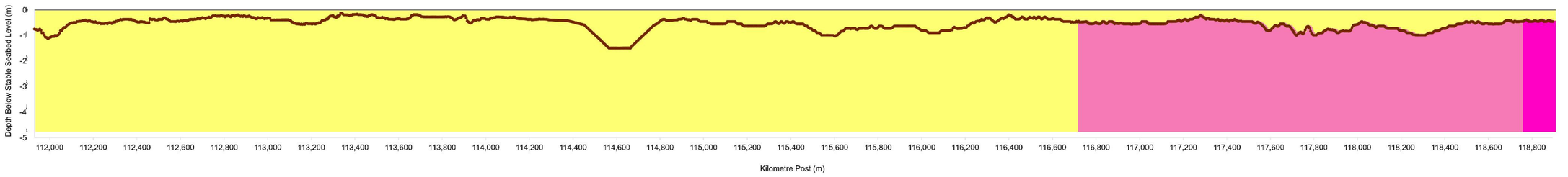




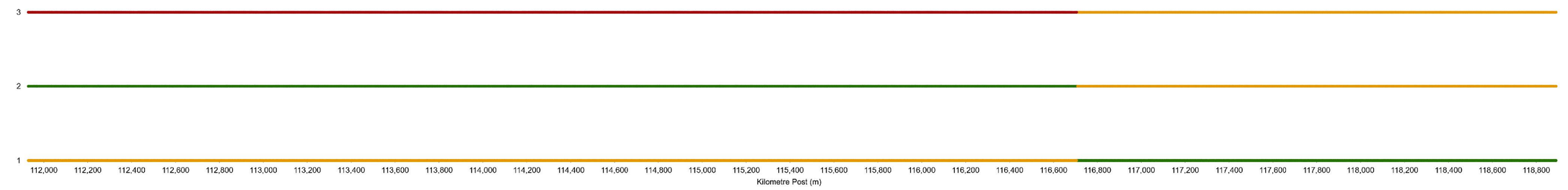
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



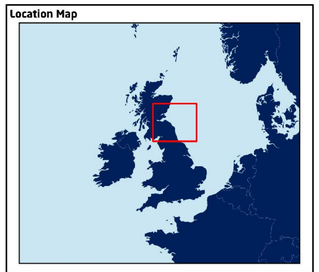
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



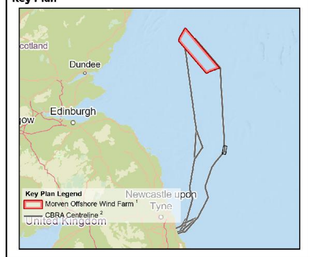
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Redline Boundary [4]
- Water depth contour (5m interval) [5]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
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Geomorphology [8]
- Boulder
- Boulder/debris
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- Depression with boulder/debris
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- Layer 1/Layer 2 Boundary [8]
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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Notes:
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

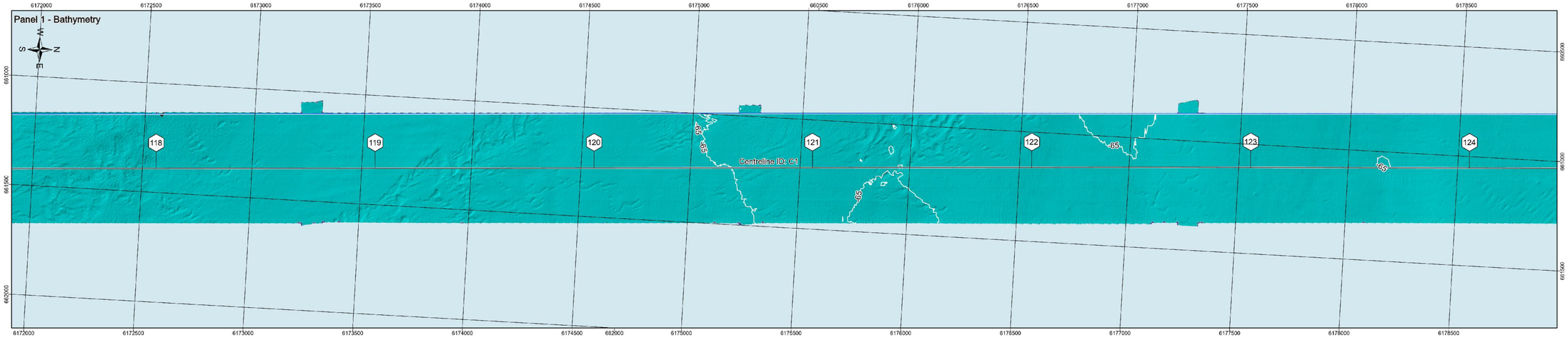
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 19 of 41

Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW bp — Partners in UK offshore wind

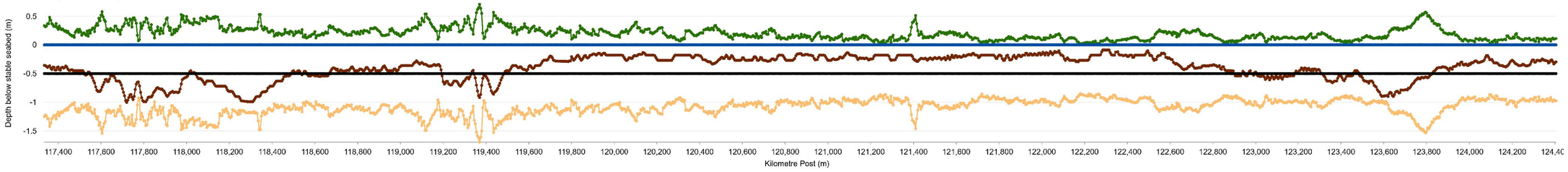
Panel 1 - Bathymetry



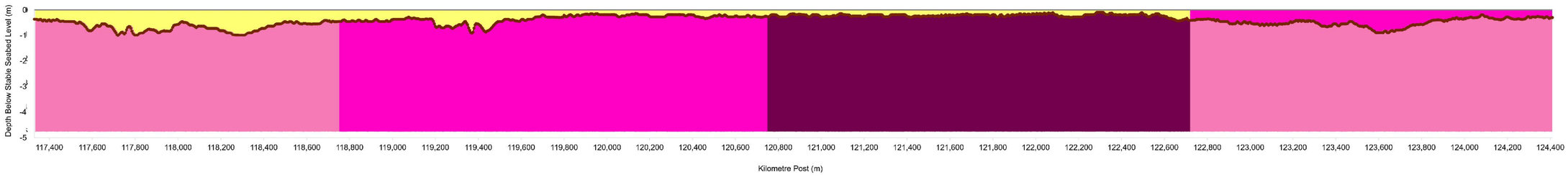
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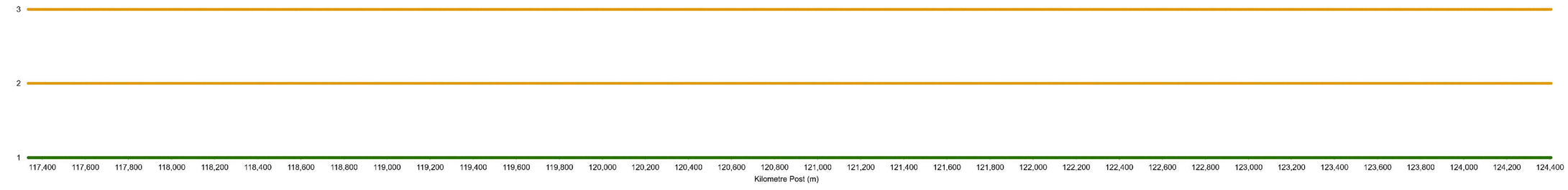
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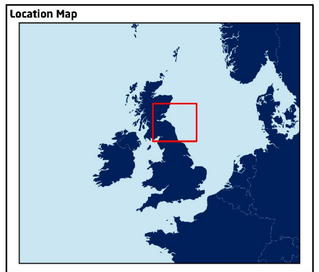
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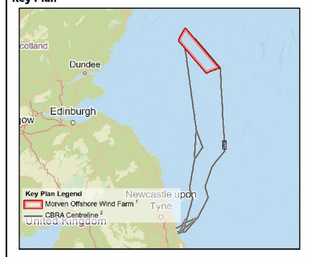
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- Layer 1/Layer 2 Boundary [4]

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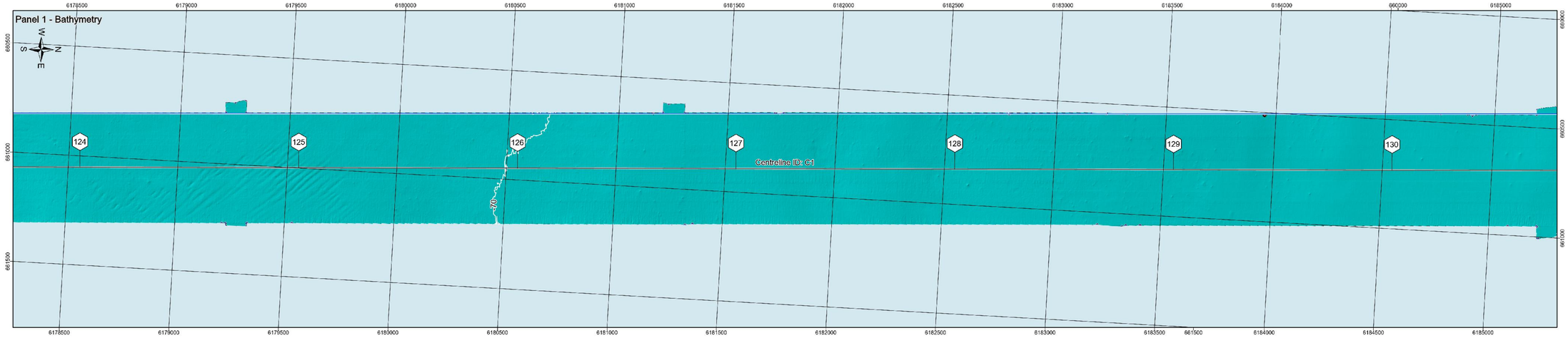
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Drawing Status
Issue for Review

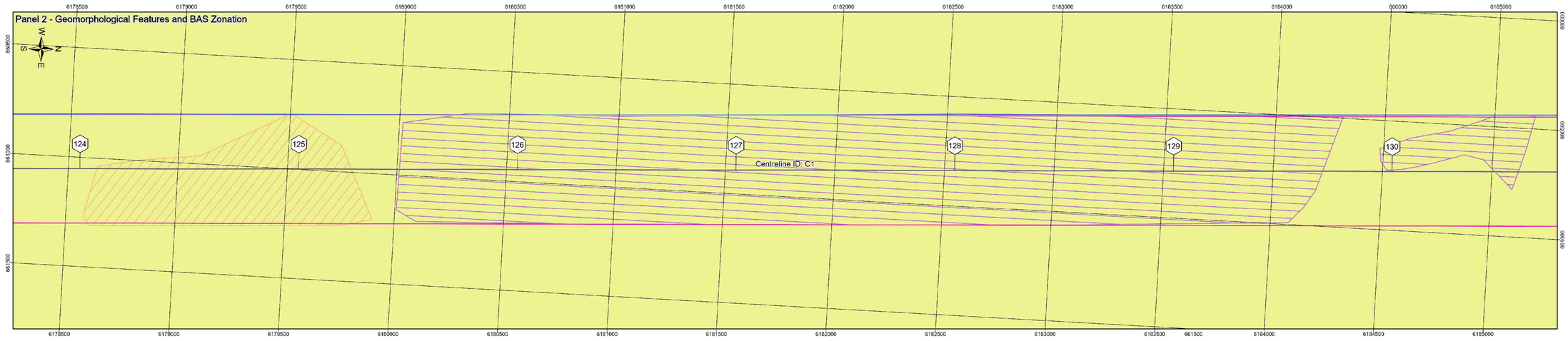
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
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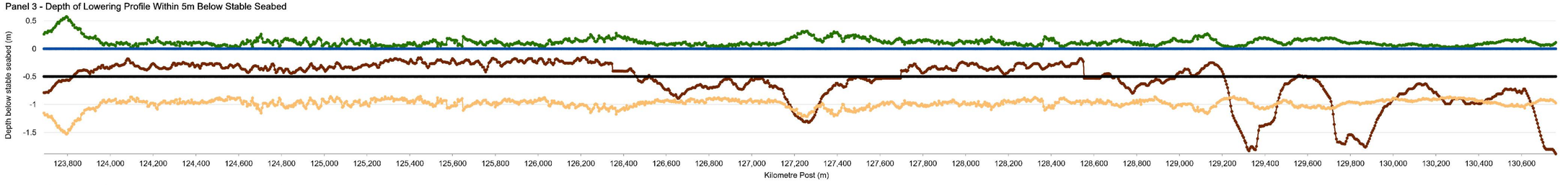
Panel 1 - Bathymetry



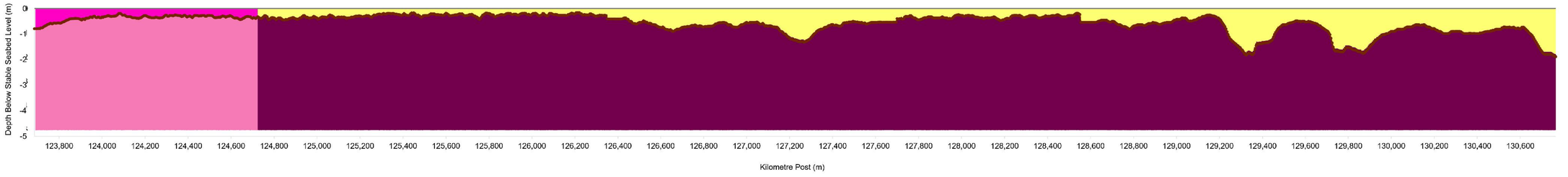
Panel 2 - Geomorphological Features and BAS Zonation



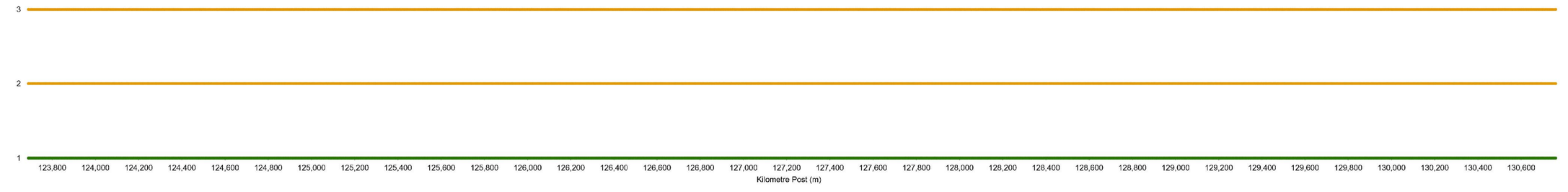
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



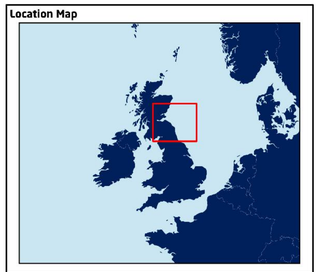
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



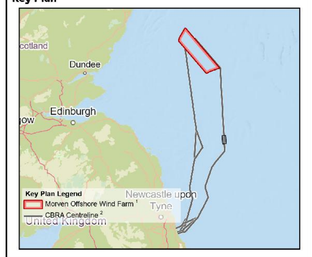
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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BAS Zone Classification [3]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
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- Sand waves

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- 1.2 sandy Mud
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
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Project Title
Morven Offshore Wind Farm

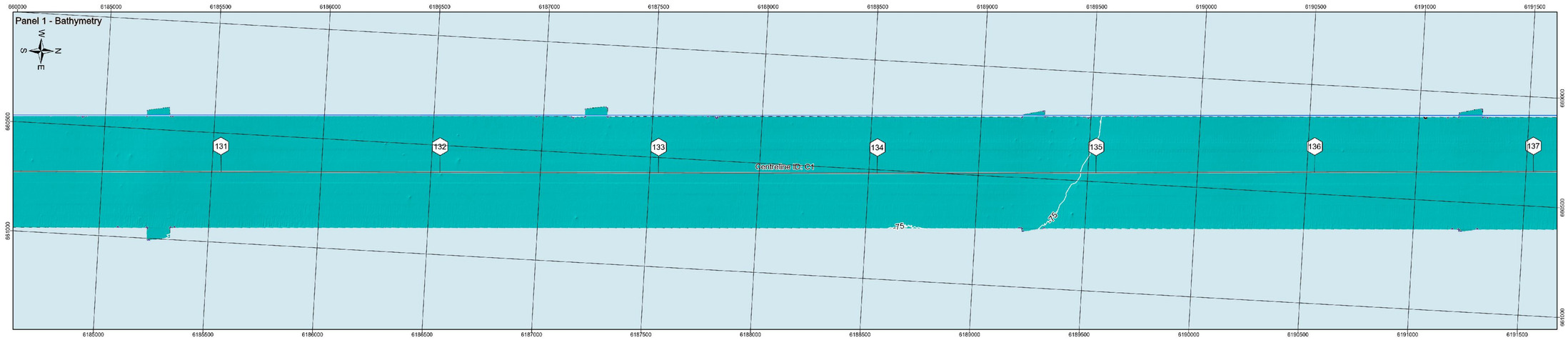
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

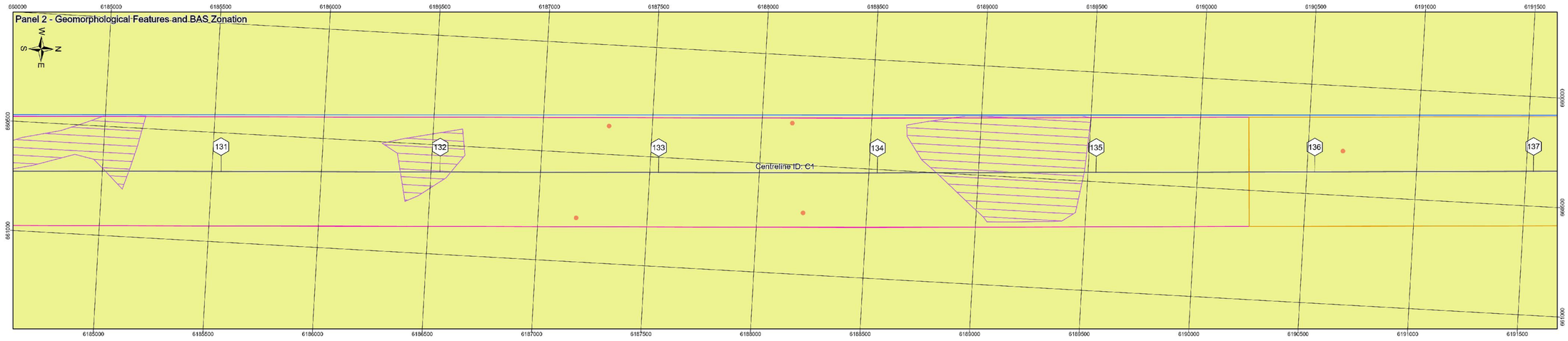
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 21 of 41

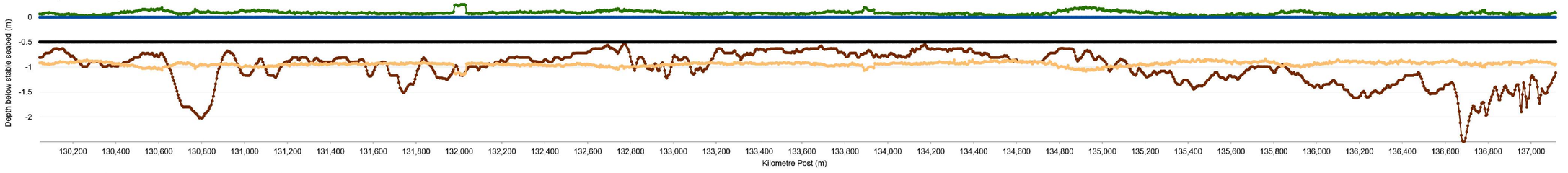
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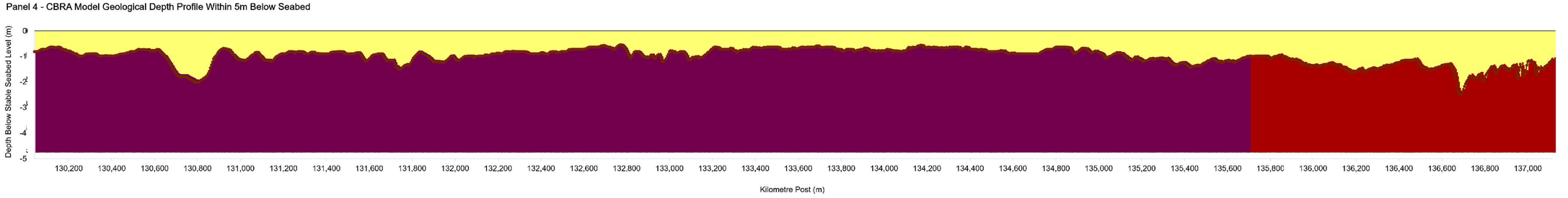
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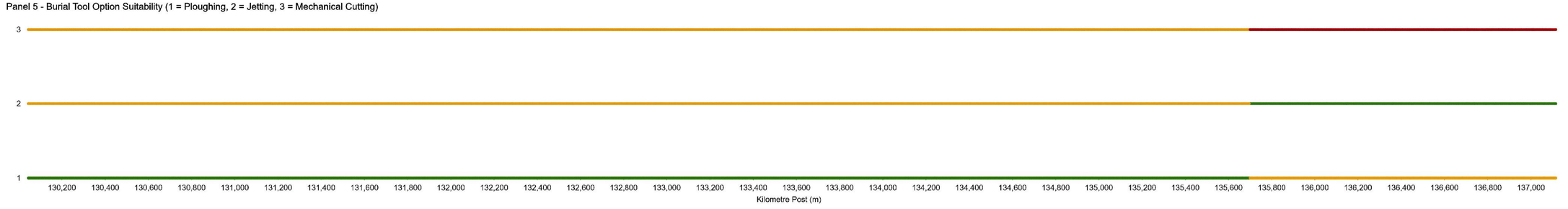
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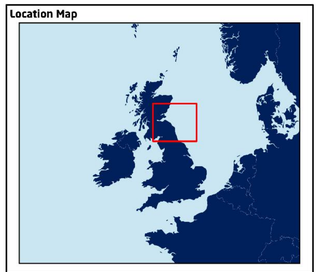




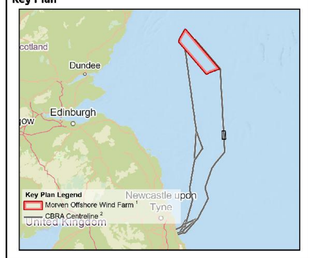




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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [5]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

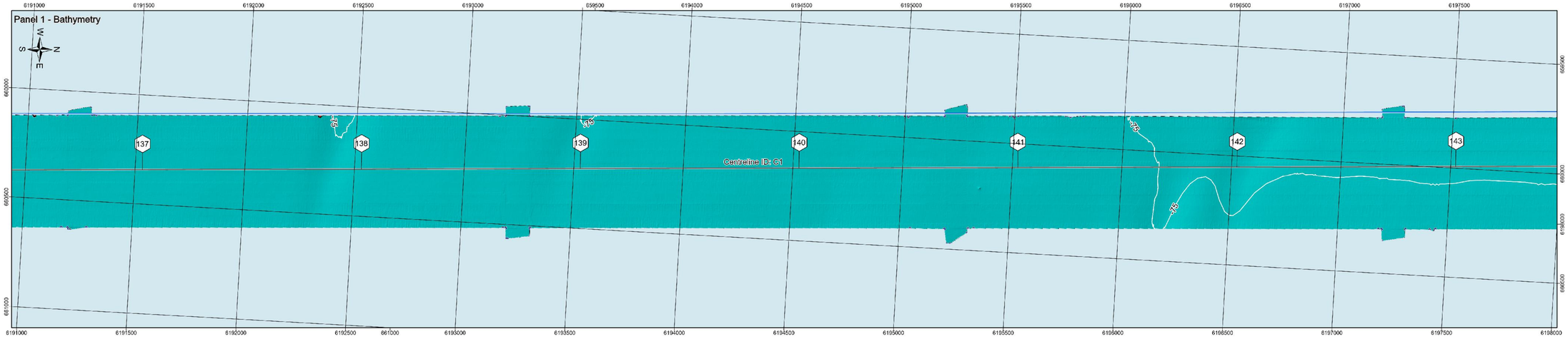
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 22 of 41

Drawing Status
Issue for Review

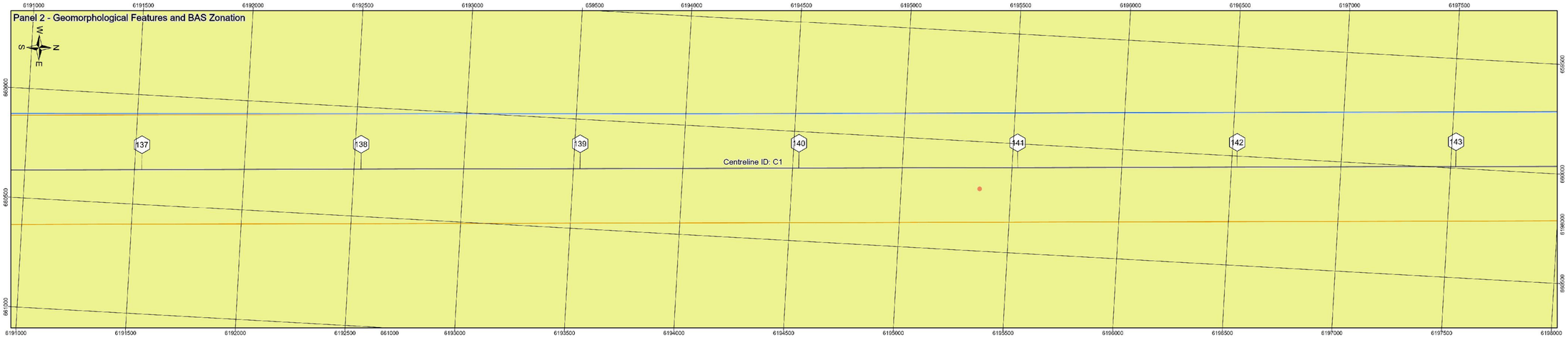
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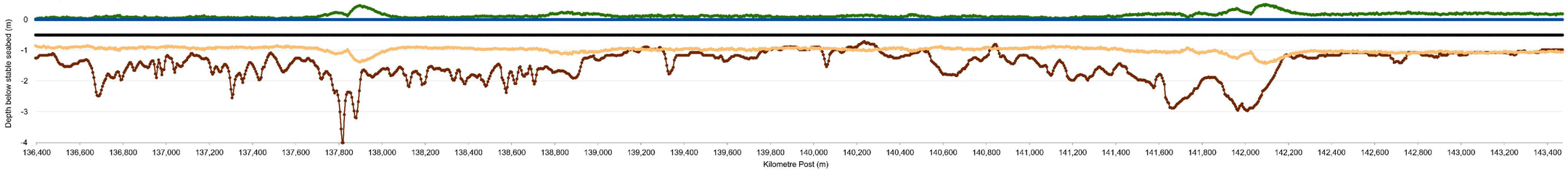
Panel 1 - Bathymetry



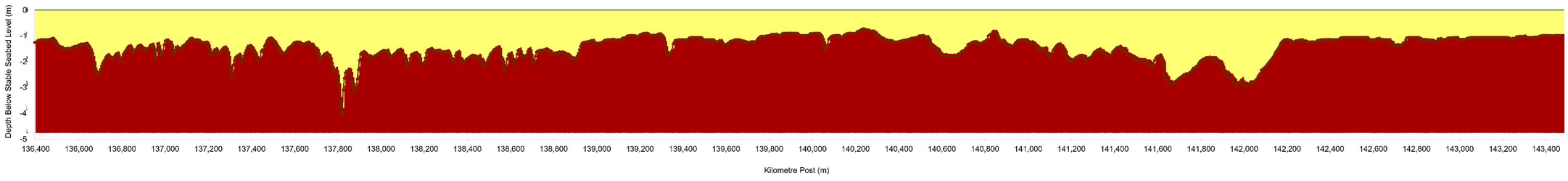
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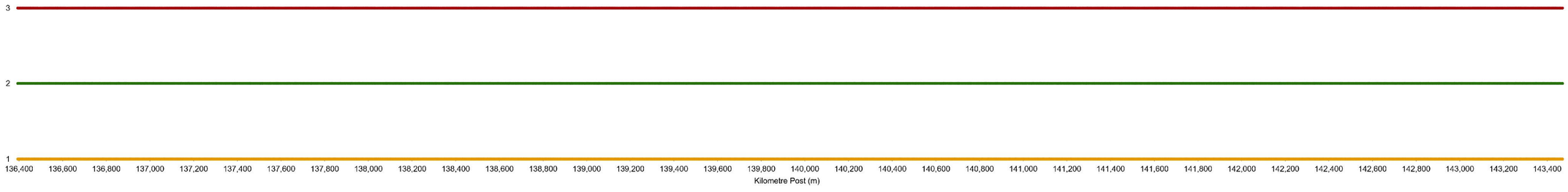
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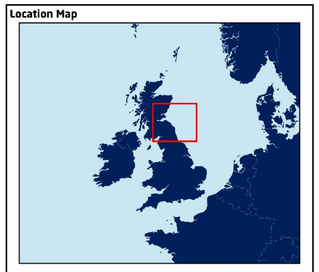
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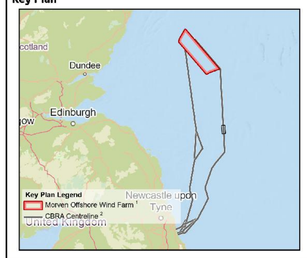
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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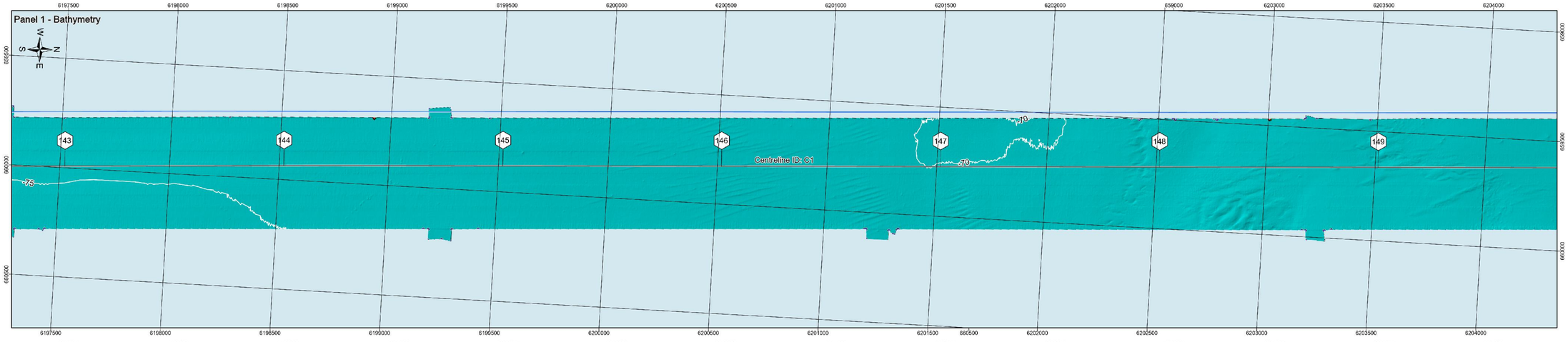
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

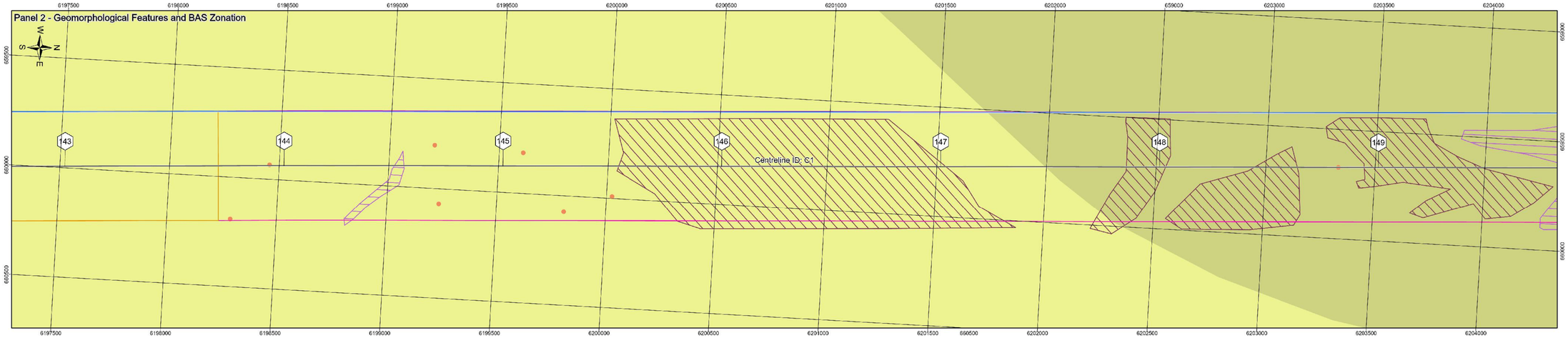
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 23 of 41

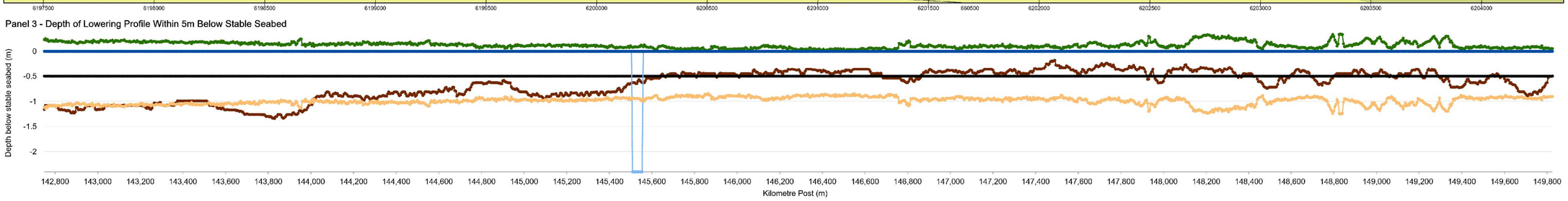
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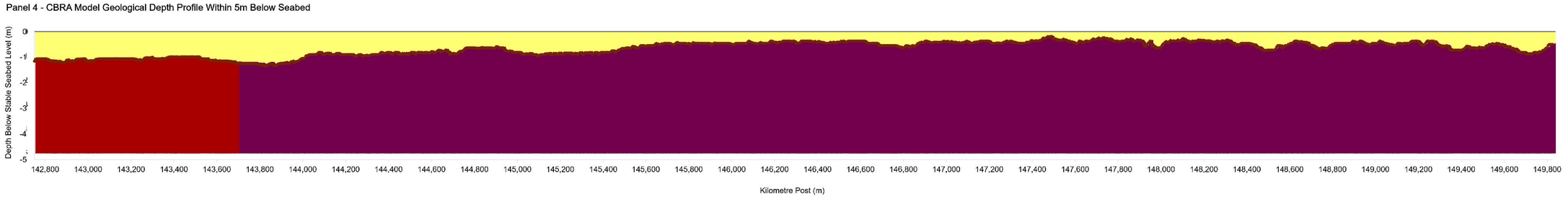
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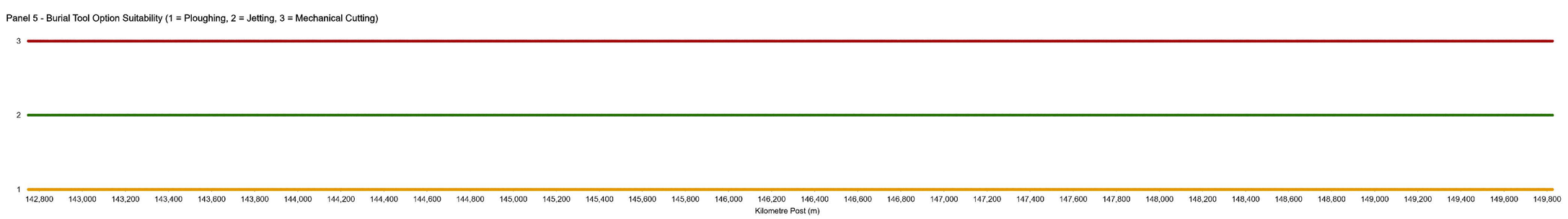
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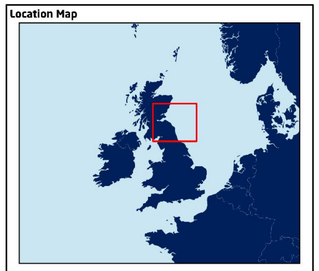




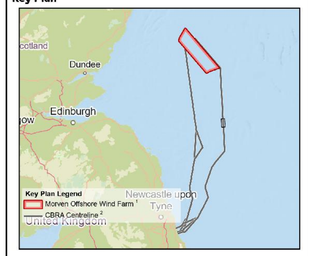




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- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
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- SEGL2 Installation Corridor [6]
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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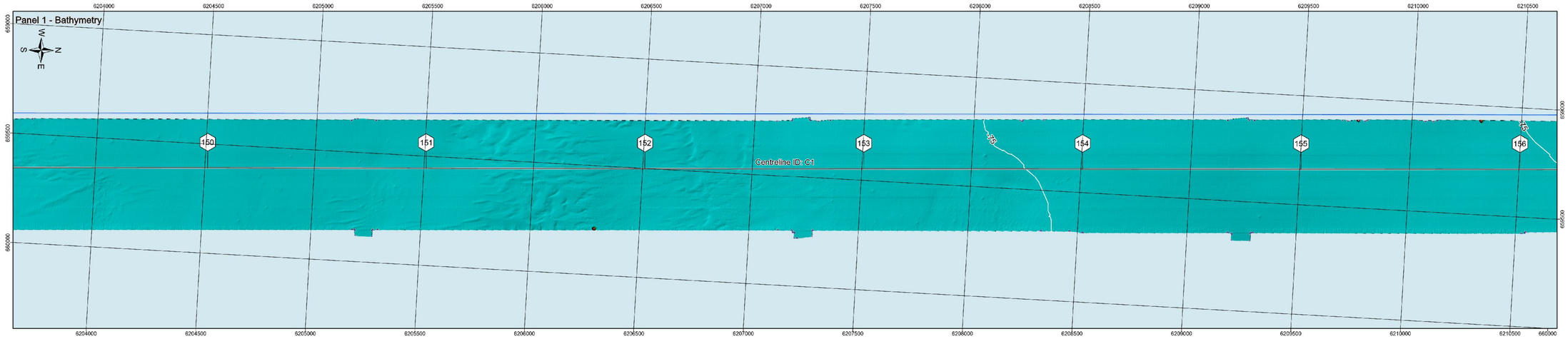
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CBRA Alignment Charts - Centreline ID: C1 - Sheet 24 of 41

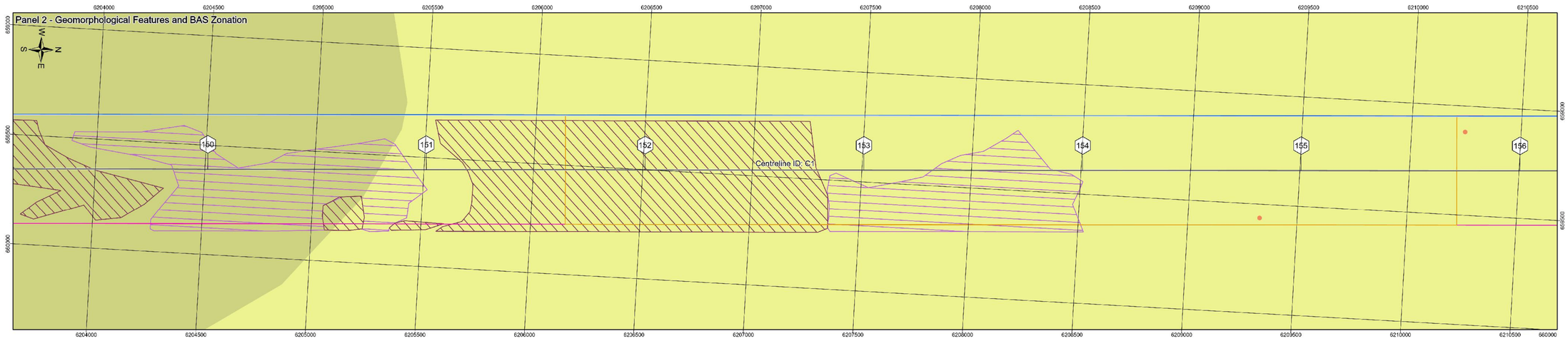
Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

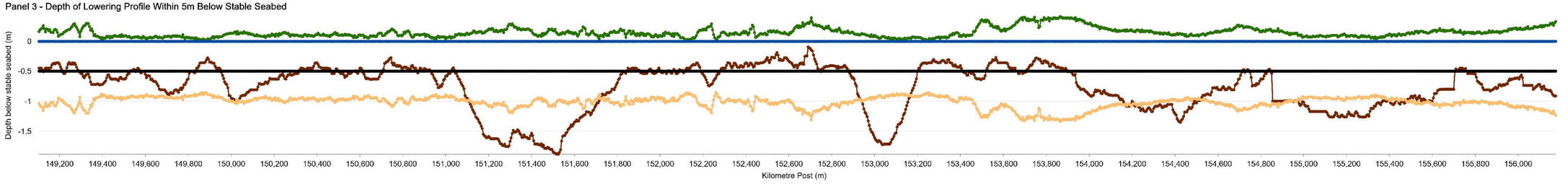
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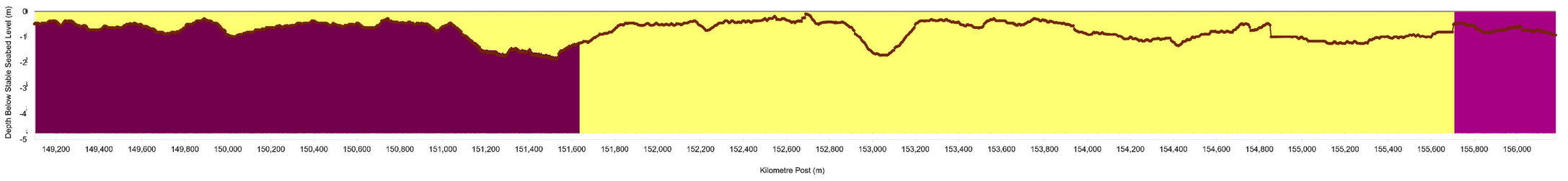




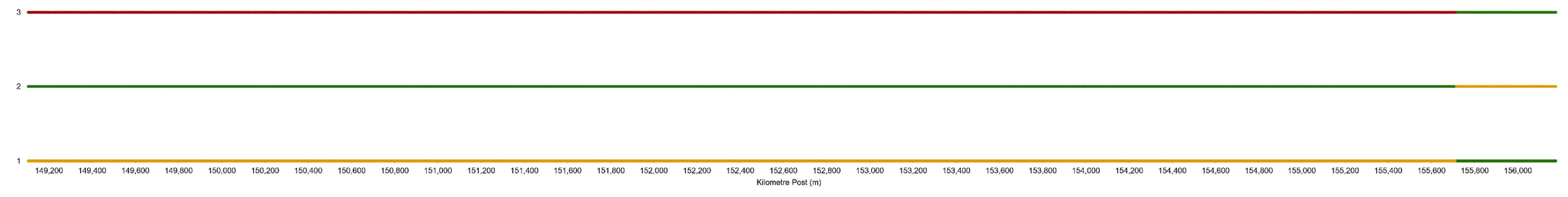
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



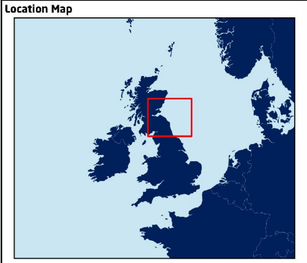
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



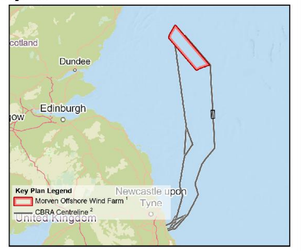
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Location Map



Key Plan



Legend

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BAS Zone Classification [3]
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Geomorphology [8]
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- Depression
- Depression with boulder/debris
- Wreck
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- Trawl mark
- Bedrock outcrop
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Panel 4

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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	

Layer 1/Layer 2 Boundary [8]

Panel 5

- Suitable [3]
- Possible [3]
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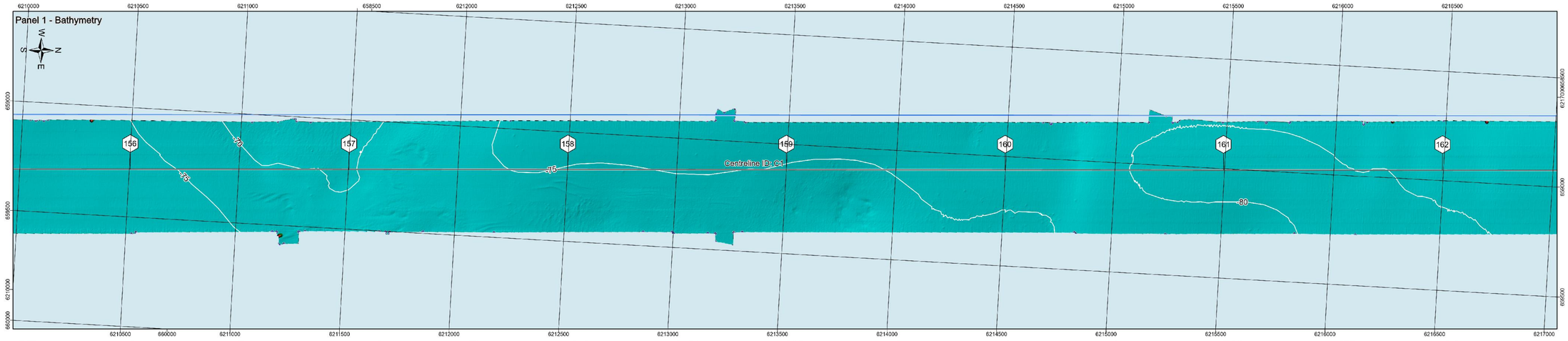
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 25 of 41

Drawing Status
Issue for Review

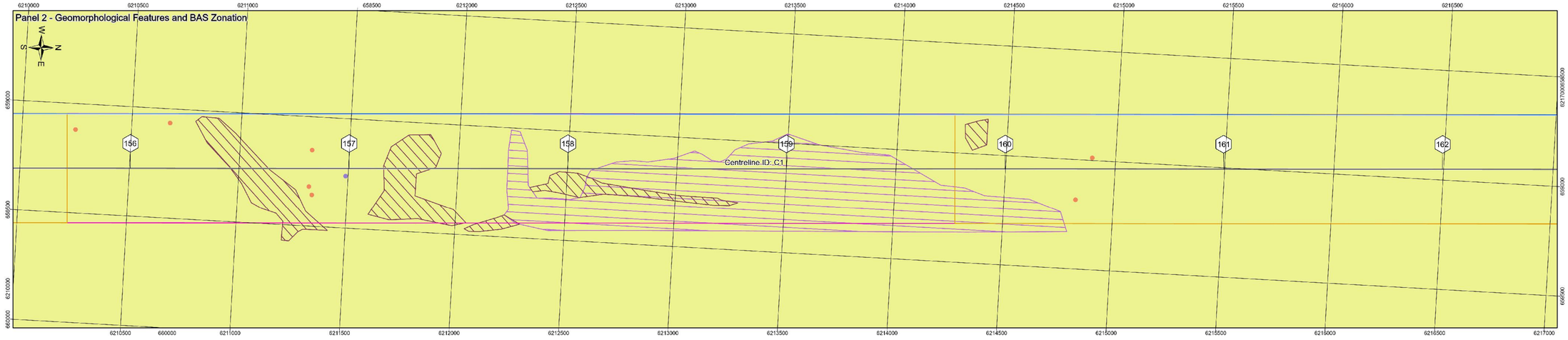
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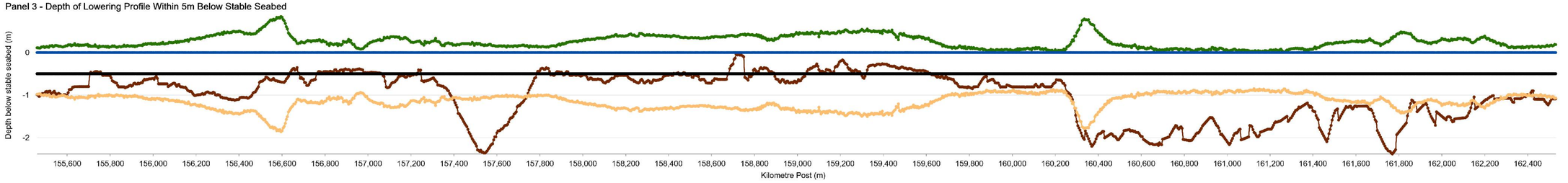
Panel 1 - Bathymetry



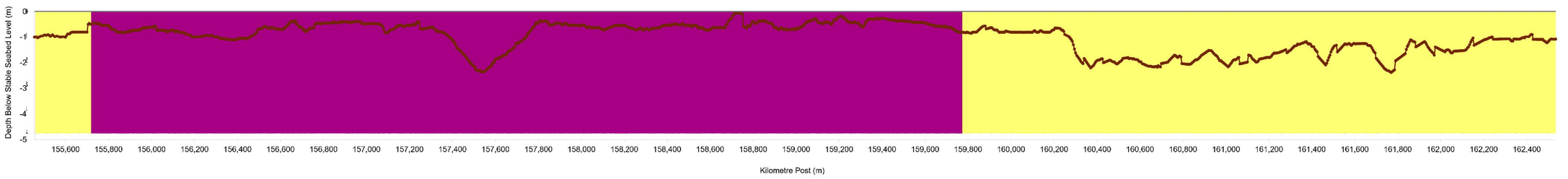
Panel 2 - Geomorphological Features and BAS Zonation



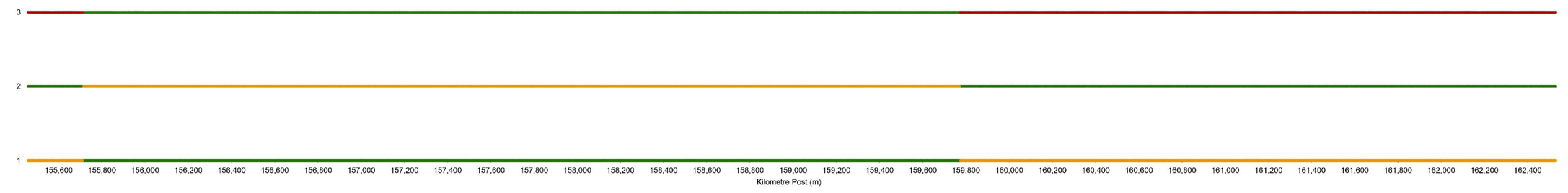
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



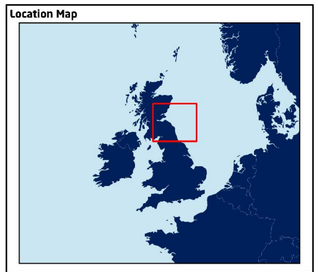
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



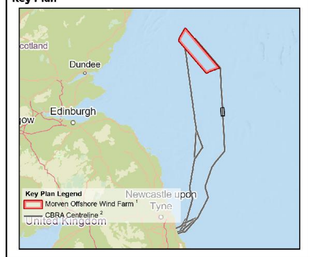
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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Panel 2

BAS Zone Classification [3]
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- Boulder/debris
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- Depression with boulder/debris
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- Layer 1/Layer 2 Boundary [8]
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

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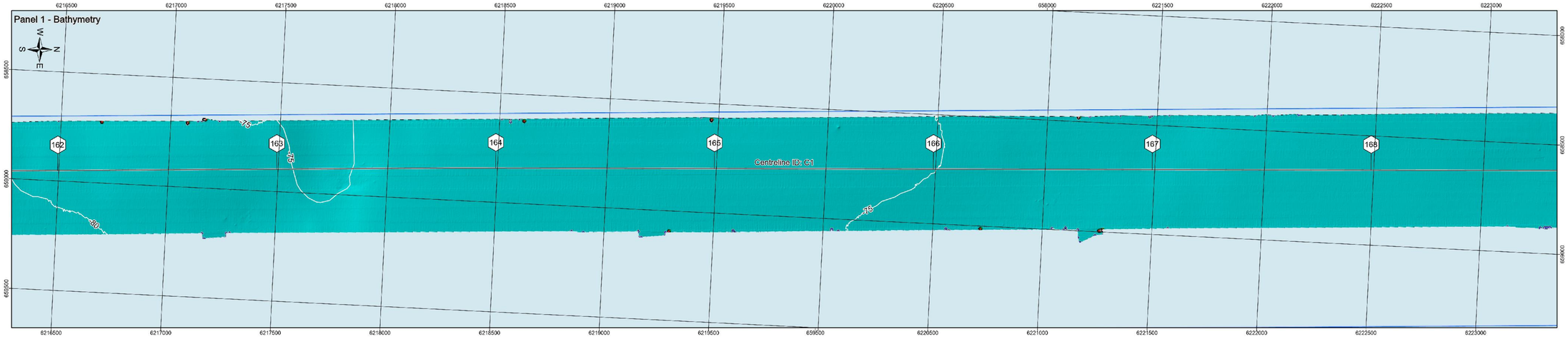
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 26 of 41

Drawing Status
Issue for Review

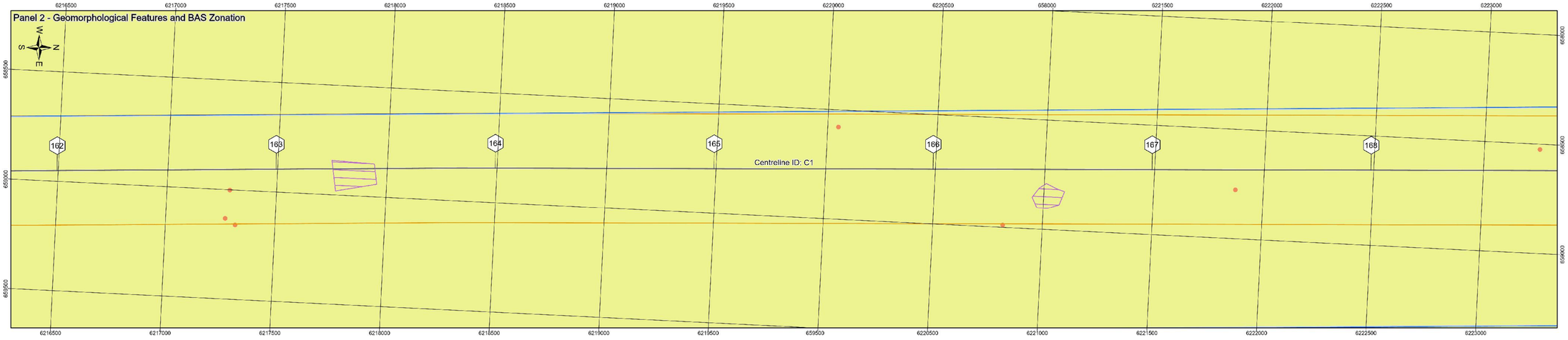
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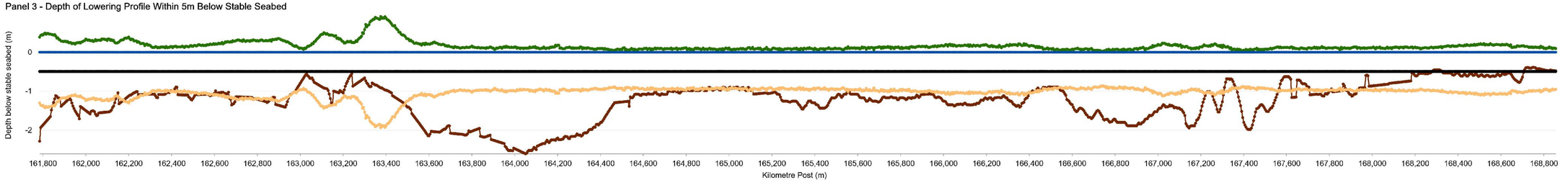
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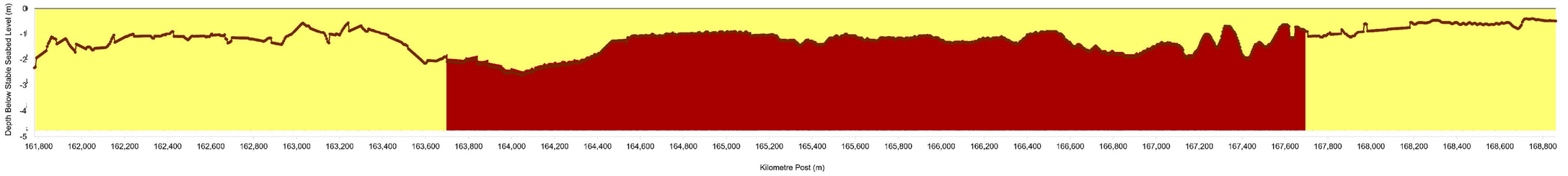
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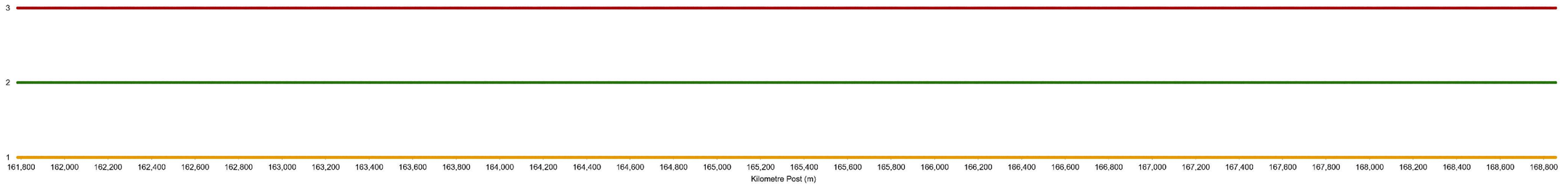
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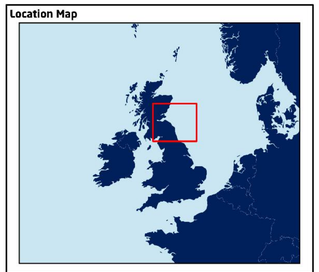
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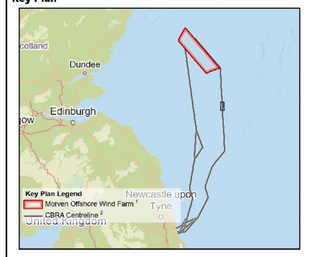
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High Strength CLAY (C5)	Very High Strength CLAY (C6)
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Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

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- Suitable [3]
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 27 of 41

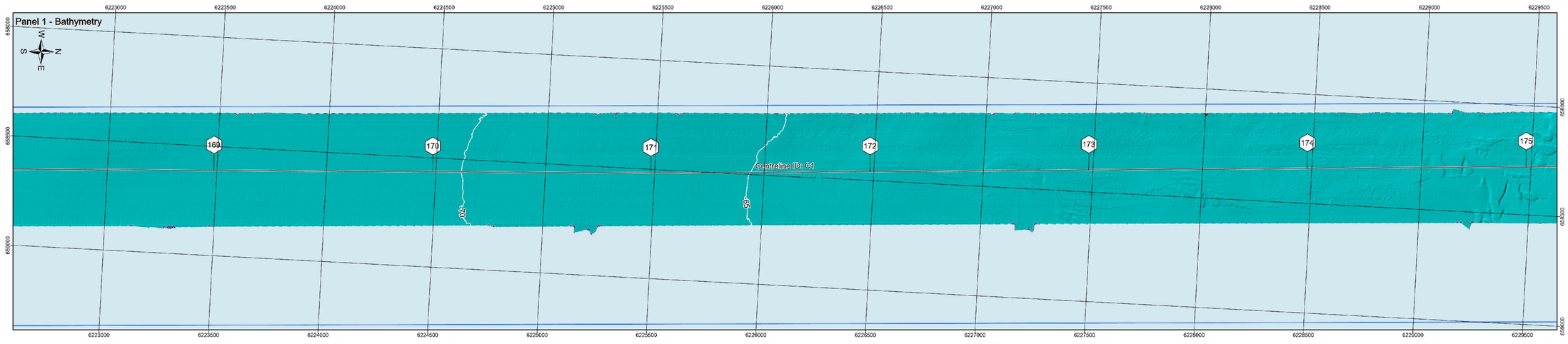
Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

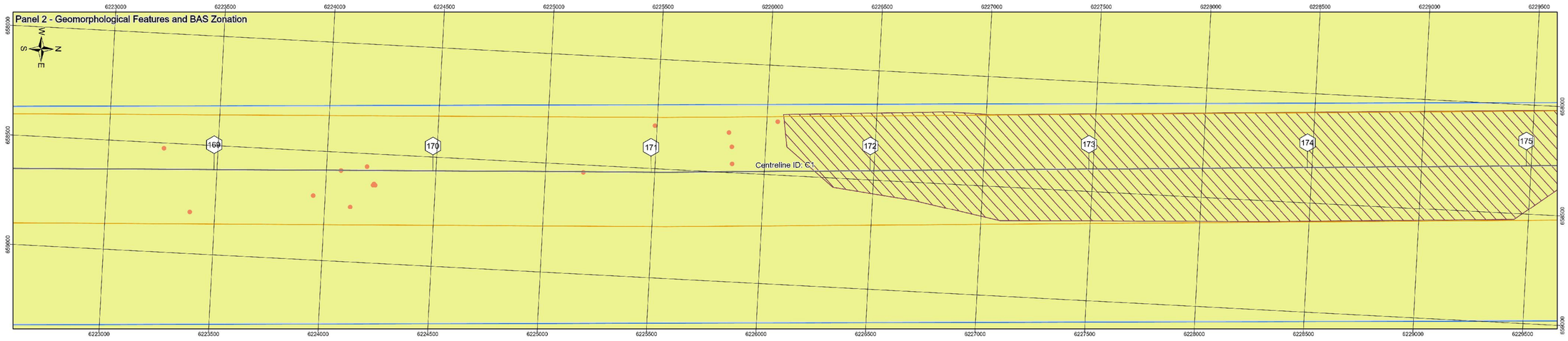
GLOBAL MARITIME — EnBW bp

Partners in UK offshore wind

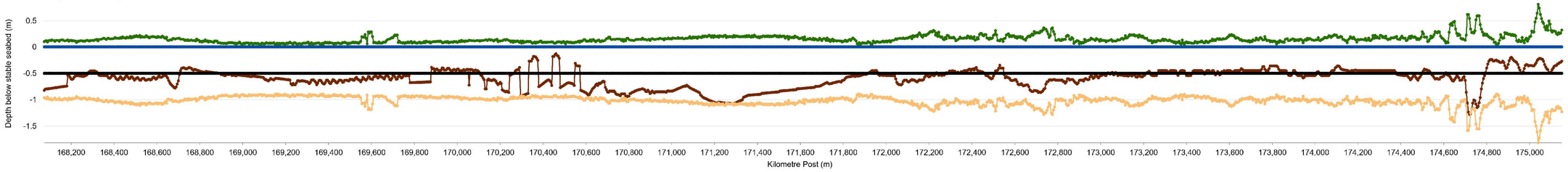
Panel 1 - Bathymetry



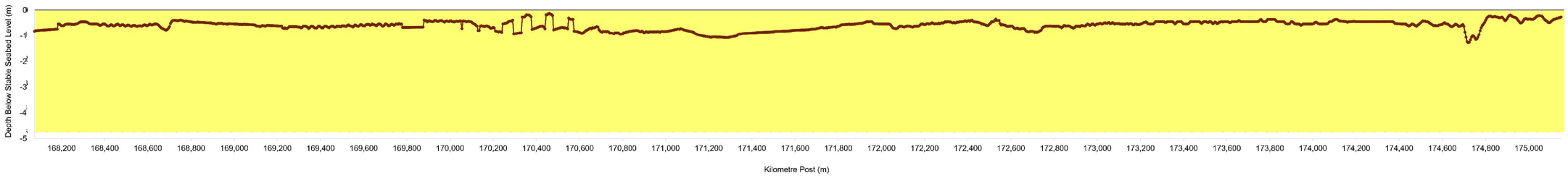
Panel 2 - Geomorphological Features and BAS Zonation



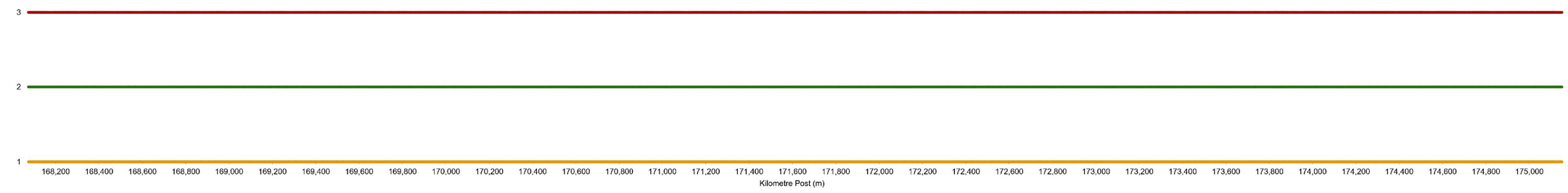
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



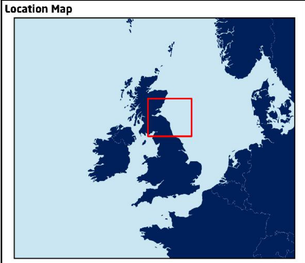
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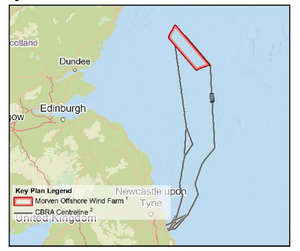
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- 1.2 sandy Mud
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- SEGL2 Installation Corridor [6]
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
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Panel 5
- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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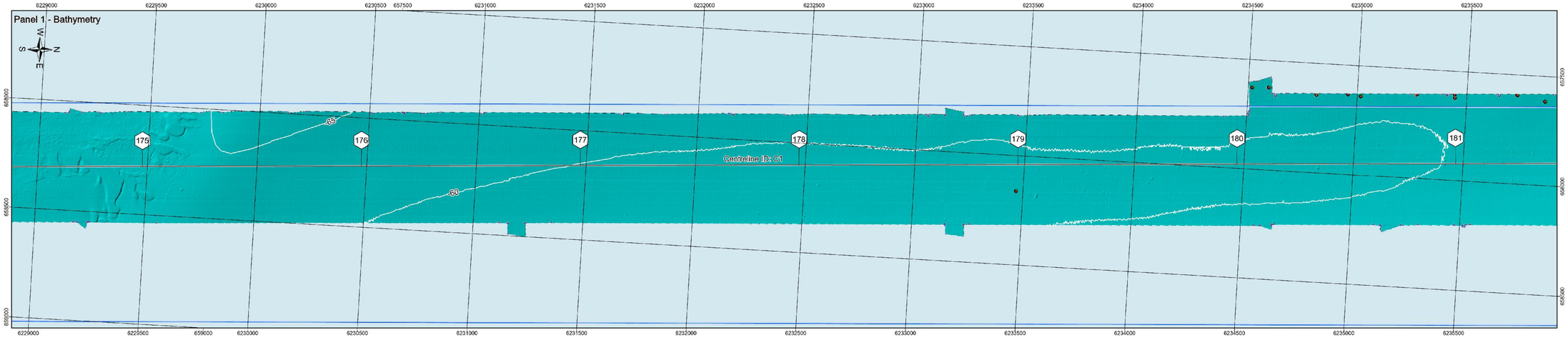
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 28 of 41

Drawing Status
Issue for Review

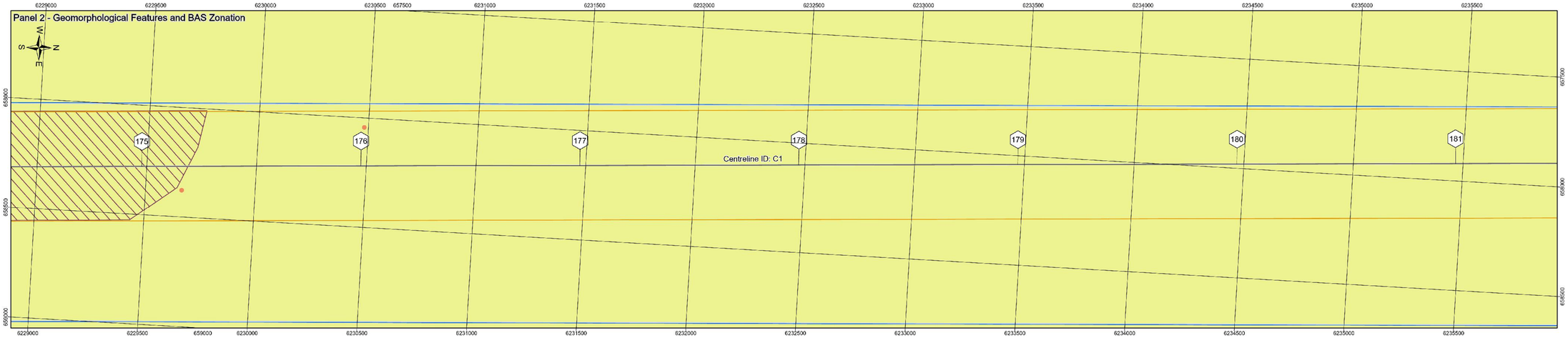
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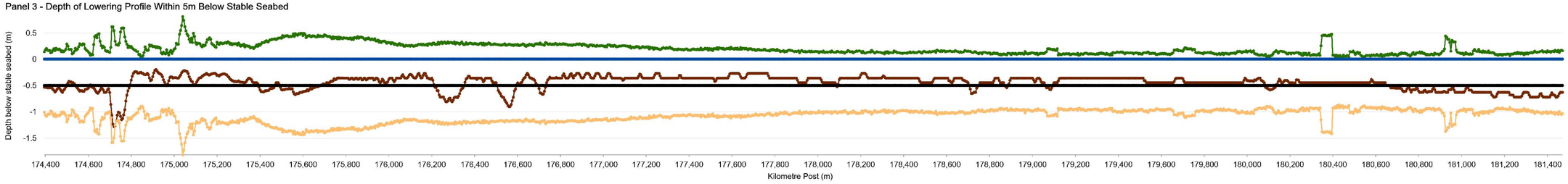
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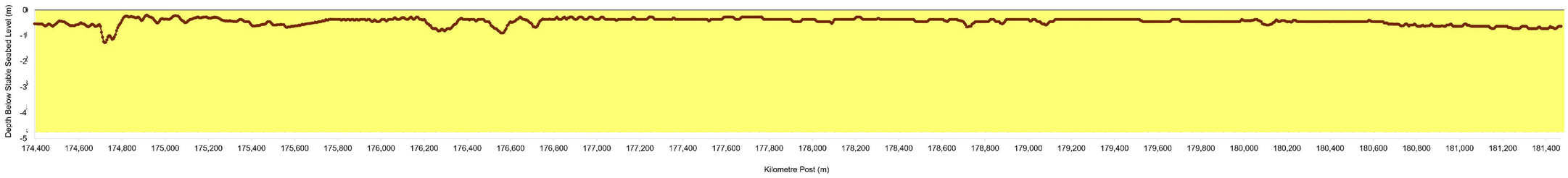
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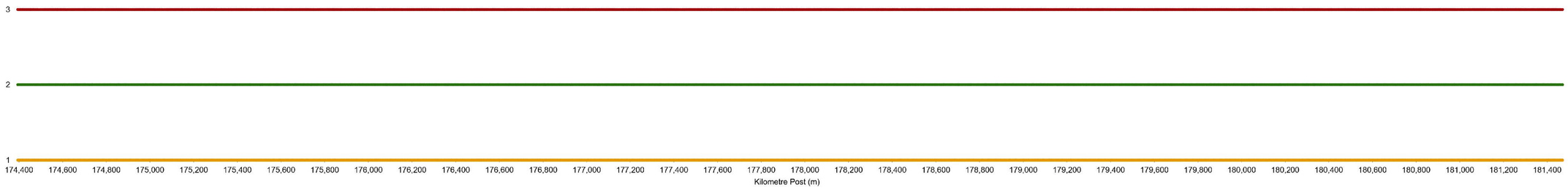
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



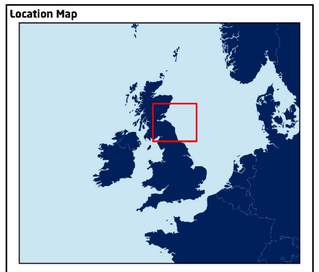
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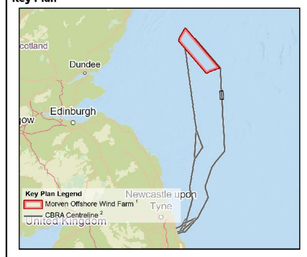
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Legend

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Panel 4

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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
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Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	

- Layer 1/Layer 2 Boundary [8]

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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Notes:
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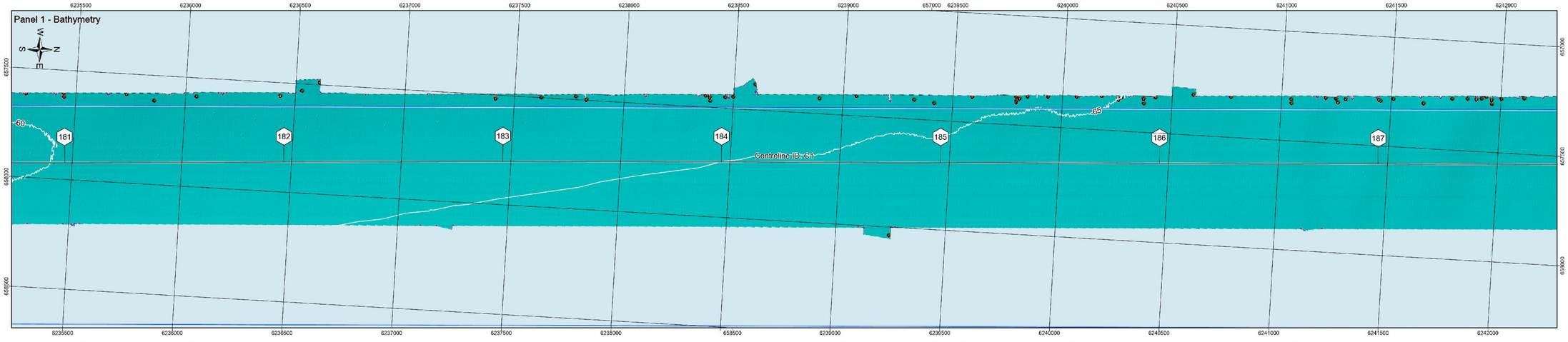
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 29 of 41

Drawing Status
Issue for Review

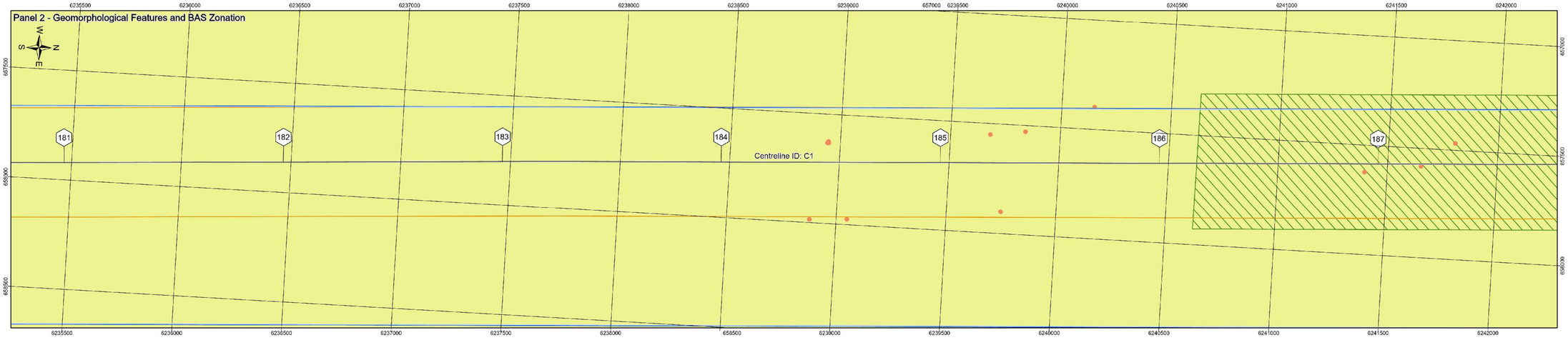
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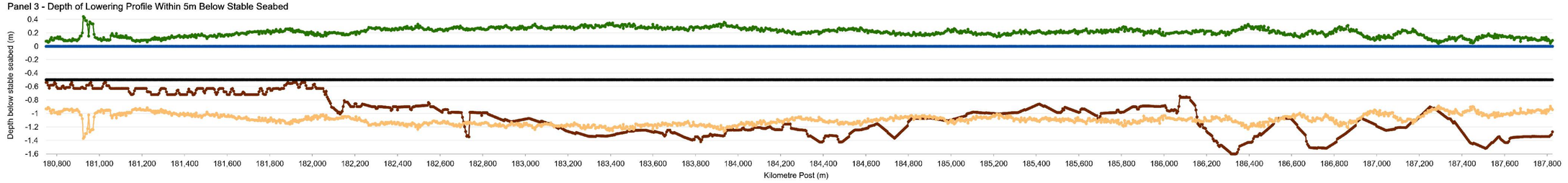
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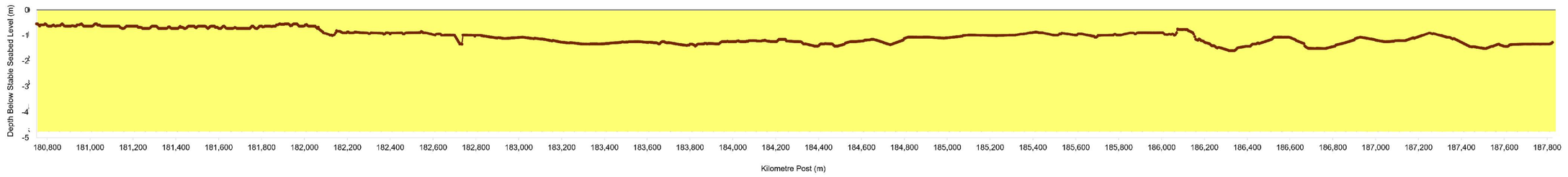
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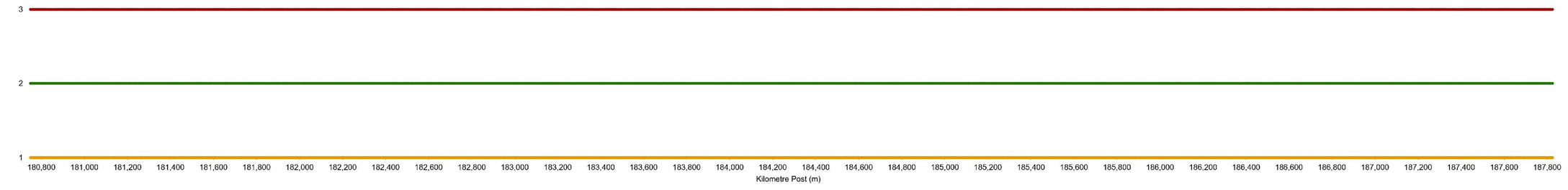
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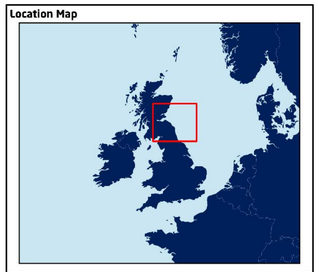
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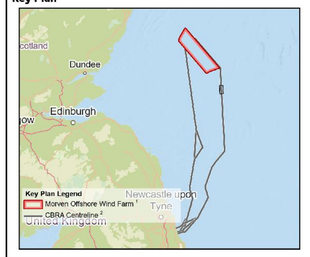
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- Layer 1/Layer 2 Boundary [9]

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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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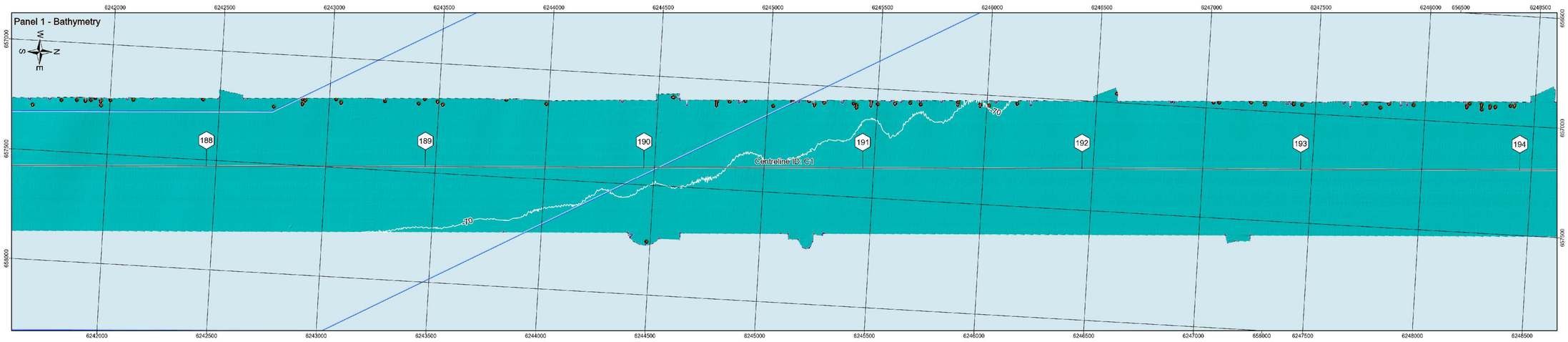
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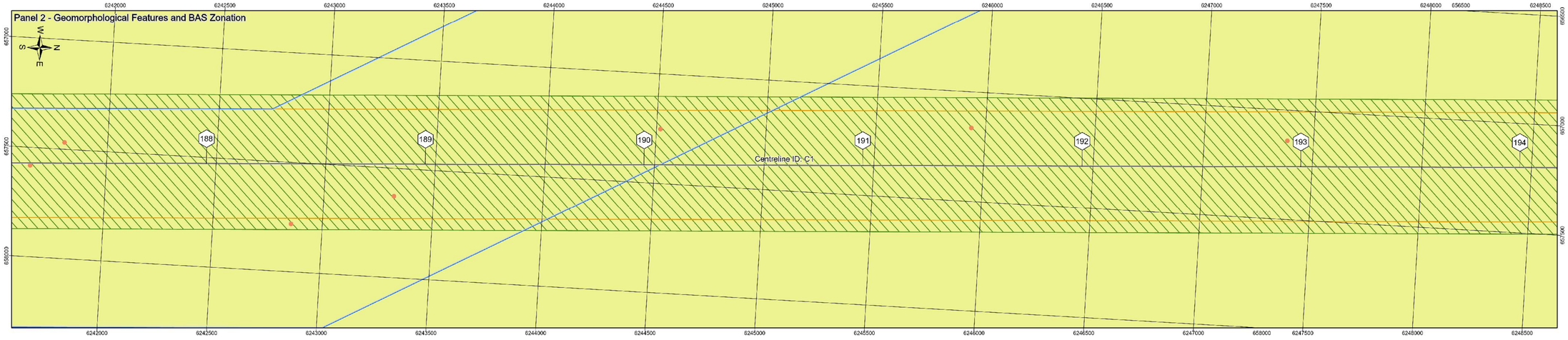
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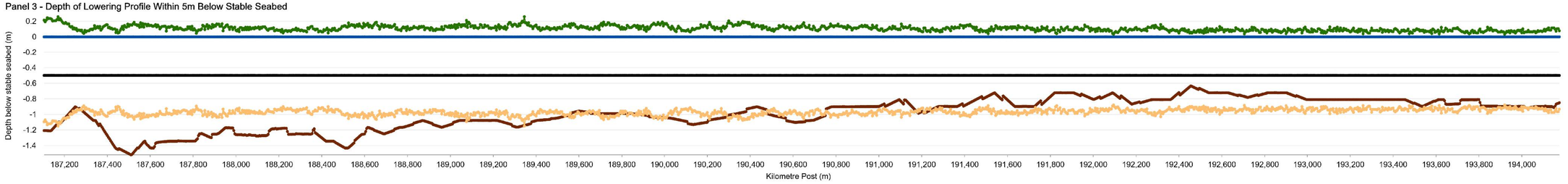
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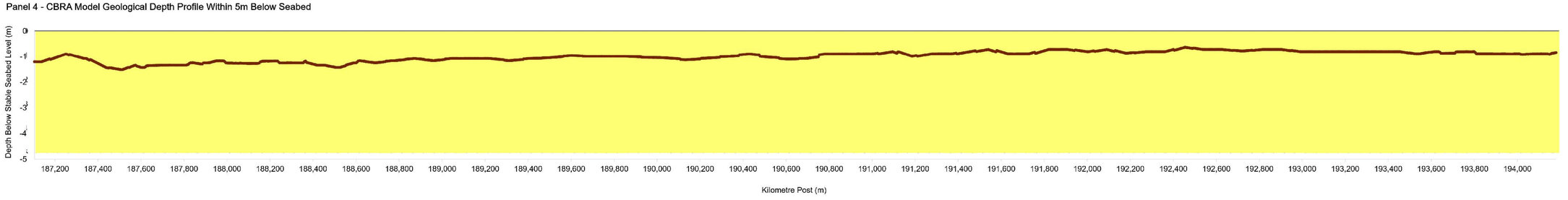
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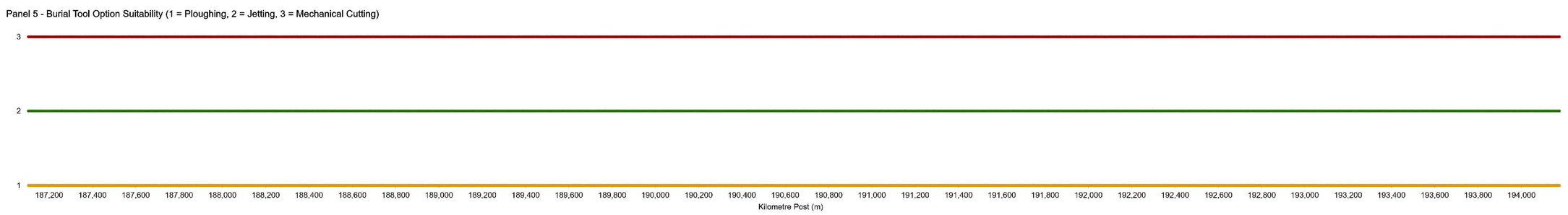
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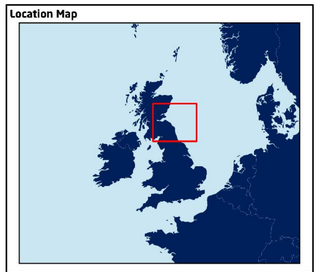




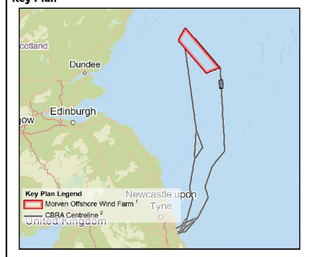




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
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- Scouring
- Thin sediment cover
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Seabed Substrate [8]
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- 1.2 sandy Mud
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
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- Low Strength CLAY (C3)
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- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
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Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Morven Offshore Wind Farm

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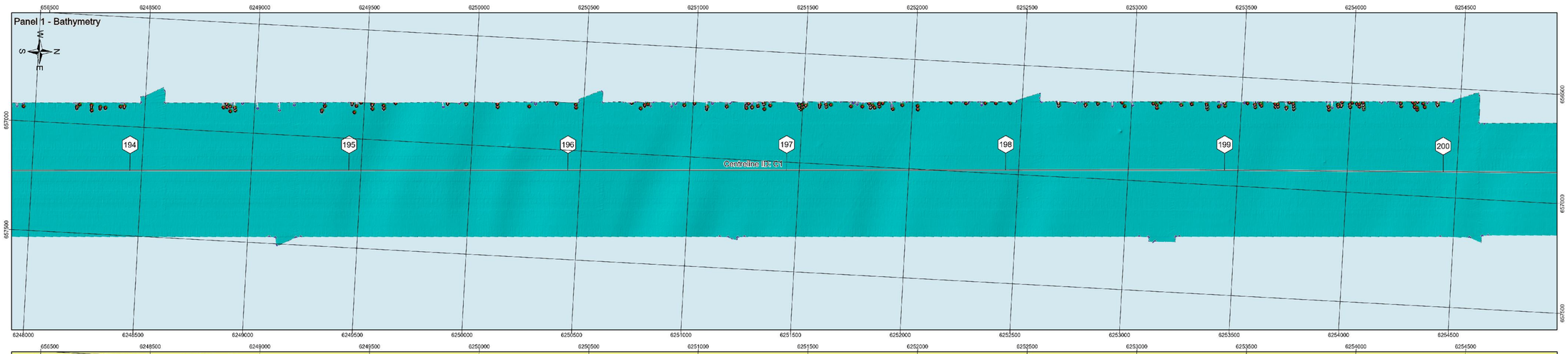
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 31 of 41

Drawing Status
Issue for Review

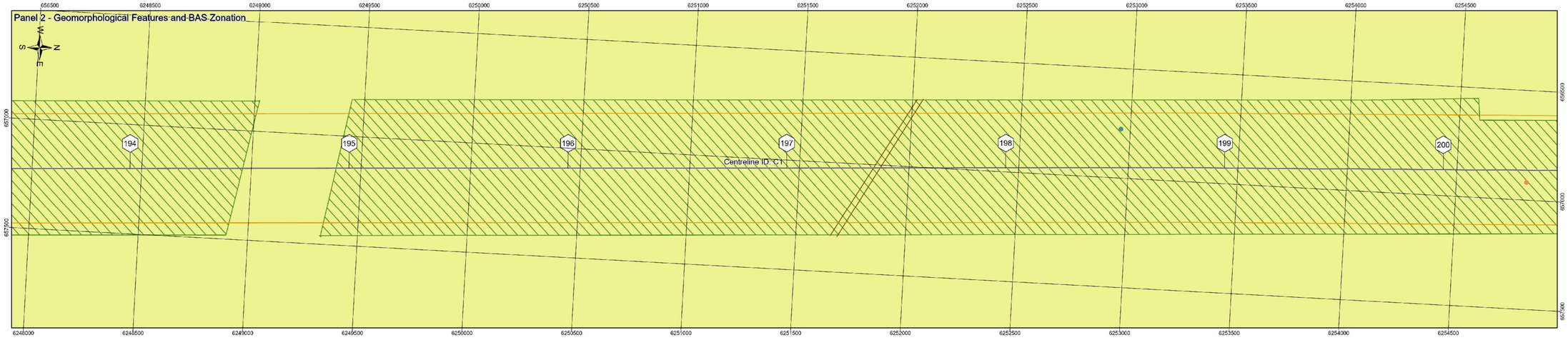
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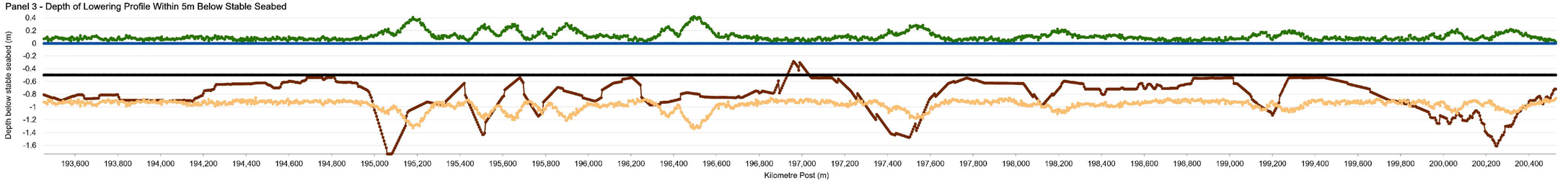
Panel 1 - Bathymetry



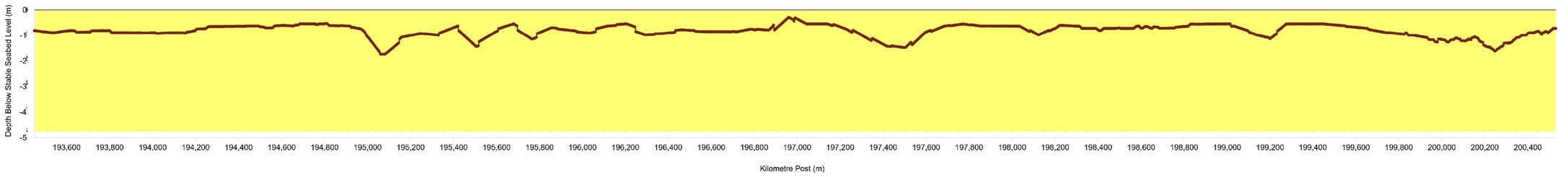
Panel 2 - Geomorphological Features and BAS Zonation



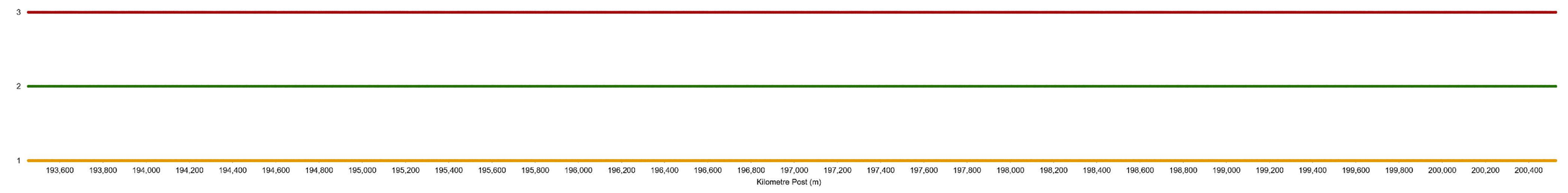
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



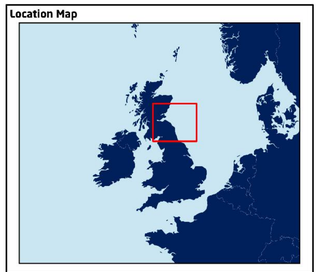
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



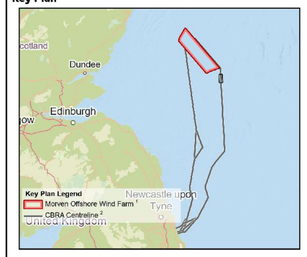
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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- Layer 1/Layer 2 Boundary [8]

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Project Title
Morven Offshore Wind Farm

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Morven Offshore Wind Farm Cable Burial Risk Assessment

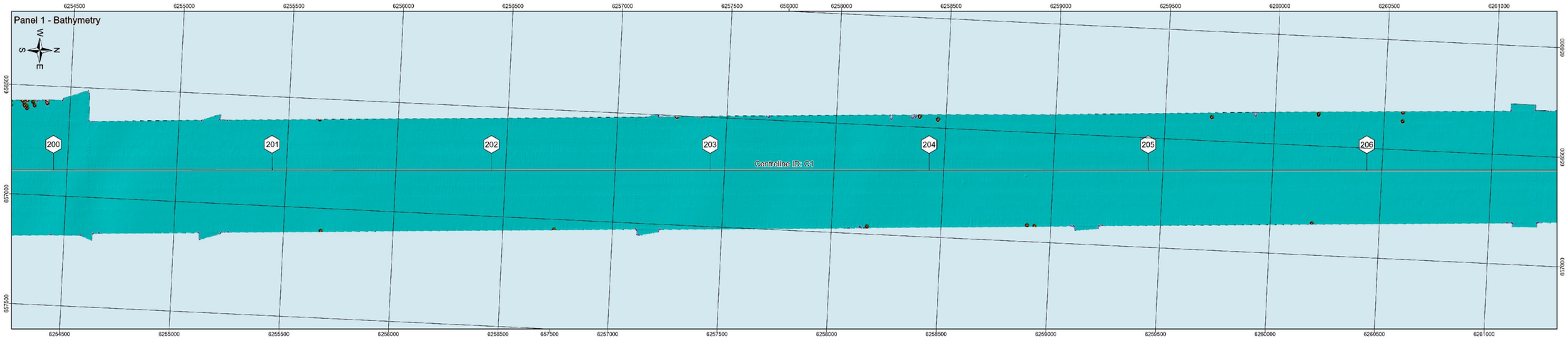
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 32 of 41

Drawing Status
Issue for Review

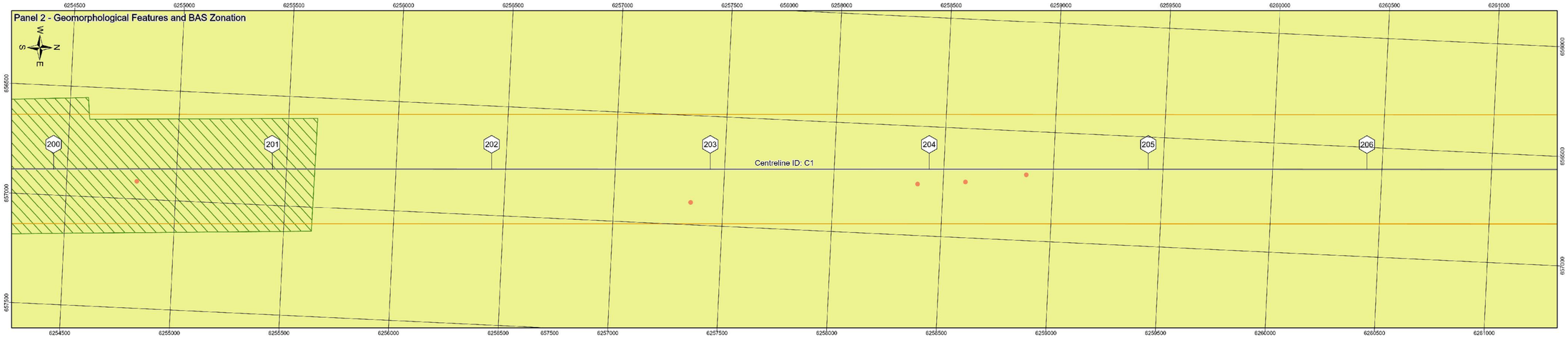
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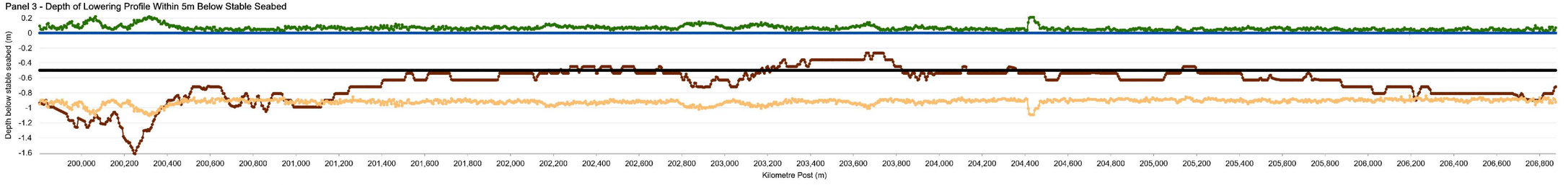
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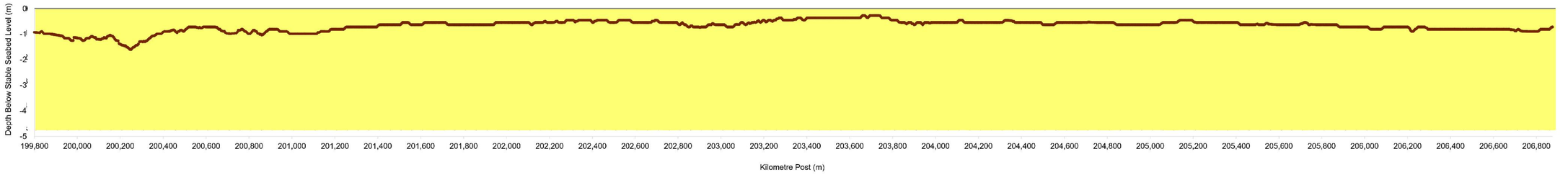
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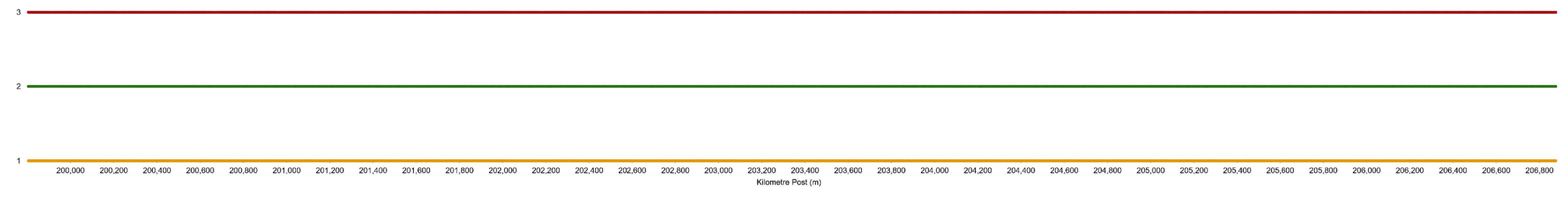
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



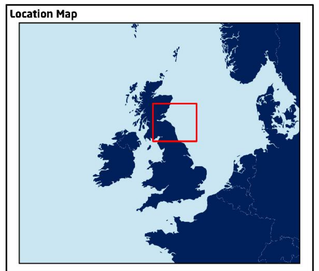
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



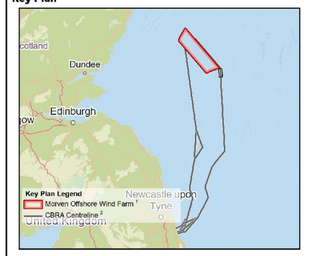
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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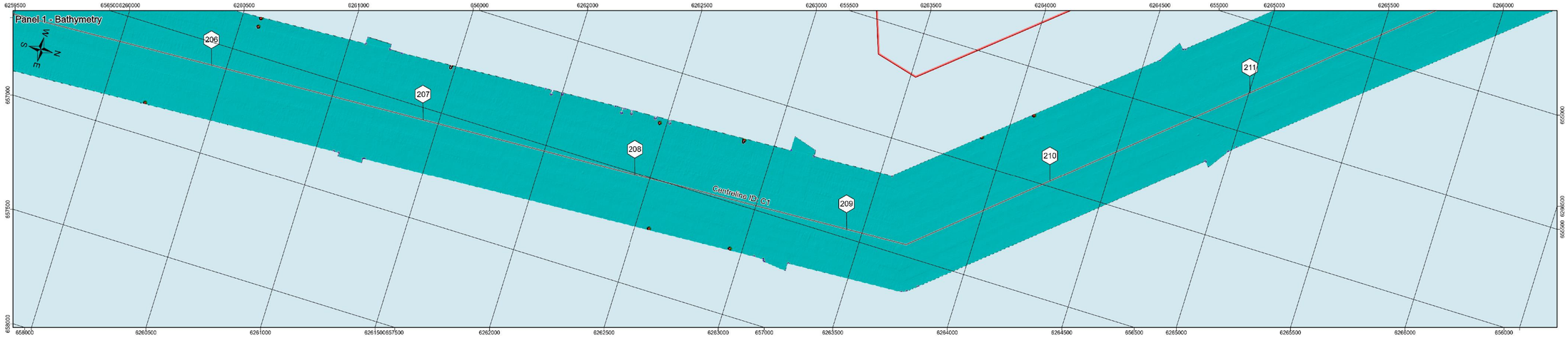
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

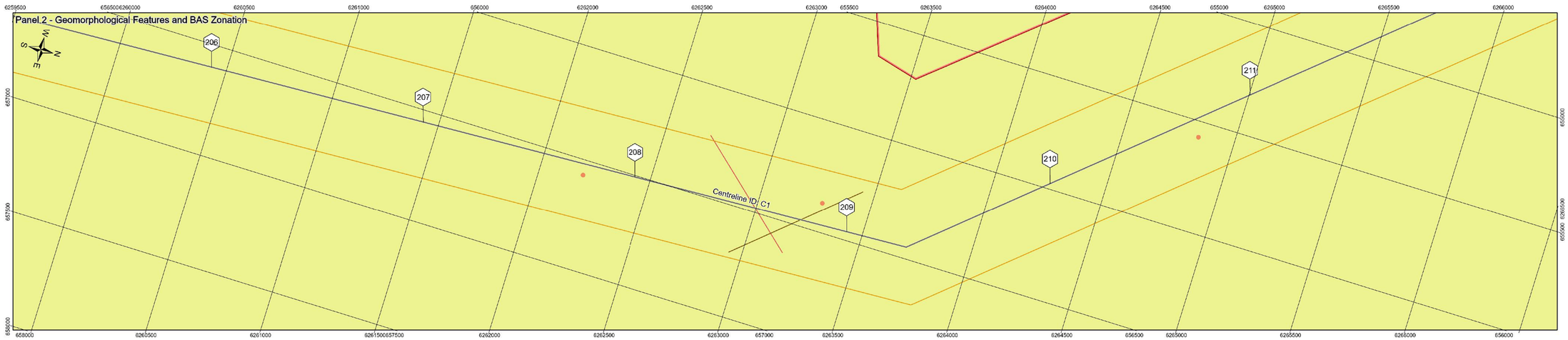
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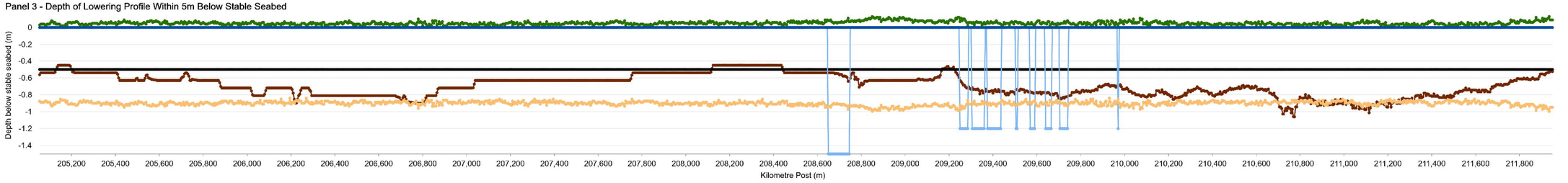
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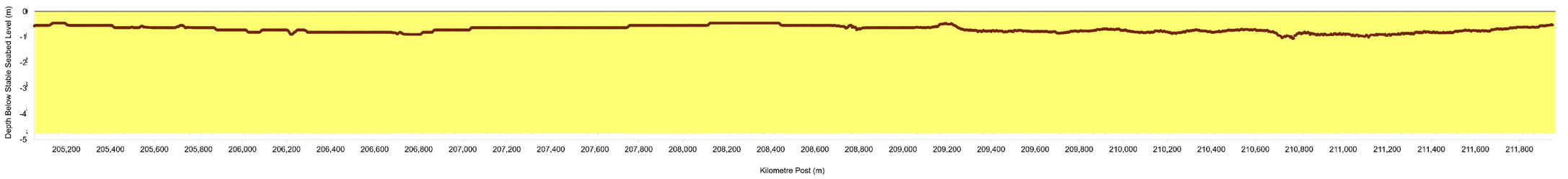




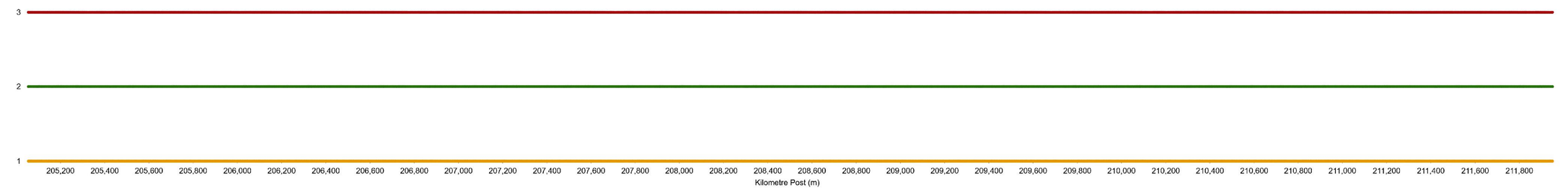
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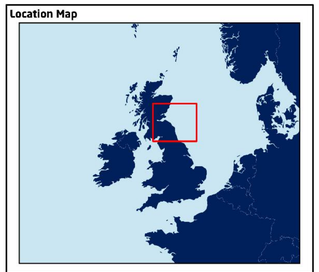
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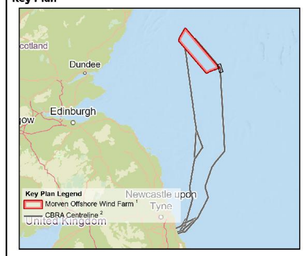
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 34 of 41

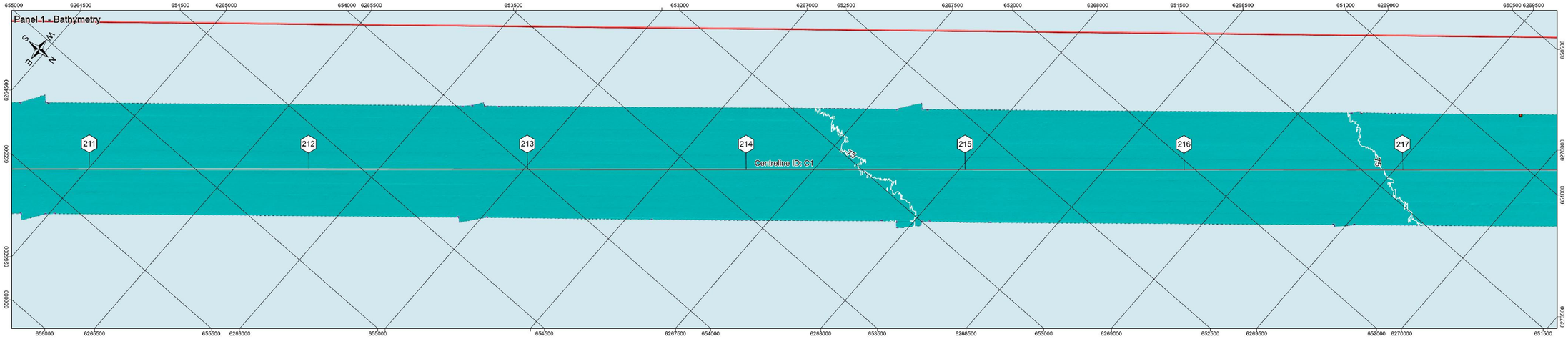
Drawing Status
Issue for Review

Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

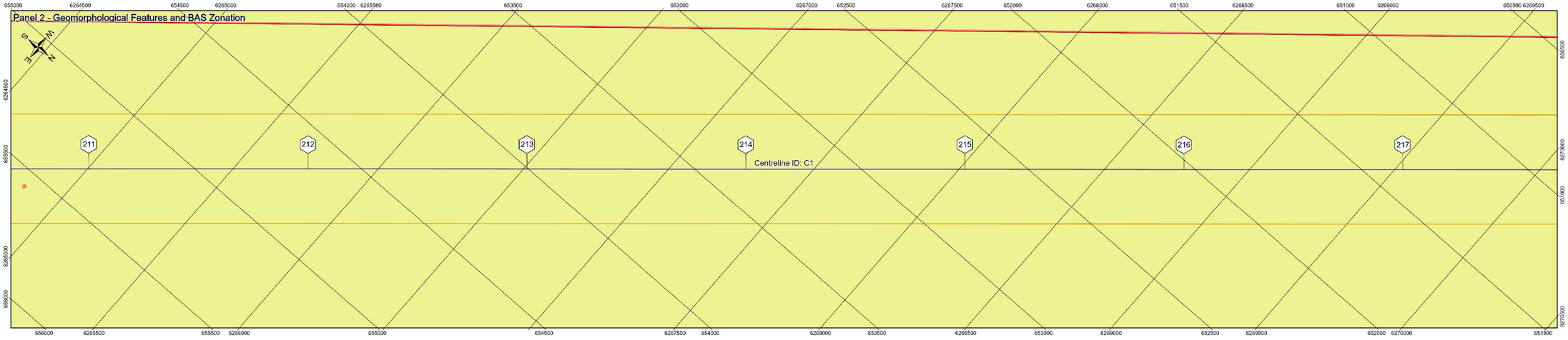
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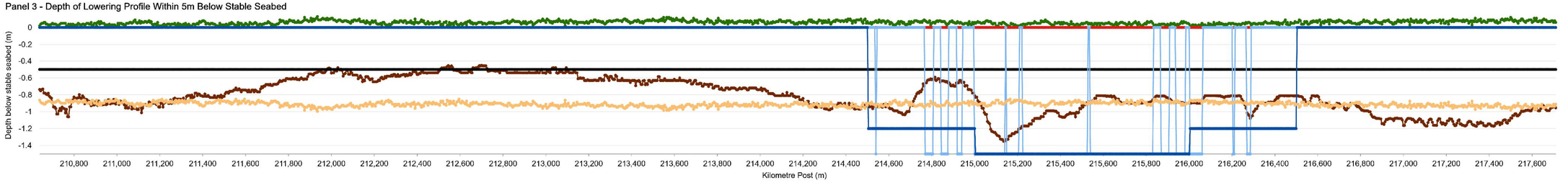
Panel 1 - Bathymetry



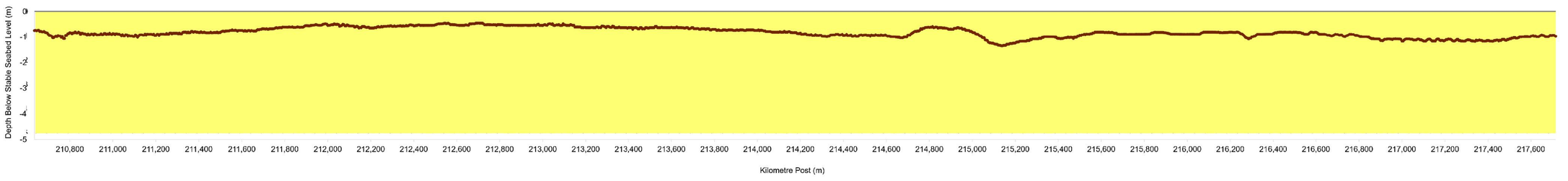
Panel 2 - Geomorphological Features and BAS Zonation



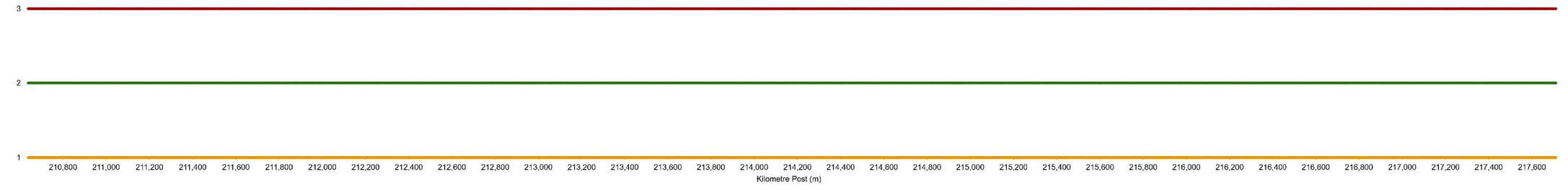
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



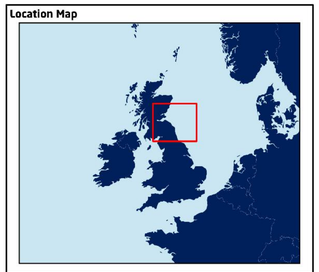
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



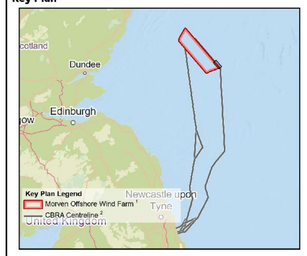
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
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- Travel mark
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- 1.2 sandy Mud
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [9]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

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Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

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Datum: European 1950
Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
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Morven Offshore Wind Farm

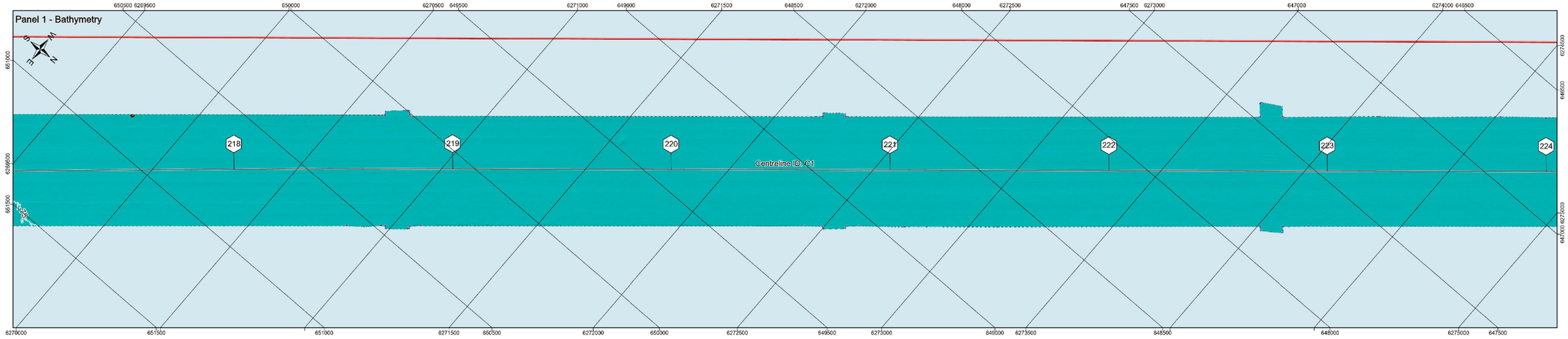
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

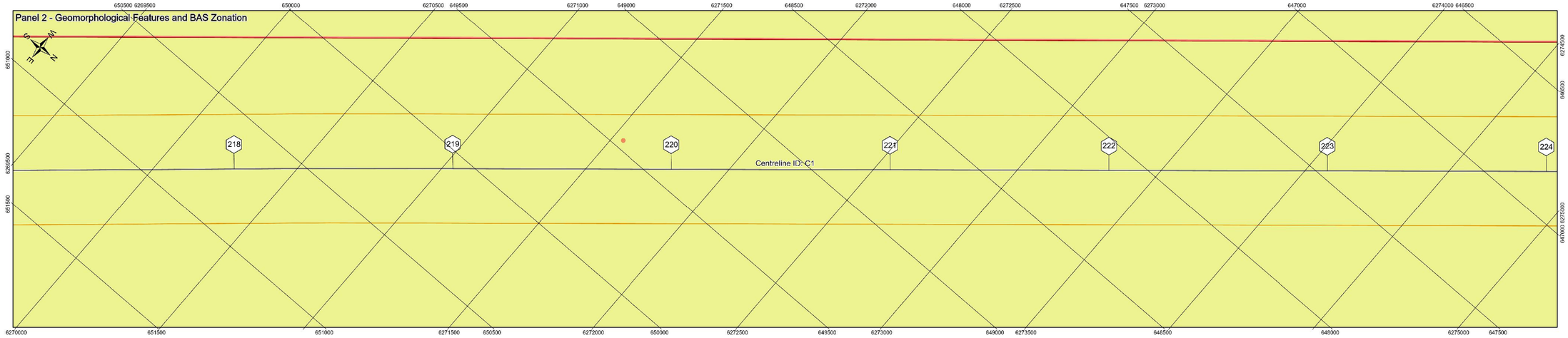
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 35 of 41

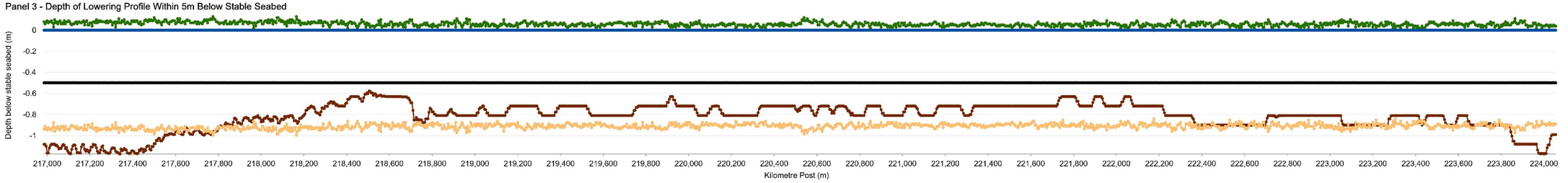
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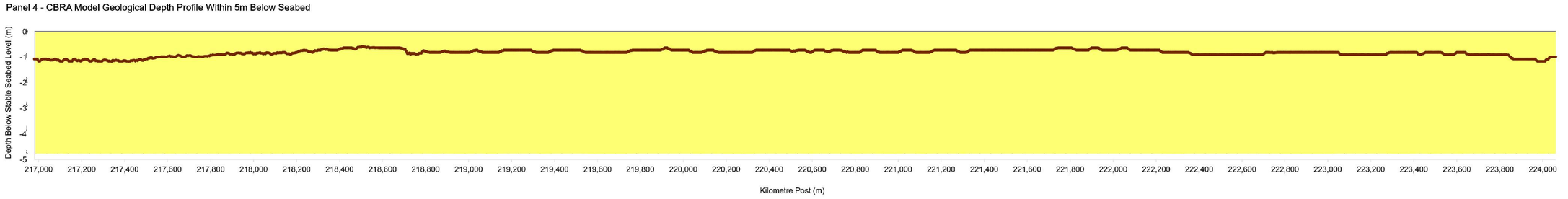
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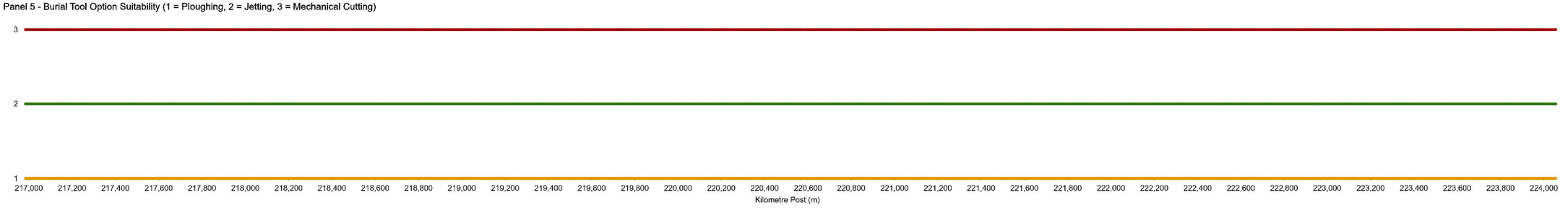
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Partners in UK offshore wind



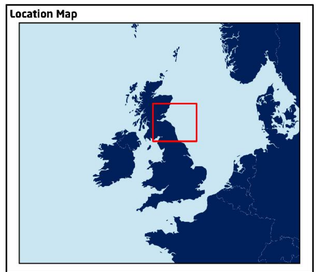




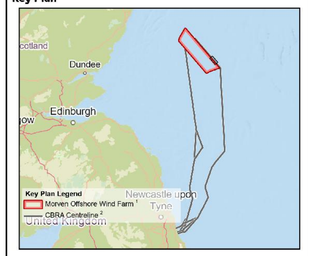




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]
- Water depth contour (5m Interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
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Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [1]
- Target Trench Depth [1]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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Central Meridian: -3.0000
Latitude of Origin: 0.0000
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Scale Factor: 0.9996
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Map Units: Meter

Notes:
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

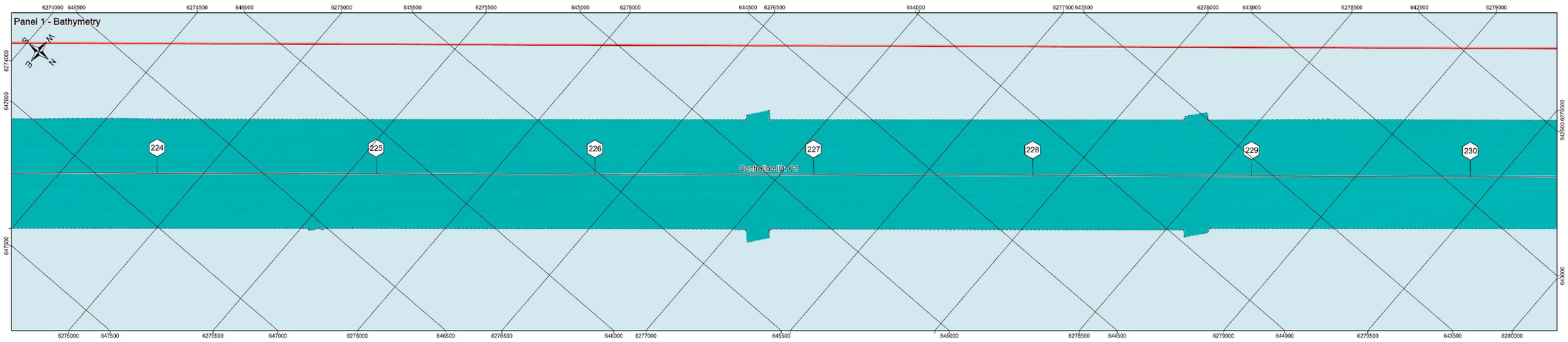
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 36 of 41

Drawing Status
Issue for Review

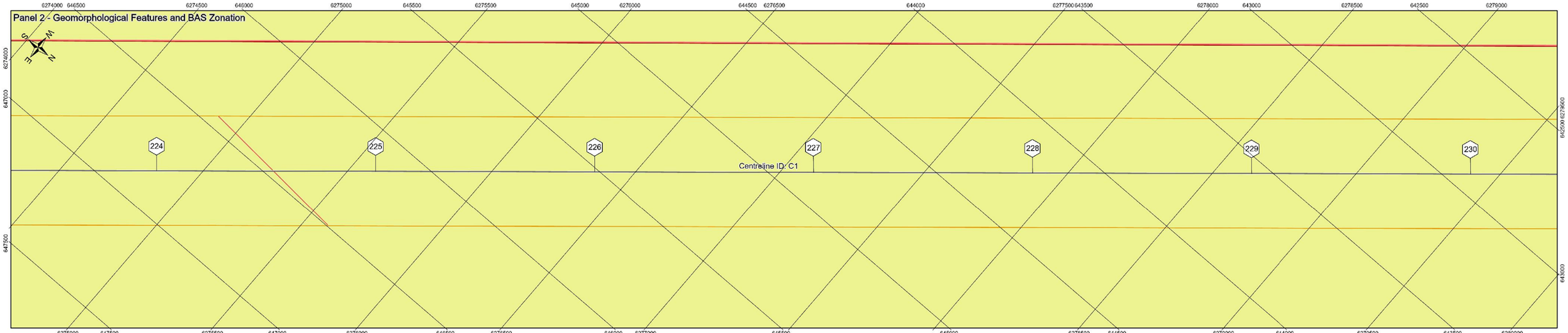
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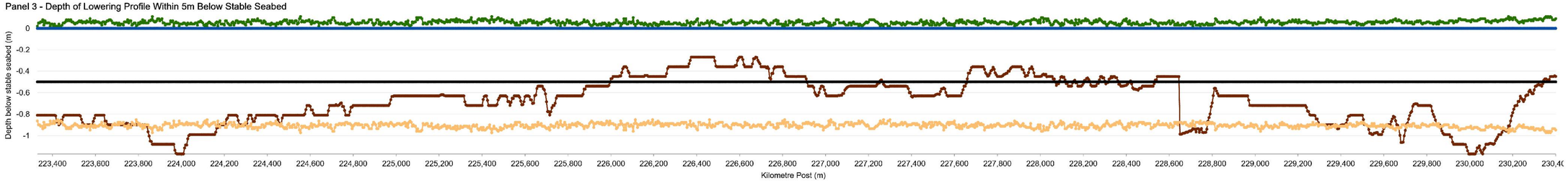
Panel 1 - Bathymetry



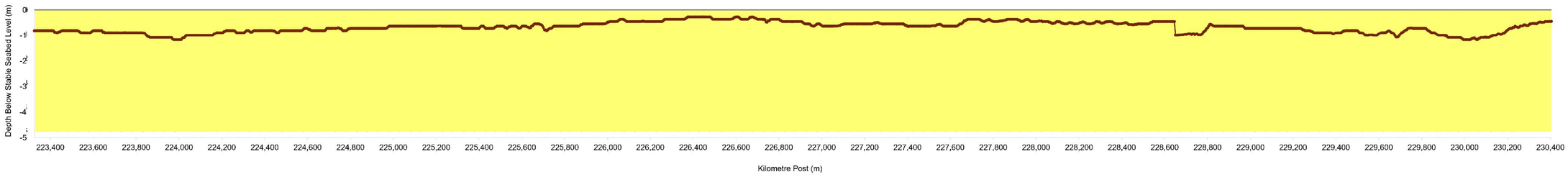
Panel 2 - Geomorphological Features and BAS Zonation



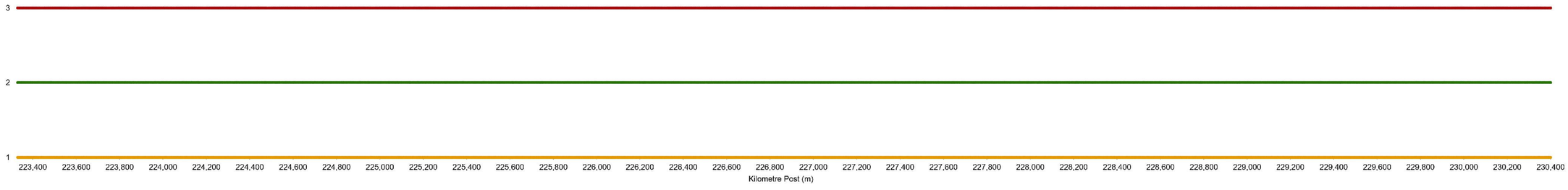
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



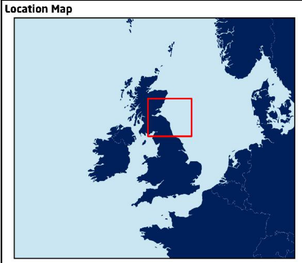
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



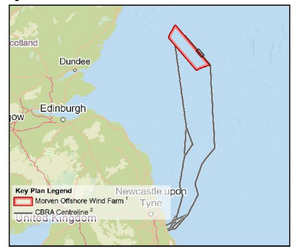
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Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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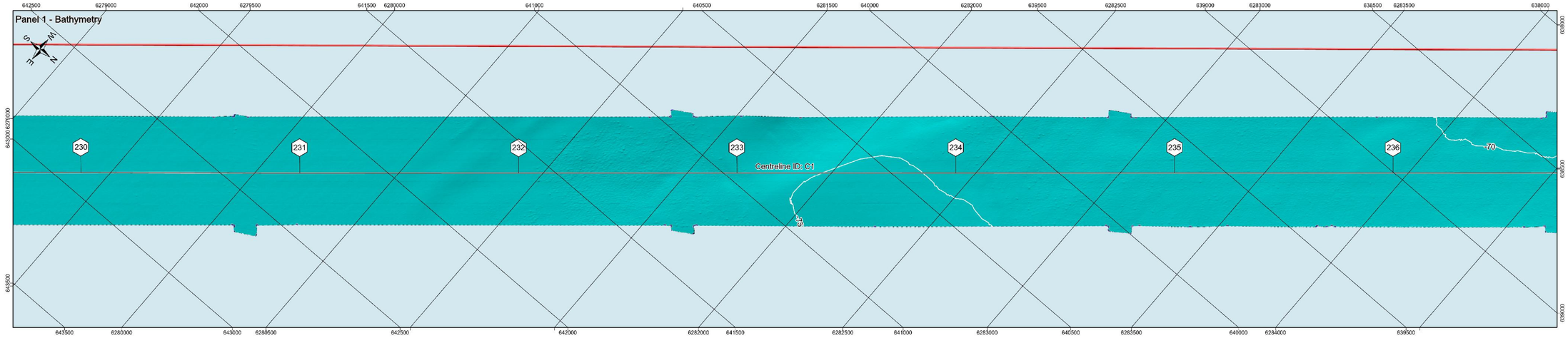
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CBRA Alignment Charts - Centreline ID: C1 - Sheet 37 of 41

Drawing Status
Issue for Review

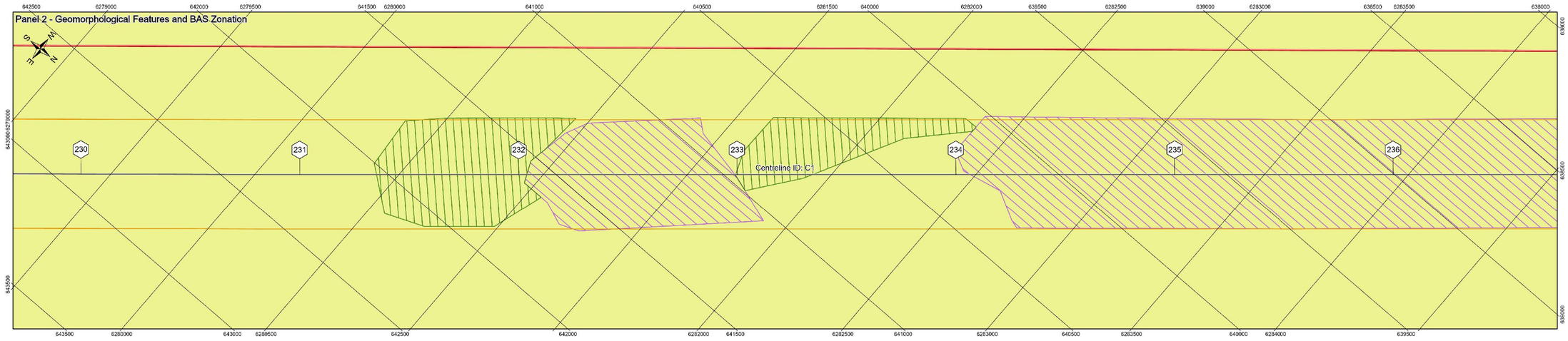
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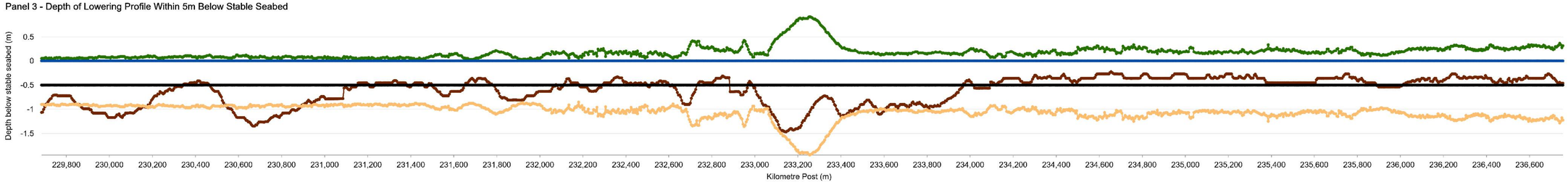
Panel 1 - Bathymetry



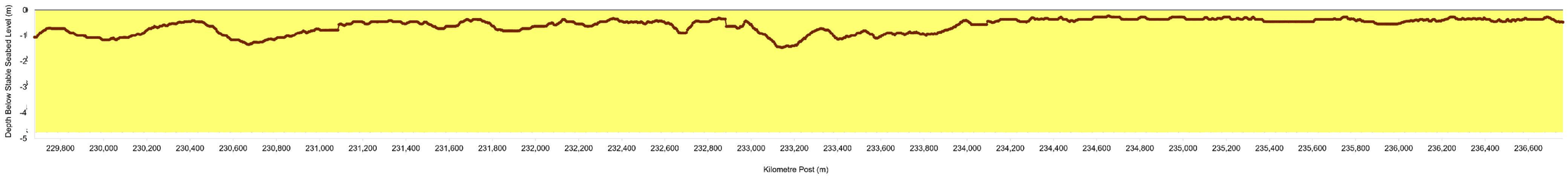
Panel 2 - Geomorphological Features and BAS Zonation



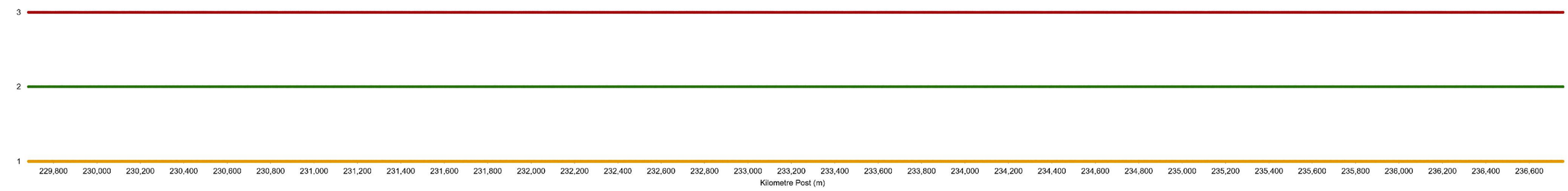
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



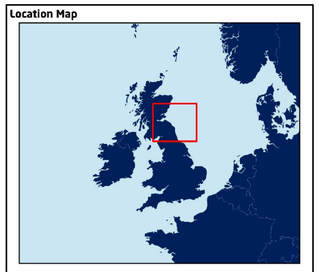
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



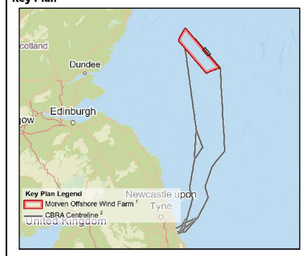
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Depression with boulder/debris
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Panel 4

Layer 1 Sediment Classification [9]
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- Extremely Low Strength CLAY (C1b)
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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- Very High Strength CLAY (C6)
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- Rock (R)

Layer 2 Sediment Classification [9]
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Panel 5

- Suitable [3]
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Revision Status

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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

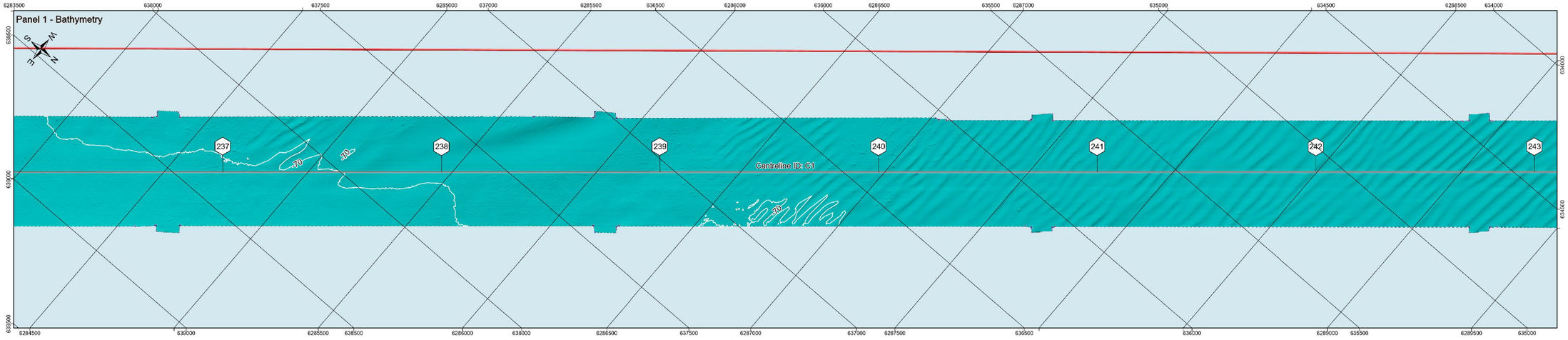
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 38 of 41

Drawing Status
Issue for Review

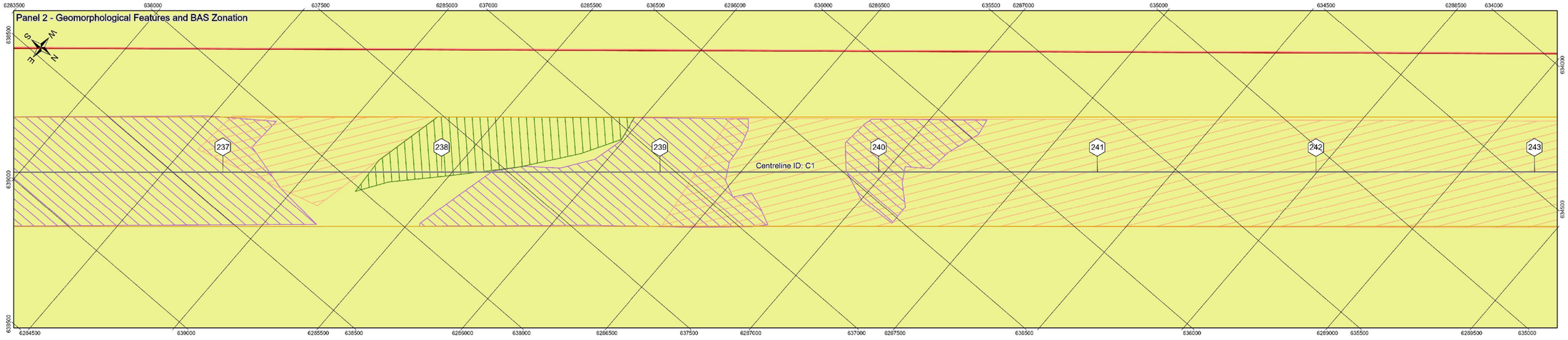
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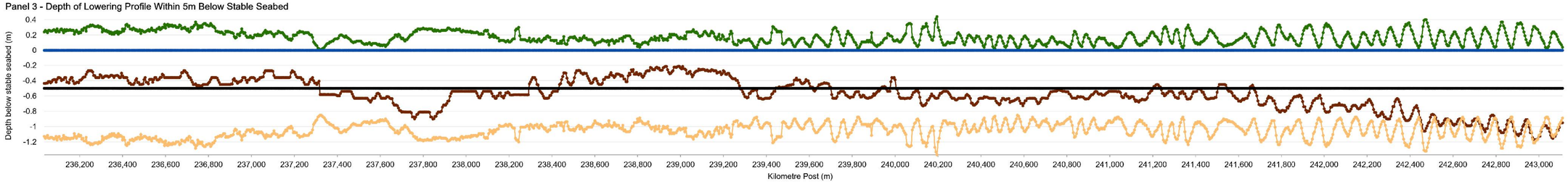
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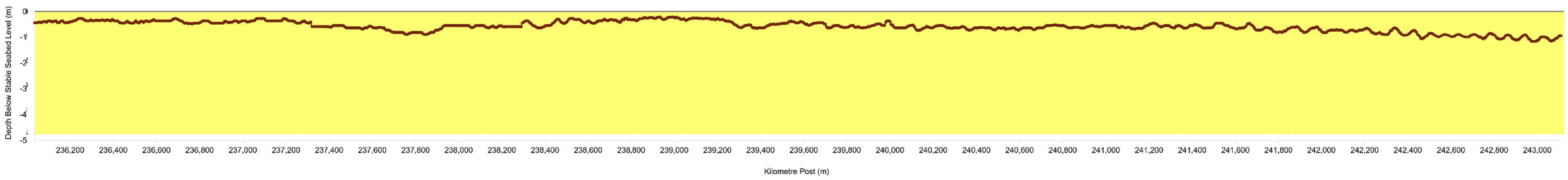
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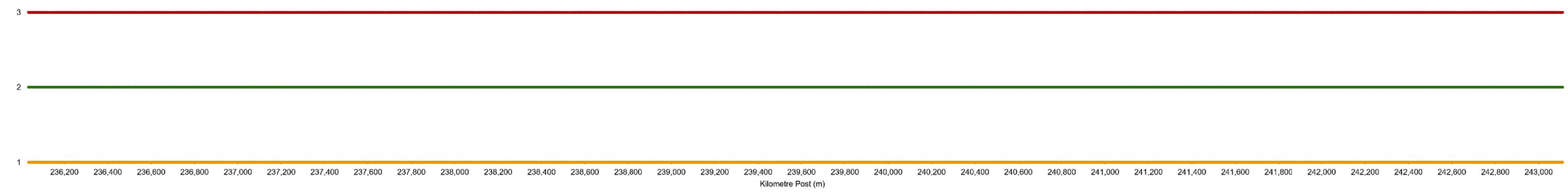
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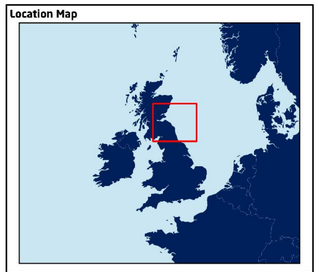
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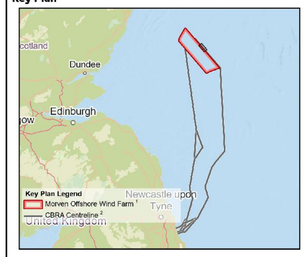
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- Rock (R)
- Layer 1/Layer 2 Boundary [8]

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Panel 5

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Notes:
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Morven Offshore Wind Farm

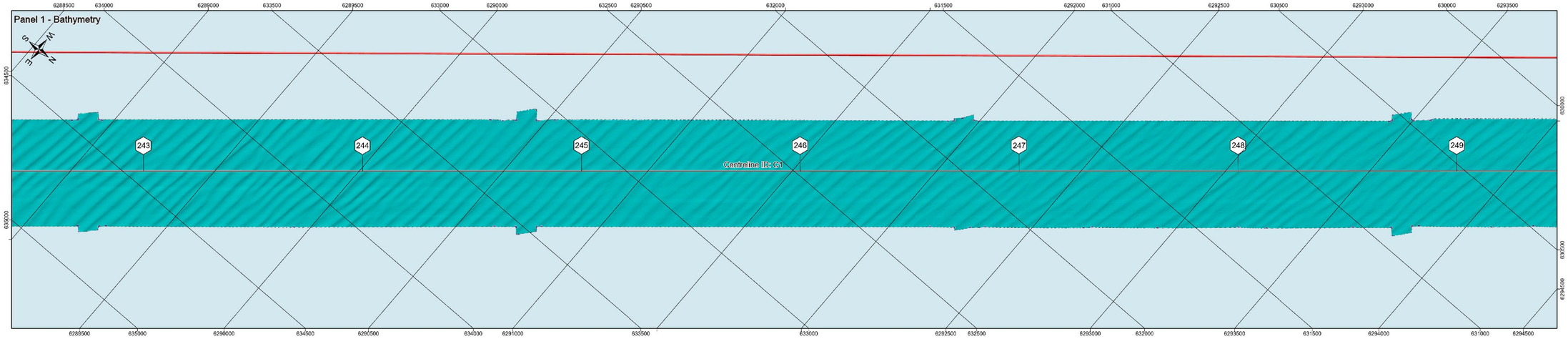
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

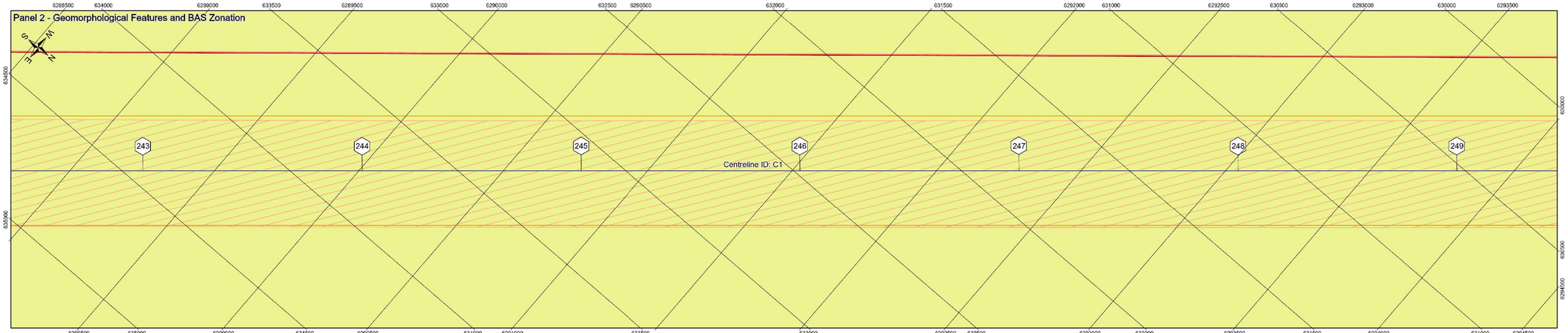
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 39 of 41

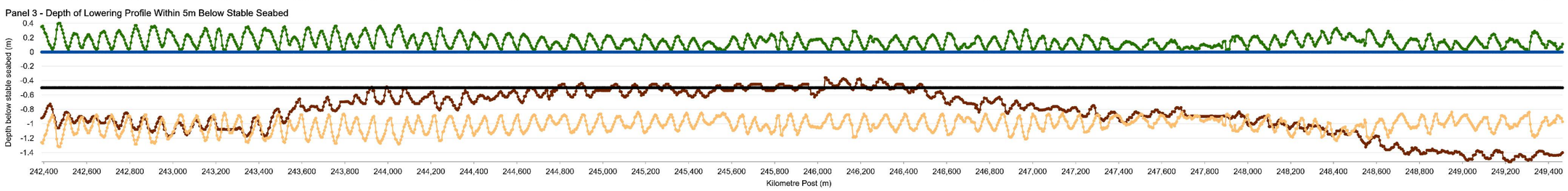
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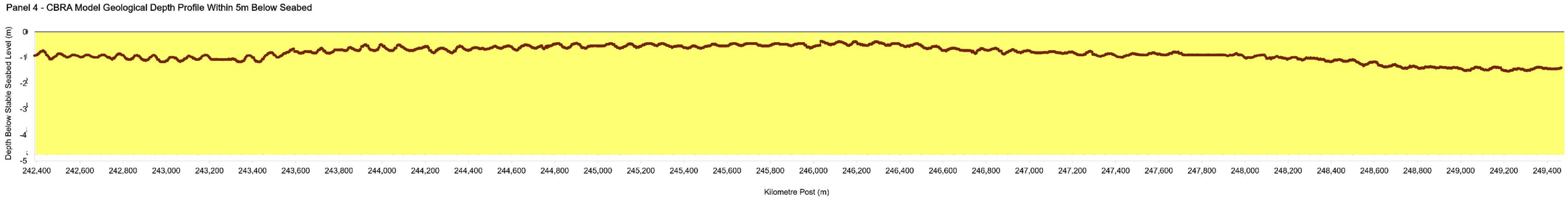
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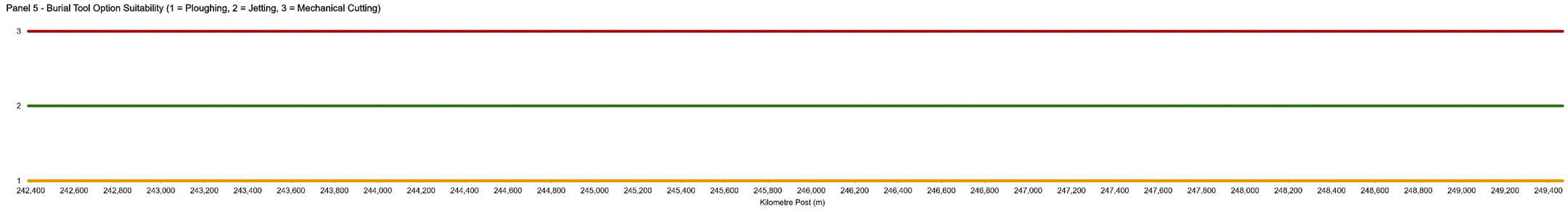
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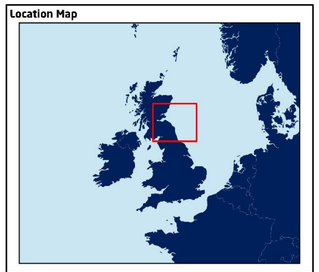




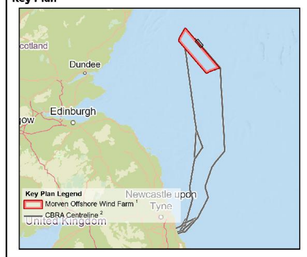




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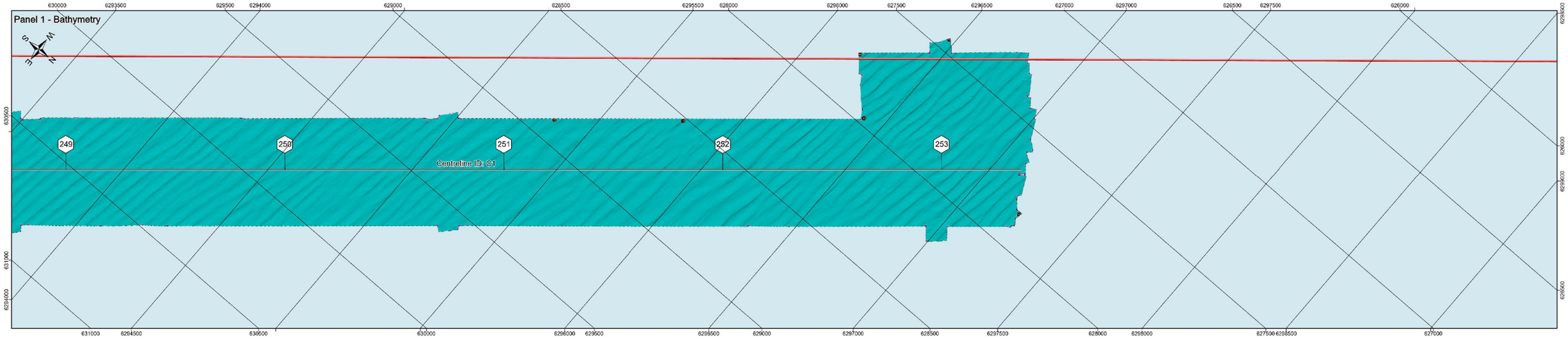
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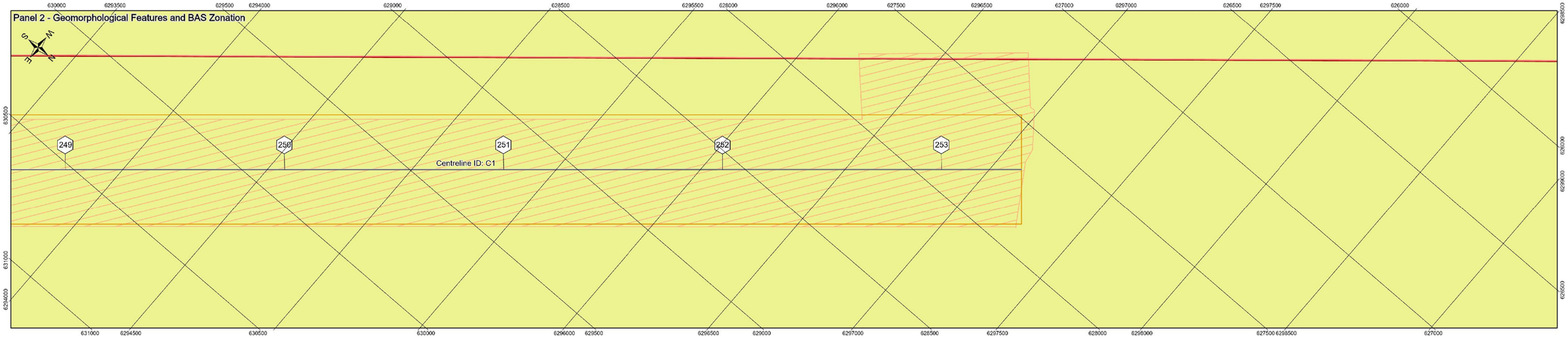
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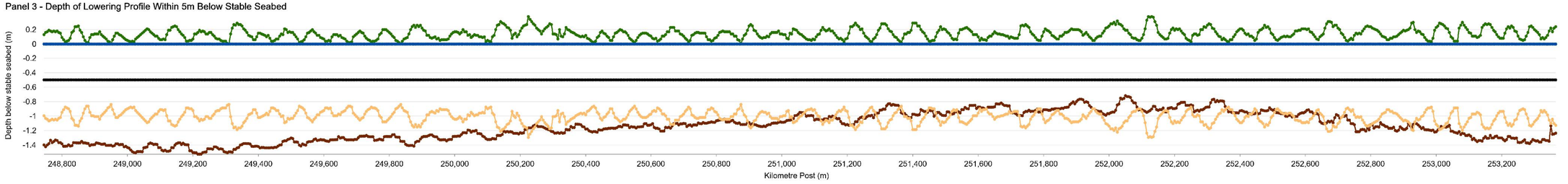
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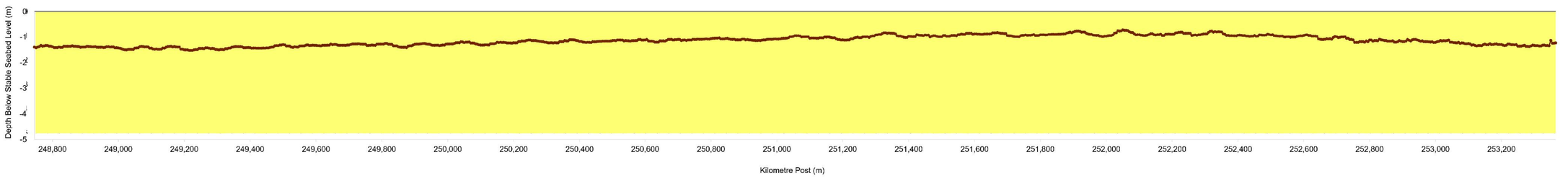




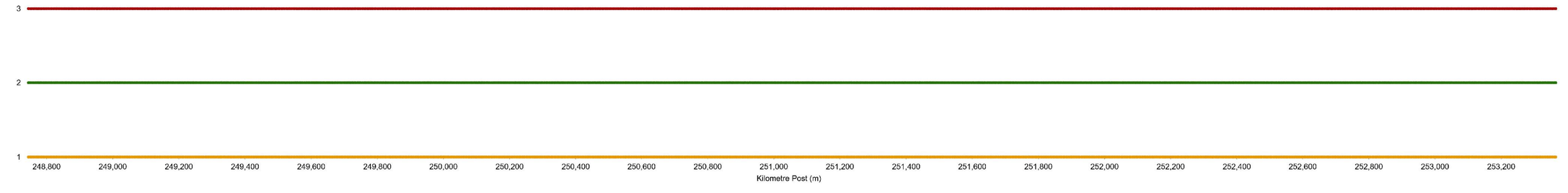
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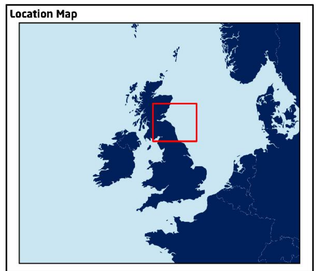
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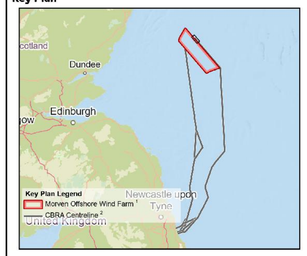
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
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- Very Low Strength CLAY (C2)
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Panel 5

- Suitable [3]
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Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Morven Offshore Wind Farm

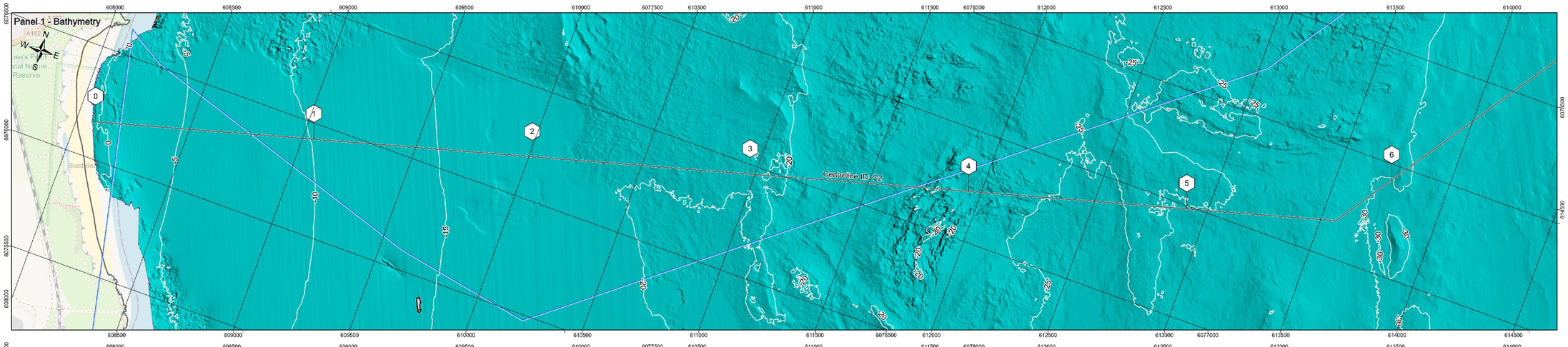
Report Title
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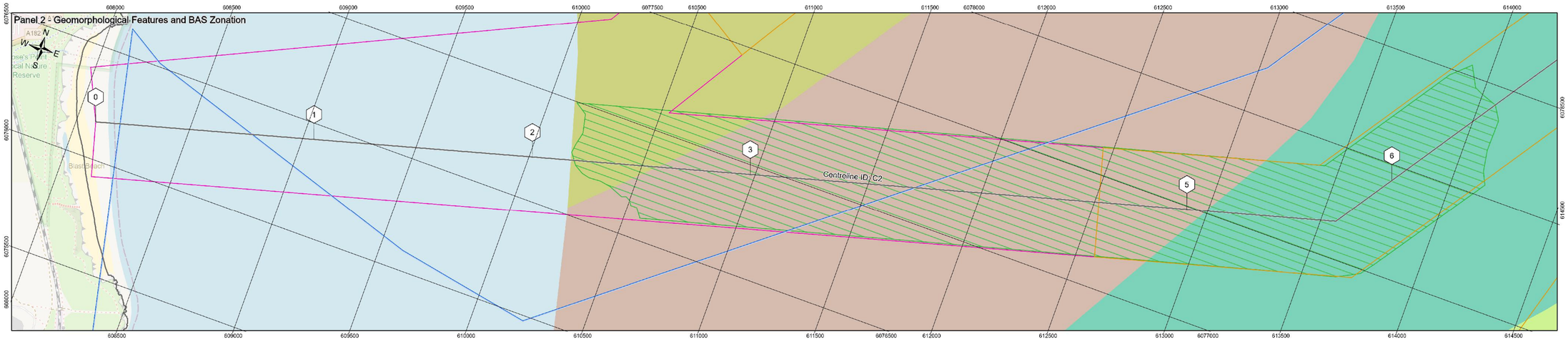
Drawing Title
CBRA Alignment Charts - Centreline ID: C1 - Sheet 41 of 41

Drawing Status
Issue for Review

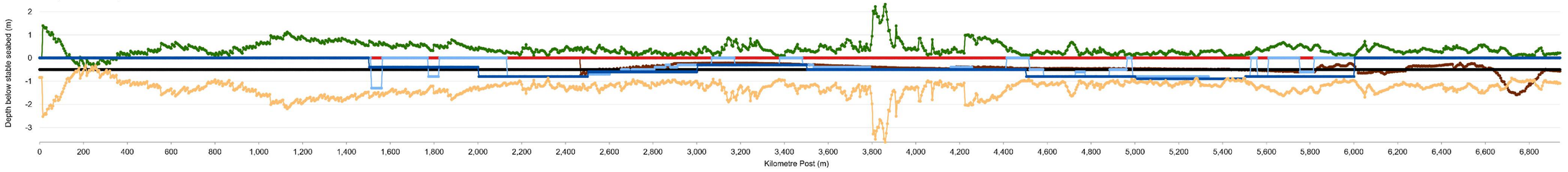
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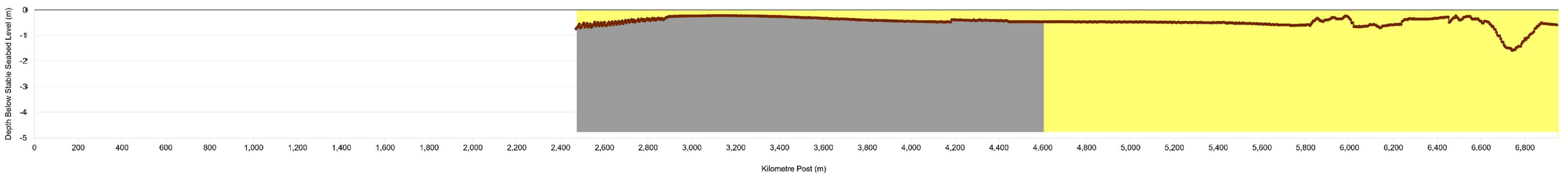




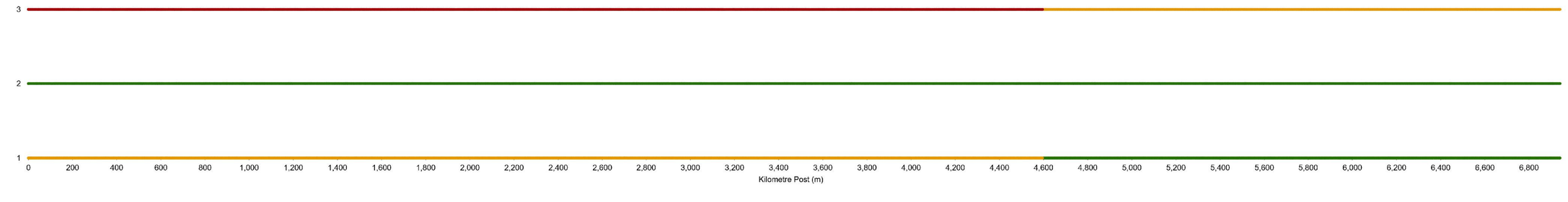
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



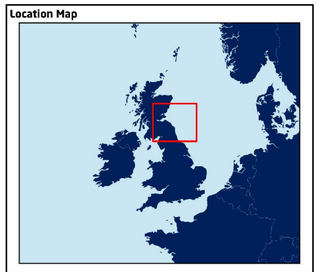
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



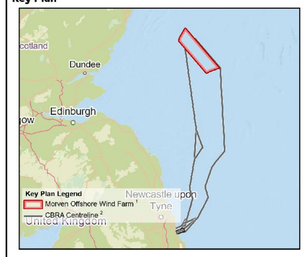
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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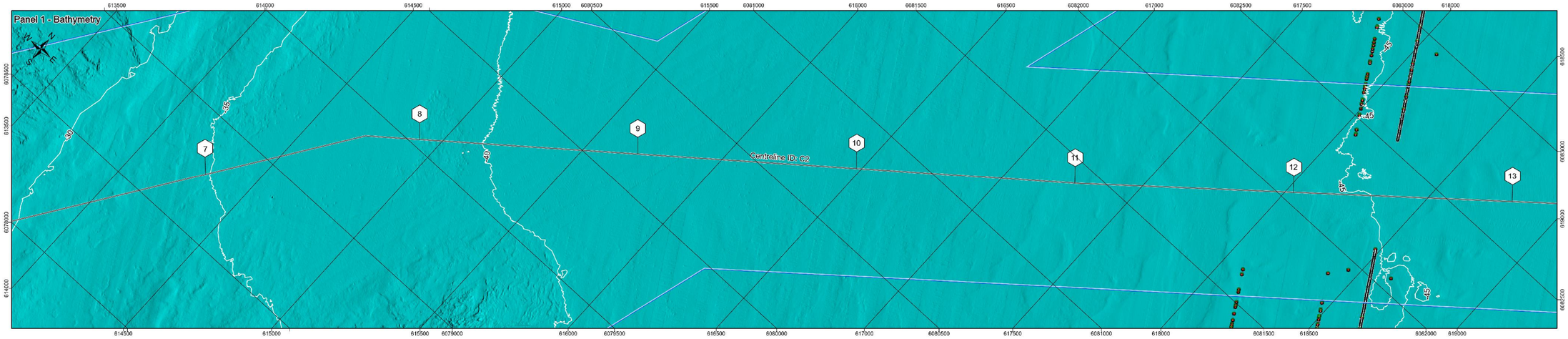
Report Title
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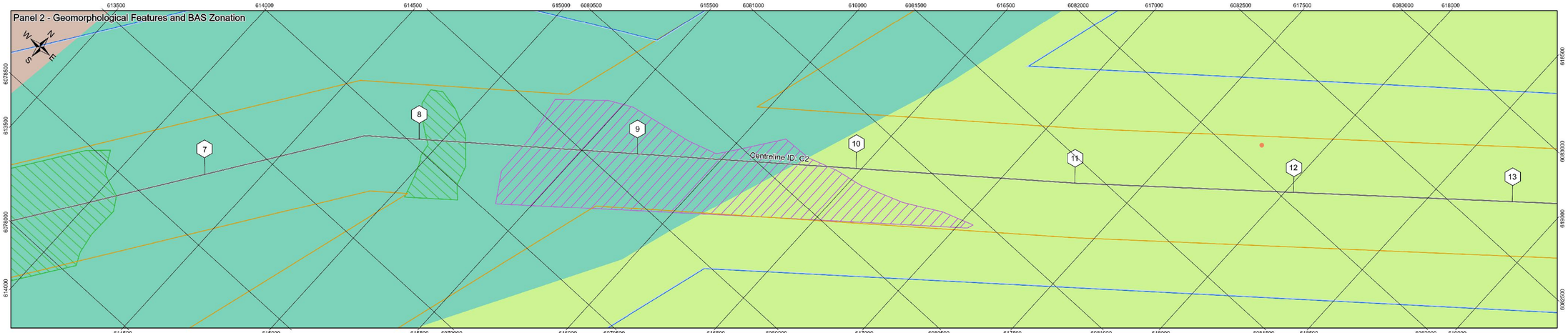
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 1 of 41

Drawing Status
Issue for Review

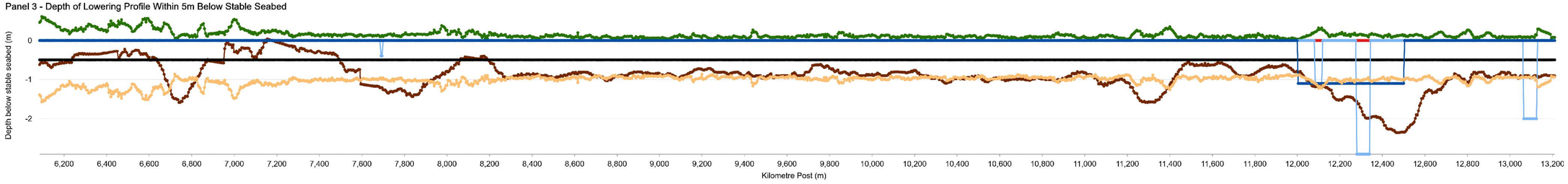
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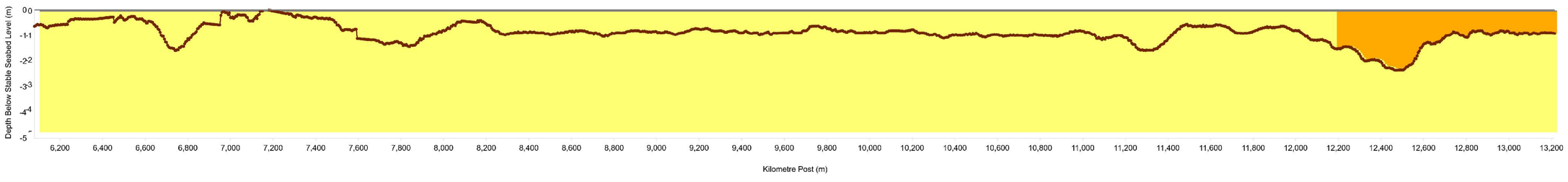




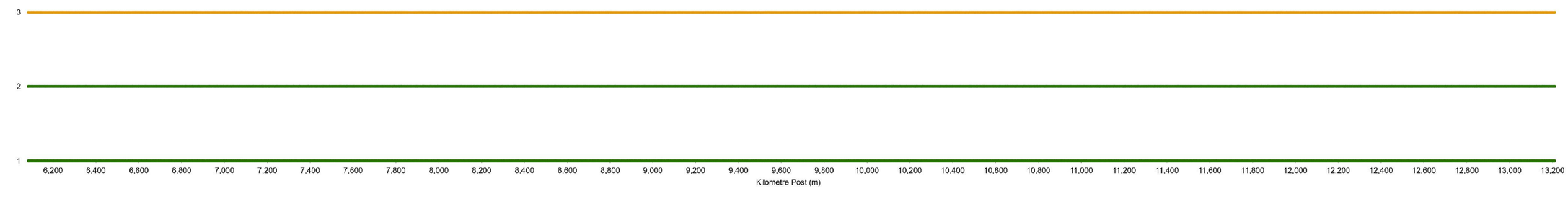
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



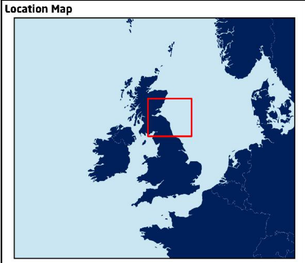
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



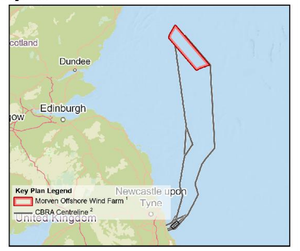
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- Layer 1/Layer 2 Boundary [8]

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- Suitable [3]
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

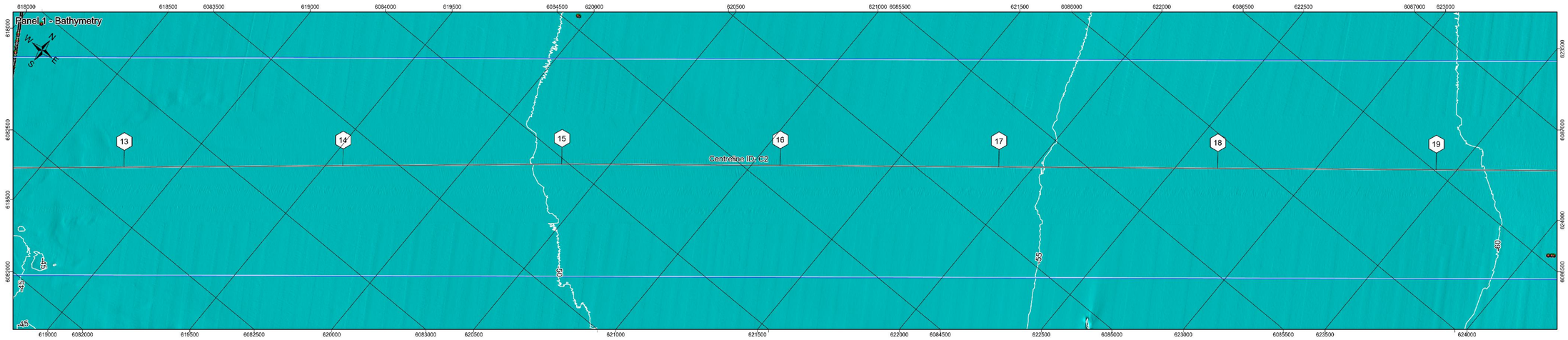
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 2 of 41

Drawing Status
Issue for Review

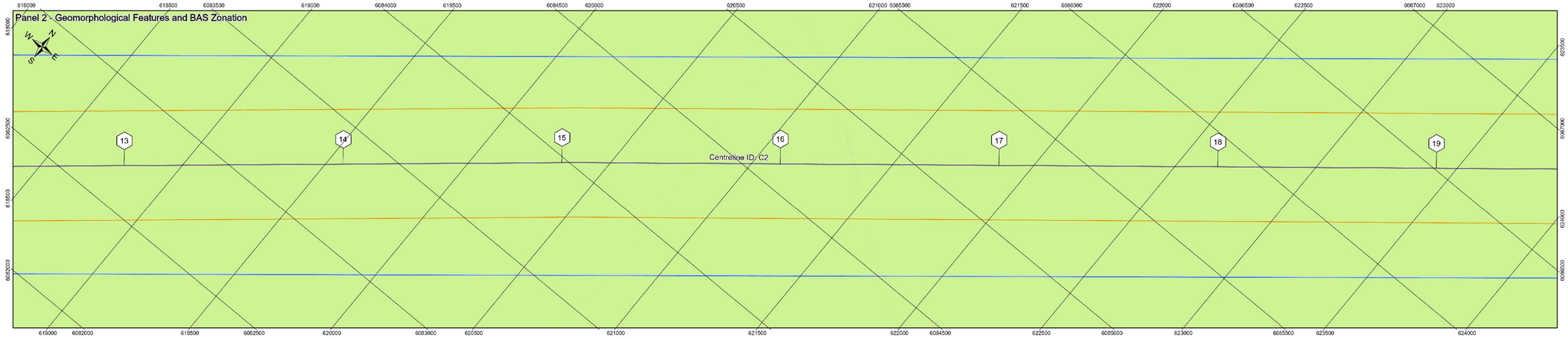
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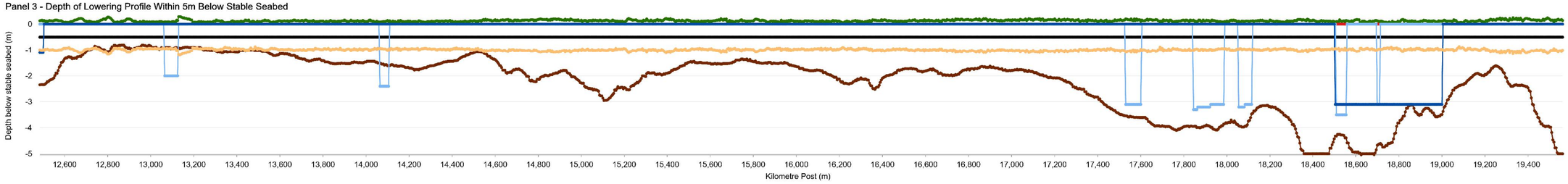
Panel 1 - Bathymetry



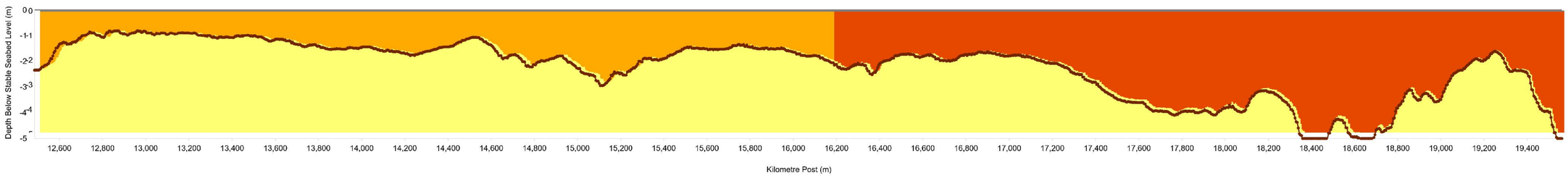
Panel 2 - Geomorphological Features and BAS Zonation



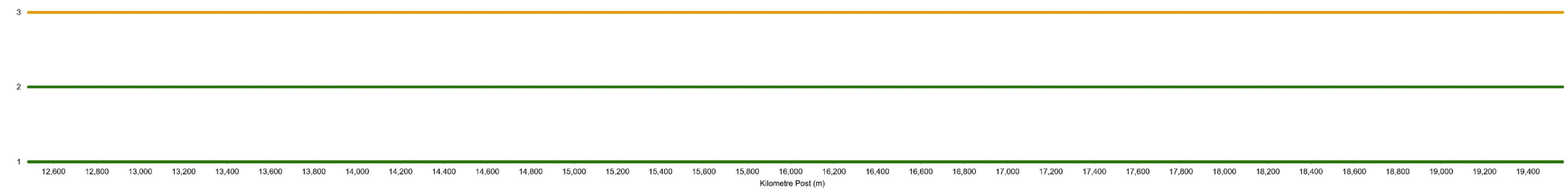
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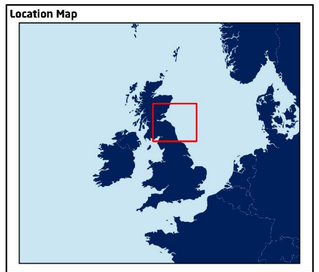
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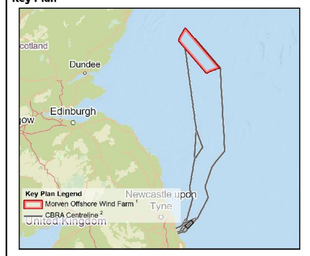
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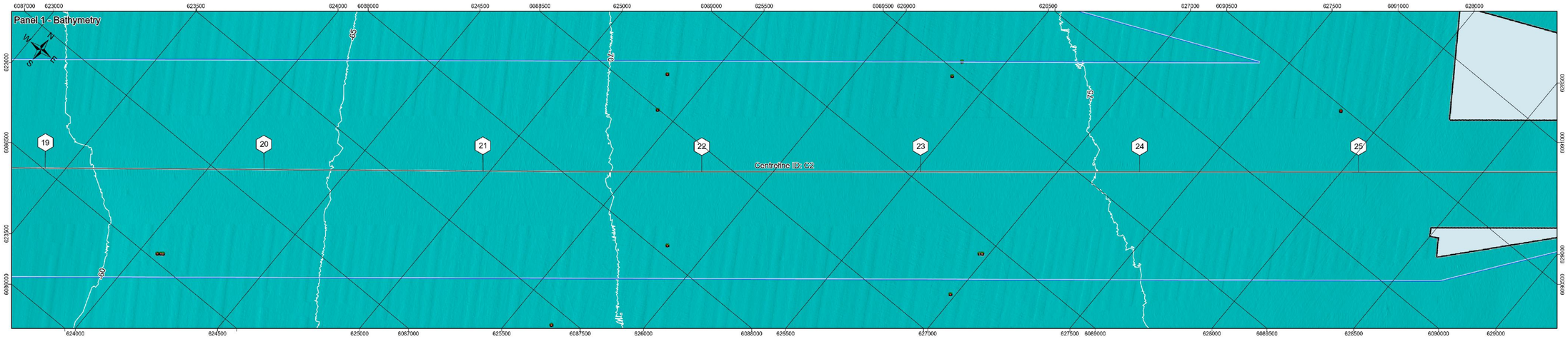
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

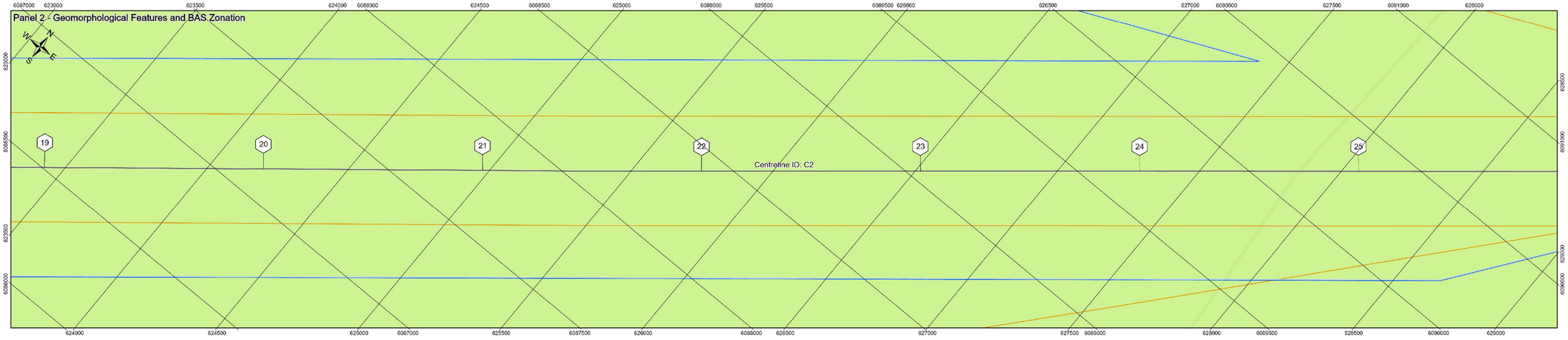
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 3 of 41

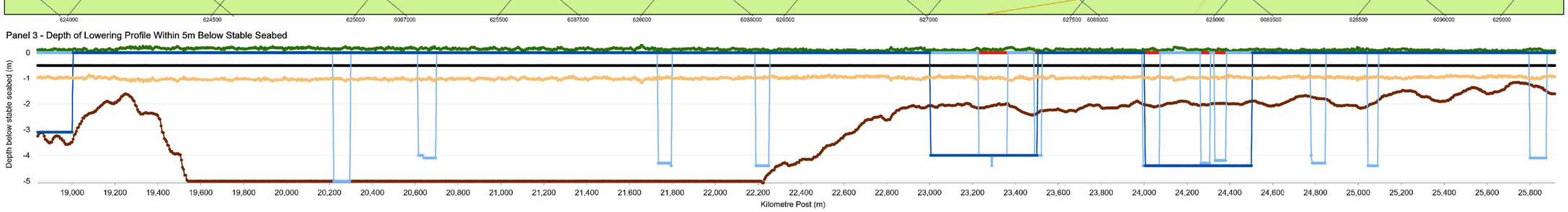
Drawing Status
Issue for Review

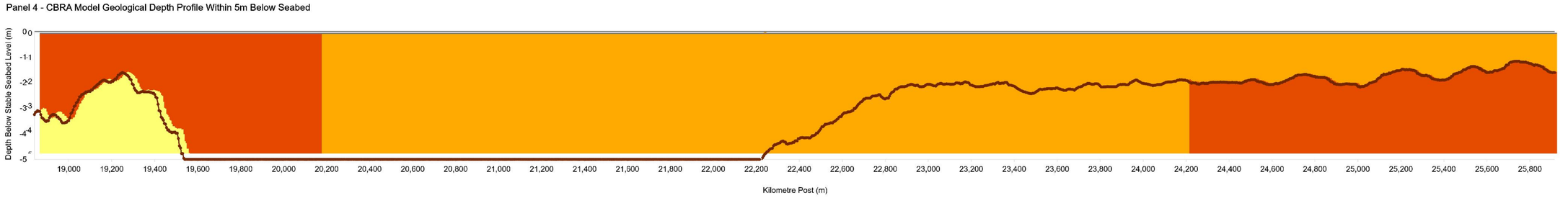
Drawing Number
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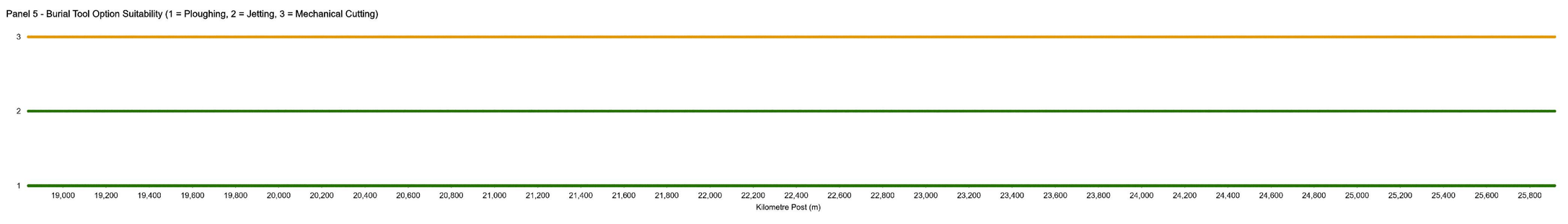
GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind



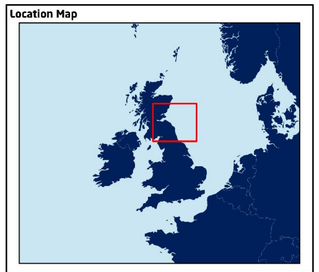




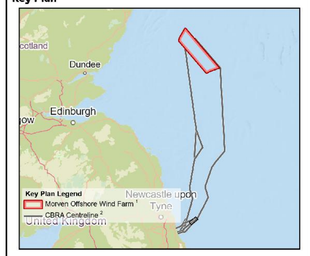




Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
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Morven Offshore Wind Farm

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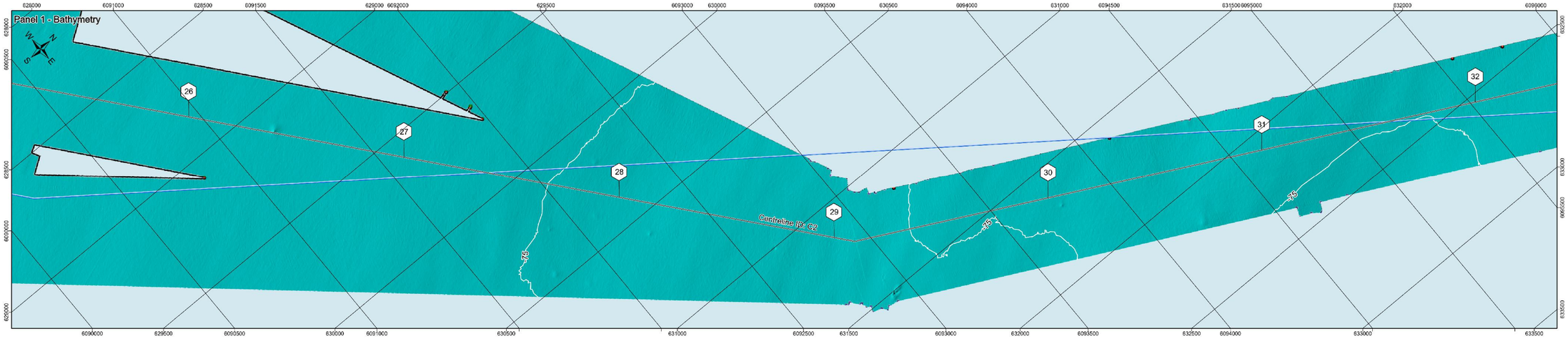
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 4 of 41

Drawing Status
Issue for Review

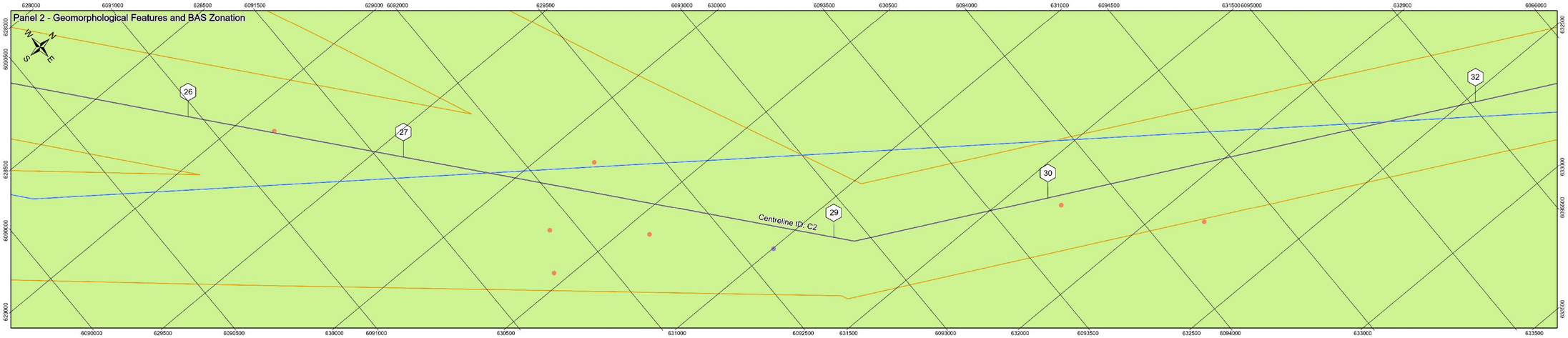
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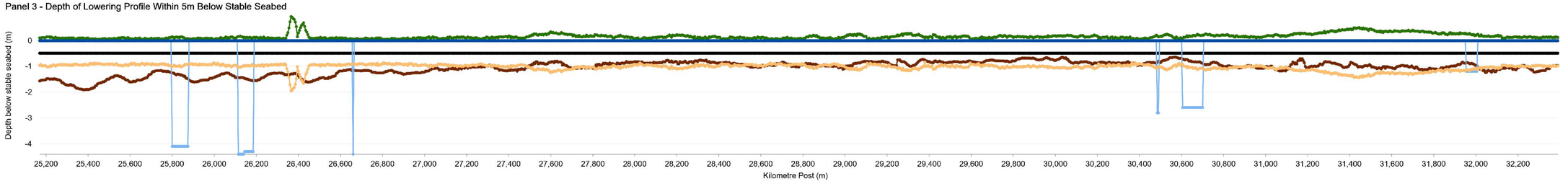
Panel 1 - Bathymetry



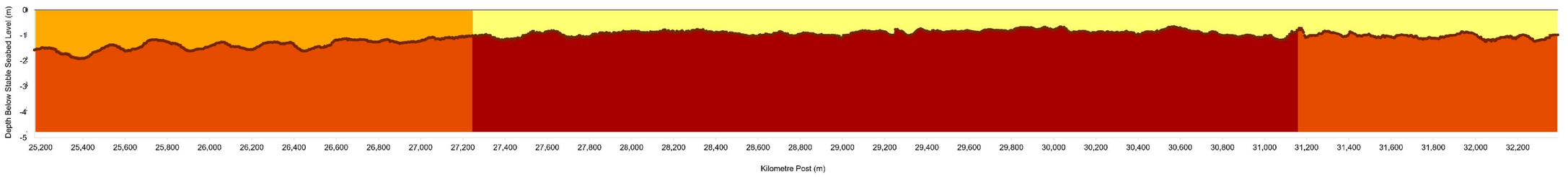
Panel 2 - Geomorphological Features and BAS Zonation



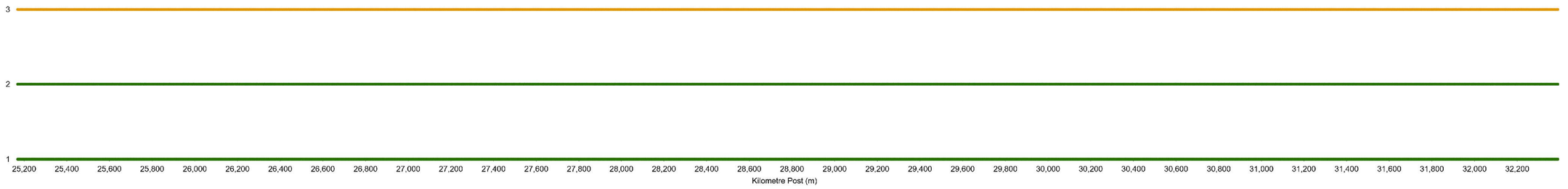
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



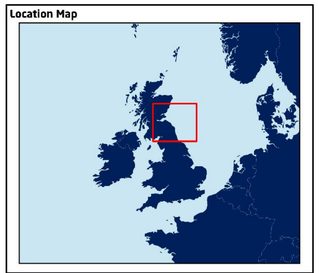
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



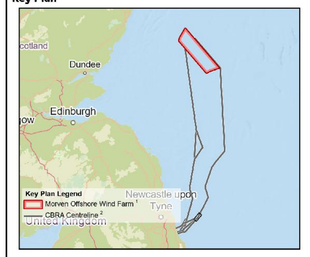
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [5]	

Panel 5

- Suitable [3]
- Possible [3]
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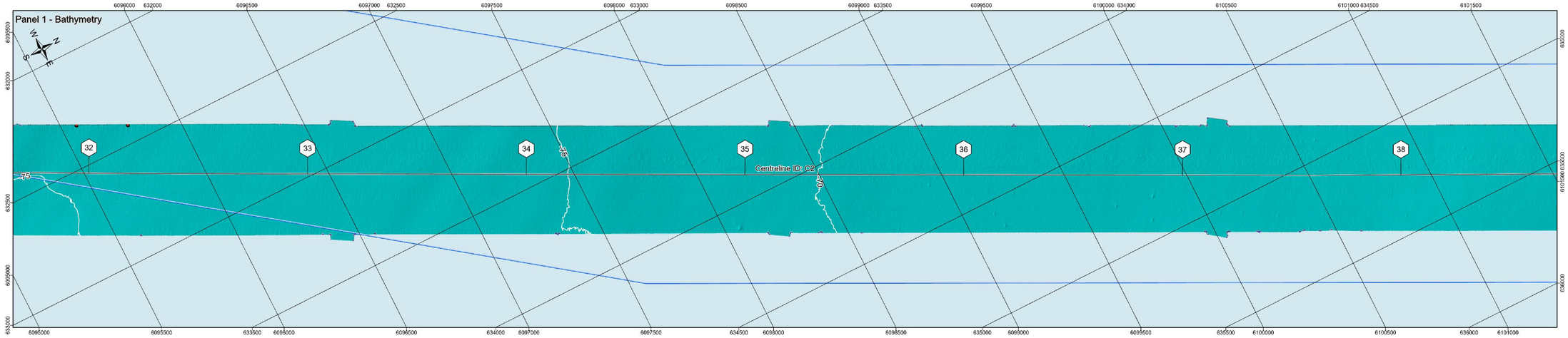
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 5 of 41

Drawing Status
Issue for Review

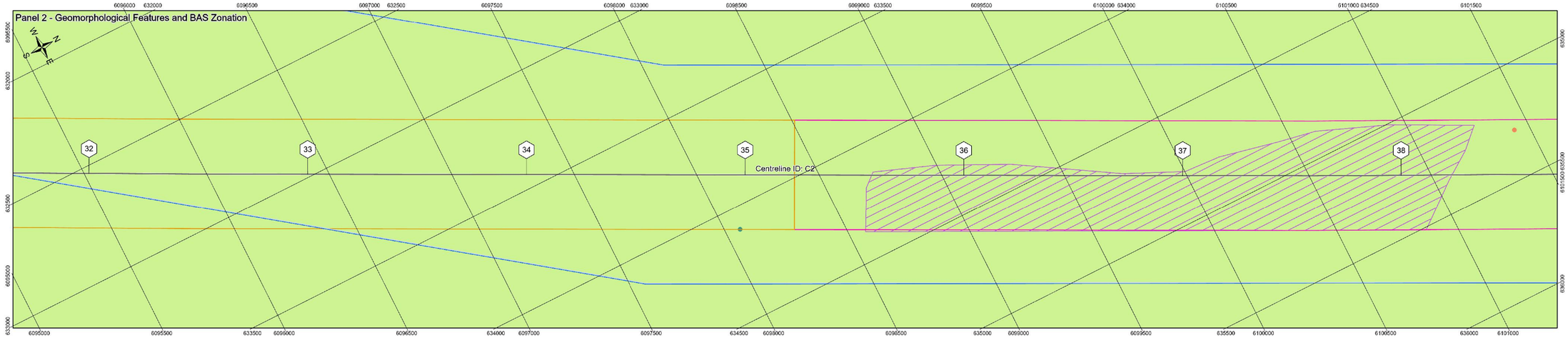
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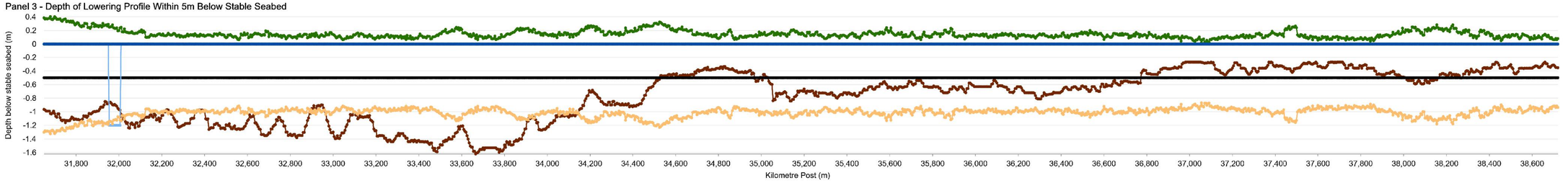
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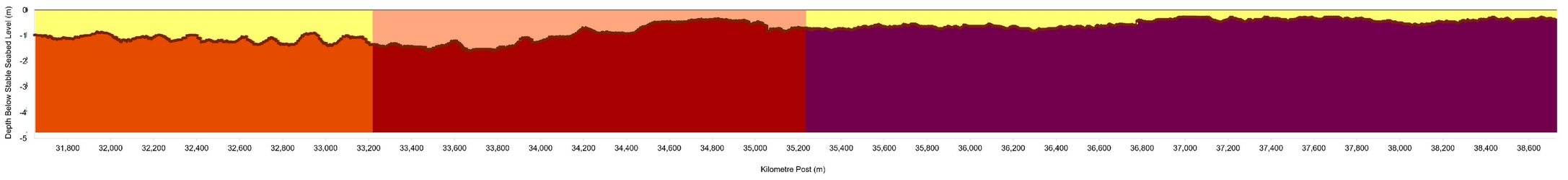
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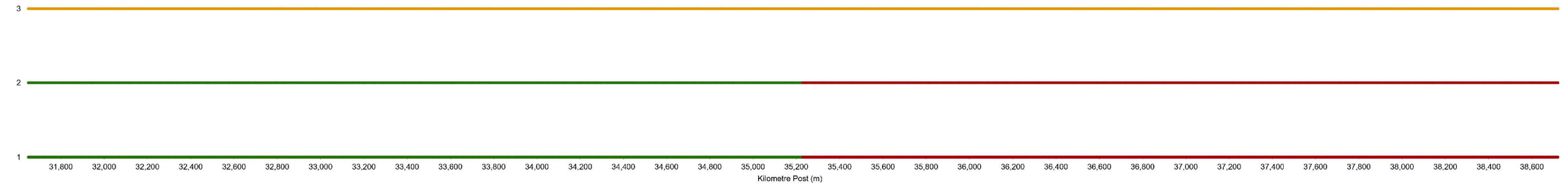
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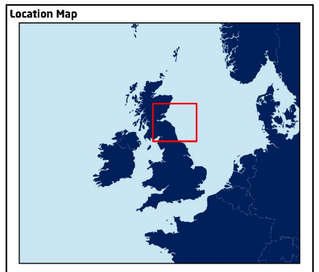
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



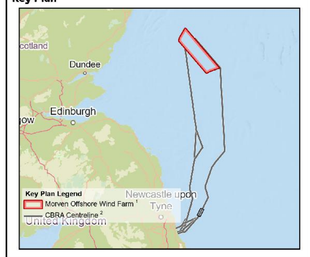
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Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
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Layer 1/Layer 2 Boundary [8]	

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- Suitable [3]
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Revision Status

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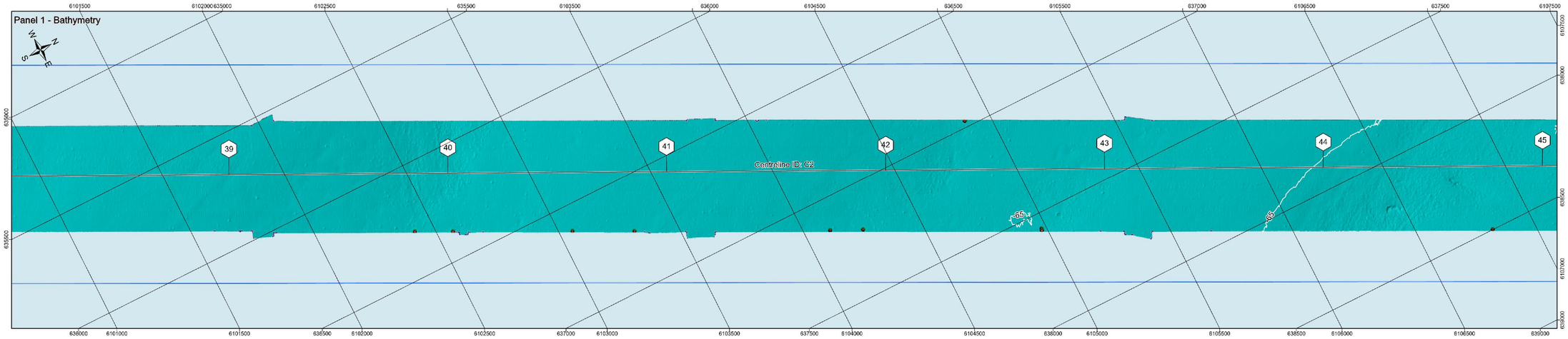
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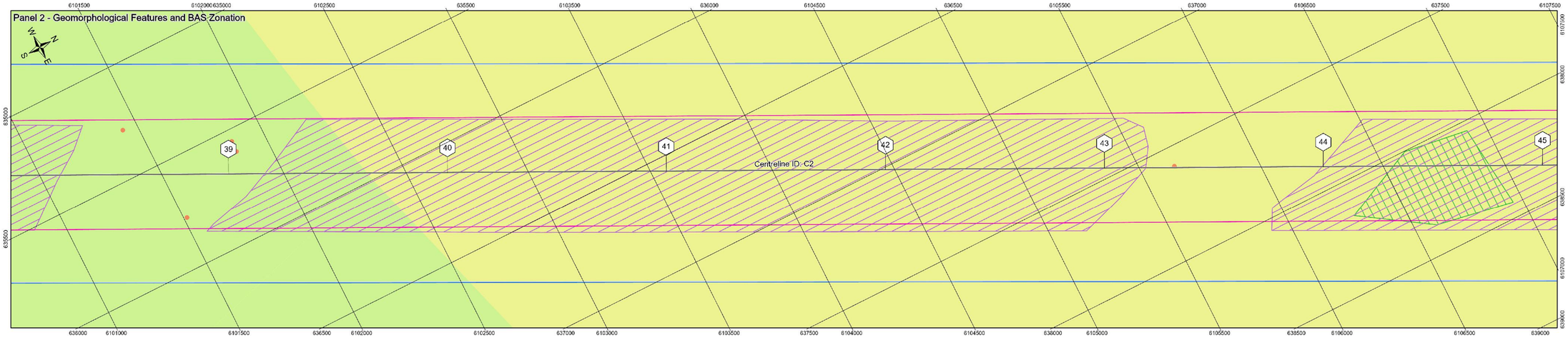
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 6 of 41

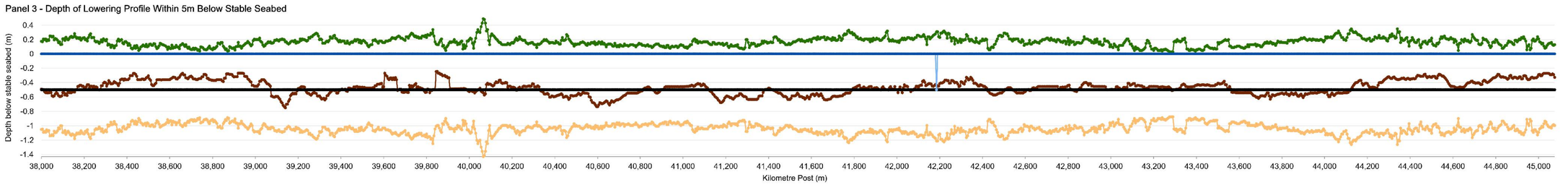
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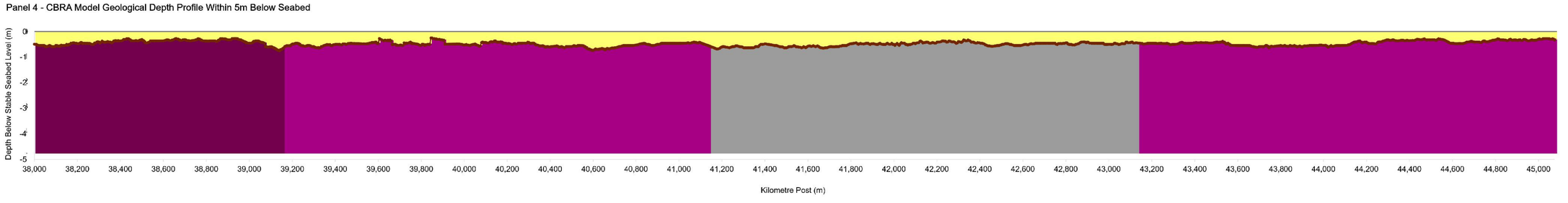
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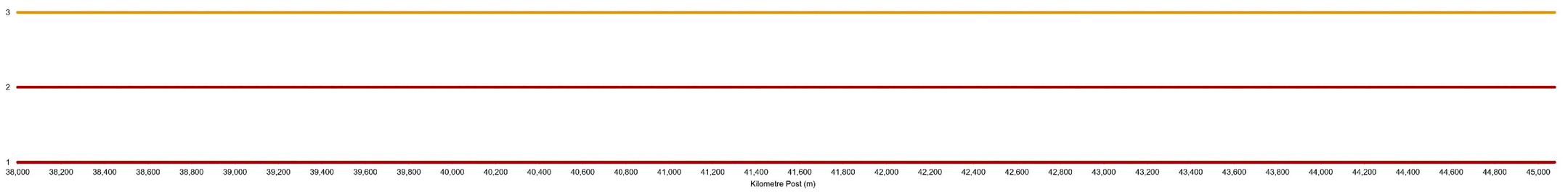
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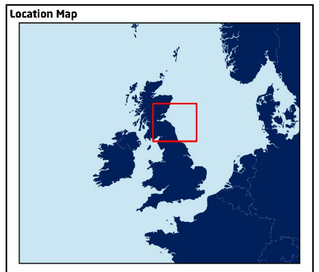




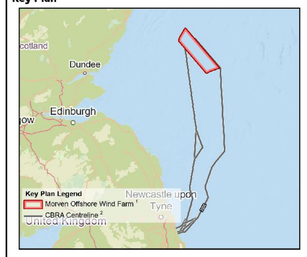




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Legend

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- CBRA Centreline [2]
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- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
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- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [8]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
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- 10. Unpublic data
- SEGL2 Installation Corridor [6]
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- Possible Mobile Bedform Height [5]
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- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

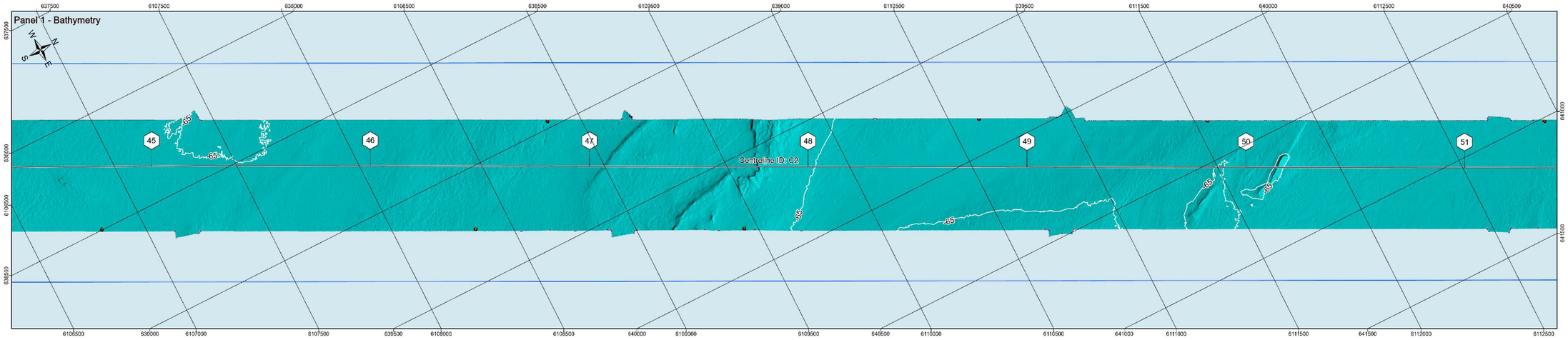
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 7 of 41

Drawing Status
Issue for Review

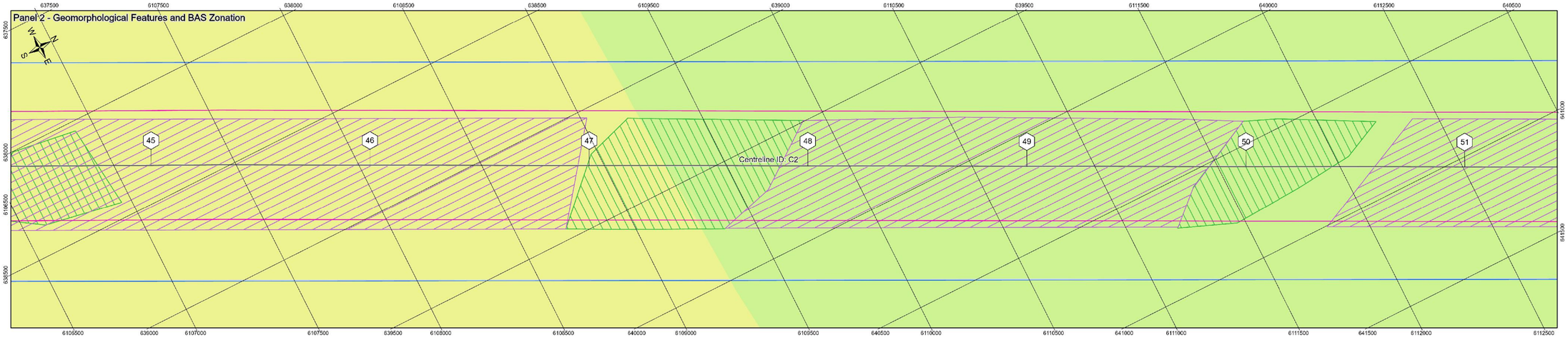
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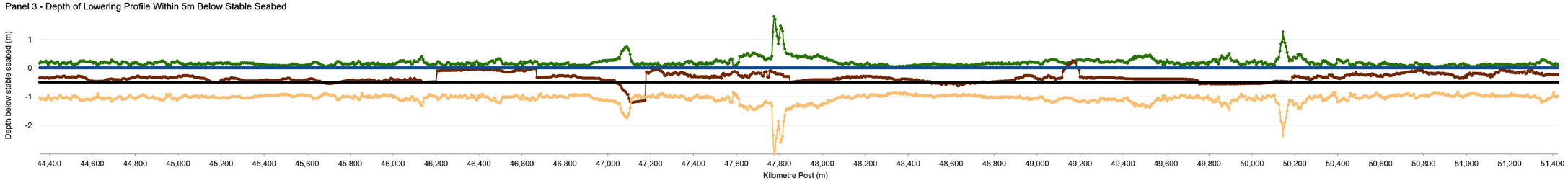
Panel 1 - Bathymetry



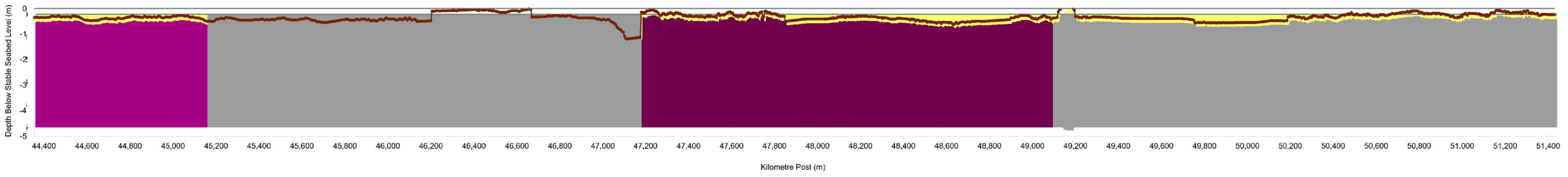
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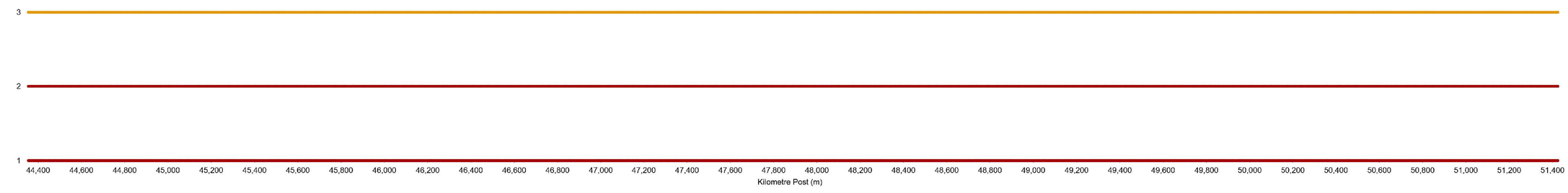
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



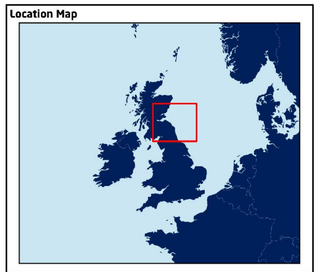
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



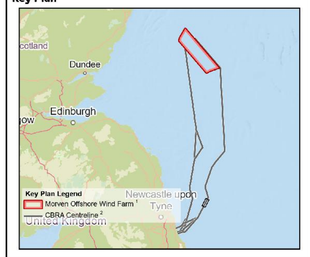
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
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Morven Offshore Wind Farm

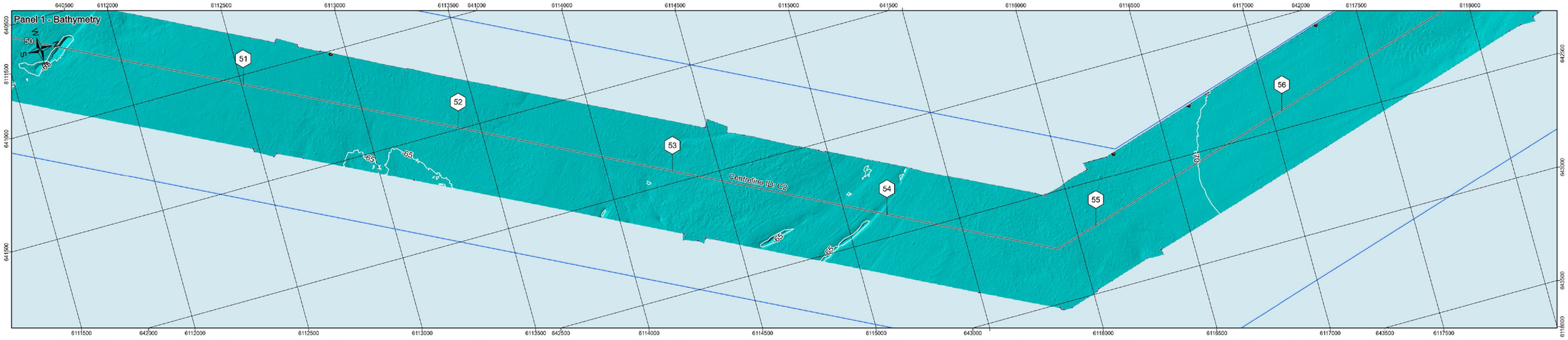
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

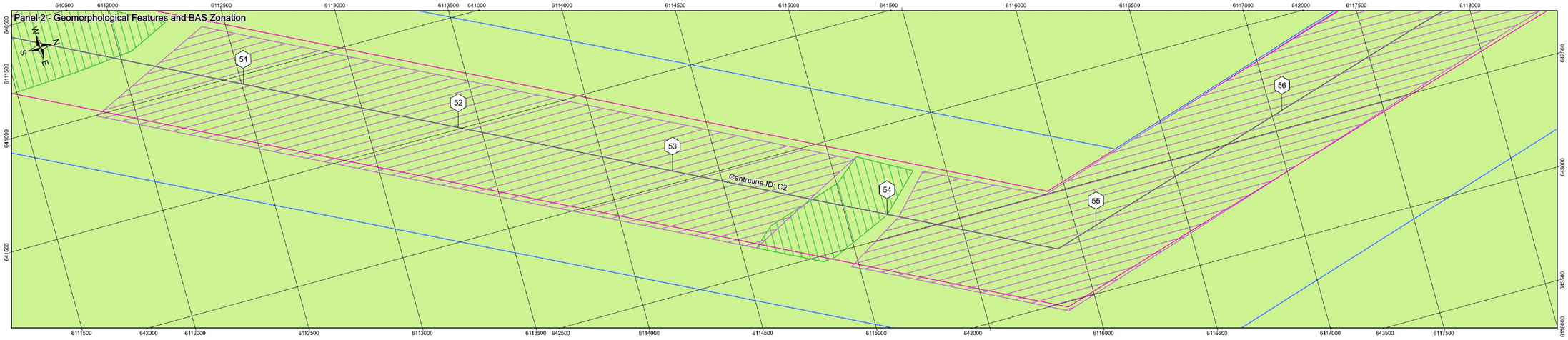
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 8 of 41

Drawing Status
Issue for Review

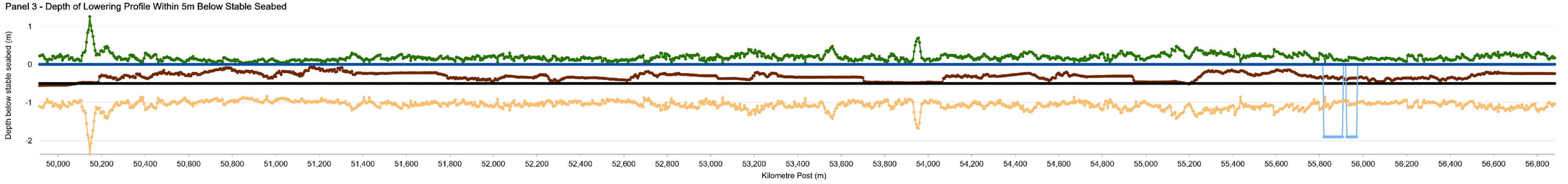
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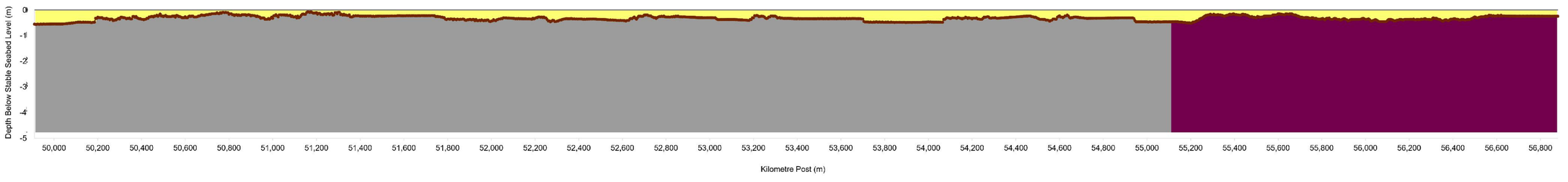




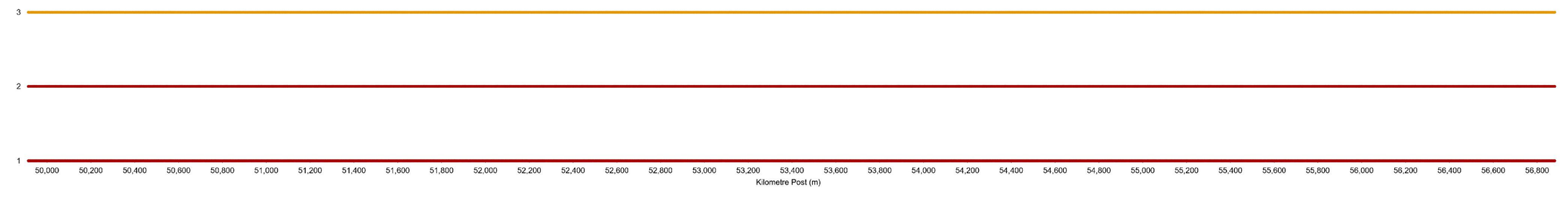
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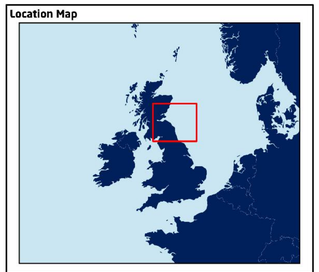
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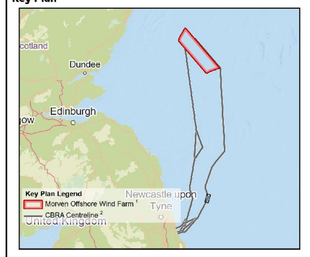
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Legend

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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
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Panel 5

- Suitable [3]
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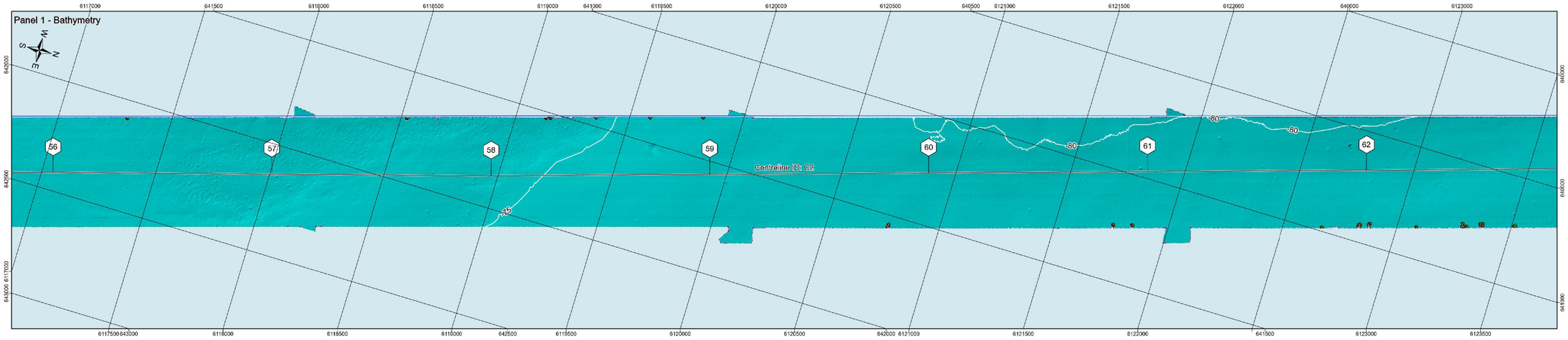
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 9 of 41

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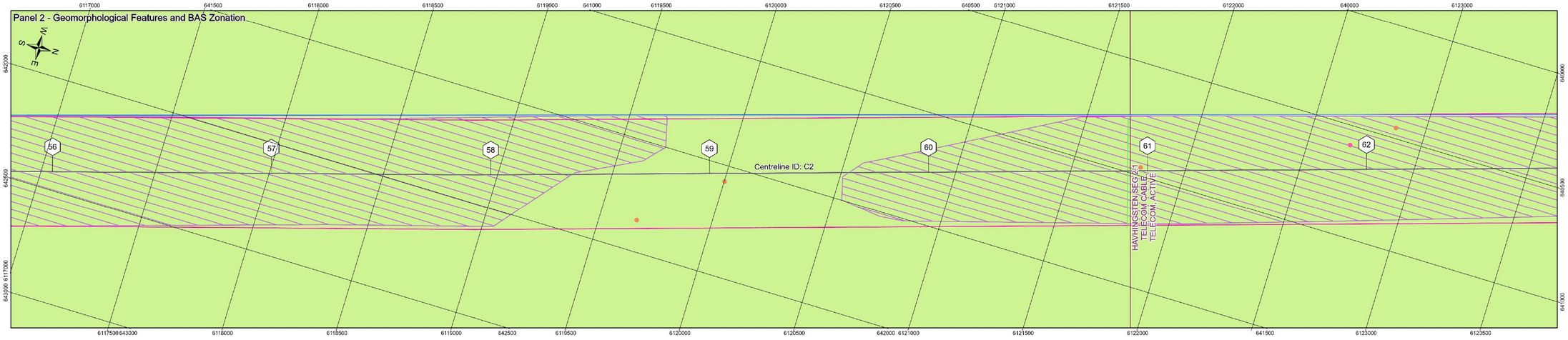
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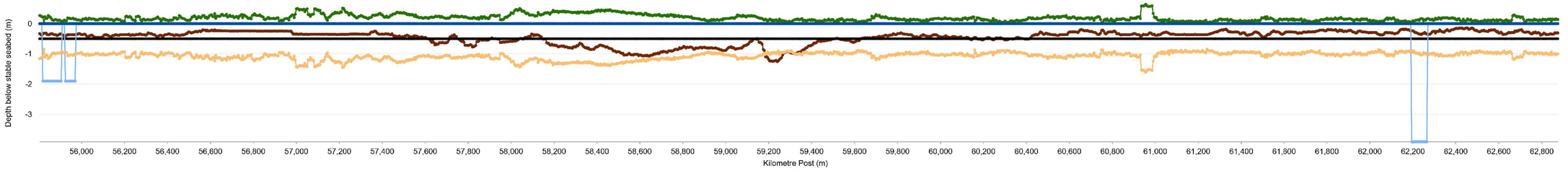
Panel 1 - Bathymetry



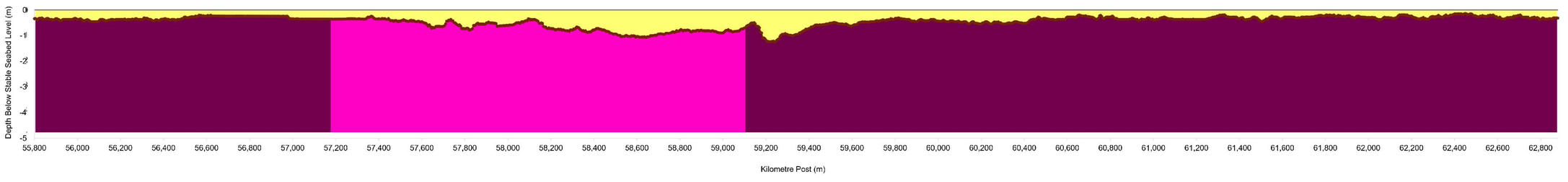
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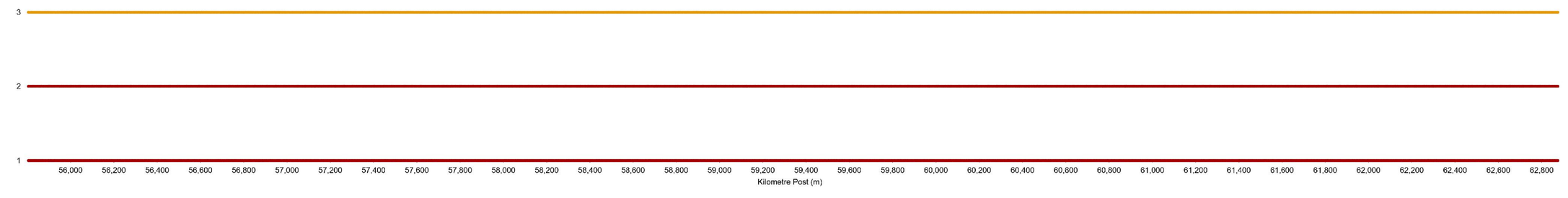
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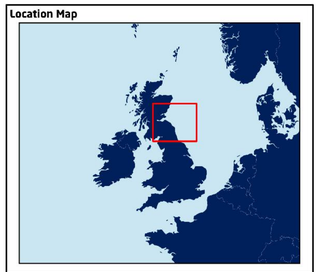
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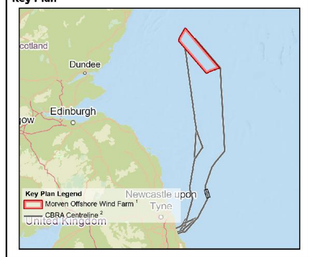
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High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
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Rock (R)	
Layer 1/Layer 2 Boundary [8]	

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Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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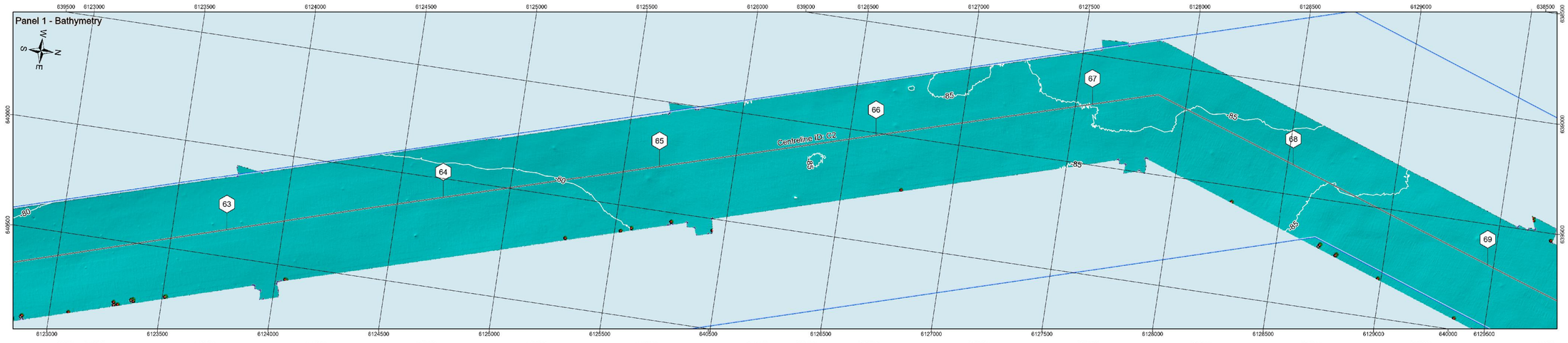
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 10 of 41

Drawing Status
Issue for Review

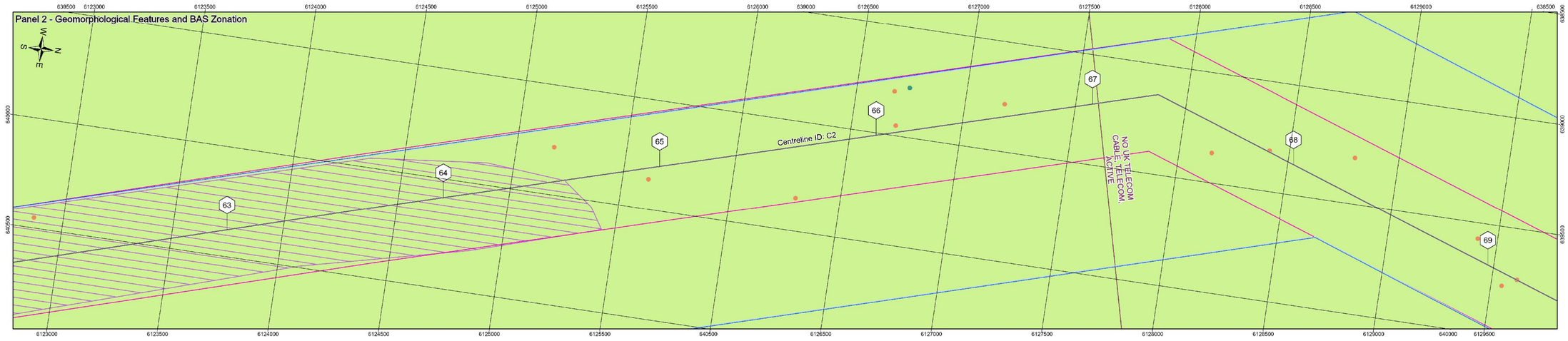
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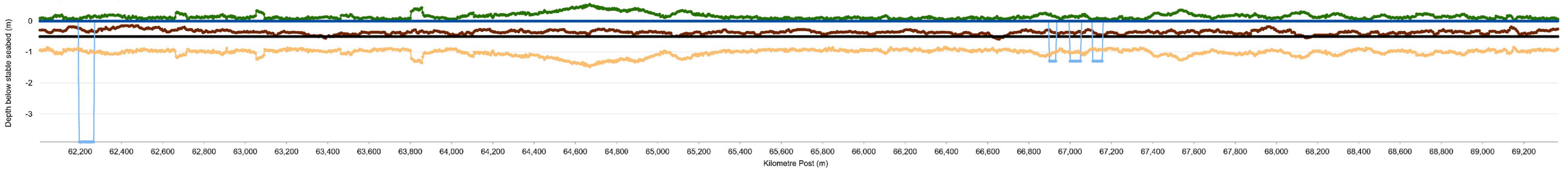
Panel 1 - Bathymetry



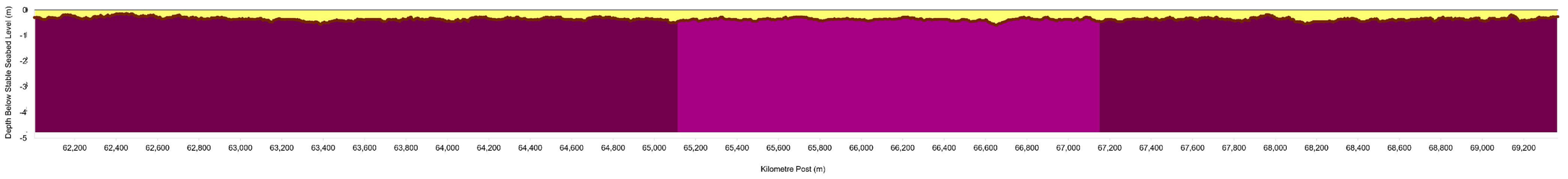
Panel 2 - Geomorphological Features and BAS Zonation



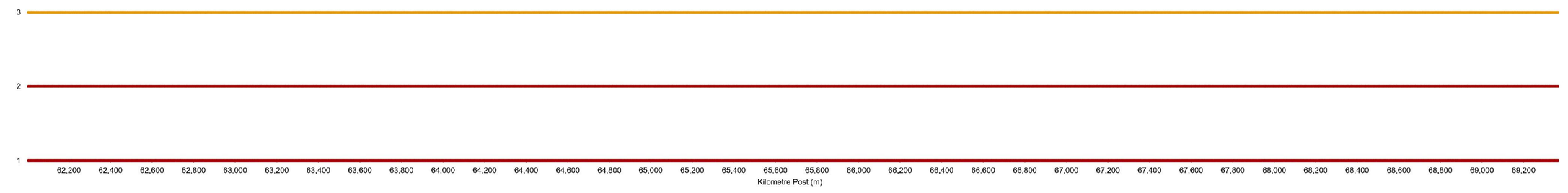
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



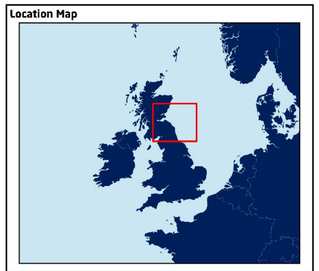
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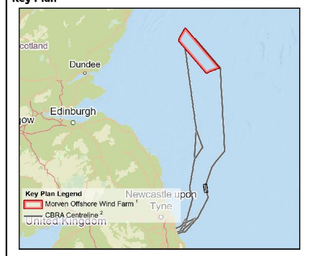
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

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- 1.3 muddy Sand
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- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

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Spatial Reference
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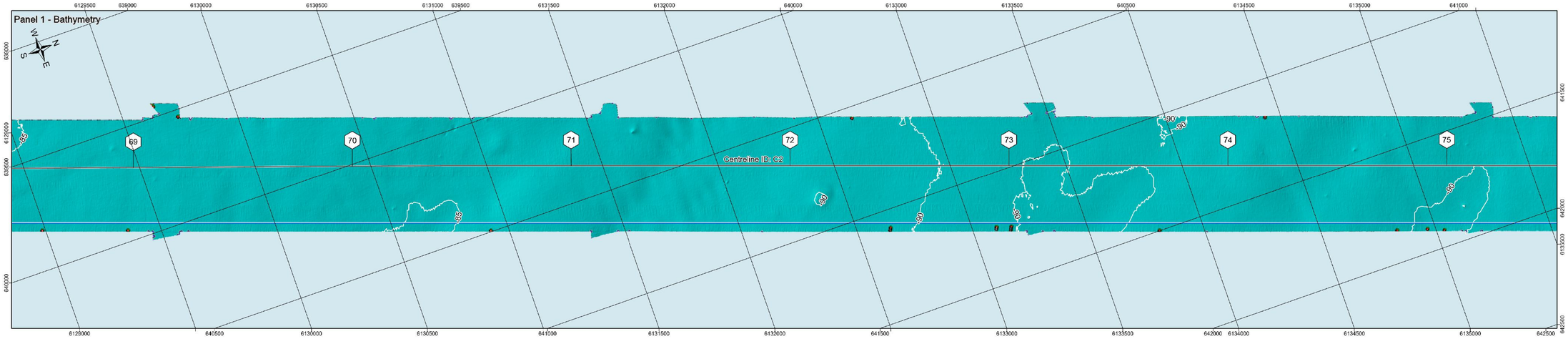
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 11 of 41

Drawing Status
Issue for Review

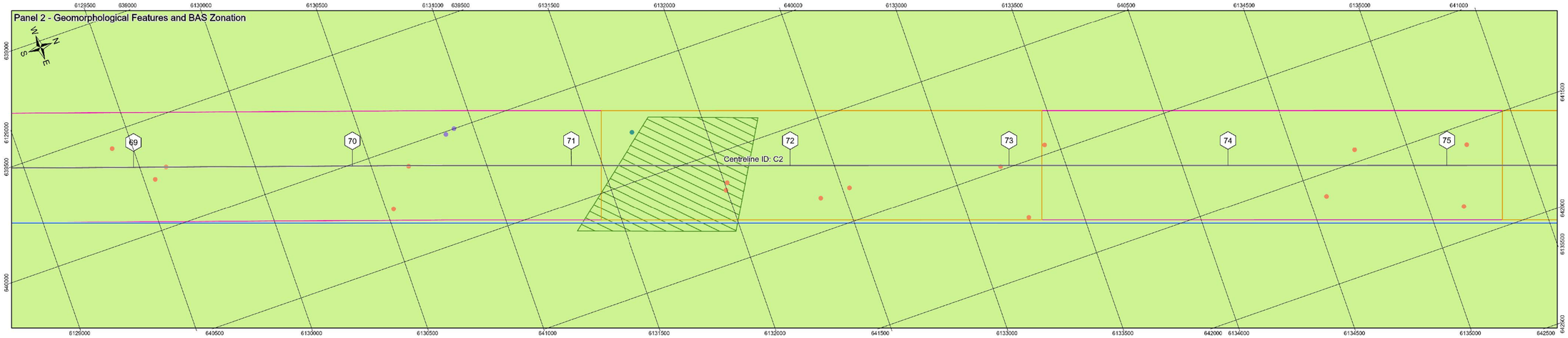
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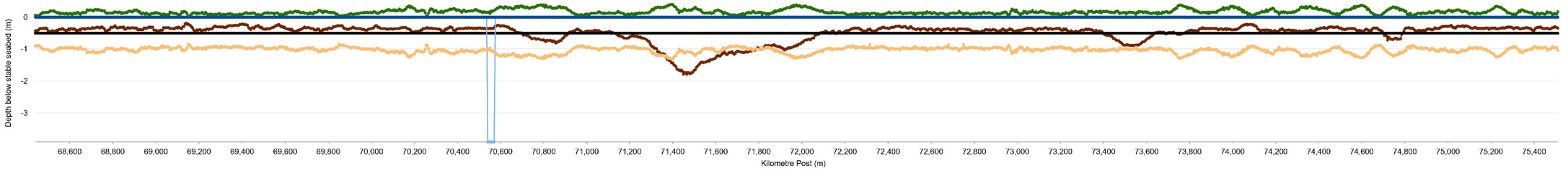
Panel 1 - Bathymetry



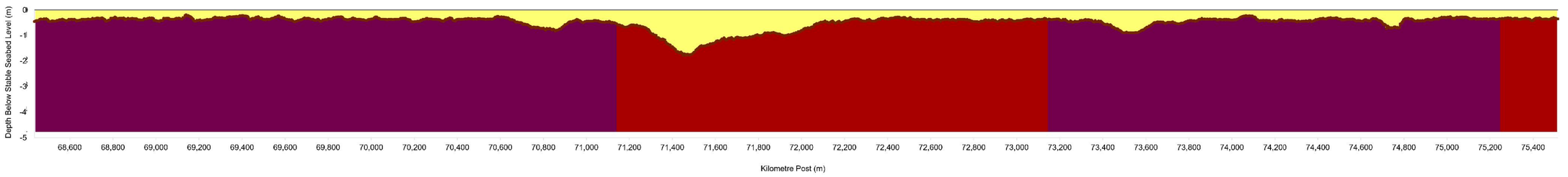
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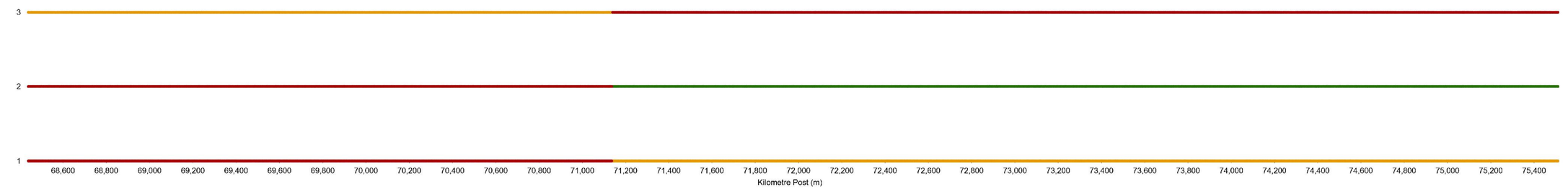
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



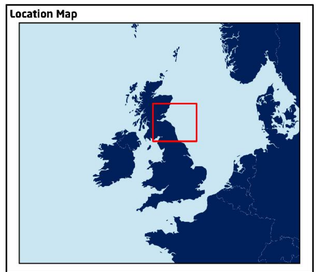
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



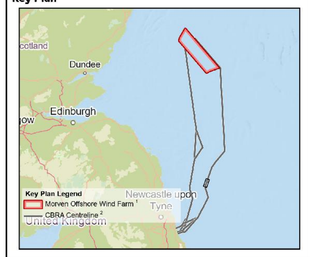
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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Scale @ A1: 1:10,000
Datum: European 1950
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Notes:
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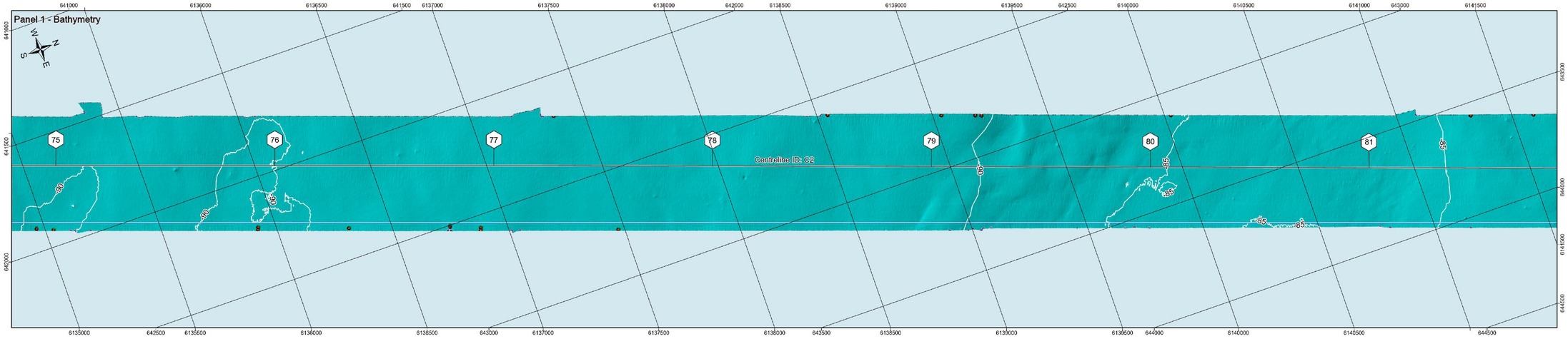
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 12 of 41

Drawing Status
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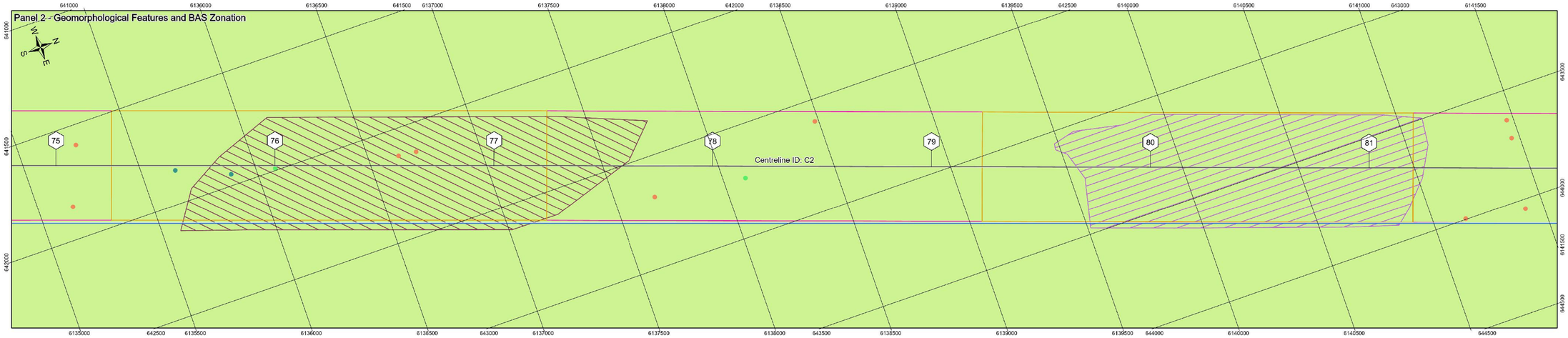
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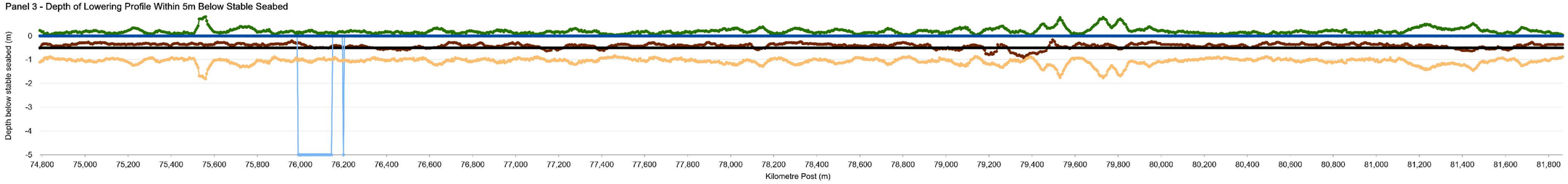
Panel 1 - Bathymetry



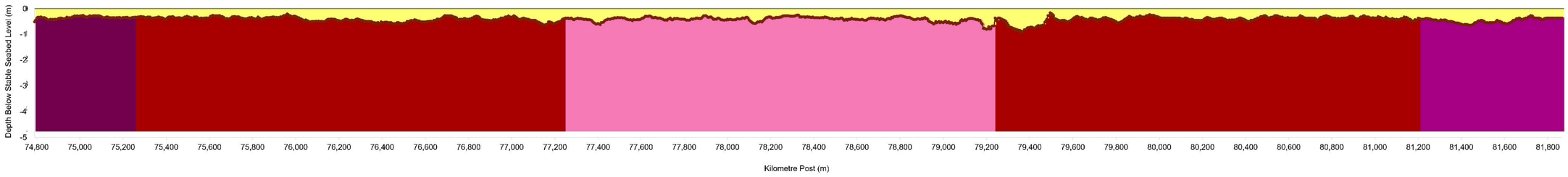
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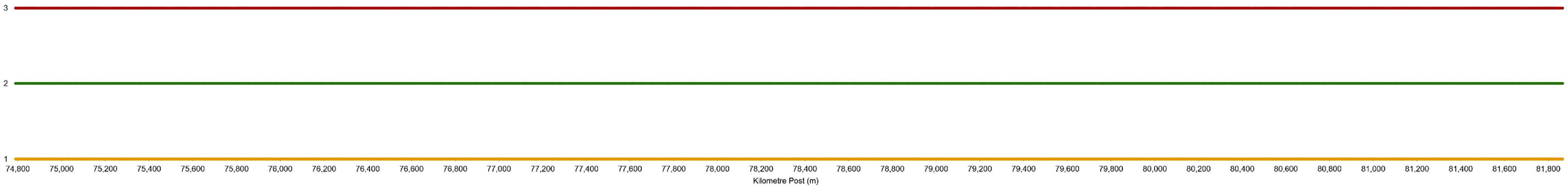
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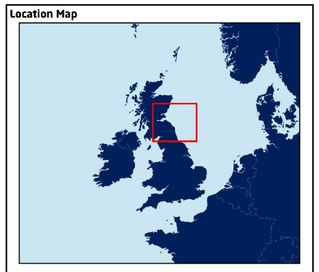
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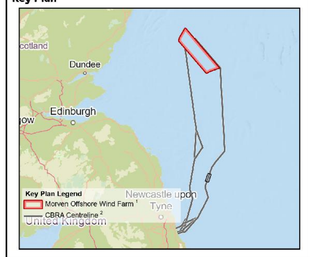
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High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [4]	

Panel 5

- Suitable [3]
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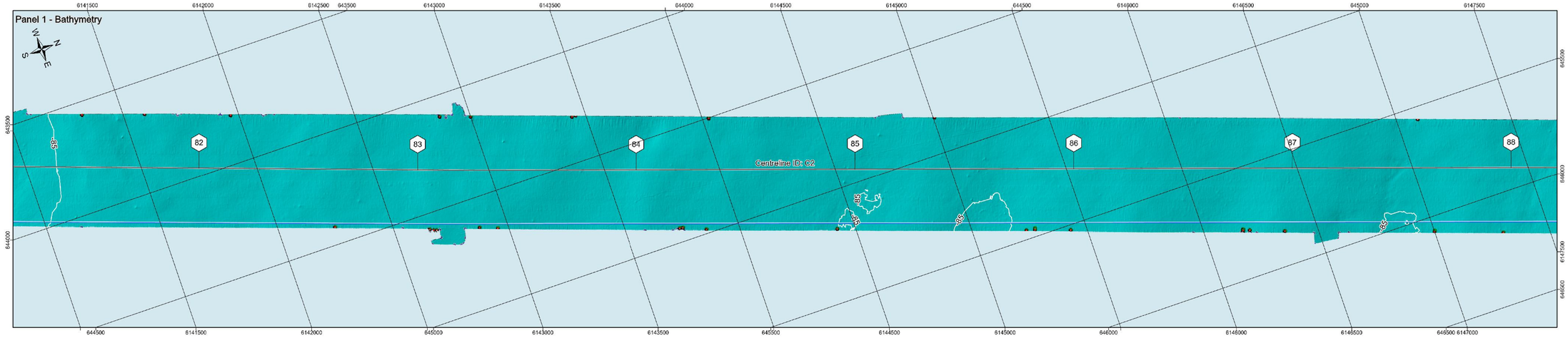
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 13 of 41

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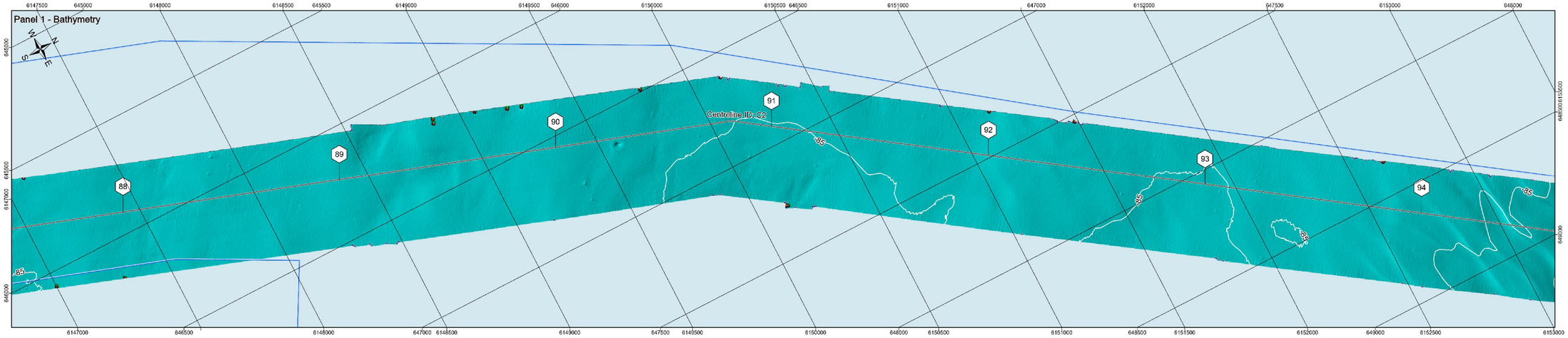
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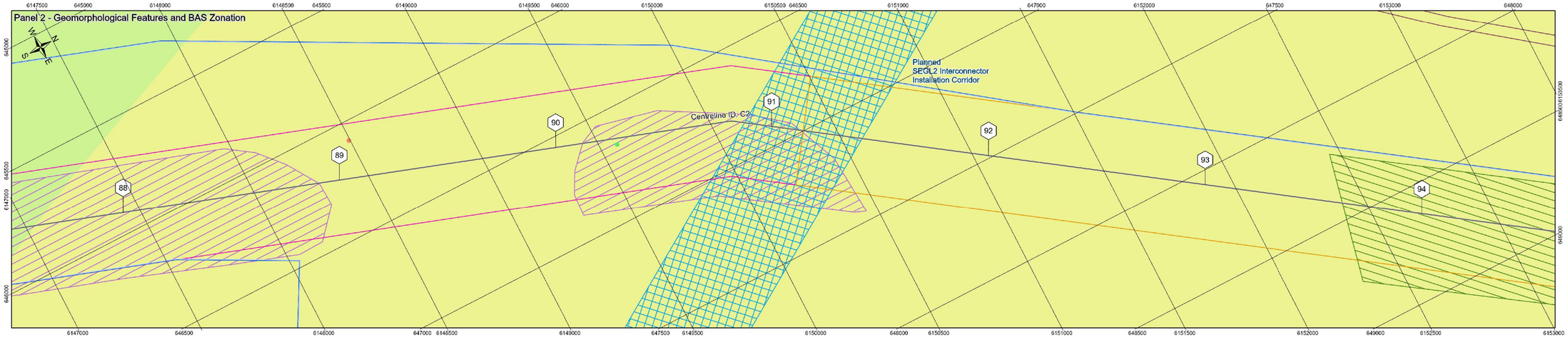
Panel 1 - Bathymetry


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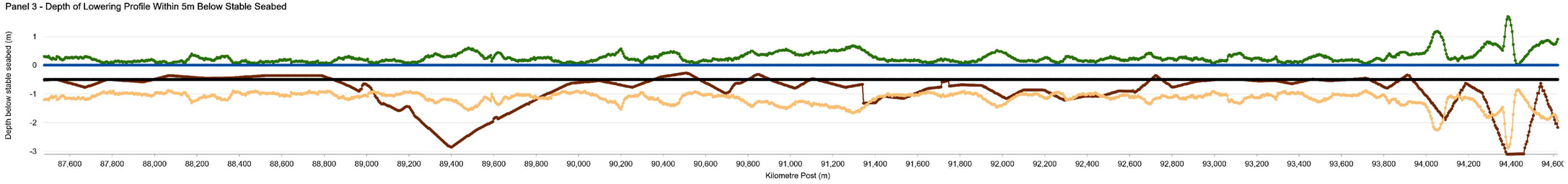
Panel 1 - Bathymetry



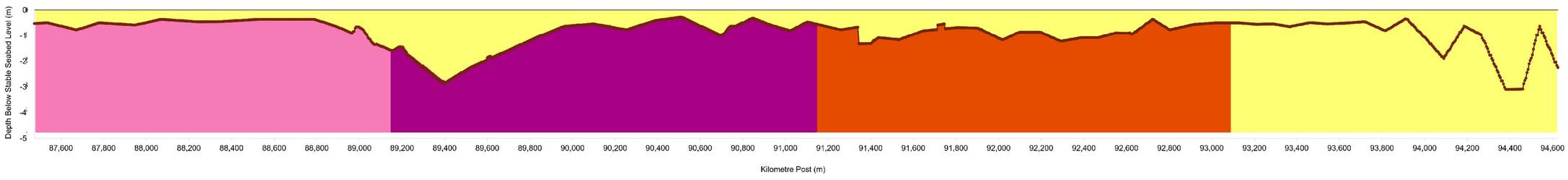
Panel 2 - Geomorphological Features and BAS Zonation



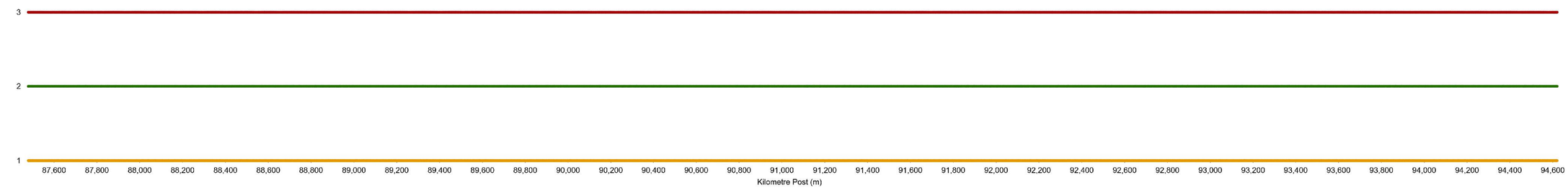
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



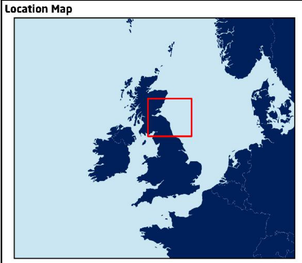
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



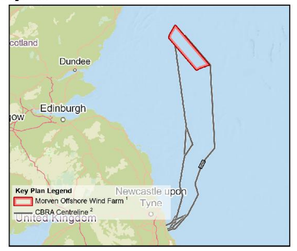
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [8]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
- 10. Unpublic data
- SEGL2 Installation Corridor [6]
- SEGL1 Installation Corridor [6]
- Active Cables [10]

Panel 3
- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5
- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
5. Derived from XOcean Geophysical Surveys, Provided March 2024.
6. Provided by EnBW bp, March 2024.
7. Source: EMODnet, June 2024.
8. Calculated by GM. Methodology found in GM-PRJ116388-GEO-RP-001.
9. TTD is the sum of bedform height, DoL, a 0.2 m cable diameter all with a 20% contingency applied. TTD is subject to change based upon tool selection.
10. Source: ESCA, April 2024.

Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

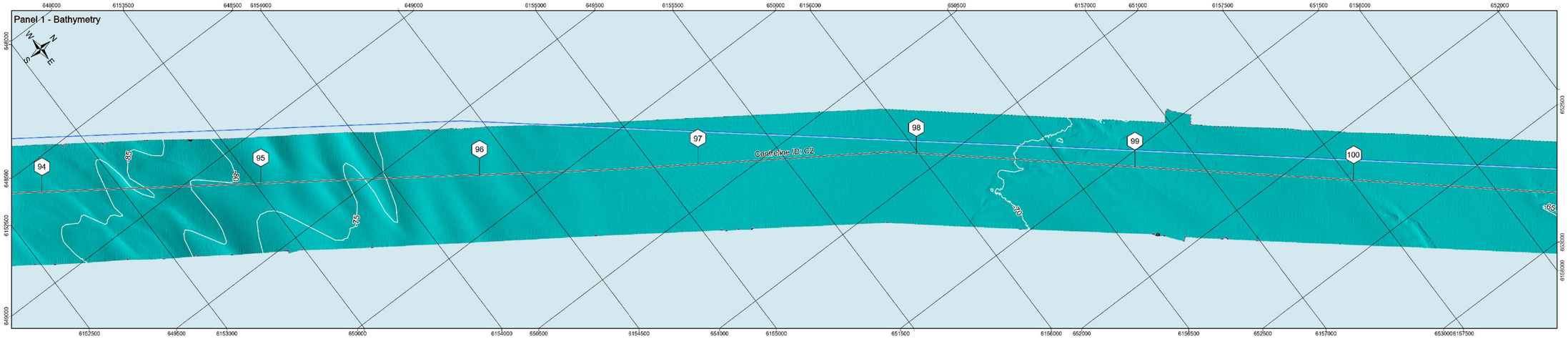
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 15 of 41

Drawing Status
Issue for Review

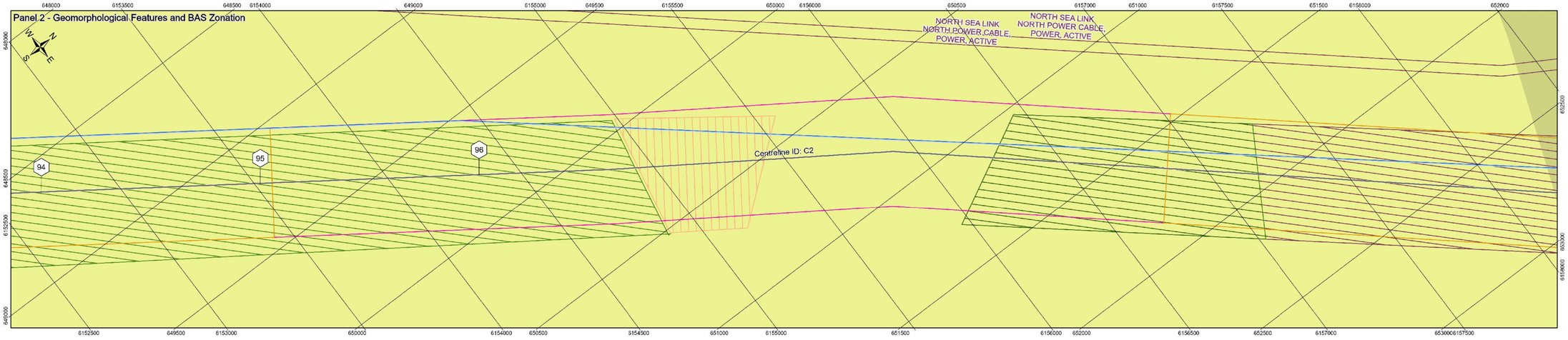
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

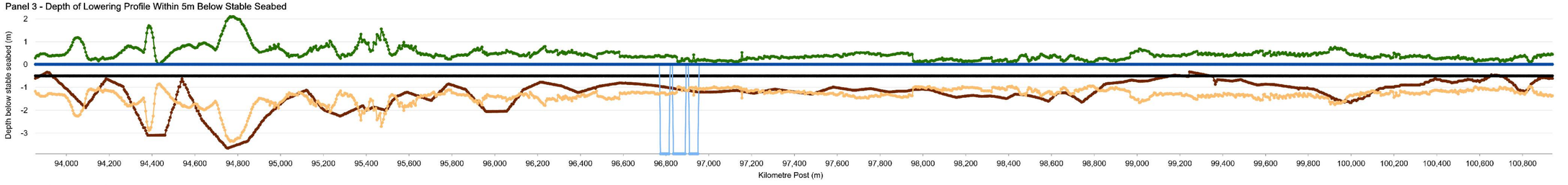
Panel 1 - Bathymetry



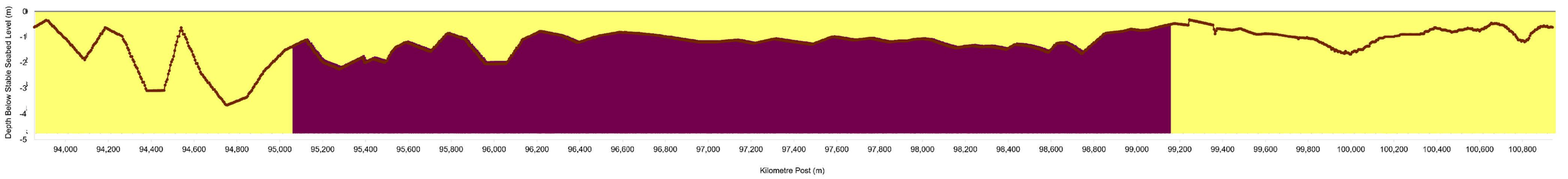
Panel 2 - Geomorphological Features and BAS Zonation



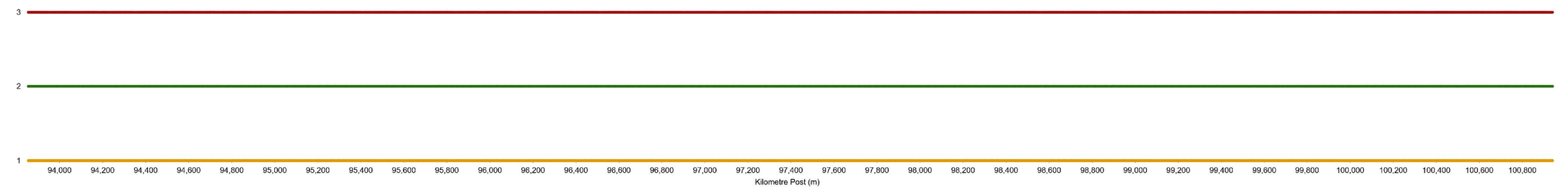
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



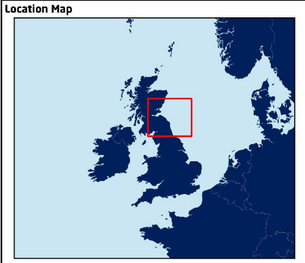
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



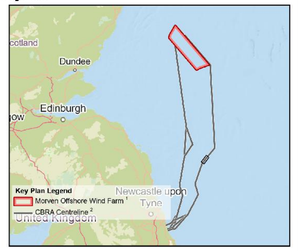
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [2]
- Redline Boundary [1]
- Water depth contour (5m interval) [6]

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BAS Zone Classification [3]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [5]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Report Title
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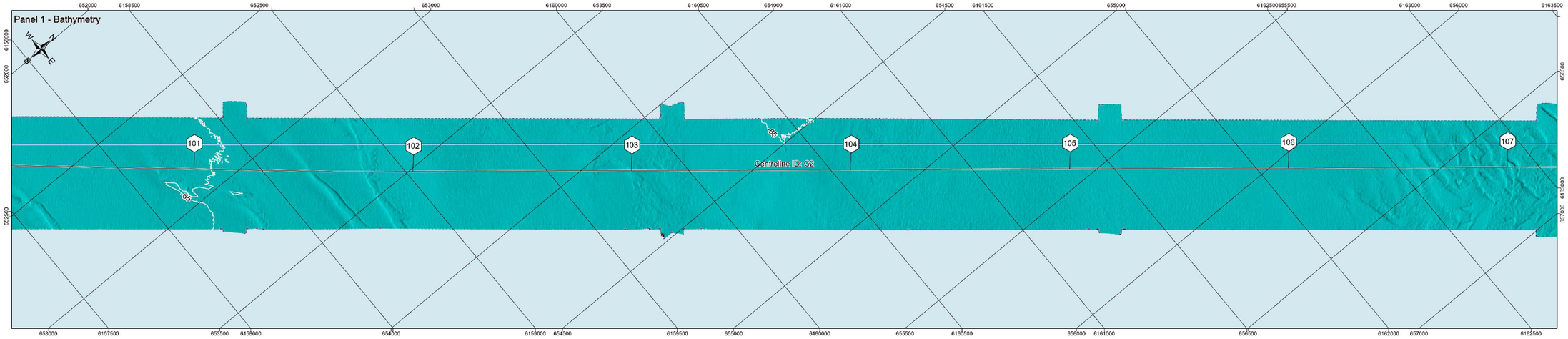
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 16 of 41

Drawing Status
Issue for Review

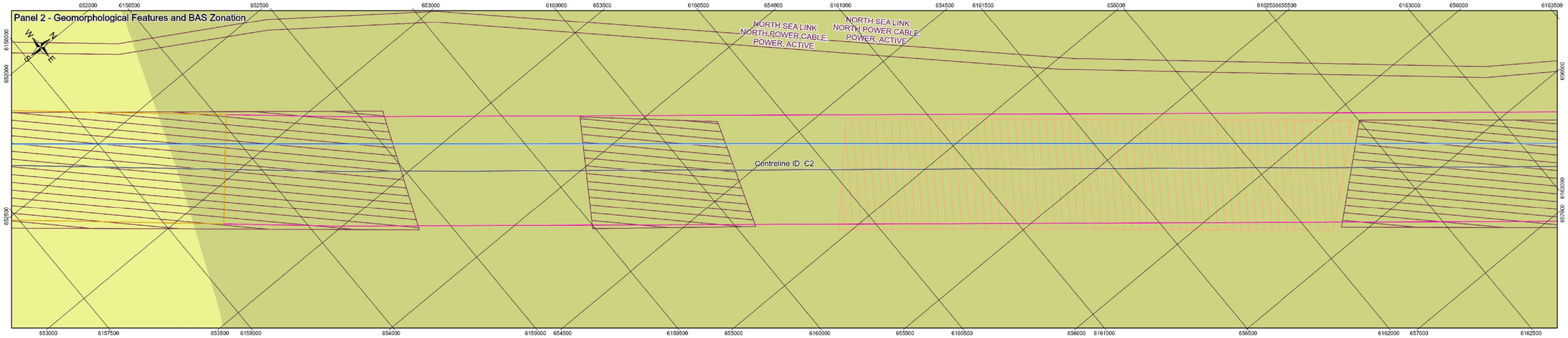
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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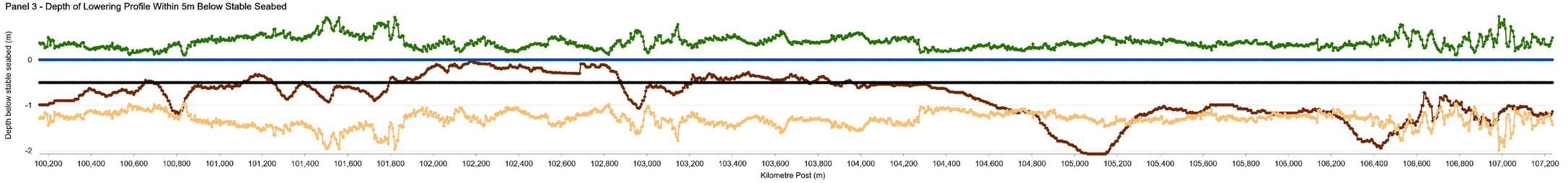
Panel 1 - Bathymetry



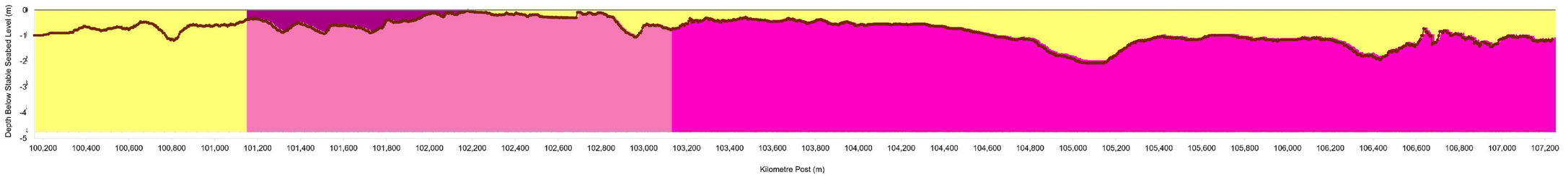
Panel 2 - Geomorphological Features and BAS Zonation



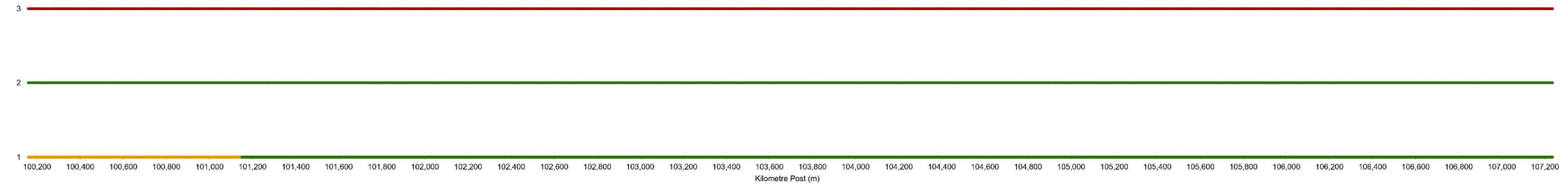
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



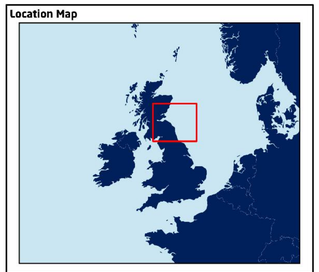
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



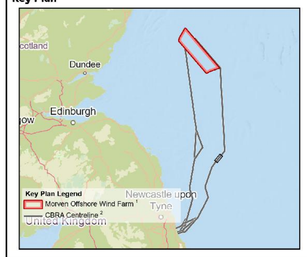
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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- Sand or C1 - C3

Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
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- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
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- Glacial features
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- Thin sediment cover
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Seabed Substrate [7]
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- 1.2 sandy Mud
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Panel 3

- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [9]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
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- Rock (R)

Panel 5

- Suitable [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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Longitude of Origin: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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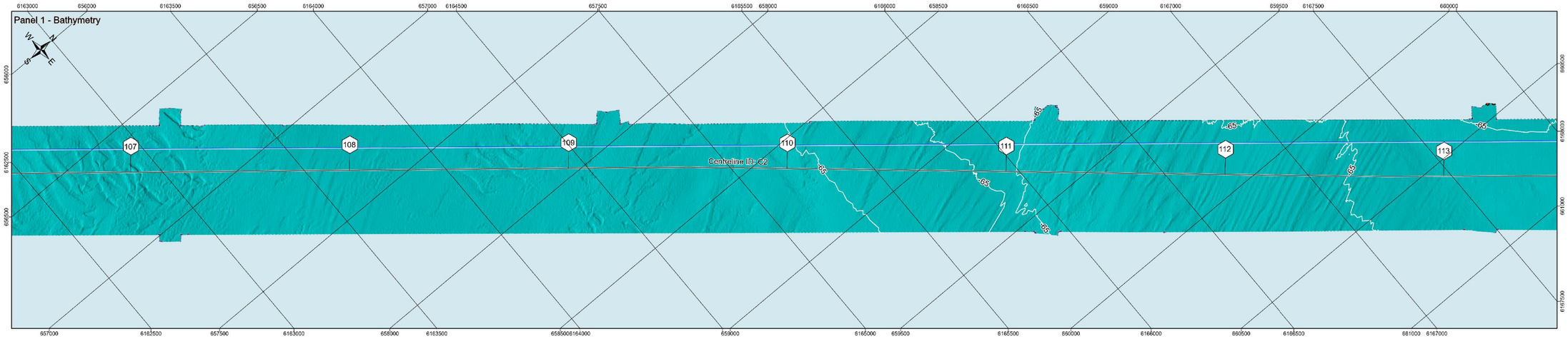
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

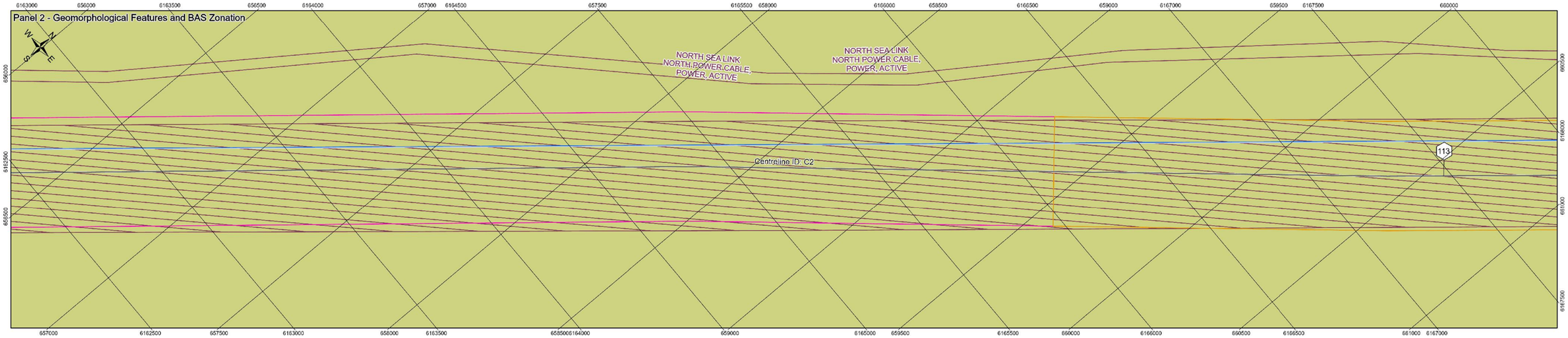
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 17 of 41

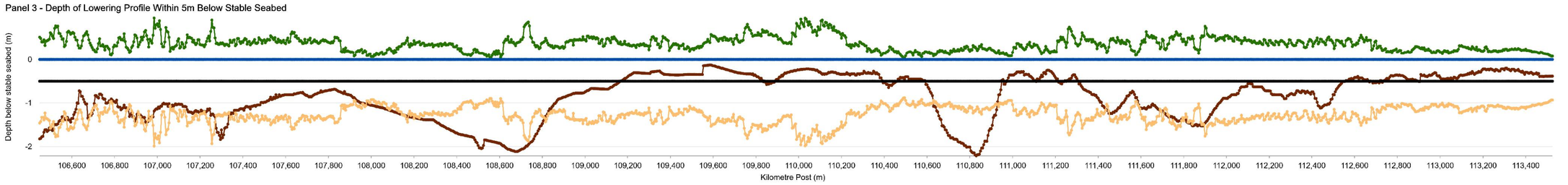
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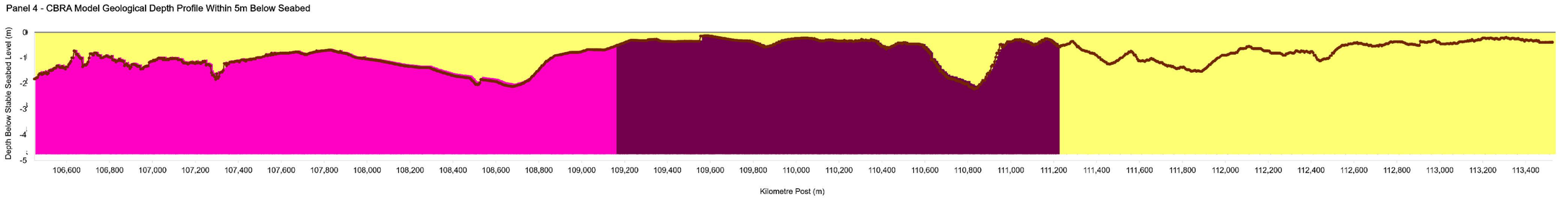
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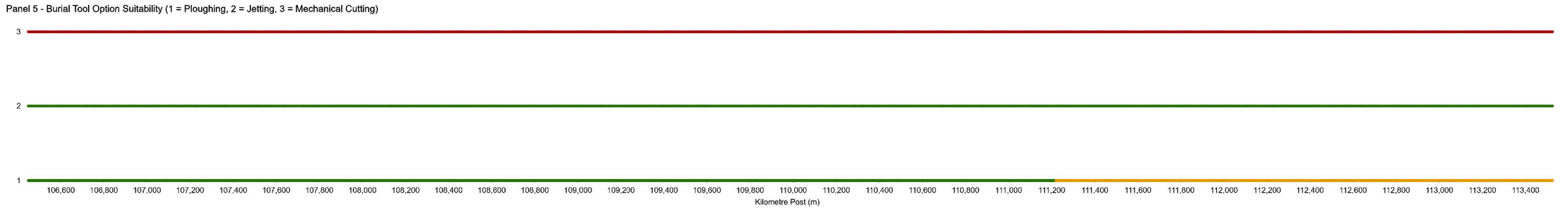
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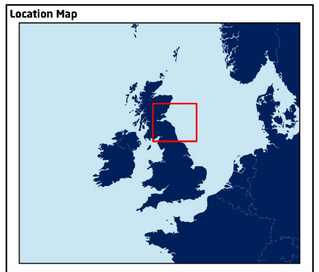




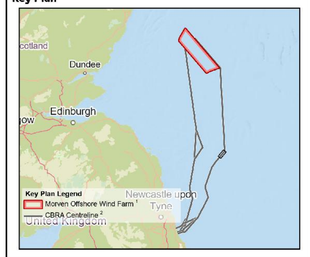




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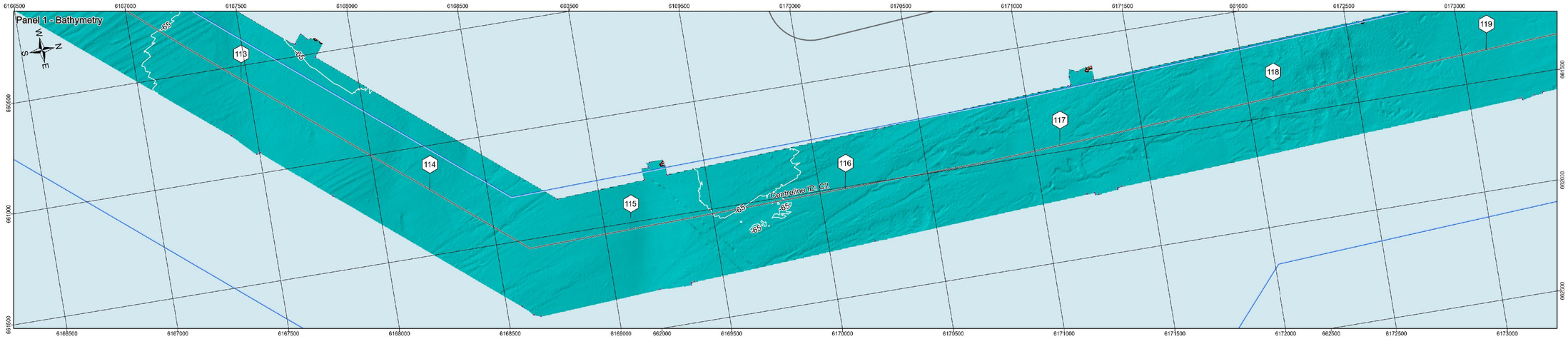
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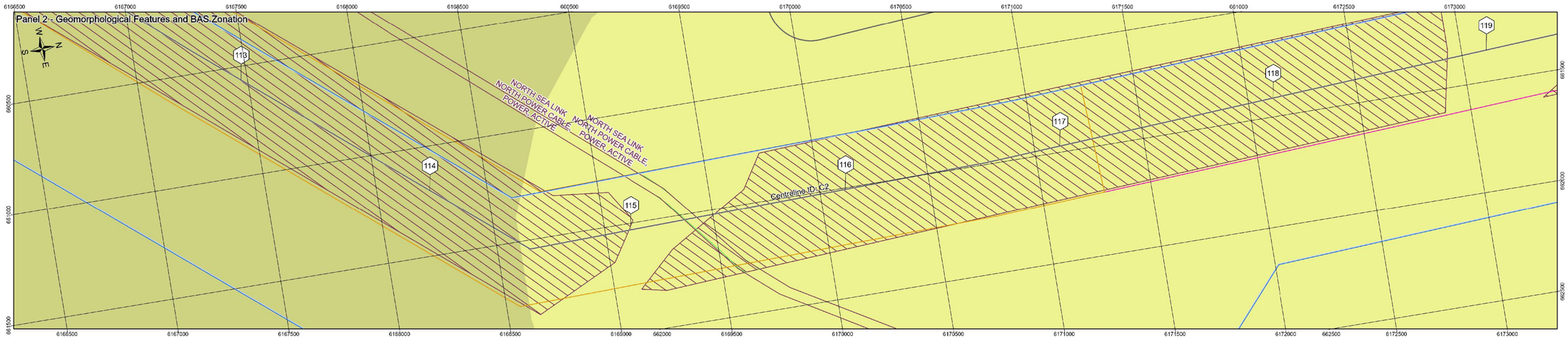
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 18 of 41

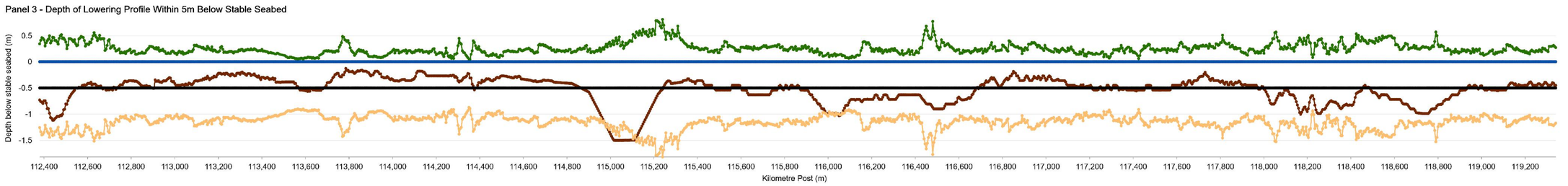
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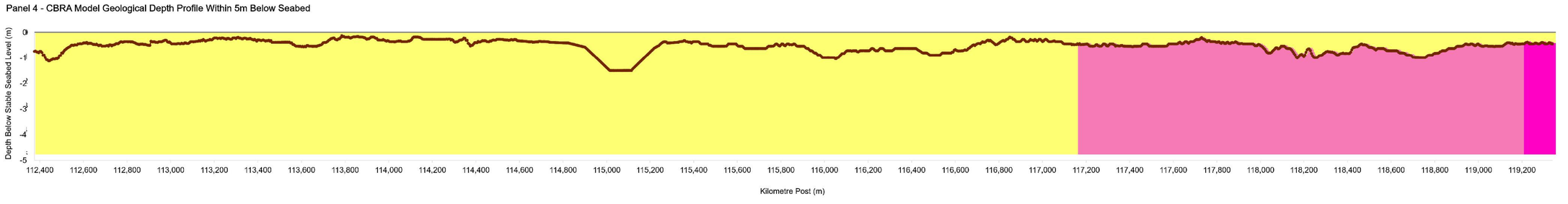
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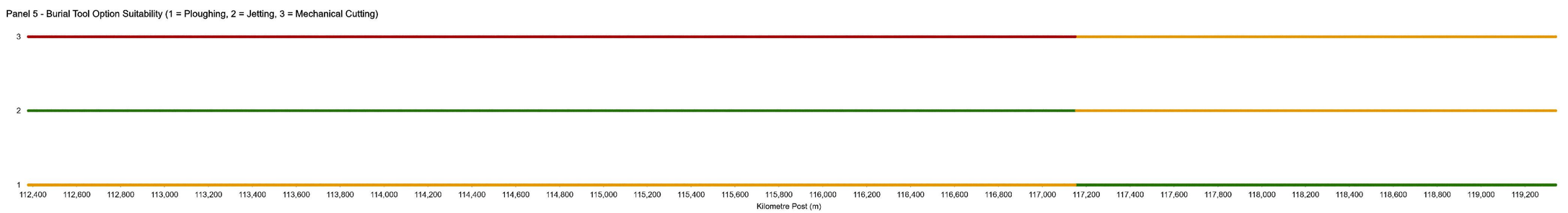
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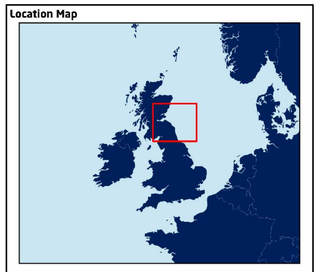




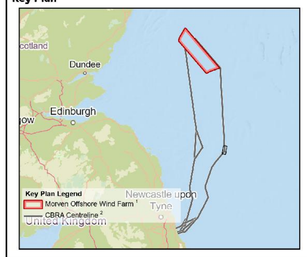




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Key Plan



Legend

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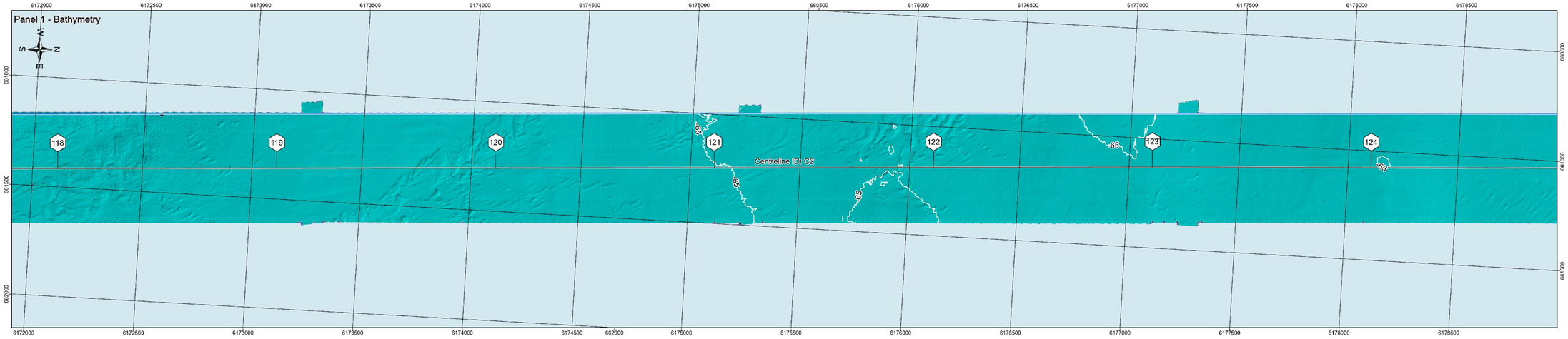
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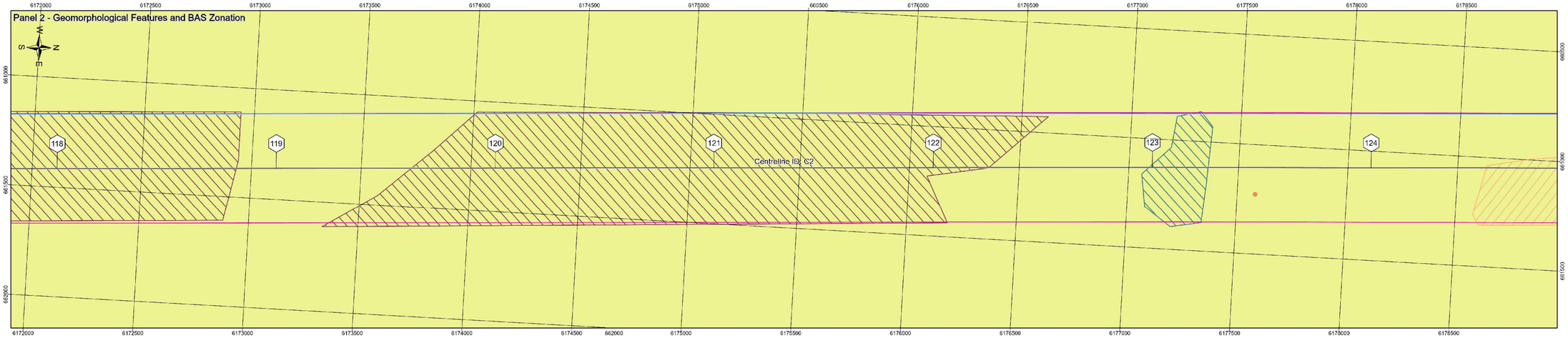
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 19 of 41

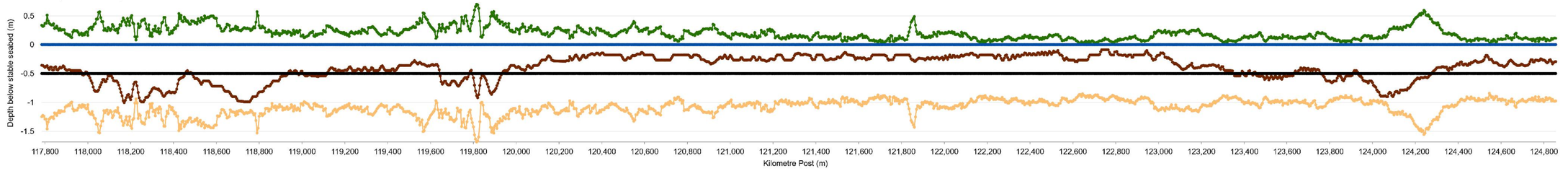
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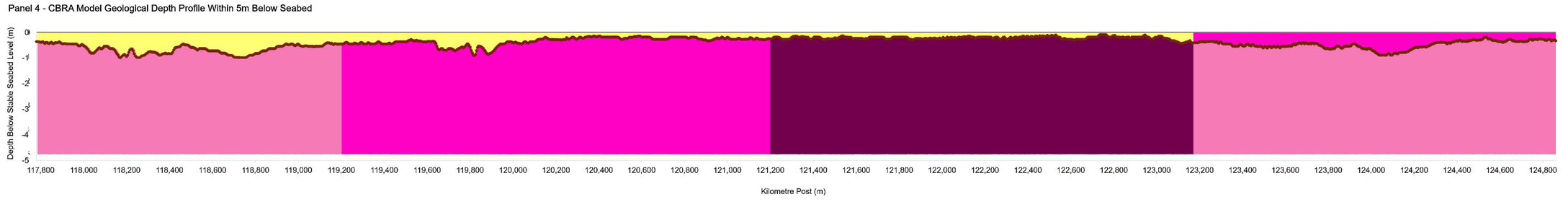
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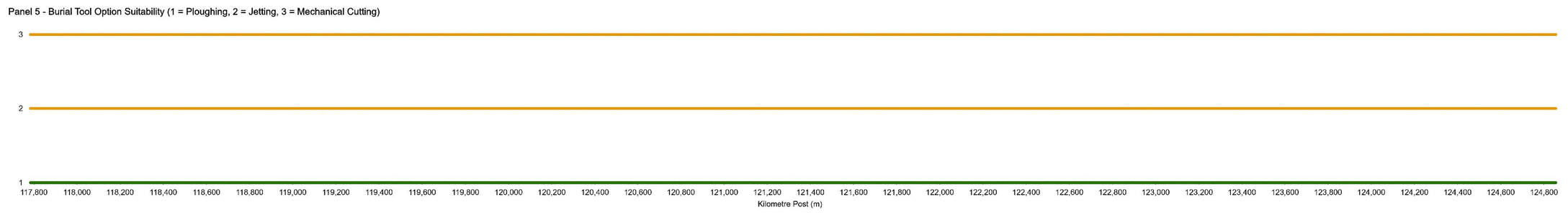
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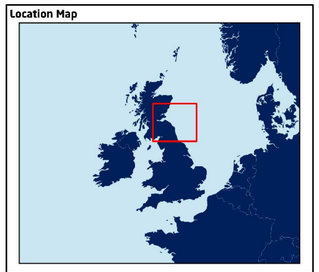




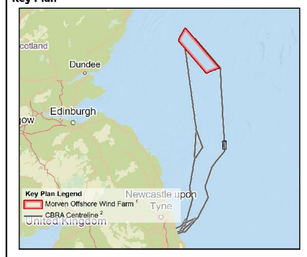




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Panel 3

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- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [4]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
5. Derived from XOcean Geophysical Surveys, Provided March 2024.
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10. Source: ESCA, April 2024.

Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

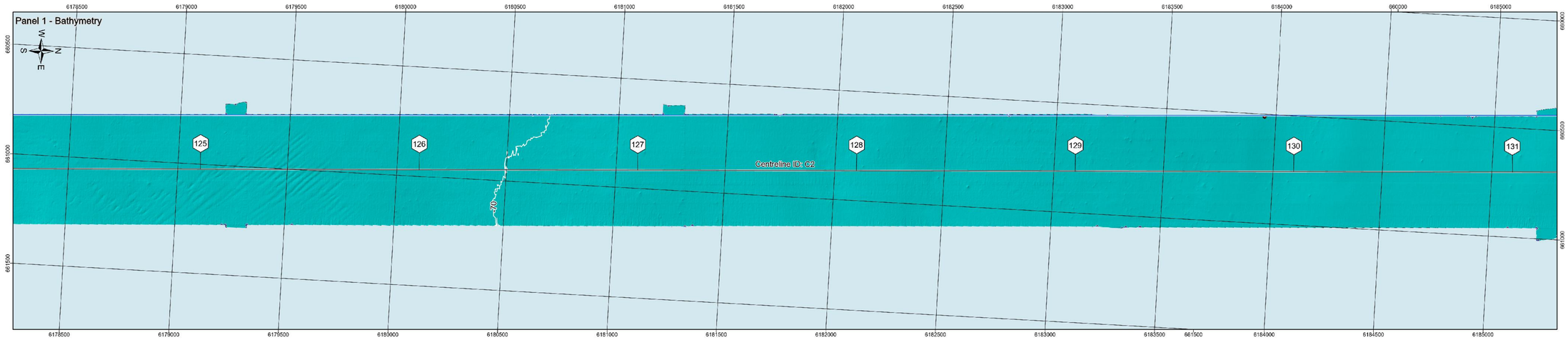
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 20 of 41

Drawing Status
Issue for Review

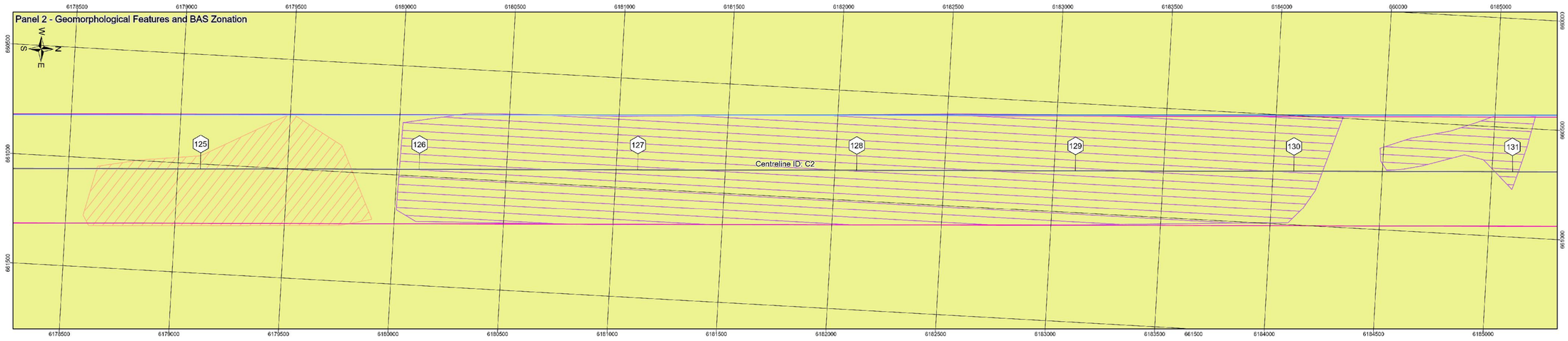
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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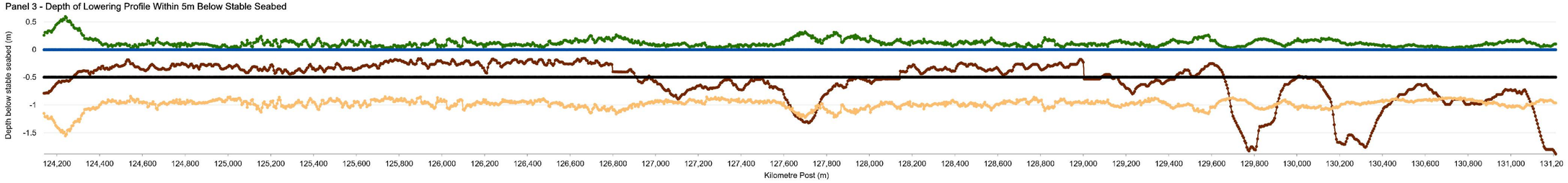
Panel 1 - Bathymetry



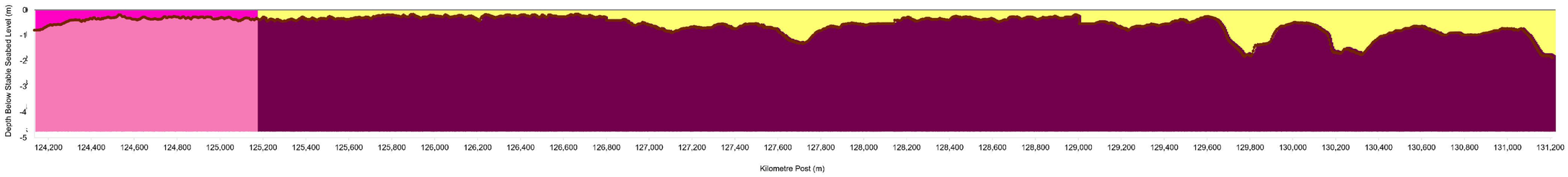
Panel 2 - Geomorphological Features and BAS Zonation



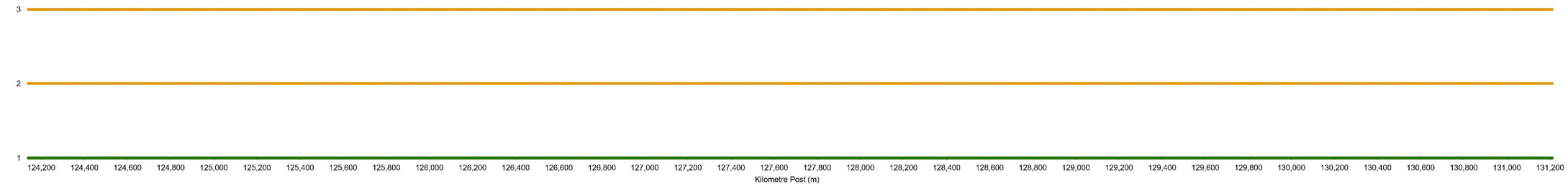
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



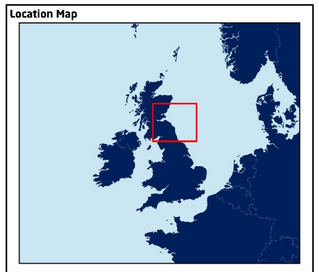
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



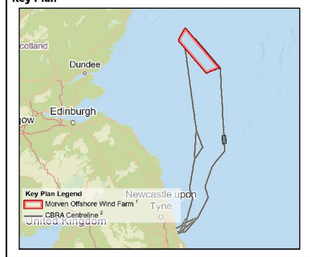
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Proposed 1000m Survey Corridor [3]
- Redline Boundary [4]
- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [8]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [1]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
- 10. Unpublic data
- SEGL2 Installation Corridor [6]
- SEGL1 Installation Corridor [6]
- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
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- Target Trench Depth [9]

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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
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Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
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Project Title
Morven Offshore Wind Farm

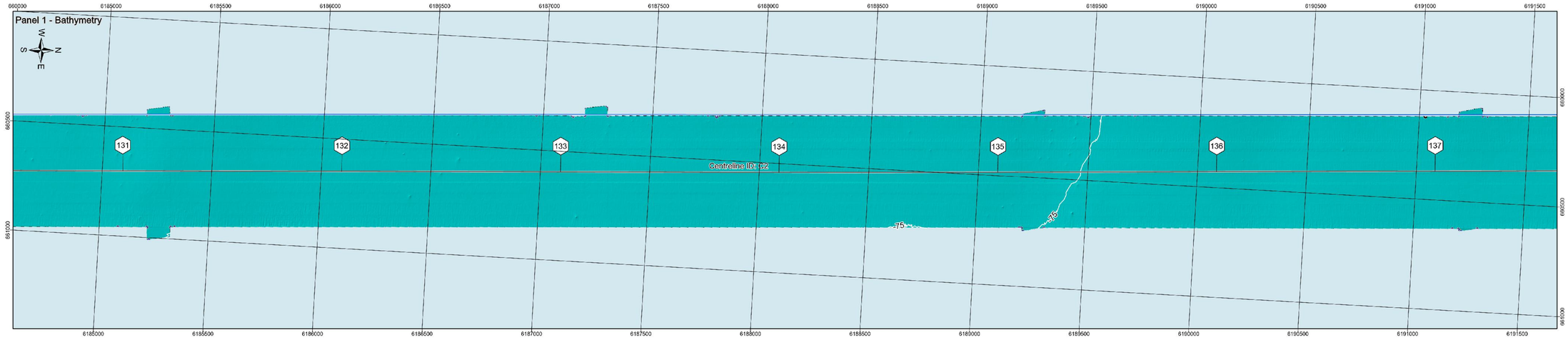
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

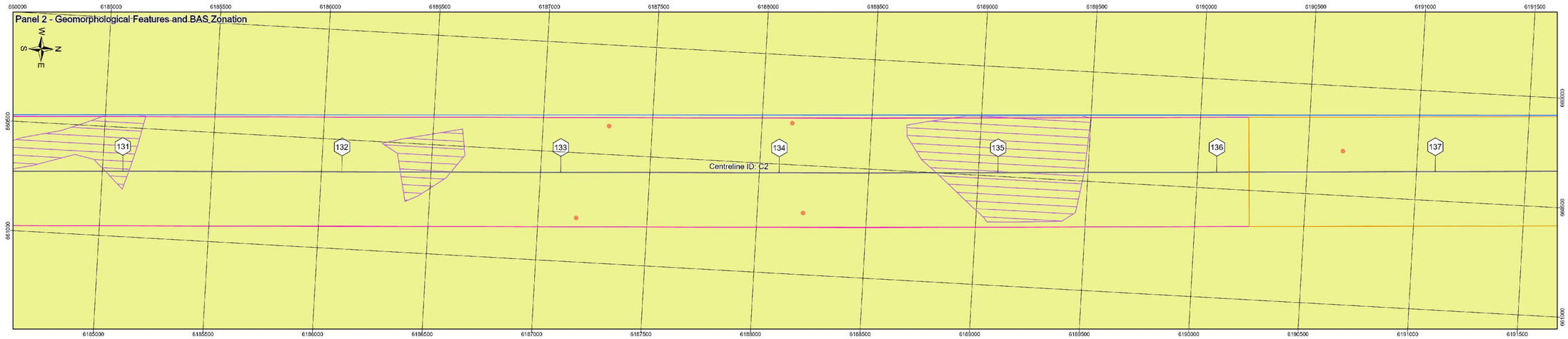
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 21 of 41

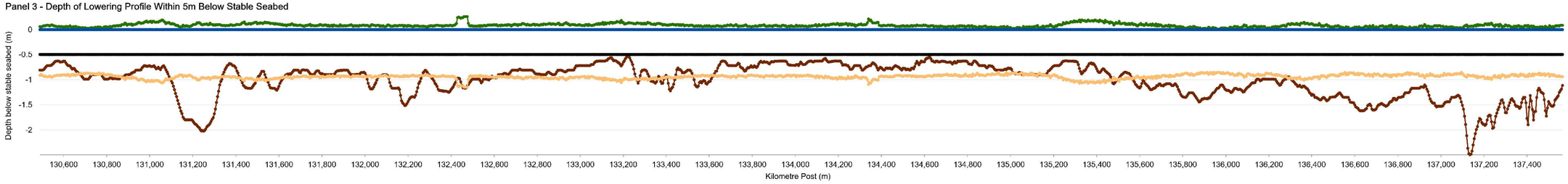
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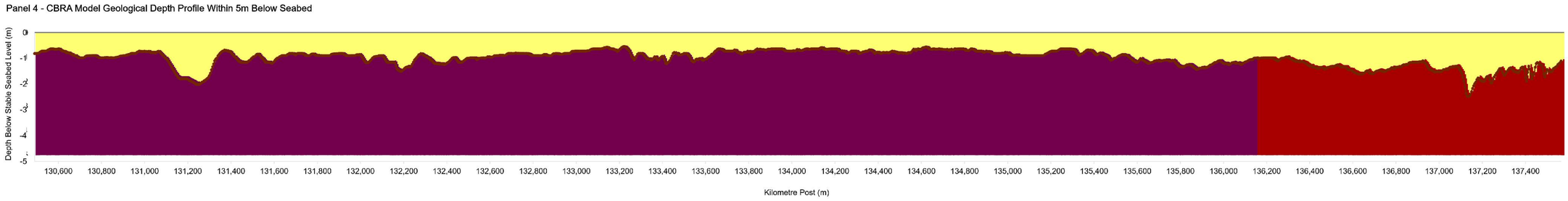
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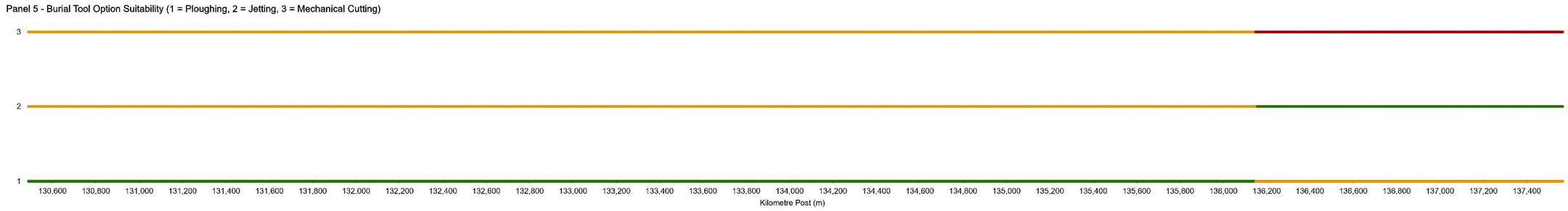
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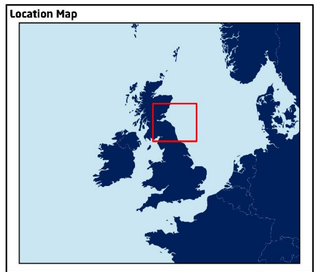




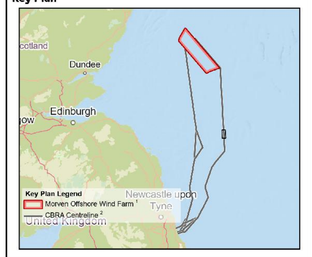




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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

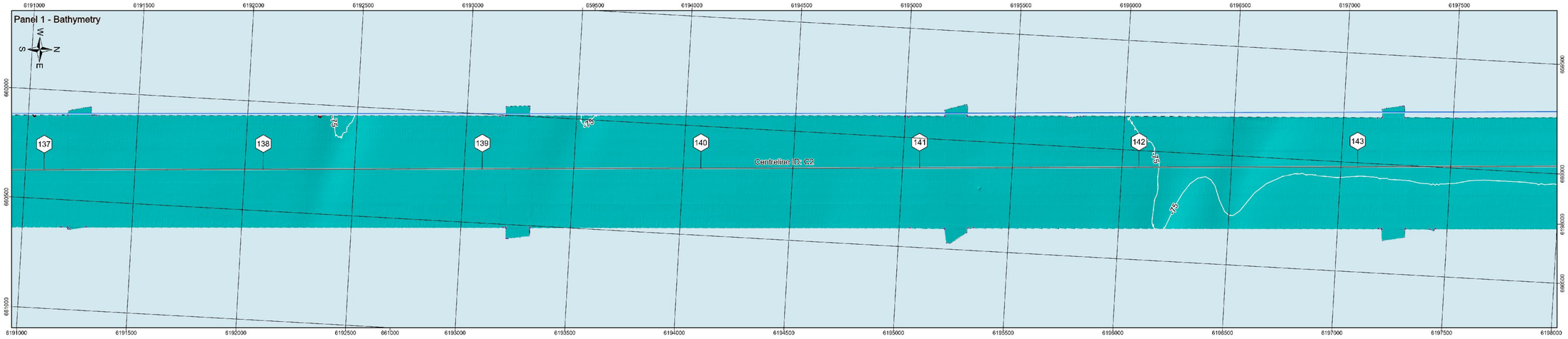
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 22 of 41

Drawing Status
Issue for Review

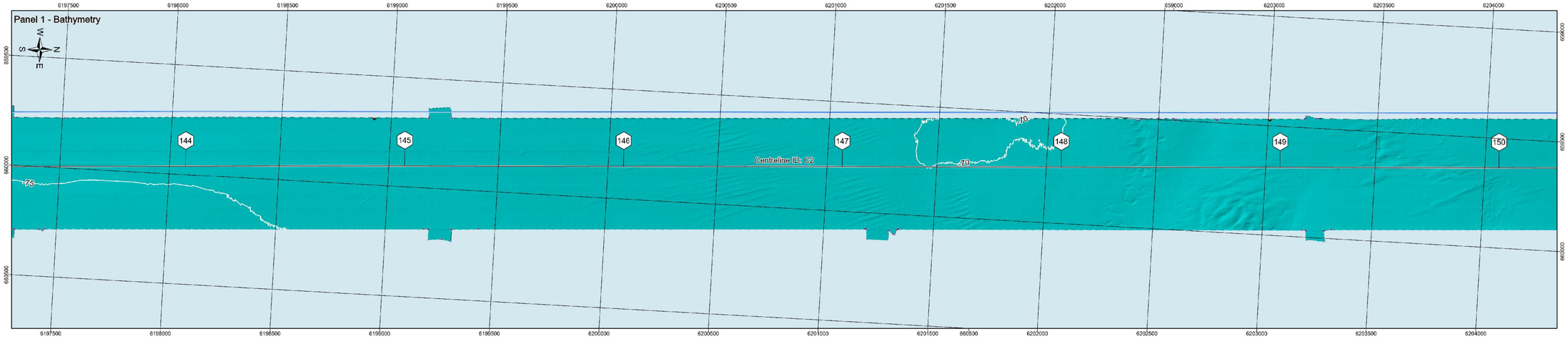
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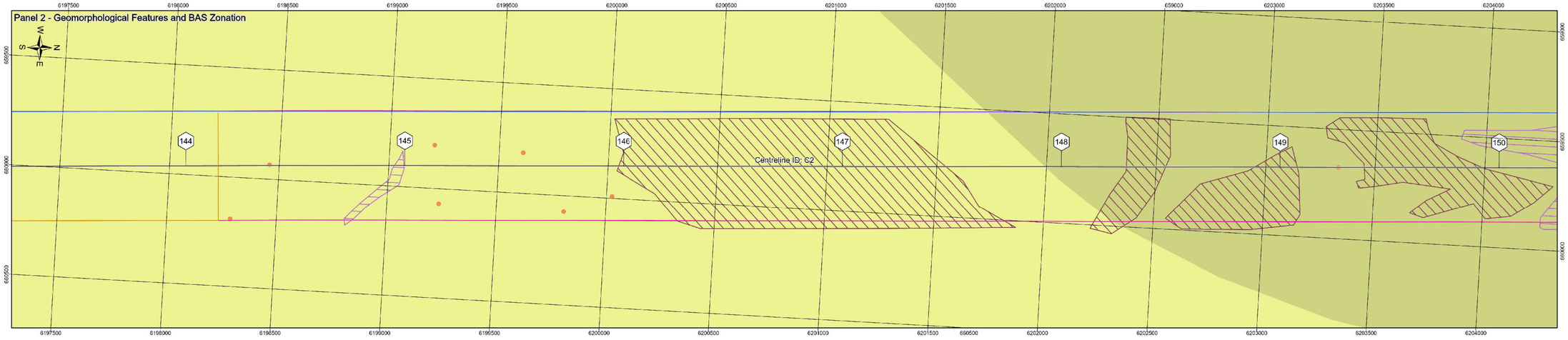
Panel 1 - Bathymetry


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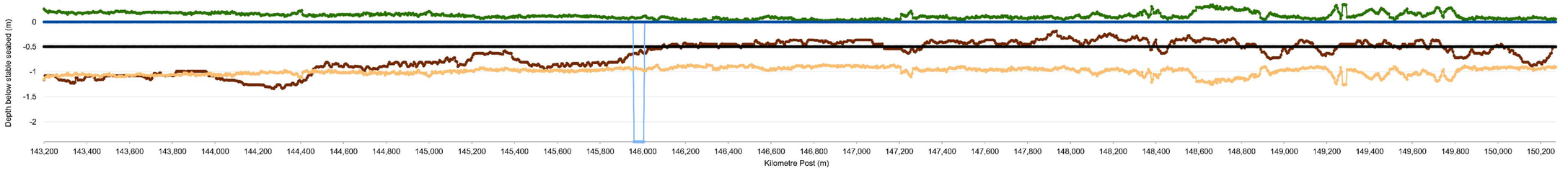
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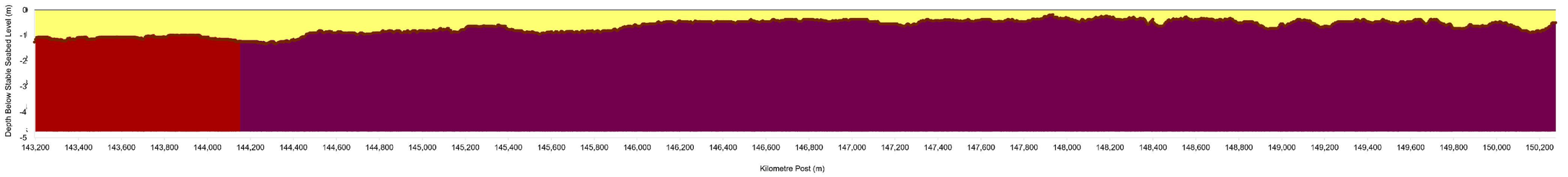
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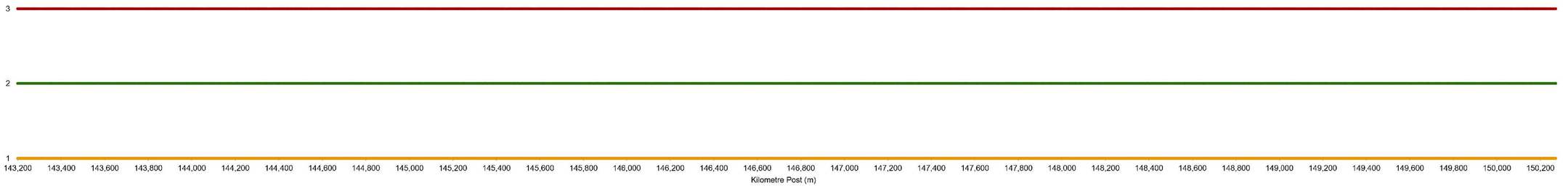
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



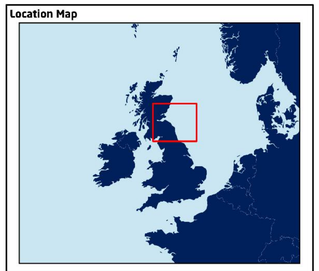
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



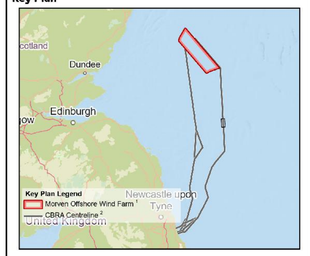
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

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Panel 4

Layer 1 Sediment Classification [9]
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
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Project Title
Morven Offshore Wind Farm

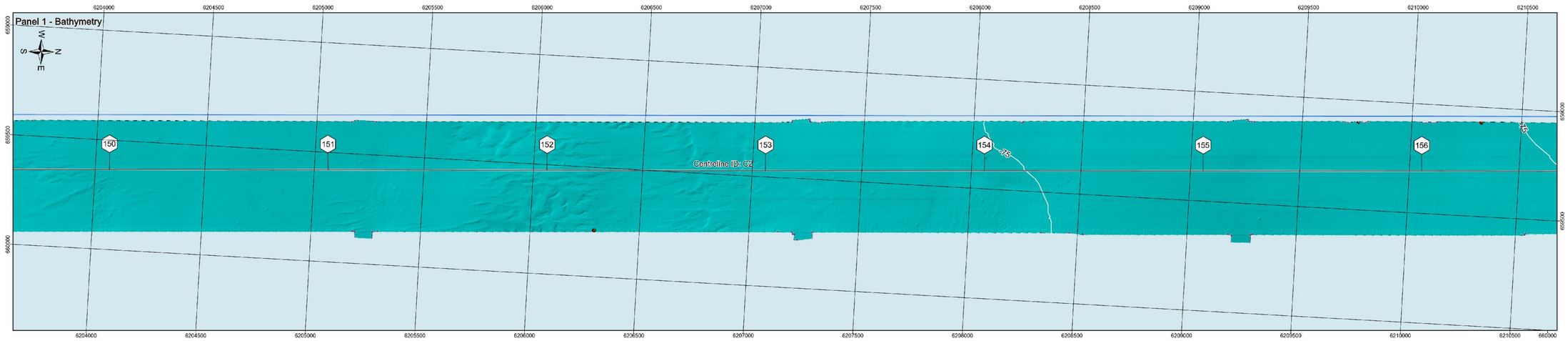
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

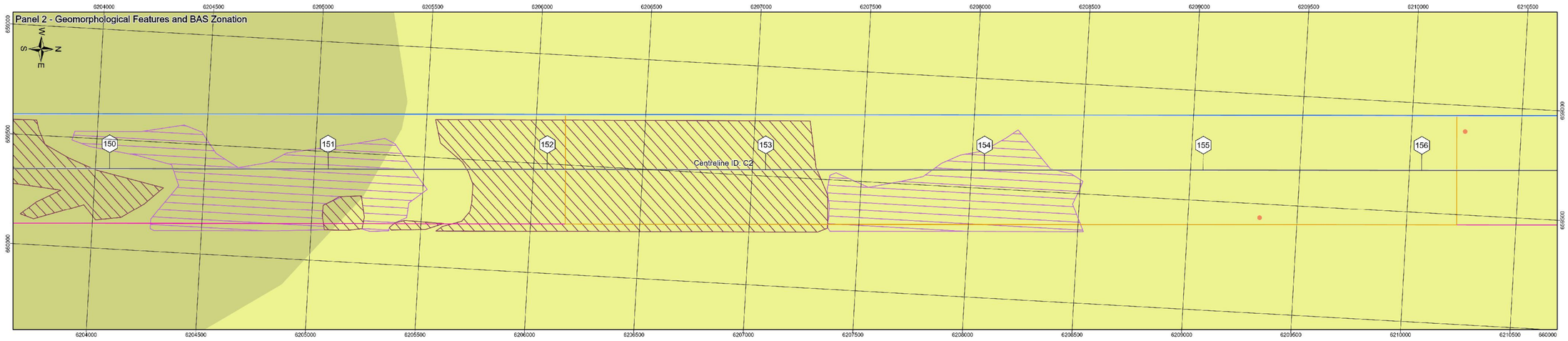
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 24 of 41

Drawing Status
Issue for Review

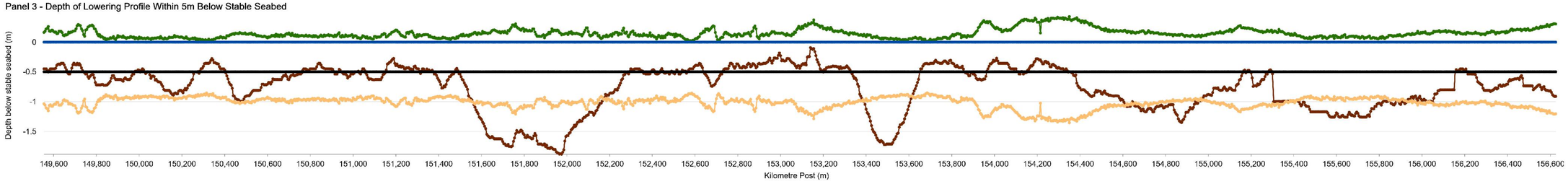
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GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

GLOBAL MARITIME — EnBW — bp
Partners in UK offshore wind

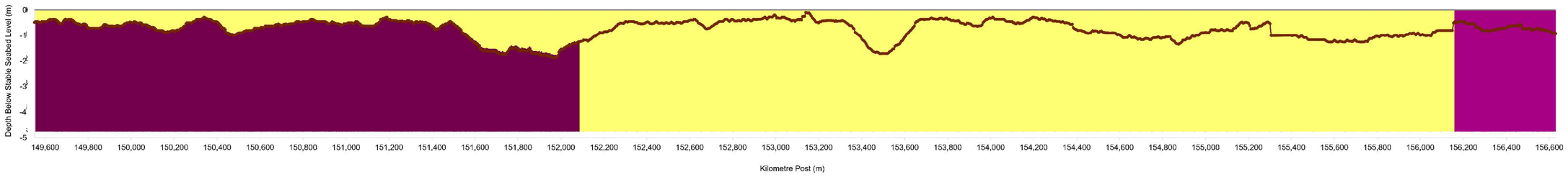




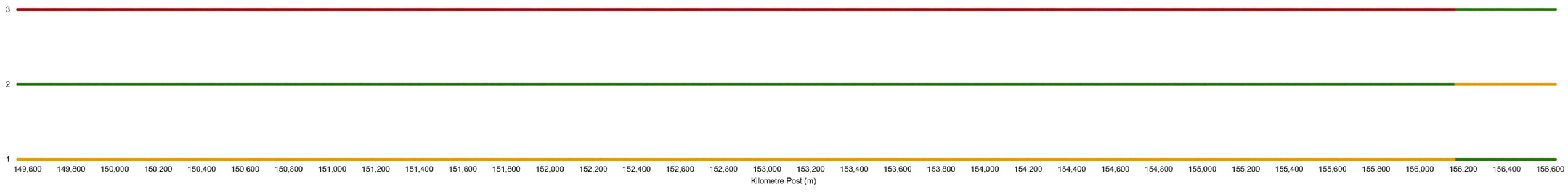
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



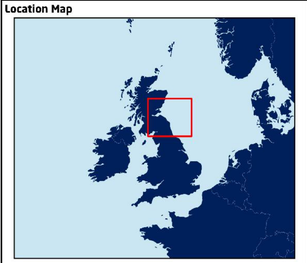
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



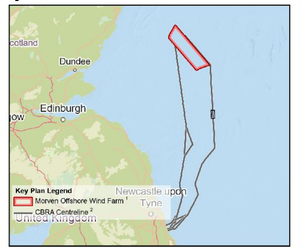
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Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Kilometre Post (1km Interval) [2]
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Panel 2

BAS Zone Classification [3]
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- Sand or C1 - C3

Geomorphology [8]
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- Boulder/debris
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- Depression with boulder/debris
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- Possible Mobile Bedform Height [5]
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Panel 4

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- Extremely Low Strength CLAY (C1b)
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
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Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
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Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Morven Offshore Wind Farm

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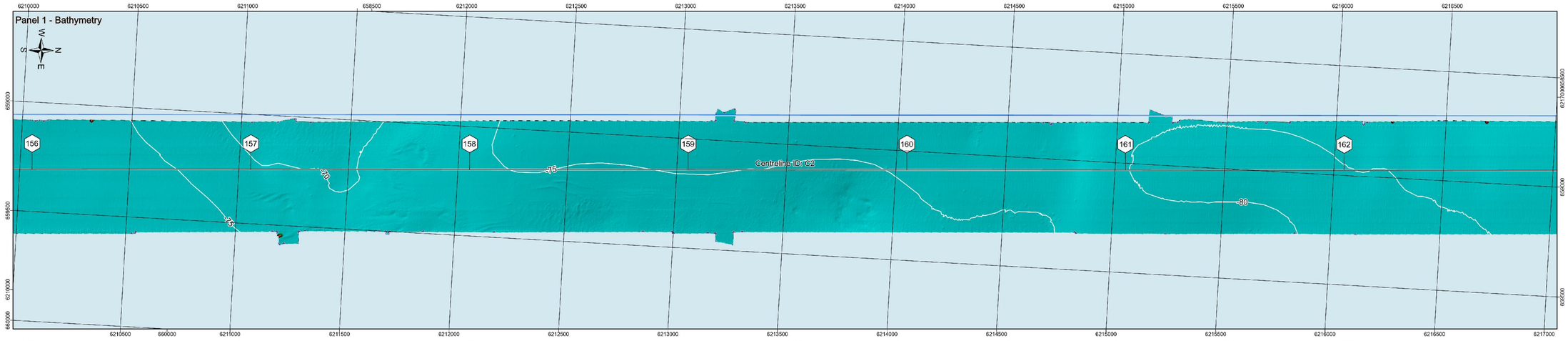
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 25 of 41

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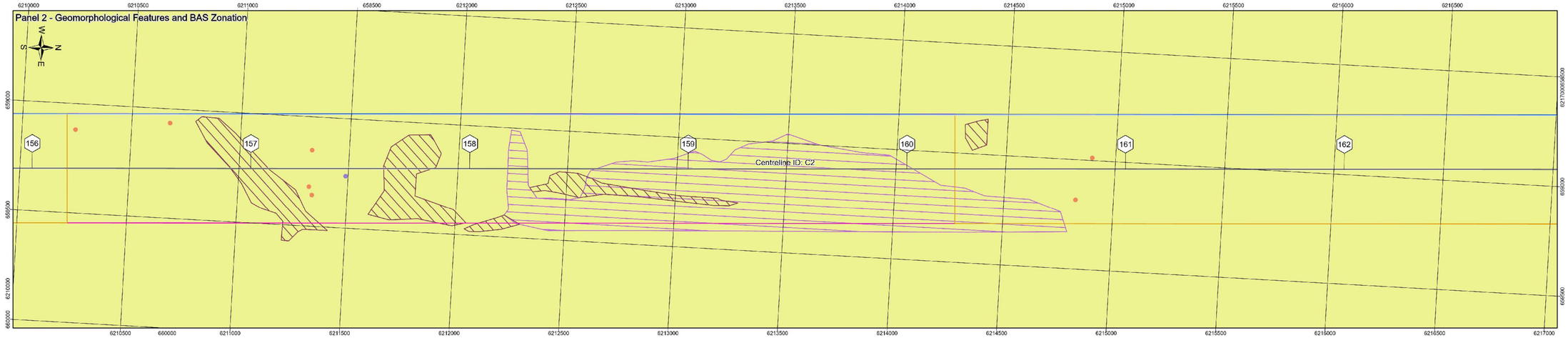
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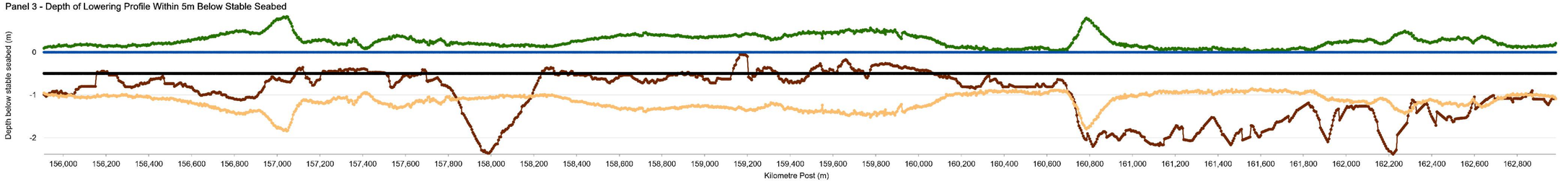
Panel 1 - Bathymetry



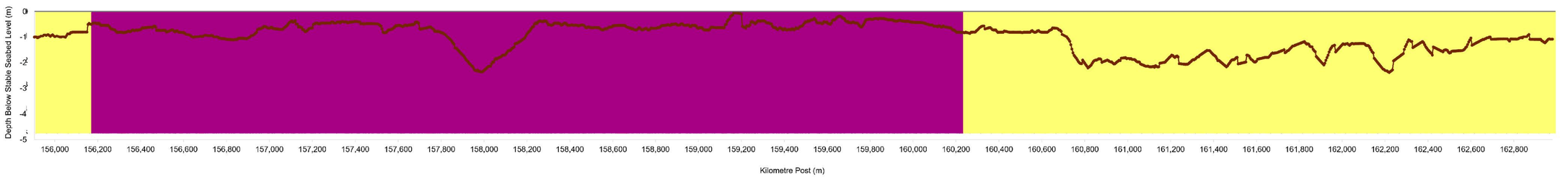
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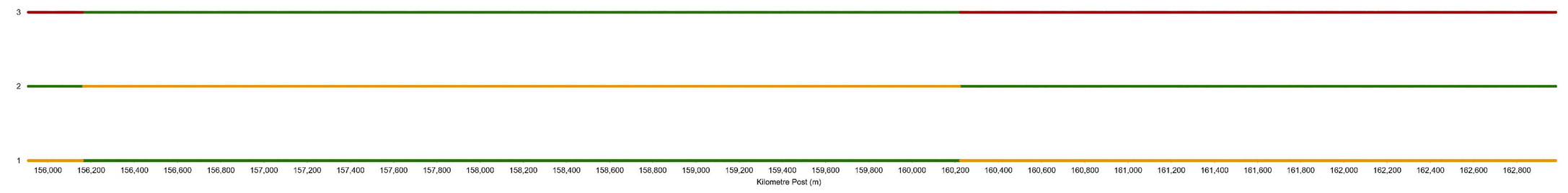
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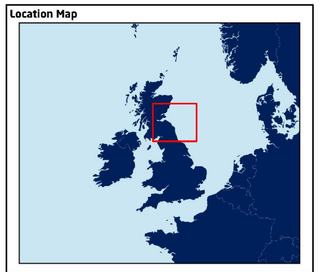
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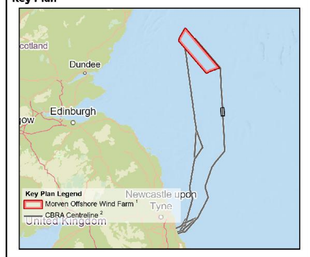
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Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

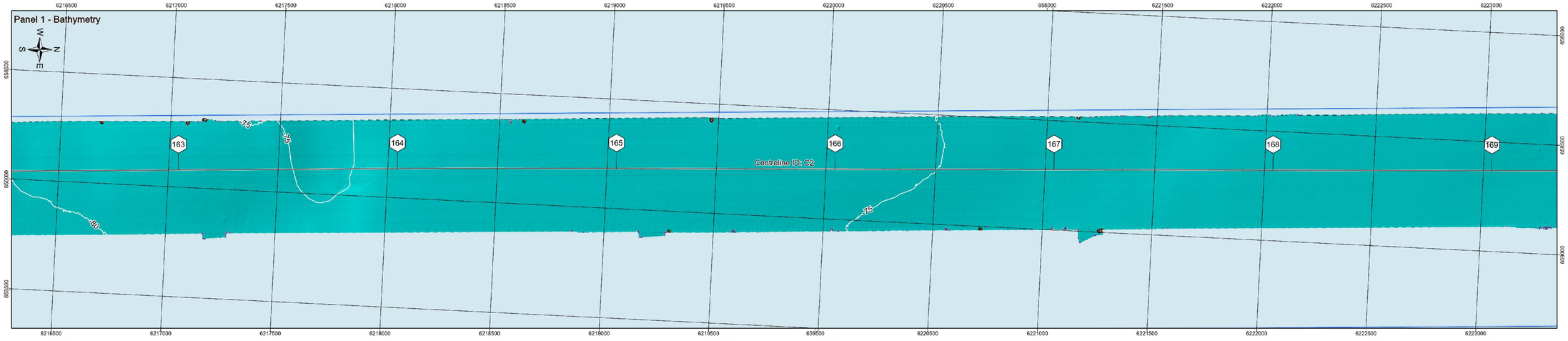
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 26 of 41

Drawing Status
Issue for Review

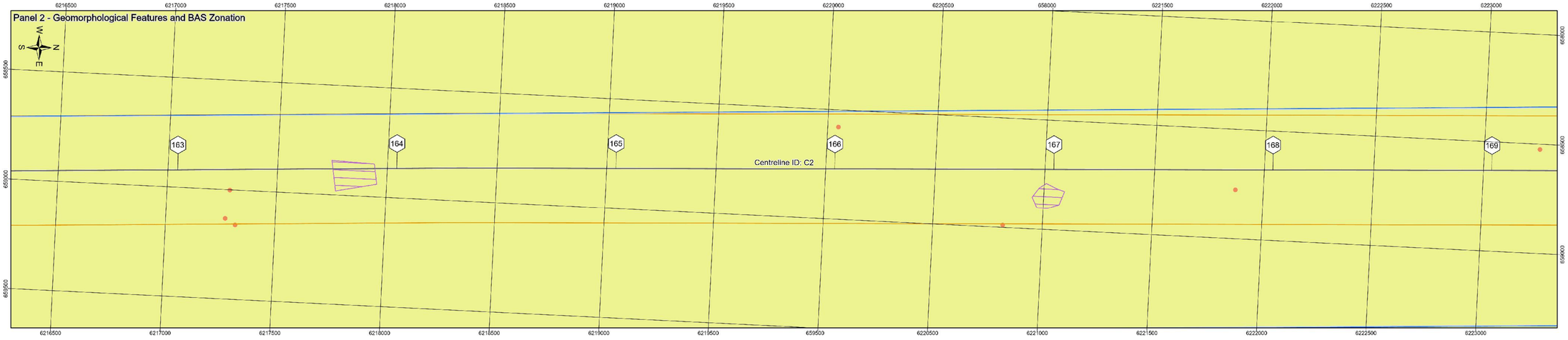
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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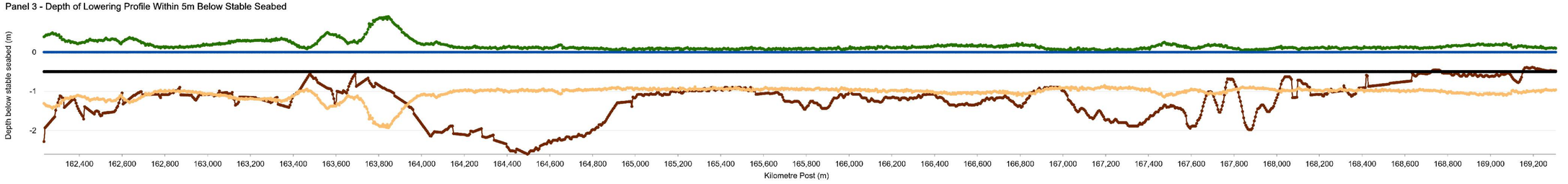
Panel 1 - Bathymetry



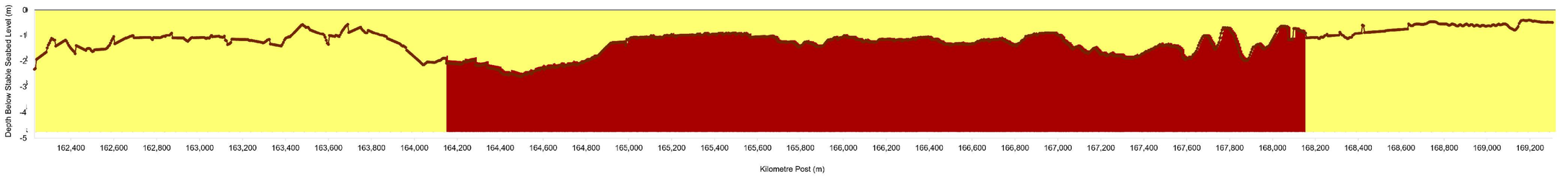
Panel 2 - Geomorphological Features and BAS Zonation



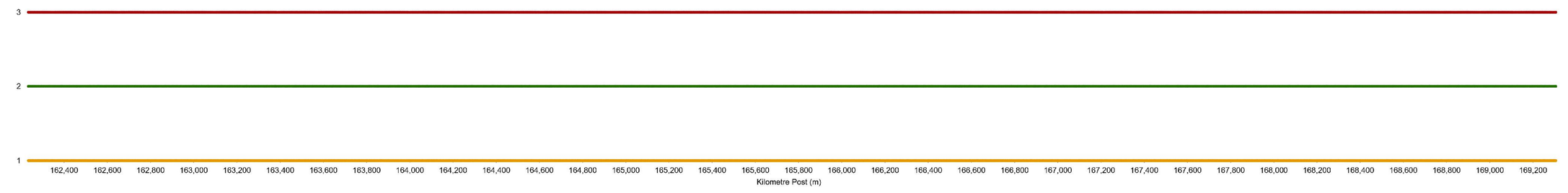
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



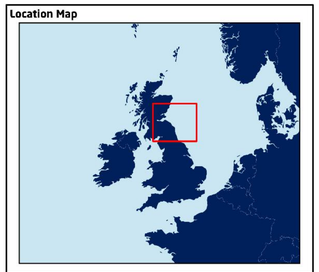
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



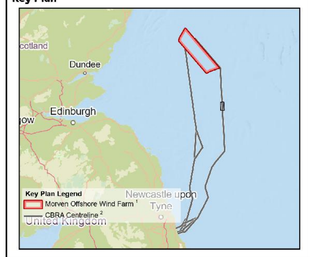
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

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- Boulder/debris
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- Depression with boulder/debris
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Panel 3

- Possible Mobile Bedform Height [5]
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Panel 4

Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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2. Created by GM, March 2024.
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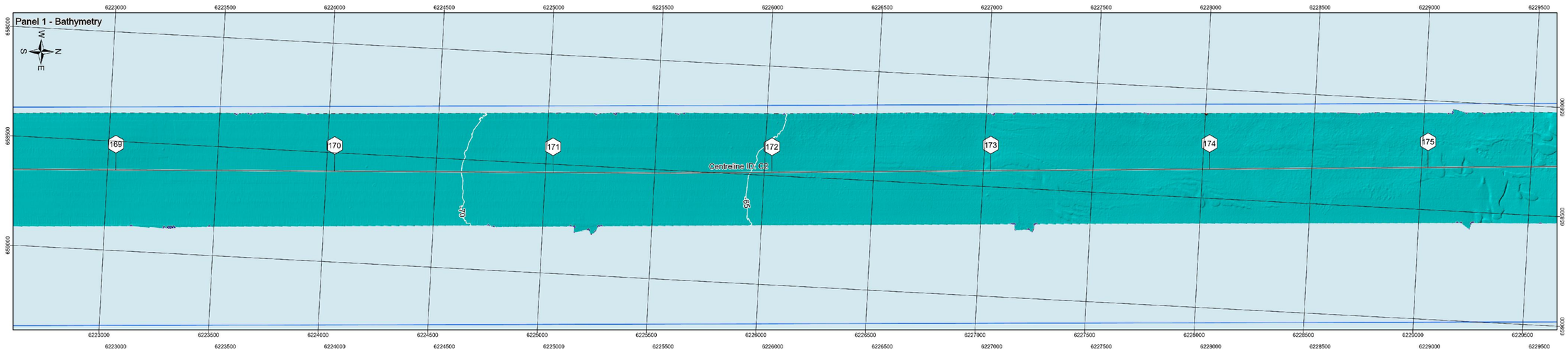
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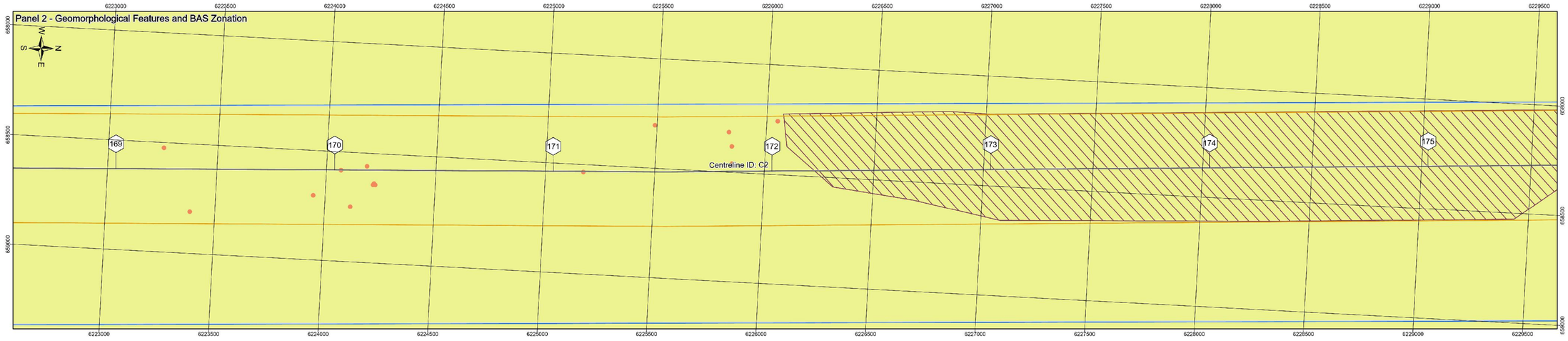
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 27 of 41

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Issue for Review

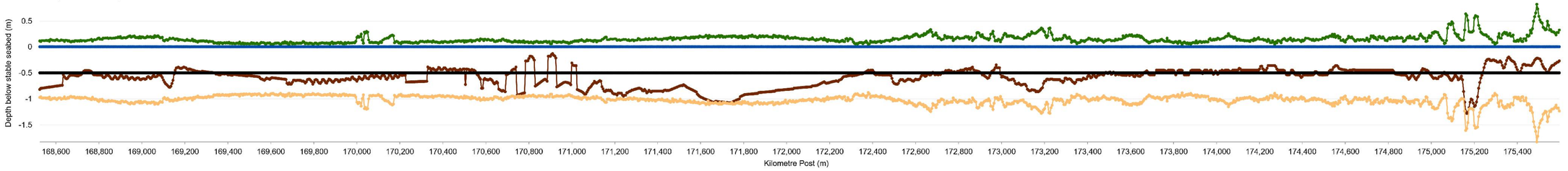
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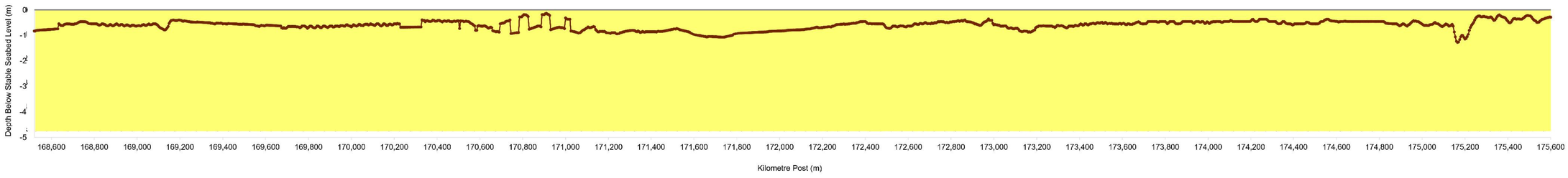




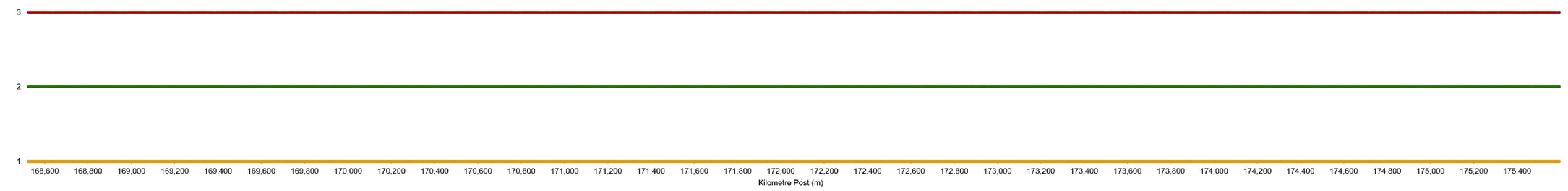
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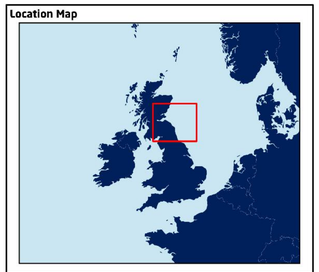
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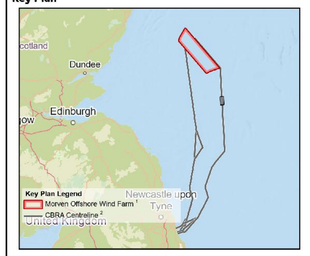
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- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [4]

Layer 2 Sediment Classification [4]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
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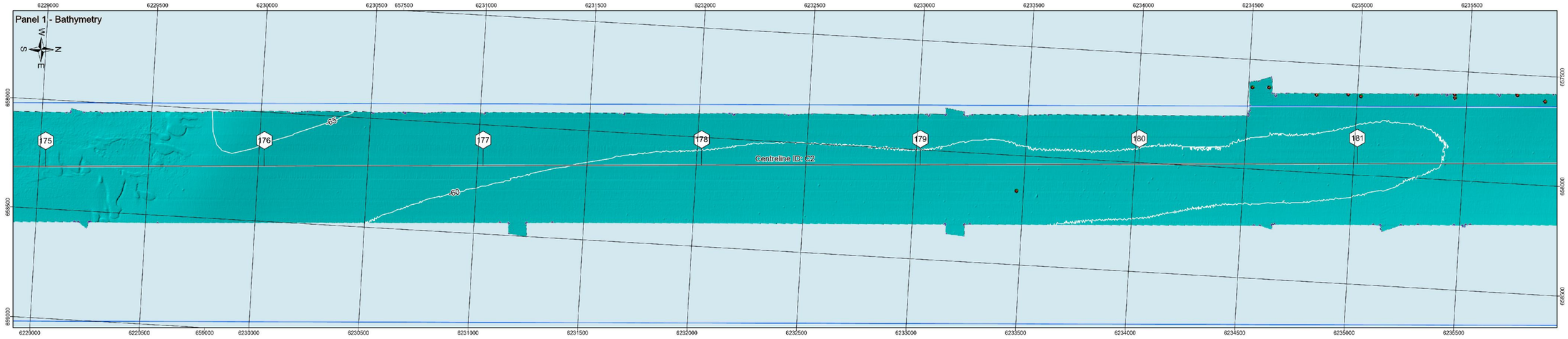
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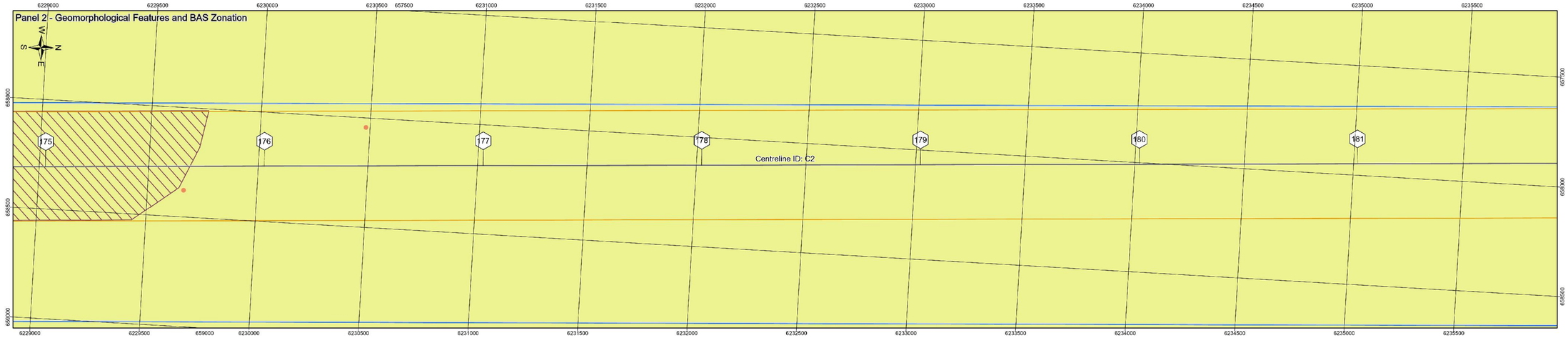
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 28 of 41

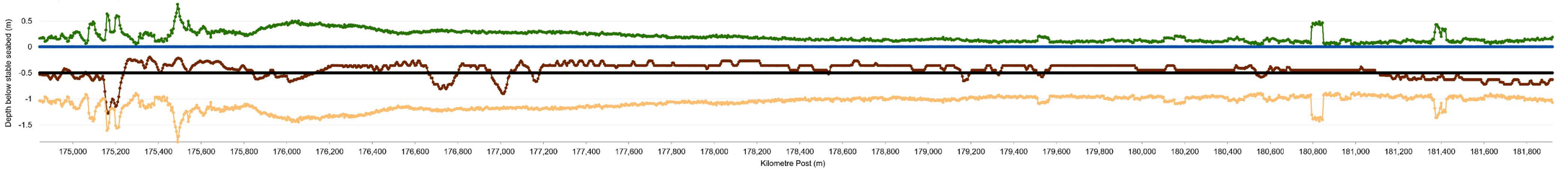
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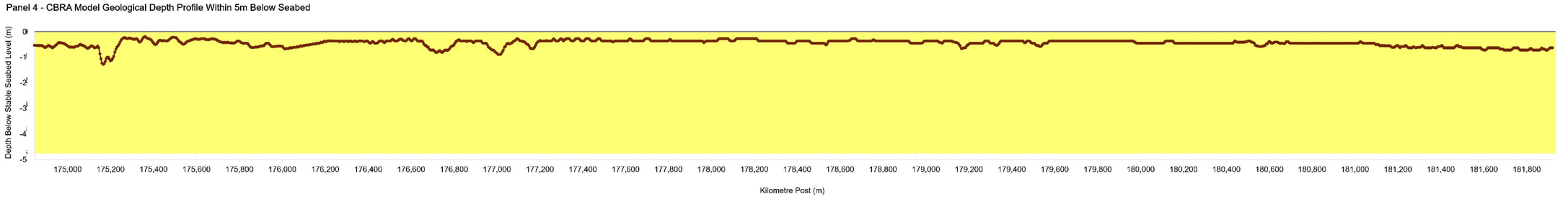
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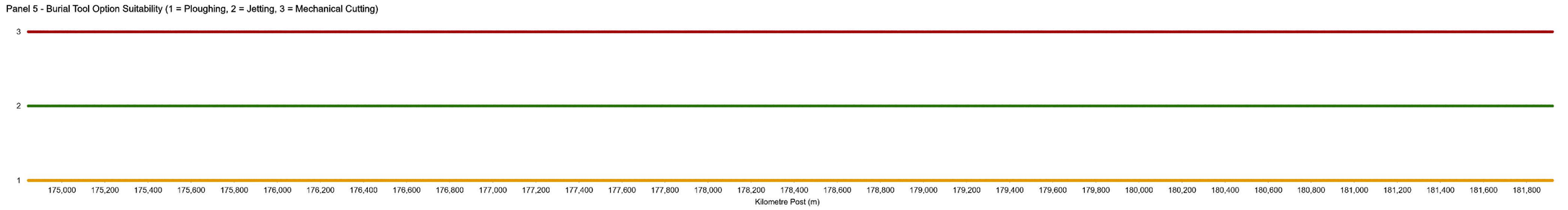
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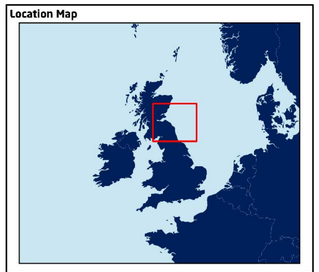




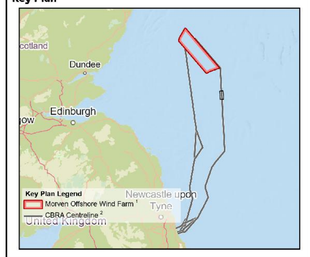




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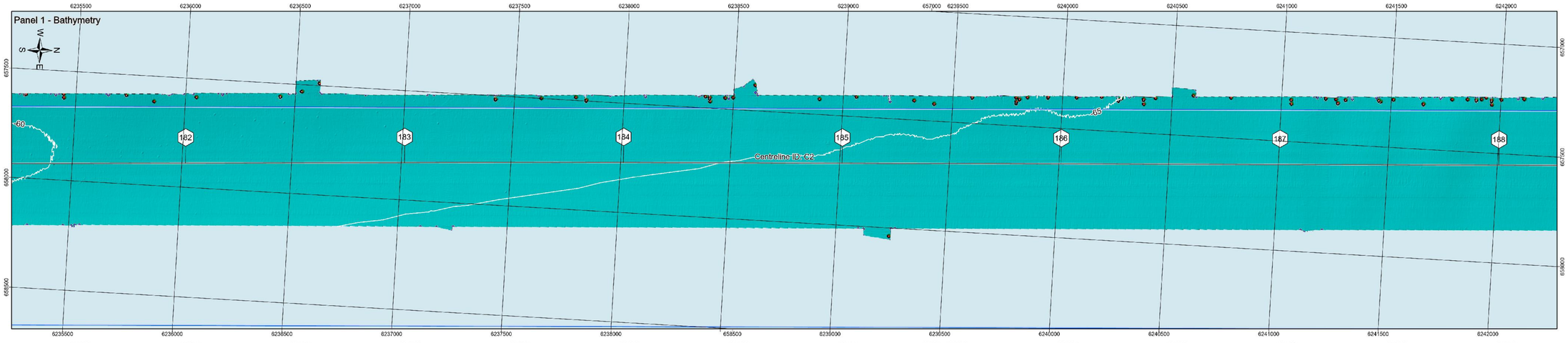
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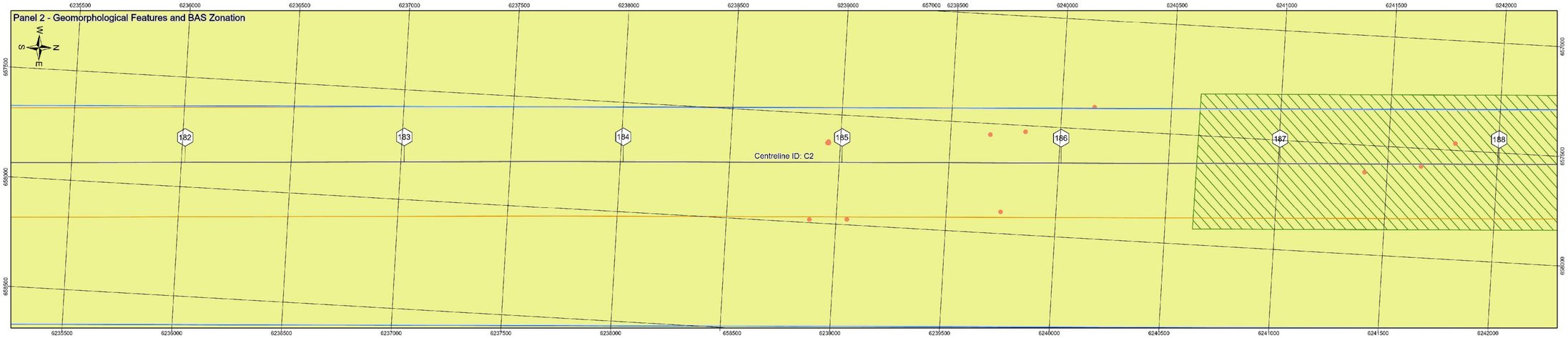
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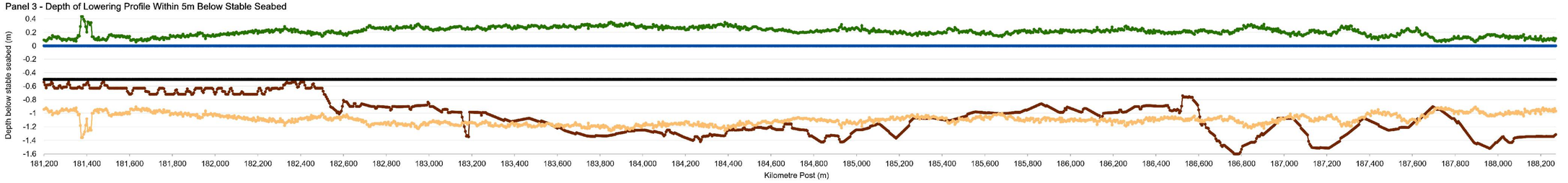
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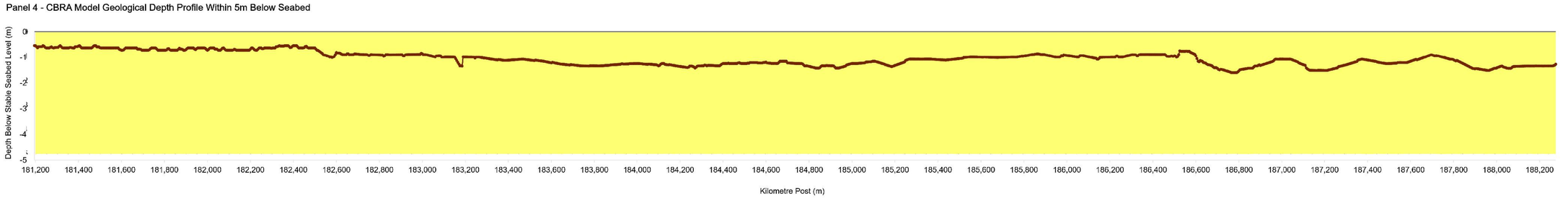
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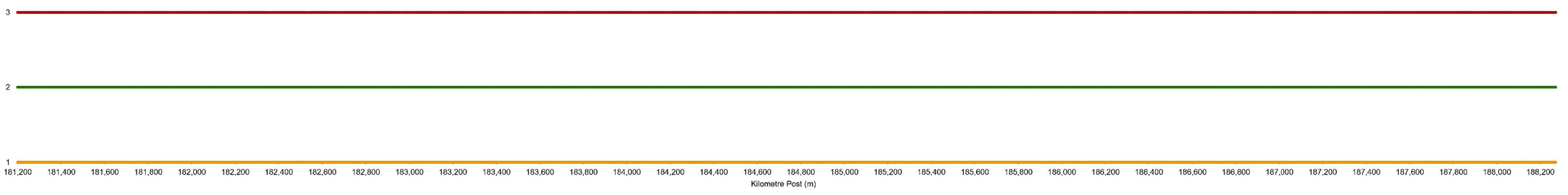
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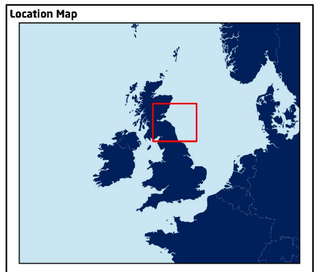




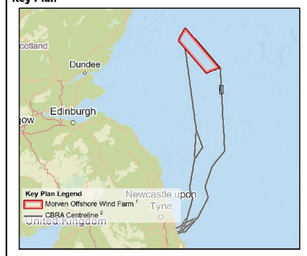




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Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
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- Proposed 1000m Survey Corridor [3]
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- Water depth contour (5m interval) [6]

Panel 2

BAS Zone Classification [3]
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Geomorphology [8]
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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
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- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
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- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
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- Target Trench Depth [5]

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Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

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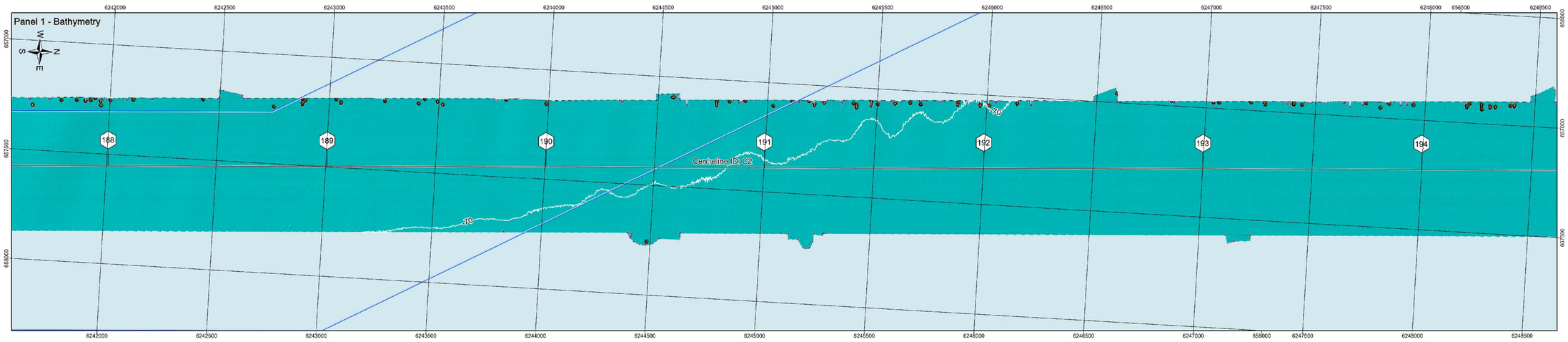
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Morven Offshore Wind Farm Cable Burial Risk Assessment

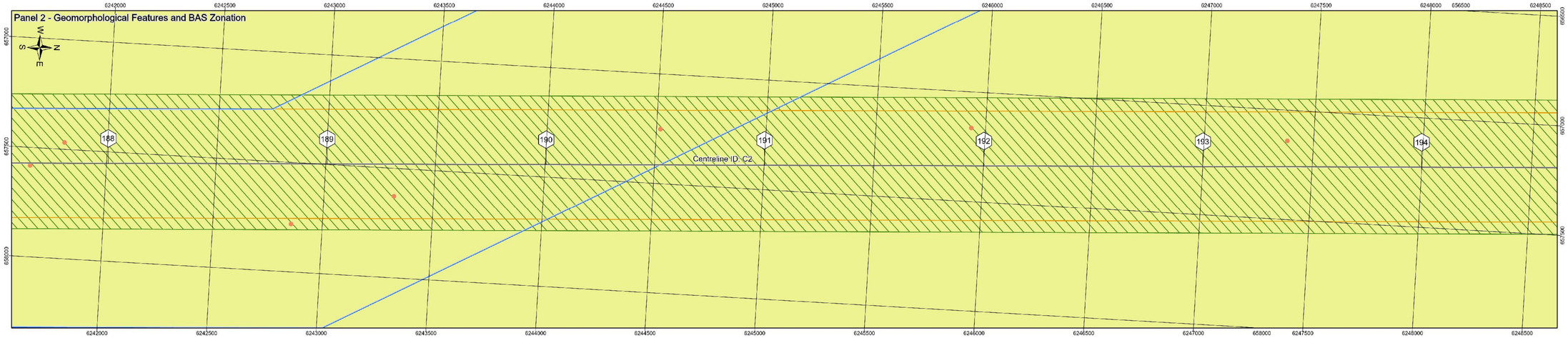
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 30 of 41

Drawing Status
Issue for Review

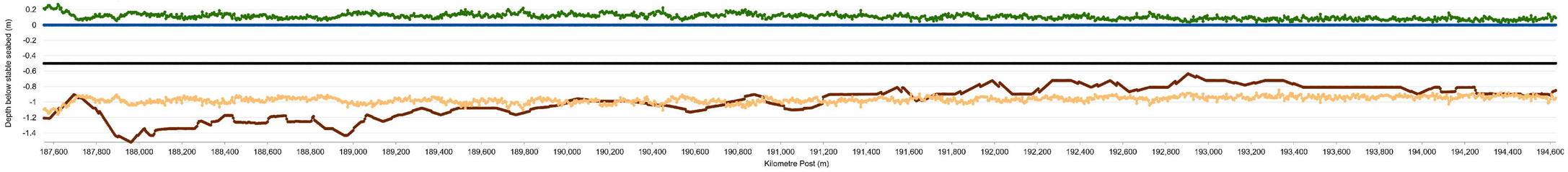
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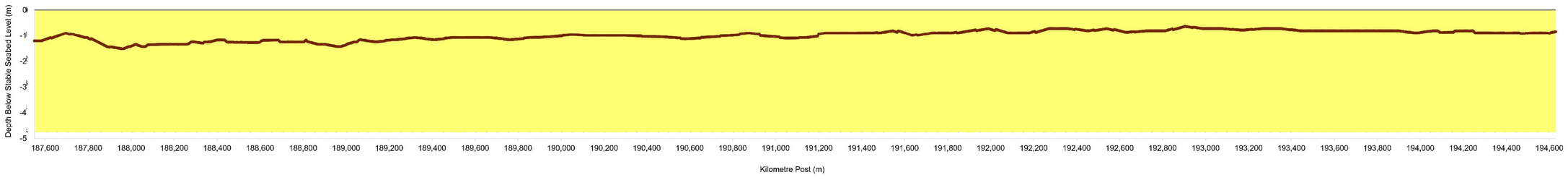




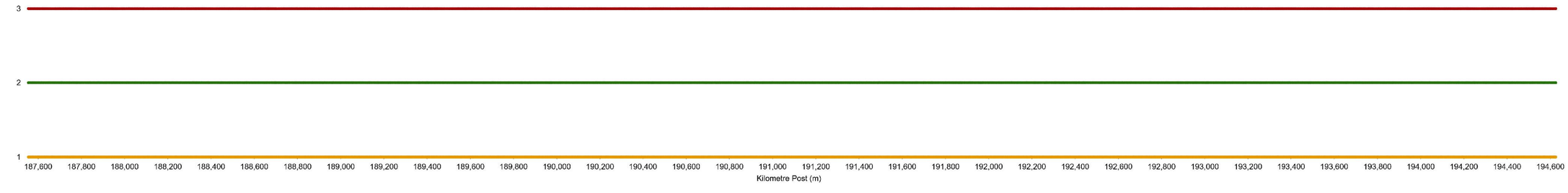
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



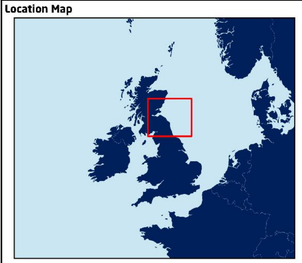
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



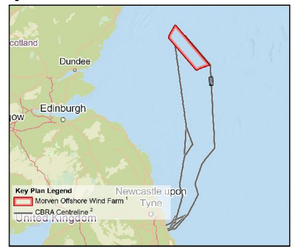
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Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
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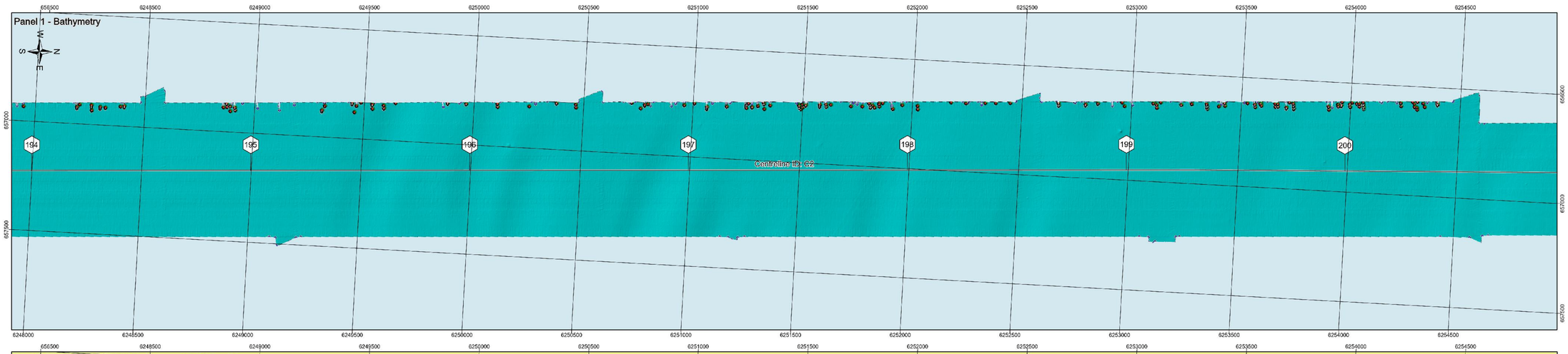
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 31 of 41

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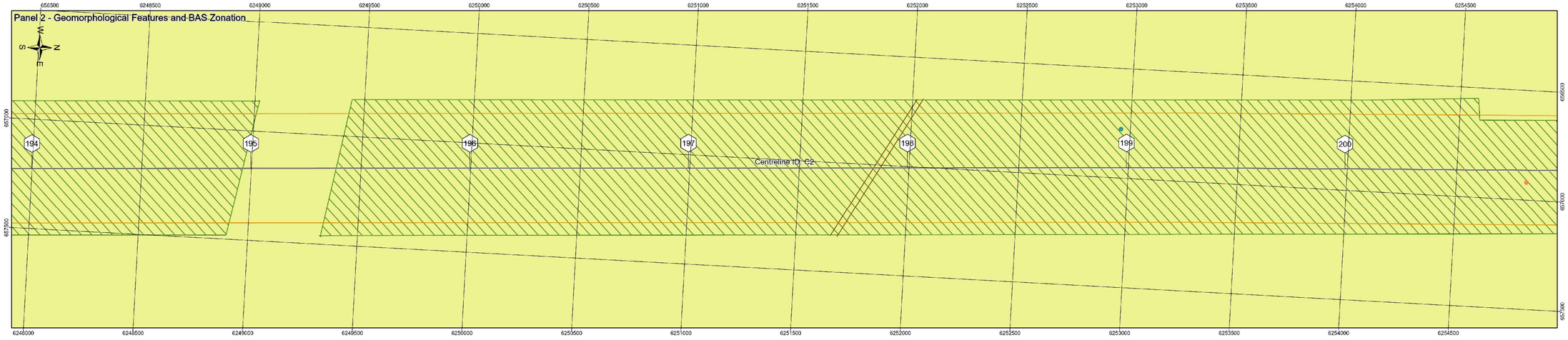
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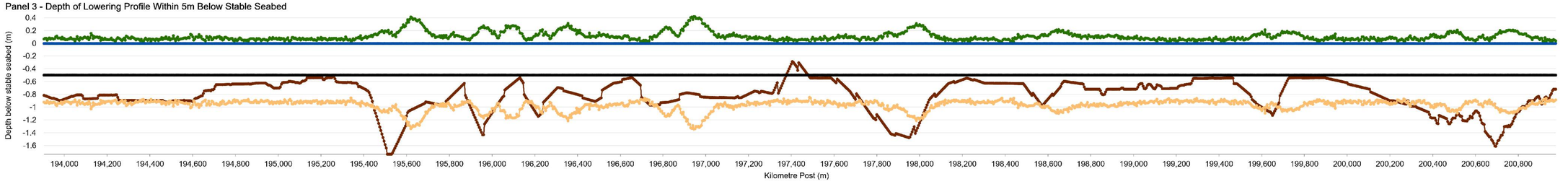
Panel 1 - Bathymetry



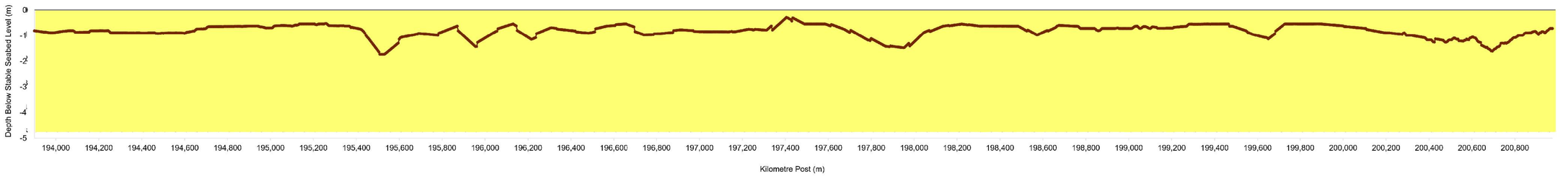
Panel 2 - Geomorphological Features and BAS Zonation



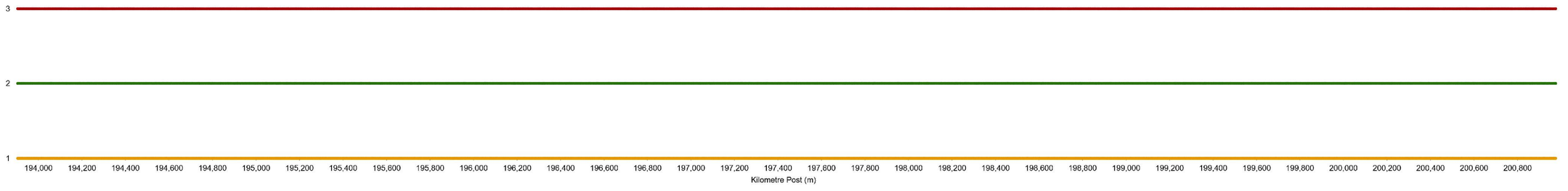
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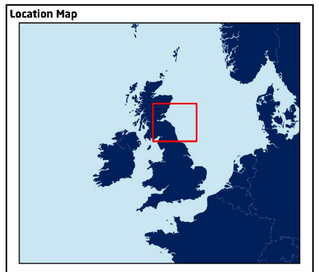
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



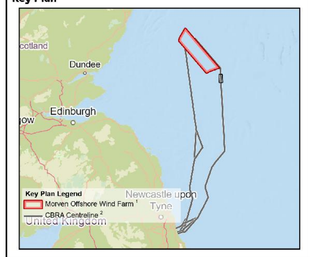
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
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Panel 5

- Suitable [3]
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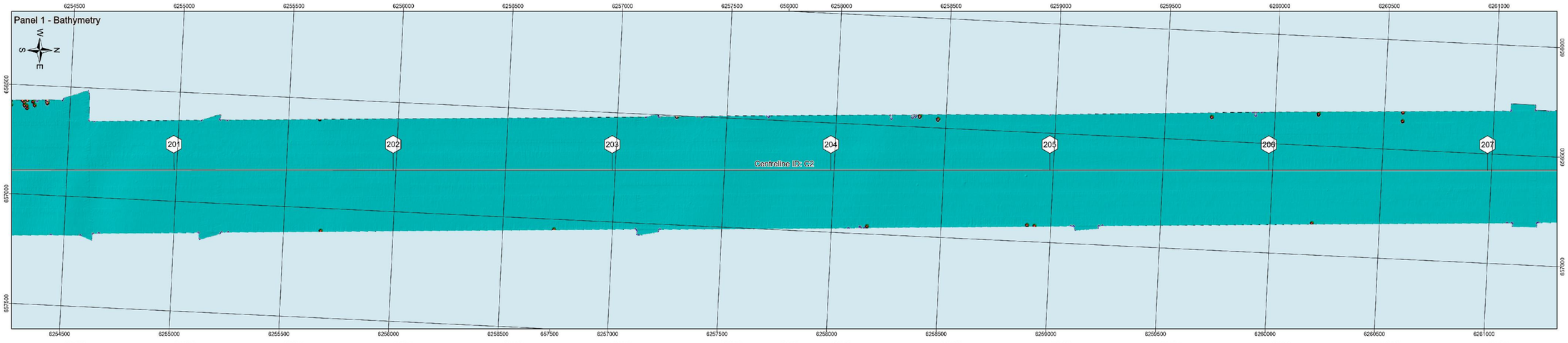
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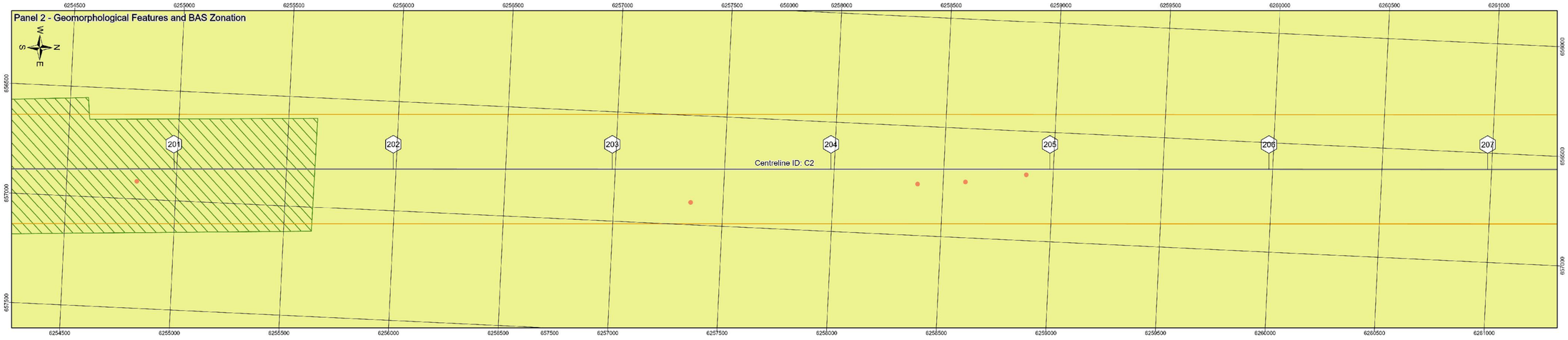
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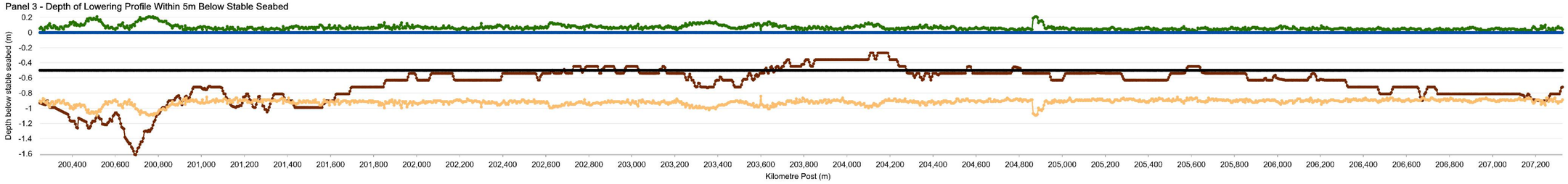
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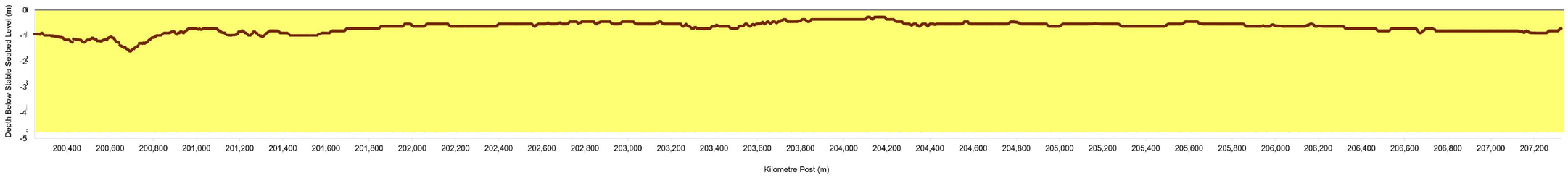
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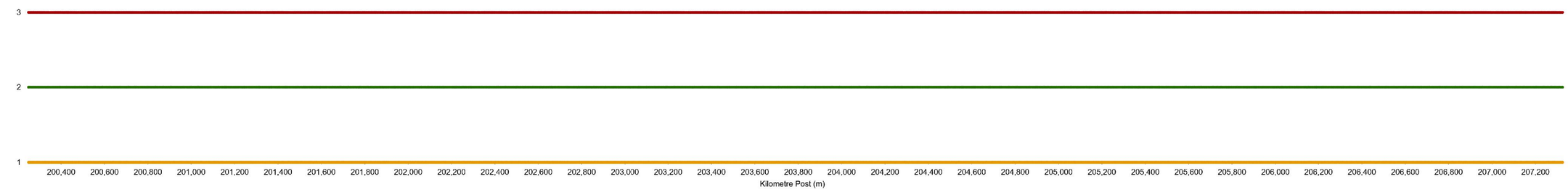
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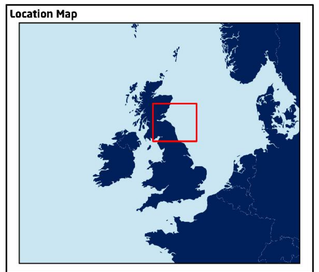
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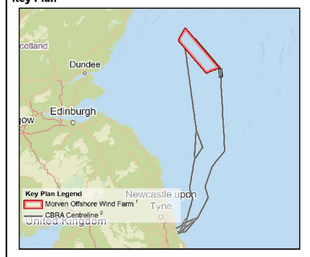
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Project Title
Morven Offshore Wind Farm

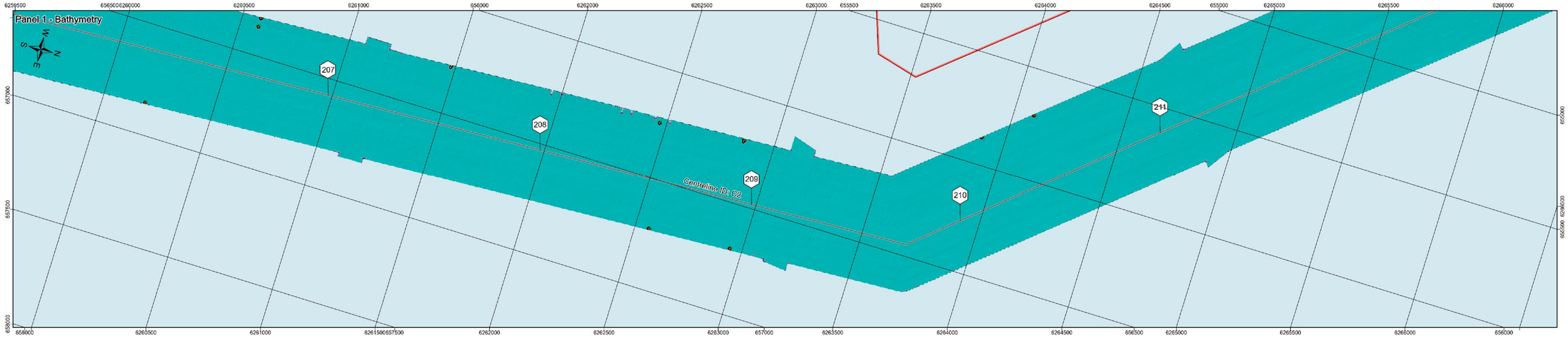
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

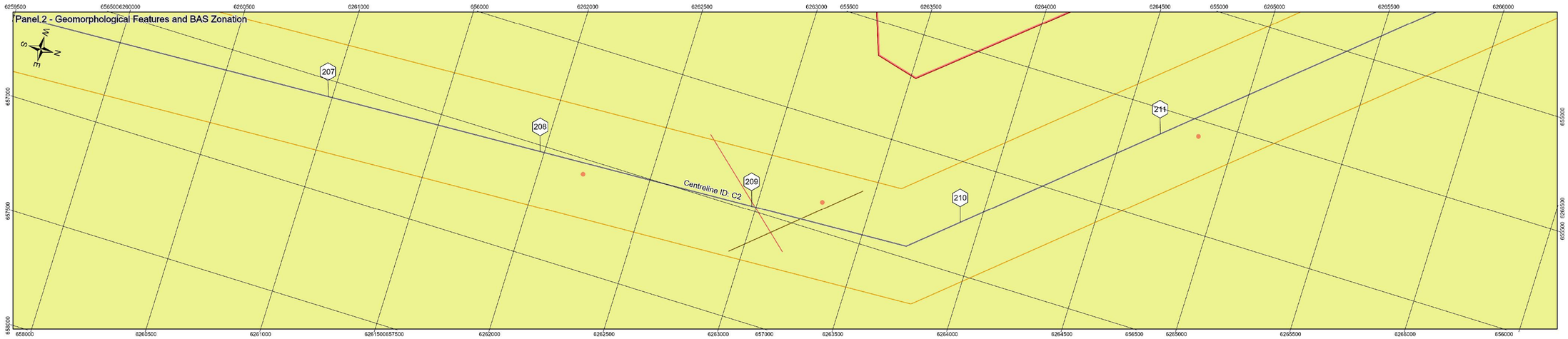
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 33 of 41

Drawing Status
Issue for Review

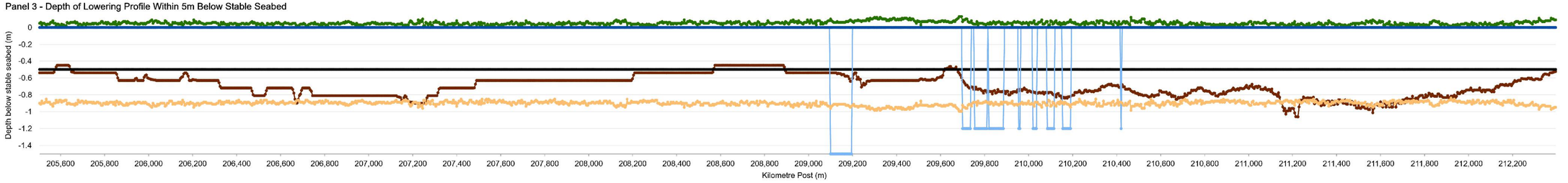
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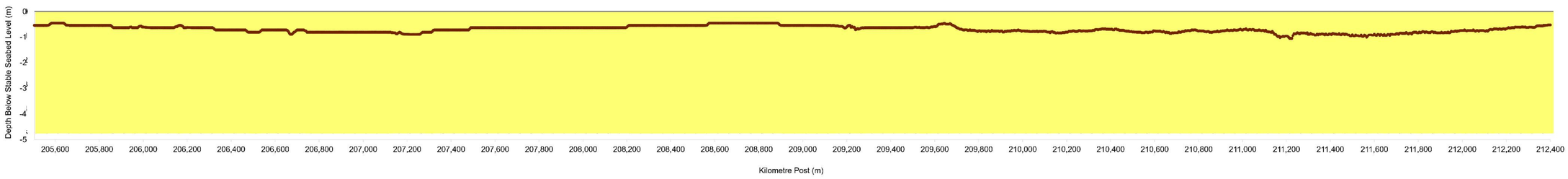




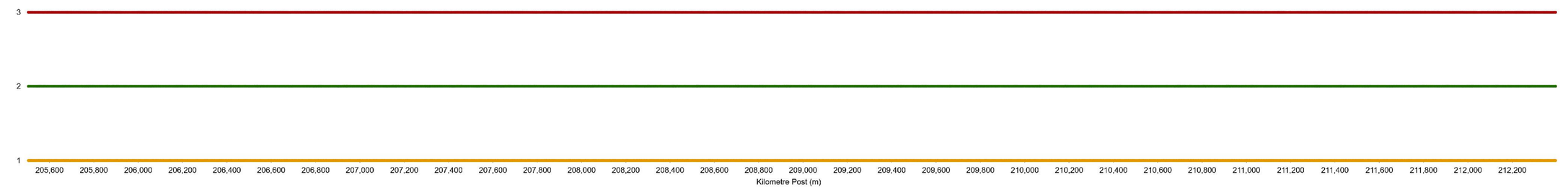
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



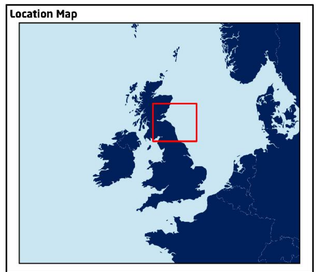
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



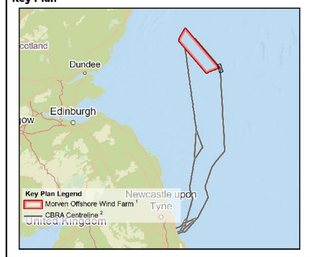
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



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Layer 1 Sediment Classification [9]	Layer 2 Sediment Classification [9]
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Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [9]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
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Scale @ A1: 1:10,000
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Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
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GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

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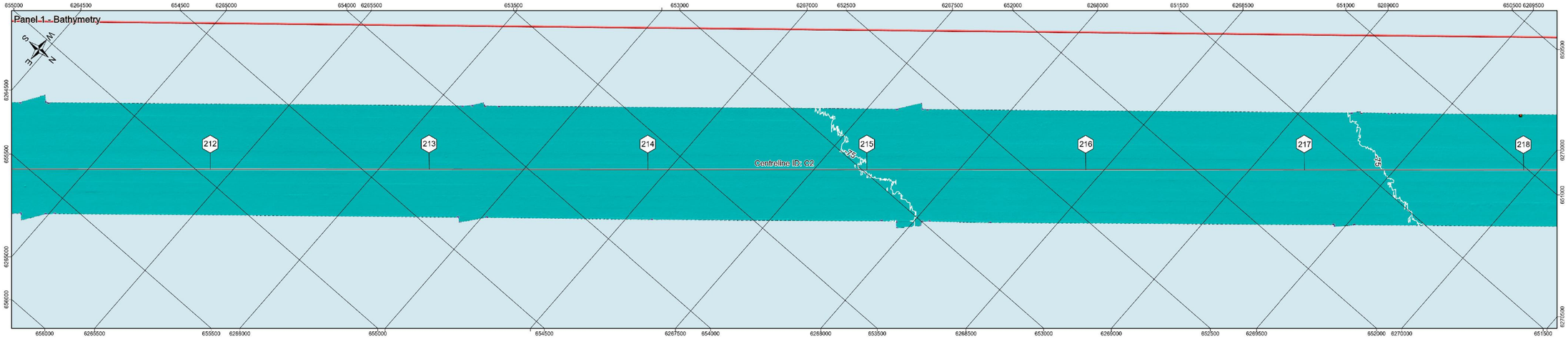
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 34 of 41

Drawing Status
Issue for Review

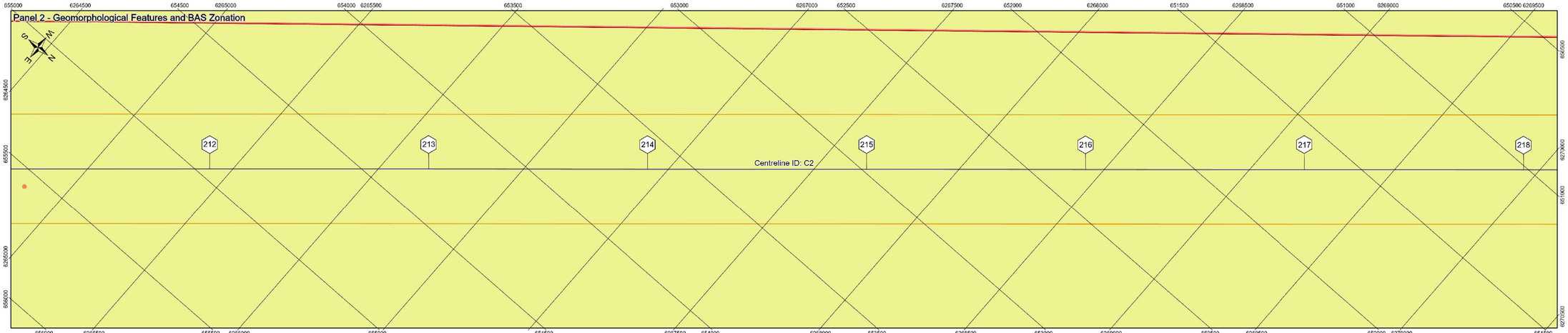
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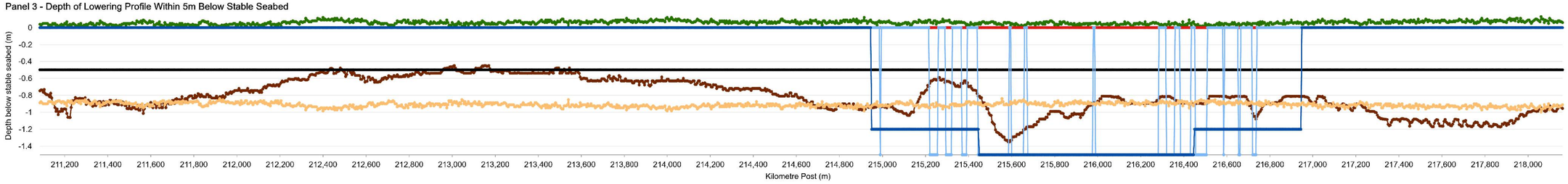
Panel 1 - Bathymetry



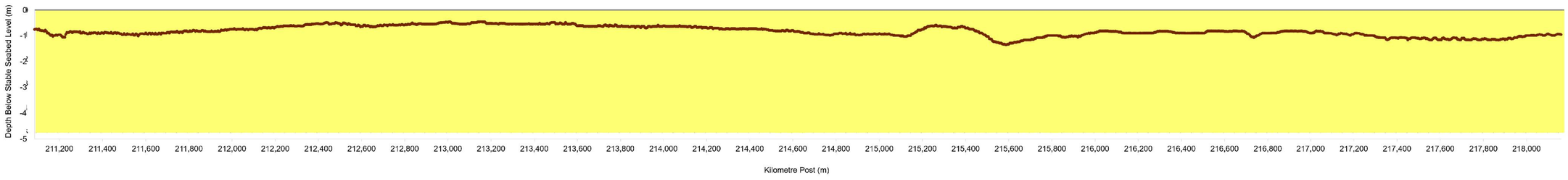
Panel 2 - Geomorphological Features and BAS Zonation



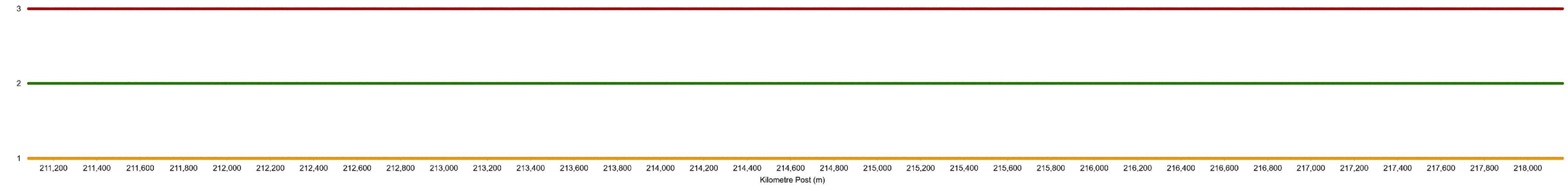
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



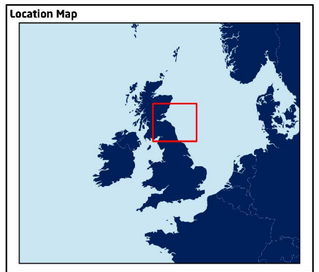
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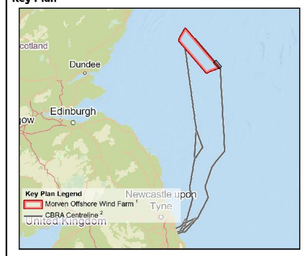
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



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Key Plan



Legend

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- CBRA Centreline [2]
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- Water depth contour (5m interval) [5]

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BAS Zone Classification [3]
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- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

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01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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Vertical Reference: Lowest Astronomical Tide (LAT)

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Spatial Reference
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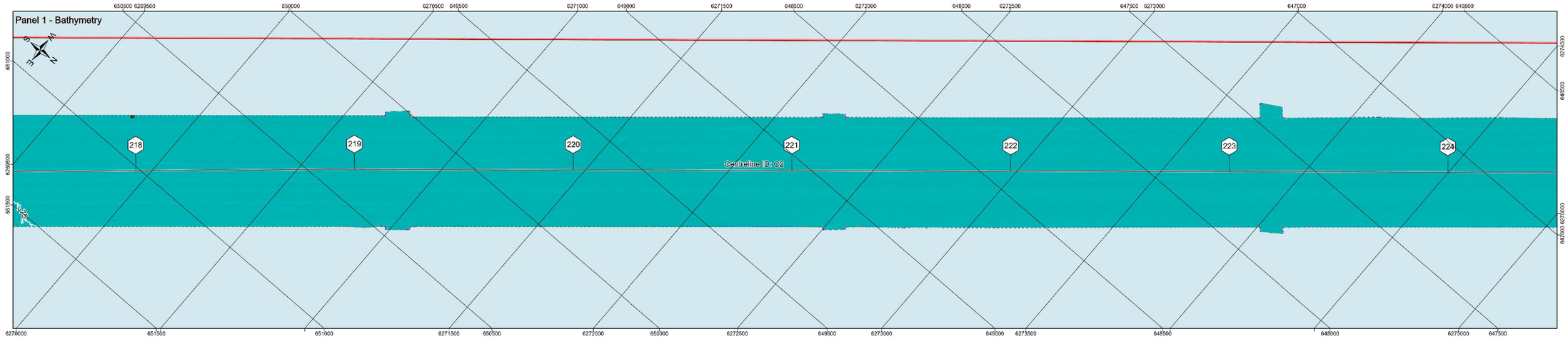
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 35 of 41

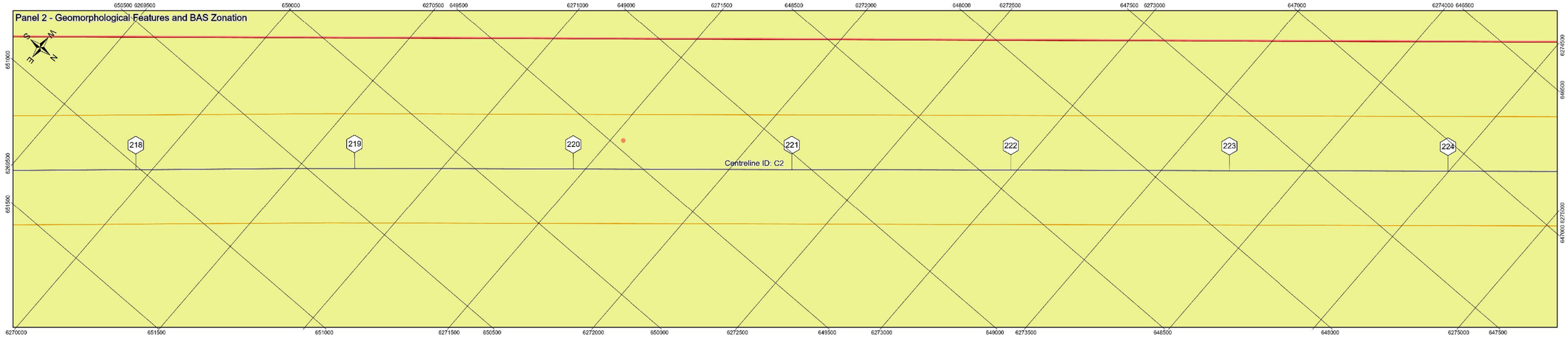
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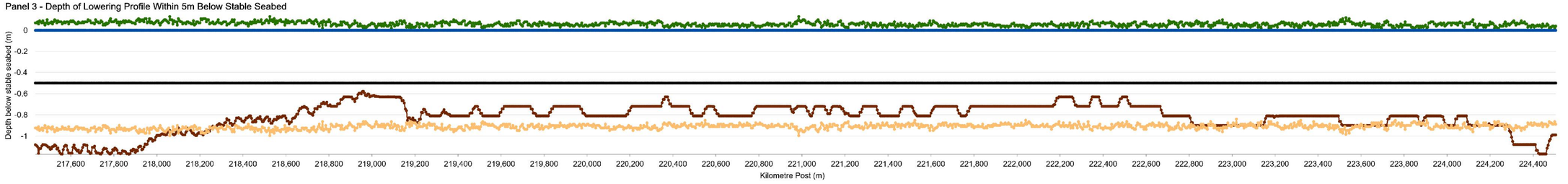
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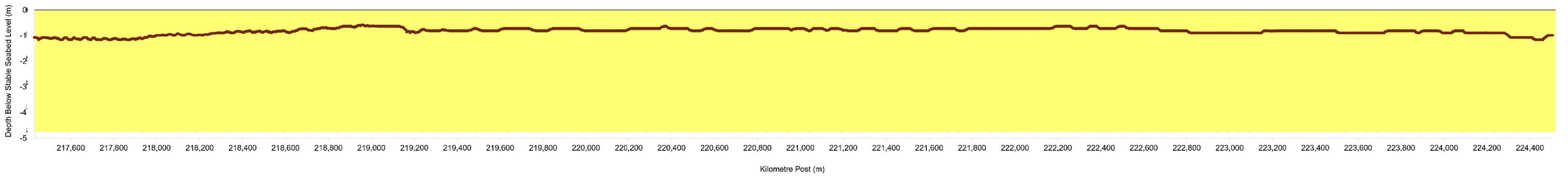




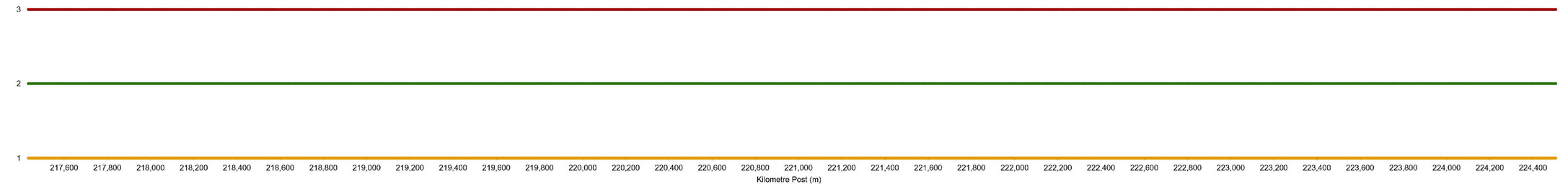
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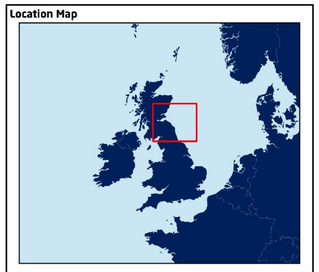
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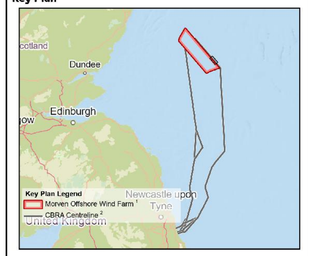
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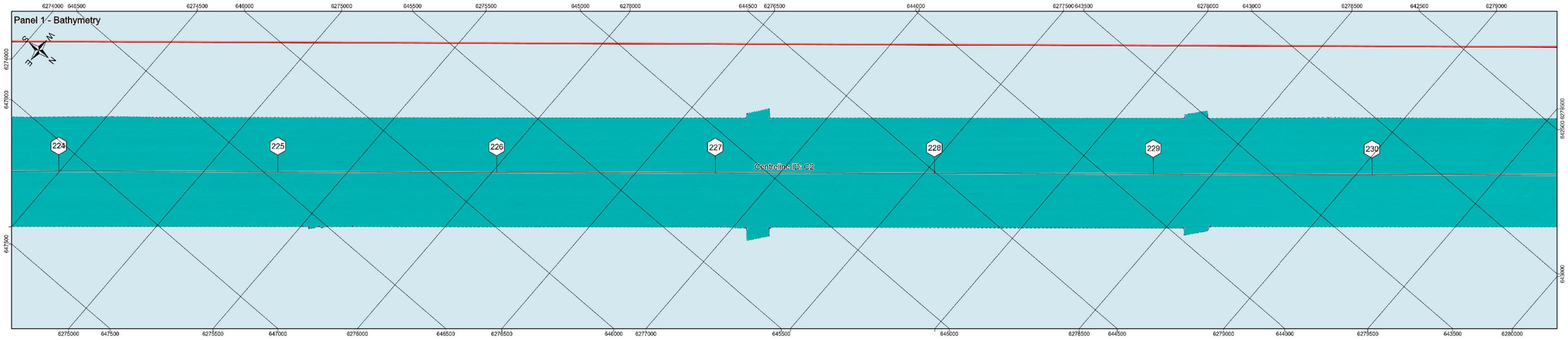
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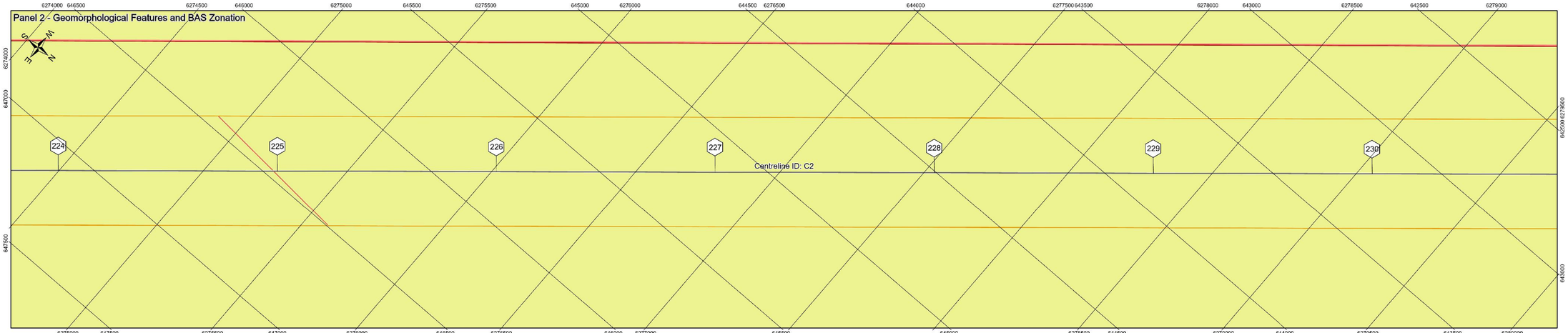
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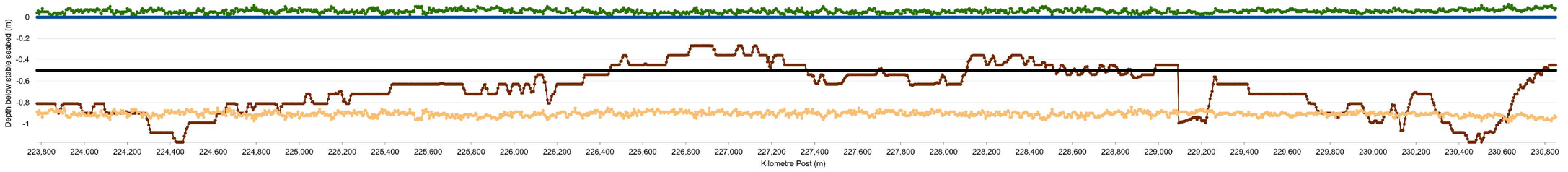
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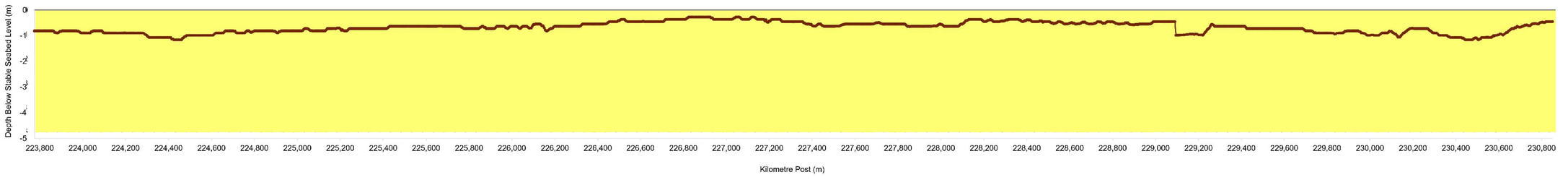




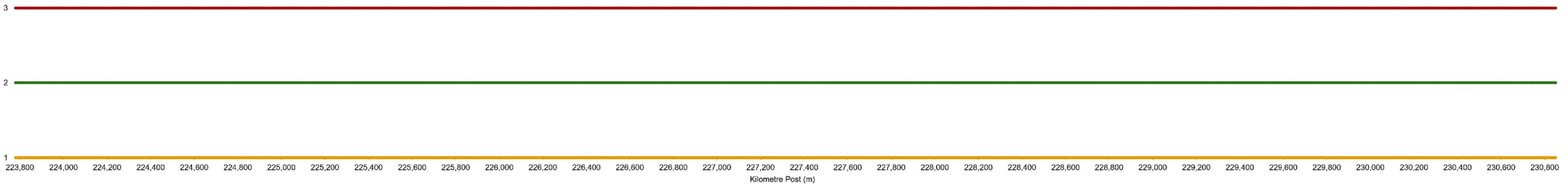
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



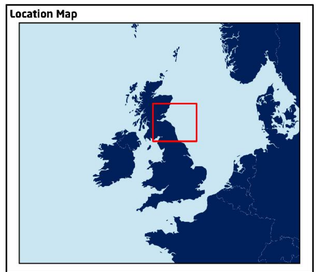
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



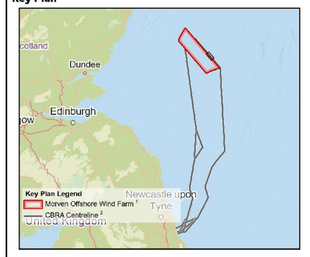
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]

Panel 2

BAS Zone Classification [3]
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- Sand or C1 - C3

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- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
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- 1.2 sandy Mud
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- Possible Mobile Bedform Height [5]
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- Global Maritime Recommended Depth of Lowering [1]
- Target Trench Depth [1]

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Panel 4

Layer 1 Sediment Classification [8]	Layer 2 Sediment Classification [8]
SAND (S)	SAND (S)
Extremely Low Strength CLAY (C1a)	Extremely Low Strength CLAY (C1b)
Extremely Low Strength CLAY (C1b)	Extremely Low Strength CLAY (C1c)
Extremely Low Strength CLAY (C1c)	Very Low Strength CLAY (C2)
Very Low Strength CLAY (C2)	Low Strength CLAY (C3)
Low Strength CLAY (C3)	Medium Strength CLAY (C4)
Medium Strength CLAY (C4)	High Strength CLAY (C5)
High Strength CLAY (C5)	Very High Strength CLAY (C6)
Very High Strength CLAY (C6)	Extremely High Strength CLAY (C7)
Extremely High Strength CLAY (C7)	Rock (R)
Rock (R)	
Layer 1/Layer 2 Boundary [8]	

Panel 5

- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
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0 100 200 m

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Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
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Project Title
Morven Offshore Wind Farm

Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

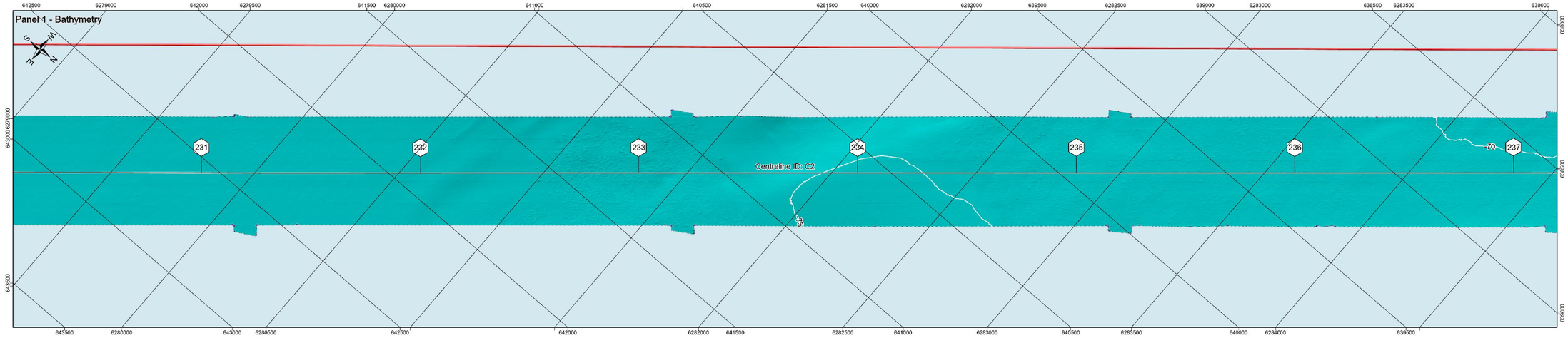
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 37 of 41

Drawing Status
Issue for Review

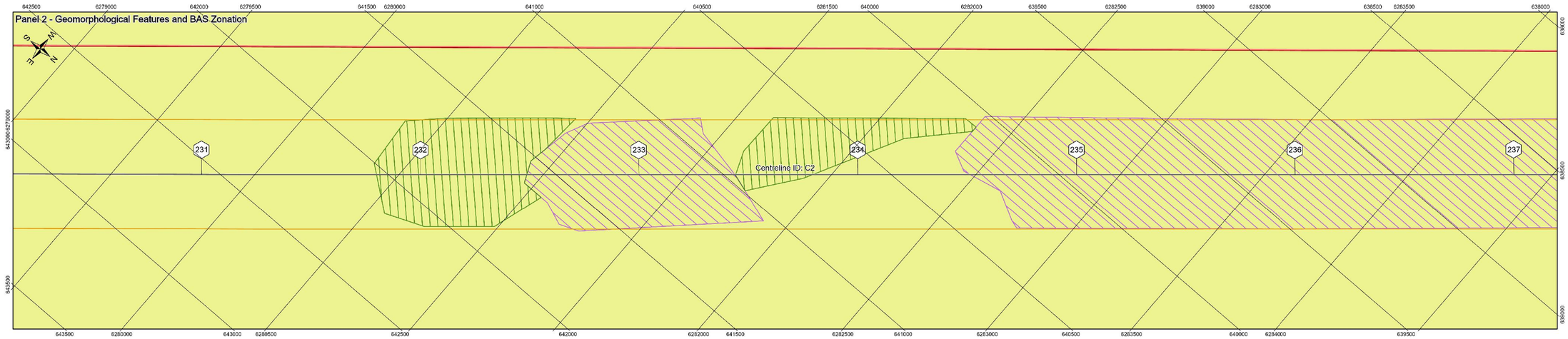
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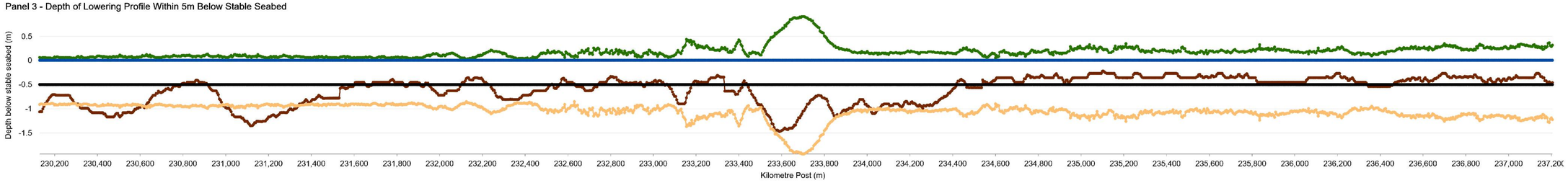
Panel 1 - Bathymetry



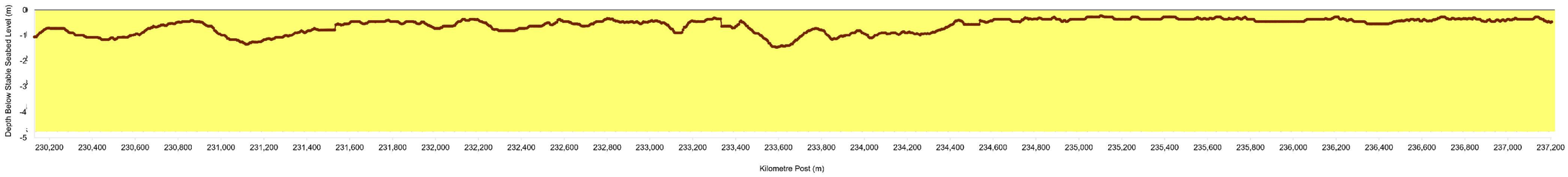
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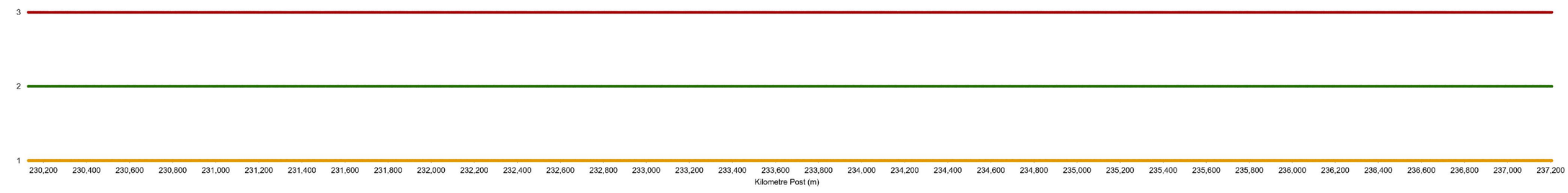
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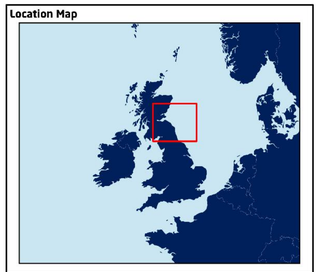
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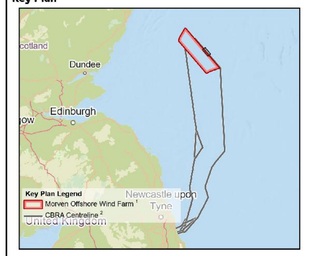
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- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5

- Suitable [3]
- Possible [3]
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Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
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Spatial Reference
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Projection: Transverse Mercator
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Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
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Map Units: Meter

Notes:
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Morven Offshore Wind Farm

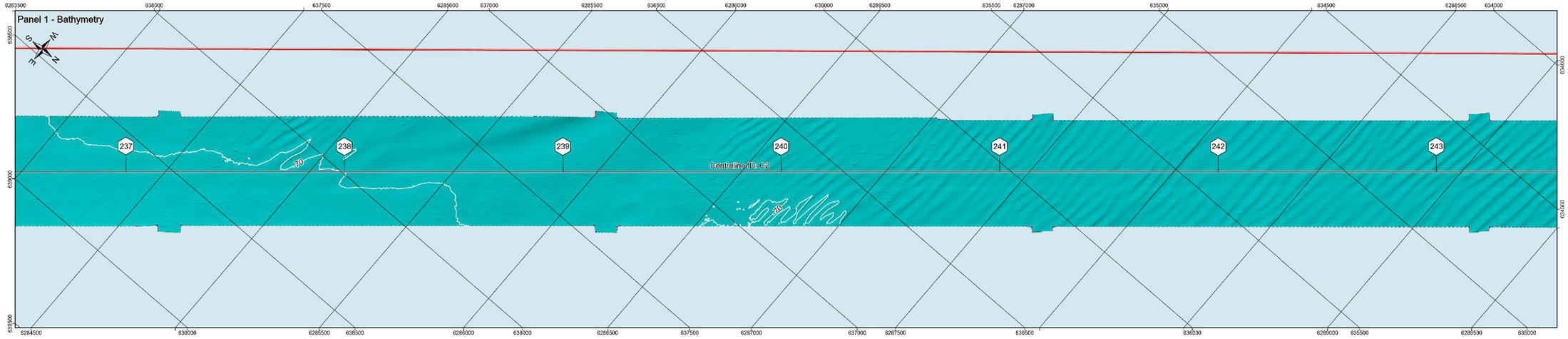
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

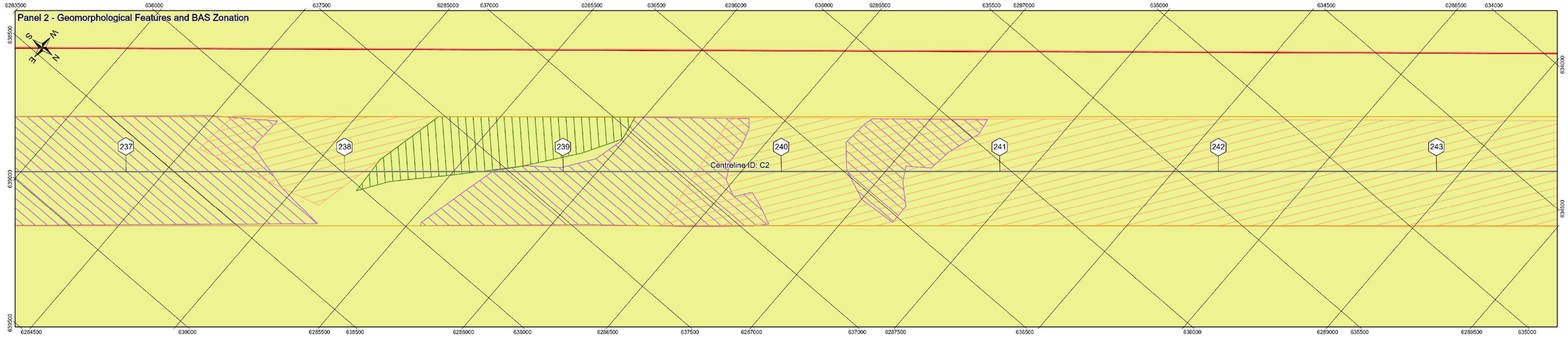
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 38 of 41

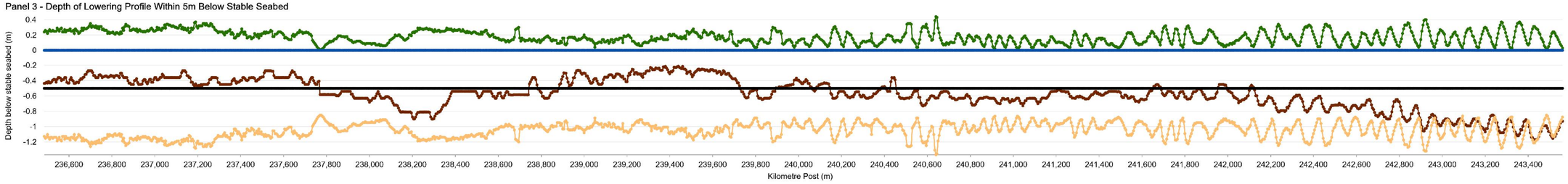
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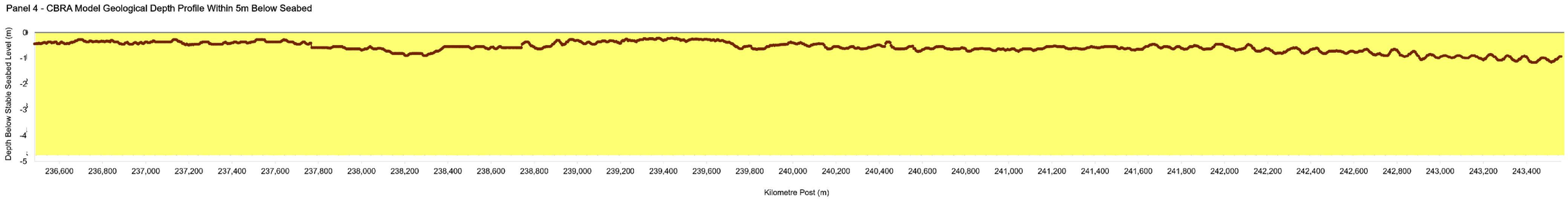
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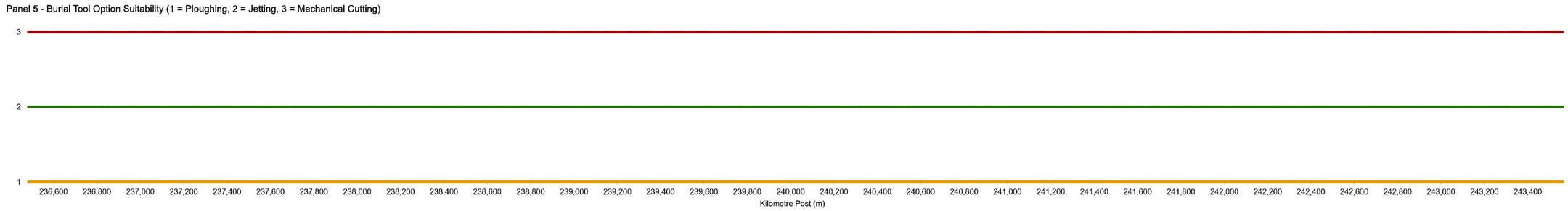
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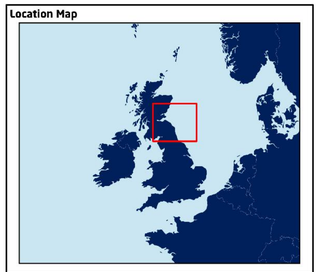




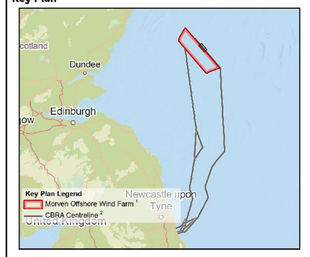




Location Map



Key Plan



Legend

Panel 1 & Site Data

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BAS Zone Classification [3]
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- Low Strength CLAY (C3)
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
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- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
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Panel 5

- Suitable [3]
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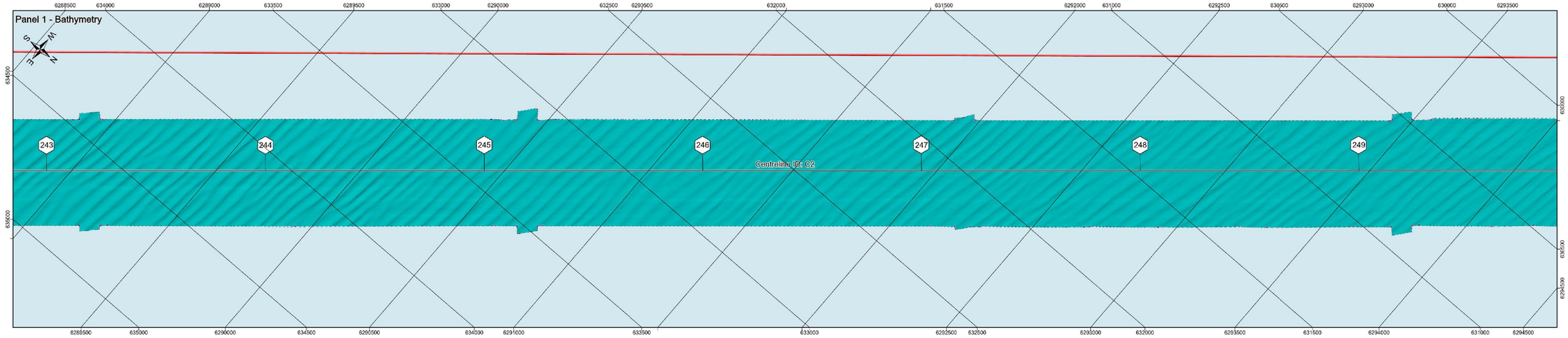
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 39 of 41

Drawing Status
Issue for Review

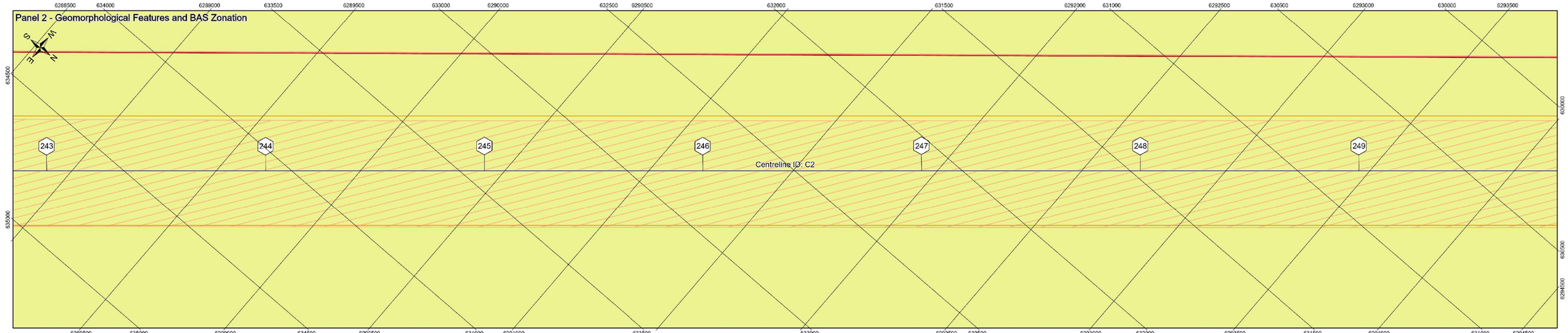
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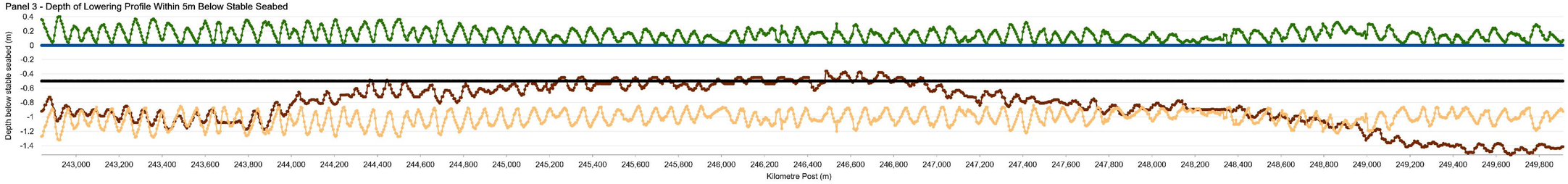
Panel 1 - Bathymetry



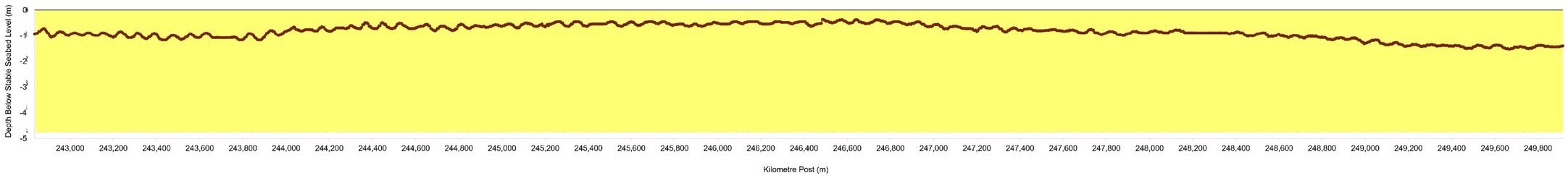
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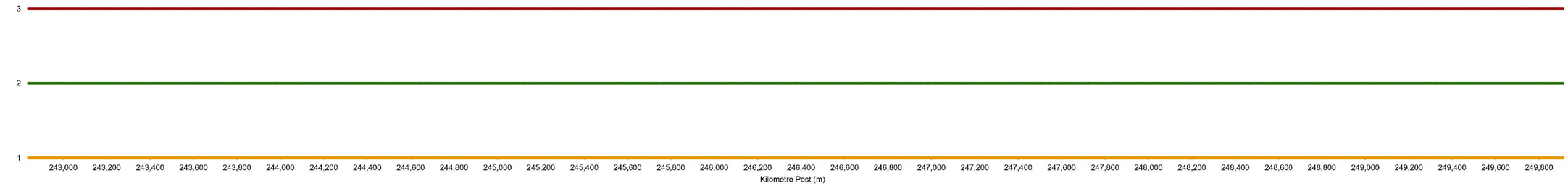
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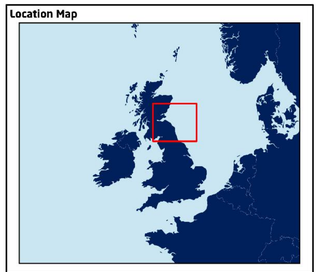
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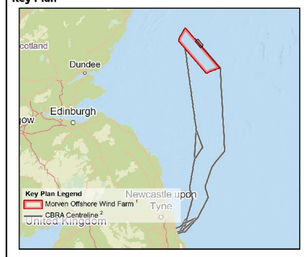
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- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)
- Layer 1/Layer 2 Boundary [8]

Layer 2 Sediment Classification [8]
- SAND (S)
- Extremely Low Strength CLAY (C1b)
- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
- Low Strength CLAY (C3)
- Medium Strength CLAY (C4)
- High Strength CLAY (C5)
- Very High Strength CLAY (C6)
- Extremely High Strength CLAY (C7)
- Rock (R)

Panel 5
- Suitable [3]
- Possible [3]
- Not Suitable [3]

Revision Status

Rev	Date	Details of Changes	Dr'n	Ch'k	App'd
01	29/07/2025	FIRST ISSUE	LMC	HCA	MLA

Scale @ A1: 1:10,000
Datum: European 1950
Projection: UTM Zone 30N

Vertical Reference: Lowest Astronomical Tide (LAT)

0 100 200 m

Spatial Reference
Name: ED 1950 UTM Zone 30N
GCS: GCS European 1950
Datum: European 1950
Projection: Transverse Mercator
Central Meridian: -3.0000
Latitude of Origin: 0.0000
Longitude of Origin: 0.0000
Latitude of Center: 0.0000
Longitude of Center: 0.0000
Scale Factor: 0.9996
Azimuth: 0.0000
Map Units: Meter

Notes:
1. Source: The Crown Estate, Nov 2023.
2. Created by GM, March 2024.
3. Created by GM, May 2024.
4. Provided by EnBW bp, May 2024.
5. Derived from XOcean Geophysical Surveys, Provided March 2024.
6. Provided by EnBW bp, March 2024.
7. Source: EMODnet, June 2024.
8. Calculated by GM. Methodology found in GM-PRJ116388-GEO-RP-001.
9. TTD is the sum of bedform height, DoL, a 0.2 m cable diameter all with a 20% contingency applied. TTD is subject to change based upon tool selection.
10. Source: ESCA, April 2024.

Project Title
Morven Offshore Wind Farm

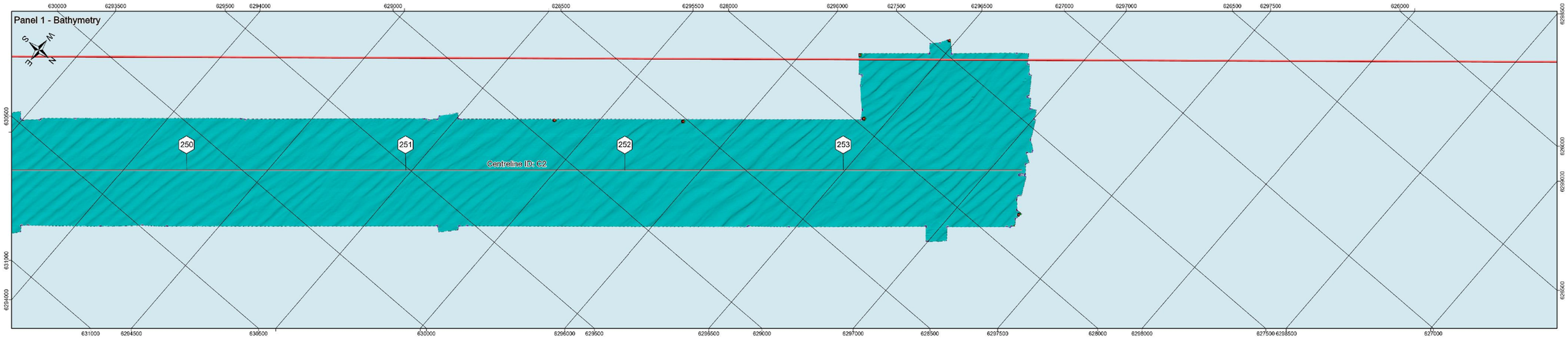
Report Title
Morven Offshore Wind Farm Cable Burial Risk Assessment

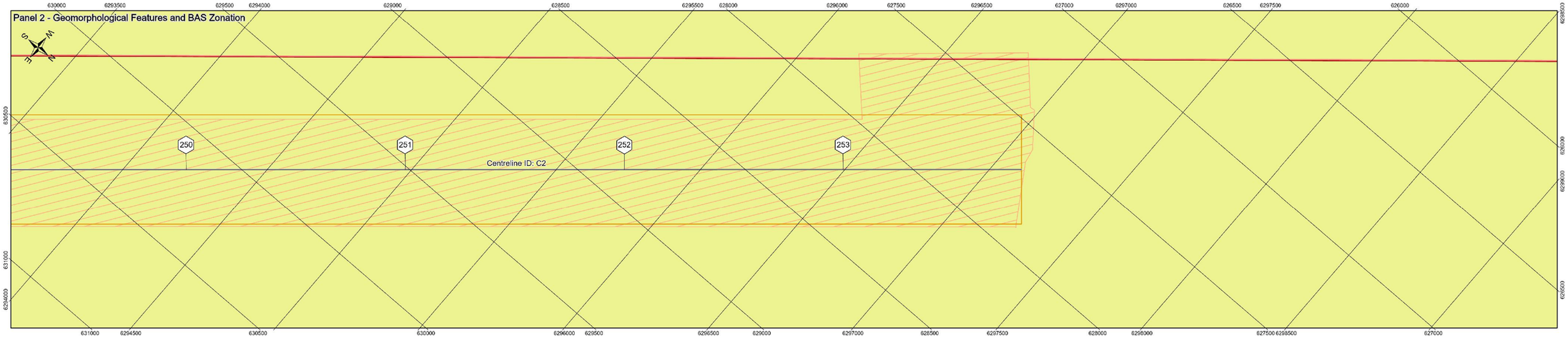
Drawing Title
CBRA Alignment Charts - Centreline ID: C2 - Sheet 40 of 41

Drawing Status
Issue for Review

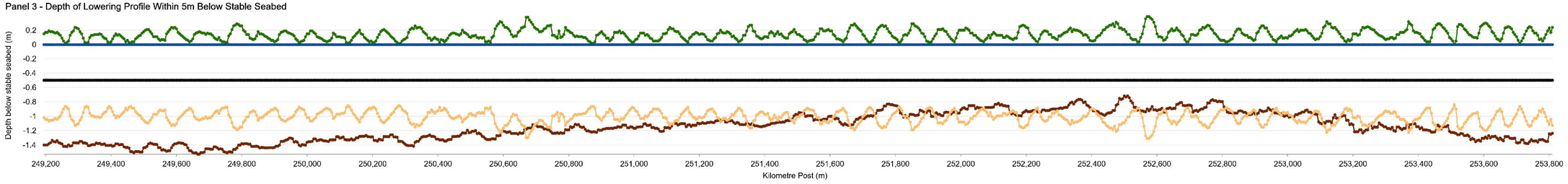
Drawing Number
GM-PRJ116388-GEO-RP-001-ACH-001-REV-01

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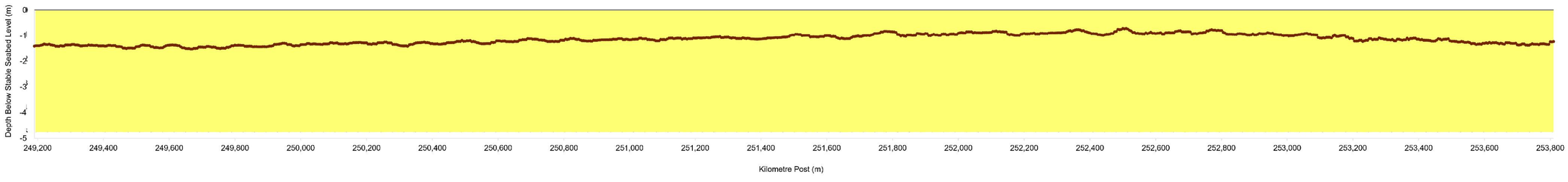




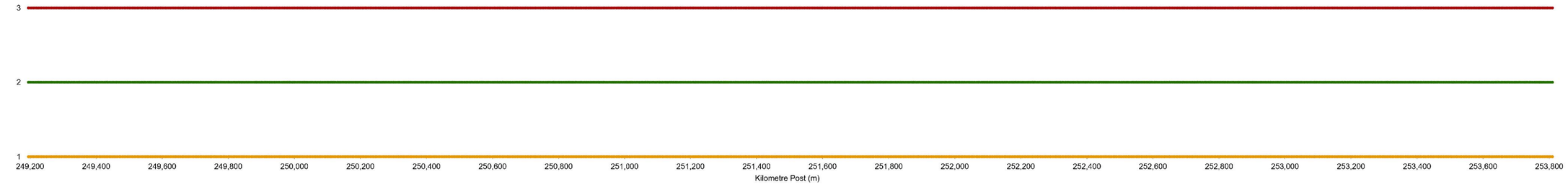
Panel 3 - Depth of Lowering Profile Within 5m Below Stable Seabed



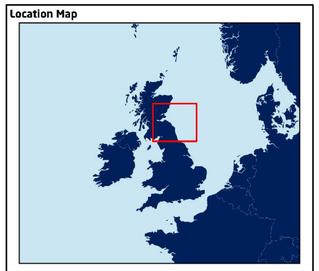
Panel 4 - CBRA Model Geological Depth Profile Within 5m Below Seabed



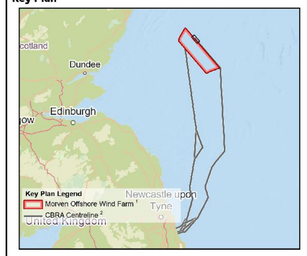
Panel 5 - Burial Tool Option Suitability (1 = Ploughing, 2 = Jetting, 3 = Mechanical Cutting)



Location Map



Key Plan



Legend

Panel 1 & Site Data

- CBRA Centreline [2]
- Kilometre Post (1km Interval) [7]
- Kilometre Post (1km Interval) [2]
- Redline Boundary [4]

Panel 2

BAS Zone Classification [3]
- C4 - C7 or Rock
- Sand or C1 - C3

Geomorphology [6]
- Boulder
- Boulder/debris
- Depression
- Depression with boulder/debris
- Wreck
- Linear feature
- Pipeline
- Trawl mark
- Bedrock outcrop
- Boulder field
- Glacial features
- Scouring
- Thin sediment cover
- Megaripples
- Sand waves

Seabed Substrate [7]
- 1.1 Mud
- 1.2 sandy Mud
- 1.3 muddy Sand
- 2. Sand
- 3. Coarse substrate
- 4. Mixed sediment
- 5. Rock & boulders
- 8. No data at this level
- 9. Restricted data
- 10. Unpublic data
- SEGL2 Installation Corridor [6]
- SEGL1 Installation Corridor [6]
- Active Cables [10]

Panel 3

- Possible Mobile Bedform Height [5]
- Reference Seabed Level (RSBL) [8]
- Layer 1/Layer 2 Boundary [8]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (from 50m x 50m cells) [5]
- CBRA Depth of Lowering Required for ~10,000 Year Impact Period per 50km of Cable (average over 500m) [5]
- Global Maritime Recommended Depth of Lowering [5]
- Target Trench Depth [5]

Reference Seabed Level is presented as 0m and is not always visible on Panel 3 due to overlap with depth of lowering data.

Panel 4

Layer 1 Sediment Classification [9]
- SAND (S)
- Extremely Low Strength CLAY (C1a)
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- Extremely Low Strength CLAY (C1c)
- Very Low Strength CLAY (C2)
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CBRA Alignment Charts - Centreline ID: C2 - Sheet 41 of 41

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Drawing Number
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