STRICTLY PRIVATE AND CONFIDENTIAL

NeuConnect

BIJLAGE 8 CBRA REPORT

NEU-ACM-CAB-NL-AP-PN-0011

ASITE DOCUMENT NUMBER

Revision Tracking

Revision No.	Revision Date	Author	Checked By	Approver	Revision Notes
P01	19/04/2021	AECOM		Neuconnect	

Originator's Reference:	ITT Reference Number:
N/A	

Bijlage 8: CBRA (Cable Burial Risk Assessment), Intertek, 20 maart 2019

NEUCONNECT BRITAIN LTD

NeuConnect Interconnetor

Cable Burial Risk Assessment

P2131_R4592_Rev1 | 20 March 2019

Intertek Energy & Water Consultancy Services
Exchange House, Station Road, Liphook, Hampshire GU30 7DW, United Kingdom

DOCUMENT RELEASE FORM

NeuConnect Britain Ltd

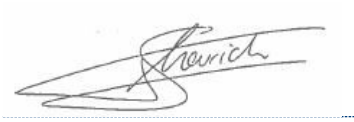
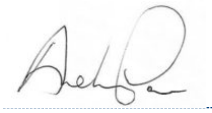
P2131_R4592_Rev1

NeuConnect Interconnetor

Cable Burial Risk Assessment

Author/s

Louis Duménil, Christopher Carroll, Alan Redman

Project Manager	Authoriser
	
Stephane Theurich	Dr. Andrew Page

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	21/12/2018	Draft	LDU/CCA	ATR/SLT	APA
Rev 1	20/03/2019	Revised	ATR/CCA	APA	APA

SUMMARY

Intertek Energy & Water Consultancy Services (Intertek) has been appointed by NeuConnect Britani Ltd to conduct a Cable Burial Risk Assessment (CBRA) study for the marine sections of the NeuConnect Interconnector cable route. The proposed Project is a High Voltage Direct Current (HVDC) electrical interconnector with an approximate capacity of 1400MW, which will allow transfer of power between the electricity transmission systems of Germany and Great Britain, crossing the Exclusive Economic Zones (EEZ) of UK, the Netherlands and Germany.

The Cable Burial Risk Assessment (CBRA) has shown that the following key hazards are present along the Greenlink Cable Route:

- sediment mobility
- anchoring; and
- fishing.

The process to calculate the Target DOL is as follows:

1. Analysis of survey results to categorise the seabed into individual zones of similar seabed sediment type, water depth range and vessel traffic density
2. Analysis of external threats to determine depths of penetration of each external aggressor (fishing gear and various anchors sizes) in identified seabed soils in each zone of the route, according to industry research;
3. Addition of a 20% Factor of Safety (FoS) to each of the respective maximum penetration depths;
4. Analysis of external threats (fishing gear and anchors) to calculate (where data allows) the probability of an aggressor-cable interaction in each zone of the route;
5. Determination of which threats must be protected against through burial in order to reduce risk from external aggressors down to ALARP;
6. Determine Recommended Minimum Depth of Lowering (RMDOL) for each zone of the route by selection of the greatest penetration depth value calculated (including the 20% FoS) for identified aggressors which must be protected against in each zone of the route in order that the overall risk to the cable over the project lifetime is reduced to ALARP or, where applicable, the legislative DOL if greater;
7. Target DOL (TDOL) is then determined as what can reasonably be added to RMDOL without incurring a step change in costs and which represents a practical target for burial tools on the market

The key hazards are explained below:

Sediment Mobility
Sediment mobility in itself does not pose a threat to a submarine cable but it can lead to issues with the thermal conductivity of cables (over burial), and exposure of cables (scour); burial under excess sand can change the thermal properties of the soil and cause hotspots along the cable, while exposure increases the risk of damage due to external aggressors such as trawling and anchoring and potentially mechanical damage from free spans.

There are a number of areas within the NeuConnect 500m corridor where there are bedforms present which could be mobile.

The first indication of mobile bedforms can be observed at KP11. These have been interpreted by the route survey contractor, MMT, as ripples and have a wave length of <15m and height <1.0 m. Ripples are observed intermittently throughout the route where they terminate at KP304 and do not appear again until KP620 from

which they then extend to the end of the route at KP700. While these may indicate some levels of sediment movement it is not thought that these minor bedforms will have an impact on the cable installation or operability.

Mega Ripples are also observed intermittently throughout the corridor, between KP108 & KP190 and then between KP669 and KP700. These are slightly larger than ripples and have a wave length of 15-50m and height 1-3m so may pose a risk to an installed cable within its lifetime.

Sandwaves present within the route corridor and are first observed between KP78 and KP 80. These have been interpreted by MMT to have a wave length 50-200m and height of >3 m. Sandwaves are next present at KP 106 and remain as intermittent features until KP294. They do not appear again until between KP673 and KP700.

For the purposes of burial targets (RMDOL & TDOL) all depths are to be measured against trough depth and after any required route engineering has been undertaken to flatten mobile sediments.

Fishing Risk
The entire route is within water depth range in which mobile gear fishing could take place, thus we recommend the cable is given sufficient protection from potential fishing gear interaction along the entire route.

The Carbon Trust' guidance (ref 12) indicates that penetration of fishing gear into the seabed is limited to a maximum of 0.3 m penetration even in soft sediment based on previous literature research. Adding a 20% Factor of Safety (FoS) to account for measurement errors and deformation of soil beneath fishing gear gives a RMDOL of 0.36m for fishing risk alone.

In practice a DOL < 0.5m is not advisable due to the instability of some trenching tools at these depths. Therefore, TDOL would be >0.5m if based on fishing risk only.

Anchoring Risk
Vessel Automatic Identification System (AIS) data has been used to determine the size and quantity of vessels which operate in the vicinity of the cable route. Vessels are grouped into size categories based on their deadweight tonnage (DWT) from Band A (0-100 DWT) to Band K (325K-460K DWT) and an appropriate associated anchor size is assigned to each band. Analysis of this data determines the probability of anchor-cable interactions for each vessel banding and thus the size of anchor which must be protected against in order to reduce risk to the cable to ALARP.

Assessment of the anchor risk strike for a surface laid cable demonstrated an unacceptable level of risk to the cable (failure probability of 97.75% over the lifetime of the cable) and thus there is a requirement to protect the cable against anchors interaction.

Anchoring risk exceeds fishing risk in in all zones of the route and thus determines RMDOL (except for zones in Germany where the legislative DOL requirements exceed the minimum DOL calculated by the probabilistic assessment). DOL has been calculated for protection against the anchor size associated with each vessel band in each cable route zone. Following this, the RMDOL has been selected for each individual zone in order that the overall risk to the cable over the project lifetime is reduced to ALARP. This varies from 0.55-2.00m. The full results by zone are provided in **Appendix E**. As can be seen if RMDOL is achieved during installation (and maintained throughout the project life) then the NeuConnect cable would have an annual failure probability of 9.00E-04. This equates to a return period of 1111.27 years and a failure probability over the (40 year) lifetime of 3.54%.

Conclusions and recommendations
TDOL is determined as what can reasonably be added to RMDOL without incurring a step change in costs and which represents a practical target for burial tools on the market.

TDOL has been set at 1.5m for the vast majority of the route and varies up to a maximum TDOL of 2m in some zones due either to anchor risk or legislative requirements. The DOL specification by cable route zone are provided in **Appendix E**. As can be seen if TDOL is achieved during installation (and maintained throughout the

project life) then the NeuConnect cable would have an annual failure probability of 5.37E-04. This equates to a return period of 1863.84 years and a failure probability over the (40 year) lifetime of 2.12%.

CONTENTS

LIST OF TABLES AND FIGURES

Tables

Figures

GLOSSARY

AIS
Automatic Identification System

CBRA
Cable Burial Risk Assessment

CPT
Cone Penetration Test

DoL
Depth of Lowering

DoC
Depth of Cover

EU
European Union

Greenlink
Greenlink Interconnector Limited

HVAC
High-Voltage Alternating Current

HVDC
High-Voltage Direct Current

ICES
International Council for the Exploration of the Sea

IMO
International Maritime Organisation

Intertek
Intertek Energy and Water Consultancy Services

MAIB
Marine Accident Investigation Branch

MBES
Multi-Beam Echo Sounder

MMO
Marine Management Organisation

PCI
Project of Common Interest

RMDOL
Recommended Minimum Depth of Lowering

SI
Seabed Index

SSS
Side-Scan Sonar

TDOL
Target Depth of Lowering

VC
Vibro-Core

1. INTRODUCTION

Intertek Energy & Water Consultancy Services (Intertek) has been appointed by NeuConnect Britain Ltd to conduct a Cable Burial Risk Assessment (CBRA) study for the marine sections of the NeuConnect Interconnector cable route.

1.1 Project background

The proposed Project is a High Voltage Direct Current (HVDC) electrical interconnector with an approximate capacity of 1400MW, which will allow transfer of power between the electricity transmission systems of Germany and Great Britain, crossing the Exclusive Economic Zones (EEZ) of UK, the Netherlands and Germany.

A Geophysical and Geotechnical campaign has been carried out over a 500m corridor along the entirety of the route, with the exception of the last remaining 50km (survey block 15) where no Geotechnical sampling has been carried out. At this time, acquisition of Geotech samples within the last 50km of the route is thought to be undertaken in Q2 of 2019. This CBRA has been completed for the first 650km only. It is recommended this is revised following the completion of the remaining 50km of the cable route.

For an overview of the route see **Figure 2-1**.

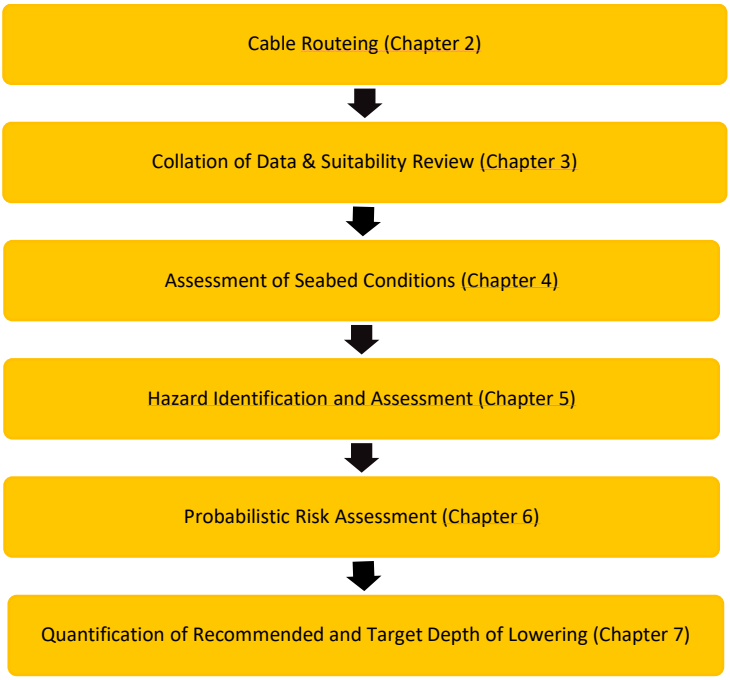
1.2 Scope of Work

The Scope of Work is as follows:

- Characterisation of the predominant hazards which could pose a risk to the cable system.
- Assessment of the risks posed to the cable system by the identified hazards.
- Assessment of the geophysical and geotechnical data along the cable route.
- Probabilistic assessment of the anchoring threat to the cable system using historical vessel AIS (Automatic Identification System) data.
- Provision of recommended Minimum Depth of Lowering (RMDOL) and Target DOL (TDOL) along the route which if achieved would reduce risk to the submarine cable to levels acceptable to the project.

The CBRA study presented in this report has been undertaken following the Carbon Trust's proposed methodology (ref 22) and steps (see **Figure 1-1**).

Figure 1-1 Burial Risk Assessment method flowchart in line with Carbon Trust CTC835 guideline



1.3 Purpose of report

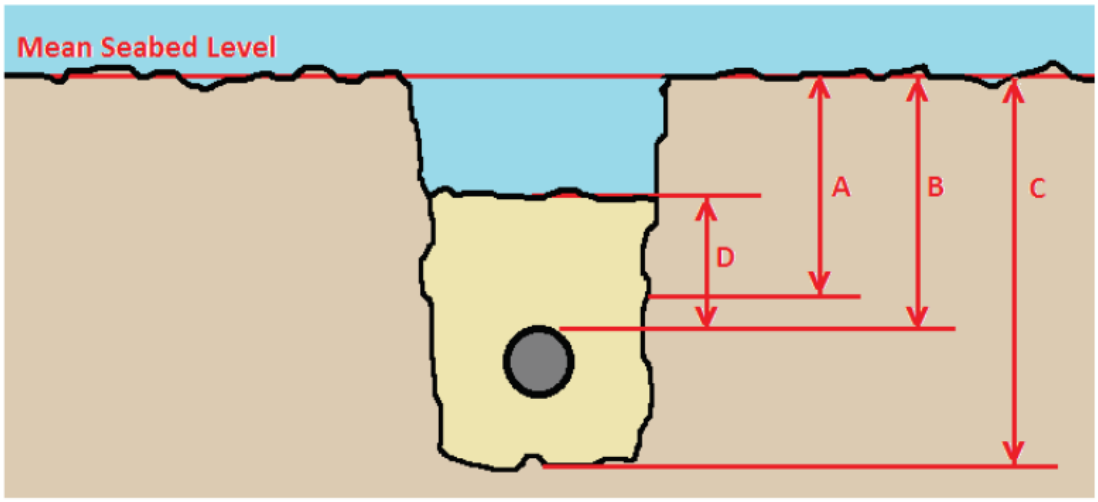
The purpose of this report is to identify any potential areas where activities, such as shipping and fishing, may pose a risk to the integrity of the installed cable. In the probabilistic risk assessment of anchoring risk, probability is measured as a ratio of the favourable cases to the whole number of cases possible. An event that would occur with certainty has a probability of 1.

Assumptions used are considered conservative and 'realistic worst case' which produces higher probabilities than would likely be the case. This enables the route and installation methods to be considered with a higher margin of safety.

1.4 Definition of trenching parameter

Intertek has used the Carbon Trust's definition of DOL for this study. This is illustrated in **Figure 1-2.**

Figure 1-2 Definition of Burial Terms used in Report



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

Recommended Minimum Depth of Lowering (RMDOL)
This is the minimum DOL recommended for protection from the external threats, it is the direct output of the populistic risk assessment and includes a factor of safety (FoS).

Target Depth of Lowering (TDOL)
This is the depth that will be specified as the target depth to the cable installation contractor. TDOL is a depth which makes best use of what is achievable by industry standard burial tools to gain additional depth beyond RMDOL without incurring a step change in costs. Target DOL is also a practical application of depth which considers the effect burial depth has on tool stability.

Target Trench Depth
This is the trench depth cable installation contractors determine is required to meet TDOL. This is driven by cable properties and the selected trenching tool and is usually the diameter of the cable plus between 0.1 m and 0.4 m beyond the TDOL.

Depth of Cover
The thickness of material on top of the cable after trenching. It is not normally required for cable protection; however, it may be required by some consenting authorities.

1.5 Relevant Data

Data obtained from the Geophysical & Geotechnical campaigns and other relevant data sources are presented in **Table 1-1** below.

Table 1-1 Provided Survey Data

Data Type	Name	Information
Survey Bathymetry (Ref1)	MMT_553_NEU_WGS84_UTM31_DTU10_LAT_DTM_1m_DTM	1m resolution bathymetry over a 500m survey corridor in UTM31
	MMT_553_NEU_WGS84_UTM32_DTU10_LAT_DTM_1m_DTM	1m resolution bathymetry over a 500m survey corridor in UTM32

Data Type	Name	Information
	MMT_553_NEU_WGS84_UTM31_DTU10_LAT_DTM_1m_DTM_Slope	Slope in degrees of the seafloor over a 500m survey corridor in UTM31
	MMT_553_NEU_WGS84_UTM32_DTU10_LAT_DTM_1m_DTM_Slope	Slope in degrees of the seafloor over a 500m survey corridor in UTM31
	Bathymetry Contours obtained from Geophysical survey	1m and 5m bathymetry contours over the extent of the survey corrido
Open Source Bathymetry	BSH Aurfmod Bathymetry (Ref 2)	German nearshore bathymetry available annually from 1982 to 2016. 50m resolution from coastline to a depth of 20m
	EMODnet Bathymetry (Ref 3	EMODnet Digital Terrain Model (DTM) is generated for European sea regions from selected bathy survey data sets (1975 to 2013 using SBES & MBES) and composite DTMs, while gaps with no data coverage are completed by integrating the GEBCO Digital Bathymetry. 200m Resolution
AIS Data (Ref 4)	Intertek_Area_of_Interest_201708_to_201807	5-minute time series data of shipping activities in 2017 (12 months of data) +/- 30km either side of the Issue 5 NeuConnect cable route provided by Oceaneering International Inc (ref 5)
Crossings (ref 5)	As found Pipeline/Cable data	As found XY locations and depth of burial for cables and pipelines along the cable route +/- 250m of the centreline
Contacts (Ref 6)	SSS contacts & Mag contacts	Seafloor Contacts and Magnetometer anomalies found within the 500m survey corridor
Seabed Sediments (Ref 7)	Seabed Classification	Seabed surficial polygon of classified geology interpreted from SSS and correlated with MBES/SBP
Geology (Ref 8)	Shallow Geological Isopach	Shallow geological isopach interpreted from sub-bottom profiler data and correlated with side scan sonar imagery and bathymetric digital terrain model data
Geotechnical Samples (Ref 8)	Vibrocore, Cone Penetrometer Tests and grab sample logs	Geotechnical sample logs from Vibrocore (VC), Cone Penetration Test (CPT) and Grab Sample (GS)
Geotechnical Results report (Ref 9)	102553-NEU-MMT-SUR-REP-GEOTECH-02	Results of the Geotechnical campaign
Geophysical Results reports (Ref 10)	102553-NEU-MMT-SUR-REP-OPERFR-02	Results of the Geophysical campaign
Admiralty Charts (Ref 11)	MarineFind	Navigation charts over the study area obtained from http://wmsgateway.findmaps.co.uk/wms/IntertecMetocCharts

Limitations

This document uses the information obtained from the geophysical and geotechnical campaigns carried out by MMT in 2018 and AIS data purchased from Oceaneering. Please note that no geotechnical operations were carried out in the last 50km of the route in German waters (Block 15) due to permitting issues therefore no VC's or CPT's were acquired in this area. This CBRA is based on MMT's survey results highlighted in **Table 1-1** and the geophysical and geotechnical reports (ref 10).

2. CABLE ROUTEING

2.1 Route development background

An initial route centreline was put forward for survey from 4C offshore after a desktop study was carried out. The route centreline was reviewed by Fichtner in German Waters and Intertek in Dutch & UK waters. Minor amendments were made, and a final centreline route was created, named:

- Neuconnect_Issue_03_180212_R03_Route_Z31

The results of the Geophysical survey revealed areas in which dynamic re-routing during the survey campaign was required to avoid major offshore constraints such as:

a. avoiding shallows around Long Sand Head

b. further avoid the BritNed cable nearshore

c. avoid windfarm licence block area

d. avoid the Nordegrunde export cable in German waters

After the re-routeing was confirmed a final centreline route was created:

- **20180726_NeuConnect_Issue_5_RPL**

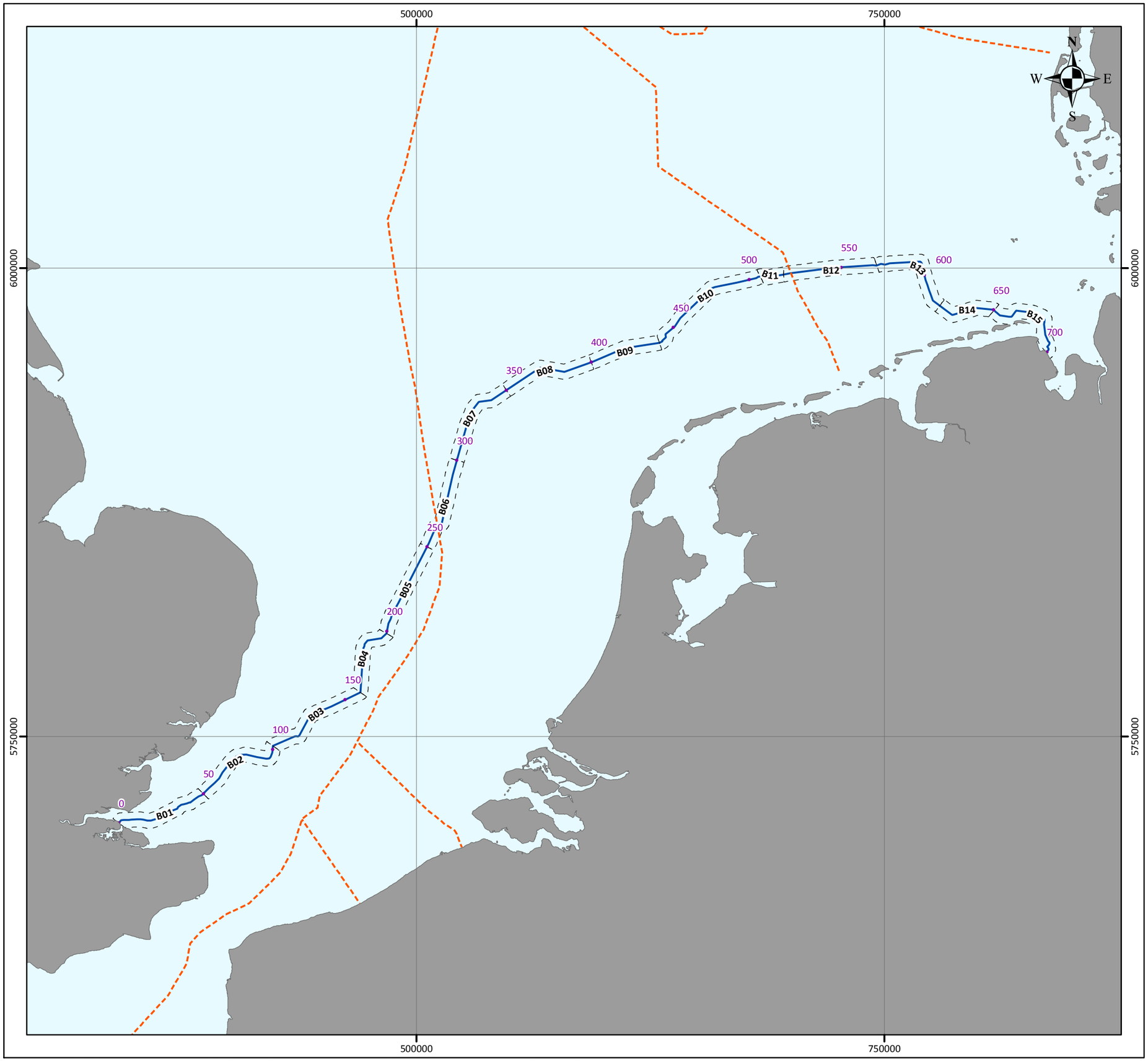
KP 0 is located on the UK landfall, Isle of Grain and increases toward Germany. KP 700.580 is located near Hooksiel, on the German landfall.

2.2 Route overview

The route assessed in this report is presented in **Figure 2-1** below. The route was divided into 15 Blocks to optimise survey efficiency. The Blocks were approximately 50 km long, but the boundaries were adjusted to coincide with turns in the cable route.

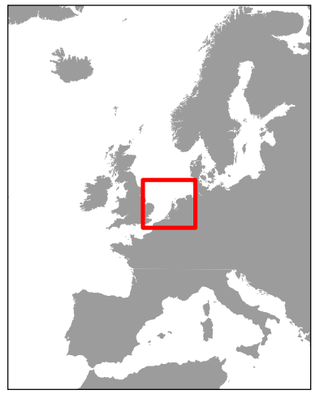
NeuConnect CBRA

Figure 2-1: Route Overview



Legend

- KP's
- Median Line
- NeuConnect Route
- Survey Block



NOTE: Not to be used for Navigation

Date	Friday, December 14, 2018 10:17:15
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, CDA NEUCONNECT, MMT
File Reference	J:\P2131\Mxd\CBRA\ Fig_2_1_Route_Overview.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 10 20 30 40

3. COLLATION OF DATA AND SUITABILITY REVIEW

This section provides an overview of the bathymetrical and geological data along the surveyed corridor, based on the interpretation of the geophysical and geotechnical data. All data obtained from the geophysical and geotechnical survey has been correlated with each other, and the output from this has been compared to the existing data sources.

3.1 Bathymetric data

The seabed topography along the route is characterised by the presence of numerous mounds, areas of mobile sediments, outcrop of bedrock, trenches, ridges, boulders, linear features such as furrows or striations of coarser sediment and varying relief. The knowledge of these features is critical to any cable installation feasibility study. This section describes the existing bathymetry data in the study area and the resolution and quality of each dataset.

Sources for the bathymetry datasets can be found in Section 1.5 and is summarised below:

- EMODnet Bathymetry – 100m resolution
- BSH Aufmod Bathymetry – 50m
- MMT Survey Data – 1m resolution bathymetric soundings
- MMT Survey Data – 1m resolution slope in degrees

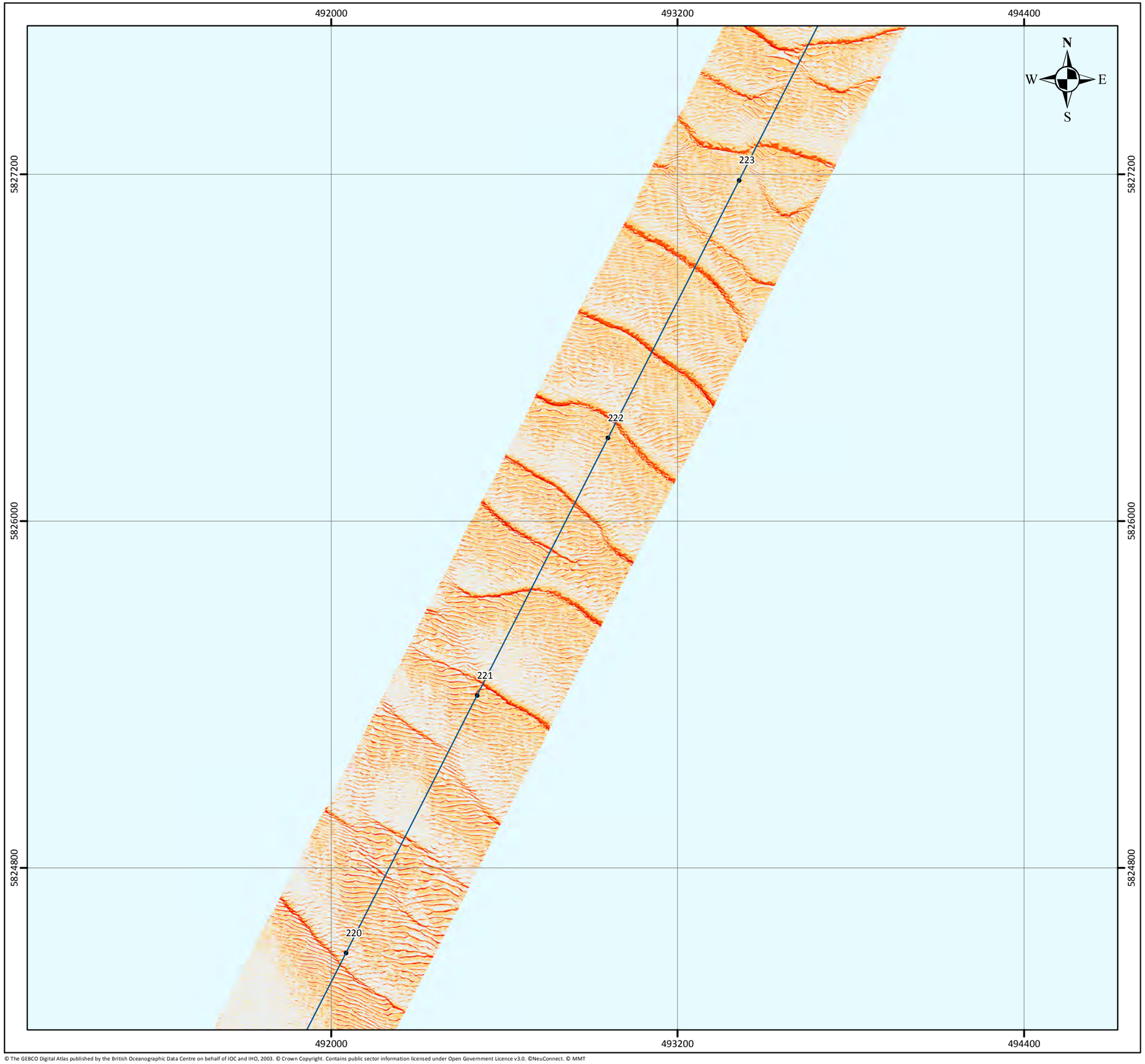
The open source data was used to define the route centreline for survey. These sources provide a good overview of the surrounding area and highlight large features such as sandwaves. There is good overall correlation between the open source data and the acquired high resolution survey data. The open source dataset, however, does not provide the high resolution required to carry out a cable burial risk assessment. This resolution is provided by the data acquired along the route during the survey.

3.1.1 Suitability of data

The bathymetric soundings obtained for this study is of very high quality and processed to a resolution (1m). It has highlighted areas of shoaling, potential areas of sediment mobility, areas of outcrop and in some cases confirmed the presence of wrecks and obstructions.

The offshore dataset provided by EMODnet and the BSH are good robust datasets suitable to show water depths, areas of shoaling and bathymetric lows. The low-resolution dataset confirms the presence of larger features in the study area, but its resolution is too low to determine any migration rate of mobile bedforms. The acquires bathymetric data provides this insight.

An example of the typical slopes encountered within the survey corridor has been provided by MMT and shown in **Figure 3-1**, while bathymetry of the cable route is displayed in **Figure 3-2** and **Figure 3-3.**



NeuConnect CBRA

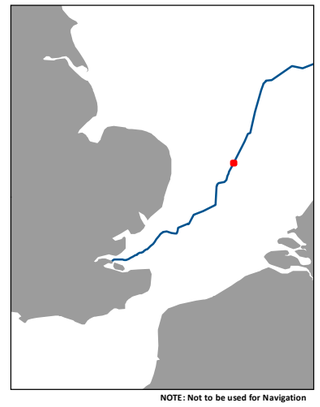
Figure 3-1: Typical Slopes Encountered within Block 5

Legend

- KP's
- NeuConnect Route

Slope (Degrees)

- 0 - 1
- 2 - 5
- 6 - 10
- 11 - 15
- 16 - 90



NOTE: Not to be used for Navigation

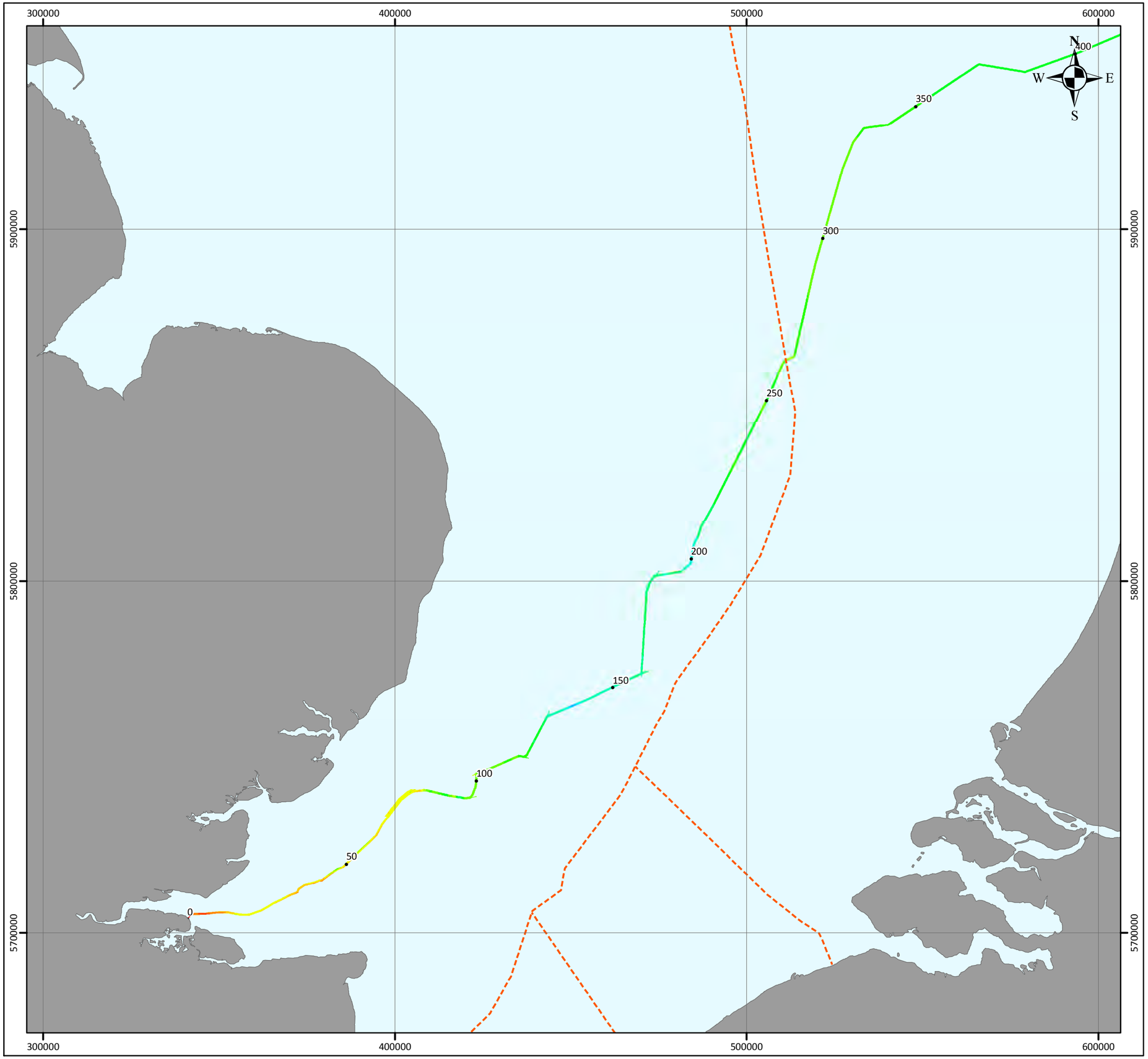
Date	Friday, December 14, 2018 10:24:21
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, CDA, NEUCONNECT, MMT
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_1_Slope.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 0.1 0.2 0.3 0.4 km

NeuConnect CBRA

Figure 3-2: Bathymetry Overview KP0-KP350

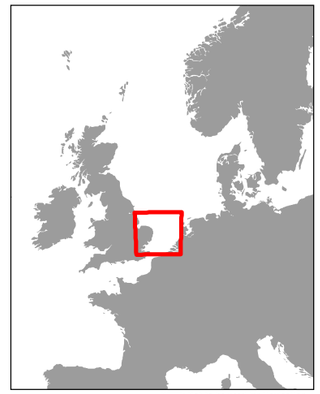


Legend

- Median Line

Bathymetry (m below LAT)

- -68
- -67 - -65
- -64 - -60
- -59 - -55
- -54 - -50
- -49 - -45
- -44 - -40
- -39 - -35
- -34 - -30
- -29 - -25
- -24 - -20
- -19 - -15
- -14 - -10
- -9 - -5
- -4 - 0
- 1 - 5

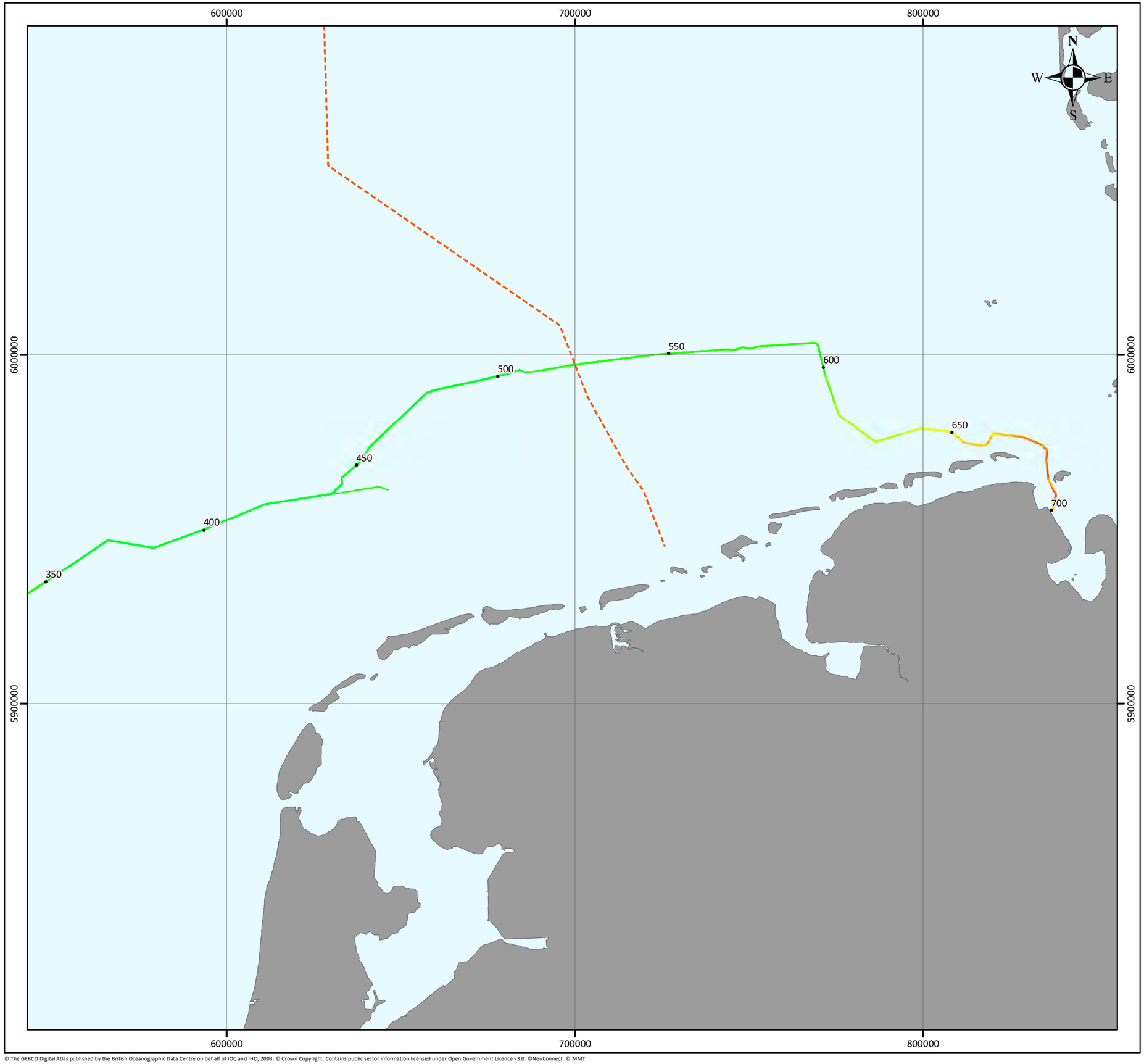


NOTE: Not to be used for Navigation

Date	Friday, December 14, 2018 10:18:58
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, CDA NEUCONNECT, MMT
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_2_Bathy_KP0_to_KP350.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 8 16 24 32 km



NeuConnect CBRA

Figure 3-3: Bathymetry Overview KP350-KP700.58

Legend

- Median Line

Bathymetry (m below LAT)

- -68
- -67 - -65
- -64 - -60
- -59 - -55
- -54 - -50
- -49 - -45
- -44 - -40
- -39 - -35
- -34 - -30
- -29 - -25
- -24 - -20
- -19 - -15
- -14 - -10
- -9 - -5
- -4 - 0
- 1 - 5

NOTE: Not to be used for Navigation

Date	Friday, December 14, 2018 10:28:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, CDA NEUCONNECT, MMT
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_3_Bathy_KP350_to_KP700.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 8 16 24 32 km

3.2 Geophysical data

Side scan sonar (SSS) data has been used for interpretation of surficial geology, identification of seabed features, and to select contacts. Sediment classes distinguished from SSS imagery are correlated with grab sample, vibrocore (VC) and cone penetration test (CPT) results. Topographical features identified from SSS records have been correlated with bathymetric digital terrain models processed from the bathymetric sounds acquired using the multibeam echo sounder (MBES). Shallow geology interpretations are based on sub-bottom profiler (SBP) data correlated with the geotechnical sampling results. SSS and MBES data is also used to corroborate the SBP interpretation in the uppermost layers.

Magnetometer records collected during the survey are used to identify cables/pipelines and ferrous objects on the seafloor within the survey corridor. Note that due to line spacing this does not constitute an unexploded ordnance (UXO) survey.

3.2.1 Geophysical Survey (Blocks 1-15)

Bathymetric soundings were of a good quality throughout. Halocline and sound velocity artefacts were present on occasion in Blocks 8, 9 and 10 and infill lines were acquired where necessary.

Side scan sonar imagery proved to be fit for purpose, yielding detection of objects as small as 0.5 m in the outer ranges of the low frequency (LF) data. Shallow depths and strong tidal currents resulted in data of reduced quality over the shallower banks in Block 02. In Blocks 7, 9 and 10 environmental noise, caused by thermocline/halocline, was observed on some of the acquired lines. Appropriate infill was acquired in order to achieve 200 % coverage, excluding the outermost survey lines. Some reruns were required due to weather and environmentally affected data in Block 13.

The overall quality of the sub bottom profiler (SBP) data were good. Penetration on the Chirp varied from 10 m to 16 m. Penetration on the Sparker varied from 18 m to 30 m in places. Greater signal attenuation was observed when thick layers of surficial sand were present. Where sediments were more granular in nature the Sparker data was used for interpretation to ensure sufficient penetration.

Magnetometer data were of good quality throughout.

3.2.2 Seabed Sediment Classification

The interpretation of surficial sediment types was derived from the acoustic character of the high frequency SSS data, and the interpretations aided by MBES bathymetric 3D surfaces and SBP data. During the review of the SSS survey data, higher intensity sonar returns (darker grey to black colours) were interpreted as relatively coarser grained sediments, and lower intensity sonar returns (lighter grey colours) were interpreted as relatively finer grained sediments. Bathymetric data was used to correct the interpretation for the effects of seabed slope on sonar returns. In addition, drop down video (DDV) images from the benthic sampling and video transects together with logs from the geotechnical sampling were used to verify any interpretations made.

Seabed Sediment Classifications are as follows:

Table 3-1 Seabed Sediment Classification

Acoustic description	Interpretation
Low acoustic reflectivity. No texture.	CLAY May contain silt, sand and/or gravel.
Low to medium acoustic reflectivity. Slightly grainy texture.	Sandy CLAY
Medium acoustic reflectivity. Grainy texture.	Gravelly CLAY

Acoustic description	Interpretation
Low to medium acoustic reflectivity. Slightly grainy to grainy texture with point source reflectors.	SILT Predominantly silt, may have minor fractions of clay, sand and/or gravel.
Medium acoustic reflectivity, slightly grainy texture.	SAND Predominantly sand, may have minor fractions of clay, silt and/or gravel.
Medium acoustic reflectivity, slightly grainy texture.	Clayey SAND
Medium to high acoustic reflectivity. Slightly grainy to grainy texture, coarse texture in places.	Gravelly SAND to sandy GRAVEL The ratio between SAND and GRAVEL can vary within this sediment type.
High acoustic reflectivity. Grainy to coarse texture.	Clayey GRAVEL
High acoustic reflectivity. Grainy to coarse texture.	GRAVEL Predominantly gravel, may have minor fractions of clay, silt and/or sand.

Seabed Feature Classifications are as follows:

Table 3-2 Seabed Feature Classification

Interpreted Seabed Feature	Criteria[1]
Ripples	Wave length <15 m Height <1.0 m
Megaripples	Wave length 15-50 m Height 1-3 m
Sandwaves	Wave length 50-200 m, Height >3 m
Boulder Field Occasional boulders All >0.5 m	Concentration of 5 to 20 boulders within a maximum area of 100 x 100 m
Boulder Field Numerous boulders All >0.5 m	Concentration of >20 boulders within a maximum area of 100 x 100 m
Trawl Mark Area	Concentration of numerous trawl marks
Current Lineation	Current lineation
Marine growth	Marine Growth (Potential Annex 1 habitat)
Relict gas/fluid seepage features	Relict gas/fluid seepage features
Eroded Depressions	Eroded Depressions
Anthropogenic	Man-made
Dredging activity	Dredging activity

[1] Note, there is no standard for bedform descriptions. Criteria presented in Table 3-2 are as defined by route survey contractor MMT. Alternative criteria are also common.

3.2.3 Shallow Geology

The classifications of the shallow geology have been derived through a combination of analysis and interpretation of the acoustic character of the SBP data and geotechnical results. A comparison with available background information was made and broken down into major sediment types along the route.

Sediment Type	Acoustic Characteristics	Lithological Variations	Blocks
CLAY	Homogeneous to layered, transparent to high amplitude recent sediments lying from at or near the seabed to base of record and/or filling paleo-channels.	Very soft to very stiff, slightly silty to very silty, slightly sandy to very sandy, slightly gravelly to very gravelly CLAY. Massive to layered to pockets. May locally contain shells, pebbles, cobbles and pockets of SILT, SAND and GRAVEL.	Blocks 1 - 15
SILT	Acoustically layered, low to medium amplitude recent sediments lying from at or near the seabed to base of record and/or filling paleo-channels.	Slightly sandy to very sandy, slightly clayey to very clayey SILT. Generally, present as laminations and pockets and occasionally as a coherent unit.	Blocks 1 - 15
SAND	Acoustically homogeneous to layered, low to medium amplitude recent sediments lying from at or near the seabed to base of record and/or filling paleo-channels.	Slightly clayey to very clayey, slightly silty to very silty, slightly gravelly to very gravelly SAND. Laminations of CLAY and SILT. May locally contain shells, pebbles, cobbles and pockets of SILT, CLAY and GRAVEL. Commonly forming mobile sediment.	Blocks 1 - 15
GRAVEL	Medium to high amplitude recent sediments lying from at or near the seabed to base of record and/or filling paleo-channels.	Slightly clayey to very clayey, slightly silty to very silty, slightly sandy to very sandy GRAVEL. Predominantly comprising shell fragments, Generally present as pockets and internal layers and commonly a surface veneer. Locally mobile. May locally contain pebbles, cobbles.	Blocks 1 - 15
PEAT	High amplitude layers/bands and/or filling paleo-channels.	Soft to firm PEAT. Present as either a thin layer/band, pockets or reworked.	Blocks 5, 6, 8, 9, 10, 12, 13 &14
SAND, SILT and CHALK	Weathered and structureless	Locally present as a mobile sediment overlying CLAY	Block 03

3.2.4 Contacts and Anomalies

The contacts or objects interpreted from the side scan sonar imagery were selected according to the following criteria:

- Wreck

- Boulder
- Debris
- Wire/rope
- Mound
- Buoy
- Fishing gear
- Other

During seabed interpretation, boulder occurrence at surface has been grouped based on the frequency and content of boulder >0.5 m per 100 x 100 m. Contacts less than 0.5 m were not picked.

Magnetic anomalies, if identified, are classified according to the following criteria:

- Dipole, monopole or complex shape
- Single anomaly or anomalies creating a linear trend relating to possible or identified cable/pipeline crossings.

3.3 Geotechnical data

The geotechnical investigations consisted of vibrocore samples (VC) and cone penetration tests (CPT).

The initial program was for approximately seven hundred (700) VC to be carried out, i.e. one every kilometre. CPT locations were to be carried out every 2km, such that correlation could be made between the two investigation methods. In total, three hundred and twenty (320) CPT locations were carried out, with multiple re-attempts required at eight locations, resulting in a total number of tests as three hundred and twenty-nine (329). Six hundred and fifty-five (655) VC locations were carried out.

3.3.1 Vibrocores

The vibrocores were recovered using an electrically powered VKG-6 vibrocore unit, owned and operated by MMT, fitted with a 6m long core barrel and using clear PVC 100mm OD liner. During VC operations, there were instances of re-attempts being required due to initial poor recovery. Poor penetration and subsequent low material recovery were generally a function of dense to very dense coarse granular material or high strength cohesive material being encountered.

Following an acceptable recovery of a vibrocore sample to the vessel deck, each liner was successively cut into 1.0m sections. Offshore processing comprised the production of a field log from the visual inspection of the cut liner ends. Upon completion of the offshore processing, the complete vibrocore samples were then appropriately labelled, sealed and placed into secure storage crates. Each vibrocore liner in turn was removed from storage, split longitudinally, photographed and logged.

Shear strength measurements were taken on any suitable cohesive strata using a torvane. In-situ thermal measurements were also carried out during logging

3.3.2 Cone Penetration Testing

CPTs were carried out to a maximum depth of 5.50m using 10cm2 electric piezocones operated from a ROSON seabed CPT unit, ballasted to eleven tonnes in air weight. The aim at each CPT location was to reach the target penetration depth of 5.00m. Re-attempts were required at eight locations due to either initial failure to reach the required depth, concern with the overall test application class, or due to electrical power and/or communication issues with the seabed CPT unit.

Measured cone end resistance, sleeve friction and dynamic porewater pressure was recorded at 2cm intervals of penetration.

3.3.3 Suitability of data

Each VC and CPT log are clearly presented in an annex to the Geotechnical report (Ref 9) and provided the relevant geological information at each location.

Within the Geotechnical report (Ref 9) a scale has been derived for the seabed conditions. We have used this to define 'route sections', based on similarities between the CPT/VC results. The scale is called the Seabed Index (SI) and can be viewed as a semi-quantitative scale in respect of the encountered ground conditions, and to some respect, the likely difficulties for engineering activities in the investigated depth below seabed level. The Seabed Index values provided are based on the geological and geotechnical characteristics of the encountered material at a depth of 1.50m. The seabed index is not, however, a suitable categorisation for a CBRA. This is because it only provides a classification at one specific depth (i.e. 1.5m) and review of the VC and CPT show that the soil type and properties vary significantly above and below this single point. As a result we have re-assessed the seabed classification using the CPTs and VC information directly – see Section 4.

3.4 AIS shipping data

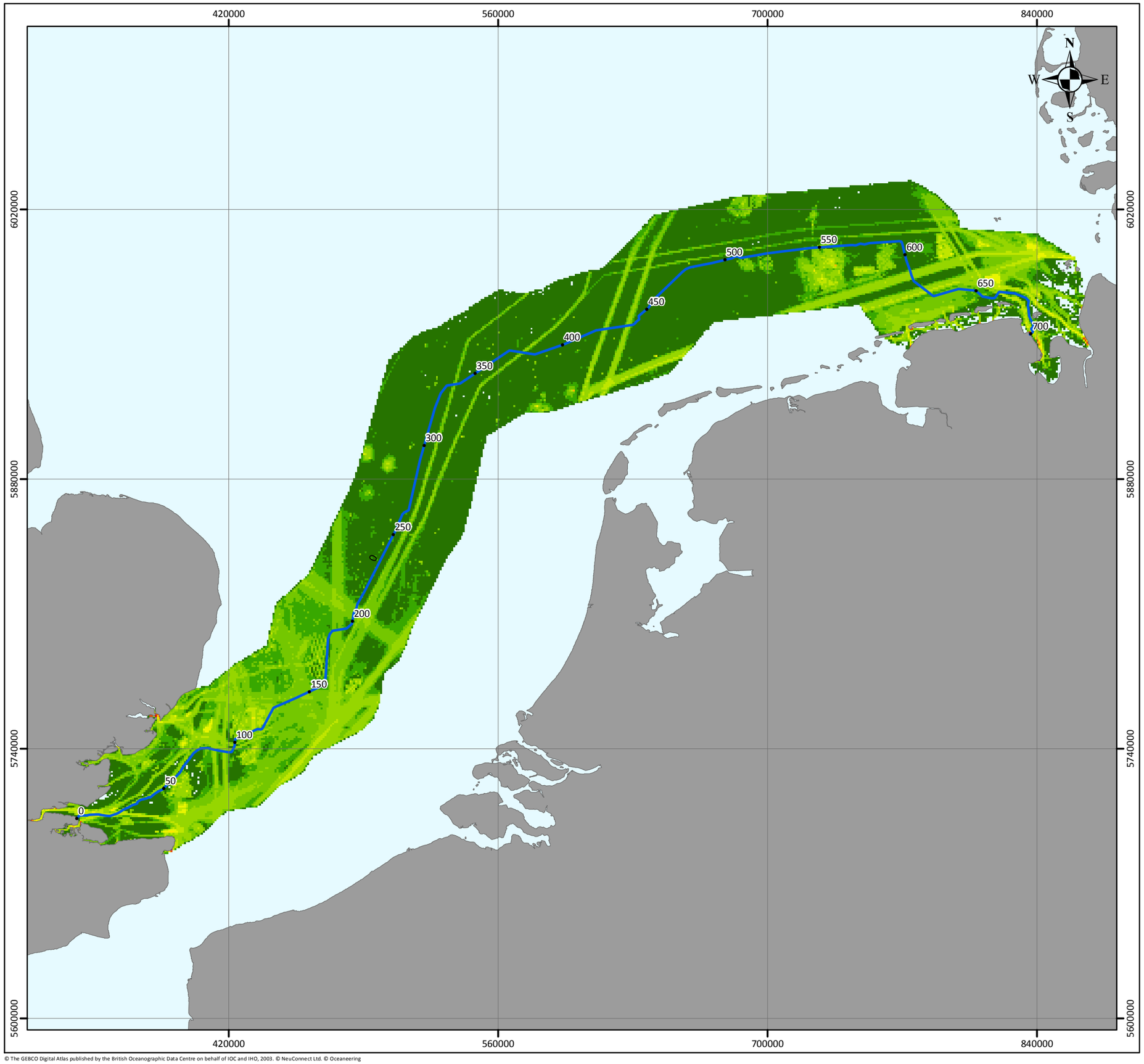
AIS (Automatic Identification System) is an automatic tracking system used on ships for identifying and locating vessels by electronically exchanging data with other nearby ships and AIS base stations and satellites. The International Maritime Organisation (IMO) requires AIS to be fitted aboard international voyaging ships with gross tonnage of 300 or more tons, and all passenger ships regardless of size. This would cover almost all commercial vessels and most private vessels that would be of risk to the cable; however, some smaller fishing vessels could be missing from the AIS dataset.

Information provided by the AIS equipment usually consists of unique identification number for each vessel, vessel name, vessel type, vessel position, course and speed. Other attributes like vessel deadweight tonnage and draught may be completed by the AIS supplier.

To quantify the anchoring risk to the cable, Intertek procured historical AIS data along the NeuConnect cable route for the period of August 2017 to July 2018 (inclusive) (ref 4) from Oceaneering for a study area of approximatively 30km wide either side of the cable route. This wide study area allows a clear insight into vessel movements by vessel type/size in the surrounding geography.

The NeuConnect route crosses several areas of high vessel traffic which are associated with shipping lanes. Where possible, the cable crosses perpendicular to these lanes, minimising the risks of encountering traffic during survey, installation and any operations and maintenance campaigns. These lanes are at approximately the following KPs: KP86; KP190; KP205; KP338, KP378; KP424; KP436; KP611; KP622 and KP 698. These are highlighted on **Figures 3-4** to **3-7.**

Vessel density increased closer to land as shipping routes condense to ports and harbours. In the UK nearshore area, between KP0 and KP20 the route travels in a westerly direction and is constrained between a shipping channel associated with the port of London and the BritNed Cable. This can clearly be seen on the AIS data before the route turns into a North Easterly direction. There are a number of additional areas separate from the linear shipping lanes with increased vessel density which can be correlated with offshore windfarms and the associated windfarm maintenance vessels. This can be seen again in German waters, where there is a clear correlation between the windfarms and vessel density. Vessel density increases again in the approach to the German landfall.



NeuConnect CBRA

Figure 3-4: Vessel Density
August 2016 to July 2017

Legend

- NeuConnect Route

Vessel Hours Per Year (1km x 1km grid)

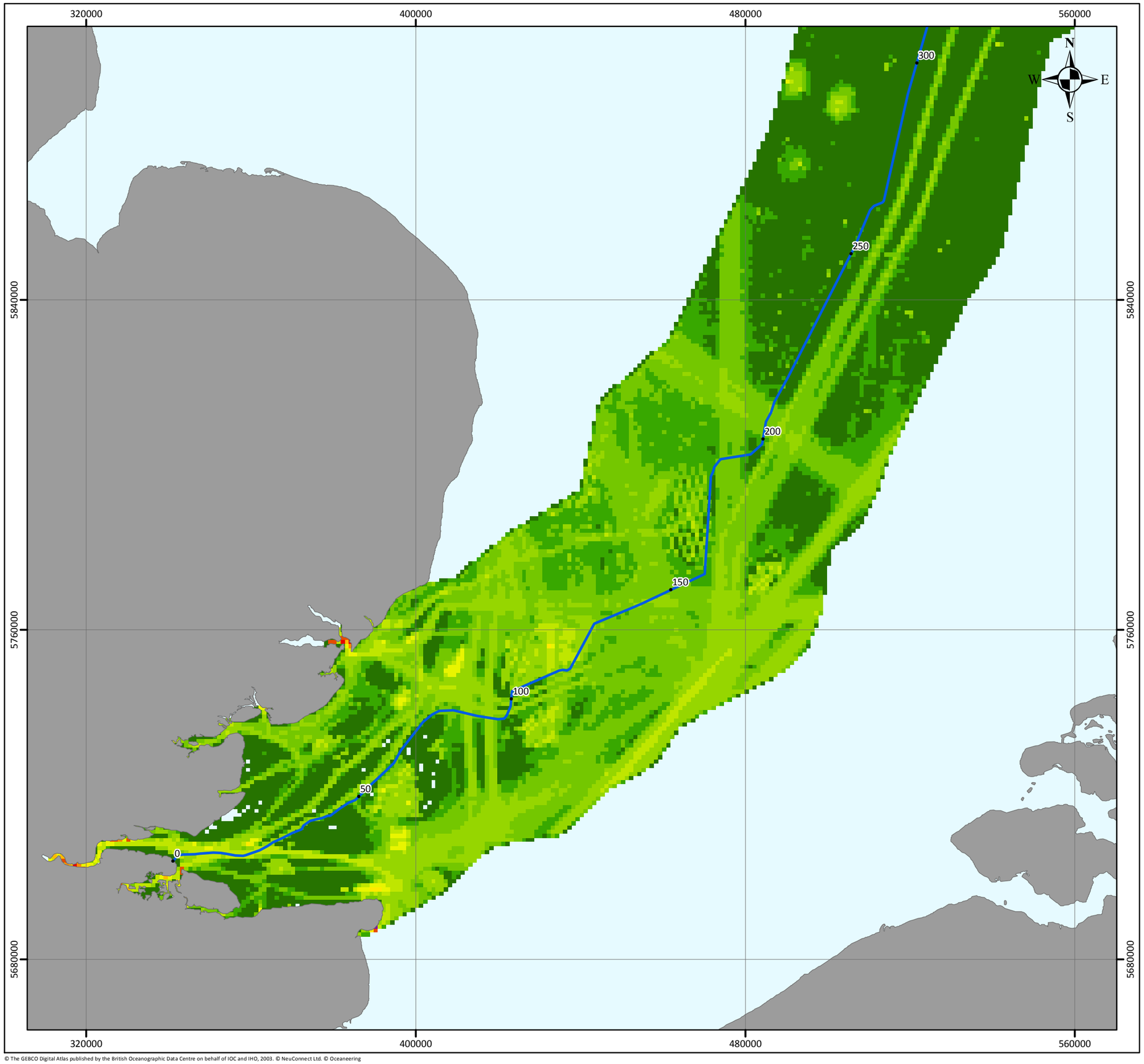
- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 200
- 200 - 1000
- 1000 - 3000
- 3000 - 5500
- 5500 - 9000
- 9000 - 13000
- 13000 - 30000
- 30000 - 55000
- 55000 - 120000

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 12:59:13
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_4_AIS_Data.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km



NeuConnect CBRA

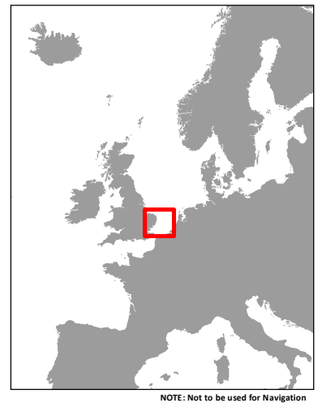
Vessel Density August 2016 to July 2017
KP0 to KP250

Legend

- KP's
- NeuConnect Route

Vessel Hours Per Year (1km x 1km grid)

- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 200
- 200 - 1000
- 1000 - 3000
- 3000 - 5500
- 5500 - 9000
- 9000 - 13000
- 13000 - 30000
- 30000 - 55000
- 55000 - 120000

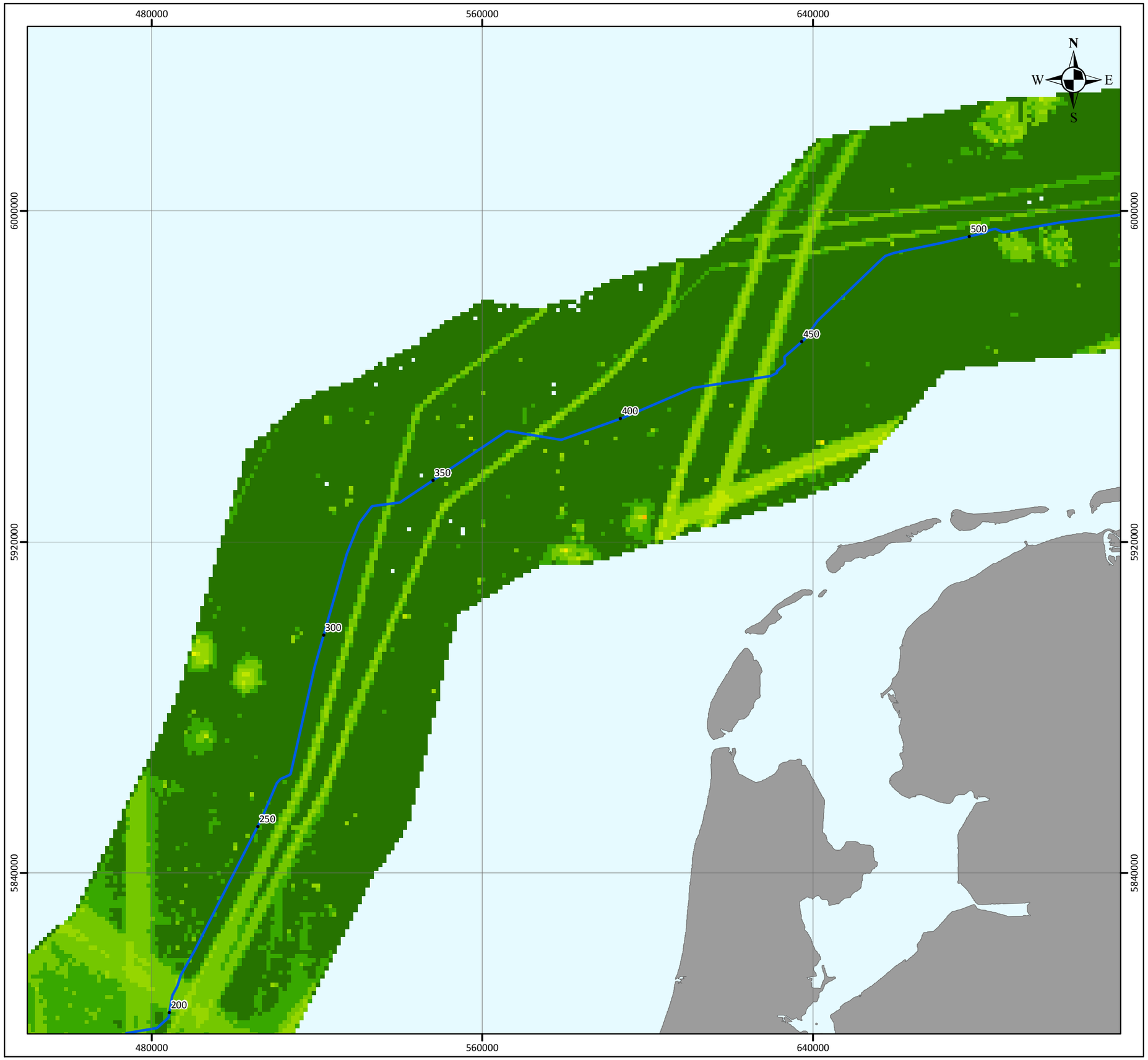


NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:23:08
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_5_AIS_Data_KP0_to_KP250.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 5 10 15 20 km



NeuConnect CBRA

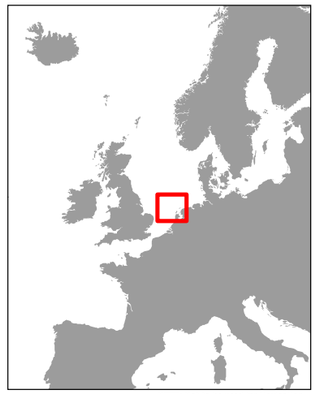
Vessel Density August 2016 to July 2017
KP250 to KP500

Legend

- KP's
- NeuConnect Route

Vessel Hours Per Year (1km x 1km grid)

- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 200
- 200 - 1000
- 1000 - 3000
- 3000 - 5500
- 5500 - 9000
- 9000 - 13000
- 13000 - 30000
- 30000 - 55000
- 55000 - 120000

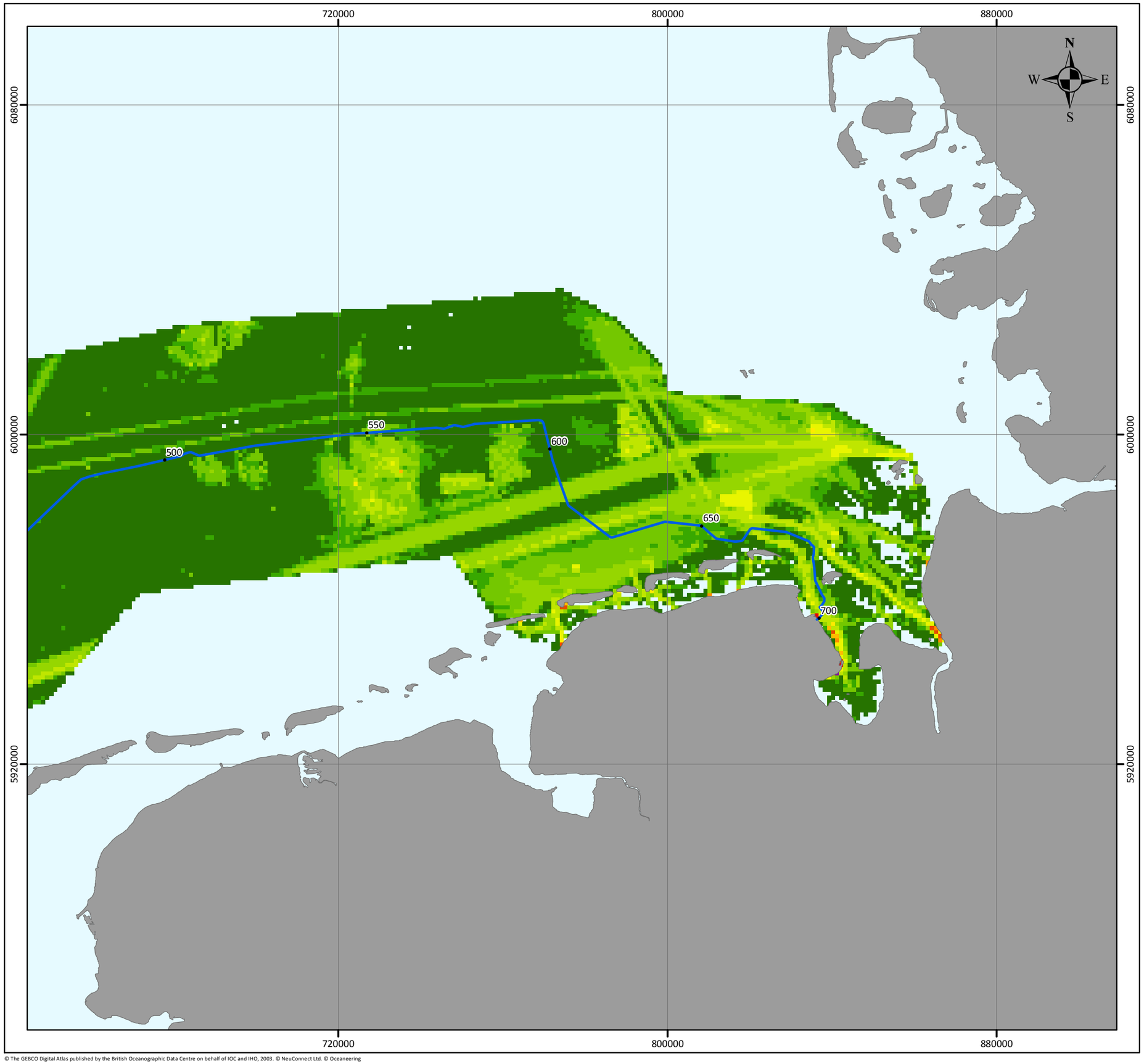


NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 13:04:57
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_6_AIS_Data_KP250_to_KP500.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 5 10 15 20



NeuConnect CBRA

Vessel Density August 2016 to July 2017
KP500 to KP700.58

Legend

- KP's
- NeuConnect Route

Vessel Hours Per Year (1km x 1km grid)

- 0 - 10
- 10 - 20
- 20 - 50
- 50 - 200
- 200 - 1000
- 1000 - 3000
- 3000 - 5500
- 5500 - 9000
- 9000 - 13000
- 13000 - 30000
- 30000 - 55000
- 55000 - 120000

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 13:02:56
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Fig_3_7_AIS_Data_KP500_to_KP700.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 5 10 15 20 km

3.5 Territorial Regulatory Burial Requirements

For the purpose of this CBRA we have complied with the following regulatory burial requirements:

- In Germany the DOL should be minimal 1.5 m as standard (i.e. regardless of threats and soil conditions – see Zones 76-81 and 84-87) and minimum 2.0m in the traffic separation lanes (Zones 82-83);
- In the very nearshore landfall area in Germany the presence of dredging activities requires the burial depth to be minimal 5 m regardless of threats and soil conditions however this section (Zone 88) is outside the scope of this CBRA.
- In the United Kingdom and the Netherlands the burial depth should follow from a risk based approach.

4. ASSESSMENT OF SEABED CONDITIONS

This section presents the breakdown of the NeuConnect cable routes based on distinct seabed conditions based on our review of the available geotechnical and regional geological data.

In the MMT geotechnical report (ref. 9), complete descriptions of CPT and VC samples at each location are provided. A further level of description is provided by applying a "Seabed Index" classification to each complete sample, reproduced from the MMT report in **Table 4-1** below. This classification is applied at 1.5m depth.

As discussed in Section 3.3, the seabed index is not a suitable categorisation for a CBRA because it only provides a classification at one specific depth (i.e. 1.5m) and review of the VC and CPT show that the soil type and properties vary significantly above and below this single point. As a result, we have re-assessed the seabed classification using the CPTs and VC information directly. The results of this analysis are provided in **Appendix A**.

Table 4-1 Summary of the Seabed Index (SI) scale

SI	Typical Seabed Sediment
1	Shallow Bedrock (<1.00m)
2	Bedrock / Obstruction (>1.00m)
3	Very dense granular, very to extremely high strength cohesive
4	Medium to high strength cohesive
5	Dense granular
6	Medium dense granular
7	Loose granular, low to medium strength cohesive
8	Very loose granular, low strength cohesive
9	Very low strength sandy cohesive
10	Extremely low strength cohesive

Table 4-2 Interpreted Undrained Shear Strength Parameter and classification

Descriptive term	Shear Strength Range (kPa)
extremely low	<10
very low	10 to 20
low	20 to 40
medium	40 to 75
high	75 to 150
very high	150 to 300

Table 4-3 Interpreted Relative Density Parameter and classification

Descriptive Term (Relative Density)	Cone Resistance Range (MPa)
very loose	<2.5
loose	2.5 to 5
medium dense	5 to 10
dense	10 to 20
very dense	>20

5. RISK IDENTIFICATION AND ASSESSMENT

To specify an appropriate DOL for the Greenlink cable, Intertek conducted a risk identification and assessment considering both the likelihood and severity of all external threat to the cable.

Risks that pose a threat to installed marine cables can be classified as either Natural or Anthropogenic risks. The following sections describe the most common risks affecting marine cables.

The completed Risk Register is provided in **Appendix B**.

5.1 Natural hazards

5.1.1 Sediment Mobility

Sediment mobility in itself does not pose a threat to a submarine cable but it can lead to issues with the thermal conductivity of cables (over burial), and exposure of cables (scour); burial under excess sand can change the thermal properties of the soil and cause hotspots along the cable, while exposure increases the risk of damage due to external aggressors such as trawling and anchoring and potentially mechanical damage from free spans.

There are several areas within the NeuConnect 500m corridor where there are bedforms present which could be mobile.

The first indication of mobile bedforms can be observed at KP11. These have been interpreted by MMT as ripples and have a wave length of <15m and height <1.0 m. Ripples are observed intermittently throughout the route where they terminate at KP304 and do not appear again until KP620 and extent to the end of the route at KP700. While these may indicate some levels of sediment movement it is not thought that these minor bedforms will have an impact on the cable installation or operability.

Mega Ripples are also observed intermittently throughout the corridor, between KP108 & KP190 and then between KP669 and KP700. These are slightly larger than ripples and have a wavelength of 15-50m and height 1-3m so may pose a risk to an installed cable within its lifetime.

Sandwaves are present within the route corridor and are first observed between KP78 and KP 80. These have been interpreted by MMT to have a wavelength 50-200m and height of >3 m. Sandwaves are next present at KP 106 and remain as intermittent features until KP294. They do not appear again until between KP673 and KP700.

For further details of mobile features interpreted along the NeuConnect corridor please see MMT's Geophysical Report (Ref 10).

For the purposes of burial targets (RMDOL & TDOL) all depths are to be measured against trough depth and after any required route engineering has been undertaken to flatten mobile sediments.

5.1.2 Other geohazards

Earthquakes, volcanic eruptions, landslides, slumps and turbidity flows, could have a devastating effect on a subsea cable within its operational lifespan. Generally, these hazards are associated with areas that are tectonically active or are located on or near a continental slope or rise. The NeuConnect route resides in an area that is tectonically stable and away from a continental shelf/plate boundary; therefore, is it not expected that any significant hazards of this nature present on the route. No areas of unstable sediment were encountered along the NeuConnect route.

5.1.3 Outcropping bedrock

Bedrock and hard sediment are considered an issue when the seabed proves to have properties that affect, and effectively inhibit, the use of the common trenching methods.

Bedrock and hard sediment may cause problems with reaching the required burial depth. In addition, topographical irregularities in bedrock or hard sediment may cause freespan, point load, and abrasion. Methods to avoid problems with bedrock or hard sediment include appropriate micro-routing, deployment of heavier trenching machines, or the installation of additional cable protection.

MMT's Geophysical results report (Ref 10) details in full the exact locations of hard ground. There are no areas of outcrop as such within the NeuConnect route. There is however, a lighthouse (Mellumplate lighthouse) that is located on an isolated rock outcrop offset 139 m east from KP 683.709.

5.1.4 Waves and currents

Waves and currents may cause abrasion and stress to an exposed cable where it crosses over rock or rough terrain. Sufficient burial and protection of a subsea cable will reduce the risk of waves and currents to a negligible level.

5.1.5 Extreme weather

Extreme weather is unexpected, unusual, unpredictable, severe or unseasonal weather and involves weather at the extremes of the historical distribution. While the NeuConnect cable is geographically in a relatively weather-stable area, sufficient depth of lowering and protection will be required to deal with the effects of extreme weather such as excessive scour and extensive movement of mobile sediments.

5.2 Anthropogenic hazards

5.2.1 Shipping

Shipping represents an anchoring hazard to a cable on or in the seabed. Vessels that drop their anchors have the potential to interact with the cables if the anchor is dragged along the cable route or dropped directly on the cable. Ships in transit do not typically anchor under normal conditions and planned anchoring normally takes place within a designated area. Contact with an anchor is often catastrophic for the cable as the forces applied by a moving anchor can be extremely large. The anchoring hazard may result from:

- Insufficient protection
- Negligent anchoring
- Emergency anchoring (where an anchor is deployed to prevent collision or grounding)
- Accidental anchoring (where an anchor falls unexpectedly from a vessel due to equipment impact or operator error). Accidental anchoring is accentuated by proximity to a port where, for navigational reasons such as the traffic density, proximity of obstructions, shallow waters and other vessels, anchors are more likely to be readied for deployment.
- A vessel being anchored inadequately (where an anchor is deployed but drags along the seabed prior to embedment)

5.2.2 Fishing gear interaction

Noting that vessels of less than 300 deadweight tonnage (DWT) tonnes are not presently required to carry AIS transponders, fishing data obtained from the Marine Management Organisation (MMO) has

been analysed to determine areas fished using mobile methods (dredging, trawling, netting etc). It is difficult to determine the specific type of gear used but the specified DOL must consider the maximum depth of penetration from fishing.

5.2.3 Dredging/aggregate extraction/subsea mining/dumping

Within UK, Dutch and German waters, all active and historical dredging and aggregation areas are known and have detailed surveys undertaken to ascertain sediment levels. All disposal and dumping sites are also known and are contaminated with material such as heavy metals and in some extreme cases radioactive waste. Aggregation, dredging and dumping ground have all been avoided with the exception on the very nearshore landfall area in Germany. The route has no option but to cross a known dredging area between approximately KP 696 and 697. Within this area the water depth is constantly maintained at 17.6m, as stated on the admiralty chart (ref 11) The Nordergründe Export Cable is also observed to cross this area. The as laid data indicates that the export cable is buried to between 5 and 6m crossing the dredged area.

The NeuConnect Interconnector will cross a total of 89 existing subsea linear assets.

- 29 in-service cables, 45 out-of-service cables and;
- 13 in-service pipelines, 2 abandoned pipelines

MMT surveyed 30 known in-service assets. Details of this survey can be found in MMT's crossing survey report (Ref 18). Each live asset will require a third-party crossing agreement and each disused asset will need permission to remove the existing asset prior to installation. Before each crossing location burial depth will be steadily decreased to allow crossing of the asset and then will be steady increased after the crossing down to the specified burial depth again. The point at which the burial depth starts to decrease will be determined by assessment of how close to the crossed asset the burial tool can be safely operated.

5.3 Risk assessment and evaluation criteria

In this section, the risk acceptance criteria are discussed to allow implementation of the results of the probability of failure and consequence of failure assessment. The key output of this Risk register being a probabilistic assessment of the risk to the cable after burial options are completed to a specified depth.

Figure 5-1 shows the risk matrix that we developed for this project. The generic meaning of the colour code is indicated in the legend below the figure. The principle works as follows: an event, such as a cable failure, has a probability of happening, and has a severity. The combination gives a location in the risk matrix and from that follows required next steps.

Figure 5-1 Risk matrix

		Likelihood				
		Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost cer
Severity	Insignificant (1)	1	2	3	4	5
	Minor (2)	2	4	6	8	10
	Moderate (3)	3	6	9	12	15
	Major (4)	4	8	12	16	20
	Severe (5)	5	10	15	20	25

	Broadly acceptable
	ALARP low
	ALARP medium
	ALARP high
	Intolerable

The severities are defined for two different categories, cost and performance, as shown in **Figure 5-2**, while the definition of the likelihood is shown in **Figure 5-3**.

Figure 5-2 Severity definition

			Severity				
			Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Severe (5)
Category	Cost		Less than £50K	£50K - £500K	£500K - £10M	£10M - £200M	10% CAPEX (>£200M)
	Performance	Availibility	Increased surveillance	Increased maintenance Occasional duration limits (days) at peak capacity	One substantial outage + major intervention Regular duration limits (hours) at peak capacity	Between one and eight 6-month outages. Between 1 and 10% capacity loss	10% availability drop through project lifetime (eg > eight 6 month outages in 40 years) > 10% max capacity loss
		Derating	Rare minor derating in a short period of time.	Routine minor derating for short period of time.	Minor derating for extended period.	Substantial derating for significant period of time.	Significant permanent derating.

Figure 5-3 Likelihood definition

	Description	Probability of event in the lifetime (40 Years)	Probability of event per year range
Rare (1)	Although they are conceivable, not expected to occur. "Plausible but no known occurrences in industry."	0% - 2%	0.00% - 0.05%
Unlikely (2)	Incidents of this nature are uncommon but there is a chance that they may occur.	2% - 10%	0.05% - 0.26%
Possible (3)	This may happen.	10% - 25%	0.26% - 0.72%
Likely (4)	Likely to experience in the near-future.	25% - 75%	0.72% - 3.41%
Almost certain (5)	Will occur or is already occurring. "Probably within the life time of the project (i.e. several known occurrences per year)."	75% - 100%	3.41% - 100.00%

5.4 Risk mitigation

There are several remedial methods of protection that can be considered to reduce the risk to the cable. The principal method of protection for most modern cable systems is burial into the seabed. In general, an activity must penetrate through the material above the burial to interact with the cable.

It may be noted that there are instances in which utility crossings or extremely hard soil conditions (e.g., bedrock) preclude burial or reduce the depth achievable. In such instances, there are three primary means of remedial protection which can be used:

- Concrete mattresses
- Rock placement
- Articulated shells

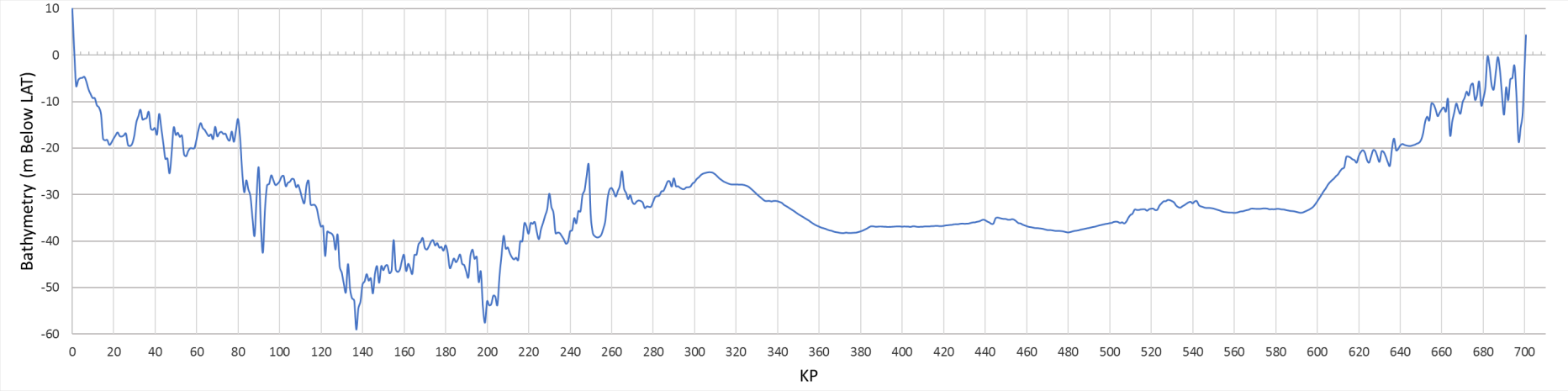
5.5 Final route segmentation

The final route segmentation used for the probabilistic assessment was divided according to changes in risk profile resulting from changes to:

- Anchoring risk (as determined by water depth and vessel traffic density)
- Fishing risk
- Changes in soil type or coastal process feature (e.g. presence of mobile sediment)

Bathymetric profile for the cable route is illustrated in **Figure 5-4** and the final cable segmentation for the NeuConnect cable route is presented in the Cable Burial Risk Assessment (CBRA) Summary Table (**Section 7**).

Figure 5-4 Bathymetry profile overview – NeuConnect cable route



6. PROBABILISTIC RISK ASSESSMENT

This section describes the methodology and results used to assess the fishing and anchoring risk to the NeuConnect cable system.

All relevant factors are assessed for a cable route on a section by section basis.

6.1 Fishing risk assessment methodology

The entire route is within a water depth range in which mobile gear fishing could take place, thus we recommend the cable is given sufficient protection from potential fishing gear interaction along the entire route.

The Carbon Trust' guidance (ref 12) indicates that penetration of fishing gear into the seabed is limited to a maximum of 0.3 m penetration even in soft sediment based on previous literature research. Adding a 20% Factor of Safety (FoS) to account for measurement errors and deformation of soil beneath fishing gear gives a Recommended Minimum DOL of 0.36m for fishing risk alone.

In practice a DOL < 0.5m is not advisable due to the instability of some trenching tools at these depths. Therefore, TDOL would be ≥0.5m if based on fishing risk only.

6.2 Vessel and anchors bands

To facilitate easier analysis of vessel traffic the vessels were grouped into 11 deadweight tonnage bands. This allowed a set range of anchor sizes to be used to characterise those carried by shipping fleets in the tonnage bands. This is shown below in **Table 6-1**.

The vessels' DWT were calculated from the vessel length data supplied in the AIS data. The methodology to calculate the vessels' DWT is as follows:

1. Create a list of all unique vessels present in the AIS data set
2. For each vessel category (Cargo, Tanker, Passenger, etc..) research the DWT information online (https://www.marinetraffic.com/, ref 14) using vessel MMSI number for a sufficient set of vessels per category (30 to 50 vessels' DWT were researched online per vessel category).
3. For each vessel category, plot the DWT vs Length and derive a power trendline that fits the distribution of data points.

Based on the above process, the following empirical formulas were derived by Intertek and used to calculate the vessels' DWT:

$$DWT_{cargo} = 0.0322 \times L^{2.6119}$$

$$DWT_{Tanker} = 0.0008 \times L^{3.3662}$$

$$DWT_{Passenger}{}^{2} = 0.0834 \times L^{2.0656}$$

$$DWT_{Vessel<70m} = 0.0042 \times L^{2.9328}$$

Where:

DWT = Vessel deadweight tonnage (tonnes)

L = Vessel length (m)

[2] The relationship between DWT and vessel length would normally be expected to be closer to the cube of the length than the square. However, as demonstrated in **Appendix D**, the formula is a good fit to the data set obtained from research.

The plots from which the above empirical formulas have been derived are provided in Appendix D.

Once the vessel deadweight tonnage is known, the theoretical anchor mass can be estimated by the following empirical formula proposed by Luger as referenced in the Submarine Power Cables book by Worzyk, 2009 (this is recognised as an acceptable approach by the Carbon Trust's CTC-835):

$$y = 7 \times 10^{-13}x^3 - 6 \times 10^{-7}x^2 + 0.1635x + 2162.2$$

Where:

y = Anchor mass (kg)

x = Vessel deadweight tonnage (upper DWT boundary of each band) (tonnes)

The Carbon Trust's guidance (ref. 13) shows the Luger formula to be a good fit with the International Association of Classification Societies (IACS) rules for vessel DWT between 10,000 Tonnes and at least up to 100,000 tonnes. However, the Luger formula does not give a range of applicability for vessel DWT below 10,000 Tonnes. Thus, for the vessel Band with a DWT up to 10,000 (Bands A-D), Intertek has used the estimated anchor size from Table 9 of ref.13 and for Bands H-K Intertek has used a chart from a presentation given by Luger.

We then used an anchor catalogue (http://www.sotra.net/catalogue/2016/index.html, ref.16) to select realistic stockless anchor dimensions based on the theoretical anchor mass calculated. The "Hall" pattern anchor is used for Bands A-F and "Spek" is used for Bands G-K as these are typical stockless anchors in common use, especially on older vessels. These type of anchors have a relatively long fluke length for its unit mass and a large opening angle, which equates to more penetration for a given fluke length.

Table 6-1 Vessel and anchor size bands

Band Name	Vessel DWT [Tonnes]	Estimated Anchor Mass [kg]	Selected Anchor Mass [kg]
Band A	0 – 100	335*	300
Band B	100 – 1,000	524	570
Band C	1,000 – 3,500	1,302	1,290
Band D	3,500 – 10,000	2,388	2,460
Band E	10,000 – 30,000	6,546	6,900
Band F	30,000 – 60,000	9,963	9,900
Band G	60,000 – 100,000	13,212	13,500
Band H	100,000 – 150,000	16,917	17,800
Band I	150,000 – 200,000	18,583	20,000
Band J	200,000 – 325,000	22,167	20,000
Band K	325,000 – 460,000	31,667	29,000

* The Carbon Trust Guideline (ref.13) specifies an estimated anchor size of 335kg for vessels of 500 Tonnes. As such, the selected anchor mass represents a conservative approach.

6.3 Probabilistic model

Intertek have developed a robust probabilistic assessment to determine the probability of interaction between an anchor and an installed cable based on local data for shipping traffic intensities, derived from historical AIS data. The model predicts the probability of a buried cable being struck because of

anchoring. The probability of cable-anchor interaction decreases as DOL increases below the maximum penetration limit of each individual class of external aggressor (i.e. fishing gear and anchors of various sizes)

The method takes account of:

- shipping traffic intensity by vessel size;
- probability of engine failure;
- probability of an emergency anchor deployment;
- dragging distance of an anchor; and
- protection factor provided by soils.

The assessment provides the annual probability of a failure, which can in turn be used to calculate the mean time to failure (MTTF) for anchoring. It should be recognised that it does not predict a failure time and that failure in Year 1 is equally as likely as in any subsequent year.

The probabilities are calculated for a range of vessel and anchor sizes. The anchor size for the upper end of the vessel tonnage band is used, as indicated in **Table 6-1**.

The probability of failure of the cable because of damage caused by emergency anchoring is calculated using the following equation:

$$P_{anchor\ damage\ per\ km} = K \times P_{loss} \times P_{deploy} \times P_{fa}$$

Where:

$P_{anchor\ damage\ per\ km}$	= probability of anchor damage on cable (-/year.km^{-1})
K	= total number of ship hours in sample box (hr/year.km^{-2})
P_{loss}	= probability of engine failure (-/engine hour)
P_{deploy}	= probability of anchor operation (-)
P_{fa}	= protection factor (-)

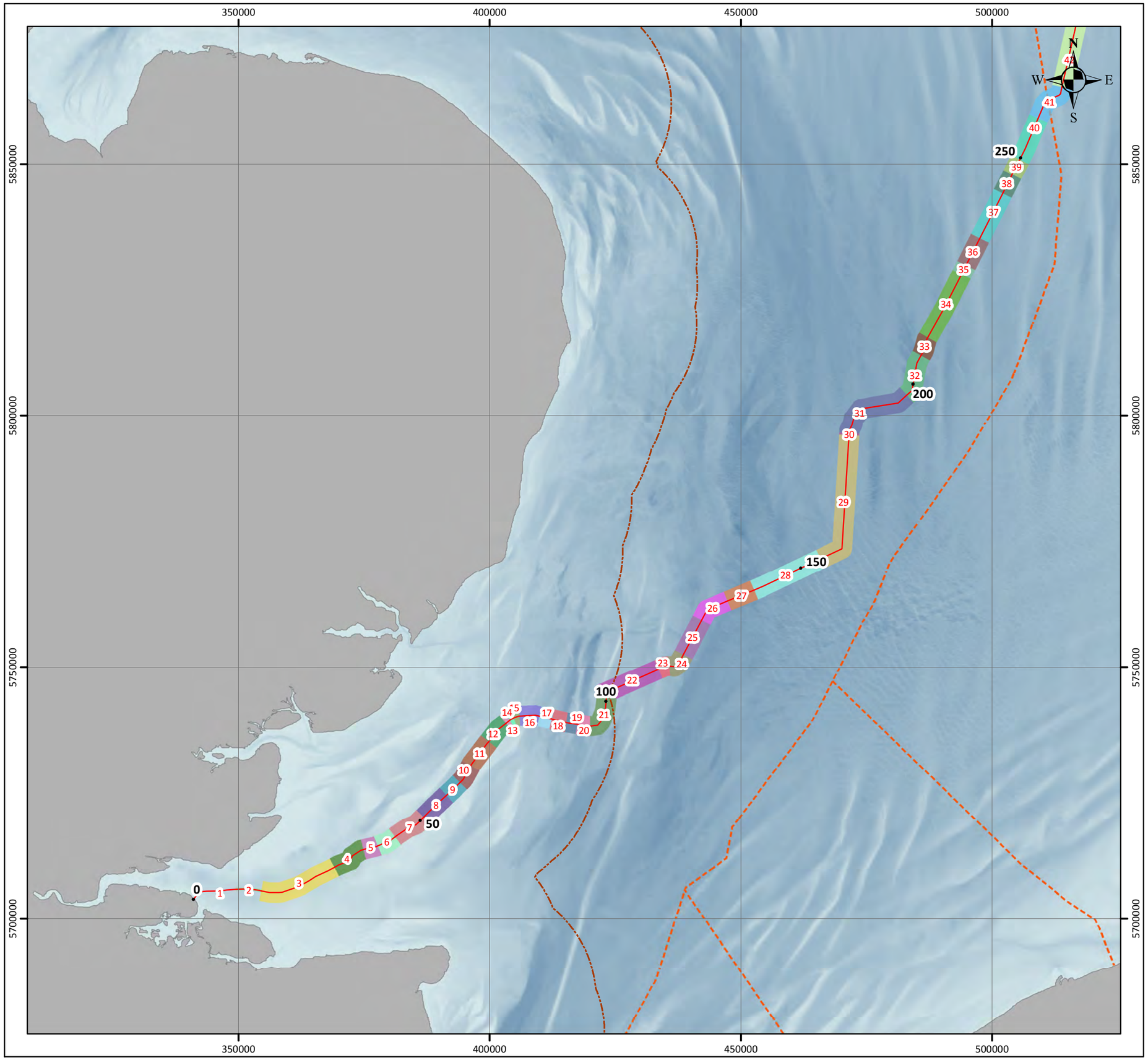
Buffer Zones

A vessel does not immediately drop an anchor when it encounters engine problems. It drifts for a period while trying to recover from the engine problem. If unrecoverable, it slows down to below approximately 1 knot before dropping an anchor. Anchoring at speeds above 1 knot will most likely lead to vessel structural damage. Defining a buffer which is greater than just directly adjacent to the cable route allows for a potential period spent drifting while trying to recover the engine and/or slow down sufficiently to allow anchoring to take place. This means that the Neuconnect cables will not just be affected by vessels that are directly above it.

The buffer for the cable route for each individual cable segments are defined as a 2km around each zone in open water and 100m and 200m for Zone 1 and Zone 2 respectively as these areas are severely constrained nearshore areas which are under the Port of London Authority's pilotage scheme (and thus highly controlled areas). **Figure 6-1** below show the cable route zones and associated buffers used.

NeuConnect CBRA

Figure 6-1: Route Zones - KP 0 to 250



Legend

- KP's
- NeuConnect Route
- UK 12nm Territorial Sea Limit
- Median Line

ZONE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

Bathymetry (Below LAT m)

High : 100

NOTE: Not to be used for Navigation

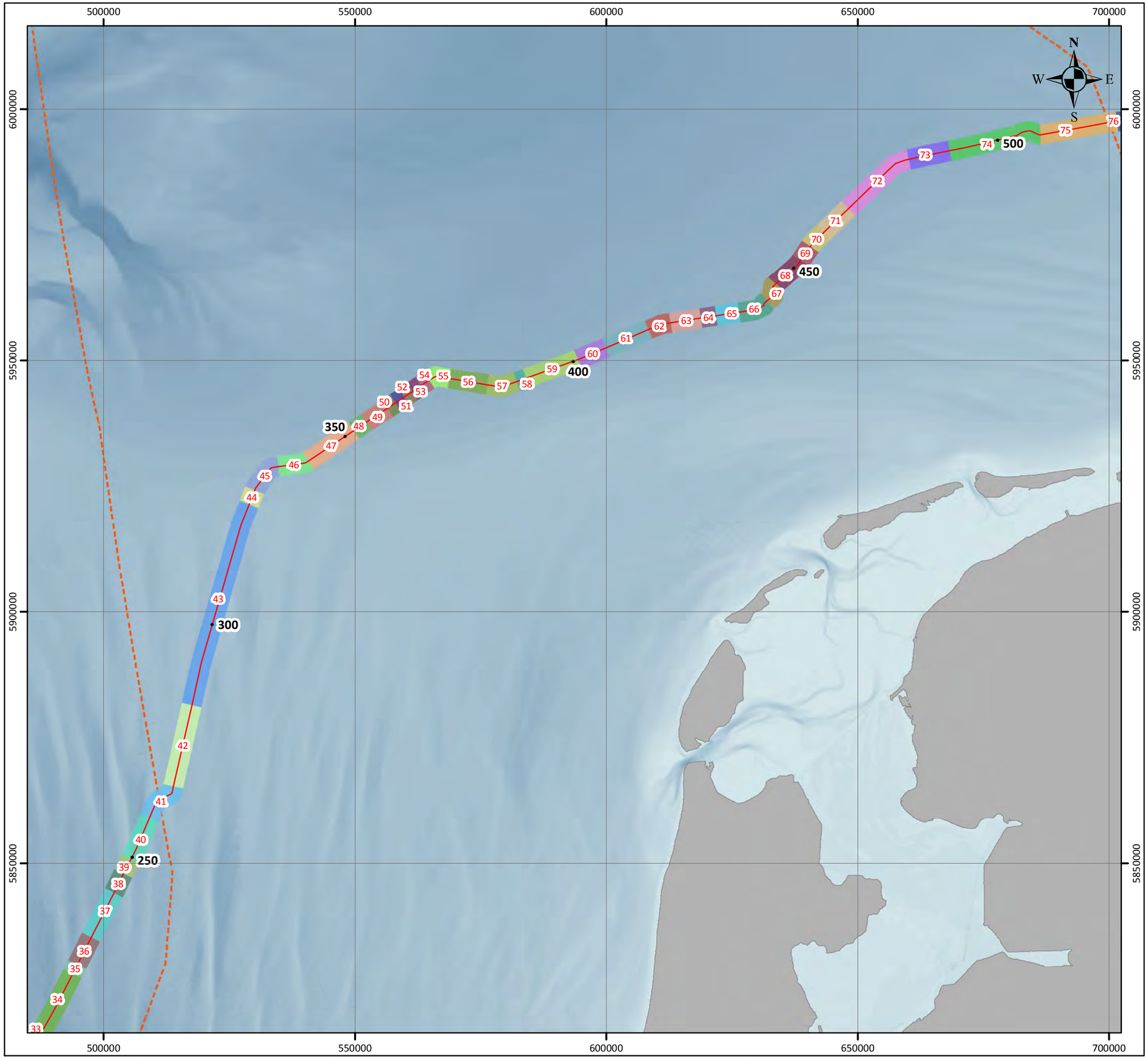
Date	Tuesday, March 19, 2019 17:02:54
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, CDA, GEBCO, EMODNET, NEUCONNECT
File Reference	J:\P2131\Mxd\CBRA\ Fig_6_1_Route_Zones_KP0-250.mxd
Created By	Chris Goode
Reviewed By	Chris Carroll
Approved By	Alan Redman

NeuConnect intertek

km
0 10 20 30 40

NeuConnect CBRA

Figure 6-2: Route Zones - KP 250 to 500



Legend

- KP's
- NeuConnect Route
- Median Line

ZONE

33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76

Bathymetry (Below LAT m)

High : 100

Low : 0

NOTE: Not to be used for Navigation

Date	Tuesday, March 19, 2019 16:53:40
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, CDA, GEBCO, EMODNET, NEUCONNECT
File Reference	J:\P2131\Mxd\CBRA\ Fig_6_3_Route_Zones_KP500-700.mxd
Created By	Chris Goode
Reviewed By	Chris Carroll
Approved By	Alan Redman

NeuConnect intertek

0 10 20 30 40 km

700000
750000
800000
850000
6050000
6000000
5950000
5900000
N
W
E
S
500
550
650
700
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88

NeuConnect CBRA

Figure 6-3: Route Zones - KP 500 to 700.58

Legend

- KP's
- NeuConnect Route

ZONE

- 74
- 75
- 76
- 77
- 78
- 79
- 80
- 81
- 82
- 83
- 84
- 85
- 86
- 87
- 88
- Median Line

Bathymetry (Below LAT m)

- High : 100
- Low : 0

NOTE: Not to be used for Navigation

Date	Tuesday, March 19, 2019 17:01:18
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO, CDA, GEBCO, EMODNET, NEUCONNECT
File Reference	J:\P2131\Mxd\CBRA\ Fig_6_3_Route_Zones_KP500-700.mxd
Created By	Chris Goode
Reviewed By	Chris Carroll
Approved By	Alan Redman

NeuConnect intertek

0 10 20 30 40 km

K - Total number of ship hours in sample box

This can be obtained by interrogating the historical AIS data. The AIS data has readings every 5 minutes.

Each Zone of Interest is split into a grid of 1km square boxes and the vessel intensities for each vessel class is calculated for each 1km square box from the AIS data.

The cable route length is then divided into sample boxes. A sample box is defined as a 1 km long box, parallel with the route of width equal to the anchor drag distance (assumed to be 60m).

The vessel intensities used for each sample box are defined as the P90 vessel intensity for each vessel/anchor bands from the buffer (i.e. the vessel intensities for which 90% of the 1km square boxes have lower intensity per band) multiplied by the drag distance(m)/1000m.

P_{loss} - Probability of engine failure

This is taken from a report compiled by DNV (Det Norske Veritas) for the Marine & Coastguard Agency (ref 26) for coastal waters around the UK. The value used in the calculations is 0.00015 / hr (equivalent to an average of 1.3 / yr of continuous vessel operation). In general, this figure is probably somewhat conservative.

P_{deploy} - Probability of anchor operation:

The anchor will not be dropped in every emergency situation. This depends on the local geography, local bathymetry and the Vessel Master's knowledge.

Table 6-2 provides the P_{deploy} factors which have been applied in this CBRA.

Table 6-2 Definition of P_{deploy}

Scenario	P_{deploy}										
	Band A	Band B	Band C	Band D	Band E	Band F	Band G	Band H	Band I	Band J	Band K
Water depth between 0 and 30m (under pilotage[3])	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water depth between 0 and 30m	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Water depth between 30 and 50m	0.05	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water depth between 50 and 75m	0	0	0.025	0.025	0.05	0.05	0.05	0.05	0.05	0.05	0.05

P_{fa} - Protection factor

This considers the protection offered by soil cover. P_{fa} is a combination between the anchor penetration depth in different soil condition and the actual cable DOL and is either 0 or 1. If the cable DOL is equal to or greater than the maximum anchor penetration depth (including Factor of Safety) for a given anchor size then P_{fa} equals to 0 for that anchor size. Conversely, if cable DOL is less than

[3] Zone 1 and Zone 2 are defined as under pilotage.

the anchor penetration depth (including the Factor of Safety) for a given anchor size then P_{fa} equals to 1 for that anchor size.

Anchor penetration depths for SANDS and CLAYS (or SAND/CLAY mixes) are typically calculated by taking the sine of the fluke opening angle and multiplying by the fluke length (for Hall anchors this is 45°). This is due to observations that anchor shanks are typically supported by the soil as they are dragged over it. However, EXTREMELY LOW STRENGTH SILTS and CLAYS (i.e. with shear strength <10kPa) are unable to support the shank and as such penetration can be significantly deeper – 3 times the sine 45° of fluke length is typically used in the industry and is accepted for this study as well. In addition, industry understanding is that HIGH STRENGTH CLAYS (≥100kPa) prevent flukes penetrating at all so it would be valid to only specify a nominal penetration depth in high strength clays present on the NeuConnect route. However, taking a conservative approach and in recognition that MMT has defined high strength clay as 75kPa (rather than 100kPa), we have defined anchor penetration depths as 0.5 times sine 45° of fluke length for areas designated as HIGH STRENGTH CLAY.

As above, the industry typically applies Sin 45° of fluke length to calculate anchor penetration in SANDS. However, trials in the German Bight in 2013 (ref 23) suggest that in SANDS anchor penetration are less than previously thought. This report concluded that a 11.5t Hall anchor would have a maximum depth of penetration of 1m in VERY LOOSE SAND, 0.79m in LOOSE SAND and 0.40m in a MEDIUM DENSE SAND which are less than the theoretical value of 1.17m calculated by Sin 45° of fluke length. In addition, the report indicates extrapolation of results to anchors of different size using a scaling factor is valid.

Thus, for each anchor size defined in **Table 6-1**, Intertek calculated the theoretical anchor penetration depth and used the results outlined in the German Bight Anchor Penetration Trials report (ref 23) to scale these anchor penetration depths to more realistic values for areas of SAND sediment type. Areas of SAND sediment type which were dense or very dense were considered as medium dense for the purposes of calculating anchor penetration depths.

A Factor of Safety of 20% has been applied on the anchor penetration depths to consider:

- uncertainty in anchor sizing;
- uncertainty of soil type; and
- deformation of the soil beneath the maximum penetration depth.

In addition, all final maximum penetration depths have been rounded up to the closet 5cm to avoid implying a level of accuracy which is not justified. Results of anchor penetration calculations by soil category, without and with the Factor of Safety are provided in Table 6-3 and 6-4 respectively.

In addition (and as can be expected), there are a number of zones in which there is a surficial sediment layer which has soil properties which vary significantly from the underlying layers. To account for this, we have assigned the zone to the categorisation associated with the underlying layer and added an offset value representative of the thickness of the surficial sediment layer. The offset layers are then added onto the calculated anchor penetration depths to give augmented anchor penetration depths for the zone. This is a conservative approach as it assumes the surficial layer provides zero protection. While conservative, this method is justified as there are zones which have surficial sediment layers composed of EXTREMELY LOW STRENGTH SILTS and CLAYS which do not support the shank of an anchor.

Table 6-3 Anchor Penetration Depths by Soil Category

Band Name	Selected Anchor mass	Theoretical value for 100% anchor penetration	Anchor Penetration by Soil Category					
			Very Loose Sand	Loose Sand	Medium Dense Sand	Extremely Low Strength Clay (<10 kPa)	Sand and Clay (≥10 to <100 kPa) & Clay (≥10 to <100 kPa)	High Strength Clay (≥100 kPa)
[-]	[kg]	[m]	[m]	[m]	[m]	[m]	[m]	[m]
Ref. Anchor (German Bight Trials)	11,500	1.17	1.00	0.79	0.40	3.52	1.17	0.59
Band A	300	0.35	0.30	0.24	0.12	1.05	0.35	0.18
Band B	570	0.44	0.38	0.30	0.15	1.33	0.44	0.22
Band C	1,290	0.57	0.49	0.39	0.20	1.72	0.57	0.29
Band D	2,460	0.71	0.61	0.48	0.24	2.14	0.71	0.36
Band E	6,900	1.00	0.85	0.68	0.34	3.01	1.00	0.50
Band F	10,500	1.03	0.88	0.69	0.35	3.10	1.03	0.52
Band G	13,500	1.12	0.95	0.75	0.38	3.35	1.12	0.56
Band H	17,800	1.25	1.06	0.84	0.43	3.75	1.25	0.63
Band I	20,000	1.28	1.09	0.86	0.44	3.84	1.28	0.64
Band J	20,000	1.28	1.09	0.86	0.44	3.84	1.28	0.64
Band K	29,000	1.46	1.24	0.98	0.50	4.37	1.46	0.73

Table 6-4 Anchor Penetration Depths by Soil Category incl. Factor of Safety (FoS)

Band Name	Selected Anchor mass	Theoretical value for 100% anchor penetration	Anchor Penetration by Soil Category incl. 20% FoS & Rounded up to nearest 5cm					
			Very Loose Sand	Loose Sand	Medium Dense Sand	Extremely Low Strength Clay (<10 kPa)	Sand and Clay (≥10 to <100 kPa) & Clay (≥10 to <100 kPa)	High Strength Clay (≥100 kPa)
[-]	[kg]	[m]	[m]	[m]	[m]	[m]	[m]	[m]
Ref. Anchor (German Bight Trials)	11,500	1.17	1.20	0.95	0.50	4.25	1.45	0.75
Band A	300	0.35	0.40	0.30	0.15	1.30	0.45	0.25
Band B	570	0.44	0.50	0.40	0.20	1.60	0.55	0.30
Band C	1,290	0.57	0.60	0.50	0.25	2.10	0.70	0.35
Band D	2,460	0.71	0.75	0.60	0.30	2.60	0.90	0.45
Band E	6,900	1.00	1.05	0.85	0.45	3.65	1.25	0.65
Band F	10,500	1.03	1.10	0.85	0.45	3.75	1.25	0.65
Band G	13,500	1.12	1.15	0.95	0.50	4.05	1.35	0.70
Band H	17,800	1.25	1.30	1.05	0.55	4.55	1.55	0.80
Band I	20,000	1.28	1.35	1.05	0.55	4.65	1.55	0.80
Band J	20,000	1.28	1.35	1.05	0.55	4.65	1.55	0.80
Band K	29,000	1.46	1.50	1.20	0.60	5.25	1.75	0.90

6.4 Identification of the acceptable risk

The calculation for probability of a cable strike for the entire cable system is given by:

$$P_{anchor\ damage,total\ system} = \sum P_{anchor\ damage\ per\ km}$$

Where:

$P_{anchor\ damage,total\ system}$ = probability of anchor damage for the entire cable route (-/year)

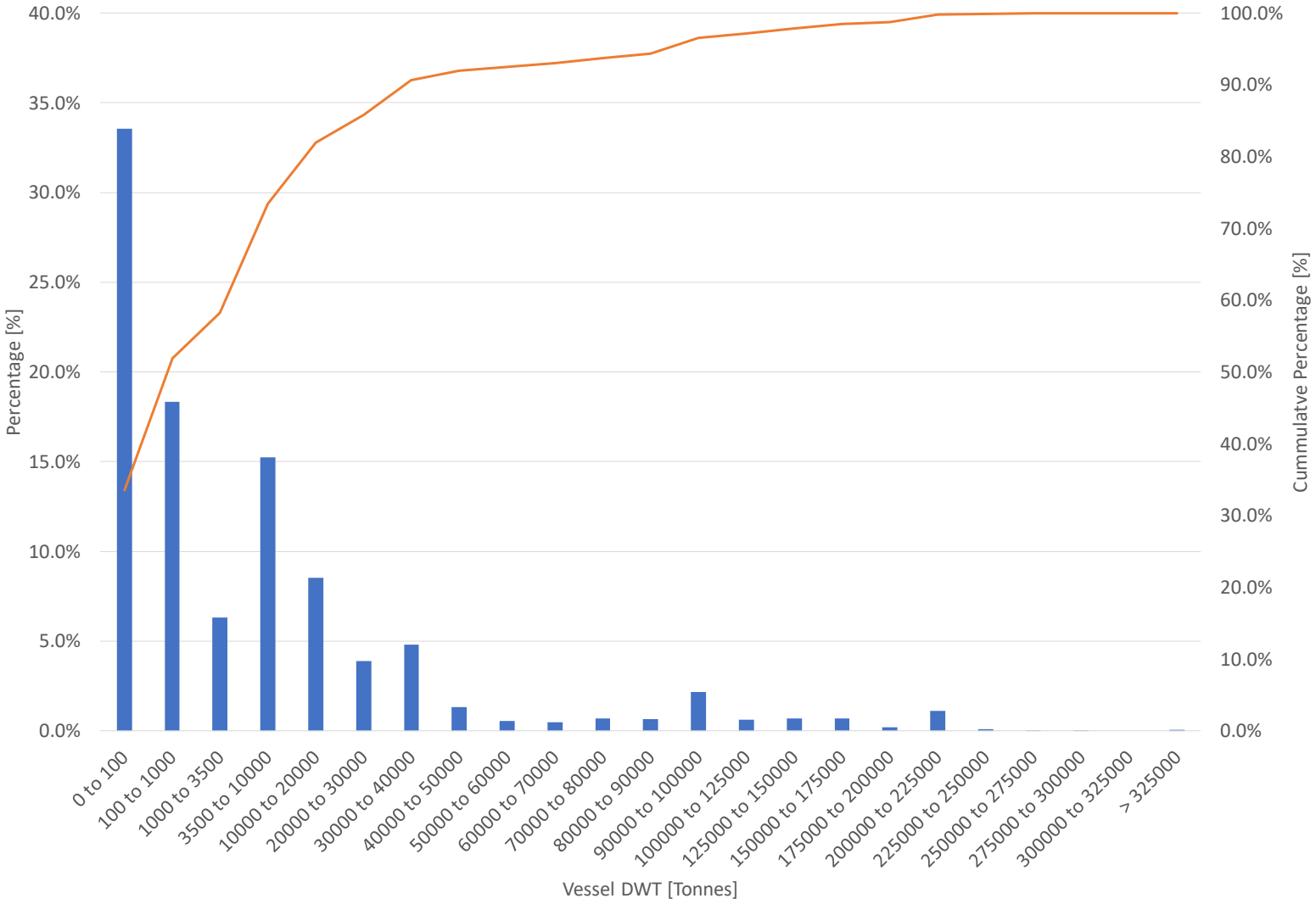
As recommended by the Carbon Trust's guideline (ref 22), Intertek used an iterative approach to identify a burial depth which results in a "target" residual risk to overall cable system.

The iterative step can be described as follows:

1. Calculate the value of $P_{anchor\ damage,total\ system}$ for all vessels with a surface-laid cable
2. Identify the value of $P_{anchor\ damage,total\ system}$ that would be acceptable to the stakeholders
3. Goal-seek RMDOL which achieves this tolerable level
4. If the RMDOL is considered impractical the acceptable level of risk should be re-considered.

The probabilistic assessment calculates the annual failure probability of 9% for the entire NeuConnect route (based on anchor risk alone) if surface laid. This value equates to a return period of 11 years and a failure probability over the (40 year) lifetime of 97.75%. This is clearly not an acceptable level of risk. **Figure 6.4.1** shows vessel size distribution by DWT. Naturally, vessel densities are overwhelmingly composed of smaller vessels, so risk reduces significantly as DOL increases over and above the penetration depths of anchor sizes associated smaller vessels.

6.4.1 Vessel size distribution



6.4.2 Results for Recommended Minimum DOL

A RMDOL was derived on a zone basis to remove the risk from anchoring from the selected vessel band in order to achieve an overall acceptable risk. The tables below present the RMDOL and associated annual failure probability for the following 6 scenarios:

1. Scenario 1: Protection against vessels in Band A
2. Scenario 2: Protection against vessels in Bands A to B
3. Scenario 3: Protection against vessels in Bands A to C
4. Scenario 4: Protection against vessels in Bands A to D
5. Scenario 5: Protection against vessels in Bands A to E
6. Scenario 6: Protection against vessels in Bands A to F
7. Scenario 7: Protection against vessels in Bands A to G
8. Scenario 8: Protection against vessels in Band A to H
9. Scenario 9: Protection against vessels in Bands A to I
10. Scenario 10: Protection against vessels in Bands A to J
11. Scenario 11: Protection against vessels in Bands A to K
12. Scenario 12: Selected Protection Section by Section (RMDOL)

Anchoring risk exceeds fishing risk in in all zones of the route and thus determines RMDOL (except for zones in Germany where the legislative DOL requirements exceed the minimum DOL calculated by the probabilistic assessment). RMDOL has been selected for each individual zone in order that the overall risk to the cable over the project lifetime is reduced to ALARP. RMODOL varies from 0.55-2.00m along the length of the route.

The full results of the above assessment by zone are provided in **Appendix E**[4]. As can be seen if RMDOL is achieved during installation (and maintained throughout the project life) then the NeuConnect cable would have an annual failure probability of 9.00E-04. This equates to a return period of 1111.27 years and a failure probability over the (40 year) lifetime of 3.54%.

6.4.3 Results for Target DoL

TDOL is determined as what can reasonably be added to RMDOL without incurring a step change in costs and which represents a practical target for burial tools on the market.

TDOL has been set at 1.5m for the vast majority of the route and varies up to a maximum TDOL of 2m in some zones due either to anchor risk or legislative requirements. The DOL specification by cable route zone are provided in **Appendix E**. As can be seen if TDOL is achieved during installation (and maintained throughout the project life) then the NeuConnect cable would have an annual failure probability of 5.37E-04. This equates to a return period of 1863.84 years and a failure probability over the (40 year) lifetime of 2.12% .

[4] Note, the failure probability is as calculated for identified hazards only and is based on the assumptions detailed in this report. It does not account for manufacturing defects or latent damage to the asset incurred during installation. Furthermore, the values provided are predicated on DOL being maintained throughout the lifetime of the asset. A robust condition survey regime is required during the asset's operational lifetime to ensure protection levels remain sufficient.

7. CBRA ASSESSMENT

Zones				Water Depth (m below LAT)			Geophysical/Geotechnical Data						Shipping Data (Anchoring Assessment)				Fishing Data		Territorial minimum DoL Requirement (m)	Recommended Minimum Depth of Lowering (m)	Target Depth of Lowering (m)
No.	Start KP	End KP	Length (km)	MAX	MIN	Mean	Survey Block	Dominant Sediment Type	Predominant Density (0-2m where applicable)	Predominant Shear Strength (0-2m where applicable)	Mobile Features (where applicable)	Categorisation for Anchor Penetration Calculation	Offset (m)	Risk from Anchoring?	Shipping Buffer Size (m)	Observation (WD)	Recommended DoL for Protection against Anchor Strike (m)	Presence of Fishing	Recommended DoL for Protection against Fishing Gear (including 20% Factor of Safety) (m)			
1	0.000	9.214	9.214	-8.680	12.130	-4.230	Block 01	Very Low Strength Clay with Extremely Low Veneer (0.4m)		Extremely Low to Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	100	0m to 30m (Under Pilotage)	1.30	Yes	0.36	N/A	1.30	1.70
2	9.214	14.300	5.086	-13.950	-8.080	-10.440	Block 01	Low Strength Clay with Veneer of Extremely Low Strength Clay (0.5m)		Low	Ripples	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.5	Yes	250	0m to 30m (Under Pilotage)	1.85	Yes	0.36	N/A	1.85	2.00
3	14.300	29.999	15.699	-19.940	-13.890	-17.981	Block 01	Low Strength Clay/Loose Sand	Loose	Low	Ripples	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	0m to 30m	1.55	Yes	0.36	N/A	1.55	1.70
4	29.999	37.066	7.067	-17.410	-11.010	-13.473	Block 01	Medium Dense Sand	Medium Dense		Ripples & Megaripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
5	37.066	39.997	2.931	-16.650	-12.180	-15.196	Block 01	Loose Sand	Loose		Ripples	LOOSE SAND		Yes	2000	0m to 30m	1.05	Yes	0.36	N/A	1.05	1.50
6	39.997	43.998	4.001	-18.920	-11.750	-15.360	Block 01	Medium Dense Sand	Medium Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
7	43.998	50.972	6.974	-26.590	-15.310	-20.174	Block 01 - 02	Loose Sand	Loose		Ripples	LOOSE SAND		Yes	2000	0m to 30m	1.05	Yes	0.36	N/A	1.05	1.50
8	50.972	57.239	6.267	-22.300	-16.410	-19.348	Block 02	Dense Sand	Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
9	57.239	60.969	3.730	-20.650	-15.740	-19.055	Block 02	Loose Sand	Loose		Ripples	LOOSE SAND		Yes	2000	0m to 30m	1.05	Yes	0.36	N/A	1.05	1.50
10	60.969	64.970	4.001	-16.910	-14.050	-15.547	Block 02	Medium Dense Sand	Medium Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
11	64.970	70.969	5.999	-19.290	-14.950	-17.151	Block 02	Dense Sand	Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
12	70.969	75.968	4.999	-19.330	-16.160	-17.280	Block 02	High Strength Clay		High to Very High		HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
13	75.968	76.963	0.995	-18.460	-15.910	-17.055	Block 02	Sand	No Information		Ripples	VERY LOOSE SAND		Yes	2000	0m to 30m	1.15	Yes	0.36	N/A	1.15	1.50
14	76.963	77.803	0.840	-21.400	-16.350	-18.676	Block 02	Very Low Strength Clay		Very Low	Ripples	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	0m to 30m	1.25	Yes	0.36	N/A	1.25	1.50
15	77.803	79.095	1.292	-20.370	-12.280	-18.037	Block 02	Sand	No Information		Ripples	VERY LOOSE SAND		Yes	2000	0m to 30m	1.15	Yes	0.36	N/A	1.15	1.50
16	79.095	83.069	3.974	-29.980	-12.500	-20.109	Block 02	Dense Sand	Dense		Ripples & Sand Waves	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.60	Yes	0.36	N/A	0.60	1.50
17	83.069	85.595	2.526	-31.360	-24.170	-28.730	Block 02	High Strength Clay		Very High		HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
18	85.595	88.550	2.955	-39.990	-28.720	-34.093	Block 02	High Strength Clay		Very High	Ripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
19	88.550	90.796	2.246	-31.530	-23.060	-26.403	Block 02	High Strength Clay		Very High	Ripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
20	90.796	93.322	2.526	-42.650	-28.830	-37.800	Block 02	High Strength Clay		Very High	Ripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
21	93.322	101.884	8.562	-28.850	-25.100	-27.109	Block 02 - 03	High Strength Clay		Very High	Ripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
22	101.884	113.069	11.185	-32.740	-25.130	-28.295	Block 03	High Strength Clay		Very High	Ripples, Megaripples & Sand Waves	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
23	113.069	115.299	2.230	-33.350	-21.690	-29.116	Block 03	Medium Dense Sand	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	N/A	0.70	1.50
24	115.299	119.533	4.234	-39.430	-28.950	-33.404	Block 03	High Strength Clay		Very High	Ripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	30m to 50m	0.80	Yes	0.36	N/A	0.80	1.50
25	119.533	127.273	7.740	-45.930	-34.610	-38.861	Block 03	High Strength Clay		Very High	Ripples & Megaripples	HIGH STRENGTH CLAY (≥100 kPa)		Yes	2000	30m to 50m	0.70	Yes	0.36	N/A	0.70	1.50
26	127.273	134.000	6.727	-52.470	-37.660	-45.623	Block 03	Dense Sand with Loose Sand Veneer (0.3m)	Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
27	134.000	139.716	5.716	-63.470	-45.010	-54.392	Block 03	Dense Sand with Loose Sand Veneer (0.3m)	Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	50m to 75m	0.80	Yes	0.36	N/A	0.80	1.50
28	139.716	154.341	14.625	-55.550	-38.540	-47.130	Block 03	Dense Sand with Loose Sand Veneer (0.3m)	Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
29	154.341	181.674	27.333	-48.610	-34.620	-42.603	Block 03 - 04	Dense Sand with Loose Sand Veneer (0.3m)	Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
30	181.674	182.027	0.353	-46.160	-40.090	-44.432	Block 04	Very Loose Sand over Medium Clay	Very Loose	Medium	Ripples, Megaripples & Sand Waves	VERY LOOSE SAND		Yes	2000	30m to 50m	1.05	Yes	0.36	N/A	1.05	1.50
31	182.027	197.298	15.271	-50.410	-37.050	-44.376	Block 04	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
32	197.298	205.967	8.669	-57.880	-46.310	-52.575	Block 04 - 05	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	50m to 75m	0.80	Yes	0.36	N/A	0.80	1.50
33	205.967	209.792	3.825	-47.950	-37.890	-41.924	Block 05	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.80	Yes	0.36	N/A	0.80	1.50
34	209.792	224.069	14.277	-45.110	-31.780	-40.060	Block 05	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
35	224.069	226.072	2.003	-40.830	-36.380	-38.911	Block 05	Medium Strength Clay		Medium to high	Ripples, Megaripples & Sand Waves	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	1.25	Yes	0.36	N/A	1.25	1.50
36	226.072	232.074	6.002	-37.350	-25.610	-33.242	Block 05	Dense Sand with Loose Sand Veneer (0.3m)	Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.80	Yes	0.36	N/A	0.80	1.50
37	232.074	242.071	9.997	-40.790	-32.680	-38.411	Block 05	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	Medium Dense	High to Very High	Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.80	Yes	0.36	N/A	0.80	1.50
38	242.071	246.290	4.219	-37.810	-29.430	-34.603	Block 05	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.80	Yes	0.36	N/A	0.80	1.50
39	246.290	249.628	3.338	-31.610	-23.030	-26.815	Block 05	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
40	249.628	258.602	8.974	-39.300	-28.710	-36.749	Block 05 - 06	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
41	258.602	266.887	8.285	-30.630	-24.870	-28.716	Block 06	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	0m to 30m	0.80	Yes	0.36	N/A	0.80	1.50
42	266.887	283.528	16.641	-33.150	-28.410	-31.378	Block 06	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.75	Yes	0.36	N/A	0.75	1.50
43	283.528	325.070	41.542	-29.840	-25.110	-27.333	Block 06 - 07	Medium Dense Sand with Loose Sand Veneer (0.3m)	Medium Dense		Ripples, Megaripples & Sand Waves	MEDIUM DENSE SAND	0.3	Yes	2000	0m to 30m	0.75	Yes	0.36	N/A	0.75	1.50
44	325.070	328.070	3.000	-29.220	-28.060	-28.522	Block 07	Very Loose Sand	Very Loose			VERY LOOSE SAND		Yes	2000	0m to 30m	0.75	Yes	0.36	N/A	0.75	1.50
45	328.070	335.083	7.013	-31.430	-29.080	-30.436	Block 07	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.3m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.3	Yes	2000	30m to 50m	0.85	Yes	0.36	N/A	0.85	1.50
46	335.083	341.250	6.167	-31.630	-31.270	-31.362	Block 07	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.3m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.3	Yes	2000	30m to 50m	1.55	Yes	0.36	N/A	1.55	1.70
47	341.250	352.068	10.818	-34.730	-31.560	-33.176	Block 07 - 08	Very Low with Extremely Low Veneer (0.4m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	0.95	Yes	0.36	N/A	0.95	1.50
48	352.068	355.069	3.001	-35.560	-34.710	-35.150	Block 08	Very Low with Extremely Low Veneer (0.4m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	0.95	Yes	0.36	N/A	0.95	1.50
49	355.069	360.070	5.001	-36.890	-35.530	-36.283	Block 08	Very Low with Extremely Low Veneer (0.5m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.5	Yes	2000	30m to 50m	1.05	Yes	0.36	N/A	1.05	1.50
50	360.070	362.055	1.985	-37.210	-36.850	-37.048	Block 08	Very Low Strength Silty Sand/Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
51	362.055	364.070	2.015	-37.540	-37.160	-37.345	Block 08	Very Low with Extremely Low Veneer (0.4m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	0.95	Yes	0.36	N/A	0.95	1.50
52	364.070	366.069	1.999	-37.770	-37.510	-37.649	Block 08	Very Low Strength Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
53	366.069	368.072	2.003	-38.050	-37.720	-37.894	Block 08	Very Low with Extremely Low Veneer (0.4m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	0.95	Yes	0.36	N/A	0.95	1.50
54	368.072	370.070	1.998	-38.210	-38.010	-38.112	Block 08	Very Low Strength Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
55	370.070	374.369	4.299	-38.310	-38.110	-38.210	Block 08	Very Low with Extremely Low Veneer (0.4m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	0.95	Yes	0.36	N/A	0.95	1.50
56	374.369	382.070	7.701	-38.280	-37.460	-37.993	Block 08	Very Low with Extremely Low Veneer (0.6m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.4	Yes	2000	30m to 50m	1.50	Yes	0.36	N/A	1.50	1.70
57	382.070	388.068	5.998	-37.480	-36.750	-36.975	Block 08	Very Low Strength Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
58	388.068	390.070	2.002	-36.910	-36.770	-36.824	Block 08	Very Low with Extremely Low Veneer (0.5m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.5	Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
59	390.070	401.070	11.000	-36.950	-36.760	-36.852	Block 08 - 09	Very Low Strength Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
60	401.070	407.069	5.999	-36.960	-36.730	-36.833	Block 09	Very Loose Silty Sand				SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
61	407.069	416.243	9.174	-36.960	-36.630	-36.806	Block 09	Very Low with Extremely Low Veneer (0.6m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.6	Yes	2000	30m to 50m	1.15	Yes	0.36	N/A	1.15	1.50
62	416.243	420.912	4.669	-36.790	-36.590	-36.705	Block 09	Very Low Strength Clay/Sandy Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
63	420.912	426.983	6.071	-36.640	-36.290	-36.444	Block 09	Very Low Strength Clay/Sandy Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	1.25	Yes	0.36	N/A	1.25	1.50
64	426.983	430.070	3.087	-36.350	-36.120	-36.211	Block 09	Very Low Strength Clay/Sandy Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.55	Yes	0.36	N/A	0.55	1.50
65	430.070	434.707	4.637	-36.290	-35.930	-36.117	Block 09	Very Low with Extremely Low Veneer (0.5m)		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.5	Yes	2000	30m to 50m	1.40	Yes	0.36	N/A	1.40	1.50
66	434.707	441.019	6.312	-35.980	-35.150	-35.640	Block 09	Very Low Strength Clay/Sandy Clay		Very Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	1.25	Yes	0.36	N/A	1.25	1.50
67	441.019	445.241	4.222	-36.290	-34.980	-35.870	Block 09 - 10	Very Loose Clayey Sand	Loose			SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.90	Yes	0.36	N/A	0.90	1.50
68	445.241	452.104	6.863	-35.460	-34.860	-35.154	Block 10	Loose Sand	Loose			LOOSE SAND		Yes	2000	30m to 50m	0.60	Yes	0.36	N/A	0.60	1.50
69	452.104	455.478	3.374	-35.980	-35.200	-35.467	Block 10	Low Strength Sandy Clay		Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.70	Yes	0.36	N/A	0.70	1.50
70	455.478	459.173	3.695	-36.630	-35.950	-36.273	Block 10	Very Loose Sand	Very Loose			VERY LOOSE SAND		Yes	2000	30m to 50m	0.60	Yes	0.36	N/A	0.60	1.50
71	459.173	466.173	7.000	-37.260	-36.580	-37.000	Block 10	Very Low Strength Sandy Clay with Extremely Low Veneer (0.5m)		Extremely Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	1.05	Yes	0.36	N/A	1.05	1.70
72	466.173	481.845	15.672	-38.140	-37.210	-37.716	Block 10	Very Loose Sand	Very Loose			VERY LOOSE SAND		Yes	2000	30m to 50m	0.75	Yes	0.36	N/A	0.75	1.50
73	481.845	490.175	8.330	-38.270	-37.080	-37.520	Block 10	Very Loose Silty Sand		Extremely Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	30m to 50m	0.70	Yes	0.36	N/A	0.70	1.50
74	490.175	508.853	18.678	-37.130	-34.850	-36.278	Block 10 - 11	Very Loose Sand	Very Loose			VERY LOOSE SAND		Yes	2000	30m to 50m	0.75	Yes	0.36	N/A	0.75	1.50
75	508.853	524.365	15.512	-35.230	-32.060	-33.350	Block 11 - 12	Dense Sand with Loose Sand Veneer (0.3m)	Dense			MEDIUM DENSE SAND	0.3	Yes	2000	30m to 50m	0.60	Yes	0.36	N/A	0.60	1.50
76	524.365	542.366	18.001	-32.820	-30.860	-31.764	Block 12	Medium Dense Sand with Loose Sand Veneer (0.2m)	Medium Dense			MEDIUM DENSE SAND	0.2	Yes	2000	30m to 50m	0.65	Yes	0.36	1.50	1.50	1.50
77	542.366	573.365	30.999	-33.920	-31.820	-33.238	Block 12 - 13	Loose Sand	Loose			LOOSE SAND		Yes	2000	30m to 50m	0.85	Yes	0.36	1.50	1.50	1.50
78	573.365	580.490	7.125	-33.160	-32.900	-33.038	Block 13	Very Loose Sand	Very Loose			VERY LOOSE SAND		Yes	2000	30m to 50m	0.60	Yes	0.36	1.50	1.50	1.50
79	580.490	591.364	10.874	-33.830	-32.990	-33.370	Block 13	Medium Dense Sand with Loose Sand Veneer (1.0m)	Medium Dense			MEDIUM DENSE SAND	0.15	Yes	2000	30m to 50m	0.45	Yes	0.36	1.50	1.50	1.50
80	591.364	595.367	4.003	-33.900	-33.360	-33.698	Block 13	Loose Sand with Very Loose Sand Veneer (1.0m)	Loose			LOOSE SAND		Yes	2000	30m to 50m	0.60	Yes	0.36	1.50	1.50	1.50
81	595.367	604.365	8.998	-33.400	-28.450	-31.315	Block 13	Loose Sand	Loose			LOOSE SAND		Yes	2000	30m to 50m	0.85	Yes	0.36	1.50	1.50	1.50
82	604.365	614.831	10.466	-28.470	-21.610	-25.515	Block 13	Medium Dense Sand with Loose Sand Veneer (0.15m)	Medium Dense			MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.75	Yes	0.36	2.00	2.00	2.00
83	614.831	629.440	14.609	-23.480	-20.080	-21.730	Block 13 - 14	Medium Dense Sand with Loose Sand Veneer (0.15m)	Medium Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.75	Yes	0.36	2.00	2.00	2.00
84	629.440	632.364	2.924	-23.310	-20.400	-21.413	Block 14	Medium Strength Clay with Low Strength Veneer (0.2m)		Medium		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	0m to 30m	1.35	Yes	0.36	1.50	1.50	1.50
85	632.364	645.366	13.002	-24.780	-17.780	-20.279	Block 14	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	Medium Dense		Ripples	MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	1.50	1.50	1.50
86	645.366	647.396	2.030	-19.500	-19.220	-19.349	Block 14	Low Strength Clay with Medium Dense Sand Veneer (0.4m)		Low		SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)		Yes	2000	0m to 30m	1.55	Yes	0.36	1.50	1.50	1.50
87	647.396	649.365	1.969	-19.270	-18.610	-18.937	Block 14	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	Medium Dense			MEDIUM DENSE SAND	0.15	Yes	2000	0m to 30m	0.70	Yes	0.36	1.50	1.50	1.50
88	649.365	700.718	51.353	-21.130	10.190	-9.589	Block 15	N/A	N/A	N/A	Ripples, Megaripples & Sand Waves	N/A		N/A	N/A	N/A	TBC	Yes	0.36	TBC	TBC	TBC

8. CONCLUSION AND RECOMMENDATIONS

The cable burial risk assessment has shown that the following hazards are present along the NeuConnect cable route. The main areas of concern are explained below:

Sediment Mobility

Sediment mobility in itself does not pose a threat to a submarine cable but it can lead to issues with the thermal conductivity of cables (over burial), and exposure of cables (scour); burial under excess sand can change the thermal properties of the soil and cause hotspots along the cable, while exposure increases the risk of damage due to external aggressors such as trawling and anchoring and potentially mechanical damage from free spans.

There are a number of areas within the NeuConnect 500m corridor where there are bedforms present which could be mobile.

The first indication of mobile bedforms can be observed at KP11. These have been interpreted by the route survey contractor, MMT, as ripples and have a wave length of <15m and height <1.0 m. Ripples are observed intermittently throughout the route where they terminate at KP304 and do not appear again until KP620 from which they then extend to the end of the route at KP700. While these may indicate some levels of sediment movement it is not thought that these minor bedforms will have an impact on the cable installation or operability.

Mega Ripples are also observed intermittently throughout the corridor, between KP108 & KP190 and then between KP669 and KP700. These are slightly larger than ripples and have a wave length of 15-50m and height 1-3m so may pose a risk to an installed cable within its lifetime.

Sandwaves present within the route corridor and are first observed between KP78 and KP 80. These have been interpreted by MMT to have a wave length 50-200m and height of >3 m. Sandwaves are next present at KP 106 and remain as intermittent features until KP294. They do not appear again until between KP673 and KP700.

For the purposes of burial targets (RMDOL & TDOL) all depths are to be measured against trough depth and after any required route engineering has been undertaken to flatten mobile sediments.

Fishing Risk

The entire route is within water depth range in which mobile gear fishing could take place, thus we recommend the cable is given sufficient protection from potential fishing gear interaction along the entire route.

The Carbon Trust' guidance (ref 12) indicates that penetration of fishing gear into the seabed is limited to a maximum of 0.3 m penetration even in soft sediment based on previous literature research. Adding a 20% Factor of Safety (FoS) to account for measurement errors and deformation of soil beneath fishing gear gives a RMDOL of 0.36m for fishing risk alone.

In practice a DOL < 0.5m is not advisable due to the instability of some trenching tools at these depths. Therefore, TDOL would be >0.5m if based on fishing risk only.

Anchoring Risk

Vessel Automatic Identification System (AIS) data has been used to determine the size and quantity of vessels which operate in the vicinity of the cable route. Vessels are grouped into size categories based on their deadweight tonnage (DWT) from Band A (0-100 DWT) to Band K (325K-460K DWT) and an appropriate associated anchor size is assigned to each band. Analysis of this data determines the probability of anchor-cable interactions for each vessel banding and thus the size of anchor which must be protected against in order to reduce risk to the cable to ALARP.

Assessment of the anchor risk strike for a surface laid cable demonstrated an unacceptable level of risk to the cable (failure probability of 97.75% over the lifetime of the cable) and thus there is a requirement to protect the cable against anchors interaction.

Anchoring risk exceeds fishing risk in in all zones of the route and thus determines RMDOL (except for zones in Germany where the legislative DOL requirements exceed the minimum DOL calculated by the probabilistic assessment). DOL has been calculated for protection against the anchor size associated with each vessel band in each cable route zone. Following this, the RMDOL has been selected for each individual zone in order that the overall risk to the cable over the project lifetime is reduced to ALARP. This varies from 0.55-2.00m. The full results by zone are provided in **Appendix E**. As can be seen if RMDOL is achieved during installation (and maintained throughout the project life) then the NeuConnect cable would have an annual failure probability of 9.00E-04. This equates to a return period of 1111.27 years and a failure probability over the (40 year) lifetime of 3.54%.

Conclusions and recommendations

TDOL is determined as what can reasonably be added to RMDOL without incurring a step change in costs and which represents a practical target for burial tools on the market.

TDOL has been set at 1.5m for the vast majority of the route and varies up to a maximum TDOL of 2m in some zones due either to anchor risk or legislative requirements. The DOL specification by cable route zone are provided in **Appendix E**. As can be seen if TDOL is achieved during installation (and maintained throughout the project life) then the NeuConnect cable would have an annual failure probability of 5.37E-04. This equates to a return period of 1863.84 years and a failure probability over the (40 year) lifetime of 2.12%.

REFERENCES

1 MMT Survey Data: Bathymetry

2 BSH Aurfmod Bathymetry

3 EMODNet (200m resolution), http://portal.emodnetbathymetry.eu/

4 AIS data. Oceaneering

5 MMT Survey Data: Contacts

6 MMT Survey Data: Seabed Sediments

7 MMT Survey Data: Geology

8 MMT Geotechnical Samples

9 MMT Geotechnical Report and VC & CPT logs, *102553-NEU-MMT-SUR-REP-GEOTECH-02*

10 MMT Geophysical Report and Survey Results, *102553-NEU-MMT-SUR-REP-OPERFR-02*

11 Admiralty charts, http://wmsgateway.findmaps.co.uk/wms/IntertecMetocCharts?

12 Risk assessment of pipeline protection, DNV_RP_F107

13 Guidance for the Preparation of Cable Burial Depth of Lowering Specification, Carbon Trust CTC835

14 Anchor Tests German Bight, Deltares

15 Vessel DWT, https://www.marinetraffic.com/

16 Anchor catalogue, http://www.sotra.net/catalogue/2016/index.html

17 Marine & Coastguard Agency, DNV 2005

18 MMT Crossing Survey report, *102553-NEU-MMT-SUR-REP-CROSSRE-02*

APPENDIX A

Seabed Sediments

Seabed Index Scale (SI)	Typical Seabed Sediment
1	Shallow Bedrock (<1.00m)
2	Bedrock / Obstruction (>1.00m)
3	Very dense granular, very to extremely high strength cohesive
4	Medium to high strength cohesive
5	Dense granular
6	Medium dense granular
7	Loose granular, low to medium strength cohesive
8	Very loose granular, low strength cohesive
9	Very low strength sandy cohesive
10	Extremely low strength cohesive

Descriptive term	Shear strength rang (kPa)
extremely low	<10
very low	10 to 20
low	20 to 40
medium	40 to 75
high	75 to 150
very high	150 to 300

Descriptive term	Cone resistance range (Relative density) Mpa
very loose	<2.5
loose	2.5 to 5
medium dense	5 to 10
dense	10 to 20
very dense	>20

						Top Layer				Layer 2				Layer 3			
Zone	Comments/Assumptions	Route KP	Location	Type	Seabed Index at 1.5m	Top Layer Thickness (m)	Top Layer Description	Top Lay Relative density Description	Top Layer Shear Strength Description	Layer 2 Thickness (m)	Layer 2 Desription	Layer 2 relative density Decription	Layer 2 Shear Strength Description	Layer 3 Thickness (m)	Layer 3 Desription	Layer 3 relative density Decription	Layer 3 Shear Strength Description
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	2.285	VC-B01-002	VC	8	0.65	Clay		Extremely Low	3.5	Silty Sand						
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	2.287	CPT-B01-002	CPT	8	0.72	Clay		Extremely Low	4.18	Silty Sand	Medium Dense to Dense					
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	3.157	VC-B01-003	VC	8	1.35	Clay		Low	1.05	Silty Sand			0.17	Clay		
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	3.999	VC-B01-004	VC	8	0.55	Sand			0.98	Clay		Very Low	1.9	Sand		
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	4.001	CPT-B01-004	CPT	8	1.28	Silty Sand	Very Loose to Loose		1.1	Clay		Low	3.02	Sand	Medium Dense to Dense	
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	5.052	VC-B01-005	VC	8	0.4	Sand			0.6	Clay		Extremely Low	2.9	Sand		
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	6.006	VC-B01-006	VC	9	0.2	Sand			2.2	Clay		Very Low	1.78	Sand with thin bands of Clay		
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	6.008	CPT-B01-006	CPT	9	0.24	Sand	Very Loose to Loose		2.3	Clay		Extremely Low	1.64	Sand with thin bands of Clay	Very Loose to Loose	
1	Very Low Strength Clay with Extremely Low Veneer (0.4m)	7	VC-B01-007	VC	8	3.49	Sand with thin bands of Clay										
1	Low Strength Clay	9.262	VC-B01-009	VC	8	0.67	Sand with thin bands of Clay		Extremely Low	0.53	Clay			2	Sand with thin bands of Clay		
1	Low Strength Clay	9.834	VC-B01-010A	VC	8	0.29	Clay		Low	2.2	Sand with thin bands of Clay						
1	Low Strength Clay	9.834	CPT-B01-010	CPT	8	0.56	Clay		Extremely Low	4.74	Sand with thin bands of Clay	Medium Dense to Dense					
1	Low Strength Clay	11.011	VC-B01-011A	VC	8	4.18	Sand with thin bands of Clay										
1	Low Strength Clay	12.049	VC-B01-012A	VC	9	1.95	Clay		Extremely low to Low	0.32	Sand with thin bands of Clay			2.3	Sand		
1	Low Strength Clay	12.049	CPT-B01-012	CPT	9	2.68	Clay		Low (Extremely low veneer 0.5m)	2.58	Sand	Medium Dense to Dense					
1	Low Strength Clay	13.088	VC-B01-013	VC	9	3.2	Clay		Low	0.68	Silt		Very Low	2.4	Sand		
2	Low Strength Clay/Loose Sand	14.3	CPT-B01-014	CPT	9	0.18	Gravel	Very Loose		2.66	Clay		Very Low to High	0.86	Sand	Medium Dense to Dense	
2	Low Strength Clay/Loose Sand	14.301	VC-B01-014	VC	9	0.28	Gravel	Medium Dense		1.52	Clay		Very Low	1.9	Sand	Loose to Medium Dense	
2	Low Strength Clay/Loose Sand	15.059	VC-B01-015	VC	7	1.64	Clay		Medium	2.7	Sand						
2	Low Strength Clay/Loose Sand	15.828	VC-B01-016	VC	7	4	Clay		Low								
2	Low Strength Clay/Loose Sand	15.83	CPT-B01-016	CPT	7	2.44	Clay		Low	0.66	Sand	Medium Dense	-	2.16	Clay		Low
2	Low Strength Clay/Loose Sand	16.97	VC-B01-017	VC	7	0.6	Silt		Very Low	1.01	Sand			0.9	Silt		
2	Low Strength Clay/Loose Sand	17.975	VC-B01-018	VC	8	0.88	Clay		Low	2	Sand			1.64	Clay		
2	Low Strength Clay/Loose Sand	17.976	CPT-B01-018	CPT	8	0.92	Clay		Low to Medium	2.4	Sand	Medium Dense to Dense		1.84	Clay		Medium
2	Low Strength Clay/Loose Sand	20.001	CPT-B01-020	CPT	8	4.66	Sand	Loose to Medium Dense		0.26	Clay		Medium	0.3	Sand	Medium Dense	
2	Low Strength Clay/Loose Sand	20.002	VC-B01-020	VC	8	3.98	Sand with thin bands of Clay			0.27	Clay		Medium				
2	Low Strength Clay/Loose Sand	20.651	VC-B01-021	VC	8	4.34	Sand with thin bands of Clay										
2	Low Strength Clay/Loose Sand	21.96	VC-B01-022	VC	8	4.3	Sand										
2	Low Strength Clay/Loose Sand	21.96	CPT-B01-022	CPT	8	5.3	Sand with thin bands of Clay	Very Loose to Loose									
2	Low Strength Clay/Loose Sand	23.104	VC-B01-023	VC	8	4.87	Sand with thin bands of Clay										
2	Low Strength Clay/Loose Sand	23.816	VC-B01-024	VC	8	4.95	Sand with thin bands of Clay										
2	Low Strength Clay/Loose Sand	23.817	CPT-B01-024	CPT	8	5.24	Sand with thin bands of Clay	Loose to Medium Dense									
2	Low Strength Clay/Loose Sand	25.3	VC-B01-025	VC	8	0.53	Clay		Very Low	1.09	Sand with thin bands of Clay			3.13	Clay		
2	Low Strength Clay/Loose Sand	26.032	CPT-B01-026	CPT	8	0.64	Sandy Clay	Loose	Extremely Low	1.74	Sand with thin bands of Clay	Loose		1.72	Clay		Low to Medium
2	Low Strength Clay/Loose Sand	26.033	VC-B01-026	VC	8	1.45	Sandy Clay		Very Low	2.65	Clay		Very Low				
2	Low Strength Clay/Loose Sand	27	VC-B01-027	VC	8	2.68	Sand			1.94	Clay		Medium				
2	Low Strength Clay/Loose Sand	27.998	VC-B01-028	VC	8	4.5	Sand										
2	Low Strength Clay/Loose Sand	28.003	CPT-B01-028	CPT	8	3.36	Sand with thin bands of Clay	Loose to Medium Dense		1.82	Sand with thin bands of Clay	Very Loose to Loose					
2	Low Strength Clay/Loose Sand	29	VC-B01-029	VC	8	3.9	Sand with thin bands of Clay		Very Low								
2	Low Strength Clay/Loose Sand	29.998	CPT-B01-030	CPT	7	0.34	Sand			1.5	Clay		Medium	2.46	Sand	Loose to Medium Dense	
2	Low Strength Clay/Loose Sand	29.999	VC-B01-030	VC	7	0.75	Clay			2.75	Sand						
3	Medium Dense Sand	31.001	VC-B01-031	VC	4	1.04	Sand			2.63	Clay		Medium				
3	Medium Dense Sand	31.603	CPT-B01-032	CPT	4	0.48	Sand	Medium Dense		4.88	Gravelly Clay		Medium to High				
3	Medium Dense Sand	31.606	VC-B01-032A	VC	5	1.96	Sand										
3	Medium Dense Sand	33	VC-B01-033	VC	6	3.41	Sand										
3	Medium Dense Sand	33.969	VC-B01-034	VC	8	3.31	Sand		Very Low								
3	Medium Dense Sand	33.971	CPT-B01-034	CPT	8	1.06	Sand	Medium Dense to Dense		2.6	Silt	Loose		0.54	Clay		Low
3	Medium Dense Sand	34.999	VC-B01-035	VC	8	4.4	Sand										
3	Medium Dense Sand	35.998	VC-B01-036A	VC	6	4.11	Sand										
3	Medium Dense Sand	36.001	CPT-B01-036	CPT	6	5.1	Sand	Dense to Very Dense									
3	Medium Dense Sand	37.066	VC-B01-037A	VC	6	3.88	Sand										
4	Loose Sand	38.135	CPT-B01-038	CPT	8	2.16	Sand with thin bands of Clay	Loose to Medium Dense		2.96	Sand	Medium Dense to Dense					
4	Loose Sand	38.136	VC-B01-038	VC	8	1.55	Sand			0.23	Clay			1.85	Sand		
4	Loose Sand	39	VC-B01-039	VC	8	6	Sand with thin bands of Clay		Very Low								
5	Medium Dense Sand	39.997	CPT-B01-040	CPT	8	2.78	Sand	Medium Dense to Dense		2.2	Clay		Low to Medium				
5	Medium Dense Sand	40	VC-B01-040	VC	8	4.9	Sand										
5	Medium Dense Sand	41	VC-B01-041A	VC	8	0.69	Sand			1.16	Gravelly Clay			2.23	Clay		
5	Medium Dense Sand	41.834	CPT-B01-042	CPT	8	2.54	Gravelly Sand	Medium Dense									
5	Medium Dense Sand	41.837	VC-B01-042	VC	8	6	Coarse Sand and Gravel										
5	Medium Dense Sand	41.843	CPT-B01-042A	CPT	8	1.2	Sand	Medium Dense to Dense		3.88	Sand with thin bands of Clay	Loose to Medium Dense					
5	Medium Dense Sand	42.999	VC-B01-043	VC	8	2.97	Sand			0.36	Clay		Very Low	2.24	Sand		
5	Medium Dense Sand	43.998	VC-B01-044	VC	8	6	Sand										
6	Loose Sand	43.999	CPT-B01-044	CPT	8	2.38	Sand	Loose to Medium Dense		2.68	Sand	Dense to Very Dense					
6	Loose Sand	45.001	VC-B01-045	VC	8	5.33	Sand										
6	Loose Sand	45.999	VC-B01-046	VC	7	6	Sand										
6	Loose Sand	46	CPT-B01-046	CPT	7	5.14	Sand	Medium Dense to Dense									
6	Loose Sand	46.999	VC-B01-047	VC	7	6	Sand										
6	Loose Sand	48.001	VC-B01-048	VC	7	6	Sand										
6	Loose Sand	48.002	CPT-B01-048	CPT	7	1.06	Sand	Very Loose to Medium Dense		4.06	Sand	Dense to Very Dense					
6	Loose Sand	48.999	VC-B01-049	VC	7	6	Sand										
6	Loose Sand	49.969	VC-B02-050	VC	7	4.88	Sand										
6	Loose Sand	50.97	VC-B02-051	VC	7	4	Sand										
7	Dense Sand	50.972	CPT-B02-051	CPT	7	5.16	Sand	Dense to Very Dense									
7	Dense Sand	51.97	VC-B02-052	VC	7	4	Sand										
7	Dense Sand	52.968	VC-B02-053	VC	7	4.18	Sand										
7	Dense Sand	52.969	CPT-B02-053	CPT	7	5.04	Sand	Dense to Very Dense									
7	Dense Sand	53.968	VC-B02-054	VC	7	4.72	Sand			1.11	Clay		Very High				
7	Dense Sand	54.969	CPT-B02-055	CPT	7	5.14	Sand	Dense to Very Dense									
7	Dense Sand	54.973	VC-B02-055B	VC	7	5.41	Sand										
7	Dense Sand	55.971	VC-B02-056	VC	7	4.6	Sand										
7	Dense Sand	57.235	VC-B02-057A	VC	7	3.33	Sand										
8	Loose Sand	57.239	CPT-B02-057	CPT	7	0.62	Sand	Very Loose to Medium Dense		4.54	Sand	Medium Dense to Very Dense					
8	Loose Sand	57.968	VC-B02-058	VC	7	4.46	Sand										
8	Loose Sand	58.969	VC-B02-059	VC	7	5.97	Sand										
8	Loose Sand	58.969	CPT-B02-059	CPT	7	0.62	Sand	Very Loose to Dense		4.86	Sand	Dense to Very Dense					
8	Loose Sand	60.128	VC-B02-060	VC	7	3.24	Sand			1.29	Clay		Low				
9	Medium Dense Sand	60.969	CPT-B02-061	CPT	4	1.1	Sand	Dense to Very Dense		4.16	Clay		Low to Medium				
9	Medium Dense Sand	60.97	VC-B02-061B	VC	7	2.18	Sand			0.5	Clay		Medium				
9	Medium Dense Sand	61.967	VC-B02-062B	VC	7	1.28	Sand			3.06	Gravelly Clay						
9	Medium Dense Sand	63.061	CPT-B02-063	CPT	7	1.8	Sand	Medium to Dense		1.4	Clay		Medium to High				
9	Medium Dense Sand	63.066	VC-B02-063B	VC	7	2.74	Sand			1.04	Clay						
9	Medium Dense Sand	63.971	VC-B02-064	VC	7	4.64	Sand										
9	Medium Dense Sand	64.97	VC-B02-065	VC	7	2.82	Sand			0.52	Clay		Medium				
10	Dense Sand	64.97	CPT-B02-065	CPT	7	2.82	Sand	Dense to Very Dense		2.36	Clay		High to Very High				
10	Dense Sand	65.973	VC-B02-066A	VC	7	3	Sand										
10	Dense Sand	66.97	CPT-B02-067	CPT	5	3.8	Sand	Dense to Very Dense		1.4	Clay		Medium				
10	Dense Sand	66.971	VC-B02-067	VC	5	3.46	Sand										
10	Dense Sand	67.874	VC-B02-068	VC	5	3.47	Sand										
10	Dense Sand	68.969	CPT-B02-069	CPT	3	5.24	Sand	Very Dense									
10	Dense Sand	68.972	VC-B02-069B	VC	3	2.89	Sand										
10	Dense Sand	70.021	VC-B02-070A	VC	4	2.45	Sandy Clay		Medium								
11	High Strength Clay	70.969	VC-B02-071A	VC	4	0.22	Sand			1.3	Clay		Very High				
11	High Strength Clay	70.969	CPT-B02-071	CPT	4	0.48	Sand	Dense to Very Dense		4.9	Clay		Medium to High				
11	High Strength Clay	72.049	VC-B02-072	VC	4	2.78	Clay		Very High								
11	High Strength Clay	72.968	VC-B02-073	VC	4	2.1	Clay		Very High								
11	High Strength Clay	72.969	CPT-B02-073	CPT	4	5.1	Clay		High to Very High								
11	High Strength Clay	73.969	VC-B02-074	VC	4	3.45	Clay		Very High								
11	High Strength Clay	74.97	VC-B02-075	VC	4	3.83	Clay		Very High								
11	High Strength Clay	74.971	CPT-B02-075	CPT	4	5.26	Clay		High								
12	Sand	75.968	VC-B02-076	VC	6	6	Sand										
13	Very Low Strength Clay	76.963	VC-B02-077	VC	9	3.85	Clay		Very Low								
13	Very Low Strength Clay	76.964	CPT-B02-077	CPT	9	1.78	Clay		Very Low	1.22	Sand	Medium Dense to Dense					
14	Sand	77.803	VC-B02-078	VC	7	6	Sand										
14	Sand	79.095	VC-B02-079	VC	7	6	Sand										
15	Dense Sand	79.095	CPT-B02-079	CPT	7	1.28	Sand	Dense to Very Dense		0.5	Clay	-	Low to Medium	1.6	Sand	Dense to Very Dense	
15	Dense Sand	80.086	VC-B02-080	VC	5	5	Sand										
15	Dense Sand	81.056	CPT-B02-081	CPT	5	5	Sand	Dense to Very Dense									
15	Dense Sand	81.058	VC-B02-081	VC	5	4.3	Sand										
15	Dense Sand	82.071	VC-B02-082	VC	4	1.39	Sand			1.5	Clay		High				
16	High Strength Clay	83.069	CPT-B02-083	CPT	4	0.42	Gravel	Loose		4.82	Clay		High to Very High				
16	High Strength Clay	83.07	VC-B02-083A	VC	4	2.74	Sandy Clay										
16	High Strength Clay	84.069	VC-B02-084A	VC	4	3.5	Clay		Very High								
16	High Strength Clay	85.07	CPT-B02-085	CPT	4	0.26	Gravel	Medium Dense		3.8	Clay		High to Very High				
16	High Strength Clay	85.074	VC-B02-085A	VC	4	0.36	Gravel			2	Clay		Very High				
16	High Strength Clay	86.07	VC-B02-086	VC	4	3.2	Clay		Very High								
16	High Strength Clay	87.07	CPT-B02-087	CPT	9	0.18	Gravel	Loose		4.9	Clay		Very Low to Low				
16	High Strength Clay	87.071	VC-B02-087	VC	4	0.24	Gravel			1.46	Clay		Very High				
16	High Strength Clay	88.07	VC-B02-088	VC	4	3.55	Clay		Very High								
16	High Strength Clay	89.071	CPT-B02-089	CPT	4	0.16	Sand	Medium Dense		4.96	Clay		High to Very High				
16	High Strength Clay	89.072	VC-B02-089	VC	4	0.74	Sand			2.26	Clay		Very High				
16	High Strength Clay	90.071	VC-B02-090	VC	4	0.88	Sand			2.57	Clay		Very High				
16	High Strength Clay	90.852	CPT-B02-091	CPT	4	0.16	Gravel	Dense		5.14	Clay		High				
16	High Strength Clay	90.853	VC-B02-091	VC	4	3.6	Clay		Very High								
16	High Strength Clay	92.069	VC-B02-092	VC	4	2.14	Clay		Very High								
16	High Strength Clay	93.069	CPT-B02-093	CPT	4	0.26	Sand	Dense		4.92	Clay		High to Very High				
16	High Strength Clay	93.071	VC-B02-093	VC	4	1.55	Clay		Very High								
16	High Strength Clay	94.069	VC-B02-094	VC	4	0.23	Gravel			1.17	Clay		Very High				
16	High Strength Clay	95.07	VC-B02-095A	VC	4	0.29	Gravelly Clay			1.19	Clay		Very High				
16	High Strength Clay	95.07	CPT-B02-095	CPT	4	0.12	Gravel	Medium Dense		4.92	Clay		High to Very High				
16	High Strength Clay	96.071	VC-B02-096	VC	4	0.98	Clay		Very High								
16	High Strength Clay	97.07	VC-B02-097	VC	4	1.42	Clay		Very High								
16	High Strength Clay	97.07	CPT-B02-097	CPT	4	0.34	Gravel	Very Dense		4.8	Clay		High to Very High				
16	High Strength Clay	98.07	VC-B02-098A	VC	4	0.25	Gravel			1.18	Clay		High				
16	High Strength Clay	99.068	VC-B02-099A	VC	4	0.29	Gravel			1.38	Clay		Very High				
16	High Strength Clay	99.07	CPT-B02-099	CPT	4	0.2	Gravel	Medium Dense		4.94	Clay		High				
16	High Strength Clay	100.072	VC-B02-100A	VC	4	1.57	Clay		Very High								

16	High Strength Clay	101.069	VC-B02-101	VC	4	2.5	Clay		Very High								
16	High Strength Clay	101.07	CPT-B02-101	CPT	4	0.22	Gravel	Medium Dense to Dense		4.82	Clay		High to Very High				
16	High Strength Clay	102.072	VC-B03-102	VC	4	0.18	Sand			1.5	Clay						
16	High Strength Clay	103.069	VC-B03-103A	VC	4	1.34	Clay		Medium								
16	High Strength Clay	103.07	CPT-B03-103	CPT	4	0.4	Sand			4.66	Clay		High to Very High				
16	High Strength Clay	103.904	VC-B03-104	VC	4	0.43	Gravel			1.87	Clay		Very High				
16	High Strength Clay	105.07	CPT-B03-105	CPT	4	0.24	Gravel	Dense		4.82	Clay		High to Very High				
16	High Strength Clay	105.073	VC-B03-105	VC	4	1.92	Clay		Very High								
16	High Strength Clay	106.074	VC-B03-106A	VC	4	0.31	Sand			1.92	Clay		Very High				
16	High Strength Clay	107.099	VC-B03-107	VC	4	0.58	Sand			0.85	Clay		Very High				
16	High Strength Clay	107.099	CPT-B03-107	CPT	4	0.38	Sand	Dense		4.68	Clay		High				
16	High Strength Clay	108.07	VC-B03-108	VC	4	1.2	Clay		Very High								
16	High Strength Clay	109.07	VC-B03-109	VC	4	2	Clay		Very High								
16	High Strength Clay	109.07	CPT-B03-109	CPT	4	0.24	Gravel	Dense		4.74	Clay		High				
16	High Strength Clay	110.025	VC-B03-110A	VC	4	1.31	Clay		Very High								
16	High Strength Clay	110.926	CPT-B03-111	CPT	4	0.22	Clay		Low	5.26	Clay		High				
16	High Strength Clay	110.927	VC-B03-111	VC	4	0.99	Clay		Very High								
16	High Strength Clay	112.559	VC-B03-112	VC	4	1.6	Clay		Very High								
17	Medium Dense Sand	113.069	CPT-B03-113	CPT	6	0.78	Sand	Very Loose to Dense		1.06	Sand	Medium Dense to Very Dense		3.24	Clay		Medium to High
17	Medium Dense Sand	113.073	VC-B03-113	VC	4	1.08	Sand			1.08	Clay		High				
17	Medium Dense Sand	114.074	VC-B03-114A	VC	6	2.7	Sand			1.3	Clay		Medium				
18	High Strength Clay	115.299	VC-B03-115	VC	4	2.27	Clay		Very High								
18	High Strength Clay	115.3	CPT-B03-115	CPT	4	0.22	Clay		Extremely Low	3.84	Clay		High				
18	High Strength Clay	116.432	VC-B03-116	VC	4	1.36	Clay		Very High								
18	High Strength Clay	117.07	CPT-B03-117	CPT	4	0.28	Gravelly Clay		Extremely Low	4.98	Clay		High to Very High				
18	High Strength Clay	117.071	VC-B03-117A	VC	4	0.56	Gravel			1.44	Clay		Very High				
18	High Strength Clay	118.068	VC-B03-118	VC	4	1.86	Clay		Very High								
18	High Strength Clay	119.068	VC-B03-119A	VC	4	0.2	Gravel			1.6	Clay		Very High				
18	High Strength Clay	119.071	CPT-B03-119	CPT	4	0.26	Sand	Dense		4.96	Clay		High to Very High				
18	High Strength Clay	120.07	VC-B03-120	VC	4	1.3	Clay		Very High								
18	High Strength Clay	121.071	VC-B03-121A	VC	4	1.93	Clay		High								
18	High Strength Clay	121.071	CPT-B03-121	CPT	4	0.26	Cay		Extremely Low	1.36	Clay		High				
18	High Strength Clay	121.071	CPT-B03-121A	CPT	4	0.36	Clay		Extremely Low	4.12	Clay		High				
18	High Strength Clay	122.07	VC-B03-122	VC	4	0.24	Sand			1.86	Clay		Very High				
18	High Strength Clay	123.07	CPT-B03-123	CPT	4	3.6	Clay		High to Very High								
18	High Strength Clay	123.072	VC-B03-123A	VC	4	0.3	Gravel			1.16	Clay		Very High				
18	High Strength Clay	124.07	VC-B03-124	VC	4	0.3	Gravel			1.27	Clay		Very High				
18	High Strength Clay	124.966	VC-B03-125A	VC	4	0.21	Gravel			1.06	Clay		Very High				
18	High Strength Clay	124.968	CPT-B03-125	CPT	4	0.26	Gravelly Clay			4.96	Clay		High to Very High				
18	High Strength Clay	126.071	VC-B03-126	VC	4	0.24	Gravel			1.23	Clay		Very High				
19	Dense Sand with Loose Sand Veneer (0.3m)	127.273	CPT-B03-127	CPT	5	2.64	Sand	Dense to Very Dense		2.54	Clay		High				
19	Dense Sand with Loose Sand Veneer (0.3m)	127.274	VC-B03-127	VC	5	2.48	Sand			0.6	Clay		Very High				
19	Dense Sand with Loose Sand Veneer (0.3m)	128.072	VC-B03-128	VC	5	4	Sand			1.9	Chalk						
19	Dense Sand with Loose Sand Veneer (0.3m)	129.05	CPT-B03-129	CPT	5	0.58	Gravelly Sand	Very Loose to Dense		2.54	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	129.057	VC-B03-129A	VC	5	2.86	Sand			1.04	Chalk						
19	Dense Sand with Loose Sand Veneer (0.3m)	130.131	VC-B03-130	VC	5	3	Sand			0.99	Chalk						
19	Dense Sand with Loose Sand Veneer (0.3m)	131.497	VC-B03-131	VC	5	6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	131.517	CPT-B03-131	CPT	5	0.44	Gravelly Sand	Very Loose to Dense		3.66	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	131.842	VC-B03-132	VC	5	5.93	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	133.064	VC-B03-133	VC	5	4.5	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	133.069	CPT-B03-133	CPT	5	0.38	Gravelly Sand	Very Loose to Dense		4.54	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	134.134	VC-B03-134	VC	5	4.79	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	135.069	CPT-B03-135	CPT	5	0.5	Gravelly Sand	Very Loose to Dense		4.74	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	135.07	VC-B03-135	VC	5	4.6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	136.02	VC-B03-136	VC	5	5.61	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	137.008	VC-B03-137	VC	5	3.84	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	137.072	CPT-B03-137	CPT	5	0.46	Gravelly Sand	Very Loose to Dense		4.8	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	138.07	VC-B03-138A	VC	5	4.56	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	139.092	CPT-B03-139	CPT	5	0.68	Gravelly Sand	Loose to Dense		4.52	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	139.095	VC-B03-139	VC	5	3.44	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	140.082	VC-B03-140	VC	5	4.73	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	141.087	VC-B03-141	VC	5	4.92	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	141.095	CPT-B03-141	CPT	5	0.32	Gravelly Sand	Very Loose to Dense		4.72	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	142.054	VC-B03-142	VC	5	4.56	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	143.068	VC-B03-143	VC	5	5.16	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	143.072	CPT-B03-143	CPT	5	0.44	Gravelly Sand	Very Loose to Dense		4.82	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	144.108	VC-B03-144	VC	5	4.36	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	145.07	VC-B03-145	VC	5	3.16	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	145.072	CPT-B03-145	CPT	5	0.58	Gravelly Sand	Very Loose to Dense		3.7	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	146.07	VC-B03-146	VC	5	4.89	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	146.947	VC-B03-147	VC	5	2.58	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	146.95	CPT-B03-147	CPT	5	0.64	Gravelly Sand	Very Loose to Dense		4.54	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	148.091	VC-B03-148	VC	5	3.63	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	149.062	VC-B03-149A	VC	6	3.86	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	149.065	CPT-B03-149	CPT	6	0.54	Gravelly Sand	Very Loose to Dense		4.68	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	150.056	VC-B03-150	VC	5	3.24	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	152.071	CPT-B03-152	CPT	5	5.06	Gravelly Sand	Very Dense									
19	Dense Sand with Loose Sand Veneer (0.3m)	152.072	VC-B03-152	VC	5	3.58	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	153.07	VC-B03-153	VC	5	5.91	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	154.065	CPT-B03-154	CPT	6	0.86	Gravelly Sand	Very Loose to Dense		4.2	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	154.071	VC-B03-154A	VC	6	2.82	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	155.109	VC-B03-155	VC	5	4.16	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	156.052	CPT-B03-156	CPT	5	0.4	Gravelly Sand	Very Loose to Dense		4.7	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	156.053	VC-B03-156	VC	5	4	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	157.084	VC-B03-157	VC	5	5.15	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	158.069	CPT-B03-158	CPT	5	0.52	Gravelly Sand	Very Loose to Dense		4.62	Gravelly Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	158.07	VC-B03-158	VC	5	3.48	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	159.07	VC-B04-159A	VC	5	3.91	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	160.112	CPT-B04-160	CPT	5	0.36	Sand	Very Loose to Dense		4.8	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	160.112	VC-B04-160	VC	5	3.05	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	161.065	VC-B04-161	VC	5	4.23	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	162.07	CPT-B04-162	CPT	6	0.54	Sand	Very Loose to Dense		4.66	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	162.07	VC-B04-162	VC	6	3.91	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	162.986	VC-B04-163	VC	6	5.16	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	164.29	VC-B04-164	VC	6	4.14	Clayey Sand		Very Low								
19	Dense Sand with Loose Sand Veneer (0.3m)	164.291	CPT-B04-164	CPT	6	5.06	Sand	Very Dense									
19	Dense Sand with Loose Sand Veneer (0.3m)	165.07	VC-B04-165	VC	6	4.76	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	166.067	CPT-B04-166A	CPT	6	2.92	Sand	Very Dense									
19	Dense Sand with Loose Sand Veneer (0.3m)	166.068	VC-B04-166	VC	6	5.23	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	167.071	VC-B04-167	VC	5	5.35	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	168.071	CPT-B04-168	CPT	5	0.66	Sand	Loose		4.56	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	168.074	VC-B04-168	VC	5	1.48	Sand			0.72	Gravel			3.77	Sand		
19	Dense Sand with Loose Sand Veneer (0.3m)	169.074	VC-B04-169A	VC	5	5.63	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	170.068	CPT-B04-170	CPT	5	3.32	Sand	Very Dense									
19	Dense Sand with Loose Sand Veneer (0.3m)	170.071	VC-B04-170	VC	5	5.59	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	171.07	VC-B04-171	VC	5	3.14	Sand			0.15	Clay		Medium	2.52	Sand		
19	Dense Sand with Loose Sand Veneer (0.3m)	172.063	CPT-B04-172	CPT	6	0.8	Sand	Loose to Dense		4.02	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	172.063	VC-B04-172A	VC	6	5.41	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	173.069	VC-B04-173	VC	6	5.37	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	174.068	CPT-B04-174	CPT	5	0.38	Sand	Very Loose to Dense		4.76	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	174.068	VC-B04-174	VC	5	6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	175.07	VC-B04-175	VC	5	5.9	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	176.089	CPT-B04-176	CPT	5	5.02	Sand	Very Dense									
19	Dense Sand with Loose Sand Veneer (0.3m)	176.089	VC-B04-176	VC	5	6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	177.103	VC-B04-177	VC	5	6	Sand with thin bands of Clay										
19	Dense Sand with Loose Sand Veneer (0.3m)	178.074	VC-B04-178	VC	5	6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	178.079	CPT-B04-178	CPT	5	0.42	Sand	Very Loose to Dense		4.78	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	179.323	VC-B04-179	VC	5	6	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	180.064	CPT-B04-180	CPT	5	0.38	Sand	Very Loose to Dense		4.86	Sand	Very Dense					
19	Dense Sand with Loose Sand Veneer (0.3m)	180.065	VC-B04-180	VC	5	3	Sand										
19	Dense Sand with Loose Sand Veneer (0.3m)	181.647	VC-B04-181	VC	5	5.6	Sand										
20	Very Loose Sand over Medium Clay	182.024	CPT-B04-182	CPT	5	0.56	Sand	Very Loose to Loose		0.58	Clay		High	4.18	Sand	Very Dense	
20	Very Loose Sand over Medium Clay	182.027	VC-B04-182	VC	5	0.35	Gravel			1.01	Clay		Low	1.4	Sand		
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	182.799	VC-B04-183	VC	5	3.56	Sand			1.25	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	183.702	CPT-B04-184	CPT	6	0.66	Sand	Very Loose to Dense		4.46	Sand	Dense to Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	183.702	VC-B04-184	VC	6	4.83	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	185.069	VC-B04-185	VC	6	4.8	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	186.067	CPT-B04-186	CPT	6	-	-	-	-	-	-	-	-	-	-	-	-
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	186.067	CPT-B04-186A	CPT	6	5.22	Sand	Dense to Very Dense									
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	186.069	VC-B04-186	VC	6	5.15	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	187.071	VC-B04-187A	VC	6	5.78	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	188.069	VC-B04-188	VC	7	2.77	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	188.072	CPT-B04-188	CPT	7	1.08	Sand	Very Loose to Dense		4.06	Sand	Dense to Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	189.07	VC-B04-189	VC	7	5.99	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	190.082	CPT-B04-190	CPT	5	0.46	Sand	Very Loose to Dense		4.82	Sand	Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	190.084	VC-B04-190	VC	5	4.82	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	191.07	VC-B04-191	VC	7	1.2	Sand			3.16	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	192.026	CPT-B04-192	CPT	5	0.74	Sand	Very Loose to Dense		3.42	Sand	Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	192.027	VC-B04-192	VC	6	6	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	193.07	VC-B04-193	VC	6	6	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	194.069	VC-B04-194	VC	5	4.86	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	194.074	CPT-B04-194	CPT	5	0.42	Sand	Very Loose to Dense		1.9	Sand	Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	194.108	CPT-B04-194A	CPT	5	0.52	Sand	Very Loose to Dense		4.4	Sand	Dense to Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	195.07	VC-B04-195	VC	6	1	Sand			0.75	Clay		Low	3.76	Sand	Very Dense	
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	196.075	CPT-B04-196	CPT	6	0.72	Sand	Medium Dense		0.56	Clay		Medium to high	3.98	Sand		
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	196.075	VC-B04-196	VC	6	0.5	Sand			0.95	Clay		Very Low	4.55	Sand		
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	197.068	VC-B04-197	VC	6	5.3	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	198.067	CPT-B04-198	CPT	6	3	Sand	Dense to Very Dense		1.18	Clay		High to Very High	0.84	Sand	Very Dense	
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	198.07	VC-B04-198	VC	6	4	Sand			1.6	Clay		Low				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	198.634	VC-B05-199	VC	6	5.45	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	200.071	VC-B05-200	VC	6	5.22	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	200.074	CPT-B05-200	CPT	6	0.36	Sand	Loose to Dense		1.96	Sand	Very Dense		2.94	Sand	Medium to Very Dense	

21	Medium Dense Sand with Loose Sand Veneer (0.3m)	201.071	VC-B05-201	VC	6	5.82	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	202.049	VC-B05-202	VC	5	6	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	202.058	CPT-B05-202	CPT	5	0.38	Sand	Very Loose to Dense		4.88	Sand	Medium Dense to Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	203.224	VC-B05-203	VC	7	0.26	Sand			3.37	Clay		High				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	204.115	CPT-B05-204	CPT	6	0.86	Sand	Medium Dense to Dense		0.64	Clay		High to Very High	2.94	Sand	Very Dense	
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	204.117	VC-B05-204	VC	6	1.25	Sand			1	Clay		Very Low	1.75	Sand		
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	205.071	VC-B05-205	VC	7	0.44	Sand			0.52	Clay		Very Low	2.57	Silty Clay		
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	206.066	CPT-B05-206	CPT	7	0.84	Sand	Very Loose to Medium Dense		4.24	Sand	Dense to Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	206.072	VC-B05-206	VC	7	0.45	Sand			4.48	Sand with Clay						
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	207.071	VC-B05-207	VC	6	5.34	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	208.244	VC-B05-208	VC	6	5.7	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	208.244	CPT-B05-208	CPT	6	0.88	Sand	Loose to Dense		4.3	Sand	Medium Dense to Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	209.54	VC-B05-209	VC	6	4	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	210.068	VC-B05-210	VC	6	4.68	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	210.069	CPT-B05-210	CPT	6	1.02	Sand	Very Loose to Very Dense		4.06	Sand	Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	211.066	VC-B05-211A	VC	6	4.56	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	212.191	VC-B05-212	VC	6	3.65	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	212.191	CPT-B05-212	CPT	6	0.78	Sand	Loose to Dense		4.24	Sand	Very Dense		2.5	Clay	-	Medum to High
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	213.068	VC-B05-213	VC	6	3.82	Sand			1.18	Clay		High				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	214.069	CPT-B05-214	CPT	6	1.12	Sand	Very Loose to Dense		1.24	Sand	Medium Dense to Very Dense		2.74	Clay	-	Medium to High
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	214.071	VC-B05-214	VC	6	2.85	Sand			2.24	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	215.072	VC-B05-215	VC	6	1.96	Sand			2.31	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	216.067	CPT-B05-216	CPT	7	1.62	Sand	Very Loose to Very Dense		3.6	Clay		Medium to High				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	216.072	VC-B05-216A	VC	7	2.73	Sand			1.21	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	217.069	VC-B05-217A	VC	5	4.78	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	218.069	CPT-B05-218	CPT	5	0.62	Sand	Very Loose to Dense		3.5	Sand	Very Dense					
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	218.07	VC-B05-218	VC	5	5.81	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	219.07	VC-B05-219A	VC	5	5.64	Sand										
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	220.067	CPT-B05-220	CPT	5	0.68	Sand	Loose to Dense		2.3	Sand	Dense to Very Dense		2.26	Clay		High to Very High
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	220.071	VC-B05-220	VC	5	4.49	Sand			1.64	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	221.069	VC-B05-221	VC	4	0.98	Sand			1.97	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	222.067	VC-B05-222	VC	6	3.11	Sand			1.54	Clay		Medium				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	222.073	CPT-B05-222	CPT	6	1.94	Sand	Loose to Very Dense		3.3	Clay		Medium to High				
21	Medium Dense Sand with Loose Sand Veneer (0.3m)	223.066	VC-B05-223	VC	6	5.97	Sand										
22	Medium Strength Clay	224.069	VC-B05-224	VC	4	2.97	Clay and Sand		Medium								
22	Medium Strength Clay	224.07	CPT-B05-224	CPT	4	2.16	Clay and Sand		Medium to High	1	Sand	Medium Dense		2.1	Clay		High
22	Medium Strength Clay	225.073	VC-B05-225A	VC	4	2	Clay and Sand		Medium								
22	Medium Strength Clay	226.07	CPT-B05-226	CPT	4	0.86	Clay and Sand		Extremely Low to High	4.38	Clay and Sand		Medium to High				
23	Dense Sand with Loose Sand Veneer (0.3m)	226.072	VC-B05-226A	VC	4	1.66	Sand		Medium								
23	Dense Sand with Loose Sand Veneer (0.3m)	227.067	VC-B05-227B	VC	4	1.47	Sand			3.23	Clay		High				
23	Dense Sand with Loose Sand Veneer (0.3m)	228.068	VC-B05-228	VC	6	1.94	Sand			1.93	Clay		Medium				
23	Dense Sand with Loose Sand Veneer (0.3m)	228.072	CPT-B05-228	CPT	6	0.36	Sand	Very Loose to Dense		1.88	Sand	Very Dense		2.76	Clay		High to Very High
23	Dense Sand with Loose Sand Veneer (0.3m)	229.069	VC-B05-229	VC	6	4.41	Sand		Medium	0.9	Clay		Medium				
23	Dense Sand with Loose Sand Veneer (0.3m)	230.068	VC-B05-230	VC	6	5.58	Sand										
23	Dense Sand with Loose Sand Veneer (0.3m)	230.072	CPT-B05-230	CPT	6	0.5	Sand	Very Loose to Dense		4.48	Sand	Dense to Very Dense					
23	Dense Sand with Loose Sand Veneer (0.3m)	231.117	VC-B05-231	VC	6	4.79	Sand			0.21	Clay		Medium				
23	Dense Sand with Loose Sand Veneer (0.3m)	232.068	VC-B05-232	VC	7	2.88	Sand			2.32	Clay		High				
23	Dense Sand with Loose Sand Veneer (0.3m)	232.074	CPT-B05-232	CPT	7	2.5	Sand	Very Loose to Very Dense		2.52	Clay		High to Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	233.07	VC-B05-233	VC	4	0.85	Sand			1.76	Clay		Very High	0.48	Silty Sand		
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	234.372	VC-B05-234	VC	4	0.56	Sand			3.44	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	234.372	CPT-B05-234	CPT	4	0.78	Gravel	Very Loose to Medium Dense	-	4.18	Clay		High to Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	235.07	VC-B05-235	VC	4	0.8	Sand			3.2	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	236.067	CPT-B05-236	CPT	4	0.6	Sand	Very Loose to Very Dense		4.4	Clay		High to Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	236.07	VC-B05-236	VC	4	0.32	Sand			0.62	Clay		High	3.17	Clay		
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	237.191	VC-B05-237	VC	4	0.44	Sand			4.44	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	238.068	VC-B05-238	VC	4	0.59	Sand			3.14	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	238.07	CPT-B05-238	CPT	4	0.6	Sand	Very Loose to Medium Dense		4.6	Clay		High to Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	238.919	VC-B05-239	VC	4	0.44	Sand			3.89	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	240.07	VC-B05-240	VC	4	0.53	Sand			3.61	Clay		Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	240.07	CPT-B05-240	CPT	4	0.74	Gravel	Very Loose to Medium Dense		4.64	Clay		High to Very High				
24	Medium Dense Sand with Loose Sand Veneer (0.3m) over High Strength Clay	241.073	VC-B05-241	VC	4	1.35	Sand			2.87	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	242.071	VC-B05-242	VC	6	3.96	Sand			0.69	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	242.073	CPT-B05-242	CPT	6	0.38	Sand	Very Loose to Very Dense		3.2	Sand	Very Dense		1.7	Clay		High to Very High
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	243.065	VC-B05-243	VC	6	2.05	Sand			1.81	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	244.07	VC-B05-244	VC	4	0.61	Sand			2.88	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	244.07	CPT-B05-244	CPT	4	0.7	Sand	Very Loose to Dense		0.42	Clay		Low to Medium	4.14	Clay		High to Very High
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	245.073	VC-B05-245	VC	7	0.34	Sand			3.07	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	246.128	CPT-B05-246	CPT	7	0.64	Sand	Very Loose to Dense		4.42	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	246.129	VC-B05-246	VC	6	5.65	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	247.071	VC-B05-247	VC	6	5.6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	248.069	CPT-B05-248	CPT	5	0.5	Sand	Very Loose to Dense		4.62	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	248.07	VC-B05-248A	VC	5	5.8	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	249.069	VC-B05-249	VC	6	4.48	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	250.069	CPT-B05-250	CPT	6	3.84	Sand	Loose to Very Dense		1.44	Clay		High to Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	250.071	VC-B05-250	VC	6	4.25	Sand			1.75	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	251.072	VC-B06-251A	VC	4	0.37	Sand			0.45	Clay		Medium	1.26	Clay		
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	251.912	VC-B06-252	VC	4	0.21	Sand			0.39	Clay		Medium	1.01	Clay		
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	251.916	CPT-B06-252	CPT	4	0.32	Sand	Loose to Dense		4.5	Clay		High to Very High	0.32	Sand	Very Dense	
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	253.068	VC-B06-253	VC	4	1.21	Sand			1.25	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	254.397	VC-B06-254B	VC	4	0.55	Sand			1.15	Clay		High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	254.398	CPT-B06-254	CPT	4	0.82	Gravel	Very Loose to Medium Dense		3.64	Clay		High to Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	255.023	VC-B06-255	VC	4	0.45	Sand			1.4	Clay		Medium				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	256.07	VC-B06-256A	VC	4	0.28	Sand			1.29	Clay		High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	256.071	CPT-B06-256	CPT	4	0.3	Gravel	Very Loose to Dense		4.96	Clay		High to Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	257.069	VC-B06-257	VC	5	2.09	Sand			1.01	Clay		Very High				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	258.069	VC-B06-258	VC	5	5.32	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	258.071	CPT-B06-258	CPT	5	0.34	Sand	Very Loose to Dense		4.96	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	259.321	VC-B06-259	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	260.069	VC-B06-260	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	260.071	CPT-B06-260	CPT	5	0.34	Sand			4.94	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	261.069	VC-B06-261	VC	5	5.32	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	261.718	CPT-B06-262	CPT	5	0.52	Sand	Loose to Dense		2.98	Sand	Very Dense		1.04	Clay		High
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	262.07	VC-B06-262	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	262.811	VC-B06-263	VC	5	4.04	Sand			1.41	Clay		Medium				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	264.071	VC-B06-264	VC	5	4.77	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	264.072	CPT-B06-264	CPT	5	0.36	Sand	Very Loose to Dense		4.94	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	265.22	VC-B06-265	VC	5	5.47	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	266.039	VC-B06-266	VC	5	4.97	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	266.047	CPT-B06-266	CPT	5	0.64	Sand	Medium Dense to Very Dense		4.42	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	266.997	VC-B06-267	VC	5	4.86	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	268.401	CPT-B06-268	CPT	6	0.52	Sand	Very Loose to Very Dense		4.74	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	268.404	VC-B06-268	VC	6	5	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	269.05	VC-B06-269	VC	6	5	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	270.068	CPT-B06-270	CPT	6	0.64	Sand	Medium Dense to Very Dense		4.56	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	270.069	VC-B06-270	VC	6	5.22	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	271.069	VC-B06-271	VC	6	4.28	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	272.068	VC-B06-272	VC	6	4.8	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	272.068	CPT-B06-272	CPT	6	0.28	Sand	Very Loose to Very Dense		5.02	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	273.139	VC-B06-273	VC	6	5.52	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	274.069	VC-B06-274	VC	6	5.5	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	274.07	CPT-B06-274	CPT	6	0.48	Sand	Very Loose to Very Dense		2.06	Sand	Very Dense		2.18	Sand	Dense	
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	275.068	VC-B06-275	VC	6	5.56	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	276.066	VC-B06-276	VC	7	4.23	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	276.07	CPT-B06-276	CPT	7	0.34	Sand	Medium Dense to Very Dense		0.82	Sand	Very Dense		4.08	Sand	Dense to Very Dense	
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	277.068	VC-B06-277	VC	6	5.26	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	278.07	VC-B06-278	VC	6	5.3	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	278.071	CPT-B06-278	CPT	6	0.52	Sand	Loose to Very Dense		4.72	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	279.07	VC-B06-279	VC	6	5.57	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	280.039	CPT-B06-280	CPT	6	0.4	Sand	Very Loose to Very Dense		4.78	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	280.041	VC-B06-280	VC	6	5.5	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	281.069	VC-B06-281	VC	6	5.16	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	282.067	VC-B06-282	VC	6	5.52	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	282.07	CPT-B06-282	CPT	6	0.44	Sand	Very Loose to Very Dense		4.78	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	283.068	VC-B06-283	VC	6	5.31	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	283.967	VC-B06-284	VC	5	2.48	Sand			0.3	Clay		Medium	0.38	Sand		
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	283.97	CPT-B06-284	CPT	5	0.5	Sand	Loose to Very Dense		1.98	Sand	Very Dense		0.38	Clay		Medium to High
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	285.166	VC-B06-285	VC	6	4.84	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	286.07	CPT-B06-286	CPT	6	0.34	Sand	Very Loose to Very Dense		4.82	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	286.071	VC-B06-286	VC	6	5.53	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	287.073	VC-B06-287	VC	6	5.7	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	288.069	CPT-B06-288	CPT	5	0.54	Sand	Very Loose to Very Dense		4.6	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	288.072	VC-B06-288	VC	5	5.71	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	289.072	VC-B06-289	VC	5	5.84	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	290.111	VC-B06-290	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	290.111	CPT-B06-290	CPT	5	0.54	Sand	Loose to Very Dense		4.6	Sand	Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	291.07	VC-B06-291	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	291.89	VC-B06-292	VC	5	5.65	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	291.893	CPT-B06-292	CPT	5	-	-	-	-	-	-	-	-	-	-	-	-
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	291.894	CPT-B06-292A	CPT	5	-	-	-	-	-	-	-	-	-	-	-	-
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	291.894	CPT-B06-292B	CPT	5	0.46	Sand	Loose to Very Dense		4.86	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	293.069	VC-B06-293	VC	5	5.57	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	294.069	VC-B06-294	VC	6	5.56	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	294.071	CPT-B06-294	CPT	6	0.38	Sand	Very Loose to Very Dense		4.9	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	295.069	VC-B06-295	VC	6	5.65	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	296.071	VC-B06-296	VC	6	5.7	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	296.071	CPT-B06-296	CPT	6	0.4	Sand	Very Loose to Very Dense		4.86	Sand	Medium Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	297.072	VC-B06-297	VC	6	5.49	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	298.069	VC-B06-298	VC	6	5.52	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	298.07	CPT-B06-298	CPT	6	0.36	Sand	Very Loose to Very Dense		4.9	Sand	Medium Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	299.068	VC-B06-299A	VC	6	5.81	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	299.931	VC-B06-300	VC	6	5.7	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	299.931	CPT-B06-300	CPT	6	0.48	Sand	Very Loose to Very Dense		4.54	Sand	Dense to Very Dense					

25	Medium Dense Sand with Loose Sand Veneer (0.3m)	301.14	VC-B07-301	VC	5	5.6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	302.07	VC-B07-302	VC	5	5.42	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	302.07	CPT-B07-302	CPT	5	0.56	Sand	Loose to Very Dense		4.34	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	303.068	VC-B07-303	VC	5	5.68	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	304.068	VC-B07-304	VC	5	5.89	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	304.069	CPT-B07-304	CPT	5	0.44	Sand	Loose to Very Dense		4.78	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	305.07	VC-B07-305	VC	5	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	306.07	CPT-B07-306	CPT	5	1.18	Sand	Loose to Dense		4	Sand	Dense to Very Dense					
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	306.071	VC-B07-306	VC	5	5.98	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	307.172	VC-B07-307	VC	5	5.96	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	308.069	CPT-B07-308	CPT	7	5.22	Sand	Medium Dense to Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	308.07	VC-B07-308	VC	7	5.94	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	309.072	VC-B07-309	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	310.069	CPT-B07-310	CPT	7	5.14	Sand	Medium Dense to Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	310.072	VC-B07-310	VC	7	5.96	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	311.07	VC-B07-311	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	311.824	CPT-B07-312	CPT	7	5.12	Sand	Medium Dense to Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	311.826	VC-B07-312	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	313.07	VC-B07-313	VC	7	5.81	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	313.622	CPT-B07-314	CPT	7	5.3	Sand	Very Loose to Medium Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	313.623	VC-B07-314	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	315.07	VC-B07-315	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	316.067	CPT-B07-316	CPT	7	5.18	Sand	Very Loose to Medium Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	316.07	VC-B07-316	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	317	VC-B07-317	VC	7	4.13	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	318.07	VC-B07-318	VC	7	4.87	Sand			0.73	Silt		Extremely Low				
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	318.071	CPT-B07-318	CPT	7	5.26	Sand	Loose to Medium Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	319.07	VC-B07-319	VC	7	4.51	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	320.069	CPT-B07-320	CPT	7	5.3	Sand	Very Loose to Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	320.07	VC-B07-320	VC	7	4.25	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	321.071	VC-B07-321	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	322.07	VC-B07-322	VC	7	6	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	322.07	CPT-B07-322	CPT	7	5.26	Sand	Loose to Medium Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	323.072	VC-B07-323	VC	7	4.54	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	323.788	VC-B07-324	VC	7	5.54	Sand										
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	323.788	CPT-B07-324	CPT	7	5.26	Sand	Loose to Medium Dense									
25	Medium Dense Sand with Loose Sand Veneer (0.3m)	325.07	VC-B07-325	VC	7	6	Sand										
26	Very Loose Sand	326.07	CPT-B07-326	CPT	8	5.26	Sand	Very Loose to Medium Dense									
26	Very Loose Sand	326.072	VC-B07-326	VC	8	5.61	Sand										
26	Very Loose Sand	327.071	VC-B07-327	VC	8	5.58	Sand										
26	Very Loose Sand	328.07	VC-B07-328	VC	8	5.36	Sand										
26	Very Loose Sand	328.07	CPT-B07-328	CPT	8	5.26	Sand	Very Loose to Loose									
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	329.07	VC-B07-329	VC	8	5.47	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	330.071	VC-B07-330	VC	8	5.95	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	330.071	CPT-B07-330	CPT	8	1.46	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	3.8	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	331.11	VC-B07-331	VC	8	6	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	332.09	VC-B07-332	VC	8	6	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	332.091	CPT-B07-332	CPT	8	1.44	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	3.82	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	333.072	VC-B07-333	VC	8	5	Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	334.07	VC-B07-334	VC	8	6	Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	334.071	CPT-B07-334	CPT	8	1.78	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	3.64	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	335.071	VC-B07-335	VC	8	5.87	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	336.07	CPT-B07-336	CPT	8	1.46	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	3.88	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	336.071	VC-B07-336	VC	8	5.87	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	337.07	VC-B07-337	VC	8	5.98	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	338.069	CPT-B07-338	CPT	8	1.42	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	3.9	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	338.071	VC-B07-338	VC	8	0.99	Silty Sand		Extremely Low	5.01	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	339.071	VC-B07-339	VC	8	0.95	Silty Sand		Extremely Low	5.05	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	340.068	VC-B07-340	VC	8	0.96	Silty Sand			4.8	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	340.069	CPT-B07-340	CPT	8	2.04	Silty Sand		Very Low with Extremely Low Veneer (0.3m)	2.34	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	341.07	VC-B07-341	VC	8	0.94	Silty Sand		Extremely Low	4.96	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	342.07	VC-B07-342	VC	8	0.95	Silty Sand		Extremely Low	5.05	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	342.07	CPT-B07-342	CPT	8	1.52	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	3.86	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	343.07	VC-B07-343	VC	8	0.95	Silty Sand		Extremely Low	5.05	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	344.07	CPT-B07-344	CPT	8	1.52	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	3.86	Sand	Very Loose to Loose					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	344.073	VC-B07-344	VC	8	0.9	Silty Sand		Extremely Low	5.1	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	345.07	VC-B07-345	VC	8	5.62	Silty Sand		Extremely Low								
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	346.07	VC-B07-346	VC	8	0.88	Silty Sand		Extremely Low	4.39	Sand						
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	346.07	CPT-B07-346	CPT	8	1.6	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	2.26	Sand	Very Loose to Loose		1.32	Silt Sand		Extremely Low to Low
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	347.068	VC-B07-3478	VC	8	4.19	Silty Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	348.069	CPT-B07-348	CPT	8	3.82	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	1.58	Sand	Medium Dense to Very Dense					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	348.07	VC-B07-348	VC	8	4.87	Silty Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	349.07	VC-B07-349	VC	8	5.49	Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	350.068	VC-B07-350	VC	8	5.6	Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	350.07	CPT-B07-350	CPT	8	4.04	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	1.34	Sand	Very Dense					
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	351.071	VC-B08-351	VC	7	5.98	Sand										
27	Very Low to Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	352.068	CPT-B08-352	CPT	7	3.58	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	1.76	Sand	Dense					
28	Very Low Strength Sandy Clay with Extremely Low Strength Veneer (0.4m)	352.07	VC-B08-352	VC	9	1.96	Clay		Extremely Low	2.04	Gravelly Clay		Extremely Low				
28	Very Low Strength Sandy Clay with Extremely Low Strength Veneer (0.4m)	352.766	VC-B08-353	VC	8	2.81	Sandy Clay		Extremely Low	0.99	Sandy Gravel						
28	Very Low Strength Sandy Clay with Extremely Low Strength Veneer (0.4m)	354.069	VC-B08-354	VC	9	5	Sandy Clay		Very Low								
28	Very Low Strength Sandy Clay with Extremely Low Strength Veneer (0.4m)	354.069	CPT-B08-354	CPT	8	3.26	Sandy Clay		Very Low with Extremely Low Veneer (0.4m)	2.14	Sand	Dense					
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	355.069	VC-B08-355	VC	8	5	Coarse Sand										
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	356.068	CPT-B08-356	CPT	8	2.94	Silty Sand		Very Low with Extremely Low Veneer (0.5m)	2.18	Sand	Dense					
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	356.07	VC-B08-356	VC	9	4.86	Silty Sand		Extremely Low								
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	357.069	VC-B08-357	VC	9	3.64	Silty Sand		Very Low								
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	358.068	CPT-B08-358	CPT	8	2.38	Silty Sand		Very Low with Extremely Low Veneer (0.5m)	3.04	Sand	Dense to Very Dense					
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	358.07	VC-B08-358	VC	9	5.51	Silty Sand		Very Low								
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	359.072	VC-B08-359	VC	8	5.49	Silty Sand		Very Low								
29	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	360.069	CPT-B08-360	CPT	8	2.34	Silty Sand		Very Low with Extremely Low Veneer (0.5m)	2.84	Sand	Dense to Very Dense					
30	Very Low Strength Silty Sand/Clay	360.07	VC-B08-360	VC	9	1.35	Silty Sand		Very Low	0.9	Clay			2.45	Sand		
30	Very Low Strength Silty Sand/Clay	361.07	VC-B08-361	VC	9	2.1	Clay		Very Low	3.1	Sand						
30	Very Low Strength Silty Sand/Clay	362.055	VC-B08-362	VC	9	2.1	Sandy Clay		Very Low	0.19	Peat			3.28	Gravelly Sand		
31	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	362.069	CPT-B08-362	CPT	8	2.1	Sandy Clay		Very Low with Extremely Low Veneer (0.4m)	0.3	Peat		Very High	2.04	Sand	Very Dense	
31	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	362.825	VC-B08-363	VC	9	1.13	Silty Sand		Extremely Low	2.24	Sandy Clay		Very Low				
31	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	364.069	CPT-B08-364	CPT	8	1.8	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	3.58	Silty Sand	Dense to Very Dense					
32	Very Low Strength Clay	364.07	VC-B08-364	VC	9	2.22	Clay		Very Low	1.96	Sand						
32	Very Low Strength Clay	365.07	VC-B08-365	VC	8	2	Clay		Very Low	3.02	Sand						
32	Very Low Strength Clay	366.069	VC-B08-366	VC	8	1.6	Clay		Very Low	2.96	Sand						
33	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	366.07	CPT-B08-366	CPT	8	1.52	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	3.7	Sand	Very Dense					
33	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	367.069	VC-B08-367	VC	9	2.2	Clay		Very Low	2.96	Sand						
33	Very Low Strength Silty Sand with Extremely Low Strength Veneer (0.4m)	368.07	CPT-B08-368	CPT	7	1.4	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	0.78	Sand	Very Loose to Dense		3.9	Sand	Very Dense	
34	Very Low Strength Clay	368.072	VC-B08-368	VC	7	1.34	Clay		Very Low	2.15	Sand						
34	Very Low Strength Clay	369.069	VC-B08-369	VC	7	1.2	Clay		Very Low	3.05	Sand						
34	Very Low Strength Clay	370.069	VC-B08-370	VC	6	0.65	Clay		Very Low	4.78	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	370.07	CPT-B08-370	CPT	6	1.2	Clay		Very Low with Extremely Low Veneer (0.4m)	4.1	Sand	Medium Dense to Very Dense					
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	371.07	VC-B08-371	VC	6	4.51	Silty Sand		Extremely Low								
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	371.517	VC-B08-372	VC	8	1.21	Silty Sand		Extremely Low	0.24	Peat			1.77	Silty Sand		
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	371.518	CPT-B08-372	CPT	8	1.26	Silty Sand		Very Low with Extremely Low Veneer (0.4m)	0.2	Peat			3.86	Silty Sand	Loose to Medium Dense	
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	373.211	VC-B08-373	VC	8	1.95	Silty Sand		Very Low	0.54	Clay		Medium	2.51	Silty Sand		
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	373.769	VC-B08-374	VC	7	1.51	Clay		Very Low	3.73	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.4m)	373.769	CPT-B08-374	CPT	7	1.66	Silty Sand		Very Low with Extremely Low Veneer (0.4m)								
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	375.196	VC-B08-375	VC	7	1.34	Clay		Very Low	3.87	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	376.07	CPT-B08-376	CPT	8	1.78	Silty Sand		Very Low with Extremely Low Veneer (0.6m)	2.82	Sand	Very Dense					
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	376.071	VC-B08-376	VC	8	1.45	Clay		Very Low	3.69	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	377.071	VC-B08-377	VC	8	1.43	Silty Sand		Very Low	3.41	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	378.071	CPT-B08-378	CPT	9	1.76	Silty Sand		Very Low with Extremely Low Veneer (0.6m)	3.36	Sand	Very Dense					
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	378.072	VC-B08-378	VC	8	1.47	Clay		Very Low	4.36	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	379.495	VC-B08-379	VC	9	1.98	Clay		Very Low	3.95	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	380.069	CPT-B08-380	CPT	9	2.28	Silty Sand		Very Low with Extremely Low Veneer (0.6m)	0.38	Peat			2.56	Sand	Medium to Very Dense	
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	380.071	VC-B08-380	VC	9	1.6	Clay		Very Low	0.77	Peat			0.15	Sand		
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	380.949	VC-B08-381	VC	9	1.57	Clay		Very Low	3.77	Sand						
35	Very Low Strength Silty Sand/Clay with Extremely Low Strength Veneer (0.6m)	382.07	VC-B08-382	VC	9	2.2	Clay		Very Low	3.67	Sand						
36	Very Low Strength Clay	382.07	CPT-B08-382	CPT	9	1.82	Clay		Very Low to Medium	3.58	Sand	Medium Dense to Very Dense					
36	Very Low Strength Clay	383.072	VC-B08-383	VC	9	2.16	Silty Sandy Clay		Very Low	0.19	Peat			2.71	Sand		
36	Very Low Strength Clay	383.695	CPT-B08-384	CPT	9	2.28	Silty Sandy Clay		Very Low	3.12	Sand	Medium Dense to Very Dense					
36	Very Low Strength Clay	383.7	VC-B08-384	VC	9	1.64	Silty Sand		Very Low	3.82	Sand						
36	Very Low Strength Clay	385.073	VC-B08-385	VC	9	2.39	Clay		Very Low	3.29	Sand						
36	Very Low Strength Clay	386.068	VC-B08-386	VC	9	1.78	Sandy Clay		Very Low	0.92	Clay		Very Low	2.91	Silt		
36	Very Low Strength Clay	386.07	CPT-B08-386	CPT	9	2.46	Clay		Very Low	2.94	Clay		Medium to High				
36	Very Low Strength Clay	387.068	VC-B08-387	VC	9	0.96	Clay		Very Low	3.53	Sand						
36	Very Low Strength Clay	388.067	VC-B08-388	VC	9	2.36	Clay		Low	3.03	Sand						
37	Extremely Low Strength Clay with Extremely Low Veneer (0.5m)	388.068	CPT-B08-388	CPT	9	2.02	Clay		Very Low with Extremely Low Veneer (0.5m)	3.22	Sand	Dense to Very Dense					
37	Extremely Low Strength Clay with Extremely Low Veneer (0.5m)	388.634	VC-B08-389	VC	9	1.6	Clay		Very Low	4.28	Sand						
37	Extremely Low Strength Clay with Extremely Low Veneer (0.5m)	390.069	CPT-B08-390	CPT	9	2.4	Clay		Very Low with Extremely Low Veneer (0.5m)	2.2	Peat		Medium to High	2.64	Sand	Dense to Very Dense	
38	Very Low Strength Clay	390.07	VC-B08-390	VC	9	2.29	Clay		Low	0.13	Peat			3.38	Sand		
38	Very Low Strength Clay	391.07	VC-B08-391	VC	9	2.55	Clay		Low	0.15	Peat			2.94	Sand		
38	Very Low Strength Clay	392.068	CPT-B08-392	CPT	9	2.9	Clay		Very Low	1.34	Sand	Dense to Very Dense					
38	Very Low Strength Clay	392.07	VC-B08-392	VC	9	2.92	Clay		Very Low	2.24	Sand						
38	Very Low Strength Clay	393.071	VC-B08-393	VC	9	3.32	Clay		Very Low	1.21	Sand						
38	Very Low Strength Clay	394.069	CPT-B08-394	CPT	9	2.7	Clay		Very Low	2.44	Sand	Dense to Very Dense					
38	Very Low Strength Clay	394.072	VC-B08-394	VC	9	2.9	Clay		Very Low	2.1	Sand						
38	Very Low Strength Clay	395.07	VC-B08-395	VC	9	3.42	Clay		Very Low	1.07	Sand						
38	Very Low Strength Clay	396.071	VC-B08-396	VC	9	5.43	Sandy Clay		Very Low								
38	Very Low Strength Clay	396.071	CPT-B08-396	CPT	9	2.72	Clay		Very Low	1.82	Silty Sand	Medium Dense to Very Dense					
38	Very Low Strength Clay	397.072	VC-B08-397	VC	9	2.16	Clay		Very Low	1.19	Silty Sand		Very Low				
38	Very Low Strength Clay	398.069	CPT-B08-398	CPT	9	2.8	Clay		Extremely Low to Medium	2.6	Sand	Medium Dense to Very Dense					
38	Very Low Strength Clay	398.07	VC-B08-398	VC	9	2.86	Clay		Very Low	2.14	Silty Sand						
38	Very Low Strength Clay	399.07	VC-B08-399	VC	9	2.72	Clay		Very Low	1.46	Silty Sand						
38	Very Low Strength Clay	400.07	VC-B08-400	VC	9	2.8	Clay		Very Low	0.1	Peat			1.11	Sand		
38	Very Low Strength Clay	400.07	CPT-B08-400	CPT	9	2.94	Clay		Very Low High	0.14	Peat		High	2.1	Sand	Medium to Very Dense	
39	Very Loose Silty Sand	401.07	VC-B09-401	VC	8	3.29	Silty Sand		Extremely Low	0.32	Clay		Low	1.07			
39	Very Loose Silty Sand	402.07	VC-B09-402	VC	8	3.94	Silty Sand		Very Low	0.86	Clay		Low				

39	Very Loose Silty Sand	402.071	CPT-B09-402	CPT	8	2.66	Silty Sand	Very Loose		2.1	Clay		Medium to High	0.22	Peat		
39	Very Loose Silty Sand	402.579	VC-B09-403	VC	8	4.55	Silty Sand		Very Low	1.44	Clay		Low				
39	Very Loose Silty Sand	404.346	CPT-B09-404	CPT	8	2.58	Silty Sand	Very Loose		2.08	Clay		Medium to Very High	0.32	Peat		Very High
39	Very Loose Silty Sand	404.348	VC-B09-404	VC	8	2.56	Silty Gravelly Sand		Very Low	1.44	Silty Clay		Very Low	0.55	Clay		
39	Very Loose Silty Sand	404.818	VC-B09-405	VC	8	2.6	Silty Sand		Very Low	2.6	Clay		Low	0.36	Peat		
39	Very Loose Silty Sand	406.33	CPT-B09-406	CPT	8	3.9	Silty Sand	Very Loose		0.12	Peat		Medium	1.18	Sand		Very Loose to Dense
39	Very Loose Silty Sand	406.331	VC-B09-406	VC	8	2.9	Silty Sand		Extremely Low	1.02	Clay		Low	0.91	Sand		
39	Very Loose Silty Sand	407.069	VC-B09-407	VC	9	1.15	Silty Sand		Extremely Low	2.2	Clay		Low	1.3	Clay		
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	408.07	VC-B09-408	VC	9	2.54	Clay		Very Low	0.49	Peat			0.31	Sand		
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	408.161	CPT-B09-408	CPT	9	3.36	Silty Clay		Very Low with Extremely Low Veneer (0.6m)	0.32	Peat			1.54	Sand	Loose to Very Dense	
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	409.07	VC-B09-409	VC	9	2.61	Clay		Very Low	0.8	Peat			2.24	Sand		
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	410.233	VC-B09-410	VC	9	4.14	Clay		Very Low	0.66	Peat						
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	410.233	CPT-B09-410	CPT	9	4.12	Clay		Very Low with Extremely Low Veneer (0.6m)	1.08	Clayey Peat		Medium				
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	411.171	VC-B09-411	VC	9	2.01	Clay		Very Low	2.35	Peat		Low	0.75			
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	412.07	CPT-B09-412	CPT	9	2.9	Clay		Very Low with Extremely Low Veneer (0.6m)	2.32	Sand	Very Dense					
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	412.071	VC-B09-412	VC	9	2.87	Clay		Very Low	1.58	Sand						
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	413.05	VC-B09-413	VC	9	2.48	Clay		Very Low	1.2	Sand						
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	414.07	CPT-B09-414	CPT	9	2.88	Clay		Very Low with Extremely Low Veneer (0.6m)	2.34	Sand	Very Dense					
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	414.072	VC-B09-414	VC	9	2.62	Clay		Very Low	1.72	Silty Sand						
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	414.988	VC-B09-415	VC	9	2.4	Clay		Very Low	2.49	Sand						
40	Very Low Strength Clay with Extremely Low Veneer (0.6m)	416.242	CPT-B09-416	CPT	9	2.56	Clay		Very Low with Extremely Low Veneer (0.6m)	1.36	Sand	Very Dense					
41	Very Low Strength Clay/Sandy Clay	416.243	VC-B09-416	VC	9	2.53	Clay		Very Low	1.11	Sand						
41	Very Low Strength Clay/Sandy Clay	417.07	VC-B09-417	VC	9	0.9	Clay		Very Low	4.01	Sand						
41	Very Low Strength Clay/Sandy Clay	418.068	CPT-B09-418	CPT	9	2.86	Clay		Very Low	1.36	Sand	Very Dense					
41	Very Low Strength Clay/Sandy Clay	418.07	VC-B09-418	VC	9	2.4	Clay		Very Low	2.41	Sand						
41	Very Low Strength Clay/Sandy Clay	418.789	VC-B09-419	VC	9	2.15	Clay		Very Low	0.83	Sand			0.31	Clay		
41	Very Low Strength Clay/Sandy Clay	420.238	CPT-B09-420	CPT	9	2.62	Clay		Very Low	2.82	Sand	Medium Dense to Very Dense					
41	Very Low Strength Clay/Sandy Clay	420.24	VC-B09-420	VC	9	2.98	Silty Sand		Extremely Low	0.33	Clay		Medium	2.61	Sand		
41	Very Low Strength Clay/Sandy Clay	421.07	VC-B09-421	VC	9	2.78	Sandy Clay		Very Low	2.77	Sand						
41	Very Low Strength Clay/Sandy Clay	422.069	CPT-B09-422	CPT	9	2.52	Sandy Clay		Very Low	0.72	Sand	Medium Dense		1.66	Clay		Medium to Very High
41	Very Low Strength Clay/Sandy Clay	422.07	VC-B09-422	VC	9	2.38	Sandy Clay		Very Low	3.01	Sand						
41	Very Low Strength Clay/Sandy Clay	423.459	VC-B09-423	VC	9	2.6	Sandy Clay		Very Low	0.66	Sand			1.27	Clay		
41	Very Low Strength Clay/Sandy Clay	424.07	VC-B09-424	VC	9	5.68	Sandy Clay		Very Low								
41	Very Low Strength Clay/Sandy Clay	424.07	CPT-B09-424	CPT	9	2.2	Sandy Clay		Very Low to Medium	0.38	Sand	Loose		2.28	Sand	Dense to Very Dense	
41	Very Low Strength Clay/Sandy Clay	424.819	VC-B09-425	VC	9	2.5	Sandy Clay		Very Low	3.73	Sand						
41	Very Low Strength Clay/Sandy Clay	425.966	VC-B09-426	VC	9	2.32	Sandy Clay		Very Low	2.58	Sand						
41	Very Low Strength Clay/Sandy Clay	425.969	CPT-B09-426	CPT	9	1.92	Sandy Clay			0.44	Sand	Very Loose		0.64	Sand	Medium to Very Dense	
41	Very Low Strength Clay/Sandy Clay	427.138	VC-B09-427	VC	9	2.09	Sandy Clay		Very Low	0.83	Silt		Low	0.32	Peat		
41	Very Low Strength Clay/Sandy Clay	427.704	CPT-B09-428	CPT	9	2.28	Clay		Very Low	0.74	Sand	Very Loose		1.44	Clay		Medium to High
41	Very Low Strength Clay/Sandy Clay	427.706	VC-B09-428	VC	9	2.48	Sandy Clay		Very Low	0.52	Sand			2.06	Clay		
41	Very Low Strength Clay/Sandy Clay	429.068	VC-B09-429	VC	9	1.76	Sandy Clay		Very Low	3.1	Sand						
41	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	430.07	VC-B09-430	VC	9	1.44	Sandy Clay		Very Low	3.02	Sand						
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	430.07	CPT-B09-430	CPT	9	1.6	Clay		Very Low with Extremely Low Veneer (0.5m)	3.8	Sand	Very Dense					
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	431.206	VC-B09-431	VC	8	1.49	Sandy Clay		Very Low	2.79	Sand	Very Low					
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	432.068	CPT-B09-432	CPT	9	1.58	Clay		Very Low with Extremely Low Veneer (0.5m)	3.82	Sand	Medium Dense to Very Dense					
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	432.07	VC-B09-432	VC	9	1.63	Sandy Clay		Extremely Low	2.96	Sand						
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	432.768	VC-B09-433	VC	9	1.88	Sandy Clay		Very Low	2.45	Sand with thin bands of Clay		Low				
42	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	434.706	CPT-B09-434	CPT	8	1.12	Clay		Very Low with Extremely Low Veneer (0.5m)	1.04	Sand	Medium Dense to Very Dense		0.36	Clay		Medium to High
43	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	434.707	VC-B09-434	VC	8	0.84	Sandy Clay		Very Low	1.32	Sand						
43	Very Low Strength Clay/Sandy Clay	435.364	VC-B09-435	VC	8	0.7	Sandy Clay		Very Low	1.04	Peat			0.43	Sandy Silt		
43	Very Low Strength Clay/Sandy Clay	436.069	CPT-B09-436	CPT	6	0.92	Clay		Very Low	3.48	Sand	Medium Dense to Very Dense					
43	Very Low Strength Clay/Sandy Clay	436.072	VC-B09-436	VC	6	1.13	Sandy Clay		Very Low	3.3	Sand						
43	Very Low Strength Clay/Sandy Clay	436.902	VC-B09-437	VC	6	1.2	Sandy Clay		Very Low	3.65	Sandy Gravel						
43	Very Low Strength Clay/Sandy Clay	438.067	VC-B09-438	VC	6	0.66	Sandy Clay		Very Low	4.29	Sand						
43	Very Low Strength Clay/Sandy Clay	438.068	CPT-B09-438	CPT	6	1.1	Clay		Very Low	1.28	Sand	Very Loose to Dense		2.03	Sand	Very Dense	
43	Very Low Strength Clay/Sandy Clay	439.175	VC-B10-439	VC	6	0.9	Sandy Clay		Very Low	3.47	Sand						
43	Very Low Strength Clay/Sandy Clay	440.173	CPT-B10-440	CPT	6	1.14	Sandy Clay		Very Low	0.78	Sand	Very Loose to Dense		3.08	Sand	Very Dense	
43	Very Low Strength Clay/Sandy Clay	440.174	VC-B10-440	VC	6	0.81	Silty Sand		Very Low	4.29	Sand						
44	Very Loose Clayey Sand	441.019	VC-B10-441	VC	6	5.39	Sand										
44	Very Loose Clayey Sand	442.299	VC-B10-442	VC	5	4.97	Sand/Clayey Sand										
44	Very Loose Clayey Sand	442.299	CPT-B10-442	CPT	5	1.08	Clayey Sand	Very Loose		4.3	Sand	Medium Dense to Very Dense					
44	Very Loose Clayey Sand	443.791	VC-B10-444	VC	6	5.6	Sand										
44	Very Loose Clayey Sand	443.792	CPT-B10-444	CPT	6	0.84	Clayey Sand	Very Loose		3.04	Sand	Dense to Very Dense					
45	Loose Sand	445.241	VC-B10-445	VC	6	4	Sand										
45	Loose Sand	446.17	VC-B10-446	VC	6	4.9	Sand										
45	Loose Sand	446.173	CPT-B10-446	CPT	6	1.2	Sand	Medium Dense to Dense		3.72	Sand	Very Dense					
45	Loose Sand	447.173	VC-B10-447	VC	6	4.7	Sand										
45	Loose Sand	448.173	CPT-B10-448	CPT	8	1.8	Sand	Very Loose to Medium Dense		1.9	Clay		Low to Very High	1.42	Sand	Dense to Very Dense	
45	Loose Sand	448.174	VC-B10-448	VC	8	6	Sand										
45	Loose Sand	449.075	VC-B10-449	VC	6	1.97	Sand			0.77	Clay		Very Low	0.38	Peat		
45	Loose Sand	450.123	VC-B10-450	VC	6	5.78	Sand										
45	Loose Sand	450.123	CPT-B10-450	CPT	6	1.22	Sand	Loose to Medium Dense		3.96	Sand	Dense to Very Dense					
45	Loose Sand	451.22	VC-B10-451	VC	6	5.68	Sand										
45	Loose Sand	452.103	VC-B10-452	VC	6	6	Sand										
46	Low Strength Sandy Clay	452.104	CPT-B10-452	CPT	6	0.88	Sandy Clay		Very Low to Low	4.42	Sand	Very Dense					
46	Low Strength Sandy Clay	453.173	VC-B10-453	VC	6	5.36	Sand										
46	Low Strength Sandy Clay	454.173	VC-B10-454	VC	5	4.87	Sand										
46	Low Strength Sandy Clay	454.174	CPT-B10-454	CPT	5	0.78	Sandy Clay		Low to Medium	4.58	Sand	Very Dense					
47	Very Loose Sand	455.478	VC-B10-455	VC	6	5.24	Sand										
47	Very Loose Sand	456.173	VC-B10-456	VC	6	6	Sand										
47	Very Loose Sand	456.174	CPT-B10-456	CPT	6	0.86	Clayey Sand	Very Loose		4.54	Sand	Very Dense					
47	Very Loose Sand	457.173	VC-B10-457	VC	6	6	Sand										
47	Very Loose Sand	458.173	VC-B10-458	VC	6	5.2	Sand										
47	Very Loose Sand	458.174	CPT-B10-458	CPT	6	1.06	Sand	Very Loose		4.32	Sand	Very Dense					
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	459.173	VC-B10-459	VC	6	0.5	Sandy Clay		Extremely Low	5.5	Sand						
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	460.173	VC-B10-460	VC	5	0.95	Sandy Clay		Very Low	0.34	Gravel			4.71	Sand		
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	460.173	CPT-B10-460	CPT	5	0.9	Sandy Clay	Very Loose		4.54	Sand	Very Dense					
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	461.131	VC-B10-461	VC	5	6	Sand										
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	462.172	VC-B10-462	VC	5	0.78	Sandy Clay		Very Low	4.39	Sand						
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	462.174	CPT-B10-462	CPT	5	0.82	Sandy Clay		Extremely Low	4.36	Sand	Very Dense					
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	463.173	VC-B10-463	VC	5	0.82	Sandy Clay		Very Low	4.15	Sand						
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	464.173	VC-B10-464	VC	5	0.88	Sandy Clay		Very Low	3.44	Sand						
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	464.174	CPT-B10-464	CPT	5	0.62	Sandy Clay		Extremely Low	3.7	Sand	Very Dense					
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	465.173	VC-B10-465	VC	5	1.83	Silty Sand		Very Low	0.25	Peat			1.72	Sand		
48	Very Low Strength Clay/Sandy Clay with Extremely Low Veneer (0.5m)	466.173	VC-B10-466	VC	5	0.74	Silty Sand		Very Low	4.35	Sand						
49	Very Loose Sand	466.174	CPT-B10-466	CPT	5	1.1	Gravelly Sand	Very Loose		3.16	Sand	Very Dense					
49	Very Loose Sand	467.174	VC-B10-467	VC	5	2.4	Sand			0.12	Clay		Medium	2.21	Sand		
49	Very Loose Sand	468.174	VC-B10-468	VC	7	6	Sand										
49	Very Loose Sand	468.174	CPT-B10-468	CPT	7	0.98	Sand	Very Loose		1.1	Sand	Medium Danese to Dense		3.34	Sand	Very Dense	
49	Very Loose Sand	469.173	VC-B10-469	VC	5	5.46	Sand										
49	Very Loose Sand	470.174	VC-B10-470	VC	5	5.65	Sand										
49	Very Loose Sand	470.174	CPT-B10-470	CPT	5	0.9	Sand	Very Loose		4.6	Sand	Very Dense					
49	Very Loose Sand	471.174	VC-B10-471	VC	5	1.12	Silty Sand		Very Low	3.85	Sand						
49	Very Loose Sand	472.173	VC-B10-472	VC	5	6	Sand										
49	Very Loose Sand	472.173	CPT-B10-472	CPT	5	0.98	Silty Sand	Very Loose		4.44	Sand	Very Dense					
49	Very Loose Sand	473.172	VC-B10-473	VC	5	1.83	Silty Sand		Very Low	0.1	Clay		Low	3.64	Sand		
49	Very Loose Sand	474.172	VC-B10-474	VC	5	6	Sand										
49	Very Loose Sand	474.174	CPT-B10-474	CPT	5	0.94	Sand	Very Loose		4.46	Sand	Very Dense					
49	Very Loose Sand	475.172	VC-B10-475	VC	5	5.45	Sand										
49	Very Loose Sand	476.174	VC-B10-476	VC	8	1.15	Sand			1.14	Clay		Very Low	3.19	Sand		
49	Very Loose Sand	476.174	CPT-B10-476	CPT	8	1.78	Sand	Very Loose to Medium Dense		1.3	Clay		Low to Medium	0.84	Sand	Very Loose to Dense	
49	Very Loose Sand	477.172	VC-B10-477	VC	8	2.23	Sand			2.08	Sandy Silt		Very Low	1.41	Sand		
49	Very Loose Sand	478.173	VC-B10-478	VC	8	4.8	Sand										
49	Very Loose Sand	478.173	CPT-B10-478	CPT	8	1.94	Sand	Very Loose to Medium Dense		3.46	Sand	Very Dense					
49	Very Loose Sand	479.175	VC-B10-479	VC	8	0.73	Sand			5.27	Sandy Silt		Very Low				
49	Very Loose Sand	480.173	VC-B10-480	VC	8	5.43	Sand										
49	Very Loose Sand	480.174	CPT-B10-480	CPT	8	1.7	Sand	Loose		3.7	Sand	Very Dense					
49	Very Loose Sand	481.174	VC-B10-481	VC	8	5.84	Sand										
50	Very Loose Sand	481.845	VC-B10-482	VC	8	0.94	Silty Sand		Extremely Low	4.76	Sand						
50	Very Loose Sand	481.846	CPT-B10-482	CPT	8	1.56	Silty Sand	Very Loose		2.56	Sand	Very Dense					
50	Very Loose Sand	483.173	VC-B10-483	VC	8	0.5	Sand			1.1	Sandy Clay		Very Low	4.2	Sand		
50	Very Loose Sand	484.173	VC-B10-484	VC	8	5.92	Sand										
50	Very Loose Sand	484.173	CPT-B10-484	CPT	8	1.5	Sand	Very Loose		3.88	Sand	Very Dense					
50	Very Loose Sand	485.173	VC-B10-485	VC	8	4.85	Sand										
50	Very Loose Sand	486.173	VC-B10-486	VC	9	0.46	Sand			1.95	Clay		Extremely Low	0.49	Peat		
50	Very Loose Sand	486.174	CPT-B10-486	CPT	9	2.52	Sand	Very Loose	Extremely Low	0.78	Clayey Peat		Low to Medium	1.72	Sand	Very Dense	
50	Very Loose Sand	487.173	VC-B10-487	VC	5	5.6	Sand										
50	Very Loose Sand	488.173	VC-B10-488	VC	5	0.89	Silty Sand		Extremely Low	5.11	Sand						
50	Very Loose Sand	488.174	CPT-B10-488	CPT	5	0.74	Silty Sand	Very Loose		4.6	Sand	Very Dense					
50	Very Loose Sand	489.173	VC-B10-489	VC	5	0.94	Silty Sand		Extremely Low	4.64	Sand						
50	Very Loose Sand	490.174	VC-B10-490	VC	5	0.89	Silty Sand		Extremely Low	4.82	Sand						
50	Very Loose Sand	490.175	CPT-B10-490	CPT	5	0.76	Silty Sand	Very Loose		4.62	Sand	Very Dense					
51	Very Loose Sand	491.174	VC-B10-491	VC	5	4.95	Sand										
51	Very Loose Sand	492.174	VC-B10-492	VC	5	5.55	Sand										
51	Very Loose Sand	492.177	CPT-B10-492	CPT	5	0.48	Clayey Sand	Very Loose to Loose		4.72	Sand	Very Dense					
51	Very Loose Sand	493.174	VC-B10-493	VC	5	5.42	Sand										
51	Very Loose Sand	494.27	VC-B10-494	VC	5	6	Sand										
51	Very Loose Sand	494.271	CPT-B10-494	CPT	5	0.8	Silty Sand	Very Loose		4.58	Sand	Very Dense					
51	Very Loose Sand	495.173	VC-B10-495	VC	5	5.67	Sand										
51	Very Loose Sand	496.173	VC-B10-496	VC	5	6	Sand										
51	Very Loose Sand	496.174	CPT-B10-496	CPT	5	0.56	Silty Sand	Very Loose to Loose		4.66	Sand	Very Dense					
51	Very Loose Sand	497.174	VC-B10-497	VC	5	4.24	Sand			1.01	Clay		Medium				
51	Very Loose Sand	498.173	VC-B10-498	VC	5	3.66	Sand			1.18	Clay		Medium				
51	Very Loose Sand	498.175	CPT-B10-498	CPT	5	0.58	Silty Sand	Very Loose to Loose		3.4	Sand	Very Dense		0.9	Clay		Medium to High
51	Very Loose Sand	499.174	VC-B10-499	VC	5	5.32	Sand			0.28	Clay		Medium				
51	Very Loose Sand	500.173	VC-B10-500	VC	5	2.16	Sand			1.04	Clay		Medium				
51	Very Loose Sand	500.173	CPT-B10-500	CPT	6	0.72	Silty Sand	Very Loose		1.44	Sand	Very Dense		2.31	Clay		High
51	Very Loose Sand	500.734	VC-B10-501	VC	6	3.53	Silty Sand		Very Low	0.1	Peat			1.31	Sand		
51	Very Loose Sand	502.173	VC-B10-502	VC	4	1.16	Sand			1.48	Clay		Medium				
51	Very Loose Sand	502.174	CPT-B10-502	CPT	4	0.74	Sand	Very Loose to Loose		0.48	Sand	Dense		3.96	Clay		High to Very High
51	Very Loose Sand	503.173	VC-B10-503	VC	4	1.65	Sand			2.89	Clay		High				
51	Very Loose Sand	504.173	VC-B10-504	VC	4	1.6	Sand			2.34	Clay		Very High				

51	Very Loose Sand	504.174	CPT-B10-504	CPT	4	1.26	Sand	Very Loose to Medium Dense		1.66	Clay		High to Very High	0.66	Sand	Very Dense	
51	Very Loose Sand	505.173	VC-B10-505	VC	4	0.54	Sand			1.71	Clay		High	3.41	Sand		
51	Very Loose Sand	507.279	VC-B11-507	VC	5	5.85	Sand										
51	Very Loose Sand	508.851	VC-B11-508	VC	5	5.77	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	508.853	CPT-B11-508	CPT	5	0.52	Sand	Very Loose to Dense		3.26	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	509.365	VC-B11-509	VC	5	5.44	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	510.527	VC-B11-510	VC	5	1.02	Sand			0.33	Clay		Medium	4.28	Sand		
52	Dense Sand with Loose Sand Veneer (0.3m)	510.528	CPT-B11-510	CPT	5	1.44	Sand	Very Loose to Dense		0.2	Clay		High to Very High	0.8	Sand	Very Dense	
52	Dense Sand with Loose Sand Veneer (0.3m)	511.365	VC-B11-511	VC	5	5.62	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	512.365	VC-B11-512	VC	5	5.81	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	512.365	CPT-B11-512	CPT	5	1.16	Sand	Very Loose to Dense		0.08	Clay		Very High	1.32	Sand	Very Dense	
52	Dense Sand with Loose Sand Veneer (0.3m)	512.366	CPT-B11-512A	CPT	5	0.54	Sand	Very Loose to Dense		2.1	Sand	Very Dense		1.08	Sand	Loose to Medium Dense	
52	Dense Sand with Loose Sand Veneer (0.3m)	513.365	VC-B11-513	VC	5	5.4	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	514.364	VC-B11-514	VC	5	5.65	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	514.366	CPT-B11-514	CPT	5	0.56	Sand	Very Loose to Dense		4.58	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	515.366	VC-B11-515	VC	5	5.16	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	515.908	VC-B11-516	VC	5	5.31	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	515.909	CPT-B11-516	CPT	5	0.54	Sand	Loose to Dense		1.8	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	515.909	CPT-B11-516A	CPT	5	0.44	Sand	Loose to Dense		4.04	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	517.414	VC-B11-517	VC	5	5.82	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	518.08	VC-B11-518	VC	5	5.47	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	518.081	CPT-B11-518	CPT	5	0.46	Sand	Loose to Dense		3.74	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	519.758	VC-B12-519	VC	5	5.86	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	519.959	VC-B12-520	VC	5	6	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	519.96	CPT-B12-520	CPT	5	0.44	Sand	Very Loose to Dense		3.04	Sand	Very Dense		1.46	Sand	Medium Dense	
52	Dense Sand with Loose Sand Veneer (0.3m)	521.363	VC-B12-521A	VC	5	6	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	522.365	CPT-B12-522	CPT	3	0.54	Sand	Loose to Very Dense		4.68	Sand	Very Dense					
52	Dense Sand with Loose Sand Veneer (0.3m)	522.365	VC-B12-522	VC	3	6	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	523.365	VC-B12-523	VC	5	5.64	Sand										
52	Dense Sand with Loose Sand Veneer (0.3m)	524.365	CPT-B12-524	CPT	5	0.46	Sand	Loose to Dense		4.82	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	524.365	VC-B12-524	VC	5	5.48	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	525.367	VC-B12-525	VC	5	4.94	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	526.364	CPT-B12-526	CPT	5	0.58	Sand	Loose to Very Dense		4.71	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	526.364	VC-B12-526	VC	5	5.7	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	526.886	VC-B12-527	VC	6	5.51	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	528.49	VC-B12-528	VC	6	2.26	Sand			0.4	Peat			2.53	Sand		
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	528.491	CPT-B12-528	CPT	6	2.22	Sand	Loose to Very Dense		0.6	Sand	Loose to Medium Dense		2.42	Sand	Very Dense	
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	529.365	VC-B12-529	VC	7	4.46	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	530.365	CPT-B12-530	CPT	7	0.54	Sand	Very Loose to Dense		1.9	Sand	Dense		2.06	Sand	Very Dense	
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	530.366	VC-B12-530	VC	7	4.98	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	531.365	VC-B12-531	VC	7	4.98	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	532.365	CPT-B12-532	CPT	7	4.16	Sand	Medium Dense to Dense		1.2	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	532.365	VC-B12-532	VC	7	5	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	533.491	VC-B12-533	VC	6	4.84	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	534.401	CPT-B12-534	CPT	6	1.02	Sand	Very Loose to Dense		4.26	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	534.402	VC-B12-534	VC	6	5.54	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	535.366	VC-B12-535	VC	6	6	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	536.495	VC-B12-536	VC	6	5.76	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	536.496	CPT-B12-536	CPT	6	0.86	Sand	Very Loose to Dense		4.44	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	537.106	VC-B12-537	VC	5	5.62	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	539.054	VC-B12-538	VC	5	5.71	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	539.055	CPT-B12-538	CPT	5	1.5	Sand	Very Loose to Dense		3.8	Sand	Very Dense					
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	539.377	VC-B12-539	VC	7	4.05	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	540.44	VC-B12-540	VC	7	5.89	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	540.441	CPT-B12-540	CPT	7	2	Sand	Medium Dense to Dense		0.08	Clay		High	3.2	Sand with thin bands of Clay	Very Loose to Dense	Low
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	541.037	VC-B12-541	VC	7	5.61	Sand										
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	542.364	VC-B12-542	VC	7	2.9	Silty Sand			1.54	Clay		Medium				
53	Medium Dense Sand with Loose Sand Veneer (0.2m)	542.366	CPT-B12-542	CPT	7	2.38	Sand	Medium Dense to Dense		0.4	Clay		Medium to High	0.64	Sand	Very Dense	
54	Loose Sand	543.219	VC-B12-543	VC	6	6	Sand										
54	Loose Sand	544.365	VC-B12-544	VC	6	5.9	Sand										
54	Loose Sand	544.367	CPT-B12-544	CPT	6	1.24	Sand	Very Loose to Dense		3.18	Sand	Very Dense					
54	Loose Sand	545.236	VC-B12-545	VC	6	1.9	Sand			0.23	Peat			2.13	Sand		
54	Loose Sand	546.838	VC-B12-546	VC	7	5.66	Sand										
54	Loose Sand	546.84	CPT-B12-546	CPT	7	2	Sand	Very Loose to Dense		3.25	Sand	Very Dense					
54	Loose Sand	547.436	VC-B12-547	VC	8	5.36	Sand										
54	Loose Sand	548.365	CPT-B12-548	CPT	8	2.14	Sand	Very Loose to Dense		3.16	Sand	Very Dense					
54	Loose Sand	548.365	VC-B12-548	VC	8	5.79	Sand										
54	Loose Sand	549.48	VC-B12-549	VC	8	1.97	Sand			0.5	Peat			3.4	Sand		
54	Loose Sand	550.491	VC-B12-550	VC	8	1.77	Sand			0.27	Peat			3.32	Sand		
54	Loose Sand	550.492	CPT-B12-550	CPT	8	2.16	Sand	Very Loose to Medium Dense		0.3	Peat		Medium to High	0.4	Sand	Dense to Very Dense	
54	Loose Sand	551.821	VC-B12-551	VC	8	2.05	Sand			1.13	Peat			2.63	Sand		
54	Loose Sand	552.364	VC-B12-552	VC	8	2.57	Sand			0.25	Silt			2.95	Sand		
54	Loose Sand	552.365	CPT-B12-552	CPT	8	1.54	Sand	Very Loose to Dense		1.22	Sand	Very Dense		0.6	Clay		Medium to High
54	Loose Sand	553.365	VC-B12-553	VC	8	2.23	Sand			0.13	Silt		Very Low	1.3	Sand		
54	Loose Sand	554.464	CPT-B12-554	CPT	8	1.62	Sand	Very Loose to Loose		0.5	Clay		Medium to High	3.16	Sand	Very Dense	
54	Loose Sand	554.465	VC-B12-554	VC	8	5.1	Sand										
54	Loose Sand	555.242	VC-B12-555	VC	8	6	Sand										
54	Loose Sand	556.658	VC-B12-556	VC	8	1.55	Sand			0.32	Peat			4.13	Sand		
54	Loose Sand	556.659	CPT-B12-556	CPT	8	1.18	Sand	Very Loose to Medium Dense		0.36	Clayey Peat		Medium	3.66	Sand	Very Dense	
54	Loose Sand	557.364	VC-B12-557	VC	7	5.72	Sand										
54	Loose Sand	558.365	CPT-B12-558	CPT	7	1.16	Sand	Very Loose to Loose		0.18	Clayey Peat			3.86	Sand	Very Dense	
54	Loose Sand	558.365	VC-B12-558	VC	7	1.48	Sand			0.28	Peat			4.02	Silty Sand		
54	Loose Sand	559.598	VC-B12-559	VC	7	1.61	Silty Sand			1.12	Peat and Clay			3.27	Sand		
54	Loose Sand	560.364	CPT-B12-560	CPT	5	0.74	Sand	Very Loose to Dense		4.36	Sand	Very Dense					
54	Loose Sand	560.365	VC-B12-560	VC	5	5.69	Sand										
54	Loose Sand	561.602	VC-B12-561	VC	5	4.75	Sand										
54	Loose Sand	562.364	CPT-B12-562	CPT	5	0.9	Sand	Very Loose to Medium Dense		0.4	Clay		Low to Medium	3.86	Sand	Very Dense	
54	Loose Sand	562.365	VC-B12-562	VC	5	5.51	Sand										
54	Loose Sand	563.367	VC-B12-563	VC	5	5.61	Sand										
54	Loose Sand	563.911	CPT-B12-564	CPT	5	0.76	Sand	Very Loose to Loose		4.38	Sand	Very Dense					
54	Loose Sand	563.914	VC-B12-564	VC	5	0.69	Sand			0.19	Peat			4.43	Sand		
54	Loose Sand	565.449	VC-B12-565	VC	5	5.89	Sand										
54	Loose Sand	566.365	VC-B12-566	VC	5	5.46	Sand										
54	Loose Sand	566.366	CPT-B12-566	CPT	5	0.7	Sand	Very Loose to Dense		4.44	Sand	Very Dense					
54	Loose Sand	567.364	VC-B12-567	VC	6	4.91	Sand										
54	Loose Sand	568.437	CPT-B12-568	CPT	6	1.36	Sand	Very Loose to Very Dense		3.8	Sand	Very Dense					
54	Loose Sand	568.437	VC-B12-568	VC	6	5.06	Sand										
54	Loose Sand	569.22	VC-B13-569	VC	6	4.85	Sand										
54	Loose Sand	571.49	VC-B13-571	VC	6	5.65	Sand										
54	Loose Sand	572.364	VC-B13-572	VC	6	1.77	Sand			1.35	Clay and Peat		Low	2.69	Sand		
54	Loose Sand	572.366	CPT-B13-572	CPT	6	1.52	Sand	Very Loose to Dense		1.34	Clay and Peat		Low to Medium	2.08	Sand	Very Dense	
55	Very Loose Sand	573.365	VC-B13-573	VC	6	4.76	Sand										
55	Very Loose Sand	574.06	VC-B13-574	VC	6	4.36	Sand										
55	Very Loose Sand	574.061	CPT-B13-574	CPT	6	0.9	Sand	Very Loose to Medium Dense		4.24	Sand	Very Dense					
55	Very Loose Sand	575.365	VC-B13-575	VC	6	6	Sand										
55	Very Loose Sand	576.364	VC-B13-576	VC	6	1.51	Sand			0.09	Peat			3.08	Sand		
55	Very Loose Sand	576.366	CPT-B13-576	CPT	6	1.2	Sand	Very Loose to Loose		0.24	Clay and Peat		Very High	3.69	Sand	Very Dense	
55	Very Loose Sand	577.366	VC-B13-577	VC	9	1.25	Sand			1.34	Clay and Peat		Very Low	1.11	Sand		
55	Very Loose Sand	578.366	VC-B13-578	VC	6	1.63	Sand			0.54	Clay		Extremely Low	3.83	Sand		
55	Very Loose Sand	578.366	CPT-B13-578	CPT	6	1.18	Sand	Very Loose to Dense		0.14	Clay		Low to Medium	3.8	Sand	Very Dense	
55	Very Loose Sand	579.21	VC-B13-579	VC	9	1.23	Sand			1.54	Clay and Peat		Low	1.03	Sand		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	580.49	VC-B13-580	VC	8	1.93	Sand			0.65	Clay and Peat		Very Low	3.16	Sand		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	580.492	CPT-B13-580	CPT	8	2.02	Sand	Loose to Dense		1.02	Clay		Low to Medium	0.2	Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	581.08	VC-B13-581	VC	8	0.76	Sand			1.99	Silt and Clay		Extremely Low	0.34	Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	582.467	VC-B13-582	VC	8	2.19	Sand			1.77	Silt and Clay		Very Low	0.23	Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	582.469	CPT-B13-582	CPT	8	2.16	Sand	Very Loose to Dense		1.32	Clay		Low to Medium	0.36	Peat		High
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	583.365	VC-B13-583	VC	8	3.67	Sandy Silt			0.99	Clay and Peat		Low	1.34	Sand		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	584.365	VC-B13-584	VC	8	2.37	Sand			2.43	Sandy Silt		Very Low	0.41	Clay and Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	584.366	CPT-B13-584	CPT	8	3.21	Sand	Loose to Very Dense		1.54	Sandy Silt		Low to High	0.14	Peat		High
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	585.364	VC-B13-585	VC	8	1.39	Sand			2.55	Sandy Silt		Very Low	0.27	Clay		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	586.365	VC-B13-586	VC	8	3.54	Sand			1.37	Silt and Clay		Very Low	0.72	Clay and Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	586.366	CPT-B13-586	CPT	8	3.48	Sand	Very Loose to Medium Dense		1.64	Clay		Low to High	0.32	Peat		Medium
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	587.365	VC-B13-587	VC	8	2.14	Sand			3.11	Silt and Clay		Very Low	0.52	Sand and Peat		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	588.365	VC-B13-588	VC	8	4.95	Sand and Silt			1.05	Clay		Low				
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	588.366	CPT-B13-588	CPT	8	2	Sand and Silt	Very Loose to Medium Dense		1.64	Clay		Medium to High	0.8	Sand	Loose	
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	589.365	VC-B13-589	VC	8	1.08	Sand			4.01	Silt and Clay			0.81	Clay		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	590.366	VC-B13-590	VC	7	0.76	Sand			2.41	Sandy Silt		Very Low	2.16	Clay		
56	Medium Dense Sand with Loose Sand Veneer (1.0m)	590.368	CPT-B13-590	CPT	7	1.14	Sand	Very Loose to Medium Dense		4.08	Sandy Silt		Low to High				
57	Loose Sand with Very Loose Sand Veneer (1.0m)	591.364	VC-B13-591	VC	8	3.83	Sand and Silt			0.23	Peat			1.94	Sand		
57	Loose Sand with Very Loose Sand Veneer (1.0m)	592.826	VC-B13-592	VC	8	3.71	Veneer of Gravel then Silt			0.13	Peat			2.16	Sand		
57	Loose Sand with Very Loose Sand Veneer (1.0m)	592.827	CPT-B13-592	CPT	8	2.84	Veneer of Gravel then Silt	Very Loose to Loose		0.92	Clay		Medium to High	0.12	Peat		
57	Loose Sand with Very Loose Sand Veneer (1.0m)	593.366	VC-B13-593	VC	8	3.83	Veneer of Gravel then Silt			0.23	Peat			1.94	Sand		
57	Loose Sand with Very Loose Sand Veneer (1.0m)	594.364	CPT-B13-594	CPT	8	3.2	Veneer of Gravel then Silt	Very Loose to Medium Dense		0.12	Peat		Medium	1.74	Sand	Very Dense	
57	Loose Sand with Very Loose Sand Veneer (1.0m)	594.366	VC-B13-594	VC	8	3.08	Veneer of Gravel then Silt			0.06	Peat			2.86	Sand		
57	Loose Sand with Very Loose Sand Veneer (1.0m)	595.367	VC-B13-595	VC	8	6	Sand with thin bands of Clay										
58	Loose Sand	596.364	CPT-B13-596	CPT	9	1.12	Sand	Very Loose to Medium Dense		0.78	Clay and Peat			3.42	Sand	Very Dense	
58	Loose Sand	596.365	VC-B13-596	VC	9	1.39	Sand and Silt		Extremely Low	0.86	Clay and Peat			3.42	Sand		
58	Loose Sand	597.365	VC-B13-597	VC	7	5.95	Sand										
58	Loose Sand	598.365	CPT-B13-598	CPT	7	1.42	Sand	Very Loose to Loose		3.84	Sand	Very Dense					
58	Loose Sand	598.366	VC-B13-598	VC	7	5.61	Sand										
58	Loose Sand	599.365	VC-B13-599	VC	7	5.92	Sand										
58	Loose Sand	600.364	CPT-B13-600	CPT	5	0.72	Sand	Very Loose to Dense		4.56	Sand	Very Dense					
58	Loose Sand	600.365	VC-B13-600	VC	5	5.6	Sand										
58	Loose Sand	601.365	VC-B13-601	VC	5	0.22	Sand			0.48	Peat			3.64	Sand		
58	Loose Sand	602.363	VC-B13-602	VC	5	0.6	Sand			0.68	Peat			4.29	Sand		
58	Loose Sand	602.365	CPT-B13-602	CPT	5	0.6	Sand	Very Loose to Loose		0.56	Peat		High	4.2	Sand	Very Dense	
58	Loose Sand	603.364	VC-B13-603	VC	5	3.75	Sand			0.14	Clay		Low	1.44	Sand		
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	604.365	VC-B13-604	VC	5	6	Sand										
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	604.367	CPT-B13-604	CPT	5	0.7	Sand	Very Loose to Medium Dense		4.7	Sand	Very Dense					
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	605.364	VC-B13-605	VC	5	5.9	Sand										
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	606.277	VC-B13-606	VC	5	4.86	Sand			0.14	Clay		Very Low	0.83	Sand		
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	606.277	CPT-B13-606	CPT	5	1	Sand	Loose to Dense		0.2	Clay		Medium	4.1	Sand	Very Dense	

59	Medium Dense Sand with Loose Sand Veneer (0.15m)	607.365	VC-B13-607	VC	5	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	608.295	VC-B13-608	VC	3	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	608.296	CPT-B13-608	CPT	3	0.54	Sand	Loose to Dense		4.72	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	609.365	VC-B13-609	VC	7	5.69	Sand			0.31	Clay		Very Low			
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	610.656	VC-B13-610	VC	7	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	610.657	CPT-B13-610	CPT	7	1.04	Sand	Loose to Dense		1.3	Clay		Medium to High	2.91	Sand	Very Dense
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	611.365	VC-B13-611	VC	6	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	612.364	VC-B13-612	VC	6	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	612.365	CPT-B13-612	CPT	6	1.06	Sand	Very Loose to Dense		4.22	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	613.365	VC-B13-613A	VC	5	5.08	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	614.365	VC-B13-614	VC	5	3.62	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	614.365	CPT-B13-614	CPT	5	0.7	Sand	Very Loose to Dense		4.38	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	615.364	VC-B13-615	VC	5	5.73	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	616.364	VC-B13-616	VC	5	5.85	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	616.366	CPT-B13-616	CPT	5	0.6	Sand	Medium Dense to Dense		4.5	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	617.365	VC-B13-617	VC	5	5.62	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	618.675	VC-B13-618	VC	5	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	618.675	CPT-B13-618	CPT	5	1.7	Sand	Loose to Very Dense		3.4	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	619.19	VC-B14-619	VC	5	4.16	Sand			0.39	Silty Peat			1.25	Sand	
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	620.365	CPT-B14-620	CPT	3	0.56	Sand	Loose to Dense		4.56	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	620.365	VC-B14-620	VC	3	4.2	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	621.716	VC-B14-621	VC	3	5.5	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	622.364	CPT-B14-622	CPT	3	0.48	Sand	Loose to Dense		4.6	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	622.364	VC-B14-622	VC	3	2.32	Sand			3.43	Sand with thin bands of Clay					
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	623.395	VC-B14-623	VC	5	5.9	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	624.756	CPT-B14-624	CPT	5	5.12	Sand	Medium Dense to Very Dense								
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	624.758	VC-B14-624	VC	5	6	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	625.365	VC-B14-625	VC	5	5.84	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	627.015	VC-B14-626	VC	5	5.41	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	627.016	CPT-B14-626	CPT	5	1.18	Sand	Medium Dense to Very Dense		3.98	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	627.575	VC-B14-627	VC	6	2.3	Sand			0.35	Clay		Low	3.19	Sand	
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	628.398	CPT-B14-628	CPT	6	3.02	Sand	Loose to Dense		2.08	Sand	Very Dense				
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	628.398	VC-B14-628	VC	6	5.54	Sand									
59	Medium Dense Sand with Loose Sand Veneer (0.15m)	629.44	VC-B14-629	VC	6	5.72	Sand									
60	Medium Strength Clay with Low Strength Veneer (0.2m)	630.058	VC-B14-630	VC	7	1.35	Clay		Medium	0.49	Peat			3.78	Sand	
60	Medium Strength Clay with Low Strength Veneer (0.2m)	630.061	CPT-B14-630	CPT	7	1.32	Clay		Medium Strength Clay with Low Strength Veneer (0.2m)	0.54	Peat		Very High	1.25	Sand	Very Dense
60	Medium Strength Clay with Low Strength Veneer (0.2m)	630.907	VC-B14-631	VC	7	2.12	Silty Sand			0.46	Peat			2.84	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	632.364	CPT-B14-632	CPT	6	0.54	Silty Sand	Loose to Dense		4.58	Sand	Very Dense				
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	632.365	VC-B14-632	VC	6	5.6	Sand									
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	633.479	VC-B14-633	VC	6	4.06	Sand			1.14	Clay		Medium			
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	634.672	CPT-B14-634	CPT	7	2.04	Sand	Loose to Very Dense		0.16	Peat		High	2.92	Sand	Very Dense
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	634.674	VC-B14-634	VC	7	1.23	Sand			0.1	Clay		Very Low	4.13	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	635.366	VC-B14-635	VC	7	5.6	Sand									
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	636.365	CPT-B14-636	CPT	3	0.54	Sand	Very Loose to Dense		3.58	Sand	Very Dense		1.02	Clay	Medium to High
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	636.365	VC-B14-636	VC	3	4.62	Sand			1.38	Clay		Low			
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	637.365	VC-B14-637	VC	8	4.12	Sand			1.69	Clay		Medium			
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	638.676	VC-B14-638	VC	8	2.82	Sand			1.93	Clay		Medium			
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	638.677	CPT-B14-638	CPT	8	1.12	Sand	Very Loose to Very Dense		3.98	Clay		Low to Medium			
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	639.364	VC-B14-639	VC	5	0.9	Sand			0.74	Silt		Medium	3.86	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	640.366	CPT-B14-640	CPT	5	0.58	Sand	Loose to Dense		4.5	Sand	Very Dense				
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	640.366	VC-B14-640	VC	5	3.77	Sand			0.46	Clay		Medium	1.46	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	641.366	VC-B14-641	VC	6	4.09	Sand			1.01	Clay		Medium	0.25	Peat	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	642.749	VC-B14-642	VC	6	2.6	Sand			0.14	Clay		Very Low	1.77	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	642.75	CPT-B14-642	CPT	6	2.82	Sand	Medium Dense to Dense		1.46	Sand	Very Dense		0.82	Clay	Medium
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	643.365	VC-B14-643	VC	6	4.5	Sand									
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	644.241	VC-B14-644	VC	7	3.18	Sand			1.23	Clay		Low	0.76	Sand	
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	644.242	CPT-B14-644	CPT	7	0.38	Sand	Loose to Medium Dense		4.7	Sand	Medium Dense to Very Dense				
61	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	645.366	VC-B14-645	VC	8	5.5	Sand									
62	Low Strength Clay with Medium Dense Sand Veneer (0.4m)	646.365	CPT-B14-646	CPT	8	1.6	Sand and Clay	Medium Dense to Dense	Low	0.3	Peat		High	3.38	Sand	Very Dense
62	Low Strength Clay with Medium Dense Sand Veneer (0.4m)	646.366	VC-B14-646	VC	8	1.36	Sand and Clay		Very Low	0.27	Peat			4.21	Sand	
63	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	647.396	VC-B14-647	VC	8	1.41	Sand			0.14	Peat			4.25	Sand	
63	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	648.152	VC-B14-648	VC	5	5.59	Sand									
63	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	648.153	CPT-B14-648	CPT	5	0.86	Sand	Loose to Very Dense		0.1	Clay		Medium	4.3	Sand	Very Dense
63	Medium Dense Sand with Very Loose Sand Veneer (0.15m)	649.365	VC-B14-649	VC	5	0.25	Sand			0.14	Clay		Very Low	3.73	Sand	

APPENDIX B

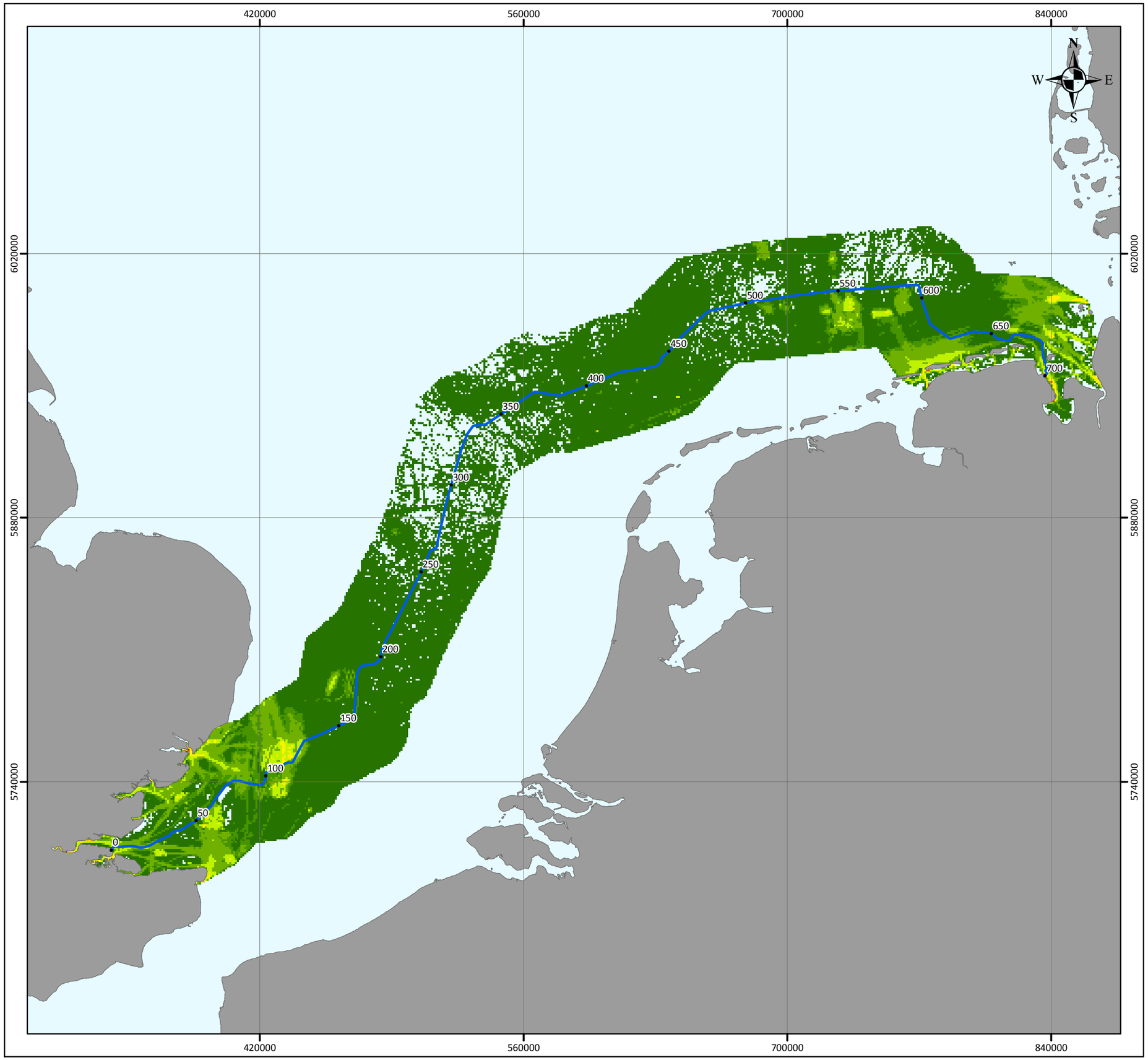
CRBA – Risk Register

Hazard log Ref No.	Hazard Class	Hazard Description (potential)	Risk Description	Initial Risk Rating			Mitigation	Residual Risk Rating		
				Likelihood	Severity	Risk rating		Likelihood	Severity	Risk rating
Natural										
1	Bathymetry	Influences presence of other natural and anthropogenic hazards.	See hazard No.12 (Mobile Sediment) for risk from bathymetric features identified along the NeuConnect Interconnector route.							
2	Seabed topography	Uneven seabed topography may lead to more variable burial requirements.	The NeuConnect crosses area of ripples (<1m height) and mege-ripples (1 to 3 m height) and sandwaves. Local burial depth may be adjusted upwards by the sandwave height resulting in degraded thermal performance leading to potential derating.	4	2	8	Ensure cable's design can tolerate short spans of increased burial depths.	1	2	2
3	Seabed obstructions (not identified during pre-installation)	Obstruction will result in section out of burial specification.	Not applicable, only applicable to as-built cable. **Not scored**							
4	Shallow gas	Represent a danger to vessels / personnel.	Applicable to installation and as-built cable but not to present CBRA. **Not scored.**							
5	Currents / waves	Abrasion, stress and fatigue where cable crosses rock/rough terrrain. Can induce loading on cable connectors. Can mobilise sediment exposing cables to further primary hazards. Metocean conditions likely to impact on surface laid cable and also influence sediment mobility.	Risk associated with protection for rocky terrain is design specific, thus outside CBRA scope. **Not scored.** See hazard No.12 for risk from Mobile Sediment. For surface laid there would be potential for damage from wave/current actions, predominantly in shallow waters.	2	3	6	CBRA to include consideration of wave/current action should surface laid be acceptable from anthropogenic threats. For protection in rocky areas, a design risk assessment would be required.	1	2	2
6	Density / turbidity currents	These may results from a number of phenomena and can travel at speed over great distances to significant depths. Can cause tensional breaks, abrasions or may bury cables.	Risk associated with unprotected cables (torsional breaks and abrasions) is design specific, thus outside CRBA scope. **Not Scored.** See hazard No.12 for risk from increased burial depth (Mobile Sediment).							
7	Fish bites	Can damage insulation: historically mainly occurred with telegraph cables but recent occurences have been noted occasionally.	Not plausible threat to a power cable.	1	1	1	No futher mitigation anticipated.			
8	Extreme weather	An increase in current and wave strengh, can increase sediment input and bury cables deeper than designed.	See hazard No.12 for risk from increased/decreased burial depth (Mobile Sediment).							
9	Submarine earthquakes	Cause submarine landslides or turbidity currents increasing/reducing sediment cover exposing cables to primary risk.	The NeuConnect route resides in an area that is tectonically stable and away from a continental shelf/plate boundary; therefore, is it not expected that any significant hazards of this nature present on the route. No areas of unstable sediment were encountered along the NeuConnect route.	1	3	3	No futher mitigation anticipated.			
10	Submarine volcanoes	Directly impact cables through contact or trigger submarine landslides (see above).	No live submarine volcano in the area. **Not scored.**							
11	Icebergs	Can directly impact on cables in shallow water depth as they scour the seabed. Not anticipated along the cable's route.	Not plausible. **Not scored.**							
Soil Conditions										
12	Mobile Sediment	Sand Wave or megaripple mobility could cause deburial or increased burial of the cable.	There are a number of areas within the NeuConnect 500m corridor where there are bedforms present which could be mobile. The first indication of mobile bedforms can be observed at KP11. These have been interpreted by MMT as ripples and have a wave length of <15m and height <1.0 m. Ripples are observed intermittently throughout the route where they terminate at KP304 and do not appear again until KP620 and extent to the end of the route at KP700. While these may indicate some levels of sediment movement it is not thought that these minor bedforms will have an impact to the cable installation or operability. Mega Ripples are also observed intermittently throughout the corridor, between KP108 & KP190 and then between KP669 and KP700. These are slightly larger than ripples and have a wave length of 15-50m and height 1-3m so may pose a risk to an installed cable within its lifetime. Sandwaves present within the route corridor and are first observed between KP78 and KP 80. These have been interpreted by MMT to have a wave length 50-200m and height of >3 m. Sandwaves are next present at KP 106 and remain as intermittent features until KP294. They do not appear again until between KP673 and KP700. The risk is that information gaps concerning the extent of sediment mobility means that the recommended DoL contingency is either too low or too high. The consequence is either lower protection or higher CAPEX.	3	2	6				
Anthropogenic										
13	Fishing	Snagging of cables with fishing gear and damage during retrieval of gear. Seabed interacting gear reducing sediment coverage above cable.	Due to inaccurate characterisation of presence of mobile fishing types there is a risk of misunderstanding the risk of mechanical damage to the installed cable. Consequence is misspecification of recommended minimum DoL leading to either greater CAPEX or greater risk of damege to the installed cable. Leads to requirement to inspect and potentially to repair. Other consequence is cable outtage and increase of monitoring requirements.	1	1	1	No further mitigation expected. Base case assumes sufficient burial to protect from known regional fishing threats applied to the whole cable route.	1	1	1
14.A	Shipping/Anchoring	Snagging of cables during normal or emergency anchoring procedures.	Due to inaccurate characterisation of shipping or soils there is a risk of misunderstanding the risk of mechanical damage to the installed cable. Consequence is misspecification of recommended minimum DoL leading to either greater CAPEX or greater risk of damege to the installed cable. Leads to requirement to inspect and potentially to repair. Other consequence is cable outtage and increase of monitoring requirements.	3	3	9	Revise the CBRA following significant changes to shippings patterns. (scored on a basis of shipping pattern changes).	2	2	4
14.B			Due to cable design for a return period of 40 years, there is a residual risk of mechanical damage.	1	2	2	No further mitigation required.	1	1	1

15	Dredging / Aggregate Extraction / Subsea Mining / Dumping	Direct contact to the cable from the dredging equipment or reduction in seabed cover increasing risk to cable.	Aggregation, dredging and dumping ground have all been avoided with the exception on the very nearshore landfall area in Germany. The route has no option but to cross a known dredging area between approximately KP 696 and 697. Within this area the water depth is constantly maintained at 17.6m. The Nordergründe Export Cable is also observed to cross this area. The as laid data indicates that the export cable is buried to between 5 and 6m crossing the dredged area.	3	3	9	Sufficent DoL will be defined in the CBRA assessment to mitigate risk	2	3	6
16	Other cables, umbilical, Pipelines	Reduced depth of lowering at crossing and/or proximity of third-party operation.	The NeuConnect Interconnector will cross a total of 89 existing subsea linear assets (29 in services cables, 45 out of service cable1 13 in service pipeline and 2 abandonned pipelines). Outside of CBRA scope, thus **not scored.**				Crossings will be subject to design risk assessment.			
17	Exclusions Misc. Activities	Such as construction, rock dumping, marine surveys, leisure activities. Any activity that directly interacts with the seabed and reduces the seabed cover.	Misc, activities are outside of the CBRA scope. N**ot scored.**							
18	Exclusions physical	Defense and acts of unintended military aggressions.	Outside of CBRA scope. **Not scored.**							
19	Exclusions planning	Updated information which significantly changes the recommendations of the CBRA	Potential to require re-routing outside of survey corridor. **Not scored.**							

APPENDIX C

Vessel Density Heat Maps



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band A

Legend

- KP's
- NeuConnect Route

Band A Vessel Hours Per Year (1km x 1km grid)

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 200
- 200 - 4000
- 4000 - 8000
- 8000 - 16000
- 16000 - 28000
- 28000 - 55000
- 55000 - 81000

NOTE: Not to be used for Navigation

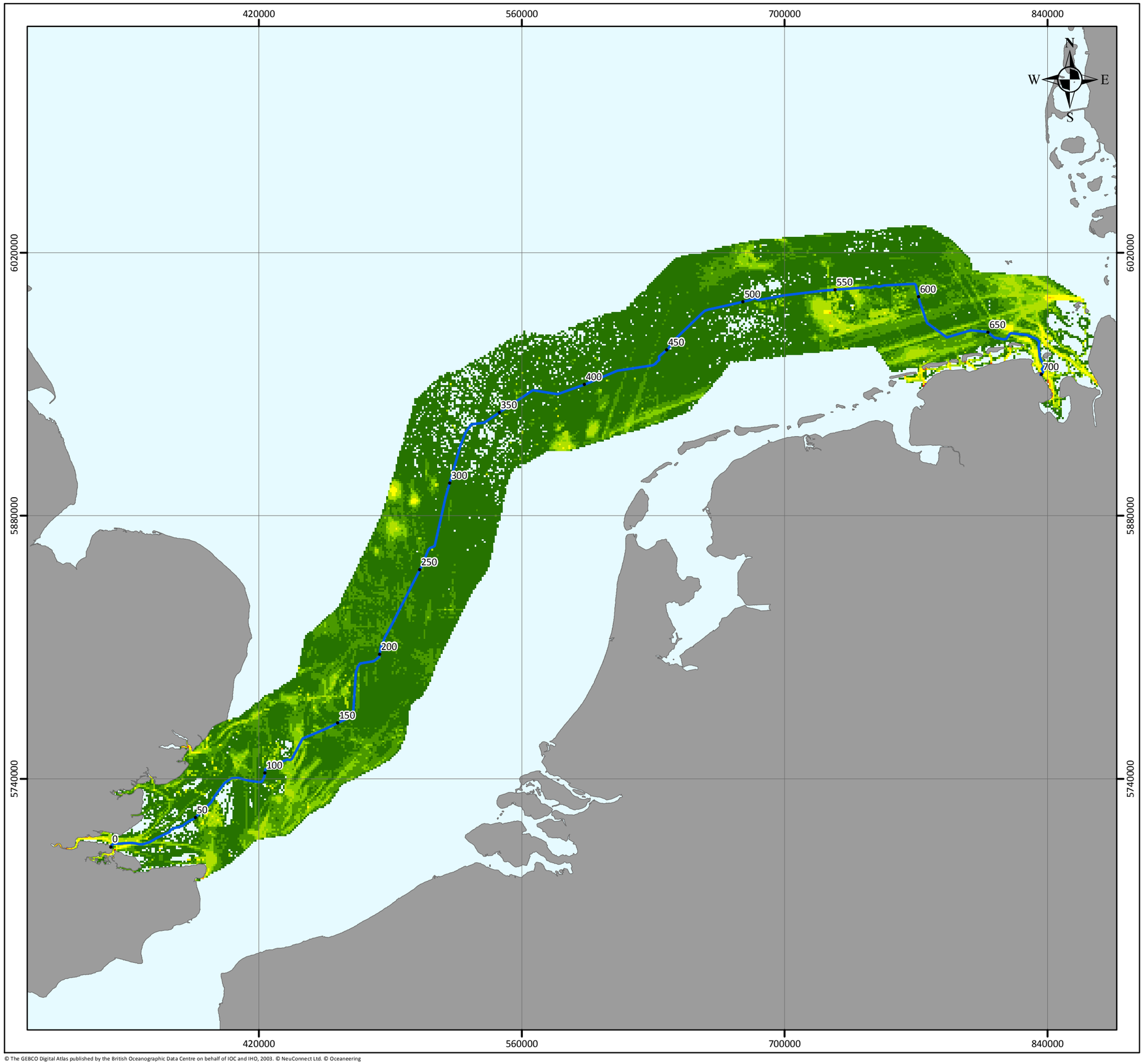
Date	Friday, December 14, 2018 13:50:56
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_A.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km

NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band B



Legend

- KP's
- NeuConnect Route

Band B Vessel Hours Per Year (1km x 1km grid)

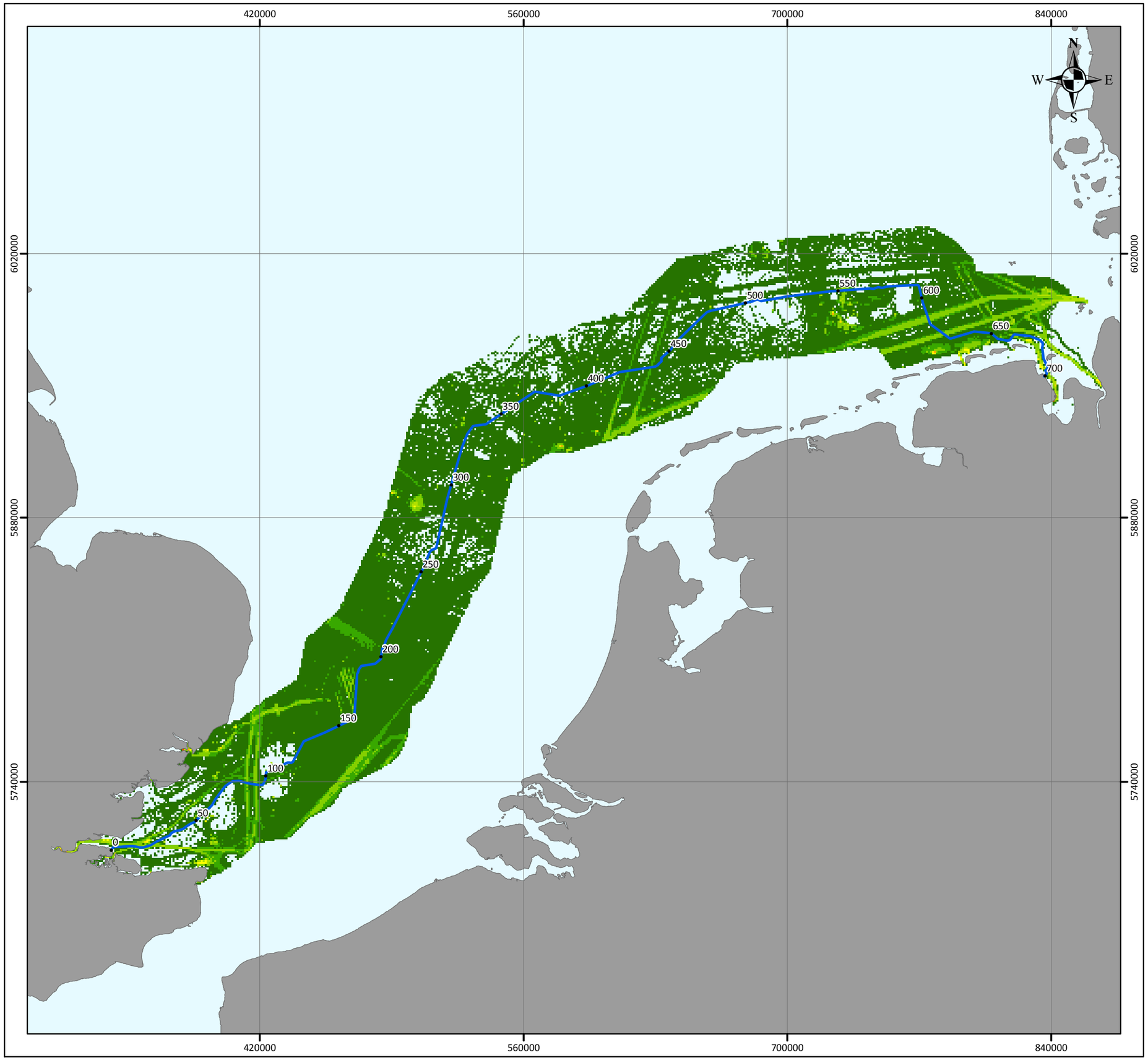
- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 50
- 50 - 600
- 600 - 1200
- 1200 - 3400
- 3400- 9000
- 9000 - 23000
- 23000 - 53000

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 13:49:31
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_B.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km



NeuConnect CBRA

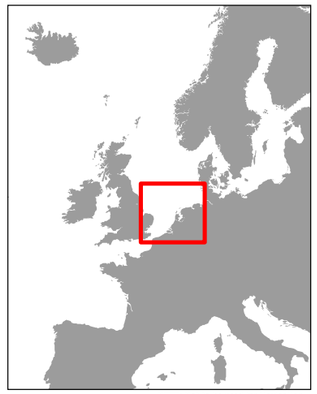
Vessel Density August 2016 to July 2017 - Band C

Legend

- KP's
- NeuConnect Route

Band C Vessel Hours Per Year (1km x 1km grid)

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 200
- 200 - 700
- 700 - 1600
- 1600 - 4000
- 4000 - 10000
- 10000 - 15000
- 15000 - 22900

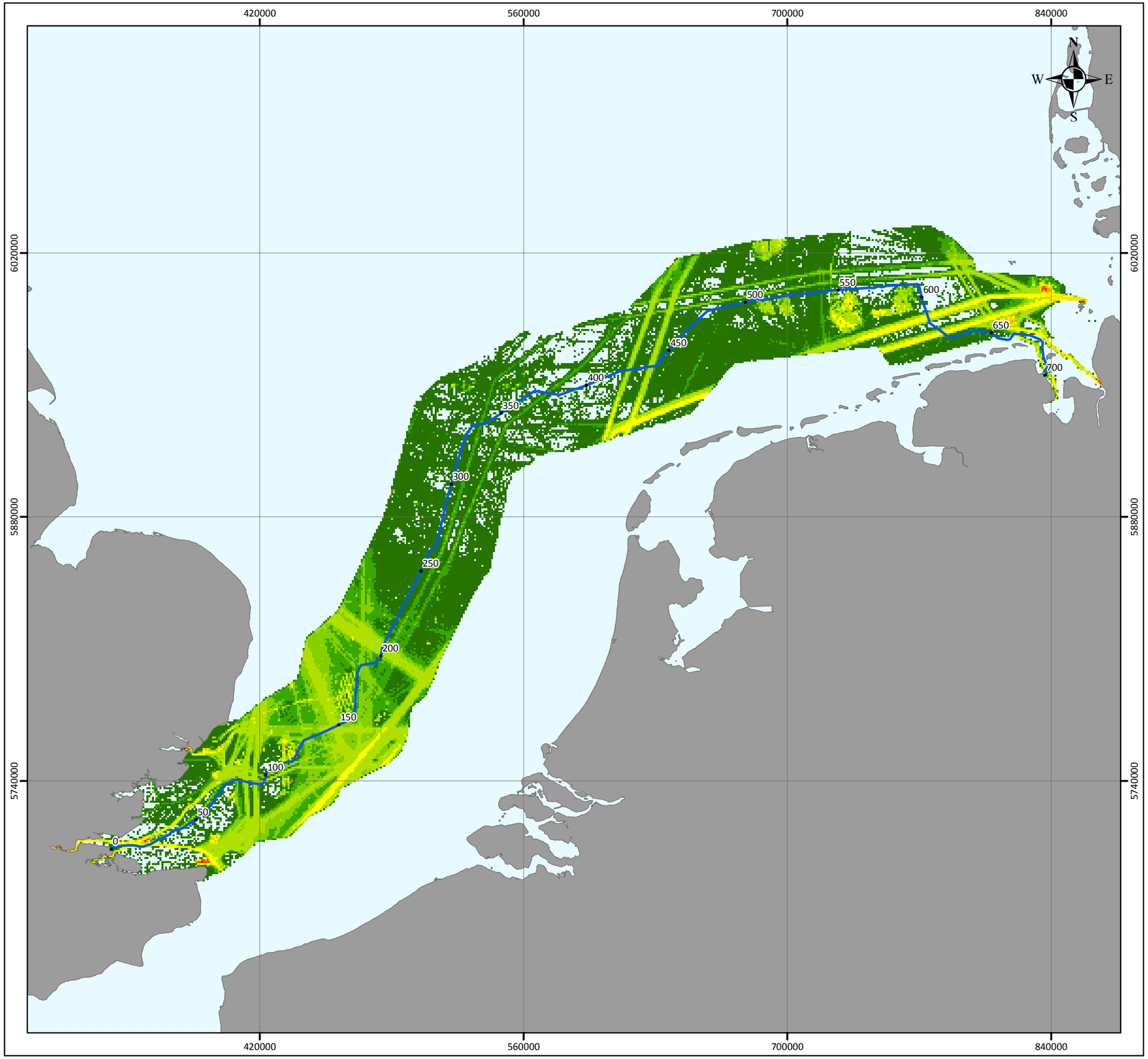


NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 13:54:59
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_C.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band D

Legend

- KP's
- NeuConnect Route

Band D Vessel Hours Per Year (1km x 1km grid)

- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 50
- 50 - 200
- 200 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 6000
- 6000 - 13000

NOTE: Not to be used for Navigation

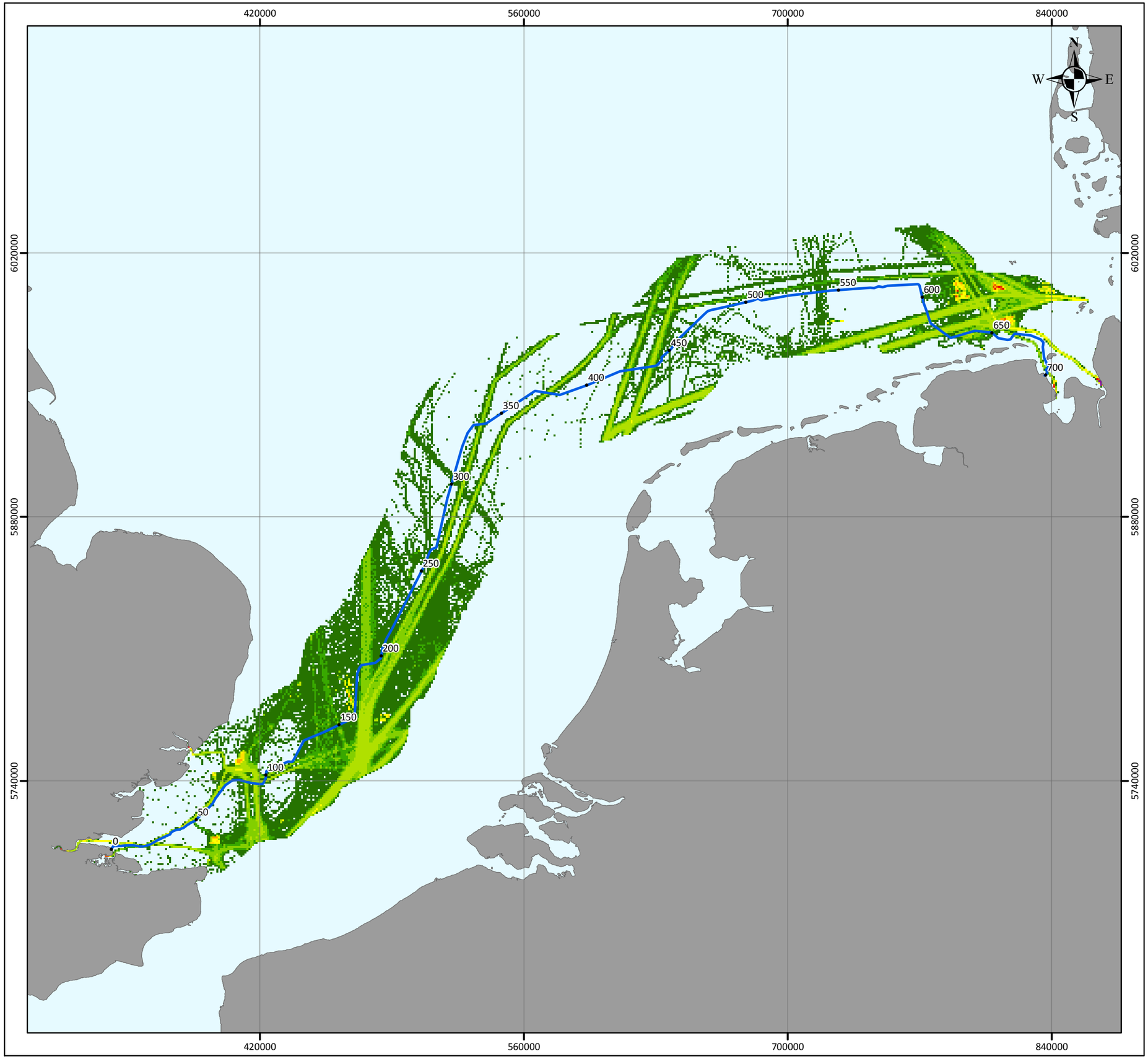
Date	Monday, December 17, 2018 13:56:41
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_D.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km

NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band E

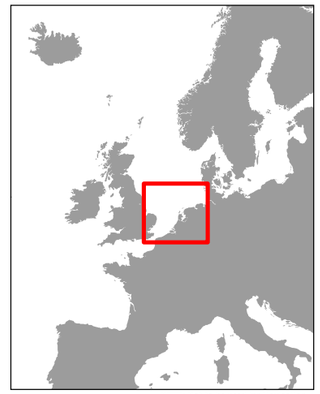


Legend

- KP's
- NeuConnect Route

Band E Vessel Hours Per Year (1km x 1km grid)

- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 20
- 20 - 80
- 80 - 200
- 200 - 400
- 400 - 800
- 800 - 1500
- 1500 - 3900

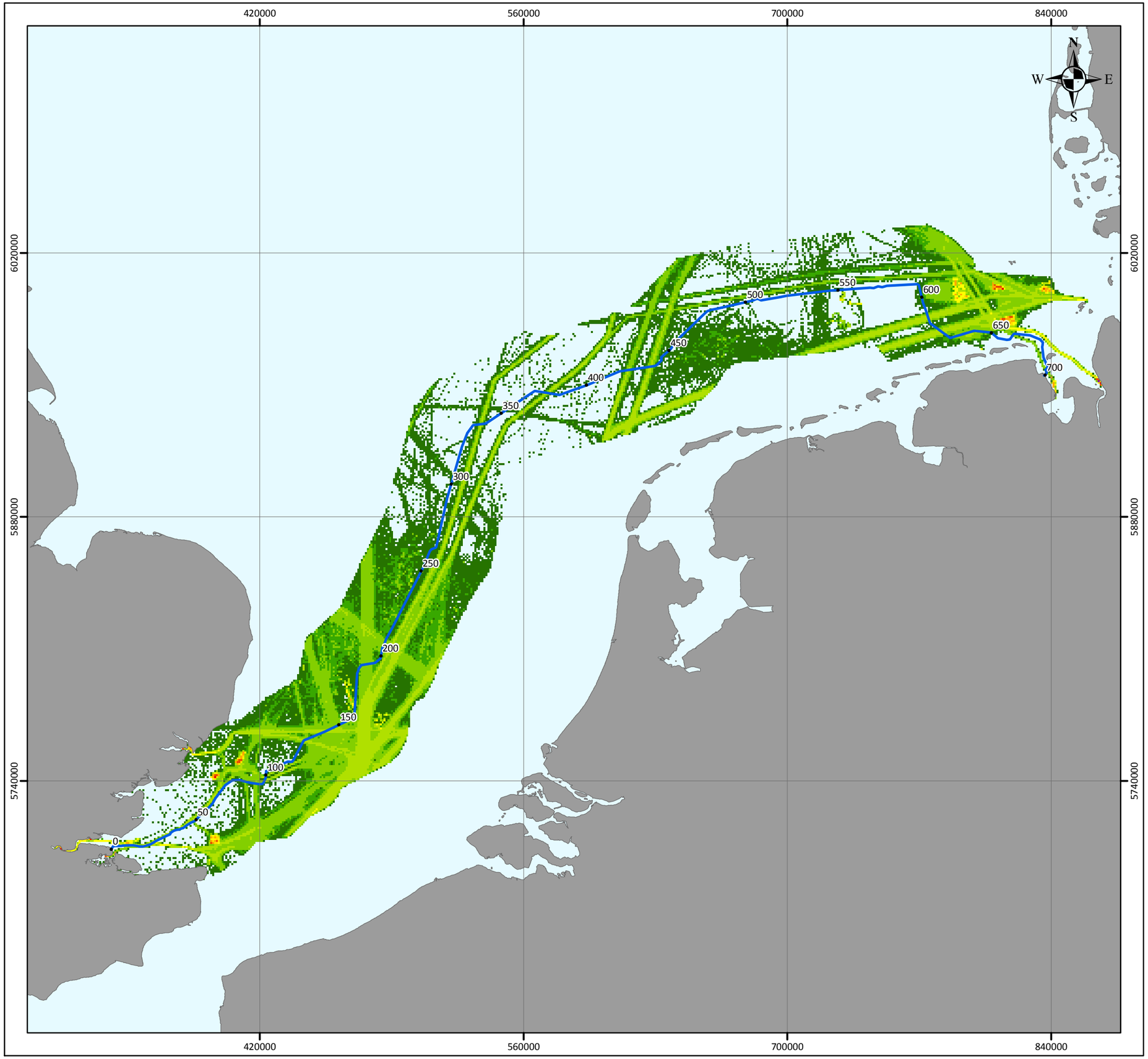


NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:01:57
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_E.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band F

Legend

- KP's
- NeuConnect Route

Band F Vessel Hours Per Year (1km x 1km grid)

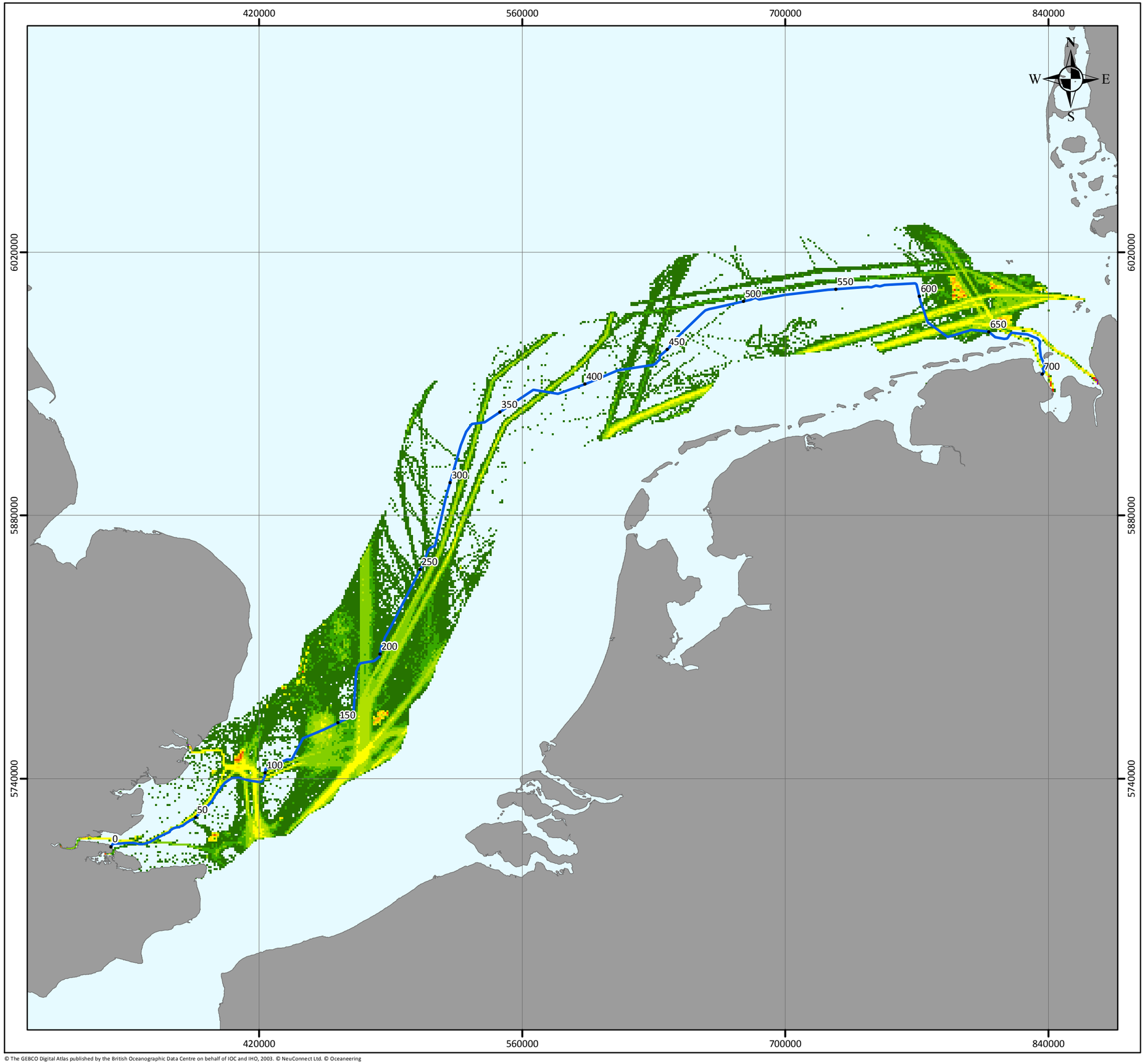
- 0 - 1
- 1 - 2
- 2 - 10
- 10 - 50
- 50 - 150
- 150 - 320
- 320 - 650
- 650 - 1300
- 1300 - 6500
- 3000 - 6500

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:02:46
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_F.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

0 10 20 30 40 km



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band G

Legend

- KP's
- NeuConnect Route

Band G Vessel Hours Per Year (1km x 1km grid)

- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 50
- 50 - 150
- 150 - 300
- 300 - 1000
- 1000 - 3000
- 3000 - 85000

NOTE: Not to be used for Navigation

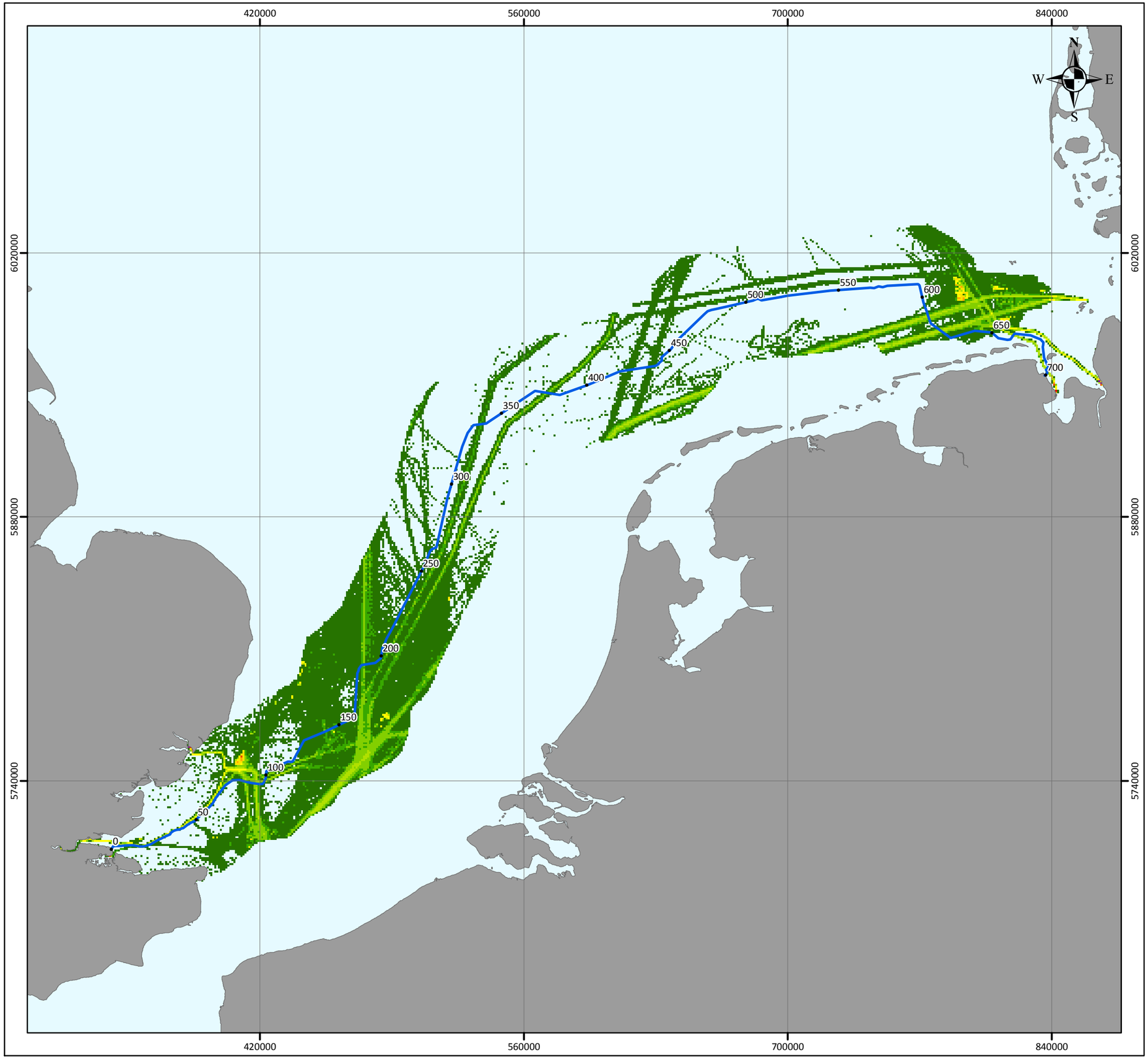
Date	Monday, December 17, 2018 14:08:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_G.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 10 20 30 40

NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band H



Legend

- KP's
- NeuConnect Route

Band H Vessel Hours Per Year (1km x 1km grid)

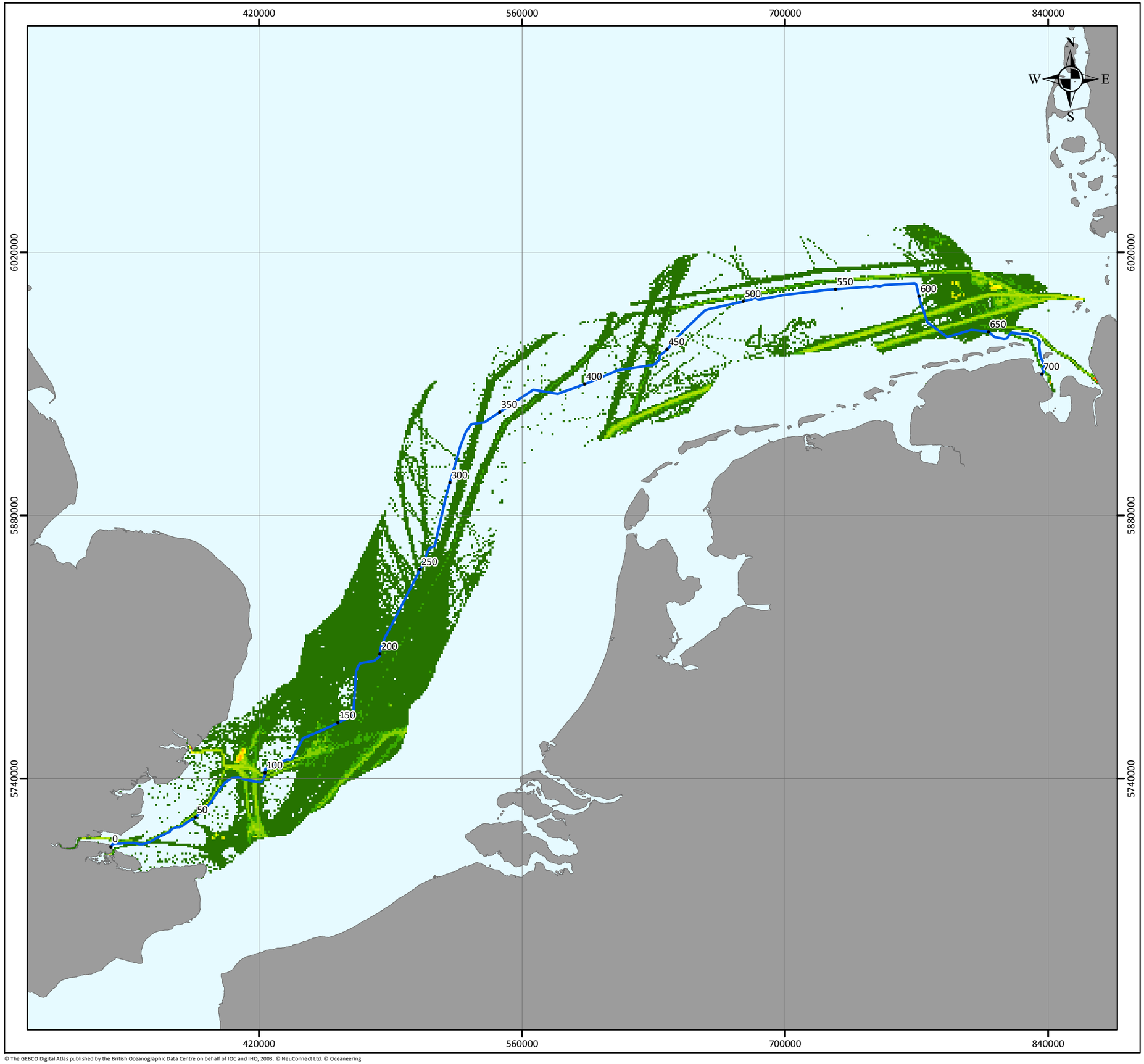
- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 50
- 50 - 150
- 150 - 300
- 300 - 600
- 600 - 2000
- 2000 - 3400

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:08:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_H.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 10 20 30 40



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band I

Legend

- KP's
- NeuConnect Route

Band I Vessel Hours Per Year (1km x 1km grid)

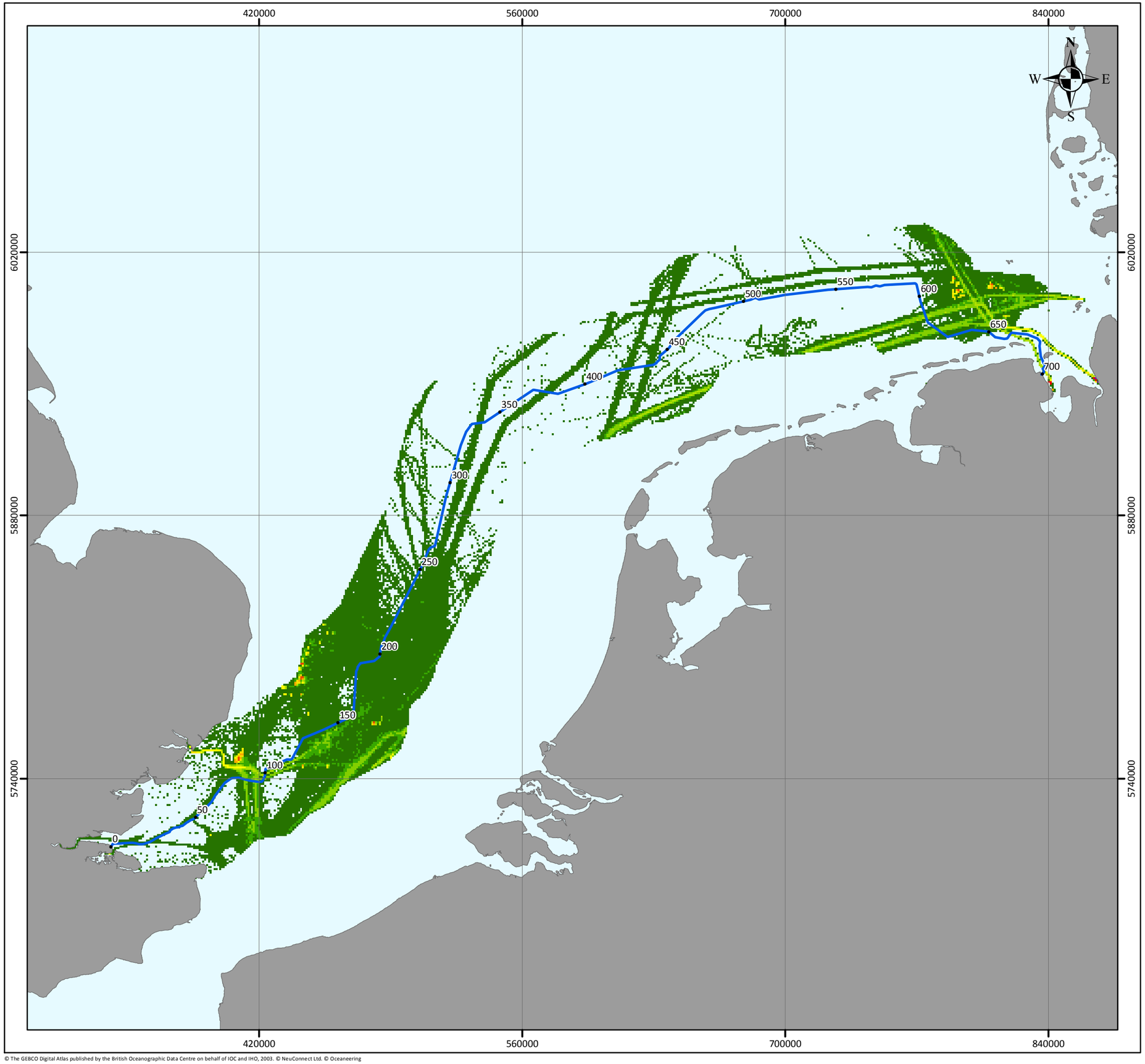
- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 20
- 20 - 50
- 50 - 150
- 150 - 400
- 400 - 800
- 800 - 1800
- 1800 - 5700

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:08:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_I.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 10 20 30 40



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band J

Legend

- KP's
- NeuConnect Route

Band J Vessel Hours Per Year (1km x 1km grid)

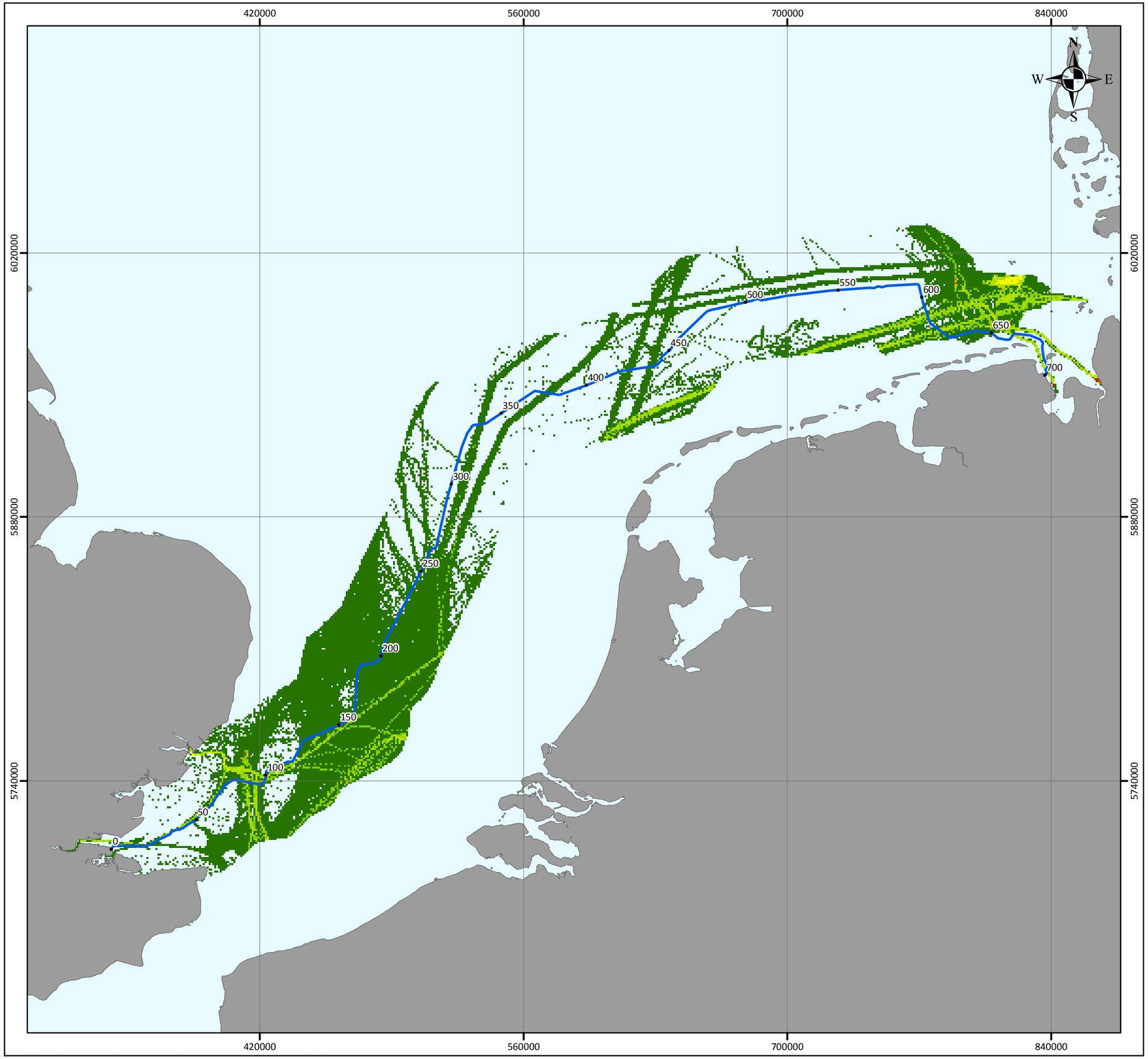
- 0 - 1
- 1 - 2
- 1 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- 100 - 250
- 250 - 3000
- 3000 - 5500

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:08:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_J.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

km
0 10 20 30 40



NeuConnect CBRA

Vessel Density August 2016 to July 2017 - Band K

Legend

- KP's
- NeuConnect Route

Band K Vessel Hours Per Year (1km x 1km grid)

- 0.0 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 50
- 50 - 150
- 150 - 250

NOTE: Not to be used for Navigation

Date	Monday, December 17, 2018 14:08:12
Projection	WGS_1984_UTM_Zone_31N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	GEBCO, NEUCONNECT, OCEANEERING
File Reference	J:\P2131\Mxd\CBRA\ Band_K.mxd
Created By	Chris Carroll
Reviewed By	Chris Goode
Approved By	Louis Dumenil

NeuConnect intertek

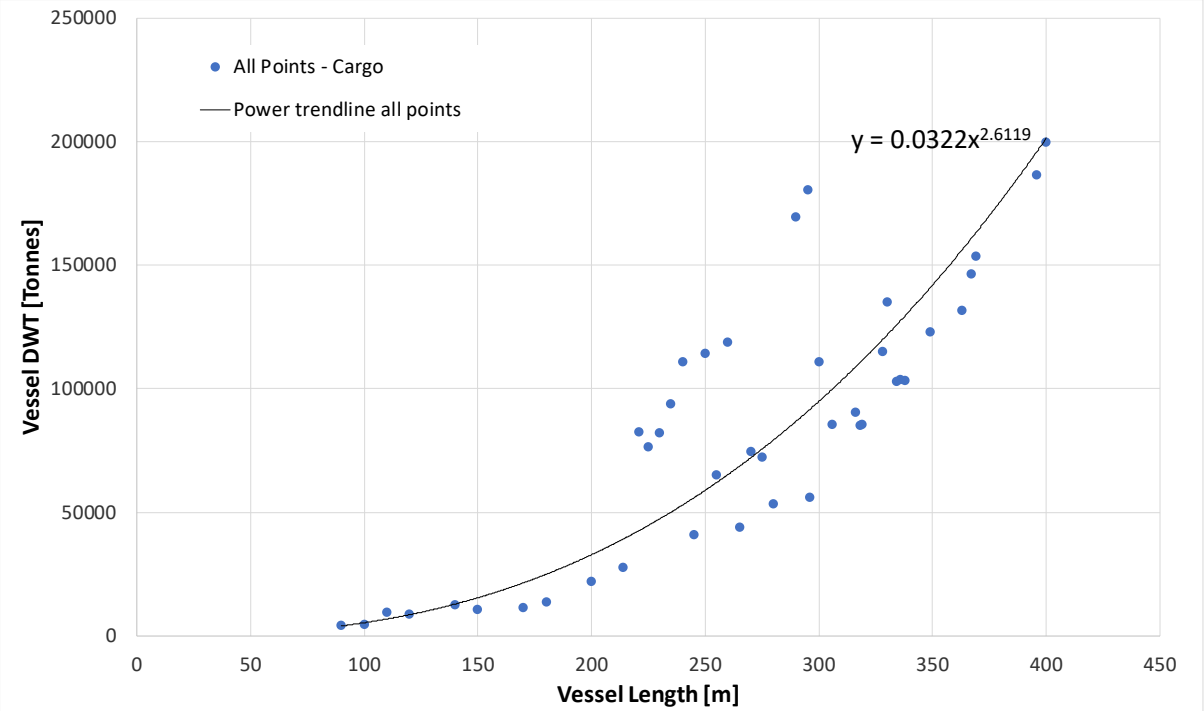
km
0 10 20 30 40

APPENDIX D

Vessel DWT charts

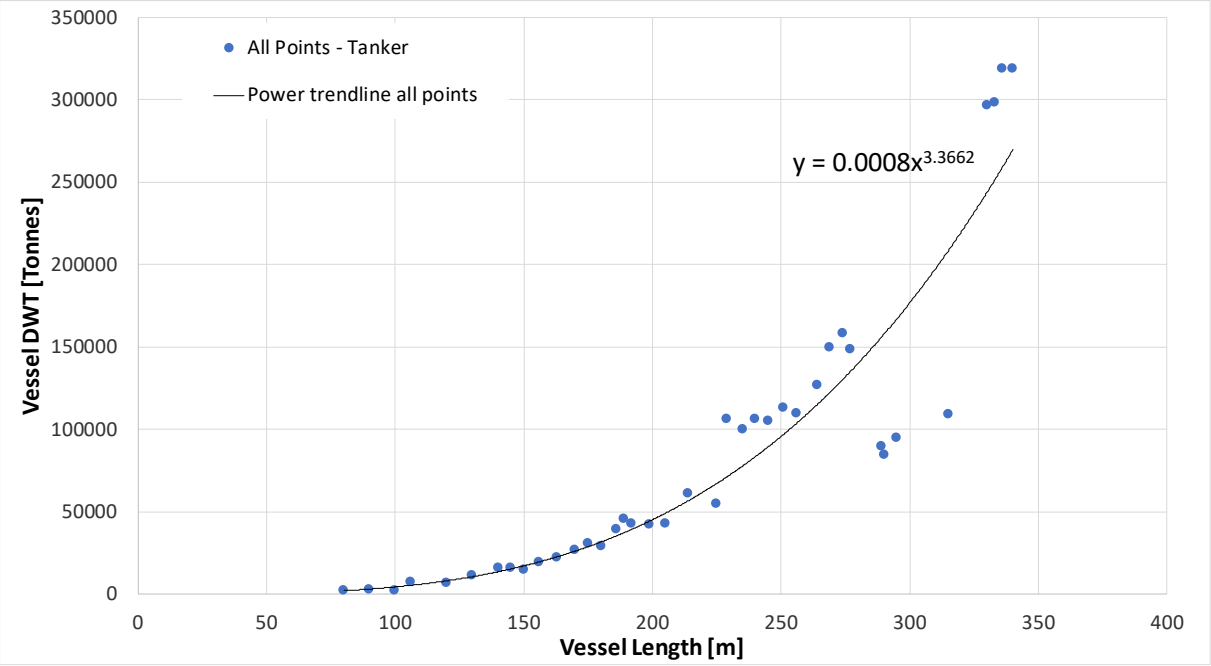
D.1 APPENDIXH1

Figure D-1 Cargo Vessels



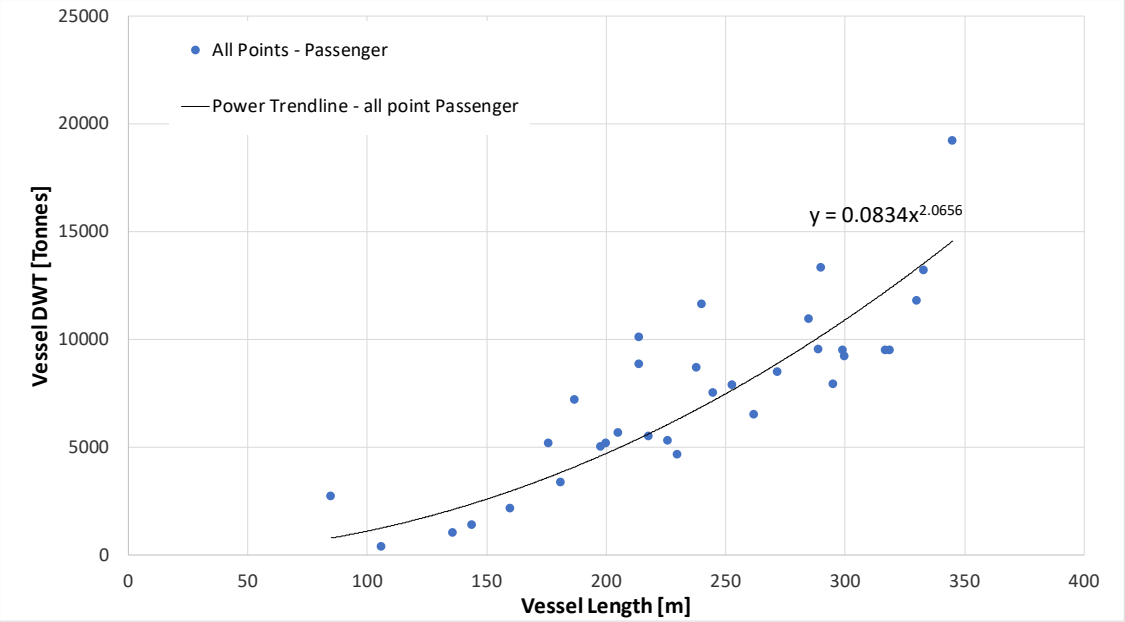
D.2 TANKER VESSELS

Figure D-2 Tanker Vessels



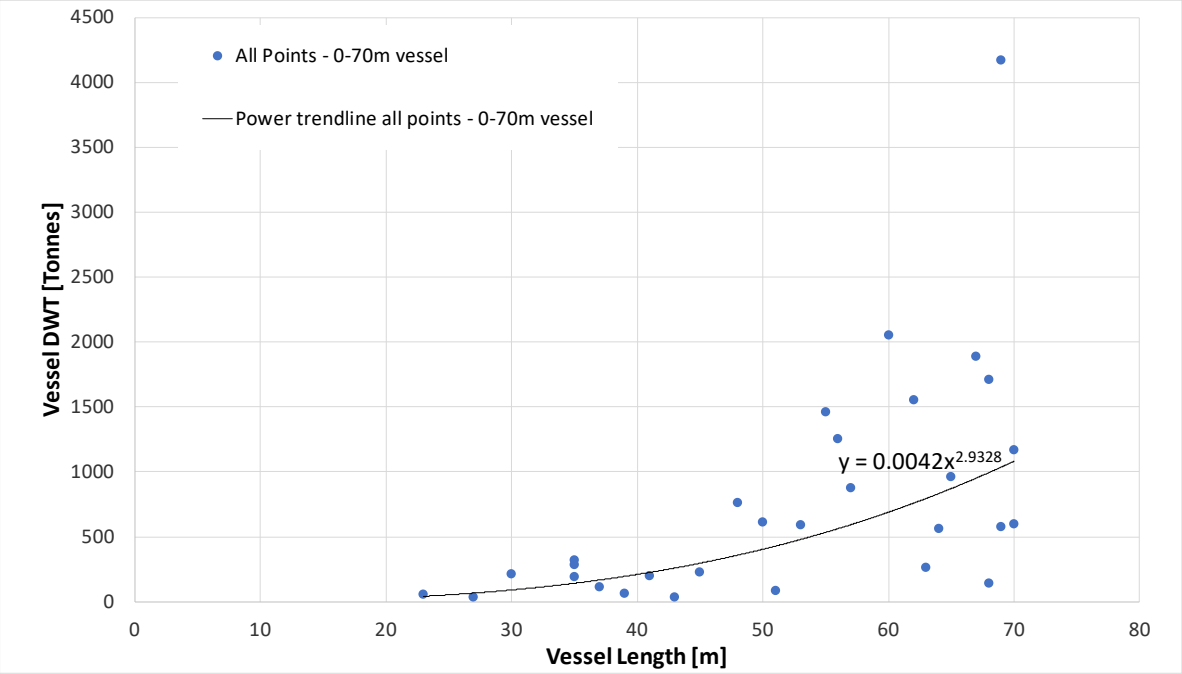
D.3 PASSENGER VESSELS

Figure D-3 Passenger Vessels



D.4 VESSELS SMALLER THAN 70 METRES

Figure D-4 Vessels Smaller than 70 Metres



APPENDIX E

Probabilistic Assessment Results

Zone	Conservative Dominant soil type for risk assessment	Scenario 1 - Protection against Band A		Scenario 2 - Protection against Bands A to B		Scenario 3 - Protection against Bands A to C	
		Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability
			$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$
Zone 1	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	1.70E-03	0.95	1.17E-03	1.10	9.45E-04
Zone 2	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.95	2.77E-03	1.05	2.45E-03	1.20	2.30E-03
Zone 3	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.32E-02	0.55	3.22E-02	0.70	3.01E-02
Zone 4	MEDIUM DENSE SAND	0.30	3.68E-03	0.35	3.67E-03	0.40	3.62E-03
Zone 5	LOOSE SAND	0.30	1.58E-03	0.40	1.57E-03	0.50	1.54E-03
Zone 6	MEDIUM DENSE SAND	0.30	1.80E-03	0.35	1.79E-03	0.40	1.77E-03
Zone 7	LOOSE SAND	0.30	2.80E-03	0.40	2.67E-03	0.50	2.63E-03
Zone 8	MEDIUM DENSE SAND	0.30	2.53E-03	0.35	2.34E-03	0.40	2.29E-03
Zone 9	LOOSE SAND	0.30	1.48E-03	0.40	1.38E-03	0.50	1.37E-03
Zone 10	MEDIUM DENSE SAND	0.30	1.40E-03	0.35	1.30E-03	0.40	1.29E-03
Zone 11	MEDIUM DENSE SAND	0.30	2.16E-03	0.35	2.05E-03	0.40	2.03E-03
Zone 12	HIGH STRENGTH CLAY (≥100 kPa)	0.25	9.93E-04	0.30	8.93E-04	0.35	8.71E-04
Zone 13	VERY LOOSE SAND	0.40	2.09E-04	0.50	1.76E-04	0.60	1.67E-04
Zone 14	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	2.25E-04	0.55	1.96E-04	0.70	1.72E-04
Zone 15	VERY LOOSE SAND	0.40	3.28E-04	0.50	2.87E-04	0.60	2.58E-04
Zone 16	MEDIUM DENSE SAND	0.30	4.58E-04	0.35	3.38E-04	0.40	2.82E-04
Zone 17	HIGH STRENGTH CLAY (≥100 kPa)	0.25	1.05E-03	0.30	9.80E-04	0.35	8.30E-04
Zone 18	HIGH STRENGTH CLAY (≥100 kPa)	0.25	2.01E-04	0.30	1.92E-04	0.35	1.78E-04
Zone 19	HIGH STRENGTH CLAY (≥100 kPa)	0.25	1.00E-03	0.30	9.57E-04	0.35	8.37E-04
Zone 20	HIGH STRENGTH CLAY (≥100 kPa)	0.25	2.69E-04	0.30	2.64E-04	0.35	2.45E-04
Zone 21	HIGH STRENGTH CLAY (≥100 kPa)	0.25	2.81E-03	0.30	2.68E-03	0.35	2.49E-03
Zone 22	HIGH STRENGTH CLAY (≥100 kPa)	0.25	3.18E-03	0.30	2.66E-03	0.35	2.54E-03
Zone 23	MEDIUM DENSE SAND	0.30	1.01E-03	0.35	9.17E-04	0.40	8.97E-04
Zone 24	HIGH STRENGTH CLAY (≥100 kPa)	0.25	4.49E-04	0.30	4.23E-04	0.35	4.20E-04
Zone 25	HIGH STRENGTH CLAY (≥100 kPa)	0.25	7.01E-04	0.30	6.50E-04	0.35	6.40E-04
Zone 26	MEDIUM DENSE SAND	0.45	2.67E-04	0.50	2.35E-04	0.55	2.28E-04
Zone 27	MEDIUM DENSE SAND	0.45	9.66E-05	0.50	9.66E-05	0.55	9.34E-05
Zone 28	MEDIUM DENSE SAND	0.45	8.35E-04	0.50	8.00E-04	0.55	7.82E-04
Zone 29	MEDIUM DENSE SAND	0.45	1.07E-03	0.50	1.01E-03	0.55	9.13E-04
Zone 30	VERY LOOSE SAND	0.40	2.57E-05	0.50	2.49E-05	0.60	2.35E-05
Zone 31	MEDIUM DENSE SAND	0.45	4.45E-04	0.50	4.24E-04	0.55	4.01E-04
Zone 32	MEDIUM DENSE SAND	0.45	1.32E-04	0.50	1.32E-04	0.55	1.24E-04
Zone 33	MEDIUM DENSE SAND	0.45	1.28E-04	0.50	1.21E-04	0.55	1.17E-04
Zone 34	MEDIUM DENSE SAND	0.45	1.36E-04	0.50	1.13E-04	0.55	1.02E-04
Zone 35	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	1.26E-05	0.55	1.06E-05	0.70	9.39E-06
Zone 36	MEDIUM DENSE SAND	0.45	3.53E-05	0.50	2.76E-05	0.55	2.47E-05
Zone 37	MEDIUM DENSE SAND	0.45	6.21E-05	0.50	4.82E-05	0.55	4.59E-05
Zone 38	MEDIUM DENSE SAND	0.45	1.88E-05	0.50	1.50E-05	0.55	1.38E-05
Zone 39	MEDIUM DENSE SAND	0.45	9.31E-05	0.50	6.43E-05	0.55	5.93E-05
Zone 40	MEDIUM DENSE SAND	0.45	3.59E-05	0.50	2.34E-05	0.55	2.23E-05
Zone 41	MEDIUM DENSE SAND	0.45	2.07E-04	0.50	9.76E-05	0.55	9.13E-05
Zone 42	MEDIUM DENSE SAND	0.45	3.40E-05	0.50	2.10E-05	0.55	1.97E-05
Zone 43	MEDIUM DENSE SAND	0.45	5.30E-04	0.50	2.80E-04	0.55	1.40E-04
Zone 44	VERY LOOSE SAND	0.40	4.34E-05	0.50	2.78E-05	0.60	1.78E-05
Zone 45	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.75	8.31E-06	0.85	5.94E-06	1.00	4.10E-06
Zone 46	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.75	1.69E-04	0.85	1.67E-04	1.00	1.65E-04
Zone 47	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	1.78E-05	0.95	1.23E-05	1.10	1.10E-05
Zone 48	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	7.09E-06	0.95	3.94E-06	1.10	3.60E-06
Zone 49	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.95	7.28E-06	1.05	4.88E-06	1.20	3.98E-06
Zone 50	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	5.47E-06	0.55	8.56E-07	0.70	2.23E-07
Zone 51	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	5.78E-06	0.95	1.29E-06	1.10	3.48E-07
Zone 52	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.00E-06	0.55	9.00E-07	0.70	4.50E-07
Zone 53	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	2.22E-06	0.95	1.52E-06	1.10	1.14E-06
Zone 54	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	1.93E-06	0.55	1.39E-06	0.70	1.02E-06
Zone 55	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.85	5.13E-06	0.95	1.90E-06	1.10	1.26E-06
Zone 56	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	1.05	2.98E-04	1.15	2.92E-04	1.30	2.90E-04
Zone 57	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	7.69E-06	0.55	2.88E-06	0.70	2.43E-06
Zone 58	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.95	1.76E-06	1.05	9.01E-07	1.20	7.51E-07
Zone 59	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	1.24E-05	0.55	4.95E-06	0.70	2.47E-06
Zone 60	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	8.32E-06	0.55	2.70E-06	0.70	1.35E-06
Zone 61	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	1.05	1.26E-05	1.15	5.85E-06	1.30	4.13E-06
Zone 62	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	1.26E-05	0.55	8.88E-06	0.70	7.98E-06
Zone 63	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.55E-04	0.55	3.48E-04	0.70	3.31E-04
Zone 64	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	8.99E-06	0.55	6.24E-06	0.70	5.67E-06
Zone 65	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.95	1.34E-04	1.05	1.30E-04	1.20	1.26E-04
Zone 66	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	5.19E-04	0.55	5.12E-04	0.70	4.91E-04
Zone 67	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.66E-05	0.55	3.29E-05	0.70	3.13E-05
Zone 68	LOOSE SAND	0.30	1.73E-05	0.40	1.25E-05	0.50	1.10E-05
Zone 69	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	5.62E-06	0.55	3.95E-06	0.70	3.19E-06
Zone 70	VERY LOOSE SAND	0.40	8.72E-06	0.50	6.60E-06	0.60	5.63E-06
Zone 71	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.95	1.75E-05	1.05	1.34E-05	1.20	1.15E-05
Zone 72	VERY LOOSE SAND	0.40	4.43E-05	0.50	3.29E-05	0.60	2.22E-05
Zone 73	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	1.86E-05	0.55	1.45E-05	0.70	1.07E-05
Zone 74	VERY LOOSE SAND	0.40	1.21E-04	0.50	1.10E-04	0.60	1.06E-04
Zone 75	MEDIUM DENSE SAND	0.45	2.46E-04	0.50	2.30E-04	0.55	2.29E-04
Zone 76	MEDIUM DENSE SAND	0.35	7.94E-05	0.40	5.78E-05	0.45	4.75E-05
Zone 77	LOOSE SAND	0.30	3.79E-04	0.40	1.76E-04	0.50	8.39E-05
Zone 78	VERY LOOSE SAND	0.40	1.33E-05	0.50	5.56E-06	0.60	1.60E-06
Zone 79	MEDIUM DENSE SAND	0.30	1.26E-04	0.35	1.06E-04	0.40	1.04E-04
Zone 80	VERY LOOSE SAND	0.40	1.13E-05	0.50	3.21E-06	0.60	2.31E-06
Zone 81	LOOSE SAND	0.30	5.20E-05	0.40	3.48E-05	0.50	2.70E-05
Zone 82	MEDIUM DENSE SAND	0.30	8.10E-03	0.35	7.83E-03	0.40	7.01E-03
Zone 83	MEDIUM DENSE SAND	0.30	1.35E-02	0.35	1.31E-02	0.40	1.14E-02
Zone 84	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.03E-04	0.55	2.36E-04	0.70	2.04E-04
Zone 85	MEDIUM DENSE SAND	0.30	2.81E-03	0.35	2.46E-03	0.40	2.19E-03
Zone 86	SAND and CLAY (≥10 to <100 kPa) & CLAY (≥10 to <100 kPa)	0.45	3.14E-04	0.55	2.87E-04	0.70	2.53E-04
Zone 87	MEDIUM DENSE SAND	0.30	3.39E-04	0.35	3.02E-04	0.40	2.55E-04
Zone 88	N/A	TBC	TBC	TBC	TBC	TBC	TBC
Annual Failure Probability for Entire route		1.00E-01		9.43E-02		8.74E-02	
Return Period (years)		9.96		10.60		11.45	
Failure Probability in the lifetime (40 years)		98.55%		98.10%		97.42%	

Zone	Scenario 4 - Protection against Bands A to D		Scenario 5 - Protection against Bands A to E		Scenario 6 - Protection against Bands A to F		Scenario 7 - Protection against Bands A to G		Scenario 8 - Protection against Bands A to H	
	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability
		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$
Zone 1	1.30	0.00E+00	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 2	1.40	1.60E-03	1.75	2.63E-04	1.75	2.63E-04	1.85	8.51E-05	2.05	6.10E-07
Zone 3	0.90	1.96E-02	1.25	3.67E-03	1.25	3.67E-03	1.35	1.35E-03	1.55	5.89E-06
Zone 4	0.45	3.28E-03	0.60	1.65E-03	0.60	1.65E-03	0.65	5.52E-04	0.70	2.65E-06
Zone 5	0.60	1.40E-03	0.85	6.98E-04	0.85	6.98E-04	0.95	2.46E-04	1.05	2.20E-06
Zone 6	0.45	1.64E-03	0.60	8.33E-04	0.60	8.33E-04	0.65	2.76E-04	0.70	1.95E-06
Zone 7	0.60	2.43E-03	0.85	1.38E-03	0.85	1.38E-03	0.95	4.76E-04	1.05	2.62E-06
Zone 8	0.45	2.08E-03	0.60	1.19E-03	0.60	1.19E-03	0.65	4.12E-04	0.70	2.35E-06
Zone 9	0.60	1.29E-03	0.85	7.70E-04	0.85	7.70E-04	0.95	2.85E-04	1.05	1.40E-06
Zone 10	0.45	1.17E-03	0.60	6.89E-04	0.60	6.89E-04	0.65	2.54E-04	0.70	1.65E-06
Zone 11	0.45	1.84E-03	0.60	1.06E-03	0.60	1.06E-03	0.65	3.94E-04	0.70	2.25E-06
Zone 12	0.45	7.68E-04	0.65	4.14E-04	0.65	4.14E-04	0.70	1.58E-04	0.80	0.00E+00
Zone 13	0.75	1.25E-04	1.05	9.27E-05	1.10	5.39E-05	1.15	1.39E-05	1.30	2.57E-06
Zone 14	0.90	1.13E-04	1.25	4.95E-05	1.25	4.95E-05	1.35	1.32E-05	1.55	0.00E+00
Zone 15	0.75	1.73E-04	1.05	1.27E-04	1.10	7.13E-05	1.15	1.60E-05	1.30	3.68E-06
Zone 16	0.45	8.94E-05	0.60	3.46E-05	0.60	3.46E-05	0.65	1.88E-05	0.70	0.00E+00
Zone 17	0.45	4.76E-04	0.65	3.03E-04	0.65	3.03E-04	0.70	1.58E-04	0.80	1.99E-06
Zone 18	0.45	9.88E-05	0.65	6.49E-05	0.65	6.49E-05	0.70	3.52E-05	0.80	4.43E-07
Zone 19	0.45	4.68E-04	0.65	2.97E-04	0.65	2.97E-04	0.70	1.13E-04	0.80	1.68E-06
Zone 20	0.45	1.41E-04	0.65	9.51E-05	0.65	9.51E-05	0.70	3.73E-05	0.80	5.68E-07
Zone 21	0.45	1.66E-03	0.65	9.49E-04	0.65	9.49E-04	0.70	4.95E-04	0.80	6.42E-06
Zone 22	0.45	1.87E-03	0.65	9.90E-04	0.65	9.90E-04	0.70	6.48E-04	0.80	4.19E-06
Zone 23	0.45	3.27E-04	0.60	1.57E-04	0.60	1.57E-04	0.65	9.97E-05	0.70	1.17E-06
Zone 24	0.45	1.99E-04	0.65	6.68E-05	0.65	6.68E-05	0.70	4.40E-05	0.80	9.53E-07
Zone 25	0.45	2.75E-05	0.65	5.92E-06	0.65	5.92E-06	0.70	2.79E-06	0.80	0.00E+00
Zone 26	0.60	1.64E-04	0.75	2.88E-05	0.75	2.88E-05	0.80	1.12E-05	0.85	0.00E+00
Zone 27	0.60	8.13E-05	0.75	2.89E-05	0.75	2.89E-05	0.80	8.36E-06	0.85	6.00E-07
Zone 28	0.60	5.14E-04	0.75	1.63E-04	0.75	1.63E-04	0.80	5.44E-05	0.85	1.10E-06
Zone 29	0.60	3.79E-04	0.75	7.95E-05	0.75	7.95E-05	0.80	4.18E-05	0.85	1.43E-06
Zone 30	0.75	3.47E-06	1.05	6.99E-07	1.10	3.68E-07	1.15	2.46E-07	1.30	1.14E-07
Zone 31	0.60	2.93E-04	0.75	8.06E-05	0.75	8.06E-05	0.80	3.44E-05	0.85	0.00E+00
Zone 32	0.60	9.13E-05	0.75	1.11E-05	0.75	1.11E-05	0.80	3.87E-06	0.85	0.00E+00
Zone 33	0.60	6.99E-05	0.75	4.65E-06	0.75	4.65E-06	0.80	2.24E-06	0.85	0.00E+00
Zone 34	0.60	6.72E-05	0.75	2.02E-05	0.75	2.02E-05	0.80	1.38E-05	0.85	0.00E+00
Zone 35	0.90	6.91E-06	1.25	1.88E-06	1.25	1.88E-06	1.35	1.43E-06	1.55	0.00E+00
Zone 36	0.60	1.88E-05	0.75	4.23E-06	0.75	4.23E-06	0.80	3.29E-06	0.85	0.00E+00
Zone 37	0.60	3.84E-05	0.75	7.50E-06	0.75	7.50E-06	0.80	3.75E-06	0.85	0.00E+00
Zone 38	0.60	1.16E-05	0.75	1.77E-06	0.75	1.77E-06	0.80	3.80E-07	0.85	0.00E+00
Zone 39	0.60	4.98E-05	0.75	1.03E-05	0.75	1.03E-05	0.80	1.25E-06	0.85	0.00E+00
Zone 40	0.60	1.45E-05	0.75	2.02E-06	0.75	2.02E-06	0.80	0.00E+00	0.85	0.00E+00
Zone 41	0.60	6.34E-05	0.75	1.24E-05	0.75	1.24E-05	0.80	3.11E-06	0.85	0.00E+00
Zone 42	0.60	1.47E-05	0.75	1.25E-06	0.75	1.25E-06	0.80	0.00E+00	0.85	0.00E+00
Zone 43	0.60	6.23E-05	0.75	0.00E+00	0.75	0.00E+00	0.80	0.00E+00	0.85	0.00E+00
Zone 44	0.75	1.12E-06	1.05	1.12E-06	1.10	0.00E+00	1.15	0.00E+00	1.30	0.00E+00
Zone 45	1.20	2.21E-06	1.55	6.31E-07	1.55	6.31E-07	1.65	3.16E-07	1.85	0.00E+00
Zone 46	1.20	1.49E-04	1.55	3.45E-05	1.55	3.45E-05	1.65	8.74E-06	1.85	0.00E+00
Zone 47	1.30	6.17E-06	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 48	1.30	2.70E-06	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 49	1.40	2.48E-06	1.75	0.00E+00	1.75	0.00E+00	1.85	0.00E+00	2.05	0.00E+00
Zone 50	0.90	7.44E-08	1.25	0.00E+00	1.25	0.00E+00	1.35	0.00E+00	1.55	0.00E+00
Zone 51	1.30	1.96E-07	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 52	0.90	3.00E-07	1.25	0.00E+00	1.25	0.00E+00	1.35	0.00E+00	1.55	0.00E+00
Zone 53	1.30	3.46E-07	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 54	0.90	2.70E-07	1.25	0.00E+00	1.25	0.00E+00	1.35	0.00E+00	1.55	0.00E+00
Zone 55	1.30	6.45E-07	1.65	0.00E+00	1.65	0.00E+00	1.75	0.00E+00	1.95	0.00E+00
Zone 56	1.50	2.65E-04	1.85	7.46E-05	1.85	7.46E-05	1.95	2.46E-05	2.15	0.00E+00
Zone 57	0.90	1.98E-06	1.25	4.50E-07	1.25	4.50E-07	1.35	0.00E+00	1.55	0.00E+00
Zone 58	1.40	6.01E-07	1.75	7.51E-08	1.75	7.51E-08	1.85	0.00E+00	2.05	0.00E+00
Zone 59	0.90	1.65E-06	1.25	0.00E+00	1.25	0.00E+00	1.35	0.00E+00	1.55	0.00E+00
Zone 60	0.90	9.00E-07	1.25	0.00E+00	1.25	0.00E+00	1.35	0.00E+00	1.55	0.00E+00
Zone 61	1.50	2.75E-06	1.85	0.00E+00	1.85	0.00E+00	1.95	0.00E+00	2.15	0.00E+00
Zone 62	0.90	5.85E-06	1.25	3.50E-07	1.25	3.50E-07	1.35	0.00E+00	1.55	0.00E+00
Zone 63	0.90	1.94E-04	1.25	7.92E-06	1.25	7.92E-06	1.35	2.00E-06	1.55	0.00E+00
Zone 64	0.90	3.61E-06	1.25	4.40E-07	1.25	4.40E-07	1.35	2.08E-07	1.55	0.00E+00
Zone 65	1.40	8.43E-05	1.75	3.83E-06	1.75	3.83E-06	1.85	2.92E-06	2.05	0.00E+00
Zone 66	0.90	2.91E-04	1.25	1.64E-05	1.25	1.64E-05	1.35	1.01E-05	1.55	0.00E+00
Zone 67	0.90	2.10E-05	1.25	2.47E-06	1.25	2.47E-06	1.35	1.39E-06	1.55	0.00E+00
Zone 68	0.60	7.10E-06	0.85	2.06E-06	0.85	2.06E-06	0.95	1.54E-06	1.05	0.00E+00
Zone 69	0.90	2.02E-06	1.25	2.53E-07	1.25	2.53E-07	1.35	2.53E-07	1.55	0.00E+00
Zone 70	0.75	4.24E-06	1.05	2.77E-06	1.10	1.39E-06	1.15	1.39E-06	1.30	1.39E-06
Zone 71	1.40	8.92E-06	1.75	3.94E-06	1.75	3.94E-06	1.85	3.94E-06	2.05	0.00E+00
Zone 72	0.75	1.36E-05	1.05	6.23E-06	1.10	1.53E-06	1.15	1.53E-06	1.30	1.53E-06
Zone 73	0.90	5.00E-06	1.25	1.25E-06	1.25	1.25E-06	1.35	1.25E-06	1.55	0.00E+00
Zone 74	0.75	3.81E-05	1.05	1.91E-05	1.10	8.41E-06	1.15	5.60E-06	1.30	4.20E-06
Zone 75	0.60	3.49E-06	0.75	0.00E+00	0.75	0.00E+00	0.80	0.00E+00	0.85	0.00E+00
Zone 76	0.50	2.11E-05	0.65	0.00E+00	0.65	0.00E+00	0.70	0.00E+00	0.75	0.00E+00
Zone 77	0.60	2.95E-05	0.85	0.00E+00	0.85	0.00E+00	0.95	0.00E+00	1.05	0.00E+00
Zone 78	0.75	5.34E-07	1.05	0.00E+00	1.10	0.00E+00	1.15	0.00E+00	1.30	0.00E+00
Zone 79	0.45	0.00E+00	0.60	0.00E+00	0.60	0.00E+00	0.65	0.00E+00	0.70	0.00E+00
Zone 80	0.75	2.01E-06	1.05	1.80E-06	1.10	0.00E+00	1.15	0.00E+00	1.30	0.00E+00
Zone 81	0.60	2.43E-05	0.85	6.75E-07	0.85	6.75E-07	0.95	0.00E+00	1.05	0.00E+00
Zone 82	0.45	3.14E-03	0.60	1.08E-03	0.60	1.08E-03	0.65	5.55E-04	0.70	3.92E-06
Zone 83	0.45	5.66E-03	0.60	1.78E-03	0.60	1.78E-03	0.65	7.54E-04	0.70	5.48E-06
Zone 84	0.90	1.73E-04	1.25	5.22E-05	1.25	5.22E-05	1.35	5.70E-06	1.55	0.00E+00
Zone 85	0.45	1.69E-03	0.60	4.66E-04	0.60	4.66E-04	0.65	1.34E-04	0.70	0.00E+00
Zone 86	0.90	2.37E-04	1.25	6.43E-05	1.25	6.43E-05	1.35	2.51E-05	1.55	0.00E+00
Zone 87	0.45	2.19E-04	0.60	6.76E-05	0.60	6.76E-05	0.65	2.77E-05	0.70	0.00E+00
Zone 88	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC
Annual Failure Probability for Entire route	5.71E-02		2.00E-02		1.99E-02		7.93E-03		6.70E-05	
Return Period (years)	17.51		49.99		50.28		126.06		14923.81	
Failure Probability in the lifetime (40 years)	90.48%		55.44%		55.23%		27.28%		0.27%	

Zone	Scenario 9 - Protection against Bands A to I		Scenario 10 - Protection against Bands A to J		Scenario 11- Protection against Bands A to K		Scenario 12-Selected Protection Section by Section		Target DoL (m)	
	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Recommended Minimum DoL (m)	Segment annual failure probability	Target DoL (m)	Segment annual failure probability
		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$		$P_{anchor\ damage}$
Zone 1	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	1.30	0.00E+00	1.70	0.00E+00
Zone 2	2.05	6.10E-07	2.05	6.10E-07	2.25	0.00E+00	1.85	8.51E-05	2.00	8.51E-05
Zone 3	1.55	5.89E-06	1.55	5.89E-06	1.75	0.00E+00	1.55	5.89E-06	1.70	5.89E-06
Zone 4	0.70	2.65E-06	0.70	2.65E-06	0.75	0.00E+00	0.70	2.65E-06	1.50	0.00E+00
Zone 5	1.05	2.20E-06	1.05	2.20E-06	1.20	0.00E+00	1.05	2.20E-06	1.50	0.00E+00
Zone 6	0.70	1.95E-06	0.70	1.95E-06	0.75	0.00E+00	0.70	1.95E-06	1.50	0.00E+00
Zone 7	1.05	2.62E-06	1.05	2.62E-06	1.20	0.00E+00	1.05	2.62E-06	1.50	0.00E+00
Zone 8	0.70	2.35E-06	0.70	2.35E-06	0.75	0.00E+00	0.70	2.35E-06	1.50	0.00E+00
Zone 9	1.05	1.40E-06	1.05	1.40E-06	1.20	0.00E+00	1.05	1.40E-06	1.50	0.00E+00
Zone 10	0.70	1.65E-06	0.70	1.65E-06	0.75	0.00E+00	0.70	1.65E-06	1.50	0.00E+00
Zone 11	0.70	2.25E-06	0.70	2.25E-06	0.75	0.00E+00	0.70	2.25E-06	1.50	0.00E+00
Zone 12	0.80	0.00E+00	0.80	0.00E+00	0.90	0.00E+00	0.80	0.00E+00	1.50	0.00E+00
Zone 13	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	1.15	1.39E-05	1.50	0.00E+00
Zone 14	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.25	4.95E-05	1.50	1.32E-05
Zone 15	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	1.15	1.60E-05	1.50	0.00E+00
Zone 16	0.70	0.00E+00	0.70	0.00E+00	0.75	0.00E+00	0.60	3.46E-05	1.50	0.00E+00
Zone 17	0.80	1.99E-06	0.80	1.99E-06	0.90	0.00E+00	0.80	1.99E-06	1.50	0.00E+00
Zone 18	0.80	4.43E-07	0.80	4.43E-07	0.90	0.00E+00	0.80	4.43E-07	1.50	0.00E+00
Zone 19	0.80	1.68E-06	0.80	1.68E-06	0.90	0.00E+00	0.80	1.68E-06	1.50	0.00E+00
Zone 20	0.80	5.68E-07	0.80	5.68E-07	0.90	0.00E+00	0.80	5.68E-07	1.50	0.00E+00
Zone 21	0.80	6.42E-06	0.80	6.42E-06	0.90	0.00E+00	0.80	6.42E-06	1.50	0.00E+00
Zone 22	0.80	4.19E-06	0.80	4.19E-06	0.90	0.00E+00	0.80	4.19E-06	1.50	0.00E+00
Zone 23	0.70	1.17E-06	0.70	1.17E-06	0.75	0.00E+00	0.70	1.17E-06	1.50	0.00E+00
Zone 24	0.80	9.53E-07	0.80	9.53E-07	0.90	0.00E+00	0.80	9.53E-07	1.50	0.00E+00
Zone 25	0.80	0.00E+00	0.80	0.00E+00	0.90	0.00E+00	0.70	2.79E-06	1.50	0.00E+00
Zone 26	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.85	0.00E+00	1.50	0.00E+00
Zone 27	0.85	6.00E-07	0.85	6.00E-07	0.90	0.00E+00	0.80	8.36E-06	1.50	0.00E+00
Zone 28	0.85	1.10E-06	0.85	1.10E-06	0.90	0.00E+00	0.85	1.10E-06	1.50	0.00E+00
Zone 29	0.85	1.43E-06	0.85	1.43E-06	0.90	0.00E+00	0.85	1.43E-06	1.50	0.00E+00
Zone 30	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	1.05	6.99E-07	1.50	0.00E+00
Zone 31	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.85	0.00E+00	1.50	0.00E+00
Zone 32	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	3.87E-06	1.50	0.00E+00
Zone 33	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	2.24E-06	1.50	0.00E+00
Zone 34	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.85	0.00E+00	1.50	0.00E+00
Zone 35	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.25	1.88E-06	1.50	1.43E-06
Zone 36	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	3.29E-06	1.50	0.00E+00
Zone 37	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	3.75E-06	1.50	0.00E+00
Zone 38	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	3.80E-07	1.50	0.00E+00
Zone 39	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	1.25E-06	1.50	0.00E+00
Zone 40	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	0.00E+00	1.50	0.00E+00
Zone 41	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.80	3.11E-06	1.50	0.00E+00
Zone 42	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.75	1.25E-06	1.50	0.00E+00
Zone 43	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.75	0.00E+00	1.50	0.00E+00
Zone 44	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	0.75	1.12E-06	1.50	0.00E+00
Zone 45	1.85	0.00E+00	1.85	0.00E+00	2.05	0.00E+00	0.85	5.94E-06	1.50	2.21E-06
Zone 46	1.85	0.00E+00	1.85	0.00E+00	2.05	0.00E+00	1.55	3.45E-05	1.70	8.74E-06
Zone 47	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	0.95	1.23E-05	1.50	6.17E-06
Zone 48	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	0.95	3.94E-06	1.50	2.70E-06
Zone 49	2.05	0.00E+00	2.05	0.00E+00	2.25	0.00E+00	1.05	4.88E-06	1.50	2.48E-06
Zone 50	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	8.56E-07	1.50	0.00E+00
Zone 51	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	0.95	1.29E-06	1.50	1.96E-07
Zone 52	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	9.00E-07	1.50	0.00E+00
Zone 53	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	0.95	1.52E-06	1.50	3.46E-07
Zone 54	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	1.39E-06	1.50	0.00E+00
Zone 55	1.95	0.00E+00	1.95	0.00E+00	2.15	0.00E+00	0.95	1.90E-06	1.50	6.45E-07
Zone 56	2.15	0.00E+00	2.15	0.00E+00	2.35	0.00E+00	1.50	2.65E-04	1.70	2.65E-04
Zone 57	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	2.88E-06	1.50	0.00E+00
Zone 58	2.05	0.00E+00	2.05	0.00E+00	2.25	0.00E+00	0.55	2.70E-06	1.50	6.01E-07
Zone 59	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	4.95E-06	1.50	0.00E+00
Zone 60	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	2.70E-06	1.50	0.00E+00
Zone 61	2.15	0.00E+00	2.15	0.00E+00	2.35	0.00E+00	1.15	5.85E-06	1.50	2.75E-06
Zone 62	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	8.88E-06	1.50	0.00E+00
Zone 63	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.25	7.92E-06	1.50	2.00E-06
Zone 64	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.55	6.24E-06	1.50	2.08E-07
Zone 65	2.05	0.00E+00	2.05	0.00E+00	2.25	0.00E+00	1.40	8.43E-05	1.50	8.43E-05
Zone 66	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.25	1.64E-05	1.50	1.01E-05
Zone 67	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.90	2.10E-05	1.50	1.39E-06
Zone 68	1.05	0.00E+00	1.05	0.00E+00	1.20	0.00E+00	0.60	7.10E-06	1.50	0.00E+00
Zone 69	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.70	3.19E-06	1.50	2.53E-07
Zone 70	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	0.60	5.63E-06	1.50	0.00E+00
Zone 71	2.05	0.00E+00	2.05	0.00E+00	2.25	0.00E+00	1.05	1.34E-05	1.70	8.92E-06
Zone 72	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	0.75	1.36E-05	1.50	0.00E+00
Zone 73	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	0.70	1.07E-05	1.50	1.25E-06
Zone 74	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	0.75	3.81E-05	1.50	0.00E+00
Zone 75	0.85	0.00E+00	0.85	0.00E+00	0.90	0.00E+00	0.60	3.49E-06	1.50	0.00E+00
Zone 76	0.75	0.00E+00	0.75	0.00E+00	0.80	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 77	1.05	0.00E+00	1.05	0.00E+00	1.20	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 78	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 79	0.70	0.00E+00	0.70	0.00E+00	0.75	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 80	1.35	0.00E+00	1.35	0.00E+00	1.50	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 81	1.05	0.00E+00	1.05	0.00E+00	1.20	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 82	0.70	3.92E-06	0.70	3.92E-06	0.75	0.00E+00	2.00	0.00E+00	2.00	0.00E+00
Zone 83	0.70	5.48E-06	0.70	5.48E-06	0.75	0.00E+00	2.00	0.00E+00	2.00	0.00E+00
Zone 84	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.50	5.70E-06	1.50	5.70E-06
Zone 85	0.70	0.00E+00	0.70	0.00E+00	0.75	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 86	1.55	0.00E+00	1.55	0.00E+00	1.75	0.00E+00	1.50	2.51E-05	1.50	2.51E-05
Zone 87	0.70	0.00E+00	0.70	0.00E+00	0.75	0.00E+00	1.50	0.00E+00	1.50	0.00E+00
Zone 88	TBC	TBC	TBC	TBC	TBC	TBC	TBC	0.00E+00	TBC	0.00E+00
Annual Failure Probability for Entire route	5.35E-05		5.35E-05		0.00E+00		9.00E-04		5.37E-04	
Return Period (years)	18684.52		18684.52		-		1111.27		1863.84	
Failure Probability in the lifetime (40 years)	0.21%		0.21%		0.00%		3.54%		2.12%	