

Nigg East Quay -Best Practicable Environmental Option Report



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Nigg East Quay Best Practicable Environmental Option Report

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1 INTRODUCTION

1.1 Scope of Report

Global Energy Nigg Ltd are required to undertake a Best Practicable Environmental Option (BPEO) assessment for the dredging and disposal of material from the proposed development of Nigg East Quay ('the proposed development').

Site investigation works were undertaken by Fugro Ltd. and the results are provided in Fugro Report G191005U, May 2019 which is provided in Appendix A of this report. Borehole locations are detailed within Figure B.1 within Appendix B of the Fugro report. The relevant laboratory analytical data from the marine boreholes is included in Appendix F of the Fugro report, and this data has been reviewed in line with the current Action Levels for disposing of sediment at sea.

The site investigation comprised 8 boreholes progressed to depths between 2.5 to 13m below seabed level with 4 of those boreholes progressed further into rock. The sediments overlying bedrock can be generally described as mixtures of sand and gravel, with sandy clay horizons also noted. Borehole logs are provided within Appendix C of the Fugro report.

The dredge for the development will remove ≤199,500m³ of material from the seabed All of this material is proposed to be disposed at sea. Previous plans had allowed for the reuse of up to 30,000m³ within the development, but this is no longer required due to further detailed review and design of the works.

The following report considers the available options for reuse and disposal of material in the context of the project.

1.2 Chemical Assessment

Review of the data provided by Fugro is summarised as follows:

- 24 samples collected from 8 boreholes between surface and 13.0m below surface;
- Samples were dominated in general by the presence of the sand sized fractions;
- No samples recorded metal concentrations greater than their respective Revised Action Level1 (RAL 1)
- No samples recorded tributyltin (TBT) levels above RAL1;
- 1 of 24 samples recorded an exceedance of RAL 1 for Dibenz(ah)anthracene in sample BH2 2.50-3.00m, no other exceedances were recorded;
- No samples recorded polychlorinated biphenyl (PCB) levels above RAL1;
- No samples recorded Total Hydrocarbon levels above RAL1.

In conclusion all 24 samples recorded contaminants of concern below RAL 1 with the exception of a single sample which recorded Dibenz(ah)anthracene in exceedance of RAL 1. There were no exceedances of RAL 2 where they are available.

2 DISCUSSION OF AVAILABLE DISPOSAL OPTIONS

The BPEO process is geared towards identifying a preferred overall strategy from the perspective of the environment as a whole, as opposed to detailed optimisation of any one selected scheme. It is a structured and systematic process to identify and compare strategic options in a transparent manner. Alternatives are evaluated in terms of their projected implications for the environment together with consideration of practicability, social and economic issues as well as within a wider strategic context.

The key stages of a BPEO are:

- Identification of options;
- Screening of options;
- Selection of assessment criteria;
- · Analysis and evaluation of criteria; and
- Evaluation of BPEO.

2.1 Identification and screening of Available Disposal Options

A number of options are available for disposal of dredged sediments. The options considered are provided in Table 2.1 along with justification for screening out those options which have not been taken forward for further consideration.

Table 2.1: Initial Best Practicable Available Options

| Location | Options | Screening Assessment | Carry forward? |
|---|--|---|-------------------|
| Coast / Harbour | Do nothing Scenario/ Leave in situ | Not an option due to the intentions to develop the quay facility. | No |
| | Infilling of an existing dry dock/harbour facility | There are no suitable dry dock or harbour facilities requiring infill in the vicinity of the project and on this basis this option is not considered viable. | No |
| | Beach Nourishment | Specific beach nourishment projects would require to be supported by Environmental Assessments as a minimum to inform how the project could affect the environment as a result of disturbance to the intertidal area, changes to the sediment levels, the variable composition and quality of the material and measures devised from the assessment outcomes to minimise impacts on the environment. There are no known beach nourishment projects in proximity to the proposed project. | No |
| landfills. Landfill space is currently at a premium financially or environmentally for the disposal of disposal fireatment first in a dewatering facility. There is s | | This is possible but it is unlikely that this option will offer long term solution due to lack of space at landfills. Landfill space is currently at a premium and does not offer a sustainable solution either financially or environmentally for the disposal of dredged arisings. Dredged material is likely to require treatment first in a dewatering facility. There is significant cost associated with set up of dewatering facility at the quayside plus transportation and additional costs associated with gaining the necessary planning and regulatory consents. | Yes |
| | Recycling/Re-use | Further review of the design has indicated that no dredged material is required for the construction project. | No |
| | Land Incineration | The dredged material consists of non-combustible material (silts) with a low combustible component and very high water content. | No |

| Location | Options | Screening Assessment | Carry forward? |
|----------|-------------------------------------|--|-------------------|
| | Application to Agricultural Land | The dredged material would need to be treated to reduce salt concentrations to acceptable levels. There would be a requirement for a detailed chemical analysis and assessment as well as a Waste Management License Exemption. Special precautions would be required during spreading in relation to the risk of odour and watercourses / aquifers. The availability of land for this option will be limited within a reasonable haulage distance of the dredge arisings. | No |
| Sea | Aquatic disposal direct to seabed. | All of the dredged material is proposed for sea disposal at CR019 – Sutors. Further consideration of this route is provided in Section 3. | Yes |

2.2 Summary of Identified BPEO Options

Three options were identified for further assessment as follows:

- Landfill; and
- Sea Disposal.

2.2.1 Landfill Disposal

Dredged material is considered to be controlled waste for the purpose of transport, storage and disposal as per Section 34 (7) of the Environmental Protection Act 1990. The Landfill (Scotland) Regulations 2003 require the classification and characterisation (i.e. inert, non-hazardous or hazardous) of the dredged material to be determined prior to landfill acceptance.

Disposal to landfill would require several stages in material handling operations:

- Dredging and transport to shore;
- Transfer to shore to a dewatering facility;
- Dewatering;
- Transfer of dewatered material to storage area for stockpiling;
- · Loading of lorries and transport to landfill site; and
- Disposal at Landfill site.

Transport to the shore would require the identification of an available jetty facility suitable for receiving material directly to the dewatering facility. Two options are available for off-loading; namely grabbing the spoil from the barge or hopper or pumping directly ashore.

The dewatering facility would require being purpose built and capable of receiving large quantities of bulk material. Currently no facility exists in proximity to the site in the Cromarty Firth. Settlement tanks, with the aid of sluices and rotational management, would allow solids to settle out and the water element drain off and return to the Cromarty Firth. Temporary mobilisation of bespoke mechanical dewatering equipment could also be utilised but at greater cost. The dewatered dredged sediment would then be removed from the facility and stockpiled for transfer via lorry to a suitably licensed landfill.

We understand that the type of vehicle most suitable for transporting the dewatered dredged material is either a rigid bodied tipper or an articulated tanker both with a 16 tonne load capacity. It is estimated that the dredge volume which cannot be utilised within the development equates to c. 390,000 tonnes of material and would require approximately 24,375 return trips would typically be required to transport the dewatered dredged material to landfill.

The number of landfills within a viable distance of the site at Nigg is considered to be low. In addition, the available capacity of each site is limited by the amount of material it can receive per annum. Due to the proposed quantity of material to be dredged it is therefore unlikely that any landfill within viable distance of the site will have the capacity to receive the dredged material.

2.2.2 Sea Disposal

This option handles material in a single stage namely transport to the disposal site. The existing licensed disposal site is approximately 0.9 nautical miles north-west of CR019 – Sutors disposal site. It is located in naturally deep water with ease of access, has capacity and is anticipated to be active for the foreseeable future.

3 FURTHER CONSIDERATION OF REMAINING DISPOSAL OPTIONS

3.1 Detailed BPEO Assessment

Each of the identified options was assessed against the criteria detailed in Table 3.1 below.

Table3.1: BPEO Detailed Assessment Criteria

| Primary Criteria | Description and Attributes | | |
|------------------|--|--|--|
| Strategic | Operational aspects, including handling, transport etc. | | |
| | Availability of suitable sites/facilities | | |
| | General Public/local acceptability | | |
| | Legislative Implications | | |
| | Summary of the outcome of consultation with third parties | | |
| Environmental | Safety Implications | | |
| | Public Health Implications | | |
| | Pollution/ Contamination Implications | | |
| | General Ecological Implications | | |
| | Interference with other legitimate activities e.g. fishing | | |
| | Amenity/Aesthetic Implications | | |
| Costs | Operating costs e.g. labour, site operations, environmental monitoring | | |
| | Capital e.g. Transport, equipment hire | | |

3.1.1 BPEO Strategic Assessment

Table 3.2 below provides details of the strategic assessment for each option taken forward for the detailed BPEO assessment:

Table 3.2: BPEO Strategic Assessment

| Criteria | Landfill | Sea Disposal |
|--|---|---|
| Operational Aspects (inc. handling and transport) | Would involve double handling of material through dewatering and transportation to landfill. A facility would need to be built for dewatering purposes. Would also increase the number of HGVs on the road network. | There would be no double handling of the dredged material. Transportation to the disposal site would be by dredger or barge(s) depending on methodology. |
| Availability of suitable sites/facilities | The geotechnical composition of the dewatered dredged material is considered to be suitable for disposal via this route. However, there is typically a limit to the amount of waste that can be accepted both on a daily and annual basis at a landfill. The landfill capacity will therefore not be able to accommodate the quantity of material generated by the East Quay dredging activities and another disposal option will be required for the surplus material. | The marine disposal site has been designed to accommodate the quantities typically generated by dredging operations. The geotechnical composition of the proposed dredged material is suitable for disposal via this route. |
| General Public /Local acceptability | Increase traffic on haul routes therefore potential for increase in public complaints. | Traditionally accepted disposal route for dredged material and limited public impact. |
| Legislative Implications | Contravenes the principles of minimising waste and long term commitments by the government to reduce land filling. | This is an accepted disposal route as long as a licence is obtained. |

3.1.2 BPEO Environmental Assessment

Table 3.3 details the environmental assessment for each option taken forward for detailed BPEO assessment.

Table 3.3: BPEO Environmental Assessment

| Criteria | Landfill | Sea Disposal |
|------------------------------------|--|--|
| Safety Implications | Double handling of material increases the potential for accidents to occur. Work would be undertaken in accordance with H&S legislation. | Minimal handling of material required as it is directly placed at the disposal site. Work would be undertaken in accordance with H&S legislation. |
| Public Health | Measures will be required to limit human contact during transfer of material from dredger to dewatering facility and transportation to landfill. Security measures typically employed at licensed landfills which will minimise human contact once accepted and placed at site. | Low potential for human contact during dredging and disposal operations. Once deposited at disposal site pathways for human contact greatly reduced. |
| Pollution/contamination | Pumping /loading ashore to dewatering facility and transportation to landfill will all require energy. Road transport increases the carbon footprint of this disposal option. Potential for spillages to occur. | Pollutant concentrations limited to acceptable levels through regulatory licensing processes. Low disturbance of sediments by natural processes limits spread in existing disposal ground, although it is acknowledging some dispersal will occur. |
| General Ecological Implications | Licensed landfill would be away from protected species and habitats with measures in place to prevent or minimise pollution of the surrounding environment. | Disposal at Sutors disposal site has historically been used and is the closest licensed disposal site. |

| Criteria | Landfill | Sea Disposal |
|---|--|--|
| Interference with other legitimate activities | Potential from limited short term local impact to commercial operations in the area of the dredged material handling and road hauling principally related to noise and dust potential. | Designated disposal site, as such there is considered no significant impact to commercial vessels or commercial fishing. |
| Amenity / Aesthetic Implications | Odour release from dewatering facility. Increase traffic noise during transportation from dewatering facility to landfill facility. Potential for spillages on haul route. No significant additional visual/ odour/noise effects as using existing landfill site. | Limited short term visual / odour / noise effects as dredged material is transported by dredger and disposed of below sea level. |

3.1.3 BPEO Cost Assessment

Costs were assessed for each of the options taken forward for detailed BPEO assessment. The BPEO assessment considered the typical costs associated with dredging, transportation to the disposal site, construction of treatment facilities (where applicable) and methods employed to protect the environment for each of the identified options. As costs are generally "Commercially Sensitive" the rates are based on experience within industry (as opposed to formal quotations).

For the purposes of comparing costs associated with each option a benchmark of 100,000 tonnes (approximately 50,500m³) of dredged material has been set.

The assumptions to calculate the costs are as follows:-

- Dredging costs are estimated to be £3.21 per m³;
- Ship transportation costs from the dredged area to disposal / transfer site have been calculated based on £1.85 per tonne;
- Costs associated with construction and operation of a dewatering facility are estimated to be in the order of £1,000,000 or greater;
- Cost associated with transfer of dewatered material to lorry are based on a wheeled shovel (costing £47 per hour) operating 2 hours per day for 6 days per week for ten weeks;
- It is assumed that handling of material for placement within the construction project is £3 per tonne;
- Transportation costs from a dewatering facility to landfill are estimated to be £4.85 per tonne; and
- Landfill gate fees are estimated to be £30 per tonne for a non-hazardous landfill (Note Maintenance dredgings are currently exempt from landfill tax as defined in HM Customs and Excise Notice LFT1, A general guide to landfill tax, November 2018, Section 8¹).

Table 3.4 provides details on the Cost assessment for each option taken forward for detailed BPEO assessment.

¹ https://www.gov.uk/government/publications/excise-notice-lft1-a-general-guide-to-landfill-tax/excise-not

Table 3.4: BPEO Cost Analysis (based on 100,000 tonnes only)

| Activity | Landfill Disposal | Sea Disposal |
|--------------------------------------|-------------------|--------------|
| | (£) | (£) |
| Dredging | 160,500 | 160,500 |
| Transport by vessel to disposal site | 185,000 | 185,000 |
| Reception facility | 70,000 | - |
| Harbour / Dock Closure | - | - |
| Dewatering Facility | 1,000,000 | - |
| Onshore handling and Placement | - | - |
| Transfer of material to lorry | 5,640 | - |
| Transportation Cost | 485,000 | - |
| Landfill Gate Fee | 3,000,000 | - |
| Total Costs | 4,906,140 | 345,500 |

Note: The above costs do not take into account the cost required to gain planning or licensing consents or potentially to purchase land (where applicable). They also do not take account of the influence volumes will have on costs (economies of scale).

3.2 BPEO Assessment Discussion

For each of the above assessment criteria the options were qualitatively and semi-quantitatively (for costs) assessed against feasibility/preference and awarded a ranking ranging from 1-4; 1 being the most acceptable and 4 being the least acceptable option. The assignment of rank was on the basis of professional judgement.

The individual assessment criteria rankings for each option were added up to give an overall hierarchy of preference. Table 3.5 below provides a summary of the BPEO assessment.

Table 3.5: BPEO Summary

| Criteria | Landfill Disposal | Sea Disposal |
|-------------|-------------------|--------------|
| Environment | 4 | 2 |
| Strategic | 4 | 2 |
| Costs | 4 | 1 |
| TOTAL SCORE | 12 | 5 |

Disposal to landfill is considered to be the least suitable option for the dredged material. It contravenes the principles of minimising waste and reducing landfilling. Several stages in material handling operations would be required to dispose of the material by this route. The cost associated with setting up a suitable treatment facility to dewater the dredged material is significant. Transportation of material by road is also undesirable as a result of increased traffic and the potential for accidental spillages. Landfill capacity is also typically limited and potentially unable to accommodate the quantities of material typically generated by this project. Any surplus dredged material would likely therefore require to be considered for disposal via an alternative route.

Deposition of the dredged material at a licensed marine disposal site is traditionally acceptable. The licensed marine disposal site has been designed to allow easy access as well as being capable of accommodating the quantities of material typically generated by dredging activities. Material handling is limited to transportation thereby reducing the risk for pollution incidences occurring. Pollutant concentrations are also limited to acceptable levels through regulatory requirements. On comparison with other disposal options the cost associated with sea disposal of the dredged material is considered to be the most financially viable.

3.3 Conclusions

The Best Practicable Environmental Option based on those reviewed for disposal of the East Quay dredge area has therefore been assessed as sea based disposal. As identified in the sediment chemical quality section, further assessment is deemed necessary to confirm the suitability of the sediment for sea disposal. The following section details this assessment.

4 SEDIMENT FURTHER ASSESSMENT

4.1 Dredge Material Characteristics

Chemical analysis of the sediments to be dredged have shown key contaminants of concern below revised Action Level 1 in all cases with the exception of a single sample BH2 2.50-3.00m which recorded Dibenz(ah)anthracene at a concentration of $18\mu g/kg$. RAL 1 for Dibenz(ah)anthracene is $10\mu g/kg$.

Average concentrations of Dibenz(ah)anthracene are 2.2µg/kg which are well below RAL1.

The individual sample concentration and average concentration is considered to be well below the Canadian Probable Effects level (PEL) of $135\mu g/kg$. PELs (Marine) have been adopted from the Canadian Environmental Quality Guidelines²If a concentration is recorded above the PEL this is the probable effect range within which adverse effects frequently occur.

4.2 Chemical Assessment Conclusions

Analytical data for the proposed dredge material concludes that the material has little in the way of contamination with only 1 sample recording a single exceedance of RAL1. Average concentrations for all contaminants of concern are below RAL1 in all instances and it is considered that the material is suitable for sea based disposal.

² http://www.ccme.ca/en/resources/canadian environmental quality guidelines/

5 WATER FRAMEWORK DIRECTIVE ASSESSMENT

This section details the assessment the dredge and disposal sites within the context of the Water Framework Directive as required by Marine Scotland.

As outlined in the Water Framework Directive Assessment: estuarine and coastal waters, there are several key receptors which can be impacted upon including the following:

- Hydromorphology;
- Biology habitats;
- Biology fish;
- Water quality; and
- Protected areas

Each of these points are considered in Table 5.1 below:

Table 5.1: Receptor Risk Assessment

| Key Receptor | Brief Summary of Potential Effects on Receptor | Further Consideration Required? | Comment |
|--------------------|---|---------------------------------------|---|
| Hydromorphology | Morphological conditions, for example depth variation, the seabed and intertidal zone structure tidal patterns, for example dominant currents, freshwater flow and wave exposure. | Yes | Hydromorphology is discussed within Chapter 5: Water Environment, Soils and Coastal Processes in the supporting EIA Report. |
| Biology - habitats | Included to assess potential impacts to sensitive/high value habitats. | Yes | Habitats and fish are covered in Chapter 4: Marine Ecology in the supporting EIA Report. |
| Biology - fish | Consideration of fish both within the estuary and also potential effects on migratory fish in transit through the estuary. | Yes | |
| Water Quality | Consideration must be given to water quality when contaminants are present in exceedance of CEFAS RAL1. | No | Contaminants noted to be below CEFAS RAL1 within all sediment samples with the exception of one minor low level exceedance for a single PAH species. Organic contaminants like PAHs have a greater affinity for the organic materials which they are bound to, and are more likely to remain strongly bound to the sediment, or if become dissolved, quickly adsorbed onto organic matter. It is considered unlikely that there would be any water quality impact at the dredge or disposal site from the contaminant levels recorded within the sediments. |

| Key Receptor | Brief Summary of Potential Effects on Receptor | Further Consideration Required? | Comment |
|-----------------|--|---------------------------------------|--|
| Protected Areas | If your activity is within 2km of any WFD protected area, include each identified area in your impact assessment. • special areas of conservation (SAC) • special protection areas (SPA) • shellfish waters • bathing waters • nutrient sensitive areas | Yes | Protected areas can be viewed within Figure 1.3 of Volume 2 of the EIA – there are no protected areas within the site boundary. Further consideration of key protected areas is provided in section 5.1 below. |

Source: Taken from https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

5.1 Protected Areas

The development site is not within a protected area. The Moray Firth SAC is located just to the south of the proposed development and the disposal site is located within the SAC.

There are no designated bathing waters in close proximity to the development site or disposal site with the closest being noted at Rosemarkie³.

Shellfish protected waters are located at Udale and Cromarty Bay south of Invergordon and approximately 2.6 Km south west from the development site⁴.

The key potential risk to the sensitive features are considered to be attributed to the transport of suspended material from the dredge site during dredging and disposal operations. Sample results have indicated that there are very low levels of key contaminants of concern within the dredge material and on this basis the risks to protected areas from fugitive contamination are considered to be low.

³ https://apps.sepa.org.uk/bathingwaters/Locations.aspx

⁴ https://www.gov.scot/binaries/content/documents/govscot/publications/map/2016/09/shellfish-water-protected-areas-maps/documents/323d3324-f111-4fe0-a702-59ac4bf28953/323d3324-f111-4fe0-a702-59ac4bf28953/govscot%3Adocument/Cromarty%2BBay%2B-%2Bshellfish%2Bwater%2Bprotected%2Barea%2Bmap.pdf

6 CONCLUSIONS

In summary, the BPEO for the proposed disposal of ≤199,500m³ of dredged material is sea based disposal at Sutors Disposal Site. Chemical analysis of the dredge material recorded 1 minor exceedance of Action Level 1 in a single sample from a total of 24 samples tested. None of the samples recorded exceedances of adopted Probable Effect Levels (where considered) or Action Level 2. On this basis there is not considered to be a significant risk associated with dredging or sea based disposal of the material.

Following the review of available information including chemical quality and consideration of potential impacts on the water environment, the potential risks associated with dredging and sea based disposal are considered to be Low.

REFERENCES

Canadian Council for Minsters of the Environment (CCME), Canadian Environmental Quality Guidelines, https://www.ccme.ca/en/resources/canadian environmental quality guidelines/

Marine Scotland (2017). Pre-DredgeSampling Guidance Version 1: Scottish Government.

Marine Scotland (2018), National Marine Plan Interactive (NMPI), https://marinescotland.atkinsgeospatial.com/nmpi/

APPENDICES

A FUGRO REPORT



FUGRO

Ground Investigation without Geotechnical Evaluation Report East Quay Development - Marine Ground Investigation Nigg Bay, Scotland

Contact No.: G191005U Issue Date 1 May 2019

Global Energy Nigg Limited





Draft for Comment





FUGRO

Ground Investigation without Geotechnical Evaluation Report East Quay Development - Marine Ground Investigation Nigg Bay, Scotland

Contract No.: G191005U

1 May 2019

Draft for Comment

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Fugro GeoServices Limited

Our ref: G191005U(01) Date: 1 May 2019

Arch Henderson LLP 142 St Vincent Street Glasgow

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Attention: Mr Michael Shuttleworth

Dear Sir,

Ground Investigation without Geotechnical Evaluation Report: East Quay Development - Marine Ground Investigation, Nigg Bay, Scotland.

We have the pleasure of submitting our draft report on the above. This report was prepared by B Marsden under the supervision of N H Armstrong. This report contains all testing completed to date.

We hope that you find this report to your satisfaction; should you have any queries, please do not hesitate to contact us.

Yours faithfully,

B Marsden

Reporting Engineer

N H Armstrong

Engineering and Reporting Manager

Distribution: One electronic copy to Mr Michael Shuttleworth



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ABBREVIATIONS

ATN Abortive Test Notice
BS British Standard
bsl Below seabed level
bgl Below ground level
bml Below mud level
CD Chart Datum
CM Central Meridian

GRS Geodetic Reference System
LAT Lowest Astronomical Tide

MSL Mean Sea Level

OD Ordnance Datum Newyln
OpCo Operating Companies
RQD Rock Quality Designation
SCR Solid Core Recovery
TCR Total Core Recovery

UKAS United Kingdom Accreditation Service
UKHO United Kingdom Hydrographic Office

UTM Universal Transverse Mercator WGS84 World Geodetic System 1984

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1. INTRODUCTION

On the instructions and under the supervision of Arch Henderson LLP (the Investigation Supervisor) acting on behalf of Global Energy Nigg Limited (the Employer), a site investigation has been carried out by Fugro GeoServices Limited (FGSL) at Nigg Bay, Scotland.

It is proposed to construct a quay on the southern border of Global Energy Nigg Limited's Energy Park. The objective of the investigation was to determine the geotechnical and geoenvironmental conditions at the site and to provide information that would assist the Investigation Supervisor in the design of the proposed works. The scope of the investigation was determined by the Investigation Supervisor.

A ground investigation without geotechnical evaluation report, was requested including exploratory hole and field-testing records, laboratory test results, photographs and site plan. The report has been provided in .pdf format.

The nearshore site work was undertaken from the FGSL jack-up barge Skate 3A from 2 March to 18 March 2019, and comprised eight light cable tool percussion boreholes four of which were extended by rotary core drilling techniques to a maximum depth below seabed level (bsl) of 23.35 m.



2. THE SITE AND GEOLOGY

2.1 Site Location and Description

The proposed quay is to be located on the southern border of Global Energy Nigg Limited's Energy Park, Nigg Nay, Cromarty Firth, 8km east of Invergordon, Highland, Scotland.

2.2 Geology

The records of the British Geological Survey (BGS 1997), BGS Online (BGS 2018) and information provided by the Client indicate that the site is underlain by Marine Beach Deposits, comprising clays, silts, and sands, resting on the Raddery Sandstone Formation, consisting of reddish brown sandstone interbedded with marl.

Further background research such as a desk study was not required within the terms of reference for the work.



3. MARINE GEOTECHNICAL INVESTIGATION

3.1 Scope of Work

The original scope of works required eight boreholes to be constructed to depths up to 25 m bsl. On the instructions of the Investigation Supervisor the depths of the boreholes were reduced during the course of the site work. Five boreholes were constructed using light cable tool percussion boring techniques to depths ranging between 9.40 mbsl (BH02) and 22.10 mbsl (BH04) and three boreholes (BH01, BH03 and BH05) were constructed using a combination of light cable tool percussion boring and rotary coring techniques to depths between 17.50 m bsl (BH05) and 23.35 m bsl (BH01).

A site plan showing the location of the exploratory positions is given in Figure B.1 in Appendix B. A schedule of exploratory holes is presented in Table 3.1.

3.2 Vessels, Plant and Equipment

The site work was conducted using the Fugro jack-up barge Skate 3A which was specifically developed for performing nearshore, high quality geotechnical site investigations and construction works. The barge includes a four-leg jack-up system allowing works in the intertidal zone up to 30 m water depth. Drilling, testing and sampling equipment on the Skate 3A comprised:

- Comacchio MC-S 1200 hydraulic drill rig capable of both rotary and percussive drilling operations;
- Dando 2000 cable percussion winch;
- Mud mixing system used to mix and hold the drill flush used during drilling operations to stabilise the borehole;
- Heavy duty 7" diameter thick-walled casing used as a conductor casing from the barge to mudline;
- Terracore S-Geobor wireline triple barrel rotary coring system, with semi-rigid core liner and seawater, which produces a hole diameter of 146 mm and a core sample of 102 mm diameter (nominal) and, when deployed with a non-coring bit, produces an open hole of 146 mm diameter;
- Sliding hammers to drive thin-walled or thick-walled samples of 450 mm or 1000 mm nominal length into the ground in advance of the borehole;
- Trip hammers used to carry out standard penetration tests.

Equipment data sheets are presented in Appendix I.

Table 3.1: Schedule of Exploratory Boreholes

| Exploratory Position Reference | Eastings (m) | Northings (m) | Seabed Elevation (m OD) [m CD] | Depth to Base of Exploratory Position (m bsl) |
|--|-----------------|------------------|-----------------------------------|--|
| BH1 | 279383.70 | 868963.58 | -1.37 [0.85] | 23.35 |
| BH2 | 279342.91 | 868934.75 | -11.32 [-9.10] | 9.40 |
| BH3 | 279380.53 | 868920.31 | -2.97 [-0.75] | 22.50 |
| BH4 | 279380.77 | 868871.12 | -4.24 [-2.02] | 22.10 |
| BH5 | 279379.79 | 868819.21 | -8.97 [-6.75] | 17.50 |
| BH6 | 279381.64 | 868746.75 | -11.82 [-9.60] | 15.00 |
| BH7 | 279451.07 | 868746.87 | -6.23 [-4.01] | 19.61 |
| BH8 | 279448.06 | 868803.00 | -3.04 [-0.82] | 19.00 |
| Note. Chart Datum at Moray Firth is 2.22m below OD (NTSLF, 2019) | | | | |



3.3 Marine Activities

3.3.1 Site Activities

The field operations were carried out twenty-four hours a day in two twelve-hour shifts. A breakdown of the site activities is given in Table 3.2.

Table 3.2: Summary of Activities

| Activity | Duration (hrs) |
|--|----------------|
| Mobilisation | 3.50 |
| Drilling/General Operations | 195 |
| Fugro Standby | 0 |
| Standby (Other) | 164 |
| Note: Refer to DPRs for details and breakdown of Standby (Other) | |

Daily Progress Records (DPR) were completed for each 24-hour period during the site work, defined from midnight to midnight, and include information on the field operations and activities together with summary information relating to progress. The DPRs are presented in Appendix I.

3.3.2 Health, Safety and Environment

A Hazard Observation Card (HOC) system was operated on board allowing crew to report Unsafe Acts, Unsafe Conditions, Safe Acts, or make HSE suggestions. HOCs are uploaded to the Fugro IMPACT system which allow them to be tracked, monitored and responsibilities relating to their close out to be assigned with an automated follow-up system in place.

In addition to the HOC system, Fugro IMPACT is also used to report on more serious incidents. An incident includes any accident, near miss or dangerous occurrence and any accidents in which any employee was injured or any damage to equipment was suffered.

The health, safety and environment statistics for the site work period are summarised in Table 3.3.

Table 3.3: Health and Safety Statistics

| Activity | Duration (hrs) / Number |
|------------------------------------|-------------------------|
| Contractors total exposure (hours) | 1860 |
| HOCs | 20 |
| HSE Meetings | 1 |
| Safety Drills | 7 |
| Tool Box Talks | 18 |
| Incidents/Near Misses | 0 |

3.3.3 Grouting Operations

All boreholes were grouted from the base of the borehole to rock head with a 2:1 Bentonite /cement grout, mixed at a solid to water ratio of 5:2 by weight. The grout was pumped bottom up in the borehole via a tremie pipe. This was process was conducted in 10 m increments and the borehole was dipped immediately afterwards before proceeding with the next interval.



3.4 Navigation and Positioning Survey

During primary positioning of the Skate 3A Jack Up Barge (JUB), Starfix HP/XP/G2 Systems were used. The heading was determined using a Meridian Gyrocompass with a ProTrack GNSS system providing a backup. Antenna position data was combined with the gyro compass data in StarFix.NG navigation software to compute the vessel position.

The JUB's positioning systems were configured to record all navigation data which enables the replay of barge movements and review offline. A mean position report was configured to the Client's specification to provide the positional information for each exploratory location. The mean position reports are reproduced in Appendix F.

3.5 Geodetic and Projection Parameters and Vertical Datum

3.5.1 Project Coordinate Reference System

Table 3.5 provides details of the geodetic datum and map projection adopted for the project.

Table 3.5: Project Geodetic and Projection Parameters

| Project Geodetic Datum | | | | |
|-----------------------------------|-----------------------|--|--|--|
| Geodetic Datum: | WGS84 | | | |
| Ellipsoid: | WGS84 | | | |
| Semi major axis: | 6337563.396 | | | |
| Inverse Flattening: | 299.3249646 | | | |
| Project Projection Parameters | | | | |
| Projection: | OSGB36 | | | |
| Grid: | British National Grid | | | |
| Longitude of Origin: | 2°00'00.0000"W | | | |
| Latitude of Origin: | 49°00'00.0000"N | | | |
| False Easting: | 400000.000 m | | | |
| False Northing: | -100000.000 m | | | |
| Scale factor on Central Meridian: | 0.9996 | | | |
| Units: | Metre | | | |
| Vertical Datum | · | | | |
| Datum: | Chart Datum (CD) | | | |

3.5.2 Vertical Datum

The vertical datum for this project is Chart Datum (CD).

3.5.3 Depth Measurement

The depth to seabed was measured by a sounding lead within the drill string prior to the commencement of boring. The depths stated on the borehole records are referenced as metres below seabed. The elevation of the seabed is also stated on the exploratory hole records.



4. GEOTECHNICAL ACTIVITIES

4.1.1 General

The investigation was carried out in accordance with BS 5930:2015, BS EN ISO 14688-1:2018, BS EN ISO 14689-1:2018 and BS EN ISO 10175:2011, as appropriate.

Details of the sampling and in situ testing carried out, together with the descriptions of the strata encountered, are given on the exploratory hole records in AppendixC.2.

An explanation of the symbols and abbreviations used on the borehole records, together with the method of strata description utilised is given in the Notes on Exploratory Hole Records in Appendix C.1.

Geotechnical and geoenvironmental samples were transported to the laboratories of Professional Soils Limited for examination and testing as scheduled by the Investigation Supervisor.

4.1.2 Boreholes

Eight, 178 mm minimum diameter, boreholes were sunk to depths between 4.45 m bsl (BH03 and BH05) and 22.10 m bsl (BH04) using light cable tool percussion boring techniques. On reaching bedrock, boreholes BH01, BH03 and BH05 were extended using rotary coring drilling techniques, to depths ranging between 17.25 m bsl (BH03) and 23.35 m bsl (BH01). The rotary coring was carried out using a deck mounted Comacchio MC-S1200 drill, a Terracore S-Geobor wireline system, triple tube core barrels and seawater flush. During core runs the driller constantly monitored and adjusted drill fluid circulation pressure, applied hydraulic pulldown pressure, rotation speed and feed rates to maintain a constant and efficient rate of penetration for the given formation, and to ensure the maximum core recovery possible. Where core recoveries were less than could reasonably have been expected, core run lengths were reduced to 50% of the previous length, unless otherwise directed by the Investigation Supervisor, to a minimum length of 0.5 m. On completion the boreholes were backfilled with cement to bentonite (2:1) grout as directed by the Investigation Supervisor.

The borehole records are given in Appendix C.2.

4.1.3 Sampling and Core Subsampling

The sample categories and achievable quality classes are defined in EN ISO 22475-1:2006 for each sample/sampler system.

In boreholes advanced by cable tool percussion boring techniques, disturbed samples were taken at each change in soil type and at regular vertical intervals during boring to identify and give a record of the strata encountered. Disturbed samples of soil were placed in a plastic tub or double sealed in plastic bags.

General purpose driven open tube (UT100) thin wall samples (100mm diameter thin walled OS-T/W, achievable quality Class 1) were taken of the cohesive strata where appropriate, and subsequently sealed to preserve their natural moisture contents. Thin wall push samples (100mm diameter thin walled OS-T/W, achievable quality Class 1) were taken where ground conditions permitted.



4.1.4 Photographic Records

Photographs of the rock core recovered are presented in Appendix D. The photographs are also presented as digital data in .jpeg format.

4.1.5 Standard Penetration Tests

Standard penetration tests (SPT) using a split spoon (S) or a solid 60° cone (C) were carried out in the granular and cohesive deposits and weathered rock at intervals stipulated by the Investigation Supervisor. The results are shown as S(N) and C(N) values on the borehole records at the relevant depths and tabulated in Appendix E together with the relevant SPT Calibration Report. The tests were carried out in accordance with BS EN ISO 22476-1:2005+A1:2011 'Geotechnical investigation and testing – Field testing. Part 3 Standard Penetration Testing'.

4.1.6 Groundwater Observations during Boring and Drilling

During the construction of boreholes in the marine environment the water level in the borehole is maintained at or above seawater level. Consequently, it was not possible to identify the inflow of groundwater into the borehole.



5. BOREHOLE RECORDS AND DESCRIPTION OF STRATA

An explanation of the symbols and abbreviations used on the borehole records, together with the method of strata description utilised, is given in the Notes on Exploratory Hole Records, in Appendix C.1

Details of the in situ sampling and testing carried out, together with the descriptions of the strata encountered are given on the borehole records, in Appendix C.2

The strata descriptions given in the borehole records, unless otherwise noted, are compiled from an examination of "disturbed" samples, "undisturbed" samples and rotary core samples, together with the results of any field testing and laboratory tests. Where there is a degree of uncertainty regarding the character of the soil or rock, the terms "probably" or "possibly" have been used and the descriptions should be treated with caution.

The consistency of cohesive strata is based on visual assessment alone; the identification and description of consistency is outlined in the Notes on Exploratory Hole Records, in Appendix C.1.

The Solid Core Recovery (SCR) and Rock Quality Designation (RQD) have been determined using the modified proposal, as given in Norbury et al (1986); that a "solid cylinder" should be defined as having a full diameter (but not necessarily a full circumference) without discontinuities and should be measured axially along the core. In a number of instances, the logging geologist assessed that some core from one run was recovered with the core from the next run. In these cases, the Total Core Recovery (TCR), SCR and RQD have been determined assuming that the core had been recovered from the core run in which it had first been drilled, and details are given in the remarks section of the borehole record. The description of rock is based on BS EN ISO 14689-1 (2003).

In his original work on the use of RQD in rock classification schemes, Deere (1968; 1989) advised that pieces of core which are not 'hard and sound' (ISRM 1978) should not be counted for the RQD even though they possess the requisite 4 in, (100 mm) length." Subsequently, 'sound core' was defined as any core which is fresh to moderately weathered and which has sufficient strength to resist hand breakage." This approached to RQD assessment is adopted by some international standards such as ASTM D6032.

In its current form BS5930 allows for the inclusion of both sound and weathered rock provided that it exhibits strength greater than 600 kPa. Thus, it may be expected that BS5930 RQD values will be much higher than that computed based on the Deere's original definition, particularly in "weak"/weathered rock sequences. Caution should therefore be exercised in using the BS5930 RQD values in rock mass classification systems which assume that RQD will be computed using Deere's original methodology.



6. GEOENVIRONMENTAL TESTING

Chemical analyses were scheduled by the Investigation Supervisor and carried out by RPS Bedford Ltd (RPS). A Schedule of Contamination Tests, presented in Table F.2 (Appendix F), gives details the number of tests undertaken. Information on sample collection, preservation, and deviating samples is given in Figure F.1.1 in Appendix F. The results are given in the RPS Certificate of Analysis Ref. No. 19-81762

The results, including details of any deviating samples and the reasons for any deviations and RPS UKAS accreditation certificates are presented in Appendix F.



7. DIGITAL DATA DELIVERABLES

Digital data to accompany the information presented within this report are listed in Table 7.1.

Table 7.1: Digital Data Deliverables

| Digital Data | Folder Reference | | | | | |
|--|-----------------------|--|--|--|--|--|
| Exploratory Position Records, Field and Laboratory Tests: | | | | | | |
| ■ Association of Geotechnical Specialists (AGS) Version 4.0.4 | AGS Data | | | | | |
| Photographic Records (cores): | | | | | | |
| ■ Photographic records of core in .jpeg format | Photography | | | | | |
| Geoenvironmental Laboratory Tests: | | | | | | |
| Geoenvironmental data as cross-tab tables in MS Excel Pre-dispersal Sampling Results Form in MS Excel | Geoenvironmental Data | | | | | |



8. REFERENCES

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APPENDICES

- A. LIMITATIONS ON USE OF DATA
- B. DRAWINGS
- C. EXPLORATORY HOLE RECORDS
- C.1 Keysheets
- C.2 Borehole Records
- D. CORE PHOTOGRAPHS
- E. FIELD TEST RECORDS
- E.1 Calibration Certificates
- E.2 Standard Penetration Test Results
- F. GEOENVIRONMENTAL TESTING
- G. SURVEY
- H. MARINE ACTIVITIES
- I. VESSEL AND PLANT DATA SHEETS



A. LIMITATIONS ON USE OF DATA

The scope of the investigation was determined by Arch Henderson LLP for the particular project requirements set out in the Specification for the Contract. The data presented in this report reflects the site conditions encountered at the time the investigation was performed. The investigation has disclosed evidence of conditions at point locations across the site which provides information about discrete volumes of soil or rock. Accordingly, there may be ground conditions at the site which may not have been revealed by the investigation, and the passage of time may give rise to changes in the conditions encountered. Any interpolation or extrapolation of strata from the exploratory boreholes is subject to the interpretation of the reader. Any cross-sections or plots are generalised by necessity and have been based on information found at the exploratory boreholes and depths sampled and tested. The exploratory borehole records should be read in conjunction with the Notes on Exploratory Hole Records presented in this report.

The investigation has been carried out by Fugro GeoServices Limited and the report has been prepared for the sole internal use of Global Energy Nigg Limited. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Fugro GeoServices Limited. If an unauthorised third party comes into possession of this report they rely upon it at their peril and the authors owe them no duty of care and skill.

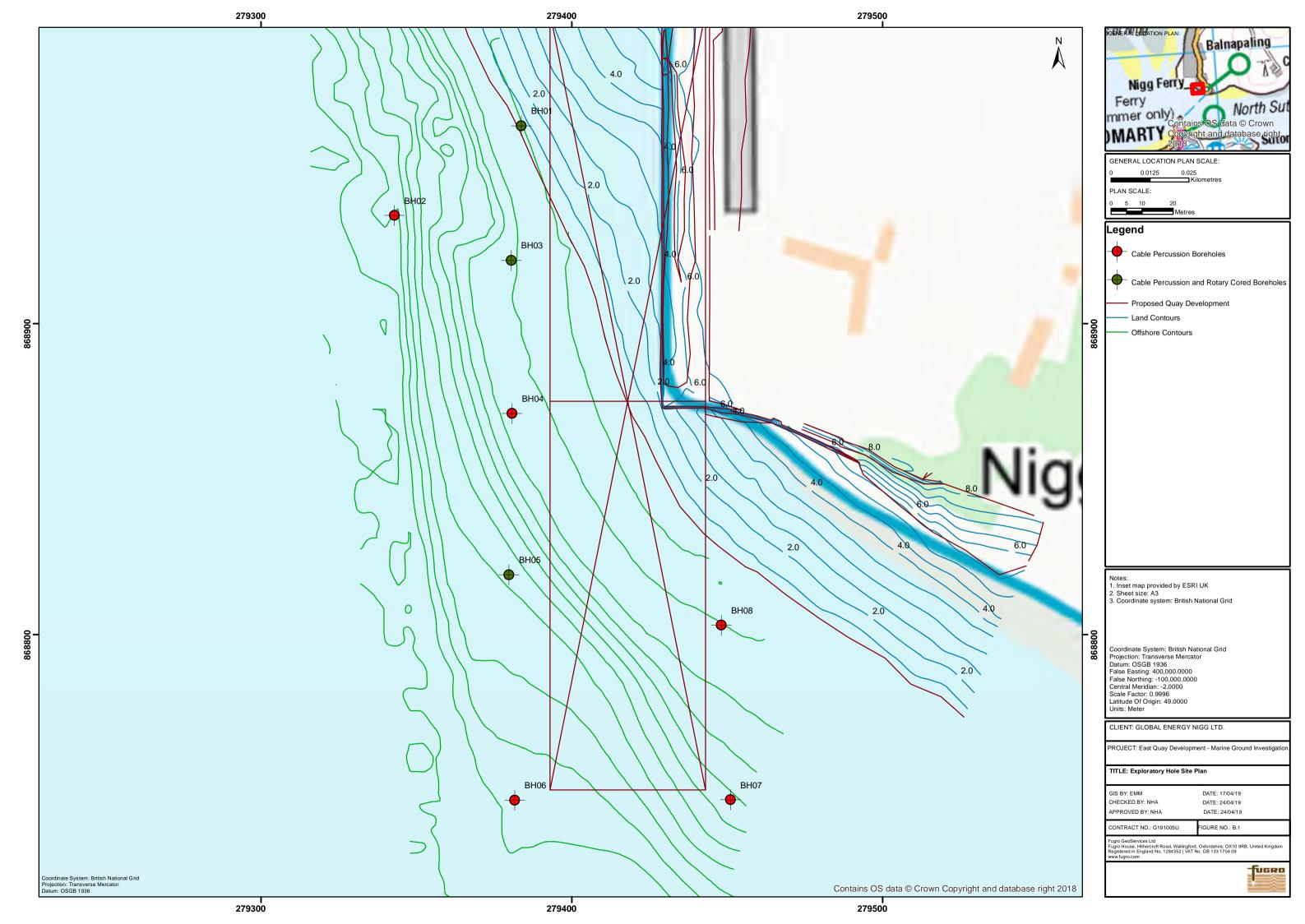
It is Fugro GeoServices Limited's understanding that this report is to be used for the purposes as described in the Specification for the investigation and as summarised in the text of the report. Should the purpose for which the report is used or the proposed use of the site change, this report may no longer be valid. Any further use or reliance upon the report in these circumstances by Global Energy Nigg Limited further review by and advice from Fugro GeoServices Limited shall be at their sole and own risk.



B. DRAWINGS

Exploratory Hole Site Plan

Figure B.1





C. EXPLORATORY HOLE RECORDS

C.1 Keysheets

General Notes on Exploratory Hole Records Figure C.1

C.2 Borehole Records

Borehole Records Figures BH01 to BH08



GENERAL NOTES

1 OPERATING PROCEDURES

The procedure used for cable percussion boring, rotary drilling, trial pitting, sampling, in situ and laboratory testing and sample descriptions are generally in accordance with BS5930:2015 'Code of practice for site investigations', BS EN ISO 14688-1:2002 'Geotechnical investigation and testing – Identification and classification of soil – Part 1 Identification and description', BS EN ISO 14689-1:2003 'Geotechnical investigation and testing – Identification and classification of rock – Part 1 Identification and description' as appropriate, and BS1377:1990 'Methods of test for soils for civil engineering purposes', unless stated otherwise. Sampling is carried out in general accordance with EN ISO 22475-1 and Standard Penetration Testing (SPT) is carried out to EN ISO 22476-3:2005.

2 GROUNDWATER

Exploratory hole water levels are recorded together with the depths at which seepages or inflows of water are detected. These observations are noted on the Records, but may be misleading for the following reasons:

- a) The exploratory hole is rarely left open at the relevant depth for a sufficient time for the water level to reach equilibrium.
- b) A permeable stratum may have been sealed off by the borehole casing.
- c) Water may have been added to the borehole to facilitate progress.
- The permeability may have been altered by the excavation/boring/drilling process.

Standpipes or piezometers should be installed when an accurate record of groundwater level is required, however, it should be noted that groundwater levels may vary significantly due to seasonal, climatic or man made effects. Water levels recorded during the investigation and any advice or comment made accordingly may, therefore, not be appropriate to particular foundation, geotechnical design, or temporary works solutions. Long term monitoring of standpipes or piezometers is always recommended when water levels are likely to have a significant effect on design.

3 CHISELLING

The remarks in the Borehole Records contain information on the time spent advancing the borehole by 'Chiselling Techniques', and the depth of borehole over which it was required. Such information may be affected by a wide range of variable factors, unrelated to the geotechnical properties of the strata. Such factors include, but are not restricted to: plant, equipment and operator. The data should, therefore, only be used subjectively and with extreme caution.

4 IDENTIFICATION AND DESCRIPTION OF SOILS - SEE SEPARATE SHEET

The identification system follows the Company's Engineering: Geotechnical Procedures Manual which is based on BS EN ISO 14688-1:2002 and appropriate clarifications in the National Foreword, BS 5930:1999 and BS EN ISO 14689-1:2003

Relative density terms are given where supported by SPT N values, with the exception of Made Ground. The field assessment of compactness or relative density for coarse grained soils is only given on trial pit records where appropriate assessment of the soils has been undertaken.

Where the terms 'soft to firm', 'firm to stiff' etc. are used they indicate a strength which is close to the borderline between the two terms and cannot be precisely defined by inspection only, and/or which is indicated as borderline or ranging between the two terms after consideration also of in situ and laboratory test results. Consistencies may have been amended in the light of test results

Where 'to' links two terms, as in 'slightly sandy to sandy' this again represents a borderline case or a range, where the precise proportions cannot be determined as outlined previously.

The name of the geological formation is only given where this has been requested and can be determined with confidence (see Clause 41.5 of BS 5930:1999).

5 INTERPRETATION OF THE RESULTS OF THE INVESTIGATION

The description of ground conditions encountered and any engineering interpretation included in the report are based on the results of the boreholes and trial pits and the field and laboratory testing carried out. There may be ground conditions at the site which have not been revealed by the investigation and consequently have not been taken into account.

Any interpolation or extrapolation of strata between exploratory holes shown on any cross sections or site plans is an estimate only of the likely stratification based on general experience of the ground conditions and is subject to the interpretation of the reader.

The term "TOPSOIL" is used in this report to describe the surface, usually organic rich, layer including turf, subsoil and weathered material with roots. The use of this term may not imply that the soil satisfies the requirements of Clause 3 of BS 3882:1994, 'Specification for topsoil', or is suitable for general horticultural and agricultural purposes.

Laboratory test results in this report give the soil properties of individual specimens tested under specified conditions. Individual results or groups of results may not be appropriate for use as design parameters for some geotechnical analyses. The samples may be non-representative, disturbed internally, or prepared and tested under conditions suited for different geotechnical applications. Unless the selection of design parameters is discussed in this report, it is recommended that the advice of a Geotechnical Specialist is sought.



IN SITU TESTING AND SAMPLING

STANDARD PENETRATION TESTS

S()&C() Standard Penetration Test (SPT). S() denotes a 50mm diameter split barrel sampler, normally undertaken in cohesive and mixed soils and C() indicates the test was carried out using a 50mm diameter, 60 degree apex, solid cone normally used in coarse granular soils and weak rock. The tests are carried out in accordance with EN ISO 22476-3:2005

The distance that the SPT assembly sinks into the ground prior to the start of the test is measured and reported as Static Weight Penetration (SWP). The sampler or cone is driven up to 450mm into the soil using a 63.6kg hammer with a 760mm drop. An initial seating drive of 150mm (or 25 blows whichever is less) is undertaken to penetrate through any ground which may be disturbed at the base of the borehole. For the test drive, the number of blows required to obtain an additional 300mm penetration (or penetration for 50 / 100 blows) is recorded as the penetration resistance (also known as the 'N' value). The test is usually completed when the test drive attains the 300mm penetration or the number of blows recorded during the 'test drive' only reaches 50 in soils or 100 in weak rock.

If the sampler advances below the bottom of the borehole under the static weight of the drive rods with the hammer assembly on top, the corresponding penetration is not included as seating drive but the information is reported separately as SWP. The test is terminated in all cases before the non return valve reaches the level of the material at the base of the borehole, in effect about 600mm total penetration. If SWP (Static Weight Penetration) is greater than 150mm then test increments of 75mm are undertaken with the final increment being completed at less than 600mm total penetration including SWP.

If a sample is not recovered in the sampler, or the cone is used, a disturbed sample of appropriate size for the material is taken on completion of the test over the depth of the test zone. The sample is given the same depth as the top of the Standard Penetration Test drive.

The depth on the Borehole Record at the left hand side of the 'Depth' column is that at the start of the test Where full penetration of the test drive is obtained, the penetration resistance ('N' value) is reported in the 'SPT Blows/N' column. If full penetration in the test drive is not obtained, then the length of drive (test length in mm) and the penetration resistance (number of blows) are both reported. Full results, including the cone or barrel type, static weight penetration, blows and penetration of each of the Seating Drive and Test Drive increments, the calibration reference number for the SPT hammer assembly, the energy ratio and the 'N' value, as well as start and end depths and water and casing levels are given on the separate Standard Penetration Test Summary

* in the 'Test Length' column denotes that the blows and penetration include the initial Seating Drive blows.

OTHER IN SITU TESTS

The following in situ tests are reported on the **Exploratory Hole Records**, in the 'Test' or 'Type' and 'Results' columns where appropriate.

- k In situ Permeability Test refer to detailed test results for permeability values
- PMT Pressuremeter Test refer to detailed test results for modulus values, etc.
- FVN/R Borehole Shear Vane Test (undrained shear strength c_u in kPa) refer also to detailed test results, N 'Natural' or peak shear strength, R Remoulded shear strength
- HVN/R Hand Shear Vane Test (Direct reading of undrained shear strength in kPa). 'N' and 'R' as above. The values are indicative and should not be taken as being equivalent to laboratory test results. The Pilcon vane results have a factor varying from about a sixth for the 33mm vane to a third for the 19mm vane which reduces the BS1377 shear vane value. The values presented are therefore approximate and should be treated with great caution if used for design purposes
- PP Pocket Penetrometer. Unconfined Strength (UCS) reported in kg/cm² to the nearest 0.25 kg/cm² or kPa with the same accuracy. Equivalent c_u in kPa is very approximately UCS x 50. Pocket Penetrometers are an aid to logging of cohesive soils, the results are indicative and should not be relied upon. The equipment used is not calibrated
- TV Tor Shear Vane (direct reading of undrained shear strength in kPa). Tor vanes are an aid to logging of cohesive soils, the results are indicative and should not be relied upon. The equipment used is not calibrated
- CBR California Bearing Ratio Test (CBR%) refer also to detailed test results
- PID Photo-Ionisation Detector Readings in headspace of small disturbed chemical samples. Result given in ppm by volume



IN SITU TESTING AND SAMPLING

UNDISTURBED SAMPLES

All samples recovered are recorded and handled in accordance with EN ISO 22475-1.

U/UT General purpose open tube sample. Sample normally taken with open tube sampler approximately 0.1m diameter and 0.45m long and driven with an 80kg sinker bar and 56kg sliding hammer, unless noted otherwise. "XX" in U100 blows column denotes the number of hammer blows. The height of hammer drop can be variable depending on operator technique. Depths are given of the top of the sample if full penetration and recovery are achieved, otherwise actual lengths of penetration and recovery are given in the appropriate columns.

'U' denotes steel or plastic liner sample in general use up to year 2010 designated OS/TKW in accordance with BS EN ISO 22475-1 with an area ratio greater than 25%. 'UT' denotes thin wall open tube sampler designated OS/TW with an area ratio less than 15%, available from 2010.

U/UT(X) General purpose open tube sample (X) mm diameter

TW(X) Thin wall (push) sample (X) mm diameter

P(X) Piston sample (X) mm diameter

DISTURBED AND CORE SAMPLES

CBR Sample taken in CBR Mould

D Small disturbed sample (plastic tub or jar with air tight lid)

B Bulk disturbed sample (polythene bag, tied at neck - size dependent on purpose)

LB Large Bulk disturbed sample (normally several bulk samples of the same material - size dependent on purpose)

W Water sampleC Core sample

CS Short core, generally about 100mm
CL Long core, generally 250mm to 300mm

Sample not recovered

ENVIRONMENTAL SAMPLES

CD Sample for chemical analysis in a plastic tub

K Sample for chemical analysis in an amber glass jar

V Sample for chemical analysis in a glass vial

CDKV Set of samples for chemical analysis as above

WAC Sample for Waste Acceptance Criteria

EC Environmental Soil Sample
EW Environmental Water Sample



KEY TO BOREHOLE AND TRIAL PIT RECORDS

| Soil Types Coarse grained, Non cohesive Boulders | Fine grained, Cohesive | Other Soil Types Topsoil |
|--|--|---|
| Cobbles | Clay | (A) |
| Gravel | | Made Ground |
| Sand | Note: Composite soil types may be signified by combined symbols. | |
| Rock Types Sedimentary Sandstone | The state of the s | Coal |
| Siltstone | Limestone | Mudstone/Claystone/Shale |
| Conglomerate | Breccia | |
| Metamorphic | Igneous | |
| Coarse/Medium grained | Coarse grained | |
| Fine grained | Hedium grained | |
| | Fine grained | |
| KEY T | O SITE PLANS AND CROSS SECTIONS | Borehole Position |
| | er level in piezometer or standpipe standpipe response zone | Trial Pit Position |
| ₩ Highest recorded water | er level in hole | Line of Section |
| | | |
| Water strike Standard Penetration | test (SPT) "N" value using split spoon | |

Standard Penetration test (SPT) "N" value using solid 60° cone

Undrained cohesion in kPa

_ cu()



DESCRIPTION OF ROCK CORES

DESCRIPTIVE ORDER

Strength, Structure, Colour, Texture, Grain Size, ROCK NAME. Minor constituents and additional information. (Geological formation - see comments under identification and description of soils). Mass characteristics - factual description of weathering state (if appropriate) and description of discontinuities and fracture state (if appropriate).

| Term | Field identification | Strength (MPa) |
|------------------|---|----------------|
| Extremely weak | Can be indented by thumbnail. Gravel sized lumps crush between finger and thumb. | <1.0 |
| Very weak | Crumbles under firm blows with point of geological hammer. Can be peeled by a pocket knife. | 1 – 5 |
| Weak | Peeled by a pocket knife with difficulty. Shallow indentations made by firm blow with point of geological hammer. | 5 – 25 |
| Medium strong | Cannot be scraped with pocket knife. Can be fractured with a single firm blow of geological hammer. | 25 – 50 |
| Strong | Requires more than one blow of geological hammer to fracture. | 50 – 100 |
| Very strong | Requires many blows of geological hammer to fracture. | 100 – 250 |
| Extremely strong | Can only be chipped with geological hammer. | > 250 |

DISCONTINUITIES

| Bedding Spacing & Planar Structures * | Spacing (mm) | Discontinuity Spacing |
|--|-----------------|--------------------------|
| | >6000 | Extremely widely spaced |
| Very thickly bedded | >2000 2000-6000 | Very widely spaced |
| Thickly bedded | 600 - 2000 | Widely spaced |
| Medium bedded | 200 - 600 | Medium spaced |
| Thinly bedded | 60 - 200 | Closely spaced |
| Very thinly bedded | 20 - 60 | Very closely spaced |
| Thickly laminated (Sedimentary) narrow (Metamorphic & Igneous) | 6 – 20 <20 | Extremely closely spaced |
| Thinly laminated (Sedimentary) Very narrow (Metamorphic & Igneous) | <6 | |

For igneous and metamorphic rocks the appropriate descriptive term for planar structure should be used e.g. medium foliated gneiss, very narrowly cleaved slate, very thickly flow banded diorite.

WEATHERING

Standard descriptions of weathered rocks for engineering purposes should always include comments on the degree, extent and nature of any weathering effects at material or mass scales. This may allow subsequent classification and provide information for separating rock into zones of like character. Indications of weathering include changes in colour changes in fracture state reduction in strength presence, character and extent of weathering products

If a systematic classification following the guidelines given in the Standard can be applied unambiguously, this is described in the text of the report. Otherwise, the rocks are not classified in terms of weathering beyond the approach described above.

Weathering terms that may be used for description of rock material and these terms may be qualified or combined. Discoloured - The degree and type of colour change from original is described, and if for mass or particular mineral constituents Disintegrated - Fragmentation by physical weathering, bonding lost but material fabric intact. Material friable, not decomposed Decomposed - Chemical alteration of mineral grains so material fabric is intact but some or all grains are decomposed

For rock mass weathering the following terms may be used

Slightly - Discolouration on surfaces and / or of material
Partially - Slightly reduced strength, slightly closer fracture spacing, weathering extending in from fractures.

Moderately - Less than half of mass decomposed/disintegrated. Fresh/discoloured rock as continuous material or corestones Highly - More than half decomposed/disintegrated. Fresh/discoloured rock as discontinuous framework or corestones

Completely - All rock material decomposed and/or disintegrated. Original mass structure largely intact

Residual Soil - All material converted to soil, structure and fabric destroyed, may be volume change but material not moved The term 'Fresh' is used to indicate that there is no visible weathering or alteration, except possibly slight discolouration on major surfaces

Appendix C Contract No. G191005U Figure C.1 (Page 5 of 7)



ROCK CORES

ROCK CORE SIZES

The core barrels commonly used by the Company in site investigations are as follows:

| Core Barrel | Borehole | Standard Core | Core Size using | Casing Size | Casing O.D | Casing I.D |
|-------------|----------------|---------------|---------------------|-------------|------------|------------|
| Type | Diameter | Size | Rigid Plastic Liner | or Type | (mm) | (mm) |
| 1 | (mm) | (mm) | (mm) | 7. | , , | ` , |
| STA | NDARD BRITISH | SIZES | , , | | | |
| NWM | 75.7 | 54.7 | 51 | NX | 88.9 | 76.2 |
| HWF | 98.8 | 76.2 | 72 | HX | 114.3 | 100.0 |
| HWAF | 99.5 | 70.9 | - | HX | 114.3 | 100.0 |
| PWF | 120.0 | 92.1 | 87 | PX | 139.7 | 122.3 |
| SWF | 145.4 | 112.8 | 107 | SX | 168.3 | 147.7 |
| UWF | 173.7 | 139.8 | 132 | UX | 193.7 | 176.2 |
| | | | | | | |
| | WIRELINE SIZE | | | | | |
| BQ | 59.9 | 36.4 | 35 | | | |
| NQ | 75.7 | 47.6 | 45 | | | |
| HQ | 96.1 | 63.5 | 61 | | | |
| PQ | 122.7 | 85.0 | 82 | | | |
| GEOBOR S | 146.0 | 102.0 | 102 | SX | 168.3 | 147.7 |
| | | | | | | |
| | THINWALL SIZE | | | | | |
| TNX | 75.7 | 60.8 | - | NX | 88.9 | 76.2 |
| T2 66 | 66.1 | 51.9 | - | 74 | 74.3 | 67.3 |
| T2 76 | 76.1 | 61.9 | - | 84 | 84.3 | 77.3 |
| T2 86 | 86.1 | 71.9 | 68 | 98 | 98.0 | 89.0 |
| T2 101 | 101.1 | 83.9 | 80 | 113 | 113.0 | 104.0 |
| T6 116 | 116.1 | 92.9 | 89 | 128 | 128.0 | 118.0 |
| T6 131 | 131.1 | 107.9 | 104 | 143 | 143.0 | 133.3 |
| | | | | | | |
| | N STANDARD BAF | | 70 | DV | 400.7 | 400.0 |
| 4.12F | 105.2 | 74.7 | 72 | PX | 139.7 | 122.3 |
| TRIEFUS | 400.7 | 404.0 | | CV | 400.0 | 4 4 7 7 |
| 5.5x4C | 139.7 | 101.6 | - | SX | 168.3 | 147.7 |
| SINGLE | | | | | | |
| TUBE | 440 | 400 | | DV | 400.7 | 400.0 |
| B116 | 116 | 102 | - | PX | 139.7 | 122.3 |
| B146 | 146 | 132 | - | SX | 168.3 | 147.7 |
| | | | | | | |

Note: Core diameters may vary when different lining systems are in use.

NCB Non coring bit for GEOBOR S.

ROCK CORE CHARACTERISTICS

- TCR **Total Core Recovery.** The length of the total amount of core sample recovered, expressed as a percentage of the length of the core run.
- SCR Solid Core Recovery. The length of solid core recovered, expressed as a percentage of the length of the core run. Solid core is defined as that length of core which has a full diameter, but not necessarily a full circumference. Only natural fractures are considered. Drilling or handling induced fractures are ignored.
- RQD Rock Quality Designation. The length of solid core recovered in pieces each more than 100mm long as a percentage of the core run length.
- I_f **Fracture Index.** The number of discontinuities expressed as 'fractures per metre', measured over any convenient length of consistent fracture characteristics. Fracture index is normally measured axial along the core.
- Fs Fracture Spacing. The minimum, average and maximum spacing of discontinuities in mm, measured over any convenient length of consistent fracture characteristics. Fracture spacing is normally measured perpendicular to the discontinuity plane unless indicated otherwise.
- AZCL Assumed Zone of Core Loss

Zones of atypical fracturing of restricted extent which occur within a rock unit of uniform fracture characteristics are identified within the Description of Strata, but not given a separate I_f / F_s .

DI - Drilling Induced

NI - Not Intact NR - No Recovery NA - Not Applicable

 I_s Corrected **Point Load Strength Index** $I_{s(50)}$ which is given in MPa



IDENTIFICATION AND DESCRIPTION OF SOILS

| | Basic Soil Ty | ре | Particle Siz | œ. | Visual Identification | Composite Soil Ty (Mixtures of basic s | | es) | | | Density / Cor | nsistency / Pea | t Condition |
|--|--|---------|----------------|--------------|---|--|-----------------------------|--------------------|-----------------------------|--------------------------------|---|-------------------------------------|--|
| KSE S | BOULDE | ERS | | | Large Boulders >630mm. These soils only seen complete in pits | Scale of secondary coarse soils. Term | | | | | | | ative description |
| VERY COAR SOILS | COBBL | .ES | | 200 | or exposures. Often difficult to recover from boreholes. | Term before (term in '[]' may | | | | Approx % 2 nd ry | by inspection of voids and particl packaging. | | |
| | | | coarse | 63 | Easily visible to naked eye; particle | be used for 2 nd ry | | | tion after | soil | Standard Per for Coarse S | netration Test | in Boreholes |
| Sizes) | | - | medium | 20 | shape can be described, grading can be described. | Slightly (sandy*) | ES P | Used to | describe | type | No of blows | Relative Dens | sity |
| ravel | GRAVE | =1 | modium | 6.3 | Well graded: wide range of grain sizes, well distributed. Poorly graded: | [occasional / little] | BBL | second | | <5 | <4 | Very Loose | |
| nd G | OKAVI | | | | not well graded. (May be uniform: size of most particles lies between | (sandy*) | S 6 | e.g. Gra | avel is | | 4-10 | Loose | |
| SOILS over 65% Sand and Gravel | | | fine | | narrow limits; or gap graded; an intermediate size of particle is | [Some] | | | d medium ular fine | 5 – 20 | 10-30 | Medium Dens | se |
| % % | | | | 2 | markedly under represented). Visible to naked eye; no cohesion | Very (sandy*) | RAVE | sandsto mudsto | ne and ne. | 20 to | 30-50 | Dense | |
| OILS er 65 | | | coarse | 0.63 | when dry; grading can be described. Well graded and poorly graded: as | [much / many] | SAND, GRAVEL or BOULDERS | and (an | | 40† | >50 | Very Dense | |
| SE SC IJy ov | SAND | | medium | | above | | SAN | and (sa and (co | bbles+) | 50† | Slightly | Visual Examin | |
| DAR8 ypica | SAND coarse 0.63 w W W W W W W W W W W W W W W W W W W | | | 0.2 | | Fine or coarseVery coarse so | oil type | - see No | otes | | cemented | can be abrade | in lumps which ed. |
| ŏE | | | | 0.063 | Only coarse silt visible with hand lens; | † described as fi Scale of secondary | | | | | Silty CLAY or | clayey SILT – ı | ise prefix only |
| | exhibits little plasticity and r | | | | exhibits little plasticity and marked dilatancy; slightly granular or silky to | before, description | after p | rincipal c | onstituent. | | when seconda | ary constituent lerial characteris | has significant |
| | SILT medium touch | | | 0.0063 | touch. Disintegrates in water; lumps dry quickly; possesses cohesion but | Term before | g g | Dogorin | tion after | Approx % 2 nd ry | | ry' not applicab | |
| | | | fine | | powders easily between fingers. | Tellii belole | Principal Soil Type | Descrip | tion arter | soil type | Consistency | | |
| Sizes) | | - | | 0.002 | Term "SILT" or "CLAY" must be used, "SILT/CLAY" not allowed. | Slightly (sandy*) | | Used to | describe nents of arv | <35 | Very soft | | pushed in up to udes between |
| d Clay | | | | | Dry lumps can be broken but not powdered between the fingers; they | (sandy*) | r SILT | constitu | ents | 35 to 65† | Soft | | ed in up to ed by fingers |
| Siltano | CLAY | | | | also disintegrate under water but more slowly than silt; smooth to the | Very (sandy*) | CLAY or | Gravel | CLAY. is coarse d quartzite | >65† | Firm | | es impression |
| FINE SOILS (Typically over 35% Silt and Clay Sizes) | | | | | touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying usually showing cracks. | * Coarse soil type a † or described as o behaviour | | | nding on m | ass | Stiff | Can be inde thumb. Crumb | nted slightly by oles if rolled |
| SOIL sally o | | | | | Intermediate and high plasticity clays | nediate and high plasticity clays these properties to a moderate (indicating preferred order for description) | | | | | | y Stiff Indented by Cannot be mould | |
| Typic | | | | | and high degree, respectively. | | | | | Hard Can be scratched nail | | ched by thumb | |
| | ORGAI | NIC | | | Contains varying amounts of organic | Loose brown very sandy subangular coarse GRAVEL with many pockets (<5mm across) of soft grey clay. | | | | | Firm Peat | Fibres compressed togeth | |
| N NC | CLAY, SILT | or | Varies | | vegetable matter - defined by colour: grey - slightly organic; | Firm thinly interlaminated brown SILT and CLAY. | | | | | Spongy Peat Very compressible, open | | ssible, open |
| ORGANIC SOILS | SAND | 0. | | | dark grey – organic; black – very organic. | Dense light brown clayey fine and medium SAND. | | | | | Plastic Peat | Moulded in ha | and, smears |
| Structur | е | | | | | | | | | | | | Particle Nature |
| Term | | Field I | dentification | | | Interval Scales | | | | | | | Particle |
| Homo- | | Depos | sit consists e | ssentially o | of one type | 0 1 (0 1) 0 | | | Mean Sp | acing | Scale of Space | ing of Other | Shape & Form |
| geneous | | | | | | Scale of Bedding S | pacing | 1 | (mm) | | Discontinuitie | | Very angular |
| Interbede interlami | nated i | n equ | | s. Otherw | types. Pre-qualified by thickness term if rise thickness of, and spacing between, | Very thickly bedded | t | | over 200 | 0 | Very widely sp large] | oaced / [Very | (Sub) angular (Sub) rounded Well rounded |
| Hetero- geneous | | A mixt | ture of types | | | Thickly bedded | | | 2000-600 |) | Widely space | d / [Large] | Low Sphericity |
| Weather (granula) | | Particl | les may be w | eakened a | and may show concentric layering | Medium bedded | | | 600-200 | | Medium space | ed / [Medium] | Flat or Elongate |
| Weather (cohesive | ed | Usuall | ly has crumb | or column | nar structure | Thinly bedded | | | 200-60 | | Closely space | ed / [Small] | High |
| Fissured | | Break | s into blocks | along unp | olished discontinuities | Very thinly bedded | | | 60-20 | | Very closely / | [Very small] | Sphericity Cubic |
| Sheared | | | | along poli | shed discontinuities | Thickly laminated | | | 20-6 | | Extremely clo | selv spaced | |
| Intact | Plant romains recognisable and retain some strength. When | | | | | Thinly laminated | | | under 6 | | • | - ' | Particle Surface |
| | ibrous Peat squeezed only water, no solids seudo- Plant remains recognisable and retain some strength. Wrien squeezed only water, no solids seudo- Plant remains recognisable and retain some strength. Wrien squeezed only water, no solids | | | | | Spacing terms may laminae, desiccation | n crac | ks, rootle | ts etc. Teri | ns such a | s partings or du | | Texture |
| fibrous P | eat . | Turbid | water when | squeezed | l, <50% solids | used for laminae less than 2mm and less than 0.6mm r | | | 0.6mm re | | | Rough | |
| Amorpho Peat | | squee | zed only pas | ste with >5 | | Discontinuity Shape Small scale (mm's) rough, smooth Medium scale (cm's) planar, stepped | | | | | dating | Smooth | |
| Gyttja | | | | | remains, maybe inorganic constituents | (See Standard for Persistence/Openn | ess) | | | | r, stepped, undi ved, straight | uating | Polished |
| Humus | | | | | ns & inorganic constituents in topsoil | nce with RS5930:1999 Section 6 clauses 41 and 43 and RS EN ISO 14688.1:2002 | | | | | | | |

NOTES Identification and descriptive method, and descriptions, generally in accordance with BS5930:1999 Section 6 clauses 41 and 43 and BS EN ISO 14688-1:2002
Additional notes relating to BS EN ISO 14688-2:2004 – modified terms for content of secondary fraction given in Annex B Table B1 are not comparable to 5930 and are not be used.

Organic Content: - Low – 2 to 6%; Medium - 6 to 20%; High - >20%. Terms not used on borehole records

Carbonate content: - Only noted if field test with dilute HCI undertaken – Carbonate free if no effervescence; Calcareous if slight effervescence; Highly calcareous if strong reaction

Carbonate content: - Only noted if field test with dilute HCI undertaken – Carbonate free if no entervescence; Calcareous if slight entervescence; Highly calcareous if strong reaction Undrained shear strength: - terms from laboratory or in situ tests not given on borehole records.

Very Coarse Soils – described by initially removing very coarse materials and describing residue before adding back the very coarse soils. If residue is cohesive then described as '......(COBBLES / BOULDERS) with low (cobble / boulder) content with (some / much etc) matrix of' If residue is granular then described as ' with matrix of ' or as a coarse soil.

Cobbles: -<10% - low cobble content; 10 to 20% - medium content; >20% - high content;

Boulders <5% - low boulder content; 5 to 20% - medium content; >20% - high content

ugro

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------|---|-------------|
| Client | Global Energy Nigg Ltd | | | 1 R |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279383.70 N868963.58 | Sheet 1 of 3 | | |
| | | • | • | |

H01 Draft Hole Type Cable Percussion and Rotary Coring Status Sampling and In Situ Testing Core Recovery Strata Details Groundwater Depth (m) TCR SCR RQD Depth Water Backfill / No. Strata Descriptions Type Leaend Results (%) (%) (%) (-) (m) Strike 0.00 - 0.50 0.00 - 0.50 Brown slightly gravelly, locally gravelly, SAND 2 ES with frequent shell fragments (<1 x 1mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed 0.50 - 1.00 (1.00)0.50 - 1.00 3 ES lithologies. 1.00 - 1.50 1.00 - 1.50 1.00 -0.15 Greyish brown SAND with occasional shell ES fragments (<1 x 1 mm) and occasional mica flakes (<2 x 2mm). 1.50 - 2.00 ĒS 1.50 - 2.00 2.00 - 2.50 2.00 - 2.50 10 2 ES (2.80) 2.50 - 3.00 2.50 - 3.00 ES 11 3.00 - 3.50 3 3.00 - 3.50FS 13 3.80 - 4.00 16 D -2.95 3.80 Soft dark brownish grey sandy CLAY with abundant mica flakes (<2 x 2mm) and 15 18 17 3.80 - 4.00 4.00 - 4.50 ES D (0.20) 4.00 -3.15 sulphureous odour. Sand is fine and medium. 4.00 - 4.50 ES Brown SAND with frequent mica flakes (<2 x 4.50 - 5.00 D 20 (1.00)4.50 - 5.00 ES 5 00 - 5 50 D 22 5 5.00 -4.15 Brown SAND with occasional angular 5.00 - 5.50 ES 21 fragments (<60 x 60 x 40mm) of cemented sand (possible lens), frequent mica flakes (<2 x 2mm) and rare gravel and cobbles. Sand is fine 5.50 - 6.00 D 5.50 - 6.00 ES to coarse. Becomes gravelly with depth. Gravel is subangular and subrounded fine to coarse of (1.70) mixed lithologies including sandstone. Cobbles 6.00 - 6.50 6.00 - 6.50 6 (<120 x 100 x 80mm) are subangular of gneiss. ĒS Below 6.00m; becoming gravelly. 6.70 - 6.80 6.80 - 7.00 27 28 6.70 -5.85 Brown slightly gravelly SAND. Sand is mainly ĒS fine and medium, gravel is subangular and 7.00 - 7.50 7.00 - 7.50 D 30 subrounded fine to coarse of mixed lithologies. ES 29 With frequent mica flakes (<1 x 1mm) and occasional locally frequent pockets or beds of very stiff grey silty clay with occasional lenses 7.50 - 8.00 -6.65 (<10 x 1mm) of brown fine and medium sand. 7.50 - 8.00ES 31 Between 6.70m and 6.80m; clay pockets, soft Brown slightly gravelly, locally gravelly, SAND with frequent mica flakes (<2 x 2mm). Sand is predominantly medium and coarse. Gravel is 8.00 - 8.50 34 8 8.00 - 8.50 FS 33 subangular and subrounded fine to coarse of 8.50 - 9.00 36 mixed lithologies.
Between 7.50m and 8.00m; sand is fine to coarse. 8.50 - 9.00 ES 35 9 9.00 - 9.50 D 38 9.00 - 9.50 ES 37

Notes

9.50 - 10.00 9.50 - 10.00

-10.00 - 10.50 10.00 - 10.50

Abbreviations and results data defined on 'Notes on Exploratory Position Records'

40

42

ĒS

D

Continued next page

TUGRO

| Contract Name | Nigg Energy Park, East Qua | Location ID | | | | | | | | |
|-----------------|----------------------------|------------------------|---|--|--|--|--|--|--|--|
| | 00 07 | | | | | | | | | |
| Client | Global Energy Nigg Ltd | Global Energy Nigg Ltd | | | | | | | | |
| Fugro Reference | G191005U | G191005U | | | | | | | | |
| Coordinates (m) | E279383.70 N868963.58 | Sheet 2 of 3 | | | | | | | | |
| | | | • | | | | | | | |

| | | Hole | Туре | Cabl | e Per | cuss | ion a | nd Ro | otary Coring | Status Draft | | | ft | |
|---|---------|----------|-------------------|------------|------------|------------|-----------|--------------|--|---|--------------------|--------|-----------------|---------------------------|
| Depth | Samp | ling an | d In Situ Testing | Co | ore Re | ecove | ery | | Strata Details | | | | | ndwater |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installatio |
| - 10.50 - 11.00 10.50 - 11.00 | D ES | 44 43 | | | | | | - | Between 10.00m and 12.50m; sand is fine to coarse. Rare to occasional gravel. | (5.50) | | | | |
| -11.00 - 11.50 11.00 - 11.50 | D ES | 46 45 | | | | | | 11 — | | | | | | |
| - - 11.50 - 12.00 - 11.50 - 12.00 | D ES | 48 47 | | | | | | - - - | | | | | | |
| - -12.00 - 12.50 - 12.00 - 12.50 | D ES | 50 49 | | | | | | 12 - | | | | | | |
| - - 12.50 - 13.00 - 12.50 - 13.00 | D ES | 52 51 | | | | | | - - - | Between 12.50m and 13.00m; slightly gravelly. Gravel is subangular and subrounded fine and medium of mixed lithologies. | | | | | |
| - -13.00 - 13.50 | D | 53 | | | | | | 13 — | Brown SAND with abundant mica flakes (<2 x 1mm). Sand is fine to coarse. | 13.00 | -12.15 | | | |
| - 13.50 - 13.85 - | D | 54 | | | | | | - | | | | | | |
| 14.00 - 14.50 - | D | 55 | | | | | | 14 — | | (2.50) | | | | |
| - 14.50 - 15.00 - - | D | 56 | | | | | | - | | | | | | |
| -15.00 - 15.50 - - | D | 57 | | | | | | 15 — | | | | | | |
| - 15.50 - 16.00 - 15.50 - 16.00 - 16.00 - 16.50 | D D | 58 59 | | | | | | 16 — | Brown slightly gravelly SAND with frequent mica flakes (<2 x 1mm). Sand is medium and coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies. | (1.10) | -14.65 | | | |
| - - - 16.50 - 17.00 | D | 60 | | | | | | - | Below 16.00m; gravelly. At 16.50m; 1 No. cobble (90 x 100 x 110mm) of | 16.60 | -15.75 | | | |
| - - -17.00 - 17.35 | D | 61 | | | | | | 17 — | dark grey psammite? Reddish-brown SANDSTONE. Recovered as slightly gravelly sand. | (0.75) | -13.73 | | | |
| 17.35 - 17.45 - 17.45 - 17.75 | | | | | | | NR 0 | - | Assessed zone of core loss. Extremely weak reddish brown SANDSTONE. Slightly to moderately weathered. | 17.35 (0.10) 17.45 (0.30) 17.75 | -16.50 -16.60 | | | |
| - - 17.35 - 18.85 - - | | | | 93 | 93 | 93 | | 18 — | Discontinuities not observed. Very weak, medium bedded, locally very thinly to thinly bedded (inclined 20°), reddish-brown locally light greenish grey SANDSTONE. Slightly weathered. With occasional subrounded clasts (<10 x 20mm) of quartz and occasional subangular to subrounded clasts (<20 x 10mm) of very stiff red clay. | / | 13.00 | | | |
| 17.75 - 20.35 1 1 1 18.85 - 20.35 | | | | 100 | 100 | 95 | 1 | 19 | Discontinuities - see depth related remarks. Between 17.85m and 17.92m; occasional light greenish grey pockets (<20 x 50mm). At 17.92m; joint, subvertical (80°), undulating, rough, very tight, clean. At 18.11m; bedding plane discontinuity, inclined (20°), planar, rough, very tight, micaceous. Between 18.15m and 18.30m; irregular light | (2.60) | | | | |
| - - | | | | | | | | - | greenish grey bed inclined (20°). Continued next page | | | | | |
| | | <u> </u> | | | | | l | | | | | l | | |

Notes

Location ID Contract Name Nigg Energy Park, East Quay Development **BH01** UGRO Client Global Energy Nigg Ltd Fugro Reference G191005U E279383.70 N868963.58 Ground Elevation (m Datum) 0.85 Coordinates (m) Sheet 3 of 3 Cable Percussion and Rotary Coring Hole Type Draft Status Sampling and In Situ Testing Core Recovery Strata Details Groundwater Depth (m) Test TCR SCR RQD Depth Water Backfill / No. Type Strata Descriptions Results (%) (%) (%) (-) (m) Strike Between 18.85m and 19.25m; thinly laminated. Between 19.04m and 19.10m; light greenish grey irregular lens. Between 19.90m and 20.00m; light reddish grey.
At 20.19m; bedding plane discontinuity, inclined
(20°), planar, rough, very tight, clean.
At 20.27m; bedding plane discontinuity, inclined
(20°), planar, rough, very tight, clean.
Very weak thickly laminated locally very thinly
to thickly bedded, reddish brown locally light 20.35 -19.50 21 20.35 - 21.85 100 100 100 to thickly bedded, reddish brown locally light grey and light greenish grey, SANDSTONE. Slightly weathered. Discontinuities - see depth Silgnty Weathered: Discontinuities - see depti related remarks.

Between 20.70m and 20.80m; cross bedded.

Between 20.95m and 21.12m; occasional pockets
(<30 x 50mm) and laminae (<15mm thick) of light
greenish grey sandstone.

Between 21.45m and 21.57m; cross bedded.

Below 21.85m; medium bedded with frequent
subangular and subrounded clasts (<6mm) of
mixed lithologies. 20.35 - 23.35 (3.00) 22

mixed lithologies. Between 22.55m and 22.65m; angular clast (100 x 21.85 - 23.35 100 100 100 80mm) of very stiff red clay. Becoming reddish brown mottled light greenish grey with frequent clay clasts (<10 x 10mm). Between 20.65m and 22.81m; light greenish grey sandstone with frequent subrounded and subangular clasts (<20 x 30mm) of very stiff red 23 -22.50 clay. At 23.18m; bedding plane discontinuity, inclined (20°), planar, rough, very tight, clean. Between 23.18m and 23.24m; laminae (10 to 15 mm thick) of light greenish grey sandstone. End of Borehole at 23.35 m 24 25 26 27 28 29

| | | | | | | | | | | | | | | | | Location | on ID | | |
|--|----------------|----------|----------------------|-----------------------|----------------------|-------------------|--------------------|----------------|------------------------|-------------------------|----------------|---------------|----------|-------------------|------------|-------------------------|---------------|--------------|-------------------|
| l _ | | | Con | tract Nan | ie | Nigg Er | nergy Pa | ırk, Eas | t Quay | Devel | opment | | | | | | | | <u> </u> |
| 15 | IGR | <u> </u> | Clie | | | | Energy N | Nigg Ltd | l | | | | | | | | Bŀ | 10 | 1 |
| | $= \approx$ | | | ro Refere | | G19100 | | | - | | | | | \ 0.05 | | | | | _ |
| | = | | — | rdinates (| | | 3.70 N8 | | | | Elevatio | n (m E | Jatu | m) 0.85 |) | Sheet | ı of 2 | Droft | |
| — | | | וטרו | Type | | Cable F | Percussion | | Rotary Equip | | 4 | | | | | Status | | Draft | |
| Depth From | Depth To (m) | Hole | Type | Date From | Date To | Ear | uipment | Core Ba | | Core Bit | Drilling Cre | w Loga | ed Bv | Remarks | | | | | |
| 0.00 10.00 | 10.00 | C | P | 03/03/2019 04/03/2019 | 04/03/2019 | Dan | ido 2000 | | | | JS/AC | В | 3K | | | | | | |
| 17.35 | 17.35 23.35 | R | | 04/03/2019 | 04/03/2019 | Comac | chio MC-S 1200 | Terracor | | | JL/SN JS/AC | E | SK SK | | | | | | |
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| | | | | Progre | | | | | | | | Rotary | | | | _ | | Core De | etails |
| Date (dd/mm/yyyy | | ss) | Hole Dep (m) | (m) | h Water Dept (m) | vveatrier | | | Depth From (m) | Depth To (m) | Flusii | * * | | (70) | sh Colo | (1111.1111) | n) From (m | | Diameter (mm) |
| 03/03/2019 04/03/2019 04/03/2019 | 00:00:0 | 00 | 0.00 0.50 1.00 | 0.50 0.50 0.50 | 3.30 3.30 3.30 | Dry Dry Dry | | | 0.00 17.35 18.85 | 17.35 18.85 20.35 | W W | | | 0 100 100 | Red Red | 00:10 00:15 00:15 | 18.85 | 20.35 | 102 102 102 |
| 04/03/2019 | 01:00:0 | 00 | 1.50 | 0.50 0.50 | 3.50 3.50 | Diy | | | 20.35 | 21.85 23.35 | , w | | | 100 100 100 | Red Red | 00:12 | | 23.35 | 102 |
| 04/03/2019 04/03/2019 | 02:00:0 | 00 | 2.50 3.00 | 0.50 0.50 | 3.70 3.70 | | | | 21.03 | 25.55 | " | | | 100 | rteu | | | | |
| 04/03/2019 | 03:00:0 | 00 | 3.50 4.00 | 0.50 0.50 | 3.80 3.90 | | | | | | | | | | | | | | |
| 04/03/2019 04/03/2019 | 03:40:0 | 00 | 4.50 5.00 | 0.50 5.00 | 4.10 5.50 | | | | | | | | | | | | | | |
| 04/03/2019 04/03/2019 | 04:20:0 | 00 | 5.50 6.00 | 5.00 5.00 | 5.50 5.50 | | | | | | | | | | | | | | |
| 04/03/2019 04/03/2019 | 05:00:0 | 00 | 6.50 7.00 | 5.00 5.00 | 5.50 5.50 | | | | | | | | | | | | | | |
| 04/03/2019 04/03/2019 | 05:40:0 | 00 | 7.50 8.00 | 5.00 5.00 | 5.50 5.50 | | | | | | | | | | | | | | |
| 04/03/2019 04/03/2019 | 06:20:0 | 00 | 8.50 9.00 | 5.00 5.00 | 5.30 5.30 | | | | | | | | | | | | | | |
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| | | | | lole and (| | | | | - | | | | | | | | | | |
| Depth 5.0 | | Hole | e Diamet | ter (mm) | Depth To 0.50 | (m) (| Casing Diam 200 | | | | | | | | | | | | |
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| 23. | 35 | | 146 | i | 17.00 17.35 | | 175 175 | | | | | | | | | | | | |
| | | (| Chise | lling / Slo | w Progre | ss | | | | | | | | | | | | | |
| Depth F | rom (m) | | Depth To | o (m) | Duration (h | :mm) | Tool / Re | emark | 1 | | | | | | | | | | |
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| | Di . T. () | | ater S | 1 | | [| Water A | Added Depth To | | | | | | | | | | | |
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| | | Wa | ter St | rike Rem | arks | | | | | - | 1 | G | ener | al Rema | arks | | | - | |
| Groundwate | r not observe | ed in m | narine er | nvironment. | | | The | e borehole v | was carrie | d out over | water from j | ack-up pl | atform | Skate 3A. D | eck to n | nudline = 5. | 50m; deck le | evel = 6.35m | CD. Water |
| | | | | | | | Gro | oundwater r | not observ | ed as bor | ehole conduc | ted in ma | rine e | nvironment. | | 10 U | - Pario pelow | _04004 16/1 | |
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| | | I۳ | etalle | tion | | | | | D:- | | | | \neg | | | | ackfill | | |
| Туре | Installation | | | | | p Depth (m) | Pip Base Dep | | meter (mm) | Туре | | epth From (m) | Denth | | Backfill M | aterial | Date | | |
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| Notes | | | | | | | | | | | | | | | | | | | |
| - Abbrevi | ations and | d res | ults da | ata defined | on 'Notes | on Expl | loratory P | osition F | Records | • | | | | | | | | | |
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Elevation Datum

Checked By

NHA

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/12/03/2019/TS

Chart Datum

OSGB

25/04/2019

Print Date

Grid Coordinate System

| | | | Cor | ntract Nar | ne | Nigg E | inergy F | Park, Eas | t Qua | y De | velo | pment | | | | | Loca | | | | |
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| -Fi | IGR | | Clie | ent | | Global | Energy | y Nigg Ltd | <u> </u> | | | | | | | | | F | 3 H | IN [,] | 1 |
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| | $\Rightarrow $ | | _ | ordinates | | E2793 | 83.70 N | N868963. | 58 | Grou | ınd l | Elevation | (m Da | atur | n) 0.8 | 35 | Shee | et 2 c | of 2 | | |
| | | = | | е Туре | | Cable | Percus | sion and | | | | | • | | | | Statu | ıs | | Draft | |
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| Depth From (m) | Depth To (m) | Hole | Туре | Date From | Date To | E | quipment | Core Ba | arrel | Core E | Bit | Drilling Crew | Logge | d By | Remarks | 3 | | | | | |
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| Date (dd/mm/yyyy 04/03/2019 | | ss) | Hole De (m) 16.5 | (m) | pth Water Depth (m) 5.20 | Weathe | er | | Depth From (| m) (r | th To m) | Flush Ty | ре | Flush (| Return (%) | Flush Color | | n Time n:mm) | Depth From (m) | Depth To (m) | Diameter (mm) |
| 04/03/2019 04/03/2019 04/03/2019 | 17:48: | 00 | 17.0 | 0 17.35 | 5.50 | | | | | | | | | | | | | | | | |
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| 04/03/2019 | | | 18.8 | | recognised | i | | | | | | | | | | | | | | | |
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| Danth | T- () | 11-1 | | Hole and | | | Casina Di | | 1 | | | | | | | | | | | | |
| Depth | | | | Depth To (| m) | _ | iameter (mm) 146 | - | | | | | | | | | | | | | |
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| Strike At (m) | Rise To (m) | Time | Elapsed | | n (m) Depth Se | ealed (m) | Depth From | n Depth To | 1 | | | | | | | | | | | | |
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| | | Wa | ter S | trike Rem | arks | | | 1 | 1 | | | | Ge | ner | al Rer | narks | | | L | L | |
| Groundwate | r not observ | | | | | | | The borehole | | | | | k-up plat | tform | Skate 3A | . Deck to m | | | | | |
| | | | | | | | ľ | level was mair Groundwater i | ntained a not obse | at or abo erved as | ove se boreh | eabed level. Al nole conducted | ı depths d in mari | and o | epth rela | ited remark nt. | s refer t | o depth | ns below s | eabed leve | ei. |
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| | | | stalla | | | | | | F | ipe | | | | | | | | Bac | kfill | | |
| Туре | ID | Re | sponse Z Top (m) | Zone Response Base (i | Zone n) Installatio | n Date | ID | Top Depth (m) | Base D | epth (m) | Diam | eter (mm) | Туре | De | epth From | (m) Depth | To (m) | В | Backfill Ma | erial | Date |
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| Notes | | | | | | | | | | | | | | | | | | | | | |
| - Abbrevi | ations an | d res | ults d | ata defined | d on 'Notes | on Exp | oloratory | Position F | Record | ds' | | | | | | | | | | | |
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| Checked By | | | NHA | | | | evation Da | tum | Cha | rt Datur | n | | | Gı | rid Coord | inate Syste | | OSGB | 1 | ı | |
| Template: Fo | GSL/HBSI/F | GSL B | H Sum | mary.hbt/Conf | g Fugro Rev5 | 12/03/20 | 19/TS | | | | | | | | | | Print D | ate | | 25/04/20 | 19 |

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID | | | | | | | |
|-----------------|----------------------------|------------------------|--|-------------|--|--|--|--|--|--|--|
| Client | Global Energy Nigg Ltd | Global Energy Nigg Ltd | | | | | | | | | |
| Fugro Reference | G191005U | | | | | | | | | | |
| Coordinates (m) | E279342.91 N868934.75 | Sheet 1 of 1 | | | | | | | | | |
| | 0.11.0 | 0 | | | | | | | | | |

Sheet 1 of 1

| | \sim | _ | rdinates (m) | _ | 9342.91 N868934.75 Ground Elevation (m Datum) -9.10 | Sheet | | | 4 | |
|----------------------------|----------|----------|--------------|--------------|--|-----------------------------|--------------------|--------|-----------------|-------------------|
| | | Hole | Туре | Cab | le Percussion | Status | | Draf | t | |
| Samp | oling an | d In Si | tu Testing | | Strata Details | | | | Grour | ndwat |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backf Installa |
| 0.00 - 0.50 0.00 - 0.50 | D ES | 2 1 | | | Dark brownish grey SAND with rare pockets (<100 x 30 x 30mm) of very soft dark grey sandy clay and rare shell fragments (<5 x 10mm). Sand is fine to coarse. | (0.50) | | | | |
| 0.50 - 1.00 0.50 - 1.00 | D ES | 4 3 | | - | Dark greenish grey SAND with occasional pockets (<30 x 50mm) of very soft dark grey sandy clay and occasional shell fragments (<1 x 1mm). | - 0.50 | -9.60 | | | |
| - 1.00 - 1.50 | ES | 5 | | 1 - | (\$1.8 111111). | | | | | |
| 1.20 - 1.30 | D | 6 | | | Between 1.20m and 1.30m; very soft dark grey sandy clay. Sand is fine to coarse. Slight organic odour. | (1.70) | | | | |
| 1.50 - 2.00 1.50 - 2.00 | D ES | 8 7 | | - | | | | | | |
| | | | | 2 - | | | | | | |
| 2.20 - 2.50 2.20 - 2.50 | D ES | 10 9 | | : | Soft dark brownish grey sandy CLAY with abundant mica flakes | 2.20 | -11.30 | | | |
| 2.50 - 3.00 | D | 12 | | - | (<1 x 1mm) and sulphureous odour. Sand is predominantly fine and medium. | | | | | |
| 2.50 - 3.00 | ES | 11 | | | Between 2.50m and 3.00m; 1 No. decomposing wood fragment (15 x 50mm). | | | | | |
| - 3.00 - 3.50 | D | 14 | | 3 - | | (1.30) | | | | |
| 3.00 - 3.50 | ES | 13 | | : | - | | | | | |
| 0.50 4.00 | | 40 | | | | 0.50 | 40.00 | | | |
| 3.50 - 4.00 3.50 - 4.00 | D ES | 16 15 | | | Soft dark grey slightly gravelly sandy CLAY with abundant mica | 3.50 | -12.60 | | | |
| | | | | | flakes, sulphureous odour and 1 No. wood fragment (80 x 60 x 50mm). | (0.50) | | | | |
| 4.00 - 4.50 | D | 17 | | 4 - | Greyish brown slightly gravelly SAND with low cobble content, and | 4.00 | -13.10 | | | |
| | | | | | abundant mica flakes(<1 x 1mm). Sand is fine to coarse. Gravel is subangular and subrounded mainly medium and coarse of mixed | (0.50) | | | | |
| 4.50 - 5.00 | D | 18 | | _ | lithologies. Cobbles (<80 x 60 x 80mm) are subangular possibly of | 4.50 | -13.60 | | | |
| | | | | | \gneiss. Greyish brown SAND with abundant mica flakes (<2 x 1mm). Sand | | | | | |
| - 5.00 - 5.50 | D | 19 | | 5 — | is fine to coarse. | | | | 1 | |
| | | | | | Between 5.00m and 6.00m; with occasional gravel. Gravel is subangular and subrounded fine to coarse of mixed lithologies (gneiss, pegmatite | | | | | |
| 5.50.000 | | | | | and sandstone). | | | | | |
| 5.50 - 6.00 | D | 20 | | - | | | | | | |
| | | | | | | | | | | |
| 6.00 - 6.50 | D | 21 | | 6 - | Between 6.00m and 8.00m; with rare to occasional gravel. Gravel is | | | | | |
| | | | | | subangular and subrounded fine to coarse of mixed lithologies. | (3.50) | | | | |
| 6.50 - 7.00 | D | 22 | | - | | | | | | |
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| - 7.00 - 7.50 | D | 23 | | 7 - | | | | | . | |
| 7.00 7.00 | | 20 | | ' : | | | | | . | |
| | | | | | - | | | | | |
| 7.50 - 8.00 | D | 24 | | - | | | | | | |
| | | | | | | | | | | |
| 8.00 - 8.50 | D | 25 | | 8 - | Greyish brown slightly gravelly SAND with abundant mica flakes | 8.00 | -17.10 | | | |
| | | | | - | (<2 x 1mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies, predominantly grey | (0.70) | | | | |
| 8.50 - 9.00 | D | 26 | | - | and red sandstone. | (0.70) | | | | |
| | | | | | Probably red, grey and reddish brown SANDSTONE. Recovered | 8.70 | -17.80 | | | |
| - 9.00 - 9.40 | D | 27 | | 9 - | as gravelly sand. | | | :::: | | |
| 3.00 - 3.40 | | ۷. | | | At 8.90 m; 1 No. cobble (120 x 80 x 60mm) sized fragments. | (0.70) | | |] | |
| | | | | | End of Borehole at 9.40 m | 9.40 | -18.50 | :::: | | |
| | | | | - | End of potentials at 9.40 m | | | | | |
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| | | | Cor | ntract Na | ıme | Nigg I | Energy F | Park, Eas | t Quay | Deve | lopment | | | | | Location | n ID | | |
|--|------------------------|---------------|----------------------|-------------------------|-------------------------|---------------|-------------------------|---------------------|-------------------|-----------------|-----------------------|----------|-------------------|------------------|--------------|-------------------------------|-------------------------------|-----------------------------|--------------------|
| -fi | JGR | 0 | Clie | ent | | Globa | al Energy | y Nigg Ltd | d | | | | | | | | BH | 10, | 7 |
| ■ = | \Rightarrow | Ĭ | | ro Refer | ence | G1910 | | ***55 | - | | , | | | | | | | | |
| | $\Rightarrow $ | i | | ordinates | | _ | | N868934.7 | 75 C | roun | d Elevatio | n (m | n Datu | ım) -9. | 10 | Sheet 1 | of 1 | | |
| | | _ | Hole | е Туре | | Cable | Percuss | | | | | | | | | Status | | Draft | |
| Depth From | T | Τ., | | | T | | | | Equip | | | <u> </u> | | | | | | | |
| (m) 0.00 | Depth To (m) 9.40 | Hole C | | Date From 02/03/2019 | | | Equipment Dando 2000 | Core Ba | arrel C | Core Bit | Drilling Cre JS/AC | | ogged By BK/RL | Remarks | | | | | |
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| | | _ | _ | Progr | | | | | | | | Rota | ary Det | | | | | Core De | etails |
| Date (dd/mm/yyyy | Time (hh:mm: | :ss) | Hole Dep | (m) | | vvcaui | ier | | Depth From (m) | Depth To (m) | Flush | Туре | Flus | sh Return (%) | Flush Coloui | Run Time (hh:mm) | e Depth) From (m) | Depth To (m) | Diameter (mm) |
| 02/03/2019 | 9 20:00: | :00 | 0.00 | 1.00 | 2.20 |) | _ | _ | | Ī | 7 | _ | _ | | _ | | _ | Ţ | |
| 02/03/2019 | 9 20:50: | :00 | 1.00 1.50 | 2.00 | 2.10 |) | | | | | | | | | | | | | |
| 02/03/2019 02/03/2019 02/03/2019 | 9 21:30: | :00 | 2.00 2.50 3.00 | 3.00 | 2.00 |) | | | | | | | | | | | | | |
| 02/03/2019 | 9 21:55: | :00 | 3.50 4.00 | 4.00 | 1.90 |) | | | | | | | | | | | | | |
| 02/03/2019 02/03/2019 | 9 22:15: | :00 | 4.50 5.00 | 4.00 | 1.70 |) | | | | | | | | | | | | | |
| 02/03/2019 03/03/2019 | 9 22:30: 9 14:55: | :00 | 5.50 6.00 | 4.00 | 1.50 |) | | | | | | | | | | | | | |
| 03/03/2019 03/03/2019 | 9 15:38:0 9 16:05:0 | :00 | 6.50 7.00 | 7.00 7.50 | 4.00 |) | | | | | | | | | | | | | |
| 03/03/2019 03/03/2019 | 9 16:20: 9 16:39: | :00 | 7.50 8.00 | 8.00 8.50 | 4.00 |) | | | | | | | | | | | | | |
| 03/03/2019 03/03/2019 | 9 17:00: | :00 | 8.50 9.00 | 9.00 | 4.00 |) | | | | | | | | | | | | | |
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| Depth 6.0 | | Hole | e Diame 220 | eter (mm) | Depth T | | | iameter (mm) 200 | _ | | | | | | | | | | |
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| Depth F | rom (m) | _ | Depth To | | low Progr Duration (| | Tool / | Remark | - | | | | | | | | | | |
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| | | W | ater : | Strike | | | Water | r Added | 1 | | | | | | | | | | |
| Strike At (m) | Rise To (m) | Time ! | Elapsed nins) | Casing Dep | oth (m) Depti | h Sealed (m) | Depth From (m) | Depth To (m) | 1 | | | | | | | | | | |
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| | | L | | | | | <u> </u> | | <u> </u> | | | | | \perp | | | \perp | | |
| | | | | trike Ren | narks | | | - 1 | | | fun | | | ral Ren | | | To Jack I | | 00 Water |
| Groundwate | er not observ | ed in m | arine er | nvironment. | | | le | level was main | ntained at o | or above | er water from j | . All de | epths and | depth rela | ited remarks | udline = 14. s refer to de | .60m; deck is pths below s | evel = 5.500 seabed leve | m CD. Water el. |
| | | | | | | | 1 | 3roundwater r | not observe | ed as b⊍ | orehole conduc | cted in | ı marine e | environmen | ıt. | | | | |
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| l | | | | | | | 1 | | | | | | | | | | | | |
| | | | stalla | tion | | $\overline{}$ | | | Pip | | | | | | | Be | ackfill | | |
| Туре | ID | Res | sponse Zo | one Response | e Zone Install | ation Date | ID . | Top Depth (m) | Base Dept | | liameter (mm) | Tyı | уре [| Depth From (| (m) Depth T | | Backfill Ma | | Date |
| - 21 | | + | Top (m) | Base | (m) | | | | + - | | - | | - | 0.00 | 9.4 | | Bentoni | | 03/03/2019 |
| | | | | | | | | | | | | | | | | | | | |
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| | | ╧ | | | | | | | | | | | | | | | | | |
| Notes | | | | | | | | | | | | | | | | | | | |
| - Abbrevi | ations an | d resi | ults da | ata define | ed on 'Not | es on Ex | (ploratory | Position F | Records | , | | | | | | | | | |
| ĺ | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Checked By | | | NHA | | | | Elevation Dat | .um | Chart I | Jatum | | | | Grid Coordi | inate Systen | | GB ————— | | |
| Template: F | GSL/HBSI/F | GSL B! | 러 Sumr | nary.hbt/Cor | ıfig Fugro Re | v5/12/03/29 | .019/TS | | | | | | | | 1/ | Print Date | | 25/04/201 | 19 |

| Contract Name | Nigg Energy Park, East Qua | Nigg Energy Park, East Quay Development | | | | | | | | | |
|-----------------|----------------------------|---|-------|--------------|--|--|--|--|--|--|--|
| Client | Global Energy Nigg Ltd | | | \mathbf{B} | | | | | | | |
| Fugro Reference | G191005U | | | | | | | | | | |
| Coordinates (m) | E279380.53 N868920.31 | Ground Elevation (m Datum) | -0.75 | Sheet 1 of 3 | | | | | | | |
| Hala Tuna | Cable Developies and Date | m. Carina | | Ctatus | | | | | | | |

Sheet 1 of 3 Status

| | | Hole | Туре | Cabl | e Per | cuss | ion a | nd Ro | otary Coring | Status | | Draft | | |
|--|---------------------|----------------|-------------------|------------|------------|------------|-----------|--------------|--|-----------------------------|--------------------|--------|-----------------|----------------------------|
| Depth | Samp | ling an | d In Situ Testing | Co | ore R | ecove | ery | | Strata Details | | | | Groui | ndwater |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installation |
| 0.00 - 0.50 0.00 - 0.50 | D ES | 2 1 | | | | | | - | Loose dark brownish grey SAND with frequent shells and shell fragments (<10 x 30mm). | | | | | |
| - 0.50 - 1.00 0.50 - 1.00 0.50 - 1.00 0.50 - 0.95 | B D ES SPT | | N = 9 (S) | | | | | - | Below 0.50m; slightly gravelly. Gravel is subangular to rounded fine to coarse of mixed lithologies. | (1.00) | | | | |
| - 1.00 - 1.50 1.00 - 1.50 - 1.50 - 2.00 | D ES | 7 6 | | | | | | 1 | Dense dark grey slightly gravelly, becoming gravelly, with depth, SAND with occasional wood and possible reed fragments (<10 x 10mm). Sand is fine to coarse. Gravel is | 1.00 | -1.75 | | | |
| 1.50 - 2.00 | ES | 8 | | | | | | - | subangular and subrounded fine to coarse of mixed lithologies. | | | | | |
| - 2.00 - 2.45 2.00 - 2.50 2.00 - 2.45 | D ES SPT | 10 11 | N = 31 (S) | | | | | 2- | Below 2.00m; sand is predominantly medium and coarse. | (2.00) | | | | |
| - 2.50 - 3.00 2.50 - 3.00 | B ES | 13 12 | | | | | | - | | | | | | |
| - 3.00 - 3.50 3.00 - 3.50 - 3.50 - 4.00 | D ES B | 15 14 17 | | | | | | 3 — | Medium dense dark grey gravelly SAND with abundant to frequent shells and shell fragments (<20 x 30mm). Sand is fine to coarse. Gravel subangular to rounded fine to coarse of mixed | 3.00 | -3.75 | | | |
| 3.50 - 4.00 | ES | 16 | | | | | | - | lithologies. At 3.50m; 1 No. subrounded cobble of dark grey possible psammite (<70 x 70 x 70mm). | (0.00) | | | | |
| - 4.00 - 4.45 4.00 - 4.50 4.00 - 4.45 | D ES SPT | | N = 17 (S) | | | | | 4- | Below 4.00m; slightly gravelly. Gravel is subangular and subrounded fine to coarse of mixed lithologies. | (2.00) | | | | |
| - 4.50 - 5.00 4.50 - 5.00 | B ES | 21 20 | | | | | | - | | | | | | |
| 5.00 - 5.29 5.00 - 5.50 5.00 - 5.50 | D D ES | 24 23 22 | | | | | | 5 — | Dark brownish grey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies. | 5.00 | -5.75 | | | |
| 5.50 - 6.00 5.50 - 6.00 5.50 - 5.79 | B ES SPT | 26 25 | 50/140 mm (S) | | | | | - | Very dense brown SAND. Sand is fine to | 5.74 | -6.49 | | | |
| - 6.00 - 6.50 6.00 - 6.50 | D ES | 28 27 | | | | | | 6- | coarse. | (0.76) | | | | |
| 6.50 - 7.00 6.50 - 7.00 | B ES | 30 29 | | | | | | - | Firm and stiff slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to | 6.50 | -7.25 | | | |
| - 7.00 - 7.45 7.00 - 7.50 7.00 - 7.45 | D ES SPT | 31 32 | N = 37 (S) | | | | | 7- | subrounded fine to coarse of mixed lithologies. Below 6.50m; with occasional pockets or lenses of brown sandy clay (<80 x 80 x 100mm) and occasional angular to subrounded fine and | (0.79) | -8.04 | | | |
| - 7.50 - 8.00 7.50 - 8.00 | B ES | 34 33 | | | | | | - | medium gravel of mixed lithologies. Dense brown silty SAND with occasional lenses or bands (<100mm thick) of brown stiff clay. Sand is fine to coarse. | (0.71) | -0.04 | × | | |
| - 8.00 - 8.50 8.00 - 8.50 | D ES | 36 35 | | | | | | 8- | Very dense brown gravelly SAND with frequent mica flakes (<2 x 2mm). Sand is fine to coarse. | 8.00 | -8.75 | ××× | | |
| - 8.50 - 9.00 8.50 - 9.00 | B ES | 38 37 | | | | | | - | Gravel is subangular and subrounded fine to coarse of pelite and sandstone. Between 8.00m and 9.00m; rare subrounded cobbles (<100 x 100 x 120mm) of pelite. | | | | | |
| - 9.00 - 9.33 9.00 - 9.50 9.00 - 9.33 | D ES SPT | 39 40 | 50/180 mm (S) | | | | | 9 — | Between 9.00m and 9.50m; occasional lenses or bands of stiff brown slightly gravelly slightly sandy clay. Sand is fine to coarse, gravel is subangular | (2.00) | | | | |
| 9.50 - 10.00 9.50 - 10.00 | B ES | 42 41 | | | | | | - | and subrounded of pegmatite. Below 9.50m; occasional subangular and subrounded fine and medium gravel of mixed lithologies. | | | | | |
| -10.00 - 10.50 10.00 - 10.50 | D ES | 44 43 | | | | | | - | Continued next page | 10.00 | -10.75 | | | |

Notes



| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|-----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | i Bi |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279380.53 N868920.31 | Ground Elevation (m Datum) | -0.75 | Sheet 2 of 3 |
| Hala Tuna | Cable Developies and Detail | m. Carina | | Ctatus |

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| | \approx | Cooi | rdinates (m) | E279 | 9380. | 53 N | 8689 | 20.31 | Ground Elevation (m Datum) -0.75 | Sheet 2 of 3 Status Draft | | | | |
|--|---------------|----------|-------------------|------------|------------|------------|-----------|-----------------------|--|-----------------------------|--------------------|--------|-----------------|---------------------------|
| | | Hole | Туре | Cabl | e Pei | cuss | ion a | nd Ro | otary Coring | Status | | | | |
| Depth | Samp | ling an | d In Situ Testing | Co | ore R | ecove | ery | | Strata Details | | | | Grour | ndwater |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installatio |
| - 10.50 - 11.00 10.50 - 11.00 | B ES | 46 45 | | | | | | | Dense reddish-brown, locally slightly gravelly SAND with frequent mica flakes (<2 x 2mm). Sand is fine to coarse. Gravel is subangular and subrounded fine and medium of mixed lithologies including pelite, quartzite and sandstone. | | | | | |
| -11.00 - 11.45 11.00 | D SPT | 47 | | | | | | 11 — | | | | | | |
| - 11.50 - 12.00 | В | 48 | | | | | | - | | | | | | |
| -12.00 - 12.50 | D B | 49 | | | | | | 12 | | (4.60) | | | | |
| - 12.50 - 13.00 - 13.00 - 13.45 | D | 50 | | | | | | 13 — | | | | | | |
| 13.00 - 13.45 13.00 - 13.45 - 13.50 - 14.00 | SPT B | | N = 33 (S) | | | | | - | | | | | | |
| - 13.70 - 13.75 - 14.00 - 14.50 | D D | 53 54 | | | | | | - - 14 — | Between 13.70m and 13.75m; band or lens (<50 mm thick) of very stiff dark brown organic silt. | | | | | |
| - - - 14.50 - 15.00 | В | 55 | | | | | | - - - | | | | | | |
| -15.00 - 15.25 -15.00 - 15.26 -15.50 - 16.00 | D SPT B | 56 57 | 50/105 mm (S) | | | | | 15 — | Very dense brown slightly gravelly, locally gravelly, SAND with high cobble content and frequent mica flakes (<2 x 2mm). Sand is fine to coarse, gravel is subangular and subrounded fine to coarse of pelite, quartzite and sandstone. Cobbles (<150 x 120 x 120mm) are of pelite, quartzite and sandstone. | (1.60) | -15.35 | | | |
| - - - - 16.20 - 16.50 - - | D | 58 | | | | | | 16 — | Brown SAND with frequent mica flakes (1 x 1mm). Sand is predominantly fine and medium. | — 16.20 (0.55) | -16.95 | | | |
| 16.75 - 16.85 - -17.00 - 17.18 | D SPT | 59 | 50/30 mm (S) | | | | | - 17 — | Extremely weak locally very weak reddish brown SANDSTONE. Slightly to moderately | 16.75 | -17.50 | | | |
| 17.25 17.00 - 17.65 - 17.00 - 18.00 | D | 60 | (-/ | 65 | 65 | 65 | 0 | - - - - - | weathered. Discontinuities not observed. Between 17.25m and 17.30m; light grey. Between 17.25m and 17.40m; very weak. Between 17.65m and 18.10m; assessed zone of | (1.35) | | | | |
| . 17.65 - 18.10 – | | | | | | | NR | 18 — | core loss. Extremely weak thickly laminated to thinly | 18.10 | -18.85 | | | |
| 18.00 - 19.50 18.10 - 19.50 | | | | 93 | 93 | 93 | 1 | 19 — | bedded (inclined 20°), reddish brown SANDSTONE. Slightly to moderately weathered. With rare clasts (<10 x 15mm) of dark grey igneous? rock. Discontinuities. See depth related remarks. At 19.13m; joint, inclined (40°), planar, rough, very | (1.40) | | | | |
| - | | | | | | | | - - - - - | tight, clean. Weak, locally thinly bedded to thickly laminated (inclined 10 to 20°), reddish-brown SANDSTONE locally grading into sandstone | 19.50 | -20.25 | | | |
| | | | | | | | | | Continued next page | | | | | |

Notes



| Contract Name | Nigg Energy Park, East Qua | Location ID | | |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279380.53 N868920.31 | Ground Elevation (m Datum) | -0.75 | Sheet 3 of 3 |
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Sheet 3 of 3

| | \sim | | Type | _ | | | | | otary Coring | Status | 01 3 | Draf | t | |
|--------------------------------|--------|-----|--------------------|------------|------------|------------|-----------|------------------------------|--|-----------------------------|--------------------|--------|-----------------|------------------------|
| Depth | Samp | ' | nd In Situ Testing | | re R | | | -I Depth Strate Deparintions | | | | | Grou | ndwate |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill Installati |
| 19.50 - 21.00 19.50 - 22.12 | | | | 100 | 100 | 100 | 1 | - | conglomerate. Slightly weathered. Between 19.50m and 19.60m; sandstone conglomerate. Clasts are rounded (<30 x 20mm). Between 19.65m and 19.70m; sandstone conglomerate. Clasts are subrounded and rounded (<10 x 10mm). Between 20.10m and 20.48m; light grey sandstone conglomerate. Clasts are subangular | | | | | |
| 21.00 - 22.50 | | | | 100 | 96 | 96 | - | 21 — | and subrounded (<30 x 20mm). Between 20.52m and 20.55 m; occasional flat clasts (60 x 5 mm inclined 30°) of reddish brown siltstone. Between 21.00m and 21.10m; occasional subrounded to subangular clasts (<10 x 20mm). Between 21.26m and 21.37m; greenish grey sandstone. | (3.00) | | | | |
| 22.12 - 22.18 22.18 - 22.50 | | | | | | | 3 | 22 - | Between 22.12m and 22.18m; non intact, recovered as fragments, possibly drilling affected, possibly extremely weak, very closely fractured. Between 22.35m and 22.41m; greenish grey coarse grained with occasional subangular clasts. Between 22.42m and 22.50m; extremely weak. | 22.50 | -23.25 | | | |
| | | | | | | | | 23 — | End of Borehole at 22.50 m | | | | | |
| | | | | | | | | 24 | | | | | | |
| | | | | | | | | 25 — | | | | | | |
| | | | | | | | | 26 — | | | | | | |
| | | | | | | | | 27 — | | | | | | |
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| | | | | | | | | 29 — | | | | | | |
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Notes

Location ID Contract Name Nigg Energy Park, East Quay Development **BH03** UGRO Client Global Energy Nigg Ltd Fugro Reference G191005U E279380.53 N868920.31 Ground Elevation (m Datum) -0.75 Coordinates (m) Sheet 1 of 2 Hole Type Cable Percussion and Rotary Coring Draft Status Equipment Hole Type Date From Date To Core Bit Drilling Crew epth To (m) Equipment Core Barrel Logged By Remarks 0.00 08/03/2019 08/03/2019 Dando 2000 4.45 JL/CA 4.45 8.50 17.25 8.50 CP CP 08/03/2019 08/03/2019 Dando 2000 JL/SN Dando 2000 Dando 2000 Comacchio MC-S 1200 08/03/2019 09/03/2019 JS/AC Terracore S-Geobor RC 09/03/2019 09/03/2019 JS/AC **Progress** Rotary Details Core Details Weather Depth To (m) 17.00 18.00 19.50 21.00 22.50 Flush Type Flush Colour (m) 1.70 1.80 1.90 2.00 2.20 2.20 2.40 2.50 2.60 00:03 00:05 00:07 00:10 17.00 18.00 19.50 21.00 08/03/2019 13:00:00 0.00 0.50 1.00 1.50 2.00 2.50 3.00 4.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.45 W W W W 100 100 100 100 100 13:00:00 13:40:00 13:49:00 14:00:00 14:30:00 14:40:00 14:50:00 15:10:00 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 15:20:00 15:30:00 4.00 4.50 4.45 5.00 2.00 2.10 08/03/2019 08/03/2019 15:50:00 16:50:00 5.00 5.50 5.50 2.20 16:50:00 17:00:00 17:45:00 18:10:00 18:38:00 19:45:00 20:00:00 21:30:00 22:10:00 22:40:00 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 08/03/2019 6.00 6.50 7.00 7.50 8.00 8.50 9.00 9.50 10.00 6.50 7.00 7.50 8.00 8.50 9.00 9.50 10.00 10.50 2.60 3.10 3.20 3.30 5.90 5.80 5.10 4.80 4.60 4.00 3.80 08/03/2019 08/03/2019 08/03/2019 08/03/2019 22:40:00 22:50:00 10.50 11.00 11.00 11.50 08/03/2019 08/03/2019 23:00:00 23:20:00 11.50 12.00 11.50 11.50 3.70 3.30 23:20:00 23:50:00 00:00:00 00:30:00 01:00:00 02:00:00 08/03/2019 09/03/2019 09/03/2019 09/03/2019 12.50 13.00 13.50 14.00 14.50 11.50 14.50 11.50 14.50 15.00 3.10 3.00 2.70 2.40 09/03/2019 Hole and Casing Hole Diameter (mm) Depth To (m) Depth To (m) Casing Diameter (mm) 220 4.45 220 220 220 220 220 146 220 220 220 146 220 8.50 14.00 8.00 11.50 17.00 17.25 17.25 22.50 Chiselling / Slow Progress Depth From (m) Depth To (m) Duration (hh:mm) Tool / Remark 6.00 9.00 01:00 01:30 Water Strike Water Added Strike At (m) Rise To (m) Casing Depth (m) Water Strike Remarks General Remarks The borehole was carried out over water from jack-up platform Skate 3A. Deck to mudline = 6.90m; deck level = 6.15m CD. Water level was maintained at or above seabed level. All depths and depth related remarks refer to depths below seabed level. Groundwater not observed as borehole conducted in marine environment. Groundwater not observed in marine environment Installation Backfill Pipe Response Zone Response Zone Top (m) Response Zone Base (m) Туре ID nstallation Dat Base Depth (m) Backfill Material ID Top Depth (m) Diameter (mm) Type Depth From (m) Depth To (m) Date 09/03/2019 0.00 22.50 Bentonite Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Checked By

NHA

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/12/03/2019/TS

Elevation Datum

Chart Datum

Grid Coordinate System

OSGB

25/04/2019

Print Date

| | | | Cont | ract Naı | me | Nig | gg Energy | Park, E | East | Quay | Deve | lopment | | | | Loca | ation I | | | |
|--|-----------------|----------|------------------------|-------------------------|-----------|----------------------|-----------------|-------------|---------|-------------------|----------------|--|-------------|--------------------|----------------|---------|-----------------|---------------|----------|----------|
| l −fi | JGRI | | Clien | nt | | Glo | obal Energ | ay Nigg | Ltd | | | | | | | | F | 3H | l۸ʻ | 3 |
| | \Rightarrow | | | o Refere | ence | | 91005U | <i>y</i> 33 | | | | | | | | | | / | I U | J |
| | $= \approx$ | | Coor | dinates | (m) | E2 | 79380.53 | N86892 | 20.3 | 1 G | roun | d Elevation | (m Da | tum) - | 0.75 | Shee | et 2 o | f 2 | | |
| | | | Hole | Туре | | Ca | ble Percu | ssion a | | | | | | | | Statı | us | | Draft | |
| Depth From | I | | . 1. | | T | | | | | Equip | | | I | | | | | | | |
| (m) | Depth To (m) | Hole T | ype [| Date From | Date | е То | Equipment | Cor | re Bar | rel C | ore Bit | Drilling Crew | Logged | By Rema | rks | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | |
| | | | | Progr | ess | | | | | | | Ro | tary D | etails | | | | C | ore De | etails |
| Date (dd/mm/yyyy | Time (hh:mm: | ss) F | lole Depti (m) | (m) | | (III) | eather | | | Depth From (m) | Depth T (m) | | | lush Return (%) | Flush Colo | our Ru | n Time h:mm) | Diameter (mm) | | |
| 09/03/2019 09/03/2019 | 9 03:00:0 | 00 | 15.00 15.50 | 15.50 16.00 | 2 | 2.40 2.50 | | | | | | | | | | | | | | |
| 09/03/2019 | 9 04:00:0 | 00 | 16.00 16.50 | 16.50 17.00 | 3 | 3.00 3.30 | | | | | | | | | | | | | | |
| 09/03/2019 09/03/2019 09/03/2019 | 9 05:00:0 | 00 | 0.00 17.00 18.00 | 17.00 17.00 17.00 | 4 | 3.80 1.40 1.60 | | | | | | | | | | | | | | |
| 09/03/2019 09/03/2019 | 9 05:30:0 | 00 | 19.50 21.00 | 17.00 17.00 17.00 | 4 | 1.70 5.10 | | | | | | | | | | | | | | |
| 09/03/2019 | | | 22.50 | 17.00 | | 5.10 | | | | | | | | | | | | | | |
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| | | | H | ole and | Casin | ng | | | | | | | | | | | | | | |
| Depth | To (m) | Hole | Diamete | er (mm) | Dep | oth To (m) | Casing I | Diameter (r | mm) | | | | | | | | | | | |
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| Donth F | rom (m) | | epth To | ling / Slo | | on (hh:mm | a) Too | I / Remark | | | | | | | | | | | | |
| Deptili | TOTTI (III) | | ерштю | (111) | Durau | OII (IIII.IIIII | 1) 100 | I/ Relliaik | | | | | | | | | | | | |
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| | | Wa | ater S | trike | | | Wate | er Adde | ed | | | | | | | | | | | |
| Strike At (m) | Rise To (m) | Time E | lapsed ns) | Casing Dept | th (m) D | epth Sealed | d (m) Depth Fro | om Depth | | | | | | | | | | | | |
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| | | | | ike Rem | narks | | | | | | | : | | | emarks | | | | | 00.14 |
| Groundwate | er not observe | ed in ma | arine env | /ironment. | | | | level was | maint | ained at c | r above | er water from jacl seabed level. Al | I depths a | nd depth r | elated remar | | | | | |
| | | | | | | | | Groundwa | ater no | ot observe | ed as bo | rehole conducted | a in marine | environn | nent. | | | | | |
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| | | Inc | tallati | ion | | | | | | Pip | е | | | | | | Back | cfill | | |
| Туре | ID | Resp | onse Zon | | Zone In: | stallation Da | ate ID | Top Depth | n (m) | Base Depti | - | | | | | | | | Date | |
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| Notes | | | | | | | | | | | | | | | | | | | | |
| - Abbrevi | ations an | d resu | lts dat | ta define | d on 'N | lotes on | Explorator | ry Position | on R | ecords' | | | | | | | | | | |
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| Checked By | | | HA | | | | Elevation D | atum | | Chart [| Datum | | | Grid Coo | ordinate Syste | _ | OSGB | | | |
| Template: F | GSL/HBSI/F | GSL BH | Summa | ary.hbt/Conf | fig Fugro | Rev5/12/0 | 03/2019/TS | | | | | | | | | Print D | ate | | 25/04/20 | 19 |

TUGRO

| Contract Name | Nigg Energy Park, East Qua | Nigg Energy Park, East Quay Development | | | | | | | | |
|-----------------|----------------------------|---|-------|--------------|--|--|--|--|--|--|
| Client | Global Energy Nigg Ltd | | | B | | | | | | |
| Fugro Reference | G191005U | | | | | | | | | |
| Coordinates (m) | E279380.77 N868871.12 | Ground Elevation (m Datum) | -2.02 | Sheet 1 of 3 | | | | | | |
| Hala Tama | O-1-1- D | • | | 04-4 | | | | | | |

BH04

| | \sim | - | Type | | le Percussion | Status | 1 01 3 | Draf | t | |
|--|---------------------|----------------------|---------------|--------------|--|------------------------|--------------------|---------------------------------------|-----------------|------------|
| Samp | oling an | | itu Testing | | Strata Details | | | | Grour | ndwater |
| Depth | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) | Level (m Datum) | Legend | Water Strike | Backfill / |
| (m) 0.00 - 0.50 0.00 - 0.50 | B ES | 2 | | (m) - | Medium dense dark brownish grey slightly gravelly to gravelly SAND. Sand is fine to coarse. Gravel is subrounded and rounded | (m) | (III Datulli) | | Strike | mstallatio |
| - 0.50 - 0.95 0.50 - 1.00 0.50 | D ES SPT | 3 4 | | - | fine and medium of mixed lithologies (sandstone, pelite, granite, quartzite, diorite and pegmatite). With frequent possible black wood fragments (<5 x 5 mm), frequent mica flakes (<2 x 2 mm) and occasional shell fragments (<2 x 1 mm). | | | | | |
| - 1.00 - 1.50 1.00 - 1.50 | B ES | 6 5 | | 1 - | Between 1.00m and 1.50 m; with low cobble content. Cobbles (<80 x 60 x 80mm) are subrounded and rounded dark grey possible pelite. | (2.50) | | | | |
| - 1.50 - 2.00 1.50 - 2.00 | D ES | 8 7 | | - | | | | | | |
| - 2.00 - 2.45 2.00 - 2.50 2.00 - 2.45 | D ES SPT | 9 10 | N = 16 (S) | 2 - | | | | | | |
| - 2.50 - 3.00 2.50 - 3.00 | B ES | 11 12 | | - | Medium dense dark brownish grey slightly gravelly SAND with frequent mica flakes (<2 x 2mm) and black decomposing wood fragments (<5 x 5mm). Sand is predominantly fine and medium. | 2.50 | -4.52 | | | |
| - 3.00 - 3.50 3.00 - 3.50 | D ES | 13 14 | | 3 - | Gravel is subangular and subrounded fine to coarse of mixed lithologies including sandstone. | | | | | |
| 3.50 - 4.00 3.50 - 4.00 | B ES | 16 15 | | | | | | | | |
| - 4.00 - 4.45 4.00 - 4.50 4.00 - 4.45 | D ES SPT | 17 18 | N = 29 (S) | 4 - | | (3.70) | | | | |
| 4.50 - 5.00 4.50 - 5.00 | D ES | 20 19 | | - | Between 4.50m and 5.00m; with low cobble content. Cobbles (<100 x 80 x 100 mm) are subrounded of sandstone. | | | | | |
| - 5.00 - 5.50 5.00 - 5.50 | B ES | 22 21 | | 5 — | | | | | | |
| 5.50 - 6.00 5.50 - 6.00 | D ES | 24 23 | | - | | | | | | |
| - 6.00 - 6.34 6.00 - 6.50 6.00 - 6.34 6.20 - 7.00 | D ES SPT B | 25 26 27 | 50/190 mm (S) | 6 - | Medium dense brownish grey and black sandy GRAVEL with low, becoming high with depth, cobble content. Sand is fine to coarse. | 6.20 | -8.22 | ××× | | |
| 6.50 - 7.00 | ES | 28 | | - | Gravel is subangular to rounded fine to coarse of mixed lithologies. Cobbles (<100 x 100 x 120mm) are subrounded of sandstone and pelite. | | | × × × × × × | | |
| - 7.00 - 7.50 7.00 - 7.50 | D ES | 30 29 | | 7- | At 7.20m; 2 No. pockets (<30 x 20mm) of very soft greyish brown sandy clay. Sand is fine and medium. | (1.90) | | × × × × × × × × × × × × × × × × × × × | | |
| 7.50 - 8.00 7.50 - 8.00 | B ES | 32 31 | | - | | | | x | | |
| - 8.00 - 8.20 8.00 - 8.35 8.20 - 8.50 8.35 - 8.50 - 9.00 | ES SPT D D | 34 35 33 37 | 50/200 mm (S) | 8 | Very dense brownish grey gravelly SAND with low to medium cobble content. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of mixed lithologies. Cobbles (<80 x 100 x | 8.10 (0.40) 8.50 | -10.12 -10.52 | ××> | | |
| 8.50 - 9.00 - 9.00 - 9.50 | ES D | 36 39 | | 9 — | | | | | | |
| 9.00 - 9.50 - 9.50 - 10.00 9.50 - 10.00 | B ES | 38 41 40 | | - | and subrounded fine to coarse of mixed lithologies. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies. Cobbles (<100 x 100 x 100mm) are subangular and subrounded of mixed lithologies probably pelite and | (2.10) | | | | |
| -10.00 - 10.25 | ES | 43 | | : | psammite. With rare shells and shell fragments (<10 x 30mm) and occasional becoming frequent with depth lenses and pockets (<80 | | | | | |
| 10.00 - 10.45 | D | 42 | | 1 | Continued next page | 1 | | | | ii |

Notes

| Contract Name | Nigg Energy Park, East Qua | Location ID | | |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | l B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279380.77 N868871.12 | Ground Elevation (m Datum) | -2.02 | Sheet 2 of 3 |
| | | • | | |

| Sheet 2 of 3 |
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| | \sim | - | rdinates (m) | E279380.77 N868871.12 Ground Elevation (m Datum) -2.02 Sheet 2 of 3 | | | | | | | | | | | |
|--|---------------|----------|---------------|---|---|-----------------------------|--------------------|--------|-----------------|----------------------------|--|--|--|--|--|
| | | Hole | Туре | Cable Percussion Status Draft | | | | | | | | | | | |
| Sampl | ling an | d In Si | tu Testing | | Strata Details | | ı | | Grour | ndwater | | | | | |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installation | | | | | |
| - 10.50 - 11.00 - 11.00 - 11.50 | SPT B | 44 45 | N = 42 (S) | | Dense dark brownish grey slightly sandy GRAVEL with medium to high cobble content. Sand is fine and medium. Gravel is angular and subrounded fine to coarse of mixed lithologies. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies. Cobbles (<100 x 100 x 100mm) are subangular and subrounded of mixed lithologies probably pelite and psammite. With rare shells and shell fragments (<10 x 30mm) and occasional becoming frequent with depth lenses and pockets (<80 x 100 x 120mm) of soft brown slightly gravelly sandy clay. | 10.60 | -12.62 | | | | | | | | |
| - - 11.50 - 12.00 | В | 46 | | - | Very dense brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse predominantly fine and medium of mixed lithologies. Below 11.00m; gravelly. | (1.90) | | | | | | | | | |
| - -12.00 - 12.23 - 12.00 - 12.50 - 12.00 - 12.24 | D D SPT | 47 48 | 50/85 mm (S) | 12 - | Below 12.00m; with low cobble content. Cobbles (<90 x 90 x 100mm) are subangular and subrounded of pelite and gneiss. | | | | | | | | | | |
| - 12.50 - 12.80 - - - - - - - - - - - - - - - - - - - | B D | 49 | | 13 — | Medium dense becoming very dense with depth brown slightly gravelly SAND with frequent mica flakes (<1 x 1 mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of pelite, gneiss and psammite. | 12.50 | -14.52 | | | | | | | | |
| -13.00 - 13.50 - - - - - - 13.50 - 14.00 | В | 50 51 | | 13 — | Between 12.50m and 13.00m; with rare to occasional gravel. Gravel is angular to subrounded medium and coarse. Sand is predominately fine and medium. | | | | | | | | | | |
| - - - -14.00 - 14.45 | D | 52 | | - - 14 — | | | | | | | | | | | |
| 14.00 - 14.45 - - - - 14.50 - 15.00 | SPT B | 53 | N = 20 (S) | - | | | | | | | | | | | |
| - - -15.00 - 15.50 | D | 54 | | 15 — | | | | | | | | | | | |
| - - 15.50 - 16.00 - - | В | 55 | | - | | | | | | | | | | | |
| - -16.00 - 16.45 - 16.00 - 16.45 - | D SPT | 56 | N = 34 (S) | 16 — | | | | | | | | | | | |
| - 16.50 - 17.00 - - - - -17.00 - 17.50 | B D | 57 58 | | - - - - 17 — | | | | | | | | | | | |
| - 17.50 - 18.00 | В | 59 | | - | | (9.60) | | | | | | | | | |
| - - -18.00 - 18.25 - 18.00 - 18.25 | D SPT | 60 | 50/100 mm (S) | 18 — | | | | | | | | | | | |
| - - - 18.50 - 19.00 - | В | 61 | | - | | | | | | | | | | | |
| - - -19.00 - 19.50 - | D | 62 | | 19 — | | | | | | | | | | | |
| - - 19.50 - 20.00 - - | В | 63 | | - | | | | | | | | | | | |
| - -20.00 - 20.25 20.00 - 20.25 | D SPT | 64 | 50/100 mm (S) | - | Continued next page |] | | | | | | | | | |

-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL Cable Percussion.hbt/Config Fugro Rev5/21/02/2019/TS

Print Date

25/04/2019

Location ID Nigg Energy Park, East Quay Development Contract Name **BH04** UGRO Client Global Energy Nigg Ltd Fugro Reference G191005U E279380.77 N868871.12 Coordinates (m) Ground Elevation (m Datum) -2.02 Sheet 3 of 3 Hole Type Draft Cable Percussion Status Groundwater Sampling and In Situ Testing Strata Details Depth (Thickness (m) Depth Depth (m) Strata Descriptions Water Test Results Level (m Datum) Backfill / Type No. (m) Strike Medium dense becoming very dense with depth brown slightly gravelly SAND with frequent mica flakes (<1 x 1 mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of 20.25 - 21.00 В 65 pelite, gneiss and psammite. -21.00 - 22.00 В 67 21 Below 21.00m; rare subangular cobbles (<120 x 120 x 80mm) of sandstone.

Between 21.20m and 21.25m; possible lenticular band of firm brown sandy clay. Sand is fine. 21.20 - 21.25 D 66 -22.00 - 22.08 SPT 50/20 mm (S) 22.10 -24.12 End of Borehole at 22.10 m 23 24 25 26 27 28 29

Print Date

25/04/2019

-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL Cable Percussion.hbt/Config Fugro Rev5/21/02/2019/TS

| | | Co | ontract | Name | N | ligg E | nergy | Park, Ea | st Qu | ay De | evelo | pment | | | | L | ocation | | | |
|----------------------------|----------------------------|-----------------------|--------------|--------------|----------------|--------------|--------------------|---|----------|-------------------|---------|----------------------------------|--------------|------------------------|-------------|---------|------------|------------------------|----------|---------------|
| -fu | GRO | CI | ient | | G | lobal | Energ | y Nigg L | td | | | | | | | | F | 3H | I۸ | 4 |
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| | $= \infty$ | _ | ordina | | | | | N868871 | .12 | Grou | und | Elevation | ı (m Da | tum) - | 2.02 | _ | heet 1 | of 1 | | |
| | | Ho | ole Type | • | С | able | Percus | sion | F | | 4 | | | | | S | tatus | | Draft | |
| Depth From | Depth To (m) | Hole Type | Date Fr | om | Date To | Fo | quipment | Core I | | ipme Core I | | Drilling Crew | Logged | By Rema | rks | | | | | |
| 0.00 | 22.10 | CP | 10/03/2 | | 1/03/2019 | | ndo 2000 | 00.0 | Janoi | | <u></u> | JL/CA | BK/RL | | | | | | | |
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| Date | Time | Hole [| | ogress | Water Depth | 147 41 | | | Dept | th Der | oth To | | otary D | etails Flush Return | l e | 0.1 | Run Time | Depth | Depth To | |
| (dd/mm/yyyy) 10/03/2019 | (hh:mm:s 03:00:0 | s) (m 0 4.0 | 00 4 | (m) I.50 | (m) 4.40 | Weathe | r | | From | (m) (| (m) | Flush T | ype | (%) | Flush | Colour | (hh:mm) | From (m) | (m) | Diameter (mm) |
| 11/03/2019 11/03/2019 | 09:20:0 21:00:0 | 0 8.5 0 21. | | 9.00 6.00 | 6.00 4.00 | | | | | | | | | | | | | | | |
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| | | • | Hole a | nd Ca | sing | | | | | | | | | | | | | | | |
| Depth 22. | | | meter (mm | 1 | Depth To (m | 1) | | iameter (mm |) | | | | | | | | | | | |
| 22. | 10 | 2 | .20 | | 16.00 | | | 220 | | | | | | | | | | | | |
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| | | Chis | sellina / | Slow | Progres | s | | | - | | | | | | | | | | | |
| Depth Fr | om (m) | | To (m) | _ | ration (hh:n | | Tool | / Remark | | | | | | | | | | | | |
| 6.5 7.0 | i0 | 7 | .00 .50 | | 01:00 01:30 | | | | | | | | | | | | | | | |
| 7.5 9.5 | 60 | 8 | .00 | | 01:00 01:00 | | | | | | | | | | | | | | | |
| 11.5 12.6 | 50 00 | 12 12 | 2.00 2.50 | | 01:06 01:03 | | | | | | | | | | | | | | | |
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| | | | Strike | | | | Wate Depth From | r Added | | | | | | | | | | | | |
| Strike At (m) | KISE To (m) | Time Elapse (mins) | Casing | Depth (m) | Depth Sea | led (m) | (m) | (m) | - | | | | | | | | | | | |
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| | | Water | Strike F | emark | (S | | | 1 | | | | | Gen | eral R | emark | s | | 1 | L | I. |
| | | | | | | | | | | | | water from jac eabed level. A | | | | | | | | m CD. Water |
| | | | | | | | | Groundwate | not obs | erved as | s bore | hole conducte | ed in marine | e environn | nent. | arno It | o. to uepi | JOIOW 5 | | |
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| <u> </u> | | Inota! | lation | | | | | | | Dinc | | | | 1 | | | Do: | ok fill | | |
| Туре | ID | Instal | Zone Res | onse Zone | Installation | Date | ID | Top Depth (m | | Pipe Depth (m) | Diam | neter (mm) | Туре | Depth Fro | m (m) L | epth To | | Ckfill Backfill Mai | terial | Date |
| 752 | | Top (r | 11) E | ase (m) | | \dashv | • | . , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | + | . / | 75- | 0.00 | | 22.10 | | Bentonit | | 12/03/2019 |
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| Notes | 41 | L " | | | . 18.1 | - | .1 | . D | <u> </u> | | | | | | | | | | | |
| - Abbrevia | ations and | results | data def | ined or | i 'Notes (| on Exp | piorator | y Position | Kecor | as' | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Checked By | | NHA | | | | FI | evation Da | atum | Ch | art Datu | m | | | Grid Cod | ordinate s | System | osgi | В | | |
| | SSI /HRSI/E/ | | nmary hht/ | Confia Fu | ıgro Rev5/1 | | | | Lon | Datul | | | | J 10 000 | . an iale (| | int Date | - | 25/04/20 | 10 |

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | i Bi |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279379.79 N868819.21 | Ground Elevation (m Datum) | -6.75 | Sheet 1 of 2 |
| Hole Type | Cable Percussion and Rota | ry Coring | | Status |

Sheet 1 of 2 Draft

| Hole Type | | | | Cabl | e Per | cuss | ion a | nd Ro | otary Coring | Status | Level Legend Strike Batall | | | |
|---|--------------------------------|-----------------------|------------------|------------|------------|------------|-----------|----------------|---|-----------------------------|----------------------------------|---------------------------------------|-----------------|---------------------------|
| Depth Sampling and In Situ Testin | | d In Situ Testing | Co | ore R | ecove | ery | | Strata Details | | | | Grour | ndwater | |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installatio |
| 0.00 - 0.50 - 0.00 - 0.50 | D ES | 2 1 | | | | | | - | Possibly very loose becoming medium dense with depth black silty SAND with slight sulphureous odour. | | | ×× × | | |
| 0.50 0.50 - 0.95 0.50 - 1.00 0.50 - 0.95 - 1.00 - 1.50 | ES D B SPT D ES | 4 3 5 7 6 | 0/450 (S) | | | | | 1- | Below 0.50m; strong sulphureous odour. Between 1.00m and 2.00m; rare subangular to | | | × × × × × × × × × × × × × × × × × × × | | |
| - 1.50 - 2.00 1.50 - 2.00 | B ES | 9 | | | | | | - | rounded medium and coarse gravel of mixed lithologies. | (2.50) | | ×× × | | |
| - 2.00 - 2.45 2.00 - 2.50 2.00 - 2.45 | D ES SPT | 10 11 | N = 10 (S) | | | | | 2- | | | | * | | |
| - 2.50 - 3.00 2.50 - 3.00 | B ES | 13 12 | | | | | | - | Dark grey SAND with frequent black organic debris (<1 x 1mm), frequent mica flakes (<1 x 1mm) and frequent shell fragments (<1 x 1mm). | 2.50 | -9.25 | <u>^</u> × × | | |
| - 3.00 - 3.50 - 3.00 - 3.50 | D ES | 15 14 | | | | | | 3 — | | (1.30) | | | | |
| 3.80 - 4.00 3.80 - 4.00 4.00 - 4.50 4.00 - 4.50 4.00 - 4.49 | B ES D ES SPT | 17 16 18 19 | 50/335 mm (S) | | | | | 4- | Very dense dark grey SAND. Sand is fine and medium. Possibly interbedded with very soft and soft dark grey sandy clay. With rare rounded and subrounded cobbles (<80 x 100 x | 3.80 | -10.55 | | | |
| - 4.50 - 5.00 4.50 - 5.00 | B ES | 21 20 | 30/333 11111 (0) | | | | | - | 100mm) of gneiss. Grey slightly gravelly SAND with low cobble content. Sand is mainly fine and medium. Gravel is angular to subrounded fine to coarse | 4.50 | -11.25 | | | |
| 5.00 - 5.50 5.00 - 5.50 | D ES | 23 22 | | | | | | 5 — | of mixed lithologies. Cobbles (<100 x 80 x 60mm) are subrounded and rounded of pelite. Very dense slightly sandy, becoming sandy with depth, GRAVEL. Sand is fine to coarse. Gravel | 5.00 | -11.75 | | | |
| - 5.50 - 6.00 | В | 24 25 | | | | | | - | is subangular to rounded fine to coarse of mixed lithologies (pelite, granite, sandstone, gneiss, pegmatite). | (1.50) | | | | |
| - 6.00 - 6.45 6.00 - 6.40 - 6.50 - 7.00 | SPT D | 25 | 50/245 mm (S) | | | | | 6 | Now, of the locally laws maked beauting all tables a surface | 6.50 | -13.25 | | | |
| - 7.00 - 7.50 | В | 27 | | | | | | 7- | Very stiff locally laminated brown slightly sandy to sandy CLAY with frequent pockets or bands of sand and gravel and occasional cobbles. Sand is mainly fine and medium. Gravel is subangular and subrounded fine to coarse of | (1.20) | | | | |
| 7.70 - 8.00 | D | 28 | | | | | | - | mixed lithologies. Cobbles ((<120 x 80 x 80mm) are as gravel. Very dense brown slightly gravelly SAND with | 7.70 | -14.45 | | | |
| - 8.00 - 8.45 8.00 - 8.40 | D SPT | 29 | 50/250 mm (S) | | | | | 8- | rare possible lenses (<15mm) of soft sandy clay. Sand is fine to coarse. Gravel is subangular and subrounded fine and medium of mixed lithologies. | (0.80) | | | | |
| - 8.50 - 9.00 - 9.00 - 9.50 | B D | 30 | | | | | | 9— | Very dense multicoloured sandy, locally slightly sandy, GRAVEL with medium cobble content. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed | 8.50 | -15.25 | | | |
| 9.50 - 10.00 | В | 32 | | | | | | | lithologies (sandstone, pelite, psammite, quartz, and pegmatite). Cobbles (<150 x 120 x 100mm) are of mixed lithologies. | | | | | |
| - - -10.00 - 10.45 10.00 - 10.38 | D SPT | 33 | 50/270 mm (S) | | | | | - | Continued next page | | | | | |

Notes

TUGRO

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | i Ri |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279379.79 N868819.21 | Ground Elevation (m Datum) | -6.75 | Sheet 2 of 2 |
| III-I- Tour | O-1-1- D | | | 04-4 |

BH05

Sheet 2 of 2

| Hole Type | | | Туре | Cabl | e Per | cuss | Draft | Draft | | | | | | |
|--|---------------|---------|--------------------|------------|------------|------------|-----------|--------------|---|--------------------------------------|----------------------------|--------|-----------------|------------------------|
| Depth | Samp | ling an | nd In Situ Testing | Co | ore R | ecove | ery | | Strata Details | | | | Grour | |
| (m) | Туре | No. | Test Results | TCR (%) | SCR (%) | RQD (%) | FI (-) | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill Installati |
| - 10.50 - 11.00 -11.00 - 11.50 | В | 34 | | | | | | - | Between 10.50m and 11.00m; slightly gravelly sand. Sand is fine to coarse. | (4.00) | | | | |
| - 11.50 - 12.00 | В | 36 | | | | | | - | Below 11.00m; slightly sandy. | | | | | |
| -12.00 - 12.50 12.00 - 12.35 - 12.50 - 13.00 | D SPT B | 37 | 50/245 mm (S) | | | | | 12 - | Proug booming roddink kroup with doub | 12.50 | -19.25 | | | |
| -13.00 - 13.50 - 13.50 - 14.00 | D B | 39 | | | | | | 13 — | Brown becoming reddish-brown with depth slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of mixed lithologies. With occasional possible pockets or lenses of firm thickly laminated brown sandy silt (Possible destructured sandstone). | (1.20) | | | | |
| -14.00 - 14.18 14.00 - 14.18 | D SPT | 41 | 50/35 mm (S) | | | | | 14 — | Extremely weak red and greenish grey SANDSTONE. Recovered as fragments. | (0.80) | -20.45 | | | |
| 14.50 - 14.90 14.90 - 15.25 14.50 - 16.00 | | | | 73 | 73 | 63 | NR NI | 15 — | Assessed zone of core loss. Extremely weak and weak red SANDSTONE. Possibly moderately weathered. Non intact (Drilling affected) recovered as sandy gravel | (0.40) - 14.90 (0.35) 15.25 | -21.25 -21.65 -22.00 | | | |
| . 15.25 - 15.70 | | | | | | | 9 | 16 — | \sized fragments (<50 x 60 x 60mm). Weak thinly laminated to thinly bedded red and greenish grey SANDSTONE with rare to occasional greenish grey reduction spots (<10 x 10mm). Slightly to moderately weathered. Discontinuities. Set # 1, bedding plane | (0.45) 15.70 | -22.45 | | | |
| 15.70 - 17.50 16.00 - 17.50 | | | | 100 | 100 | 100 | 2 | 17 — | discontinuities - very closely to medium spaced, inclined (15°) planar, rough, very tight, clean. Set #2, joints - closely spaced, inclined (60°), planar, rough, very tight and clean or open and infilled with sand. Weak becoming moderately weak with depth, thickly laminated to medium bedded red SANDSTONE with rare locally frequent greenish grey reduction spots (<10 x 10mm). Fresh to slightly weathered. Discontinuities. Set | (1.80) | -24.25 | | | |
| - | | | | | | | | 18 — | #1, bedding plane discontinuities - closely to widely spaced subhorizontal (<10°), planar, rough, very tight, clean. Between 16.07m and 16.48m; red with frequent greenish grey reduction spots (<10 x 10mm) medium to coarse grained sandstone. Between 17.10m to 17.42m; rudaceous medium to coarse sandstone. Clasts are subangular and subrounded of mixed lithologies (<10 x 10 x 10mm). End of Borehole at 17.50 m | 17.50 | 724.20 | | | |
| | | | | | | | | - | | | | | | |

Notes

| | | С | ontract I | Name | N | ligg E | nergy | Park, | , Eas | t Qua | y De | velo | pment | | | | Location | on ID | | |
|--|---------------|---------------------|---------------|----------------------------|-------------------|----------|--------------------------------|------------|---------------|------------------------|---------------|-------------------|---|----------------|-------------------|-------------------|-----------------|--------------------|------------|---------------|
| - fi | JGRO | | lient | | | Global | l Energ | y Nig | ıg Ltd |] | | | | | | | 1 | Bh | 10 | 5 |
| | = | | ugro Re | ierence | | 31910 | | | | | | | | | | |] | | I U | |
| | $= \infty$ | С | oordinat | es (m) | | | 79.79 N | | | | | | Elevation | (m Dat | um) -6 | 3.75 | Sheet | 1 of 1 | | |
| | | - Н | ole Type | ; | C | Cable | Percus | sion | | | | ŭ | | | | | Status | | Draft | |
| Depth From | Depth To (m) | Hole Type | e Date Fr | om D | ate To | - | quipment | | Core Ba | Equi | pme Core E | | Drilling Crew | Logged | By Remar | ke | | | | |
| 0.00 | 4.45 | CP | 13/03/20 | 019 13/0 | 03/2019 | Da | ando 2000 | | Jore Ba | rrei | Core E | SIT | JW/CA | BK/RL | | KS | | | | |
| 4.00 | 11.00 | CP | 13/03/20 | | 03/2019 | | acchio MC 1200 | | | | | | MB/AC | BK/RL | | | | | | |
| 11.00 14.18 | 14.18 | CP | 14/03/20 | | 03/2019 | | acchio MC 1200 acchio MC | | orroor. | | | | MB/AC JW/CA | BK/RL BK/RL | | | | | | |
| 14.10 | 17.50 | RC | 14/03/20 | 119 14/0 | 03/2019 | Coma | 1200 | -5 1 | Geobo | | | | JW/CA | DR/RL | | | | | | |
| | | | | ogress | | | | | | | | | Ro | tary De | | | | | Core D | etails |
| Date (dd/mm/yyyy | | ss) (| m) | ng Depth Wa (m) 0.00 | ater Depth (m) | Weathe | er | | | Depth From (n | n) (r | th To m) | Flush Ty | pe F | ush Return (%) | Flush Cold | (nn.mi | m) From (n | n) (m) | Diameter (mm) |
| 13/03/2019 13/03/2019 14/03/2019 | 9 23:59:0 | 00 4 | .00 4 | 1.00 4.18 | | | | | | 0.00 14.50 16.00 | 16 | .50 .00 .50 | W W W | | 100 100 100 | Red Red Red | 00:0 00:0 | 6 14.50 6 16.00 | 17.50 | 102 102 |
| 14/03/201 | 9 13:45:0 | 00 17 | 7.50 | 4.18 | | | | | | 10.00 | " | .50 | | | 100 | ricu | | | | |
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| | | | Hole a | nd Casi | ing | | | | | | | | | | | | | | | |
| | To (m) | | ameter (mm) | De | epth To (m | n) | Casing D | | r (mm) | | | | | | | | | | | |
| 11 | .00 | | 220 200 | | 4.00 11.00 | | | 220 200 | | | | | | | | | | | | |
| 14 | 3.00 3.18 | | 220 175 | | 13.00 13.50 | | | 220 175 | | | | | | | | | | | | |
| 1/ | '.50 | | 146 | | 14.50 | | | 146 | | | | | | | | | | | | |
| <u> </u> | | 01. | II: / | | | | | | | | | | | | | | | | | |
| Donth F | rom (m) | | selling / | | rogres | | Tool | / Rema | rle | | | | | | | | | | | |
| | 2.00 | | 12.50 | Dura | 01:30 | nin) | 1001 | / Rema | IIK | | | | | | | | | | | |
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| | | Wate | r Strike | | | | Wate | r Add | ded | | | | | | | | | | | |
| Strike At (m) | Rise To (m) | Time Elap (mins) | sed Casing | Depth (m) | Depth Sea | aled (m) | Depth From | | pth To (m) | | | | | | | | | | | |
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| C | | | Strike R | | 3 | | | Th | b - ' | | | | | | eral Re | | and the control | 2.50 | lavial === | CD 'W': |
| Groundwate | er not encoun | tered in ma | arine environ | ment. | | | | level w | as main | tained a | t or abo | ove s | water from jack eabed level. All hole conducted | I depths an | d depth re | elated reman | | | | |
| | | | | | | | | JIOUIIC | awatei n | or onse | veu as | , note | noie conducted | a ni ilidilile | GIVIIOIIM | on. | | | | |
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| | | Insta | llation | | | | | | | P | ipe | | | | | | В | ackfill | | |
| Туре | ID | Respons | se Zone Resp | onse Zone ase (m) | Installation | Date | ID | Top De | pth (m) | Base De | • | Dian | neter (mm) | Туре | Depth Froi | m (m) Depth | 1 To (m) | Backfill M | aterial | Date |
| | | 1.29 | | - ' | | | | | | | | | | | 0.00 | 17 | 7.50 | Bento | nite | 14/03/2019 |
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| Notes | | | | | | _ | | _ | | | | | | | | | | | | |
| - Abbrevi | iations and | d results | data def | ned on ' | 'Notes | on Exp | ploratory | y Pos | ition F | Record | ls' | | | | | | | | | |
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| 01 | | | | | | | | | | T _C : | . D . | | | | 0.17.0 | | I | 200 | | |
| Checked By | - | NHA | | 06 | P :: 5:: | | evation Da | atum | | Chai | t Datur | n | | | Grid Coo | rdinate Syst | | SGB | 05/01/0- | 10 |
| remplate: F | GSL/HBSI/F | SL BH S | ummary.hbt/0 | Jontig Fugi | ro Rev5/1 | 2/03/20 | 19/ fS | | | | | | | | | | Print Date | | 25/04/20 | 19 |

FUGRO

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | \mathbf{B} |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279381.64 N868746.75 | Ground Elevation (m Datum) | -9.60 | Sheet 1 of 2 |
| | 0.11.0 | • | | 01.1 |

BH06

Sheet 1 of 2

| | \sim | _ | rdinates (m) e Type | _ | e Percussion | Status | 1 01 2 | Draf | t | | |
|---|----------------|---------|------------------------|-----------------|--|----------------------|--------------------|--------|-----------------|------------|--|
| Samp | ling an | | tu Testing | | Strata Details | - \ | | | Groundwate | | |
| Depth | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) | Level (m Datum) | Legend | Water Strike | Backfill . | |
| (m) 0.00 - 0.50 0.00 - 0.50 | D ES | 2 | | - | Very soft and soft black sandy CLAY probably interbedded with | (m) | | | ou mo | | |
| - 0.50 - 1.00 - 0.50 - 1.00 | B ES | 4 3 | | - | black clayey SAND. With rare shell fragments (<10 x 10 x 10mm) and slight sulphurous odour. Sand is fine to coarse. | | | | | | |
| 0.50 - 0.95 - - 1.00 - 1.50 | SPT D | 6 | 0/450 (S) | 1- | | | | | | | |
| 1.00 - 1.50 | ES | 5 | | | | | | | | | |
| - 1.50 - 2.00 - 1.50 - 2.00 | B ES | 8 7 | | - | | (3.00) | | | | | |
| - 2.00 - 2.50 - 2.00 - 2.50 - 2.00 - 2.45 | D ES SPT | 10 9 | 0/450 (S) | 2 - | | | | | | | |
| - - 2.50 - 3.00 | В | 11 | | - - - | | | | | | | |
| - - 3.00 - 3.50 | D | 12 | | 3 — | Soft dark grey sandy CLAY possibly interbedded with dark grey clayey SAND. With frequent wood fragments (<10 x 20mm) and | 3.00 | -12.60 | | | | |
| - - 3.50 - 4.00 | В | 13 | | - | rare shell fragments (<5 x 10mm). Organic and slight sulphurous odour. Sand is fine to coarse. | | | | | | |
| - 4.00 - 4.45 - 4.00 - 4.45 | D SPT | 14 | 0/450 (S) | 4- | | | | | | | |
| 4.40 - 5.00 | В | 15 | | | | (2.50) | | | | | |
| - - - 5.00 - 5.50 - | D | 16 | | 5 — | | | | | | | |
| - 5.50 - 6.00 | В | 17 | | - | Loose dark grey slightly clayey SAND with occasional wood and shell fragments (<5 x 10mm). Slight organic odour. Sand is fine to | 5.50 | -15.10 | | | | |
| - 6.00 - 6.45 - 6.00 - 6.45 | D SPT | 18 | N = 8 (S) | 6 - | coarse. | (1.00) | | | | | |
| - - 6.50 - 7.00 | В | 19 | | - - - | Loose dark grey SAND with occasional wood fragments (<5 x 10mm). Sand is fine to coarse. | 6.50 | -16.10 | | | | |
| 7.00 - 7.50 | D | 20 | | 7 - | | | | | | | |
| - 7.50 - 8.00 | В | 21 | | - | | (2.00) | | | | | |
| 8.00 - 8.50 8.00 - 8.45 | D SPT | 22 | N = 5 (S) | 8 — | Below 8.00m; 1 No. wood fragment (<5 x 10mm). | | | | | | |
| - 8.50 - 9.00 | В | 23 | | - | Loose becoming medium dense with depth, dark grey SAND with occasional bands or lenses (<60 mm thick) of soft grey sandy clay, | 8.50 | -18.10 | | | | |
| 9.00 - 9.50 | D | 24 | | 9 — | occasional wood fragments (<5 x 10mm) and occasional shell fragments (>5 x 5mm). Sand is fine to coarse. | | | | | | |
| 9.50 - 10.00 | В | 25 | | - | | | | | | | |
| - - -10.00 - 10.45 10.00 - 10.45 | D SPT | 26 | N = 6 (S) | - | Continued next page | - | | | | | |

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL Cable Percussion.hbt/Config Fugro Rev5/21/02/2019/TS

Print Date

25/04/2019

FUGRO

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279381.64 N868746.75 | Ground Elevation (m Datum) | -9.60 | Sheet 2 of 2 |
| | | | | |

BH06

eet 2 of 2

| | \gtrsim | | rdinates (m) | | 9381.64 N868746.75 Ground Elevation (m Datum) -9.60 | Sheet | | 1 | | |
|--------------------------------|-----------|---------|--------------|--------------|---|-----------------------------|--------------------|--------|-----------------|--------------------|
| | | Hole | Туре | Cab | le Percussion | Status | | Draf | t | |
| Samp | ling an | d In Si | tu Testing | | Strata Details | | | | Grou | ndwat |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfi Installa |
| 10.50 - 11.00 | В | 27 | | - | Loose becoming medium dense with depth, dark grey SAND with occasional bands or lenses (<60 mm thick) of soft grey sandy clay, occasional wood fragments (<5 x 10mm) and occasional shell fragments (>5 x 5mm). Sand is fine to coarse. | | | | | |
| -11.00 - 11.50 | D | 28 | | 11 - | Below 11.00m; 1 No. shell fragment (<5 x 20mm). | | | | | |
| 11.50 - 12.00 | В | 29 | | - | | (6.50) | | | | |
| 12.00 - 12.45 12.00 - 12.45 | D SPT | 30 | N = 11 (S) | 12 - | | | | | | |
| 12.50 - 13.00 13.00 - 13.50 | B D | 31 | | 13 — | | | | | | |
| 3.50 - 14.00 | В | 33 | | - | Below 13.00m; sand is predominantly fine and medium. Occasional plant fibres. | | | | | |
| 4.00 - 14.45 4.00 - 14.60 | D SPT | 34 | N = 22 (S) | 14 — | | | | | | |
| 4.50 - 15.00 | В | 35 | N - 22 (3) | - | Below 14.50m; 1 No. shell fragment (<5 x 20mm). Gravel is subrounded fine and medium. | | | | | |
| | | | | 15 — | End of Borehole at 15.00 m | - 15.00 | -24.60 | | | |
| | | | | - | | | | | | |
| | | | | 16 - | | | | | | |
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| | | | | 19 — | | | | | | |
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Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL Cable Percussion.hbt/Config Fugro Rev5/21/02/2019/TS

Print Date

| | | C | Contr | act Nar | ne | Nigg | Energy | Park, E | ast (| Quay [| Devel | opment | | | | L | .ocatio | | | |
|--------------------------|-----------------------|--------------------|----------------|-----------------------|--------------------|-------------|-------------------------|-------------|--------------------|-----------------------|-----------------|----------------------------|-----------------------------------|---------------------|-------------------------|------------|-------------------|-------------------------|-----------------|---------------|
| – <u>F</u> t | JGRO | | lient | t | | Globa | al Energ | y Nigg | Ltd | | | | | | | | | Bŀ | 10 | 6 I |
| │ ┋ ╿≣ | $= \approx$ | F | ugro | Refere | ence | | 005U | | | | | | | | | | | | IU | |
| | $= \infty$ | C | coord | dinates | (m) | E279 | 381.64 | N86874 | 6.75 | Gr Gr | ound | Elevation | on (m Da | atum) | -9.60 | | Sheet 1 | 1 of 1 | | |
| | | _ - | lole | Туре | | Cable | e Percus | ssion | _ | | | | | | | S | Status | | Draft | |
| Depth From | | | Τ. | . = | | | | | | quipn | | T | 1. | | | | | | | |
| (m) 0.00 | Depth To (m) 13.00 | Hole Typ | - 1 | ate From 6/03/2019 | Date T 16/03/20 | | Equipment Dando 2000 | | Barre | el Co | re Bit | Drilling Co | RL | d By Re | emarks | | | | | |
| 13.00 | 15.00 | CP | 16 | 5/03/2019 | 16/03/20 | | macchio MC 1200 | | | | | MB/AC | RL | | | | | | | |
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| | | | | Progre | ess | | | | | | | 1 | Rotary D | Detail | s | | | | Core D | etails |
| Date (dd/mm/yyyy | | ss) | e Depth (m) | (m) | oth Water D | **Cut | her | | Fi | Depth rom (m) | Depth To (m) | Flush | п Туре | Flush Re | eturn Flus | sh Colour | Run Tim (hh:mm | ne Depth r) From (m) | Depth To (m) | Diameter (mm) |
| 16/03/2019 16/03/2019 | 08:00:0 21:35:0 | 00 0 | 0.00 4.50 | 0.50 15.00 | 2.10 No | t | | | | | | | | | | | | | | |
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| | | | Нс | le and | Casing | | | | | | | | | | | | | | | |
| Depth | To (m) | Hole Di | | | Depth | To (m) | Casing [| Diameter (m | m) | | | | | | | | | | | |
| 6.0 | | | 220 220 | | 6.0 13. | 00 | | 220 220 | | | | | | | | | | | | |
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| | | Ch | iselli | ng / Slo | w Prog | ress | | | | | | | | | | | | | | |
| Depth F | rom (m) | Dep | th To (| m) | Duration | (hh:mm) | Tool | / Remark | | | | | | | | | | | | |
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| | · · | Wate | | | | | Donth Fro | m Depth | | | | | | | | | | | | |
| Strike At (m) | rdise 10 (m) | Time Elap (mins |) | Casing Depth | ı (m) Depi | h Sealed (m | (m) | (m) | \dashv | | | | | | | | | | | |
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| | | Water | Stril | ke Rem | arks | | | | | | | | Ge | neral | Rema | rks | L | | 1 | I |
| Groundwate | r not observe | | | | | | | | | | | | jack-up plati | form Sk | ate 3A. D | eck to mud | | | | m CD. Water |
| | | | | | | | | Groundwa | naintai ter not | ned at or observed | above s | seabed leve ehole condu | I. All depths a acted in maria | and dep ne envir | oth related conment. | remarks i | refer to de | epths below s | seabed lev | el. |
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| | | Insta | | | | | | | | Pipe | - | | | | | | Ba | ackfill | | |
| Туре | ID | Respon Top | se Zone (m) | Response Base (r | Zone n) Instal | lation Date | ID | Top Depth | m) Ba | ase Depth | (m) Dia | meter (mm) | Туре | Depth | n From (m) | Depth To | o (m) | Backfill Ma | aterial | Date |
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| Note: | | | | | | | | | | | | | | | | | | | | |
| Notes | ations or | d recult | e date | a dofina | l on 'Nic | ee or F | vnlorete: | v Docitic | n Da | corda! | | | | | | | | | | |
| - Applevi | ations and | ı result | o udla | a ueiilie0 | OII NO | es un E | vhiolgiol | y rusili0 | ıı Ke | corus | | | | | | | | | | |
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| Checked By | , | NHA | | | | I | Elevation D | atum | | Chart Da | atum | | | Grid | Coordina | te Svetem | os | GB | | |
| | GSL/HBSI/F0 | | | rv.hbt/Confi | a Fuaro Re | | | atuni | | Jonait Da | aturili | | | Gild | Joordina | | rint Date | JD | 25/04/20 | 19 |
| piato. 1 | | | | , | J . 29.0 i W | | | | | | | | | | | - 1' | 5410 | | 1-3/3 4/20 | |

FUGRO

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | \mathbf{B} |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279451.07 N868746.87 | Ground Elevation (m Datum) | -4.01 | Sheet 1 of 2 |
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| Status | Draft |

| | \sim | | Type | _ | e Percussion | Status | | Draf | t | |
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| Samp | ling an | d In Si | tu Testing | | Strata Details | , | | · | Grour | ndwater |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill / Installation |
| 0.00 - 0.50 - 0.00 - 0.50 | D ES | 2 | | | Loose dark brownish grey silty SAND with abundant shell fragments (<1 x 1mm). Sand is fine to coarse. | | | ××× ××× | | |
| - 0.50 - 0.95 - 0.50 - 1.00 - 0.50 - 1.00 - 0.50 - 0.95 - 1.00 - 1.50 - 1.00 - 1.50 | D B ES SPT D ES | 3 5 4 7 6 | N = 9 (S) | 1— | Below 0.50m; thin and thick beds (<100 mm) of very soft dark grey sandy clay. Sand is fine to coarse. Strong sulphureous odour. | | | X | | |
| - - 1.50 - 2.00 - 1.50 - 2.00 | B ES | 8 9 | | - | | (3.50) | | × × × × × × × × × | | |
| 2.00 - 2.45 2.00 - 2.50 2.00 - 2.45 | D ES SPT | 10 11 | N = 6 (S) | 2 - | | | | * | | |
| - 2.50 - 3.00 - 2.50 - 3.00 | B ES | 13 12 | | - | | | | × × × × × × | | |
| - - 3.00 - 3.50 - 3.00 - 3.50 | D ES | 15 14 | | 3 - | | | | * * * * * * * * * | | |
| 3.50 - 4.00 3.50 - 4.00 | B ES | 17 16 | | - | Very soft dark brownish grey sandy CLAY with bands (possible <80mm) of clayey sand. Strong sulphureous odour. Sand is fine to coarse. | 3.50 | -7.51 | | | |
| - 4.00 - 4.45 - 4.00 - 4.50 - 4.00 | D ES SPT | 18 19 | | 4- | | (1.50) | | | | |
| - 4.50 - 5.00 - 4.50 - 5.00 - | B ES | 21 20 | | - | | | | | | |
| - 5.00 - 5.50 - 5.00 - 5.50 - | D ES | 23 22 | | 5 | Medium dense greyish brown SAND with frequent shell fragments (<1 x 1mm) and frequent mica flakes (<1 x 1mm). Sand is predominantly fine and medium. | 5.00 | -9.01 | | | |
| - 5.50 - 6.00 - 5.50 - 6.00 | B ES | 25 24 | | - | | | | | | |
| - 6.00 - 6.45 6.00 - 6.50 6.00 - 6.45 | D ES SPT | 26 27 | N = 19 (S) | 6 — | | (2.00) | | | | |
| - 6.50 - 7.00 - 6.50 - 7.00 | B ES | 29 28 | | | | | | | | |
| - 7.00 - 7.50 - 7.00 - 7.50 - | D ES | 31 30 | | 7 | Medium dense greyish brown SAND interbedded with soft dark greyish brown sandy clay. With frequent mica flakes (<1 x 1mm) and slight sulphureous odour. Sand is fine and medium. | 7.00 | -11.01 | | | |
| - 7.50 - 8.00 - 7.50 - 8.00 - | B ES | 33 32 | | - | | | | | | |
| 8.00 - 8.45 8.00 - 8.45 | D SPT | 34 | N = 17 (S) | 8 — | | | | | | |
| - - 8.50 - 9.00 - | В | 35 | | | | | | | | |
| - — 9.00 - 9.50 - - | D | 36 | | 9 — | Below 9.00m; slightly gravelly with occasional shell fragments (<20 x 20mm) and rare to occasional gravel. Gravel is subangular to subrounded fine and medium of mixed lithologies. | (4.00) | | | | |
| - - 9.50 - 10.00 - - | В | 37 | | - | | | | | | |
| -10.00 - 10.45 10.00 - 10.45 | D SPT | 38 | N = 20 (S) | | Continued next page | - | | | | |

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

TUGRO

| Contract Name | Nigg Energy Park, East Qua | y Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279451.07 N868746.87 | Ground Elevation (m Datum) | -4.01 | Sheet 2 of 2 |
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| | \approx | | ro Reference | _ | 10050 | | 0 - 1 0 | | | |
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| | \sim | | rdinates (m) e Type | | 9451.07 N868746.87 Ground Elevation (m Datum) -4.01 Ground Elevation (m Datum) | Sheet Status | | Draf | + | |
| Samp | oling an | | tu Testing | Cabi | Strata Details | Status | | Diai | | ndwater |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | |
| - 10.50 - 11.00 | В | 39 | | - - - - | Medium dense greyish brown SAND interbedded with soft dark greyish brown sandy clay. With frequent mica flakes (<1 x 1mm) and slight sulphureous odour. Sand is fine and medium. | | | | | |
| - 11.00 - 11.30 - 11.30 - 11.70 | D B | 40 41 | | 11 — | Medium dense brownish grey slightly gravelly SAND with low cobble content and frequent mica flakes (<1 x 1mm). Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of mixed | - 11.00 | -15.01 | | | |
| - 11.70 - 12.15 - 11.70 - 12.40 - 11.70 - 12.15 | D B SPT | 42 43 | N = 23 (S) | 12 — | lithologies. Cobbles (<80 x 80 x 60mm) are of pelite. | (2.00) | | | | |
| - - 12.40 - 13.00 - | D | 44 | | - - - - | | | | | | |
| | В | 45 | | 13 | Dense brownish grey SAND with frequent mica flakes (1 x 1mm) and occasional thin beds (<60mm) of soft brownish grey sandy clay. Sand is fine to coarse. | - 13.00 | -17.01 | | | |
| - 13.50 - 14.00 - - - - - - - - 14.00 - 14.45 | B D | 46 47 | | - - - - 14 — | | | | | | |
| 14.00 - 14.45 - - - 14.50 - 15.00 | SPT B | 48 | N = 34 (S) | - | | (3.00) | | | | |
| | D | 49 | | 15 — | | | | | | |
| - 15.50 - 16.00 - - - - - - -16.00 - 16.45 | B D | 50 51 | | - - - - 16 — | Below 15.50m; occasional gravel and frequent wood fragments (<5 x 5mm). Gravel is subangular and subrounded fine to coarse of mixed lithologies. Medium dense greyish brown SAND with frequent mica flakes (<1 | - 16.00 | -20.01 | | | |
| 16.00 - 16.45 - - - 16.50 - 17.00 | SPT B | 52 | N = 17 (S) | - - - | x 1mm), occasional to frequent shell fragments and occasional wood fragments (<5 x 5mm). | | | | | |
| | D | 53 | | 17 - | Between 17.00m and 17.50m; rare very thin clay bands or lenses (<50mm). | | | | | |
| - 17.50 - 18.00 - 18.00 - 18.00 - 18.45 | B D | 54 55 | | 18 — | | (3.61) | | | | |
| 18.00 - 18.45 - - - 18.50 - 19.00 | SPT B | 56 | N = 12 (S) | - | | | | | | |
| - - - - - - - - | D | 57 | | 19 — | | | | | | |
| - 19.50 - 19.60 - - - | SPT | | 50/60 mm (S) | - | Below 19.50m; probable boulder (no recovery from SPT). End of Borehole at 19.61 m | 19.61 | -23.62 | | | |

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

| | | C | ontr | act Na | me | N | ligg E | nergy | Park | , Eas | t Quay | / Dev | velo | pment | | | | | Locat | | | | |
|--|-----------------------|------------|----------------------|-------------------------|---------|----------------------|------------|----------------------|---------|--------------------|-------------------|------------|-------------|----------------------------------|----------------|----------|------------|-----------|----------|--------------|-------------------|-----------------|---------------|
| l −fi | JGRC | | lient | t | | G | Slobal | Energ | y Nig | gg Ltd | ŀ | | | | | | | | | F | ۲H | 10 | 7 |
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| | $= \infty$ | C | oord | dinates | (m) | Е | 2794 | 51.07 | N868 | 3746.8 | 87 (| Grou | ınd l | Elevation | ı (m Da | tum) | -4.0 | 1 ; | Shee | t 1 o | f 2 | | |
| | | _ - | lole [·] | Туре | | С | able | Percus | ssion | | | | | | | | | ; | Statu | IS | | Draft | |
| Depth From | | | Τ. | | | 1 | _ | | | | Equip | | | | T | | | | | | | | |
| (m) 0.00 | Depth To (m) 19.61 | Hole Typ | - 1 | ate From 7/03/2019 | | ate To 03/2019 | | quipment ndo 2000 | | Core Ba | arrel | Core B | Bit | Drilling Crew JS/AC | V Logged BK | By Re | emarks | | | | | | |
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| | | | | Progr | ess | | | | | | | | | R | otary D | etail | s | | | | C | ore De | etails |
| Date (dd/mm/yyyy | Time (hh:mm:s | Hole s) | Depth (m) | Casing Do | epth W | ater Depth (m) | Weathe | r | | | Depth From (m) | Dept (m | th To n) | Flush T | ype | Flush Re | Flu | sh Colour | | Time :mm) | Depth From (m) | Depth To (m) | Diameter (mm) |
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| Depth 19. | | Hole Di | 220 | r (mm) | D | epth To (m 19.50 | ו) | Casing E | 220 | er (mm) | - | | | | | | | | | | | | |
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| Depth F | | | th To (| (m) | Dura | ation (hh:n | nm) | Tool | / Rema | ark | | | | | | | | | | | | | |
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| Strike At (m) | Rise To (m) | Time Elap | sed | Casing Dep | th (m) | Depth Sea | uled (m) | Depth Fro | m De | epth To | - | | | | | | | | | | | | |
| Olike At (III) | ruse to (III) | (mins | + | Odding Dop | () | Беригоса | ilea (III) | (m) | + | (m) | | | | | | | | | | | | | |
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| Groundwate | r not observe | d in marir | ne envi | ironment. | | | | | level w | as mair | ntained at | or abo | ove se | water from jac eabed level. A | All depths a | and dep | th related | | | | | | |
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| Depth From (m) | Depth To (m) | Hole | Туре | Date From | n Da | ate To | Equipment | Core I | | Core Bi | | g Crew | Logged | By Re | emarks | | | | | |
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| Depth F | rom (m) | <u> </u> | Depth 1 | To (m) | Dura | ation (hh:mm) | Tool | I / Remark | _ | | | | | | | | | | | |
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| | | W | /ater | Strike | | | Wate | er Added | 1 | | | | | | | | | | | |
| Strike At (m) | Rise To (m) | Time (r | Elapsed mins) | d Casing De | apth (m) | Depth Sealed (| (m) Depth From | Depth To | 7 | | | | | | | | | | | |
| | | | | | | | | | 7 | | | | | | | | | | | |
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| | | 14/0 | tor C | Strike Re | orke | | | | | Щ | | | Cor | - aral | Rema | alca | | | | |
| Groundwate | er not observe | | | | | <u>, </u> | | | | | | | k-up platfo | orm Ska | ate 3A. De | eck to mu | | | | m CD. Water |
| | | | | | | | | level was ma Groundwate | aintained a | at or abo | ove seabed le | level. All | Il depths a | and dep | oth related | | | | | |
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| T | | Res | stalla sponse Z | Zone Respon | nse Zone | | 15 | To Donth (s | | onth (m) | D'tor (m | | T | Pantt | (m) | T _D th Tc | | Ckfill Packfill Mar | | D-to |
| Туре | ID | + | Top (m) |) Base | ie (m) | Installation Date | e ID | Top Depth (m | n) Base De | :pth (ni) | Diameter (mr | n) | Туре | Беры | h From (m) | Depth To |) (m) | Backfill Ma | teriai | Date |
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| Notes | -tiono on | 4 roc | ulto d | 1-to dofin | rd on ' | INI-top on | lorator | Desition | Dagore | 1_1 | | | | | | | | | | |
| - Abbievi | ations and | a resi | ülts u | ata uemi | ea on i | Notes on | Exploratory | y Position | Record | ıS' | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Checked By | | 1 | NHA | | | | Elevation Da | atum | Cha | rt Datum | n | | | Grid | Coordinat | te System | OSGE | В | | |
| Template: F0 | GSL/HBSI/F | GSL B | H Sum | marv.hbt/Cr | onfia Fua | ro Rev5/12/0 | 3/2019/TS | | | | | | | | | Р | rint Date | | 25/04/20 | 19 |

TUGRO

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | 1 B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279448.06 N868803.00 | Ground Elevation (m Datum) | -0.82 | Sheet 1 of 2 |
| | 0.11.0 | • | | 01.1 |

BH08

| == | \sim | | ro Reference | | 10050 | \dashv_{a} | | | | |
|---|--------------|-------------|--------------|--------------|---|-----------------------------|--------------------|--------|-----------------|--------------------------|
| | \succeq | _ | rdinates (m) | | 9448.06 N868803.00 Ground Elevation (m Datum) -0.82 | Sheet | | Draf | | |
| Samn | ling an | | tu Testing | Cab | le Percussion Strata Details | Status | • | Diai | | ndwate |
| | iiig air | | T Tooking | | Citata Botano | I | 1 | | 0.00. | |
| Depth (m) | Туре | No. | Test Results | Depth (m) | Strata Descriptions | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | Backfill Installation |
| 0.00 - 0.50 0.00 - 0.50 0.50 - 1.00 | D ES B | 2 1 4 | | - | Brown slightly gravelly SAND with occasional shell fragments (<5 x 10mm) and frequent mica flakes (<1 x 1mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of mixed lithologies | (0.50) | -1.32 | | | |
| 0.50 - 1.00 | ES | 3 | | - | Brown SAND with frequent mica flakes (<1 x 1mm). Sand is fine to coarse. | | 1.02 | | | |
| 1.00 - 1.50 1.00 - 1.50 | D ES | 6 5 | | 1- | | (1.00) | | | | |
| 1.50 - 2.00 1.50 - 2.00 | B ES | 8 7 | | - | Greyish brown SAND with frequent mica flakes (1 x 1mm). Sand is fine to coarse. | 1.50 | -2.32 | | | |
| 2.00 - 2.50 2.00 - 2.50 | D ES | 10 9 | | 2- | | (1.50) | | | | |
| 2.50 - 3.00 2.50 - 3.00 | B ES | 12 11 | | - | | | | | | |
| 3.00 - 3.50 3.00 - 3.50 | D ES | 14 13 | | 3 - | Brownish grey clayey SAND with frequent mica flakes (<1 x 1mm) and slight organic odour. Sand is fine to coarse | 3.00 | -3.82 | | | |
| 3.50 - 4.00 3.50 - 4.00 | B ES | 16 15 | | - | | (1.00) | | | | |
| 4.00 - 4.50 4.00 - 4.50 | D ES | 18 17 | | 4 - | Soft dark brownish grey sandy CLAY with abundant mica flakes (<1 x 1mm) and organic odour. Sand is fine to coarse. | 4.00 | -4.82 | | | |
| 4.50 - 5.00 4.50 - 5.00 | B ES | 20 19 | | - | | | | | | |
| 5.00 - 5.50 5.00 - 5.50 | D ES | 22 21 | | 5 | | | | | | |
| 5.50 - 6.00 5.50 - 6.00 | B ES | 24 23 | | - - - | Below 5.50m; occasional to frequent decomposing wood fragments (<10 x 20mm). | (3.00) | | | | |
| 6.00 - 6.50 6.00 - 6.50 | D ES | 26 25 | | 6 - | | | | | | |
| 6.50 - 7.00 6.50 - 7.00 | B ES | 28 27 | | - | | | | | | |
| 7.00 - 7.50 7.00 - 7.50 | D ES | 30 29 | | 7 - | Greenish brown clayey SAND interbedded with very soft sandy clay. Sand is fine and medium. | 7.00 | -7.82 | | | |
| 7.50 - 8.00 7.50 - 8.00 | D ES | 32 31 | | - | | | | | | |
| 8.00 - 8.50 8.00 - 8.50 | D ES | 34 33 | | 8 - | Between 8.00m and 9.00m; bands (<50mm) of brown fibrous peat. | | | | | |
| 8.50 - 9.00 8.50 - 9.00 | D ES | 36 35 | | - | | | | | | |
| 9.00 - 9.50 9.00 - 9.50 | D ES | 38 37 | | 9 | | | | | | |
| 9.50 - 10.00 9.50 - 10.00 | D ES | 40 39 | | - | | (5.50) | | | | |
| 10.00 - 10.50 | D ES | 42 41 | | - | Continued next page | | | | | |

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

| Contract Name | Nigg Energy Park, East Qu | Nigg Energy Park, East Quay Development | | | | | | | |
|-----------------|---------------------------|---|-------|--------------|--|--|--|--|--|
| Client | Global Energy Nigg Ltd | | | l B | | | | | |
| Fugro Reference | G191005U | | | | | | | | |
| Coordinates (m) | E279448.06 N868803.00 | Ground Elevation (m Datum) | -0.82 | Sheet 2 of 2 | | | | | |
| | | • | | 0 | | | | | |

Sheet 2 of 2

| | \sim | _ | Type | | le Percussion | Status | 2 01 2 | Draf | t | |
|---------------------------------|----------|----------|--------------|--------------|--|-----------------------------|--------------------|--------|-----------------|------|
| | | | | Oub | | Otatus | | Diai | | |
| Samp | oling an | d In Si | tu Testing | | Strata Details | | | T | Grou | ndwa |
| Depth (m) | Туре | No. | Test Results | Depth (m) | | Depth (Thickness) (m) | Level (m Datum) | Legend | Water Strike | |
| | | | | - | Greenish brown clayey SAND interbedded with very soft sandy clay. Sand is fine and medium. | | | | | |
| 10.50 - 11.00 10.50 - 11.00 | D ES | 44 43 | | - | | | | | | |
| -11.00 - 11.50 11.00 - 11.50 | D ES | 46 45 | | 11 - | | | | | | |
| 11.50 - 12.00 | В | 47 | | - | | | | | | |
| -12.00 - 12.50 | D | 48 | | 12 - | | | | | | |
| | | | | | | | | | | |
| 12.50 - 13.00 | В | 49 | | - | Greyish brown clayey SAND with rare subangular and subrounded fine to coarse gravel of mixed lithologies. Sand is mainly fine and medium. | (0.50) | -13.32 | | | |
| -13.00 - 13.50 | D | 50 | | 13 - | Greyish brown clayey SAND with occasional bands of soft greyish brown sandy clay and occasional oyster shell fragments (<50 x 6 x | 13.00 | -13.82 | | | |
| 13.50 - 14.00 | В | 51 | | - | 8mm). Sand is fine and medium. | | | | | |
| 14.00 - 14.50 | D | 52 | | 14 — | | (2.00) | | | | |
| 14.50 - 15.00 | В | 53 | | - | | | | | | |
| -15.00 - 15.50 | D | 54 | | 15 — | Greyish brown gravelly SAND with rare bands of soft sandy clay. | - 15.00 | -15.82 | | | |
| | | | | - | Sand is mainly fine and medium. Gravel is subangular and subrounded fine to coarse of mixed lithologies. | (0.80) | | | | |
| 15.80 - 16.00 | D | 55 | | | COPPLES (<100 v 120 v 100mm), subrounded of questrite | 15.80 | -16.62 | | | |
| -16.00 - 16.40 | В | 56 | | 16 - | COBBLES (<100 x 120 x 100mm) , subrounded of quartzite. Grey and dark grey sandy GRAVEL with occasional shell | (0.20) 16.00 | -16.82 | 0 0 | | |
| 40.50 47.00 | | 57 | | | fragments (<10 x 10mm). Sand is fine to coarse, gravel is angular to subrounded fine to coarse of mixed lithologies. | (0.50) | 47.00 | | | |
| 16.50 - 17.00 | В | 57 | | | Recovered as sandy GRAVEL with high cobble content and possible boulders. Sand is fine to coarse, gravel is subangular and subrounded fine to coarse of mixed lithologies. | 16.50 | -17.32 | | | |
| -17.00 - 17.50 | В | 58 | | 17 - | | (1.20) | | | | |
| 17.70 - 18.00 | D | 59 | | - | | 17.70 | -18.52 | | | |
| -18.00 - 18.50 | В | 60 | | 18 - | Extremely weak reddish brown SANDSTONE. Recovered as fragments. Between 17.70m to 18.00m; grey. | 17.70 | 10.02 | | | |
| | | | | | | (1.30) | | | | |
| 18.90 - 19.00 | D | 61 | | 19 — | | 19.00 | -19.82 | | | |
| | | | | 19 - | End of Borehole at 19.00 m | 19.00 | -18.02 | | | |
| | | | | | | | | | | |
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-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

| | | (| Contr | ract Nan | ne | Nigg I | Energy I | Park, Eas | t Quay | De\ | /elopmer | nt | | | | L | _ocatio | n ID | | | |
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| l −fu | JGRO | | Clien | t | | Globa | I Energy | y Nigg Lto | | | | | | | | | | Bl | H | NS | ₹ |
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| | $= \stackrel{\sim}{\sim}$ | _ | | dinates | | E2794 | 148.06 N | N868803. | 00 | Grou | nd Eleva | tion | (m Da | tum) | -0.82 | | Sheet ' | 1 of 2 | | | |
| = | | - | Hole | Туре | | Cable | Percus | sion | | | | | - | | | 5 | Status | | Dr | aft | |
| | | | | | | | | | Equip | mer | nt | | | | | | | | | | |
| Depth From (m) | Depth To (m) | Hole Ty | - 1 | ate From | Date To | | Equipment | Core Ba | arrel | Core B | - | | | - 1 | arks | | | | | | |
| 0.00 10.00 | 10.00 18.50 | CP CP | 0: | 5/03/2019 5/03/2019 | 05/03/2019 06/03/2019 |) D | ando 2000 ando 2000 | | | | JL/S JS/A | | BK/RL BK/RL | | | | | | | | |
| 18.50 | 19.00 | RC | 06 | 6/03/2019 | 06/03/2019 | | omacchio : Skate_3A | | | rracore Geobo | | AC | BK/RL | - | | | | | | | |
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| | | | | Progre | | | | | | | | Ro | otary D | | | | | | | e De | tails |
| Date (dd/mm/yyyy | | is) | le Depth (m) | (m) | th Water Dep (m) | Weath | er | | Depth From (m) | Dept (m | h To i) Flu | ush Ty | pe F | lush Retu (%) | rn Flus | h Colour | Run Tin (hh:mn | | oth Dep | pth To (m) | Diameter (mm) |
| 05/03/2019 05/03/2019 | 12:45:0 | 0 | 0.00 0.50 | 0.50 1.00 | 1.60 1.60 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 13:18:0 14:20:0 | | 1.00 1.50 | 1.50 2.00 | 1.80 2.20 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 9 14:41:0 | 10 | 2.00 2.50 | 2.50 3.00 | 2.50 2.80 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 16:00:0 | 10 | 3.00 3.50 | 3.50 4.00 | 2.90 3.10 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 16:48:0 | 10 | 4.00 4.50 | 4.50 5.00 | 3.20 3.30 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 18:00:0 | 10 | 5.00 5.50 | 5.50 6.00 | 3.60 3.90 | | | | | | | | | | | | | | | | |
| 05/03/2019 | 18:30:0 | 10 | 6.00 | 6.50 | 4.30 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 20:10:0 | 10 | 6.50 7.00 | 7.00 7.50 | 4.30 4.30 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 21:10:0 | 10 | 7.50 8.00 | 8.00 8.50 | 4.30 4.30 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 21:30:0 | 10 | 8.50 9.00 | 9.00 9.50 | 4.30 4.30 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 22:00:0 | 0 | 9.50 10.00 | 10.00 10.50 | 4.30 3.10 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 22:10:0 | 10 | 10.50 11.00 | 11.00 11.50 | 3.00 2.80 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 22:50:0 | 0 | 11.50 12.00 | 12.00 12.50 | 2.60 2.50 | | | | | | | | | | | | | | | | |
| 05/03/2019 05/03/2019 | 23:20:0 | 10 | 12.50 13.00 | 13.00 13.50 | 2.50 2.30 | | | | | | | | | | | | | | | | |
| 06/03/2019 06/03/2019 | 00:00:0 | 0 | 13.50 14.00 | 14.00 14.50 | 2.20 2.10 | | | | | | | | | | | | | | | | |
| 06/03/2019 06/03/2019 | 00:30:0 | 10 | 14.50 15.00 | 15.00 15.50 | 2.10 2.30 | | | | | | | | | | | | | | | | |
| 00/03/2018 | 9 00.50.0 | io | | ole and (| _ | | | | | | | | | | | | | | | | |
| Depth 1 | To (m) | Hole D | iamete | | Depth To | (m) | Casing Di | iameter (mm) | | | | | | | | | | | | | |
| 5.0 | 00 | | 220 | , , | 5.00 | | | 220 | | | | | | | | | | | | | |
| 10. 17. | .00 | | 220 220 | | 10.00 17.00 | | | 220 146 | | | | | | | | | | | | | |
| 18. 19. | | | 146 146 | | 17.00 | | | 220 | | | | | | | | | | | | | |
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| | | Cł | niselli | ing / Slo | w Progre | 200 | | | | | | | | | | | | | | | |
| Depth F | rom (m) | | pth To (| | Duration (h | | Tool | Remark | 1 | | | | | | | | | | | | |
| 15. | | | 16.00 | () | 01:00 | | | | | | | | | | | | | | | | |
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| | | Wat | er St | trike | | | Wate | r Added | | | | | | | | | | | | | |
| Strike At (m) | Rise To (m) | Time Ela | psed | Casing Depth | (m) Depth S | Sealed (m) | Depth Fron | n Depth To | 1 | | | | | | | | | | | | |
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| | | Wate | r Stri | ke Rem | arks | | <u> </u> | | 1 | 1 | | | Gen | eral F | Remai | rks | 1 | | | 1 | |
| Groundwate | r not observe | | | | | | | The borehole | | | | | k-up platfo | orm Skat | e 3A. De | ck to mu | | | | | |
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| Туре | ID | Respo | nse Zone | e Response | | on Date | ID | Top Depth (m) | Base Dep | | Diameter (mm |) | Туре | Depth F | rom (m) | Depth To | | | l Material | | Date |
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| l | ations and | result | ts dat | a defined | on 'Note | s on Ev | plorator | Position F | Records | ;' | | | | | | | | | | | |
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| | | | (| Contr | act Nar | ne | Nigg Energy Park, East Quay Development Location ID | | | | | | | | | | | | | | | |
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| -6 | JGR | • | | Client | | | | | y Nigg Lt | | | | | | | | | | | 3H | I | Q |
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| Y | $\equiv \hat{\hat{}}$ | | ! ⊢ | | linates | | | | N868803 | .00 | Grou | und | Elevation | (m Da | atur | m) -0.8 | 82 | Shee | et 2 o | f 2 | | |
| | | | ŀ | Hole ⁻ | Туре | | Cable | Percus | sion | | • | | | | | ' | | Statu | ıs | | Draft | |
| D | ı | | | | | T | _ | | | | ıipme | | | | | | | | | | | |
| Depth From (m) | Depth To (| n) H | lole Ty | pe D | ate From | Date To | E | quipment | Core E | arrel | Core I | Bit | Drilling Crew | Logge | d By | Remarks | | | | | | |
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| | | | | | Progre | ess | | | | Т | | | Ro | otary [| Deta | ails | | | | | Core De | etails |
| Date (dd/mm/yyyy | Tir (hh:m | ne m:ss) | Но | le Depth (m) | | pth Water Depti | Weath | er | | Dep | oth Dep | oth To (m) | Flush Ty | _ | Flush | | lush Colou | ır Rur | n Time n:mm) | Depth From (m) | Depth To (m) | Diameter (mm) |
| 06/03/2019 06/03/2019 | 9 01:0 9 02:0 | 0:00 0:00 | | 15.50 16.00 | 16.00 16.50 | 2.60 2.80 | | | | | | | | | | | | | , | | . , | |
| 06/03/2019 | | | | 16.50 | 17.00 | Not recognise | 1 | | | | | | | | | | | | | | | |
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| 06/03/2019 | | | | 17.50 18.00 | 17.00 17.00 | Not recognised Not | d l | | | | | | | | | | | | | | | |
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| Depth F | rom (m) | T | | pth To (| | Duration (hh | | Tool / | / Remark | | | | | | | | | | | | | |
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| | 1 | | | er St | rike | | | | r Added | | | | | | | | | | | | | |
| Strike At (m) | Rise To (r | n) ' | Time Ela (min: | s) | Casing Depti | n (m) Depth S | ealed (m) | Depth Fron (m) | n Depth To (m) | 4 | | | | | | | | | | | | |
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| | | 1 | Nato | r Stril | ke Rem | arke | | l T | 1 | 1 | | | | Go | ner | al Rem | narke | | | <u> </u> | | |
| Groundwate | er not obse | | | | | idi NO | | | The borehole | was ca | arried out | tover | water from jac | k-up plat | form | Skate 3A. | Deck to m | nudline = | = 6.00m | ı; deck lev | el = 5.18m | CD. Water |
| | | | | | | | | | Groundwater | not ob | served as | | eabed level. Al hole conducte | | | | | | | | | |
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| Туре | ID | | Kespo To | nse Zone p (m) | Response Base (r | Zone n) Installation | n Date | ID | Top Depth (m) | Base | Depth (m) | Diam | neter (mm) | Туре | D | epth From (| m) Depth | To (m) | В | ackfill Mat | erial | Date |
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| | ations a | nd ı | result | s data | a defined | d on 'Notes | on Ex | ploratory | / Position | Reco | rds' | | | | | | | | | | | |
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| Checked By | / | | NH | A | | | Е | levation Da | itum | CI | nart Datui | m | | | G | rid Coordi | nate Syste | m | OSGB | | | |
| Template: F | GSL/HBSI | /FGS | L BH S | Summar | y.hbt/Confi | g Fugro Rev5 | /12/03/20 | 19/TS | | | | | | | | | | Print Da | ate | | 25/04/20 | 19 |



D. CORE PHOTOGRAPHS

Rotary Core Photographs

BH01 Plate BH01/1

BH03 Plates BH03/1 and BH03/2

BH05 Plate BH05/1







BH01; 17.35m to 18.85m



BH01; 20.35m to 21.85m



BH01; 21.85m to 23.35m







BH03; 17.00m to 18.00m



BH03; 18.00m to 19.50m



BH03; 19.50m to 21.00m





BH03; 21.00m to 22.50







BH05; 14.50m to 16.00m



BH05; 16.50m to 17.00m



E. FIELD TEST RECORDS

E.1 CALIBRATION CERTIFICATES

SPT Hammer Calibration Certificate SPT08

E.2 STANDARD PENETRATION TEST RESULTS

Standard Penetration Test Results Figures BH01 to BH08

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD AINLEYS INDUSTRIAL ESTATE ELLAND

WEST YORKSHIRE HX5 9JP

SPT Hammer Ref: SPT08

Test Date: 19/09/2018

Report Date:

19/09/2018

File Name:

SPT08.spt

Test Operator:

SH

Instrumented Rod Data

Diameter d_r (mm):

54

Wall Thickness t_r (mm):

6.3

Assumed Modulus Ea (GPa): 200

Accelerometer No.1:

7080

Accelerometer No.2:

11609

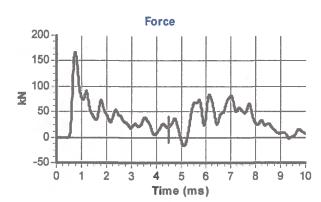
SPT Hammer Information

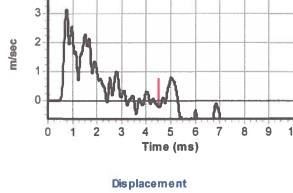
Hammer Mass m (kg):

Falling Height h (mm): 760

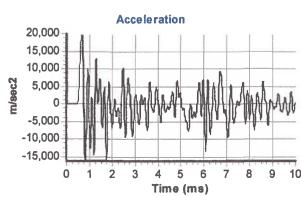
SPT String Length L (m): 10.0

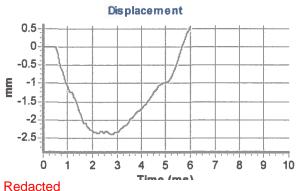
Comments / Location





Velocity





Calculations

Area of Rod A (mm2):

944

Theoretical Energy E_{theor} (J):

473

Measured Energy E_{meas}

242

Energy Ratio E_r (%):

51

Signed: S.HOWARTH

Title:

FITTER

The recommended calibration interval is 12 months



| Contract Name | Nigg Energy Park, East Qua | ligg Energy Park, East Quay Development | | | | | |
|-----------------|-----------------------------|---|--------------|-------|-----|--|--|
| Client | Global Energy Nigg Ltd | | | BH | 101 | | |
| Fugro Reference | G191005U | | | | | | |
| Coordinates (m) | E279383.70 N868963.58 | 0.85 | Sheet 1 of 1 | | | | |
| Hala Tima | Cable Developies and Detail | • | Ctatus | Droft | | | |

| Hole T | | Test Result | | ation Test Results | | | Status | Dra | all |
|-------------------------------------|---|---|--|--|--|--|--|--|--|
| est Type Per | Self Weight enetration (mm) | Test Result | | ation rest results | | | | | |
| 31 FG | siletration (min) | | | Total Penetration | Hamr | ner Serial | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| | | | | Total Penetration (mm) | Hamr | mer Serial umber | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| tu Vane Test | t Results | | In Situ Hand Pen | etrometer Results | | Volatile | Headspace Testi | na by Photoionis | ation Detector |
| e Undisturbed Und Shear Strength | ndrained Residu | ual Undrained Strength (kPa) | Test Depth (m) | Undisturbed Undrained Shear (kPa) | Strength | | | | sult (ppm) |
| | | | | | | | | | |
| | tu Vane Tes e Undisturbed Ur Shear Strengt | tu Vane Test Results Be Undisturbed Undrained Shear Strength (kPa) Resid | tu Vane Test Results Pe Undisturbed Undrained Shear Strength (kPa) Residual Undrained Shear Strength (kPa) | tu Vane Test Results tu Vane Test Results tu Vane Test Results Hodaturbed Undrained Residual Undrained Shear Strength (kPa) Shear Strength (kPa) Shear Strength (kPa) Test Depth (m) | tu Vane Test Results In Situ Hand Penetrometer Results Undestuded Undrained Shear Strength (6-Pa) Shear Strength (6-Pa) Shear Strength (6-Pa) Test Depth (m) Undestuded Undrained Shear (6-Pa) | tu Vane Test Results In Situ Hand Penetrometer Results (Didistultion to Undamed Sheer Strength (I/Pa) Shear Strength (I/Pa) Test Depth (m) Undata/bed Undamed Sheer Strength (I/Pa) Test Depth (m) | tu Vane Test Results In Situ Hand Penetrometer Results Volatile Undishibed Undiamed Sheer Strength (Pag) Test Depth (m) Undishibed Undiamed Sheer Strength (Pag) Test Depth (m) Undishibed Undiamed Sheer Strength (Pag) Test Depth (m) Undishibed Undiamed Sheer Strength (Pag) | tu Vane Test Results In Situ Hand Penetrometer Results Volatile Headspace Test Describer Sergin shall be describerance of the service of t | tu Vane Test Results In Situ Hand Penetrometer Results Te Uninstance Unionized Unionized Peneduction (Proposition of Protocomic Results) Test Depth (m) Test Depth (m) PID Results Protocomic Results Test Depth (m) PID Results Protocomic Resu |

-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



| Contract Name | Nigg Energy Park, East Qua | | Location ID | | |
|-----------------|----------------------------|----------------------------|-------------|--------------|------------|
| Client | Global Energy Nigg Ltd | | | BH | 102 |
| Fugro Reference | G191005U | | | | |
| Coordinates (m) | E279342.91 N868934.75 | Ground Elevation (m Datum) | -9.10 | Sheet 1 of 1 | |
| Hala Tima | Cable Developion | | | Ctatus | Droft |

| · | \sim | | rdinates Type | s (m) | | 9342.91 r e Percus | N868934. | ./5 | Ground | d Elevation | (m Dat | um) -9. | 10 Shee | t 1 of 1 s Dra | oft |
|---------------------|-----------|----------------------------|-----------------------------|----------------|---------------------------------|-----------------------|------------|--------|--------------|---------------------------|------------------|-----------------------|------------------|--------------------|-----------------|
| | | поіе | туре | | Cabi | | | Penetr | ation T | est Results | <u> </u> | | Statu | S Di | ait |
| Test Depth (m | m) Test | Type | Self Weig | ht (mm) | Test Result | | rtandard i | CHCU | | | | nmer Serial | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| Test Depth (m | n) Test | Type | Self Weigh Penetration (| tht (mm) | Test Result | | | | | Total Penetratic (mm) | | nmer Serial Number | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| | | | | | | | | | | | | | | | |
| | In Situ \ | Vane Te | est Resu | Ilts Recide | ual Undrained | | | | Undisturb | eter Results | S ar Strength | | | ting by Photoionis | |
| Test Depth (m) Test | est Type | Undisturbed Shear Stren | ngth (kPa) | Shear | ual Undrained Strength (kPa) | Test | t Depth (m | 1) | o. anotur Di | ed Undrained She (kPa) | cacnyul | Tes | t Depth (m) | PID Re | sult (ppm) |
| Notes | | | | | | | | | | | | | | | |
| INOTES | | | | | | | | | | | | | | | |

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



| Contract Name | Nigg Energy Park, East Qua | Nigg Energy Park, East Quay Development | | | | | | |
|-----------------|----------------------------|---|-------|--------------|--|--|--|--|
| Client | Global Energy Nigg Ltd | | | B | | | | |
| Fugro Reference | G191005U | | | | | | | |
| Coordinates (m) | E279380.53 N868920.31 | Ground Elevation (m Datum) | -0.75 | Sheet 1 of 1 | | | | |

Sheet 1 of 1

| | Ho | le Type | Cable Percussion and Rotary Coring Status Draft | | | | | | aft | |
|---|----------------|---|--|---|--|---|-------------------------|------------------|------------------|------------------------------|
| | | | Standard Penetration Test Results | | | | | | | |
| Test Depth (m) | Test Type | Self Weight Penetration (mm) | Test Resul | t | | Total Penetration (mm) | Hammer Serial Number | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| Test Depth (m) 0.50 2.00 4.00 5.50 7.00 9.00 11.00 13.00 15.00 17.00 | | Self Weight Penetration (mm) 0 0 0 0 0 450 0 0 0 0 0 | Test Resul N=9 (3,2/2 N=31 (3,4/ N=17 (2,3/ 50 (7,11/50 N=37 (1,3/ 50 (2,8/50 N=0 (0 for N=33 (2,1/ 50 (3,11/50 | Standard Penetr t ,2,2,3) 4,5,10,12) 3,3,6,5) 0 for 140mm) 6,10,9,12) for 180mm) 0mm/0 for 0mm) | | est Results | Hammer Serial Number | , | | |
| Toot Donth | Tuna Undisturb | Test Results ed Undrained Resi rength (kPa) Shea | dual Undrained Strength (kPa) | In Situ Hand Per Test Depth (m) | | eter Results ed Undrained Shear S (kPa) | trop ath | Headspace Test | | ation Detector sult (ppm) |
| Notes | | | | | | | | | | |

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



| Contract Name | Nigg Energy Park, East Qu | ligg Energy Park, East Quay Development | | | | | | | |
|-----------------|---------------------------|---|-------|--------------|--|--|--|--|--|
| Client | Global Energy Nigg Ltd | | | l B | | | | | |
| Fugro Reference | G191005U | | | | | | | | |
| Coordinates (m) | E279380.77 N868871.12 | Ground Elevation (m Datum) | -2.02 | Sheet 1 of 1 | | | | | |

Sheet 1 of 1

| on | Status | Draπ |
|---------------------------------|--------|------|
| nderd Departmetics Test Desults | | |

| | _ | ordinates (m) | | | Ground | d Elevation (n | n Datum) -2. | | 1 of 1 | - fu |
|--|---|---|--|---|-----------|--|--|--|--|---|
| | Но | le Type | Cab | le Percussion | T | 4 D 4- | | Status | Dr: | aft |
| | | Self Weight | I | Standard Penetr | ration Te | | Hammer Serial | T | T | |
| | | Penetration (mm) | | | | (mm) | Number | | | |
| Test Depth (m) 0.50 2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00 18.00 20.00 22.00 | Test Type S S S S S S S S S S S S S S S S S S S | Self Weight Penetration (mm) 450 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | N=16 (4,4/ N=29 (2,4/ 50 (1,0/50 50 (4,11/50 N=42 (7,9/ 50 (7,18/50 N=20 (2,3/ N=34 (2,4/ 50 (2,9/50 50 (4,9/50 | t 0mm/0 for 0mm) 4.4.4.4) 7.6.8.8) for 190mm) 0 for 200mm) 8,11,10,13) 0 for 85mm) 3,5,5,7) | | Total Penetration | Hammer Serial Number 08 08 08 08 08 08 08 08 08 08 08 08 08 | Energy Ratio (%) 51 51 51 51 51 51 51 51 51 51 51 51 51 | Casing Depth (m) 1.00 2.50 4.50 6.50 8.00 10.50 12.50 14.50 16.00 16.00 16.00 16.00 | Water Depth (m) 7.80 7.30 5.80 5.30 6.40 4.10 1.80 2.80 3.40 4.00 4.30 4.00 |
| In S Test Depth (m) Test Ty | | Fest Results ed Undrained Resi rength (kPa) Shea | dual Undrained Strength (kPa) | In Situ Hand Per Test Depth (m) | | eter Results ed Undrained Shear St (kPa) | | Headspace Test tt Depth (m) | | ation Detector sult (ppm) |

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279379.79 N868819.21 | Ground Elevation (m Datum) | -6.75 | Sheet 1 of 1 |

neet 1 of 1

| | \geq | | ordinates | s (m) | | 9379.79 N86 | | | d Elevation (n | n Datur | n) -6.7 | 75 | Sheet | 1 of 1 | |
|--|--------|-----------|---|------------------------------------|--|-------------|------------|----------|-------------------------------|--|---------------------------------|--|---------------------------------|--|--|
| | | Но | le Type | | Cabl | e Percussio | n and Rota | ry Corir | ıg | | | : | Status | Dra | aft |
| | | | | | | Stan | dard Penet | ration T | est Results | | | | | | |
| Test Depth (m) | Test T | | Self Weig Penetration | tht (mm) Tes | st Result | : | | | Total Penetration (mm) | Hamme Num | r Serial ber | Energy R | tatio (%) | Casing Depth (m) | |
| Test Depth (m) 0.50 2.00 4.00 6.00 8.00 10.00 12.00 14.00 | Test T | | Self Weig Penetration 150 0 0 0 0 0 0 | N=0 N=1 50 50 50 50 | 0 (0,0/0, 10 (2,1/ (5,8/50 t (6,10/50 (6,12/50 (25 for 1 (25 for 1 | 0,0,0) | 270mm) | ration i | | Hamme Num Oi Oi Oi Oi Oi Oi Oi | 8 8 8 8 8 8 8 | 51 51 51 51 51 51 51 51 | 1 1 1 1 1 1 1 | Casing Depth (m) 1.00 2.00 4.00 6.00 8.00 10.00 12.50 13.50 | Water Depth (m) 3.40 3.70 3.70 DRY DRY DRY 3.10 3.20 |
| In | Situ V | ane 1 | 「est Resu | ılts | | In Sit | u Hand Pe | netrome | eter Results | | Volatile | Headspa | ace Testi | ing by Photoionis | ation Detector |
| Test Depth (m) Test | Type U | ndisturbe | ed Undrained ength (kPa) | Residual U Shear Stren | Indrained | Test De | | | ed Undrained Shear S (kPa) | | | t Depth (| | | sult (ppm) |
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Notes

-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | BH |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279381.64 N868746.75 | Ground Elevation (m Datum) | -9.60 | Sheet 1 of 1 |

| | Hole Type | Cable Pe | ercussion | | | | Status | Dra Dra | aft |
|-----------------------|-----------------------------------|--|----------------------------------|---------|--|---|------------------|---|--|
| | | | Standard Penetr | ation T | est Results | | | | |
| Test Depth (m) Test T | Type Self Weight Penetration (mm) | Test Result | | | Total Penetration (mm) | Hammer Serial Number | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| Test Depth (m) | 450 | Test Result N=0 (0,0/0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 | 0) 0) 0) 2) 2) 1) | ation i | est Results Total Penetration (mm) 450 450 450 450 450 450 450 450 600 | Hammer Serial Number 08 08 08 08 08 08 08 08 08 | Energy Ratio (%) | Casing Depth (m) 1.00 2.50 4.50 6.50 8.50 10.50 12.50 14.50 | Water Depth (m) 2.20 2.50 3.00 3.30 3.20 3.10 2.20 DRY |
| In Situ V | /ane Test Results | | In Situ Hand Pen | etrome | eter Results | Volatii | e Headspace Test | ing by Photoionis | ation Detector |
| | Indisturbed Undrained Res | dual Undrained r Strength (kPa) | Test Depth (m) | | ed Undrained Shear St (kPa) | | st Depth (m) | | sult (ppm) |
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Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



Hole Type

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID |
|-----------------|----------------------------|----------------------------|-------|--------------|
| Client | Global Energy Nigg Ltd | | | B |
| Fugro Reference | G191005U | | | |
| Coordinates (m) | E279451.07 N868746.87 | Ground Elevation (m Datum) | -4.01 | Sheet 1 of 1 |

Cable Percussion

BH07

Sheet 1 of 1

Status Draft

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|---------------------|---------------|--|------------------------------------|-------------------|---------|---------------------------|-------------------------|------------------|-------------------|-----------------|
| | | | | Standard Penetr | ation T | | | | | |
| Test Depth (m) | Test Type | Self Weight Penetration (mm) | Test Result | t | | Total Penetration (mm) | Hammer Serial Number | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
| 0.50 | S | 150 | N=9 (0,0/2 | | | 450 | 08 | 51 | 1.00 | 6.30 |
| 2.00 | S | 0 | N=6 (1,1/1 | 0 1 4) | | 450 | 08 | 51 | 2.50 | 5.90 |
| 4.00 | S | | | 0mm/0 for 0mm) | | 0 | 08 | 51 | 4.50 | 5.30 |
| 6.00 | S S | 0 | N=19 (2,3/4 | | | 450 | 08 | 51 | 6.50 | 4.60 |
| 8.00 | S | | N=17 (2,3/4 | | | 450 | 08 | 51 | 8.00 | 3.70 |
| 10.00 | S | 0 | | | | 450 | 08 | 51 | | 3.00 |
| | 8 | | N=20 (3,3/4 | | | | | | 10.50 | |
| 11.70 | S | 0 | N=23 (4,4/ | | | 450 | 08 | 51 | 12.00 | 3.20 |
| 14.00 | S | 0 | N=34 (4,4/ | | | 450 | 08 | 51 | 14.50 | 4.10 |
| 16.00 | S | 0 | N=17 (3,4/3 | 3,3,4,7) | | 450 | 08 | 51 | 16.00 | 5.20 |
| 18.00 | S | 0 | N=12 (3,2/ | 3,3,3,3) | | 450 | 08 | 51 | 18.50 | 5.80 |
| 19.50 | S | 0 | 50 (25 for 4 | 10mm/50 for 60mm) | | 100 | 08 | 51 | 19.50 | 5.40 |
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| Ir | n Situ Vane | Test Results | | In Situ Hand Pen | netrome | eter Results | Volatile | Headspace Test | ing by Photoionis | ation Detector |
| | | | dual Undrained | Test Depth (m) | | ed Undrained Shear S | | st Depth (m) | | sult (ppm) |
| Test Depth (m) Test | Type Shear St | ed Undrained Resident Residence Resi | dual Undrained r Strength (kPa) | rest Depth (m) | | (kPa) | - ies | r nehm (m) | PID Re | ouit (bhtii) |
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Notes

-Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

Print Date



Template: FGSL/HBSI/FGSL SPT Summary.hbt/Config Fugro Rev5/18/02/2019/TS

| Contract Name | Nigg Energy Park, East Qua | ay Development | | Location ID | |
|-----------------|----------------------------|----------------------------|-------|--------------|-------|
| Client | Global Energy Nigg Ltd | | | BH | INR |
| Fugro Reference | G191005U | | | | 100 |
| Coordinates (m) | E279448.06 N868803.00 | Ground Elevation (m Datum) | -0.82 | Sheet 1 of 1 | |
| Hala Tura | Cable Deversaies | • | | Ctatus | Droft |

| | | | | orumate | 3 (111) | | 9440.00 N000003.00 | Ciodin | ı Elevation (ii | Datum) -0 | | | |
|-------------------|--------|--------|-------------------------|-----------------------------|----------------|----------------------------------|-----------------------|------------|--------------------------------|-------------------------|------------------|-------------------|-----------------|
| | | | Но | le Type | | Cabl | e Percussion | | | | Status | Dra | aft |
| | | | | | | | Standard Pen | etration T | est Results | | | | |
| Test Dept | h (m) | Test 7 | Туре | Self Wei | ght (mm) | Test Result | | | Total Penetration (mm) | Hammer Serial Number | Energy Ratio (%) | Casing Depth (m) | Water Depth (m) |
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| | In | Situ \ | /ane l | est Res | ults | | In Situ Hand P | enetrome | ter Results | Volatile | Headspace Testi | ing by Photoionis | ation Detector |
| Test Depth (m) | Test 1 | Гуре | Jndisturbe Shear Str | ed Undrained ength (kPa) | Resid Shear | lual Undrained Strength (kPa) | Test Depth (m) | Undisturbe | ed Undrained Shear St (kPa) | trength Te: | st Depth (m) | PID Res | sult (ppm) |
| | | | | | | | | | | | | | |
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| Notes | | | | | | | | • | | ı | | • | |
| | iation | s and | result | ts data d | efine | d on 'Note | s on Exploratory Posi | tion Reco | ords' | | | | |

25/04/2019

Print Date



F. GEOENVIRONMENTAL TESTING

| General Notes on Laboratory Test Results | Figure F.1 |
|---|------------|
| Schedule of Contamination Testing | Table F.2 |
| RPS Bedford Ltd (RPS), Certificates of Analysis Number: | 19-81762 |



GUIDANCE NOTES

NOTES ON CHEMICAL ANALYSIS FOR CONTAMINATED LAND ASSESSMENT

Sampling, Sample Preservation, Transport and Storage

Sampling of soils for environmental chemical analysis is undertaken to the standards set out in BS 10175:2011+A1:2013, sampling of groundwater is undertaken as per BS EN ISO 22475–1:2006 and BS ISO 5667–11:2009, sampling of surface waters as per BS EN ISO 5667–1:2006 and BS ISO 5667–6:2014, and sampling of ground gases for environmental testing as per CIRIA Guidance C665.

The sample container types used are dictated by the requirements of chemical testing as set out in the project specification and as provided by the selected environmental testing laboratory. Sample containers are filled as instructed by laboratory guidelines, ensuring minimisation of sample headspace.

Where sample volumes are limited by the sampling technique (e.g. dynamic sampling) certain sample container types may be prioritised to achieve the most comprehensive testing possible.

Samples on site are preserved by control of temperature to between 2 and 4 degrees Celsius unless otherwise stated. Samples are despatched to the analytical laboratory on the day of sampling under Chain of Custody (CoC) in temperature controlled cool-boxes. Sample temperature is measured on receipt at the designated analytical laboratory. Temperature control is maintained at the analytical laboratory prior to receipt of testing instructions, preparation and analysis.

Where testing instructions are to be provided by the Investigation Supervisor, blank testing schedules are provided as standard within 1 to 2 working days of sampling.

Scheduled Testing

The requested chemical analyses scheduled on available samples given on the relevant CoC.

The schedule lists the date of sampling, CoC number under which the samples were transported, tests requested and laboratory certificate reference for all samples.

Laboratory Analytical Methodologies and Accreditation

Analytical laboratories used by FGSL are accredited by UKAS (United Kingdom Accreditation Service). Dependent on Limits of Detection being achievable as requested at the time of scheduling, chemical analyses on soils, waters and gases will, where possible, be accredited by MCERTS (Monitoring Certification Scheme). MCERTS is the Environment Agency's performance standard for laboratories undertaking chemical testing. The accreditation applicable for individual tests is presented on the analytical laboratory test certificates in this report.

A summary of the methodologies used by the analytical laboratory in carrying out the requested analyses is presented on the summary pages of the analytical laboratory test certificates. Further information may be obtained on the test methodologies by contacting the laboratory concerned.

Where marine sediment samples are tested, principally as part of a dredging licence application, specific laboratory accreditation testing is required, as detailed in the relevant guidance documents from the



licensing agency. Details of these tests are given in relevant guidance documents reproduced in the appendix with the results.

Deviating Samples

UKAS is the accreditation body responsible for auditing laboratories to both ISO 17025 and MCERTS in the UK. All UKAS accredited laboratories are required to operate appropriate procedures for the handling of deviating samples.

Deviating (or non-conforming) samples are defined as those which may have been compromised in some way during sampling, transportation, storage or analysis, and which may cause the integrity of the analytical data to be in doubt.

Examples of deviating samples that can occur from sampling, transportation and storage issues include:

- Incorrect sample containers for analyses requested, for example, no separate volatile container supplied or samples for organics analysis supplied in plastic containers;
- Headspace present in containers for volatile compounds or Biological Oxygen Demand (BOD) analyses;
- No sampling date supplied (mandatory for MCERTS);
- No sampling time supplied (applicable for certain water parameters);
- Temperature exceeded;
- Holding time for the analysis exceeded.

Where deviating samples are subsequently analysed, UKAS requires that the competent laboratory "shall include a disclaimer in the report, clearly stating that the sample was deviating and that, as a result, the test result(s) may be invalid". It is also a condition of MCERTS that the whole results certificate is included in reports sent to Global Energy Nigg Limited, including all supporting information. and not just the results sheets. Each analytical report therefore contains a page detailing the deviating samples and the reasons for the non-conformity.

FGSL undertakes to sample, record, transport and store samples in such a way that deviating samples should not occur unless for reasons outside of FGSL's control.

Waste Acceptance Criteria Testing

Where samples have been scheduled for Waste Acceptance Criteria (WAC) testing to BS EN 12457, Part 3, analysis is undertaken for one of the Full, Hazardous or Inert WAC suites, as specified and as detailed below.

Full WAC Suite: The solid material from each sample is tested for: total organic carbon (TOC); loss on ignition (LOI); benzene, toluene, ethylbenzene and xylene (BTEX): Polychlorinated biphenyls (PCB's); Total petroleum hydrocarbons (TPH (C10 – C40)); Polycyclic aromatic hydrocarbons (PAHs); pH value; and acid neutralisation capacity. Two leachate specimens for each sample are prepared at liquid to solid ratios of 2:1 and then 8:1 and both are analysed for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, chloride, fluoride, sulphate, total dissolved solids, phenol index and dissolved organic carbon.



Hazardous WAC Suite: The solid material from each sample is tested for total organic carbon, loss on ignition and acid neutralisation capacity. Two leachate specimens for each sample are prepared at liquid to solid ratios of 2:1 and then 8:1 and both are analysed for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, chloride, fluoride, sulphate, total dissolved solids and dissolved organic carbon.

Inert WAC Suite: The solid material from each sample for total organic carbon, BTEX, PCB's, TPH (C10 – C40) and PAH. Two leachate specimens for each sample are prepared at liquid to solid ratios of 2:1 and then 8:1 and both analysed for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, chloride, fluoride, sulphate, total dissolved solids, phenol index and dissolved organic carbon.

Results – calculation: The results of the testing of the 2:1 and 8:1 leachate specimens are then calculated to give a liquid to solid ratio of 10:1 result in mg/kg. These 10:1 results, and the results of the solid determinations, can be compared to the values set out in the guidance produced by the Environment Agency (2005) to assist with appropriate disposal to landfill, under Landfill Directive (1999/31/EC).

Chemical Analysis on Leachates Prepared from Soil Samples

Where artificially produced leachate specimens are requested from soil samples the leachate preparation technique is in accordance with British Standard BS EN 12457, as detailed on the Schedules.

The following is a summary of the different leaching preparations available:

- BS EN 12457–1: One stage test carried out at a liquid to solid ratio of 2:1;
- BS EN 12457–2: One stage test carried out at a liquid to solid ratio of 10:1;
- BS EN 12457–3: Two stage test carried out at a liquid to solid ratio of 2:1 followed by 8:1, giving a cumulative liquid to solid ratio of 10:1.

The resultant leachate specimens are then tested for the list of parameters as scheduled.

AGS Data for Chemistry Testing

Chemical testing results are provided in AGS 4.0 format where requested. It should be noted that where laboratory methodologies differ, or determinants tested do not appear on the AGS code list for chemical test names, a new and unique code may be used for an individual test.



Table F.2 Schedule of Contamination Testing

| BH Ref. | ES | Depth (m) | Matrix Type | Sampling Date | Marine Scotland Suite (exc. PSA) testing | RPS Report Number |
|---------|----|-------------|----------------|------------------|--|----------------------|
| BH1 | 1 | 0.00-0.50 | Sediment | 04/03/2019 | 1 | 19-81762 |
| BH1 | 3 | 0.50-1.00 | Sediment | 04/03/2019 | | |
| BH1 | 5 | 1.00-1.50 | Sediment | 04/03/2019 | | |
| BH1 | 7 | 1.50-2.00 | Sediment | 04/03/2019 | | |
| BH1 | 9 | 2.00-2.50 | Sediment | 04/03/2019 | | |
| BH1 | 11 | 2.50-3.00 | Sediment | 04/03/2019 | | |
| BH1 | 13 | 3.00-3.50 | Sediment | 04/03/2019 | | |
| BH1 | 15 | 3.80-4.00 | Sediment | 04/03/2019 | | |
| BH1 | 17 | 4.00-4.50 | Sediment | 04/03/2019 | | |
| BH1 | 19 | 4.50-5.00 | Sediment | 04/03/2019 | | |
| BH1 | 21 | 5.00-5.50 | Sediment | 04/03/2019 | | |
| BH1 | 23 | 5.50-6.00 | Sediment | 04/03/2019 | | |
| BH1 | 25 | 6.00-6.50 | Sediment | 04/03/2019 | 1 | 19-81762 |
| BH1 | 28 | 6.80-7.00 | Sediment | 04/03/2019 | | |
| BH1 | 29 | 7.00-7.50 | Sediment | 04/03/2019 | | |
| BH1 | 31 | 7.50-8.00 | Sediment | 04/03/2019 | | |
| BH1 | 33 | 8.00-8.50 | Sediment | 04/03/2019 | | |
| BH1 | 35 | 8.50-9.00 | Sediment | 04/03/2019 | | |
| BH1 | 37 | 9.00-9.50 | Sediment | 04/03/2019 | | |
| BH1 | 39 | 9.50-10.00 | Sediment | 04/03/2019 | | |
| BH1 | 41 | 10.00-10.50 | Sediment | 04/03/2019 | | |
| BH1 | 43 | 10.50-11.00 | Sediment | 04/03/2019 | | |
| BH1 | 45 | 11.00-11.50 | Sediment | 04/03/2019 | | |
| BH1 | 47 | 11.50-12.00 | Sediment | 04/03/2019 | | |
| BH1 | 49 | 12.00-12.50 | Sediment | 04/03/2019 | | |
| BH1 | 51 | 12.50-13.00 | Sediment | 04/03/2019 | 1 | 19-81762 |
| BH2 | 1 | 0.00-0.50 | Sediment | 02/03/2019 | 1 | 19-81762 |
| BH2 | 3 | 0.50-1.00 | Sediment | 02/03/2019 | | |
| BH2 | 5 | 1.00-1.50 | Sediment | 02/03/2019 | 1 | 19-81762 |
| BH2 | 7 | 1.50-2.00 | Sediment | 02/03/2019 | | |
| BH2 | 9 | 2.20-2.50 | Sediment | 02/03/2019 | | |
| BH2 | 11 | 2.50-3.00 | Sediment | 02/03/2019 | 1 | 19-81762 |
| BH2 | 13 | 3.00-3.50 | Sediment | 02/03/2019 | | |
| BH2 | 15 | 3.50-4.00 | Sediment | 02/03/2019 | | |
| BH3 | 1 | 0.00-0.50 | Sediment | 08/03/2019 | 1 | 19-81762 |
| ВН3 | 3 | 0.50-1.00 | Sediment | 08/03/2019 | | |
| ВН3 | 6 | 1.00-1.50 | Sediment | 08/03/2019 | | |
| ВН3 | 8 | 1.50-2.00 | Sediment | 08/03/2019 | | |
| ВН3 | 11 | 2.00-2.50 | Sediment | 08/03/2019 | | |
| ВН3 | 12 | 2.50-3.00 | Sediment | 08/03/2019 | | |
| ВН3 | 14 | 3.00-3.50 | Sediment | 08/03/2019 | | |
| ВН3 | 16 | 3.80-4.00 | Sediment | 08/03/2019 | | |
| ВН3 | 19 | 4.00-4.50 | Sediment | 08/03/2019 | | |
| ВН3 | 20 | 4.50-5.00 | Sediment | 08/03/2019 | | |
| ВН3 | 22 | 5.00-5.50 | Sediment | 08/03/2019 | | |



| BH3 | | | | Motrix | Compling | Marine Scotland | DDC Donort |
|--|---------|----|-------------|----------------|------------------|-----------------|----------------------|
| BH3 | BH Ref. | ES | Depth (m) | Matrix Type | Sampling Date | | RPS Report Number |
| BH3 | BH3 | 25 | 5.50-6.00 | Sediment | 08/03/2019 | 1 | 19-81762 |
| BH3 32 | BH3 | 27 | 6.00-6.50 | Sediment | 08/03/2019 | | |
| BH3 33 7.50-8.00 Sediment 08/03/2019 BH3 35 8.00-8.50 Sediment 08/03/2019 BH3 37 8.50-9.00 Sediment 08/03/2019 BH3 40 9.00-9.50 Sediment 08/03/2019 BH3 41 9.50-10.00 Sediment 08/03/2019 BH3 43 10.00-10.50 Sediment 08/03/2019 BH3 45 10.50-11.00 Sediment 08/03/2019 BH3 45 10.50-11.00 Sediment 11/03/2019 1 19-81762 BH4 1 0.00-0.50 Sediment 11/03/2019 1 19-81762 BH4 4 0.50-1.00 Sediment 11/03/2019 BH4 5 1.00-1.50 Sediment 11/03/2019 BH4 7 1.50-2.00 Sediment 11/03/2019 BH4 10 2.00-2.50 Sediment 11/03/2019 BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 22 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH5 4 0.50-1.00 Sediment 11/03/2019 BH5 4 0.50-1.00 Sediment 11/03/2019 BH5 4 0.50-1.00 Sediment 11/03/2019 BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 10 0.00-0.50 Sediment 13/03/2019 BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 14 3.00-5.50 Sediment 13/03/2019 BH5 14 3.00-5.50 Sediment 13/03/2019 BH5 14 3.00-5.50 Sediment 13/03/2 | BH3 | 29 | 6.80-7.00 | Sediment | 08/03/2019 | | |
| BH3 35 | BH3 | 32 | 7.00-7.50 | Sediment | 08/03/2019 | | |
| BH3 | BH3 | 33 | 7.50-8.00 | Sediment | 08/03/2019 | | |
| BH3 | BH3 | 35 | 8.00-8.50 | Sediment | 08/03/2019 | | |
| BH3 | BH3 | 37 | 8.50-9.00 | Sediment | 08/03/2019 | | |
| BH3 | BH3 | 40 | 9.00-9.50 | Sediment | 08/03/2019 | | |
| BH3 45 10.50-11.00 Sediment 08/03/2019 1 19-81762 BH4 1 0.00-0.50 Sediment 11/03/2019 1 19-81762 BH4 4 0.50-1.00 Sediment 11/03/2019 1 19-81762 BH4 5 1.00-1.50 Sediment 11/03/2019 1 19-81762 BH4 7 1.50-2.00 Sediment 11/03/2019 1 19-81762 BH4 10 2.00-2.50 Sediment 11/03/2019 1 18-814 1 2.50-3.00 Sediment 11/03/2019 1 19-81762 11/03/2019 1 19-81762 1 19-81762 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 19-81762 1 1 1 | BH3 | 41 | 9.50-10.00 | Sediment | 08/03/2019 | | |
| BH4 1 0.00-0.50 Sediment 11/03/2019 1 19-81762 BH4 4 0.50-1.00 Sediment 11/03/2019 1 19-81762 BH4 5 1.00-1.50 Sediment 11/03/2019 1 19-81762 BH4 7 1.50-2.00 Sediment 11/03/2019 1 18-14 10 2.00-2.50 Sediment 11/03/2019 1 18-14 10 2.00-2.50 Sediment 11/03/2019 1 18-14 12 2.50-3.00 Sediment 11/03/2019 1 18-14 14 3.00-3.50 Sediment 11/03/2019 1 18-14 15 3.50-4.00 Sediment 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 11/03/2019 1 19-81762 1 11/03/2019 1 19-81762 </td <td>BH3</td> <td>43</td> <td>10.00-10.50</td> <td>Sediment</td> <td>08/03/2019</td> <td></td> <td></td> | BH3 | 43 | 10.00-10.50 | Sediment | 08/03/2019 | | |
| BH4 4 0.50-1.00 Sediment 11/03/2019 BH4 5 1.00-1.50 Sediment 11/03/2019 BH4 7 1.50-2.00 Sediment 11/03/2019 BH4 10 2.00-2.50 Sediment 11/03/2019 BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.00 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 </td <td>BH3</td> <td>45</td> <td>10.50-11.00</td> <td>Sediment</td> <td>08/03/2019</td> <td>1</td> <td>19-81762</td> | BH3 | 45 | 10.50-11.00 | Sediment | 08/03/2019 | 1 | 19-81762 |
| BH4 5 1.00-1.50 Sediment 11/03/2019 BH4 7 1.50-2.00 Sediment 11/03/2019 BH4 10 2.00-2.50 Sediment 11/03/2019 BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00< | BH4 | 1 | 0.00-0.50 | Sediment | 11/03/2019 | 1 | 19-81762 |
| BH4 7 1.50-2.00 Sediment 11/03/2019 BH4 10 2.00-2.50 Sediment 11/03/2019 BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 36 8.50-9.00 | BH4 | 4 | 0.50-1.00 | Sediment | 11/03/2019 | | |
| BH4 10 2.00-2.50 Sediment 11/03/2019 BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.5 | BH4 | 5 | 1.00-1.50 | Sediment | 11/03/2019 | | |
| BH4 12 2.50-3.00 Sediment 11/03/2019 BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10. | BH4 | 7 | 1.50-2.00 | Sediment | 11/03/2019 | | |
| BH4 14 3.00-3.50 Sediment 11/03/2019 BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 1 19-81762 BH4 21 5.00-6.00 Sediment 11/03/2019 1 19-81762 BH4 23 5.50-6.00 Sediment 11/03/2019 1 19-81762 BH4 26 6.00-6.50 Sediment 11/03/2019 1 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 1 1 11/03/2019 1 | BH4 | 10 | 2.00-2.50 | Sediment | 11/03/2019 | | |
| BH4 15 3.50-4.00 Sediment 11/03/2019 BH4 18 4.00-4.50 Sediment 11/03/2019 BH4 19 4.50-5.00 Sediment 11/03/2019 1 19-81762 BH4 21 5.00-5.50 Sediment 11/03/2019 1 19-81762 BH4 23 5.50-6.00 Sediment 11/03/2019 1 19-81762 BH4 26 6.00-6.50 Sediment 11/03/2019 1 19-81762 BH4 28 6.50-7.00 Sediment 11/03/2019 1 19-81762 BH4 29 7.00-7.50 Sediment 11/03/2019 1 19-81762 BH4 31 7.50-8.00 Sediment 11/03/2019 1 19-81762 BH4 36 8.50-9.00 Sediment 11/03/2019 1 19-81762 BH4 38 9.00-9.50 Sediment 11/03/2019 1 19-81762 BH4 40 9.50-10.00 <t< td=""><td>BH4</td><td>12</td><td>2.50-3.00</td><td>Sediment</td><td>11/03/2019</td><td></td><td></td></t<> | BH4 | 12 | 2.50-3.00 | Sediment | 11/03/2019 | | |
| BH4 18 4.00-4.50 Sediment 11/03/2019 1 19-81762 BH4 19 4.50-5.00 Sediment 11/03/2019 1 19-81762 BH4 21 5.00-5.50 Sediment 11/03/2019 1 19-81762 BH4 23 5.50-6.00 Sediment 11/03/2019 1 19-81762 BH4 26 6.00-6.50 Sediment 11/03/2019 1 19-81762 BH4 28 6.50-7.00 Sediment 11/03/2019 1 19-81762 BH4 31 7.50-8.00 Sediment 11/03/2019 1 19-81762 BH4 34 8.00-8.20 Sediment 11/03/2019 1 19-81762 BH4 36 8.50-9.00 Sediment 11/03/2019 1 19-81762 BH4 38 9.00-9.50 Sediment 11/03/2019 1 19-81762 BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 <td>BH4</td> <td>14</td> <td>3.00-3.50</td> <td>Sediment</td> <td>11/03/2019</td> <td></td> <td></td> | BH4 | 14 | 3.00-3.50 | Sediment | 11/03/2019 | | |
| BH4 19 4.50-5.00 Sediment 11/03/2019 1 19-81762 BH4 21 5.00-5.50 Sediment 11/03/2019 1 19-81762 BH4 23 5.50-6.00 Sediment 11/03/2019 1 19-81762 BH4 26 6.00-6.50 Sediment 11/03/2019 1 19-81762 BH4 28 6.50-7.00 Sediment 11/03/2019 1 19-81762 BH4 29 7.00-7.50 Sediment 11/03/2019 1 19-81762 BH4 31 7.50-8.00 Sediment 11/03/2019 1 19-81762 BH4 34 8.00-8.20 Sediment 11/03/2019 1 19-81762 BH4 36 8.50-9.00 Sediment 11/03/2019 1 19-81762 BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 <td>BH4</td> <td>15</td> <td>3.50-4.00</td> <td>Sediment</td> <td>11/03/2019</td> <td></td> <td></td> | BH4 | 15 | 3.50-4.00 | Sediment | 11/03/2019 | | |
| BH4 21 5.00-5.50 Sediment 11/03/2019 BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH4 43 10.00-10.25 Sediment 11/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.5 | BH4 | 18 | 4.00-4.50 | Sediment | 11/03/2019 | | |
| BH4 23 5.50-6.00 Sediment 11/03/2019 BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 </td <td>BH4</td> <td>19</td> <td>4.50-5.00</td> <td>Sediment</td> <td>11/03/2019</td> <td>1</td> <td>19-81762</td> | BH4 | 19 | 4.50-5.00 | Sediment | 11/03/2019 | 1 | 19-81762 |
| BH4 26 6.00-6.50 Sediment 11/03/2019 BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00< | BH4 | 21 | 5.00-5.50 | Sediment | 11/03/2019 | | |
| BH4 28 6.50-7.00 Sediment 11/03/2019 BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 1 BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 BH4 43 10.00-10.25 Sediment 13/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment | BH4 | 23 | 5.50-6.00 | Sediment | 11/03/2019 | | |
| BH4 29 7.00-7.50 Sediment 11/03/2019 BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 Sediment 13/03/2019 BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 16 3.50-4.00 <td>BH4</td> <td>26</td> <td>6.00-6.50</td> <td>Sediment</td> <td>11/03/2019</td> <td></td> <td></td> | BH4 | 26 | 6.00-6.50 | Sediment | 11/03/2019 | | |
| BH4 31 7.50-8.00 Sediment 11/03/2019 BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 1 BH4 43 10.00-10.25 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 19-81762 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 <t< td=""><td>BH4</td><td>28</td><td>6.50-7.00</td><td>Sediment</td><td>11/03/2019</td><td></td><td></td></t<> | BH4 | 28 | 6.50-7.00 | Sediment | 11/03/2019 | | |
| BH4 34 8.00-8.20 Sediment 11/03/2019 BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 BH4 43 10.00-10.25 Sediment 11/03/2019 BH5 1 0.00-0.50 Sediment 13/03/2019 BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 Sediment 13/03/2019 BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 16 3.50-4.00 Sediment 13/03/2019 BH5 19 4.00-4.50 Sediment 13/03/2019 BH5 20 4.50-5.00 | BH4 | 29 | 7.00-7.50 | Sediment | 11/03/2019 | | |
| BH4 36 8.50-9.00 Sediment 11/03/2019 BH4 38 9.00-9.50 Sediment 11/03/2019 BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 BH4 43 10.00-10.25 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 19-81762 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 19 4.50-5.00 | BH4 | 31 | 7.50-8.00 | Sediment | 11/03/2019 | | |
| BH4 38 9.00-9.50 Sediment 11/03/2019 1 19-81762 BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 BH4 43 10.00-10.25 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 19-81762 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 | BH4 | 34 | 8.00-8.20 | Sediment | 11/03/2019 | | |
| BH4 40 9.50-10.00 Sediment 11/03/2019 1 19-81762 BH4 43 10.00-10.25 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 19-81762 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 | BH4 | 36 | 8.50-9.00 | Sediment | 11/03/2019 | | |
| BH4 43 10.00-10.25 Sediment 11/03/2019 1 19-81762 BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 18 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 <t< td=""><td>BH4</td><td>38</td><td>9.00-9.50</td><td>Sediment</td><td>11/03/2019</td><td></td><td></td></t<> | BH4 | 38 | 9.00-9.50 | Sediment | 11/03/2019 | | |
| BH5 1 0.00-0.50 Sediment 13/03/2019 1 19-81762 BH5 4 0.50-1.00 Sediment 13/03/2019 1 19-81762 BH5 6 1.00-1.50 Sediment 13/03/2019 1 18 BH5 8 1.50-2.00 Sediment 13/03/2019 1 19-81762 BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 | BH4 | 40 | 9.50-10.00 | Sediment | 11/03/2019 | 1 | 19-81762 |
| BH5 4 0.50-1.00 Sediment 13/03/2019 BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH4 | 43 | 10.00-10.25 | Sediment | 11/03/2019 | | |
| BH5 6 1.00-1.50 Sediment 13/03/2019 BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 1 | 0.00-0.50 | Sediment | 13/03/2019 | 1 | 19-81762 |
| BH5 8 1.50-2.00 Sediment 13/03/2019 BH5 11 2.00-2.50 Sediment 13/03/2019 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 4 | 0.50-1.00 | Sediment | 13/03/2019 | | |
| BH5 11 2.00-2.50 Sediment 13/03/2019 1 19-81762 BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 6 | 1.00-1.50 | Sediment | 13/03/2019 | | |
| BH5 12 2.50-3.00 Sediment 13/03/2019 1 19-81762 BH5 14 3.00-3.50 Sediment 13/03/2019 1 19-81762 BH5 16 3.50-4.00 Sediment 13/03/2019 1 19-81762 BH5 19 4.00-4.50 Sediment 13/03/2019 1 19-81762 BH5 20 4.50-5.00 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 8 | 1.50-2.00 | Sediment | 13/03/2019 | | |
| BH5 14 3.00-3.50 Sediment 13/03/2019 BH5 16 3.50-4.00 Sediment 13/03/2019 BH5 19 4.00-4.50 Sediment 13/03/2019 BH5 20 4.50-5.00 Sediment 13/03/2019 BH5 22 5.00-5.50 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 11 | 2.00-2.50 | Sediment | 13/03/2019 | | |
| BH5 16 3.50-4.00 Sediment 13/03/2019 BH5 19 4.00-4.50 Sediment 13/03/2019 BH5 20 4.50-5.00 Sediment 13/03/2019 BH5 22 5.00-5.50 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 12 | 2.50-3.00 | Sediment | 13/03/2019 | 1 | 19-81762 |
| BH5 19 4.00-4.50 Sediment 13/03/2019 BH5 20 4.50-5.00 Sediment 13/03/2019 BH5 22 5.00-5.50 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 | BH5 | 14 | 3.00-3.50 | Sediment | 13/03/2019 | | |
| BH5 20 4.50-5.00 Sediment 13/03/2019 BH5 22 5.00-5.50 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 16 | 3.50-4.00 | Sediment | 13/03/2019 | | |
| BH5 22 5.00-5.50 Sediment 13/03/2019 1 19-81762 BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 19 | 4.00-4.50 | Sediment | 13/03/2019 | | |
| BH6 1 0.00-0.50 Sediment 16/03/2018 1 19-81762 BH6 3 0.50-1.00 Sediment 16/03/2018 1 19-81762 | BH5 | 20 | 4.50-5.00 | Sediment | 13/03/2019 | | |
| BH6 3 0.50-1.00 Sediment 16/03/2018 | BH5 | 22 | 5.00-5.50 | Sediment | 13/03/2019 | 1 | 19-81762 |
| | BH6 | 1 | 0.00-0.50 | Sediment | 16/03/2018 | 1 | 19-81762 |
| | BH6 | 3 | 0.50-1.00 | Sediment | 16/03/2018 | | |
| BH6 5 1.00-1.50 Sediment 16/03/2018 1 19-81762 | BH6 | 5 | 1.00-1.50 | Sediment | 16/03/2018 | 1 | 19-81762 |



| BH Ref. | ES | Depth (m) | Matrix Type | Sampling Date | Marine Scotland Suite (exc. PSA) testing | RPS Report Number |
|---------|----|-----------|----------------|------------------|--|----------------------|
| BH6 | 7 | 1.50-2.00 | Sediment | 16/03/2018 | | |
| BH6 | 9 | 2.00-2.50 | Sediment | 16/03/2018 | 1 | 19-81762 |
| BH7 | 1 | 0.00-0.50 | Sediment | 07/03/2019 | 1 | 19-81762 |
| BH7 | 4 | 0.50-1.00 | Sediment | 07/03/2019 | | |
| BH7 | 6 | 1.00-1.50 | Sediment | 07/03/2019 | | |
| BH7 | 9 | 1.50-2.00 | Sediment | 07/03/2019 | | |
| BH7 | 11 | 2.00-2.50 | Sediment | 07/03/2019 | | |
| BH7 | 12 | 2.50-3.00 | Sediment | 07/03/2019 | | |
| BH7 | 14 | 3.00-3.50 | Sediment | 07/03/2019 | 1 | 19-81762 |
| BH7 | 16 | 3.50-4.00 | Sediment | 07/03/2019 | | |
| BH7 | 19 | 4.00-4.50 | Sediment | 07/03/2019 | | |
| BH7 | 20 | 4.50-5.00 | Sediment | 07/03/2019 | | |
| BH7 | 22 | 5.00-5.50 | Sediment | 07/03/2019 | | |
| BH7 | 24 | 5.50-6.00 | Sediment | 07/03/2019 | | |
| BH7 | 27 | 6.00-6.50 | Sediment | 07/03/2019 | 1 | 19-81762 |
| BH7 | 28 | 6.50-7.00 | Sediment | 07/03/2019 | | |
| BH7 | 30 | 7.00-7.50 | Sediment | 07/03/2019 | | |
| BH7 | 32 | 7.50-8.00 | Sediment | 07/03/2019 | | |
| BH8 | 1 | 0.00-0.50 | Sediment | 05/03/2019 | 1 | 19-81762 |
| BH8 | 3 | 0.50-1.00 | Sediment | 05/03/2019 | | |
| BH8 | 5 | 1.00-1.50 | Sediment | 05/03/2019 | | |
| BH8 | 7 | 1.50-2.00 | Sediment | 05/03/2019 | | |
| BH8 | 9 | 2.00-2.50 | Sediment | 05/03/2019 | | |
| BH8 | 11 | 2.50-3.00 | Sediment | 05/03/2019 | 1 | 19-81762 |
| BH8 | 13 | 3.00-3.50 | Sediment | 05/03/2019 | | |
| BH8 | 15 | 3.50-4.00 | Sediment | 05/03/2019 | | |
| BH8 | 17 | 4.00-4.50 | Sediment | 05/03/2019 | | |
| BH8 | 19 | 4.50-5.00 | Sediment | 05/03/2019 | | |
| BH8 | 21 | 5.00-5.50 | Sediment | 05/03/2019 | 1 | 19-81762 |



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Certificate of Analysis

Report No.: 19-81762

Issue No.:

Date of Issue 17/04/2019

Customer Details: Fugro GeoServices Ltd, Fugro House, Hithercroft Road, Wallingford,

Oxfordshire OX10 9RB.

Customer Contact: Karen Blackmore

Customer Order No.: 78367KB-WAL

Customer Reference: G191005U

Quotation Reference: 190318/04

Description: 24 sediment samples

Date Received: 19/03/2019

Date Started: 25/03/2019

Date Completed: 12/04/2019

Test Methods: Details available on request (refer to SOP code against relevant result/s)

Notes: Issue 2 replaces Issue 1 in its entirety

Redacted

By: Matthew Hickson, Laboratory Manager

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Observations and interpretations are outside of the scope of UKAS accreditation.

Results reported herein relate only to the items supplied to the laboratory for testing.

Results on an Interim Report are not dry-weight corrected.



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dry solids (at 105°C)

tributyltin (TBT)

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Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

Determinand

total organic carbon total petroleum hydrocarbons by GCFID (C10 - C40) dibutyltin (DBT)

| Customer Sample No | | | | | | | | | | | | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 |
|--------------------|-------------|-------|----------|-------------|--------|-------------------|-------------------|------------|-------------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | | | Cı | ustomer Sam | ple ID | Certific | ed Reference | Material | | AQC spike | 9 | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m |
| | | | | RPS Sam | ple No | | | | | | | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 |
| | | | | Sample | Туре | | SEDIMENT | Г | | SEDIMEN | т | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| Sample Location | | | | | cation | | | | | | | | | | | | |
| | Sample Dept | | | | | | CRM BCR-64 | | | | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m |
| Sampling Date | | | | | g Date | CRM NIST 1944 | | | Spike on clean sediment | | | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | | | |
| | | N | 397 | % | | n/a | n/a | n/a | n/a | n/a | n/a | 82.5 | 81.2 | 79.7 | 79.7 | 77.7 | 66.0 |
| | | OU | 404 | % | 0.3 | 4.4 | 4.52 | 102.7% | 1.5 | 1.47 | 98.0% | 0.6 | < 0.3 | < 0.3 | 0.5 | 0.7 | 1.7 |
| | | N | In house | μg/kg | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 844 | 1320 | 1190 | 4590 | 8070 | 49800 |
| | 1002-53-5 | UO | 395 | ug/kg DW | 5 | 770 | 547.88 | 71.2% | 40 | 37.18 | 92.9% | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| | 56573-85-4 | OU | 395 | ug/kg DW | 2 | 480 | 373.02 | 77.7% | 40 | 40.34 | 100.9% | < 2.00 | < 2.00 | < 2.00 | < 2.00 | < 2.00 | 57.8 |



dry solids (at 105°C)

tributyltin (TBT)

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Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

Determinand

total organic carbon total petroleum hydrocarbons by GCFID (C10 - C40) dibutyltin (DBT)

| | | Cust | omer Samp | le No | | | | | | | BH3 ES1 | BH3 ES25 | BH3 ES45 | BH4 ES1 | BH4 ES19 | BH4 ES40 |
|-----------------|-------|----------|-------------|--------|------------------------------|-------------------|------------|-------------------------|-------------------|------------|------------|------------|--------------|------------|------------|------------|
| | | Cı | ustomer Sam | ple ID | Certifie | ed Reference | Material | | AQC spike | е | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m |
| | | | RPS Sam | ple No | | | | | | | 398226 | 398227 | 398228 | 398229 | 398230 | 398231 |
| | | | Sample | Туре | SEDIMENT | | | SEDIMENT | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| Sample Location | | | | | | | | | | | | | | | | |
| Sample Depth (m | | | | | | CDM DCD C | | | | | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m |
| Sampling Date | | | | | CRM BCR-646 CRM NIST 1944 | | | Spike on clean sediment | | | 08/03/2019 | 08/03/2019 | 08/03/2019 | 11/03/2019 | 11/03/2019 | 11/03/2019 |
| Sampling Time | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | | | |
| | N | 397 | % | | n/a | n/a | n/a | n/a | n/a | n/a | 79.2 | 81.8 | 82.5 | 86.0 | 86.0 | 79.5 |
| | UO | 404 | % | 0.3 | 4.4 | 4.52 | 102.7% | 1.5 | 1.47 | 98.0% | 1.1 | < 0.3 | < 0.3 | 0.5 | < 0.3 | 0.6 |
| | N | In house | μg/kg | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 2340 | 1570 | 1360 | 2160 | 1600 | 4270 |
| 1002-53-5 | UO | | ug/kg DW | 5 | 770 | 547.88 | 71.2% | 40 | 37.18 | 92.9% | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| 56573-85-4 | UO | 395 | ug/kg DW | 2 | 480 | 373.02 | 77.7% | 40 | 40.34 | 100.9% | < 2.00 | < 2.00 | < 2.00 | < 2.00 | < 2.00 | < 2.00 |



dry solids (at 105°C)

tributyltin (TBT)

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Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

Determinand

total organic carbon total petroleum hydrocarbons by GCFID (C10 - C40) dibutyltin (DBT)

| | | Cust | omer Samp | le No | | | | | | | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 |
|--|-------|----------|-------------|--------|------------------------------|-------------------|------------|-------------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | | Cı | ustomer Sam | ple ID | Certific | ed Reference | Material | | AQC spike | e | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | RPS Sam | ple No | | | | | | | 398232 | 398233 | 398234 | 398235 | 398236 | 398237 |
| | | | Sample | Туре | | SEDIMENT | Γ | SEDIMENT | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | Sample Lo | cation | | | | | | | | | | | | |
| Sample Depth (m) Sampling Date Sampling Time | | | | | | CDM DCD C | | | | | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | | | CRM BCR-646 CRM NIST 1944 | | | Spike on clean sediment | | | 13/03/2019 | 13/03/2019 | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 |
| | | | | | | KM 14131 13 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | | | |
| | N | 397 | % | | n/a | n/a | n/a | n/a | n/a | n/a | 64.8 | 80.1 | 81.2 | 68.2 | 76.1 | 76.1 |
| | UO | 404 | % | 0.3 | 4.4 | 4.52 | 102.7% | 1.5 | 1.47 | 98.0% | 1.0 | 0.7 | 0.5 | 0.6 | 0.5 | 0.6 |
| | N | In house | μg/kg | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 8050 | 2110 | 2240 | 6400 | 3230 | 2590 |
| 1002-53-5 | UO | 395 | ug/kg DW | 5 | 770 | 547.88 | 71.2% | 40 | 37.18 | 92.9% | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| 56573-85-4 | UO | 395 | ug/kg DW | 2 | 480 | 373.02 | 77.7% | 40 | 40.34 | 100.9% | < 2.00 | < 2.00 | < 2.00 | 11.2 | < 2.00 | < 2.00 |



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Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

Report No.: 19-81762 Customer Reference: G191005U Customer Order No: 78367KB-WAL

| | | | Cust | omer Samp | le No | | | | | | | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
|---|------------|-------|----------|-------------|--------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | | | Cı | ustomer Sam | ple ID | Certifi | ed Reference | Material | | AQC spik | e | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | RPS Sam | ple No | | | | | | | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | | | | Sample | Туре | | SEDIMEN' | Г | | SEDIMEN | IT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Lo | cation | | | | | | | | | | | | |
| | | | | Sample Dep | th (m) | | CRM BCR-64 | 16 | | | | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | Sampling | | | | | | CRM NIST 19 | - | Spik | e on clean s | ediment | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | | | Samplin | g Time | | CKI-1 NIST IS | | | | | | | | | , | |
| | | | | | | | | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | | | |
| dry solids (at 105°C) | | N | 397 | % | | n/a | n/a | n/a | n/a | n/a | n/a | 74.0 | 71.6 | 80.8 | 80.2 | 78.0 | 75.2 |
| total organic carbon | | UO | 404 | % | 0.3 | 4.4 | 4.52 | 102.7% | 1.5 | 1.47 | 98.0% | 0.8 | 0.9 | 0.5 | 0.5 | 0.6 | 0.9 |
| total petroleum hydrocarbons by GCFID (C10 - C40) | | N | In house | μg/kg | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 1750 | 7860 | 2630 | 2690 | 2200 | 2770 |
| dibutyltin (DBT) | 1002-53-5 | UO | 395 | ug/kg DW | 5 | 770 | 547.88 | 71.2% | 40 | 37.18 | 92.9% | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| tributyltin (TBT) | 56573-85-4 | UO | 395 | ug/kg DW | 2 | 480 | 373.02 | 77.7% | 40 | 40.34 | 100.9% | < 2.00 | < 2.00 | < 2.00 | < 2.00 | < 2.00 | < 2.00 |



arsenic (HF digest) cadmium (HF digest)

copper (HF digest) lead (HF digest)

mercury (HF digest) nickel (HF digest)

zinc (HF digest)

chromium (HF digest)

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Results Summary - Metals

Determinand

Report No.:19-81762Customer Reference:G191005UCustomer Order No:78367KB-WAL

CAS No

7440-38-2

7440-43-9

7440-47-3

7440-50-8

7439-92-1

7439-97-6

7440-02-0

7440-66-6

| /AL | | | | | | | | | | | | |
|-------|-------|--------------|---------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | Cu | stomer Sam | ple No | | | | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 |
| | | Customer San | nple ID | Standa | rd Reference | Material | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m |
| | | RPS Sam | nple No | | | | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 |
| | | Sample | е Туре | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | Sample Lo | ocation | | | | | | | | | |
| | | Sample Dep | oth (m) | | | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m |
| | | Samplin | g Date | | SRM-2702 | | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 |
| | | Samplin | g Time | | | | | | | | | |
| | 1 | | | | | | | | | | | |
| Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | | | | | | |
| USI | M-129 | mg/kg DW | 0.5 | 45.3 | 48.5 | 107.1% | 1.65 | 1.43 | 0.88 | 2.34 | 1.56 | 9.41 |
| USI | M-129 | mg/kg DW | 0.1 | 0.817 | 0.94 | 115.1% | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | 0.16 |
| USI | M-129 | mg/kg DW | 0.5 | 352 | 326 | 92.6% | 2.87 | 7.03 | 6.58 | 4.08 | 4.27 | 41.1 |
| USI | M-129 | mg/kg DW | 0.5 | 117.7 | 114 | 96.9% | 1.66 | 2.22 | 2.21 | 1.69 | 1.85 | 13.9 |
| USI | M-129 | mg/kg DW | 0.5 | 132.8 | 132 | 99.4% | 3.61 | 6.69 | 8.57 | 4.42 | 4.29 | 25.8 |
| USI | M-129 | mg/kg DW | 0.01 | 0.4474 | 0.41 | 91.6% | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.19 |
| USI | M-129 | mg/kg DW | 0.5 | 75.4 | 72.6 | 96.3% | 0.77 | 2.79 | 3.04 | 1.23 | 1.44 | 17.2 |
| USI | M-129 | mg/kg DW | 2 | 485.3 | 497 | 102.4% | 7.50 | 9.06 | 9.67 | 9.77 | 8.15 | 83.4 |



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Results Summary - Metals

Report No.: 19-81762 Customer Reference: G191005U Customer Or

| Customer Order No: | 78367KB-W | 'AL | Cu | stomer Sam | nlo No | | | | BH3 ES1 | BH3 ES25 | BH3 ES45 | BH4 ES1 | BH4 ES19 | BH4 ES40 |
|----------------------|-----------|-------|-------|--------------|---------|-------------------|-------------------|------------|------------|------------|--------------|------------|------------|------------|
| | | | | | - | | ard Reference | Material | | | | | | |
| | | | | Customer San | • | | aru Keierence | Material | 0.00-0.50m | | 10.50-11.00m | | 4.50-5.00m | |
| | | | | RPS San | nple No | | | | 398226 | 398227 | 398228 | 398229 | 398230 | 398231 |
| | | | | Sample | e Type | | SEDIMENT | Г | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | |
| | | | | Sample Dep | oth (m) | | | | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m |
| | | | | Samplin | ng Date | | SRM-2702 | ! | 08/03/2019 | 08/03/2019 | 08/03/2019 | 11/03/2019 | 11/03/2019 | 11/03/2019 |
| | | | | Samplin | a Time | | | | | , , | | , , | | , , |
| | | | | oup | .9 | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | | | | | | |
| arsenic (HF digest) | 7440-38-2 | USI | M-129 | mg/kg DW | 0.5 | 45.3 | 48.5 | 107.1% | 1.87 | 1.13 | 0.61 | 1.84 | 2.42 | 1.43 |
| cadmium (HF digest) | 7440-43-9 | USI | M-129 | mg/kg DW | 0.1 | 0.817 | 0.94 | 115.1% | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| chromium (HF digest) | 7440-47-3 | USI | M-129 | mg/kg DW | 0.5 | 352 | 326 | 92.6% | 4.12 | 7.11 | 6.26 | 3.08 | 25.4 | 3.38 |
| copper (HF digest) | 7440-50-8 | USI | M-129 | mg/kg DW | 0.5 | 117.7 | 114 | 96.9% | 1.35 | 2.18 | 2.82 | 6.72 | 8.54 | 1.46 |
| lead (HF digest) | 7439-92-1 | USI | M-129 | mg/kg DW | 0.5 | 132.8 | 132 | 99.4% | 4.63 | 8.40 | 8.41 | 3.47 | 12.5 | 3.98 |
| mercury (HF digest) | 7439-97-6 | USI | M-129 | mg/kg DW | 0.01 | 0.4474 | 0.41 | 91.6% | 0.03 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 |
| nickel (HF digest) | 7440-02-0 | USI | M-129 | mg/kg DW | 0.5 | 75.4 | 72.6 | 96.3% | 1.17 | 2.80 | 2.89 | 0.94 | 14.2 | 1.12 |
| zinc (HF digest) | 7440-66-6 | USI | M-129 | mg/kg DW | 2 | 485.3 | 497 | 102.4% | 6.71 | 9.56 | 8.65 | 7.61 | 32.5 | 8.37 |



arsenic (HF digest) cadmium (HF digest)

chromium (HF digest)

copper (HF digest) lead (HF digest)

mercury (HF digest) nickel (HF digest)

zinc (HF digest)

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Results Summary - Metals

Determinand

Report No.:19-81762Customer Reference:G191005UCustomer Order No:78367KB-WAL

CAS No 7440-38-2

7440-43-9

7440-47-3

7440-50-8 7439-92-1

7439-97-6 7440-02-0

7440-66-6

| VA | L | | | | | | | | | | | | |
|----|-------------|-------|--------------|---------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | | Cus | stomer Sam | ple No | | | | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 |
| | | | Customer San | nple ID | Standa | rd Reference | Material | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | RPS Sam | nple No | | | | 398232 | 398233 | 398234 | 398235 | 398236 | 398237 |
| | | | Sample | е Туре | | SEDIMENT | 7 | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | Sample Lo | ocation | | | | | | | | | |
| | | | Sample Dep | oth (m) | | | | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | Sampling Da | | | | | SRM-2702 | | 13/03/2019 | 13/03/2019 | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 |
| | | | Samplin | g Time | | | | | | | | | |
| _ | 1 | | 1 | | A I | | | | | | | | |
| | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | | | | | | |
| | USI | M-129 | mg/kg DW | 0.5 | 45.3 | 48.5 | 107.1% | 5.85 | 1.79 | 1.62 | 3.68 | 1.73 | 2.63 |
| | USI | M-129 | mg/kg DW | 0.1 | 0.817 | 0.94 | 115.1% | 0.11 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| | USI | M-129 | mg/kg DW | 0.5 | 352 | 326 | 92.6% | 24.7 | 5.93 | 5.20 | 17.1 | 7.86 | 13.4 |
| | USI | M-129 | mg/kg DW | 0.5 | 117.7 | 114 | 96.9% | 6.79 | 2.10 | 1.24 | 5.65 | 2.46 | 2.98 |
| | USI | M-129 | mg/kg DW | 0.5 | 132.8 | 132 | 99.4% | 15.2 | 5.57 | 4.55 | 13.9 | 7.45 | 8.18 |
| | USI | M-129 | mg/kg DW | 0.01 | 0.4474 | 0.41 | 91.6% | 0.08 | 0.04 | 0.03 | 0.06 | 0.03 | 0.03 |
| | USI | M-129 | mg/kg DW | 0.5 | 75.4 | 72.6 | 96.3% | 10.2 | 1.94 | 1.66 | 6.97 | 2.56 | 5.15 |
| | USI | M-129 | mg/kg DW | 2 | 485.3 | 497 | 102.4% | 38.1 | 20.2 | 7.71 | 34.8 | 12.7 | 16.2 |



arsenic (HF digest) cadmium (HF digest)

copper (HF digest) lead (HF digest)

mercury (HF digest) nickel (HF digest)

zinc (HF digest)

chromium (HF digest)

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Results Summary - Metals

Determinand

Report No.:19-81762Customer Reference:G191005UCustomer Order No:78367KB-WAL

CAS No

7440-38-2

7440-43-9

7440-47-3

7440-50-8

7439-92-1

7439-97-6

7440-02-0

7440-66-6

| /AL | | | | | | | | | | | | |
|-------|-------|--------------|---------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|
| | Cus | stomer Sam | ple No | | | | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
| | | Customer San | nple ID | Standa | rd Reference | Material | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | RPS Sam | nple No | | | | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | | Sample | е Туре | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | Sample Lo | ocation | | | | | | | | | |
| | | Sample Dep | oth (m) | | | | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | Samplin | g Date | | SRM-2702 | | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | Samplin | g Time | | | | | | | | | |
| | | | | | | | | | | | | |
| Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | | | | | | |
| USI | M-129 | mg/kg DW | 0.5 | 45.3 | 48.5 | 107.1% | 1.72 | 3.44 | 0.93 | 0.98 | 1.16 | 2.51 |
| USI | M-129 | mg/kg DW | 0.1 | 0.817 | 0.94 | 115.1% | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| USI | M-129 | mg/kg DW | 0.5 | 352 | 326 | 92.6% | 6.91 | 13.4 | 2.68 | 3.45 | 3.40 | 13.4 |
| USI | M-129 | mg/kg DW | 0.5 | 117.7 | 114 | 96.9% | 1.64 | 2.28 | < 0.50 | 1.61 | 1.59 | 3.06 |
| USI | M-129 | mg/kg DW | 0.5 | 132.8 | 132 | 99.4% | 6.34 | 3.18 | 0.65 | 3.57 | 3.15 | 7.03 |
| USI | M-129 | mg/kg DW | 0.01 | 0.4474 | 0.41 | 91.6% | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.03 |
| USI | M-129 | mg/kg DW | 0.5 | 75.4 | 72.6 | 96.3% | 2.46 | 6.36 | 1.10 | 0.88 | 1.10 | 5.14 |
| USI | M-129 | mg/kg DW | 2 | 485.3 | 497 | 102.4% | 8.69 | 17.4 | 4.51 | 4.68 | 5.90 | 16.1 |



Results Summary - Polycyclic Aromatic Hydrocarbons

| | | | | | - | | | | | | | | | | | |
|-------------------------|----------|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|
| | | | Cus | tomer Sam | ole No | | | | | | | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 |
| | | | (| Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m |
| | | | | RPS Sam | ple No | | | | | | | 398220 | 398221 | 398222 | 398223 | 398224 |
| | | | | Sample | Туре | | SEDIMENT | 1 | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Lo | | | | | | | | | | | | |
| | | | | Sample Dep | | | | | | | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m |
| | | | | Samplin | | | IAEA-459 | | Spik | e on clean se | diment | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | | |
| | | 1 | | 1 | | A! | | 1 | A! | Management | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | i | 1 |
| naphthalene | 91-20-3 | U | 396 | ug/kg DW | 2.6 | n/a | n/a | N/A | 25 | 27.67 | 110.7% | < 2.6 | < 2.6 | < 2.6 | < 2.6 | 5.51 |
| acenaphthylene | 208-96-8 | U | 396 | ug/kg DW | 2 | 3.06 | 3.71 | 121.2% | 25 | 23.21 | 92.8% | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| acenaphthene | 83-32-9 | U | 396 | ug/kg DW | 1.7 | 2.33 | 2.3172 | 99.5% | 25 | 23.89 | 95.6% | < 1.7 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| fluorene | 86-73-7 | U | 396 | ug/kg DW | 1.6 | 5.02 | 5.89 | 117.3% | 25 | 25.63 | 102.5% | < 1.6 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| phenanthrene | 85-01-8 | U | 396 | ug/kg DW | 3.9 | 27.54 | 33.63 | 122.1% | 25 | 23.16 | 92.6% | < 3.9 | < 3.9 | < 3.9 | < 3.9 | 10.5 |
| anthracene | 120-12-7 | U | 396 | ug/kg DW | 2.4 | 7.55 | 7.91 | n/a | 25 | 25.93 | 103.7% | < 2.4 | < 2.4 | < 2.4 | < 2.4 | 3.53 |
| fluoranthene | 206-44-0 | U | 396 | ug/kg DW | 2.4 | 36.78 | 43.69 | 118.8% | 25 | 24.94 | 99.8% | < 2.4 | < 2.4 | < 2.4 | 6.50 | 22.1 |
| pyrene | 129-00-0 | U | 396 | ug/kg DW | 2.8 | 41.5 | 49.39 | 119.0% | 25 | 24.34 | 97.4% | < 2.8 | < 2.8 | < 2.8 | 5.57 | 20.2 |
| benzo(a)anthracene | 56-55-3 | U | 396 | ug/kg DW | 1.6 | 17.53 | 19.8 | 112.9% | 25 | 26.24 | 105.0% | < 1.6 | < 1.6 | < 1.6 | 4.47 | 10.3 |
| chrysene | 218-01-9 | U | 396 | ug/kg DW | 1.7 | N/A | N/A | N/A | 25 | 23.66 | 94.6% | < 1.7 | < 1.7 | < 1.7 | 3.27 | 6.81 |
| benzo(b+j)fluoranthene | 205-99-2 | U | 396 | ug/kg DW | 1.6 | 52.02 | 55.32 | 106.3% | 25 | 23.53 | 94.1% | < 1.6 | < 1.6 | < 1.6 | 6.77 | 17.5 |
| benzo(k)fluoranthene | 207-08-9 | U | 396 | ug/kg DW | 2 | 14.29 | 15 | 105.0% | 25 | 23.11 | 92.4% | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 5.71 |
| benzo(a)pyrene | 50-32-8 | U | 396 | ug/kg DW | 0.9 | 18.58 | 20.16 | 108.5% | 25 | 23.8 | 95.2% | < 0.9 | < 0.9 | < 0.9 | 5.18 | 9.77 |
| indeno(1,2,3-c,d)pyrene | | | | | | | 25.75 | 111.1% | 25 | 25.7 | 102.8% | < 2.2 | < 2.2 | < 2.2 | 3.34 | 8.66 |
| dibenzo(a,h)anthracene | | | | | | | N/A | N/A | 25 | 22.52 | 90.1% | < 1.6 | < 1.6 | < 1.6 | < 1.6 | 2.75 |
| benzo(g,h,i)perylene | 191-24-2 | U | 396 | ug/kg DW | 1.4 | 28.36 | 31.23 | 110.1% | 25 | 22.1 | 88.4% | < 1.4 | < 1.4 | < 1.4 | 3.56 | 8.36 |



Results Summary - Polycyclic Aromatic Hydrocarbons

| | | | | | | | | | | | | • | | • | | |
|-------------------------|----------|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|---------------|------------|------------|------------|------------|--------------|------------|
| | | | Cus | stomer Sam | ple No | | | | | | | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 | BH4 ES1 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m | 0.00-0.50m |
| | | | | RPS Sam | nple No | | | | | | | 398225 | 398226 | 398227 | 398228 | 398229 |
| | | | | Sample | | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | | | | | | | | | | | | |
| | | | | Sample Dep | | | | | | | | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m | 0.00-0.50m |
| | | | | Samplin | | | IAEA-459 | | Spik | e on clean se | diment | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 | 11/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | | |
| | 1 | | | 1 | | Assissad | Managed | | Assissad | Measured | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Value | Recovery % | | | | | |
| naphthalene | 91-20-3 | U | 396 | ug/kg DW | 2.6 | n/a | n/a | N/A | 25 | 27.67 | 110.7% | 18.1 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| acenaphthylene | 208-96-8 | U | 396 | ug/kg DW | 2 | 3.06 | 3.71 | 121.2% | 25 | 23.21 | 92.8% | 12.3 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| acenaphthene | 83-32-9 | U | 396 | ug/kg DW | 1.7 | 2.33 | 2.3172 | 99.5% | 25 | 23.89 | 95.6% | 44.8 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| fluorene | 86-73-7 | U | 396 | ug/kg DW | 1.6 | 5.02 | 5.89 | 117.3% | 25 | 25.63 | 102.5% | 39.1 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| phenanthrene | 85-01-8 | U | 396 | ug/kg DW | 3.9 | 27.54 | 33.63 | 122.1% | 25 | 23.16 | 92.6% | 43.4 | < 3.9 | < 3.9 | < 3.9 | < 3.9 |
| anthracene | 120-12-7 | U | 396 | ug/kg DW | 2.4 | 7.55 | 7.91 | n/a | 25 | 25.93 | 103.7% | 17.9 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| fluoranthene | 206-44-0 | U | 396 | ug/kg DW | 2.4 | 36.78 | 43.69 | 118.8% | 25 | 24.94 | 99.8% | 94.2 | 5.53 | < 2.4 | < 2.4 | < 2.4 |
| pyrene | 129-00-0 | U | 396 | ug/kg DW | 2.8 | 41.5 | 49.39 | 119.0% | 25 | 24.34 | 97.4% | 98.8 | 4.04 | < 2.8 | < 2.8 | < 2.8 |
| benzo(a)anthracene | 56-55-3 | U | 396 | ug/kg DW | 1.6 | 17.53 | 19.8 | 112.9% | 25 | 26.24 | 105.0% | 54.3 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| chrysene | 218-01-9 | U | 396 | ug/kg DW | 1.7 | N/A | N/A | N/A | 25 | 23.66 | 94.6% | 36.6 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| benzo(b+j)fluoranthene | 205-99-2 | U | 396 | ug/kg DW | 1.6 | 52.02 | 55.32 | 106.3% | 25 | 23.53 | 94.1% | 96.5 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| benzo(k)fluoranthene | 207-08-9 | U | 396 | ug/kg DW | 2 | 14.29 | 15 | 105.0% | 25 | 23.11 | 92.4% | 28.7 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| benzo(a)pyrene | 50-32-8 | U | 396 | ug/kg DW | 0.9 | 18.58 | 20.16 | 108.5% | 25 | 23.8 | 95.2% | 50.0 | < 0.9 | < 0.9 | < 0.9 | < 0.9 |
| indeno(1,2,3-c,d)pyrene | 193-39-5 | U | 396 | ug/kg DW | 2.2 | 23.18 | 25.75 | 111.1% | 25 | 25.7 | 102.8% | 47.3 | < 2.2 | < 2.2 | < 2.2 | < 2.2 |
| dibenzo(a,h)anthracene | 53-70-3 | U | 396 | ug/kg DW | 1.6 | N/A | N/A | N/A | 25 | 22.52 | 90.1% | 18.1 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| benzo(g,h,i)perylene | 57 5 | | | | | | | | 25 | 22.1 | 88.4% | 50.6 | < 1.4 | < 1.4 | < 1.4 | < 1.4 |



Results Summary - Polycyclic Aromatic Hydrocarbons

| | | | Cus | tomer Sam | ole No | | | | | | | BH4 ES19 | BH4 ES40 | BH5 ES1 | BH5 ES12 | BH5 ES22 |
|-------------------------|----------|-------|-----|--------------|---------|----------|--------------|------------|----------|---------------|------------|------------|------------|------------|------------|------------|
| | | | (| Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | RPS Sam | ple No | | | | | | | 398230 | 398231 | 398232 | 398233 | 398234 |
| | | | | Sample | | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | | SEDIMENT | SEDIMENT |
| | | | | Sample Lo | | | SEDIMENT | | | GEDINENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Dep | | | | | | | | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | Samplin | | | IAEA-459 | | Spik | e on clean se | diment | 11/03/2019 | 11/03/2019 | 13/03/2019 | 13/03/2019 | 13/03/2019 |
| | | | | Samplin | g Time | | | | • | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned | Measured | Recovery % | Assigned | Measured | Recovery % | | | | | |
| | 0.10 | | | | | Value | Value | - | Value | Value | • | 2.6 | 2.6 | 6.40 | 2.67 | 2.6 |
| naphthalene | 91-20-3 | U | 396 | ug/kg DW | 2.6 | n/a | n/a | N/A | 25 | 27.67 | 110.7% | < 2.6 | < 2.6 | 6.48 | 3.67 | < 2.6 |
| acenaphthylene | 208-96-8 | U | 396 | ug/kg DW | 2 | 3.06 | 3.71 | 121.2% | 25 | 23.21 | 92.8% | < 2.0 | < 2.0 | 11.0 | < 2.0 | < 2.0 |
| acenaphthene | 83-32-9 | U | 396 | ug/kg DW | 1.7 | 2.33 | 2.3172 | 99.5% | 25 | 23.89 | 95.6% | < 1.7 | < 1.7 | 7.51 | < 1.7 | < 1.7 |
| fluorene | 86-73-7 | U | 396 | ug/kg DW | 1.6 | 5.02 | 5.89 | 117.3% | 25 | 25.63 | 102.5% | < 1.6 | < 1.6 | 17.3 | 2.04 | < 1.6 |
| phenanthrene | 85-01-8 | U | 396 | ug/kg DW | 3.9 | 27.54 | 33.63 | 122.1% | 25 | 23.16 | 92.6% | < 3.9 | < 3.9 | 42.4 | 5.91 | < 3.9 |
| anthracene | 120-12-7 | U | 396 | ug/kg DW | 2.4 | 7.55 | 7.91 | n/a | 25 | 25.93 | 103.7% | < 2.4 | < 2.4 | 17.6 | < 2.4 | < 2.4 |
| fluoranthene | 206-44-0 | U | 396 | ug/kg DW | 2.4 | 36.78 | 43.69 | 118.8% | 25 | 24.94 | 99.8% | 4.11 | < 2.4 | 81.8 | 8.21 | < 2.4 |
| pyrene | 129-00-0 | U | 396 | ug/kg DW | 2.8 | 41.5 | 49.39 | 119.0% | 25 | 24.34 | 97.4% | < 2.8 | < 2.8 | 75.4 | 10.0 | < 2.8 |
| benzo(a)anthracene | 56-55-3 | U | 396 | ug/kg DW | 1.6 | 17.53 | 19.8 | 112.9% | 25 | 26.24 | 105.0% | < 1.6 | < 1.6 | 36.9 | 3.87 | < 1.6 |
| chrysene | 218-01-9 | U | 396 | ug/kg DW | 1.7 | N/A | N/A | N/A | 25 | 23.66 | 94.6% | < 1.7 | < 1.7 | 27.6 | 2.79 | < 1.7 |
| benzo(b+j)fluoranthene | 205-99-2 | U | 396 | ug/kg DW | 1.6 | 52.02 | 55.32 | 106.3% | 25 | 23.53 | 94.1% | 2.14 | < 1.6 | 50.7 | 6.06 | < 1.6 |
| benzo(k)fluoranthene | 207-08-9 | U | 396 | ug/kg DW | 2 | 14.29 | 15 | 105.0% | 25 | 23.11 | 92.4% | < 2.0 | < 2.0 | 17.5 | < 2.0 | < 2.0 |
| benzo(a)pyrene | 50-32-8 | U | 396 | ug/kg DW | 0.9 | 18.58 | 20.16 | 108.5% | 25 | 23.8 | 95.2% | < 0.9 | < 0.9 | 37.9 | 3.85 | < 0.9 |
| indeno(1,2,3-c,d)pyrene | 193-39-5 | U | 396 | ug/kg DW | 2.2 | 23.18 | 25.75 | 111.1% | 25 | 25.7 | 102.8% | < 2.2 | < 2.2 | 18.7 | 2.86 | < 2.2 |
| dibenzo(a,h)anthracene | 53-70-3 | U | 396 | ug/kg DW | 1.6 | N/A | N/A | N/A | 25 | 22.52 | 90.1% | < 1.6 | < 1.6 | 7.67 | < 1.6 | < 1.6 |
| benzo(g,h,i)perylene | 191-24-2 | U | 396 | ug/kg DW | 1.4 | 28.36 | 31.23 | 110.1% | 25 | 22.1 | 88.4% | < 1.4 | < 1.4 | 21.0 | 3.06 | < 1.4 |



Results Summary - Polycyclic Aromatic Hydrocarbons

| | | | Cus | stomer Sam | ple No | | | | | | | BH6 ES1 | BH6 ES5 | BH6 ES9 | BH7 ES1 | BH7 ES14 |
|-------------------------|--|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|------------|
| | | | | Customer Sar | nple ID | Certif | ied Reference | Material | | AQC spike | | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m |
| | | | | RPS San | nple No | | | | | | | 398235 | 398236 | 398237 | 398238 | 398239 |
| | | | | Sample | е Туре | | SEDIMENT | г | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | | | i |
| | | | | Sample Dep | oth (m) | | | | | | | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m |
| | | | | Samplir | | | IAEA-459 | | Spik | e on clean se | diment | 16/03/0320 | 16/03/2019 | 16/03/2019 | 07/03/2019 | 07/03/2019 |
| | | | | Samplin | ng Time | | | | | | | | | | | |
| | | | | | | | | 1 | | | | | | | <u> </u> | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | 1 ' | i l |
| naphthalene | 91-20-3 | 11 | 396 | ug/kg DW | 2.6 | n/a | n/a | N/A | 25 | 27.67 | 110.7% | 8.96 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| acenaphthylene | 208-96-8 | ii | 396 | ug/kg DW | 2.0 | 3.06 | 3.71 | 121.2% | 25 | 23.21 | 92.8% | 8.35 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| acenaphthene | 83-32-9 | Ü | 396 | ug/kg DW | 1.7 | 2.33 | 2.3172 | 99.5% | 25 | 23.89 | 95.6% | 11.4 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| fluorene | 86-73-7 | Ü | 396 | ug/kg DW | | 5.02 | 5.89 | 117.3% | 25 | 25.63 | 102.5% | 15.0 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| phenanthrene | 85-01-8 | Ü | 396 | ug/kg DW | 3.9 | 27.54 | 33.63 | 122.1% | 25 | 23.16 | 92.6% | 31.5 | < 3.9 | < 3.9 | < 3.9 | < 3.9 |
| anthracene | 120-12-7 | U | 396 | ug/kg DW | 2.4 | 7.55 | 7.91 | n/a | 25 | 25.93 | 103.7% | 9.58 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| fluoranthene | 206-44-0 | U | 396 | ug/kg DW | 2.4 | 36.78 | 43.69 | 118.8% | 25 | 24.94 | 99.8% | 54.9 | 4.44 | < 2.4 | < 2.4 | < 2.4 |
| pyrene | 129-00-0 | U | 396 | ug/kg DW | 2.8 | 41.5 | 49.39 | 119.0% | 25 | 24.34 | 97.4% | 54.6 | 4.64 | < 2.8 | < 2.8 | < 2.8 |
| benzo(a)anthracene | 56-55-3 | U | 396 | ug/kg DW | 1.6 | 17.53 | 19.8 | 112.9% | 25 | 26.24 | 105.0% | 30.9 | 2.14 | < 1.6 | < 1.6 | < 1.6 |
| chrysene | 218-01-9 | U | 396 | ug/kg DW | 1.7 | N/A | N/A | N/A | 25 | 23.66 | 94.6% | 22.1 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| benzo(b+j)fluoranthene | 205-99-2 | U | 396 | ug/kg DW | 1.6 | 52.02 | 55.32 | 106.3% | 25 | 23.53 | 94.1% | 48.6 | 4.24 | < 1.6 | < 1.6 | < 1.6 |
| benzo(k)fluoranthene | 207-08-9 | U | 396 | ug/kg DW | 2 | 14.29 18.58 | 15 20.16 | 105.0% | 25 | 23.11 | 92.4% | 16.5 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| benzo(a)pyrene | | | | | | | | 108.5% | 25 | 23.8 | 95.2% | 34.1 | 2.47 | < 0.9 | < 0.9 | < 0.9 |
| indeno(1,2,3-c,d)pyrene | 193-39-5 | Ū | 396 | ug/kg DW | 2.2 | 23.18 | 25.75 | 111.1% | 25 | 25.7 | 102.8% | 20.9 | < 2.2 | < 2.2 | < 2.2 | < 2.2 |
| dibenzo(a,h)anthracene | (a,h)anthracene 53-70-3 U 396 ug/kg DW | | | | | | | | 25 | 22.52 | 90.1% | 7.00 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| benzo(g,h,i)perylene | 191-24-2 | U | 396 | ug/kg DW | 1.4 | 28.36 | 31.23 | 110.1% | 25 | 22.1 | 88.4% | 22.3 | < 1.4 | < 1.4 | < 1.4 | < 1.4 |



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Results Summary - Polycyclic Aromatic Hydrocarbons

| customer order no. | 70307RD W | , | | | | | | | | | | | | | |
|-------------------------|-----------|-------|-----|------------------------------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|--------------------------|------------|--------------------------|
| | | | Cus | tomer Sam | ole No | | | | | | | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
| | | | (| Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | RPS Sam | | | | | | | | 398240 | 398241 | 398242 | 398243 |
| | | | | | | | | | | CERTMENT | | | | | |
| | | | | Sample | | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Lo Sample Dep Samplin | th (m) | | IAEA-459 | | Snil | te on clean se | diment | 6.00-6.50m | 0.00-0.50m 05/03/2019 | | 5.00-5.50m 05/03/2019 |
| | | | | Samplin | | | IALA-439 | | Эріг | te on clean se | unitenc | 07/03/2013 | 03/03/2013 | 03/03/2013 | 03/03/2013 |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | |
| naphthalene | 91-20-3 | U | 396 | ug/kg DW | 2.6 | n/a | n/a | N/A | 25 | 27.67 | 110.7% | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| acenaphthylene | 208-96-8 | U | 396 | ug/kg DW | 2 | 3.06 | 3.71 | 121.2% | 25 | 23.21 | 92.8% | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| acenaphthene | 83-32-9 | U | 396 | ug/kg DW | 1.7 | 2.33 | 2.3172 | 99.5% | 25 | 23.89 | 95.6% | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| fluorene | 86-73-7 | U | 396 | ug/kg DW | 1.6 | 5.02 | 5.89 | 117.3% | 25 | 25.63 | 102.5% | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| phenanthrene | 85-01-8 | U | 396 | ug/kg DW | 3.9 | 27.54 | 33.63 | 122.1% | 25 | 23.16 | 92.6% | < 3.9 | < 3.9 | < 3.9 | < 3.9 |
| anthracene | 120-12-7 | U | 396 | ug/kg DW | 2.4 | 7.55 | 7.91 | n/a | 25 | 25.93 | 103.7% | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| fluoranthene | 206-44-0 | U | 396 | ug/kg DW | 2.4 | 36.78 | 43.69 | 118.8% | 25 | 24.94 | 99.8% | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| pyrene | 129-00-0 | U | 396 | ug/kg DW | 2.8 | 41.5 | 49.39 | 119.0% | 25 | 24.34 | 97.4% | < 2.8 | < 2.8 | < 2.8 | < 2.8 |
| benzo(a)anthracene | 56-55-3 | U | 396 | ug/kg DW | 1.6 | 17.53 | 19.8 | 112.9% | 25 | 26.24 | 105.0% | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| chrysene | 218-01-9 | U | 396 | ug/kg DW | 1.7 | N/A | N/A | N/A | 25 | 23.66 | 94.6% | < 1.7 | < 1.7 | < 1.7 | < 1.7 |
| benzo(b+j)fluoranthene | 205-99-2 | U | 396 | ug/kg DW | 1.6 | 52.02 | 55.32 | 106.3% | 25 | 23.53 | 94.1% | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| benzo(k)fluoranthene | 207-08-9 | U | 396 | ug/kg DW | 2 | 14.29 | 15 | 105.0% | 25 | 23.11 | 92.4% | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| benzo(a)pyrene | 50-32-8 | U | 396 | ug/kg DW | 0.9 | 18.58 | 20.16 | 108.5% | 25 | 23.8 | 95.2% | < 0.9 | < 0.9 | < 0.9 | < 0.9 |
| indeno(1,2,3-c,d)pyrene | 193-39-5 | U | 396 | ug/kg DW | 2.2 | 23.18 | 25.75 | 111.1% | 25 | 25.7 | 102.8% | < 2.2 | < 2.2 | < 2.2 | < 2.2 |
| dibenzo(a,h)anthracene | 53-70-3 | U | 396 | ug/kg DW | 1.6 | N/A | N/A | N/A | 25 | 22.52 | 90.1% | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| benzo(g,h,i)perylene | 191-24-2 | U | 396 | ug/kg DW | 1.4 | 28.36 | 31.23 | 110.1% | 25 | 22.1 | 88.4% | < 1.4 | < 1.4 | < 1.4 | < 1.4 |



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Results Summary - Polychlorinated Biphenyls

Report No.: 19-81762 Customer Reference: G191005U Customer Order

| Customer Order No: | 78367KB-W | 'AL | | | | | | | | | | | | | |
|--------------------|------------|-------|------------|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 |
| | | | | Customer Sar | nple ID | Certifi | ed Reference | Material | | AQC spike | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m |
| | | | | RPS San | nple No | | | | | | | 398220 | 398221 | 398222 | 398223 |
| | | | | Sampl | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | | |
| | Sample D | | | | | | | | | | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m |
| | ng Date | | CRM BCR-53 | 6 | Spik | e on clean se | liment | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | | | | |
| | | | | Samplir | ng Time | | | | | | | | | | |
| | | 1 | | | _ | Assissad | Managed | ı | Assissad | Managed | ı | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | |
| PCB congener 28 | 7012-37-5 | U | 396 | ug/kg DW | 0.1 | 44 | 42.68 | 97.0% | 2.5 | 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| PCB congener 52 | 35693-99-3 | U | 396 | ug/kg DW | 0.2 | 38 | 41.52 | 109.3% | 2.5 | 2.18 | 87.2% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 101 | 37680-73-2 | U | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 118 | 31508-00-6 | U | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 138 | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 153 | 35065-27-1 | U | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 180 | 35065-29-3 | U | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |



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Results Summary - Polychlorinated Biphenyls

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

| No: | 78367KB-W | AL | | | | | | | | | | | | | |
|-------------|------------|-------|-----|--------------|---------|-------------------|--------------|------------|-------------------|----------------|------------|------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m |
| | | | | RPS Sam | ple No | | | | | | | 398224 | 398225 | 398226 | 398227 |
| | | | | Sample | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Lo | ocation | | | | | | | | | | |
| | Sample Dep | | | | | | | | | | | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m |
| | | | | Samplin | g Date | | CRM BCR-53 | 6 | Spik | e on clean sec | liment | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | |
| | 1 | | | 1 | | Assigned | Measured | 1 | Assigned | Measured | ı | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Value | Recovery % | Assigned Value | Value | Recovery % | | | | |
| | 7012-37-5 | U | 396 | ug/kg DW | 0.1 | 44 | 42.68 | 97.0% | 2.5 | 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | 35693-99-3 | U | 396 | ug/kg DW | 0.2 | 38 | 41.52 | 109.3% | 2.5 | 2.18 | 87.2% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 37680-73-2 | U | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 31508-00-6 | U | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | 0.9 | < 0.2 | < 0.2 |
| | 35065-27-1 | U | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | 0.7 | < 0.2 | < 0.2 |
| | 35065-29-3 | U | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | | | | | | | • | | | | | | | | |



Results Summary - Polychlorinated Biphenyls

| Customer Order No: | 78367KB-W | 'AL | | | | | | | | | | | | | |
|---------------------------------|------------|-------|-----|--------------|---------|-------------|-----------------------|------------|---------------------|-------------------|------------|--------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH3 ES45 | BH4 ES1 | BH4 ES19 | BH4 ES40 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 10.50-11.00m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m |
| | | | | RPS Sam | nple No | | | | | | | 398228 | 398229 | 398230 | 398231 |
| | | | | Sample | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | | |
| | | | | Sample Dep | oth (m) | | | | | | | 10.5-11.0m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m |
| | | | | Samplin | ng Date | | CRM BCR-53 | 86 | Spik | ce on clean sec | diment | 08/03/2019 | 11/03/2019 | 11/03/2019 | 11/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned | Measured | Recovery % | Assigned | Measured | Recovery % | | | | |
| | 7012-37-5 | II | 396 | ug/kg DW | | Value 44 | Value 42.68 | 97.0% | Value 2.5 | Value 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| PCB congener 28 PCB congener 52 | 35693-99-3 | U | 396 | ug/kg DW | 0.1 | 38 | 41.52 | 109.3% | 2.5 | 2.13 | 87.2% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| PCB congener 101 | 37680-73-2 | Ü | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 118 | 31508-00-6 | U | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 138 | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 153 | 35065-27-1 | Ū | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| PCB congener 180 | 35065-29-3 | Ū | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |



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Results Summary - Polychlorinated Biphenyls

| No: | 78367KB-W | AL | | | | | | | | | | | | | |
|-------------|------------|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m |
| | | | | RPS Sam | nple No | | | | | | | 398232 | 398233 | 398234 | 398235 |
| | | | | Sample | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | | |
| | | | | Sample Dep | oth (m) | | | | | | | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m |
| | | | | Samplin | ng Date | | CRM BCR-53 | 86 | Spik | e on clean se | diment | 13/03/2019 | 13/03/2019 | 13/03/2019 | 16/03/0320 |
| | | | | Samplin | g Time | | | | | | | | | | |
| | | | 1 | ı | | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | |
| | 7012-37-5 | U | 396 | ug/kg DW | 0.1 | 44 | 42.68 | 97.0% | 2.5 | 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | 35693-99-3 | U | 396 | ug/kg DW | 0.2 | 38 | 41.52 | 109.3% | 2.5 | 2.18 | 87.2% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 37680-73-2 | U | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 31508-00-6 | U | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-27-1 | U | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | < 0.2 | < 0.2 | 0.9 |
| | 35065-29-3 | U | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |



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Results Summary - Polychlorinated Biphenyls

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

| No: | 78367KB-W | AL | | | | | | | | | | | | | |
|-------------|---|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH6 ES5 | BH6 ES9 | BH7 ES1 | BH7 ES14 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m |
| | | | | RPS Sam | ple No | | | | | | | 398236 | 398237 | 398238 | 398239 |
| | | | | Sample | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample Lo | ocation | | | | | | | | | | |
| | | | | Sample Dep | oth (m) | | | | | | | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m |
| | | | | Samplin | g Date | | CRM BCR-53 | 6 | Spik | e on clean sec | liment | 16/03/2019 | 16/03/2019 | 07/03/2019 | 07/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | |
| | Sample Lu Sample Dep Samplin Samplin | | | | | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | |
| | 7012-37-5 | U | 396 | ug/kg DW | 0.1 | 44 | 42.68 | 97.0% | 2.5 | 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | 35693-99-3 | U | 396 | ug/kg DW | 0.2 | 38 | 41.52 | 109.3% | 2.5 | 2.18 | 87.2% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 37680-73-2 | U | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 31508-00-6 | Ü | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| · | 35065-27-1 | U | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| · | 35065-29-3 | U | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |



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Results Summary - Polychlorinated Biphenyls

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

| No: | 78367KB-W | AL | | | | | | | | | | | | | |
|-------------|------------|-------|-----|--------------|---------|-------------------|-------------------|------------|-------------------|-------------------|------------|------------|------------|------------|------------|
| | | | Cu | stomer Sam | ple No | | | | | | | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
| | | | | Customer San | nple ID | Certifi | ed Reference | Material | | AQC spike | | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | RPS Sam | nple No | | | | | | | 398240 | 398241 | 398242 | 398243 |
| | | | | Sample | е Туре | | SEDIMENT | | | SEDIMENT | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | Sample L | ocation | | | | | | | | | | |
| | | | | Sample Dep | oth (m) | | | | | | | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | Samplin | ng Date | | CRM BCR-53 | 6 | Spik | e on clean sec | diment | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | | | Samplin | g Time | | | | | | | | | | |
| | | 1 | 1 | 1 | | A! | Management | 1 | Accional | | 1 | | | | |
| Determinand | CAS No | Codes | SOP | Units | RL | Assigned Value | Measured Value | Recovery % | Assigned Value | Measured Value | Recovery % | | | | |
| | 7012-37-5 | U | 396 | ug/kg DW | 0.1 | 44 | 42.68 | 97.0% | 2.5 | 2.15 | 86.0% | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| | 35693-99-3 | U | 396 | ug/kg DW | 0.2 | 38 | 41.52 | 109.3% | 2.5 | 2.18 | 87.2% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 37680-73-2 | U | 396 | ug/kg DW | 0.2 | 44 | 51.19 | 116.3% | 2.5 | 2.25 | 90.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 31508-00-6 | U | 396 | ug/kg DW | 0.2 | 27.5 | 31.36 | 114.0% | 2.5 | 2.57 | 102.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-28-2 | U | 396 | ug/kg DW | 0.2 | 44.2 | 53.13 | 120.2% | 2.5 | 2.62 | 104.8% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-27-1 | U | 396 | ug/kg DW | 0.2 | 50 | 59.39 | 118.8% | 2.5 | 2.59 | 103.6% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | 35065-29-3 | U | 396 | ug/kg DW | 0.2 | 22.4 | 26.23 | 117.1% | 2.5 | 2.6 | 104.0% | < 0.2 | < 0.2 | < 0.2 | < 0.2 |



Results Summary PSA Results

| | | | Customer S | Sample No | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 |
|--|--------|-------|------------|--------------|---------------|----------------|----------------------|--------------|---------------|----------------|---------------|---------------|---------------|
| | | | Customer | Sample ID | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m |
| | | | RPS | Sample No | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 | 398226 | 398227 | 398228 |
| | | | Sai | mple Type | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | Samp | ole Location | | | | | | | | | |
| | | | Sample | Depth (m) | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m |
| | | | | | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 |
| | | | San | npling Time | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| | | | | | Unimodal, | Trimodal, | Unimodal, | Unimodal, | Unimodal, | Polymodal, | Unimodal, | | Unimodal, |
| | | | | | Moderately | Very Poorly | Moderately | Moderately | Very Poorly | Very Poorly | Moderately | Unimodal, | Moderately |
| sample type | | S | In-house | | Well Sorted | Sorted | Well Sorted | Sorted | Sorted | Sorted | Well Sorted | Poorly Sorted | Sorted |
| | | | | | | | | | Slightly | | | | |
| | | | | | Slightly | | Slightly | | Gravelly | | Slightly | Slightly | |
| textural group (GRADISTAT) | | S | In-house | | Gravelly Sand | Gravelly Sand | Gravelly Sand | Sand | Muddy Sand | Sandy Mud | Gravelly Sand | Gravelly Sand | Gravelly Sand |
| | | | | | | | | | Slightly Very | | | | |
| | | | | | Slightly Very | | Slightly Fine | Moderately | Fine Gravelly | Very Fine | Slightly Very | | Very Fine |
| | | | | | Fine Gravelly | Gravelly | Gravelly | Sorted | Coarse Silty | Sandy Very | Fine Gravelly | | Gravelly |
| sediment name | | S | In-house | | | | Medium Sand | | | | | | Medium Sand |
| arithmetic mean (method of moments) | | S | In-house | um | 389 | 6700 | 399 | 355 | 308 | 103 | 421 | 409 | 694 |
| arithmetic sorting (method of moments) | | S | In-house | um | 194 | 12900 | 390 | 156 | 226 | 158 | 848 | 262 | 1100 |
| arithmetic skewness (method of moments) | | S | In-house | um | 5.33 | 1.76 | 9.89 | 0.502 | 1.56 | 2.11 | 13.5 | 2.85 | 5.23 |
| arithmetic kurtosis (method of moments) | | S | In-house | um | 69.0 | 4.39 | 130 | 5.31 | 25.2 | 6.70 | 204 | 30.5 | 33.7 |
| geometic mean (method of moments) | | S | In-house | um | 336 | 763 | 320 | 290 | 147 | 31.0 | 304 | 243 | 420 |
| geometic sorting (method of moments) | | S | In-house | um | 2.01 | 8.44 | 2.21 | 2.41 | 5.69 | 5.87 | 2.32 | 5.23 | 3.27 |
| geometic skewness (method of moments) | | S | In-house | um | -5.57 | 0.309 | -4.40 | -4.19 | -1.53 | -0.500 | -3.50 | -2.79 | -3.24 |
| geometic kurtosis (method of moments) | | S | In-house | um | 52.2 | 3.90 | 39.8 | 26.9 | 4.67 | 3.28 | 32.0 | 10.5 | 22.2 |
| logarithmic mean (method of moments) | | S | In-house | phi | 1.57 | 0.390 | 1.65 | 1.79 | 2.76 | 5.01 | 1.72 | 2.04 | 1.25 |
| logarithmic sorting (method of moments) | | S | In-house | phi | 1.01 | 3.08 | 1.14 | 1.27 | 2.51 | 2.55 | 1.21 | 2.39 | 1.71 |
| logarithmic skewness (method of moments) | | S | In-house | phi | 5.57 52.2 | -0.309 3.90 | 4.40 | 4.19 26.9 | 1.53 4.67 | 0.500 3.28 | 3.50 32.0 | 2.79 | 3.24 22.2 |
| logarithmic kurtosis (method of moments) | | S | In-house | phi | | | 39.8 | | | | | 10.5 | |
| mean (Folk and Ward method - um) | | S | In-house | um | 357 | 1240 | 338 | 326 | 150 | 34.0 | 320 | 358 | 443 |
| sorting (Folk and Ward method - um) | | S | In-house | um | 1.47 | 8.08 | 1.61 | 1.66 | 4.84 | 6.01 | 1.61 | 2.97 | 1.86 |
| skewness (Folk and Ward method - um) | | S | In-house | um | -0.072 | 0.621 | -0.161 | -0.222 | -0.720 | -0.055 1.06 | -0.097 | -0.541 | 0.029 |
| kurtosis (Folk and Ward method - um) | | S | In-house | um | 0.984 | 2.09 | 1.05 | 1.40 | 0.945 | 1.06 | 1.03 | 3.07 | 2.30 |



Results Summary PSA Results

| | | | Customer S | ample No | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 |
|---|--------|-------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|--------------|
| | | | Customer | Sample ID | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m |
| | | | RPS | Sample No | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 | 398226 | 398227 | 398228 |
| | | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | le Location | | | | | | | | | |
| | | | | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m |
| | | | | | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 |
| | | | San | npling Time | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| mean (Folk and Ward method - phi) | | S | In-house | phi | 1.49 | -0.315 | 1.57 | 1.62 | 2.74 | 4.88 | 1.65 | 1.48 | 1.17 |
| sorting (Folk and Ward method - phi) | | S | In-house | phi | 0.555 | 3.01 | 0.684 | 0.730 | 2.28 | 2.59 | 0.682 | 1.57 | 0.892 |
| skewness (Folk and Ward method - phi) | | S | In-house | phi | 0.072 | -0.621 | 0.161 | 0.222 | 0.720 | 0.055 | 0.097 | 0.541 | -0.029 |
| kurtosis (Folk and Ward method - phi) | | S | In-house | phi | 0.984 | 2.09 | 1.05 | 1.40 | 0.945 | 1.06 | 1.03 | 3.07 | 2.30 |
| | | | | | | Very Coarse | | | | Very Coarse | | | |
| mean description (Folk and Ward method) | | S | In-house | | Medium Sand | Sand | Medium Sand | | Fine Sand | Silt | | Medium Sand | |
| | | | | | Moderately | Very Poorly | Moderately | Moderately | Very Poorly | Very Poorly | Moderately | | Moderately |
| sorting description (Folk and Ward method) | | S | In-house | | Well Sorted | Sorted | Well Sorted | Sorted | Sorted | Sorted | Well Sorted | Poorly Sorted | Sorted |
| | | | | | | Very Coarse | F: C! ! | E: C! ! | Very Fine | | | Very Fine | |
| skewness description (Folk and Ward method) | | S | In-house | | Symmetrical | Skewed | Fine Skewed | Fine Skewed | Skewed | Symmetrical | Symmetrical | Skewed | Symmetrical |
| kurtosis description (Folk and Ward method) | | S | In-house | | Mesokurtic | Leptokurtic | Mesokurtic | Leptokurtic | Mesokurtic | Mesokurtic | Mesokurtic | Leptokurtic | Leptokurtic |
| MODE 1 - um | | S | In-house | um | 428 | 428 | 428 | 428 | 428 | 38.1 | 428 | 428 | 428 |
| MODE 2 - um | | S | In-house | um | | 38300 | | | | 428 | | | |
| MODE 3 - um | | S | In-house | um | | 13600 | | | | 9.43 | | | |
| MODE 1 - phi | | S | In-house | phi | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 4.74 | 1.25 | 1.25 | 1.25 |
| MODE 2 - phi | | S | In-house | phi | - | -5.24 | | | <u> </u> | 1.25 | | | |
| MODE 3 - phi | | S | In-house | phi | | -3.74 | | | | 6.75 | | | |
| D10 - um | | S | In-house | um | 208 | 178 | 184 | 186 | 8.6 | 3.2 | 181 | 83.8 | 235 |
| D50 - um | | S | In-house | um | 364 | 400 | 352 | 336 | 323 | 35.0 | 327 | 400 | 451 |
| D90 - um | | S | In-house | um | 591 | 32600 | 601 | 562 | 584 | 370 | 582 | 653 | 762 |
| (D90/D10) - um | | S | In-house | um | 2.84 | 183 | 3.27 | 3.03 | 67.5 | 117 | 3.22 | 7.80 | 3.25 |
| (D90 - D10) - um | | S | In-house | um | 383 | 32400 | 417 | 376 | 575 | 367 | 401 | 569 | 528 |
| (D75/D25) - um | | S | In-house | um | 1.70 | 3.26 | 1.86 | 1.77 | 9.11 | 9.27 | 1.90 | 2.03 | 1.63 |



Results Summary PSA Results

| | | | Customer S | Sample No | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 |
|---|---------|-------|------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|--------------|--------------|
| | | | Customer | Sample ID | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m |
| | | | RPS | Sample No | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 | 398226 | 398227 | 398228 |
| | | | | mple Type | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | ole Location | | | | | | | | | |
| | | | | Depth (m) | | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m |
| | | | | npling Date | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 |
| | | | San | npling Time | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| (D75 - D25) - um | CAS III | S | In-house | um | 192 | 579 | 215 | 193 | 403 | 84.8 | 211 | 267 | 227 |
| D10 - phi | | S | In-house | phi | 0.759 | -5.03 | 0.735 | 0.833 | 0.777 | 1.43 | 0.781 | 0.614 | 0.391 |
| D50 - phi | | S | In-house | phi | 1.46 | 1.32 | 1.51 | 1.57 | 1.63 | 4.84 | 1.61 | 1.32 | 1.15 |
| D90 - phi | | S | In-house | phi | 2.27 | 2.49 | 2.44 | 2.43 | 6.85 | 8.31 | 2.47 | 3.58 | 2.09 |
| (D90/D10) - phi | | S | In-house | phi | 2.99 | -0.495 | 3.33 | 2.92 | 8.82 | 5.80 | 3.16 | 5.82 | 5.34 |
| (D90 - D10) - phi | | S | In-house | phi | 1.51 | 7.52 | 1.71 | 1.60 | 6.08 | 6.87 | 1.69 | 2.96 | 1.70 |
| (D75/D25) - phi | | S | In-house | phi | 1.70 | 7.58 | 1.81 | 1.70 | 3.79 | 1.95 | 1.80 | 2.10 | 1.92 |
| (D75 - D25) - phi | | S | In-house | phi | 0.769 | 1.70 | 0.896 | 0.821 | 3.19 | 3.21 | 0.927 | 1.02 | 0.702 |
| % gravel | | S | In-house | % | 0.21 | 23.7 | 0.77 | 0.00 | 0.05 | 0.00 | 1.05 | 0.22 | 5.13 |
| % sand | | S | In-house | % | 97.9 | 71.7 | 97.1 | 95.3 | 73.6 | 32.4 | 96.2 | 89.9 | 92.0 |
| % mud | | S | In-house | % | 1.86 | 4.61 | 2.18 | 4.69 | 26.4 | 67.6 | 2.78 | 9.88 | 2.85 |
| % very coarse gravel (>32<64mm or <-5>-6phi) | | S | In-house | % | 0.00 | 10.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % coarse gravel (>16<32mm or <-4>-5phi) | | S | In-house | % | 0.00 | 6.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % medium gravel (>8<16mm or <-3>-4phi) | | S | In-house | % | 0.00 | 4.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.46 |
| % fine gravel (>4<8mm or <-2>-3phi) | | S | In-house | % | 0.00 | 1.24 | 0.41 | 0.00 | 0.01 | 0.00 | 0.25 | 0.02 | 2.15 |
| % very fine gravel (>2<4mm or <-1>-2phi) | | S | In-house | % | 0.21 | 0.98 | 0.36 | 0.00 | 0.05 | 0.00 | 0.46 | 0.20 | 2.53 |
| % very coarse sand (>1<2mm or <0>-1phi) | | S | In-house | % | 0.40 | 0.83 | 0.43 | 0.09 | 0.10 | 0.00 | 0.28 | 1.89 | 3.26 |
| % coarse sand (>0.5<1mm or <1>0phi) | | S | In-house | % | 16.9 | 12.0 | 17.2 | 14.3 | 16.7 | 4.25 | 14.5 | 26.4 | 29.6 |
| % medium sand (>0.25<0.5mm or <2>1phi) | | S | In-house | % | 64.9 | 40.0 | 56.5 | 61.2 | 46.8 | 10.1 | 55.5 | 48.1 | 51.3 |
| % fine sand (>0.125<0.25mm or <3>2phi) | | S | In-house | % | 15.4 | 17.6 | 21.3 | 19.1 | 9.34 | 6.65 | 24.5 | 12.4 | 6.23 |
| % very fine sand (>0.0625<0.125mm or <4>3phi) | | 5 | In-house | % | 0.25 | 1.30 | 1.61 | 0.64 | 0.68 | 11.5 | 1.44 | 1.18 | 1.64 |
| % very coarse silt (>0.03125<0.0625mm or <5>4phi | | S | In-house | % | 0.51 | 1.40 | 0.88 | 1.42 | 5.78 | 21.2 | 1.02 | 0.40 | 0.09 |
| % coarse silt (>0.015625<0.03125mm or <6>5phi) | | S | In-house | % | 0.44 | 0.91 | 0.36 | 1.20 | 6.92 | 16.5 | 0.57 | 0.28 | 0.17 |
| % medium silt (>0.007813<0.015625mm or <7>6phi) | | S | In-house | % | 0.15 0.15 | 0.45 0.47 | 0.10 0.12 | 0.53 0.57 | 4.41 4.41 | 8.57 | 0.20 0.22 | 1.87 2.10 | 0.46 0.39 |
| % fine silt (>0.003906<0.007813mm or <8>7phi) | | S | In-house | % | 0.15 | - | | | | 9.05 | | | 0.39 |
| % very fine silt (>0.001953<0.003906mm or <9>8phi | | S | In-house | % | | 0.44 0.94 | 0.14 0.57 | 0.40 | 2.54 | 6.15 | 0.20 0.56 | 1.58 | |
| % clay (<0.001953mm or >9phi) | | S | In-house | % | 0.45 | 0.94 | 0.57 | 0.58 | 2.33 | 6.05 | 0.56 | 3.65 | 1.34 |



Results Summary PSA Results

| | | | Customer S | Sample No | BH4 ES1 | BH4 ES19 | BH4 ES40 | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 |
|--|---------|-------|------------|-------------|---------------|--------------|-------------|-------------|---------------|--------------|-------------|---------------|-------------|
| | | | Customer | Sample ID | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | RPS | Sample No | 398229 | 398230 | 398231 | 398232 | 398233 | 398234 | 398235 | 398236 | 398237 |
| | | | Sar | nple Type | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | Samp | le Location | | | | | | | | | |
| | | | Sample | Depth (m) | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | San | npling Date | 11/03/2019 | 11/03/2019 | 11/03/2019 | 13/03/2019 | 13/03/2019 | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 |
| | | | San | npling Time | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| Determinant. | CAS III | Coucs | | Onico | | Bimodal, | Trimodal, | Polymodal, | | Bimodal, | Polymodal, | | Trimodal, |
| | | | | | Trimodal, | Very Poorly | Very Poorly | Very Poorly | Unimodal, | Very Poorly | Very Poorly | Unimodal, | Very Poorly |
| sample type | | S | In-house | | Poorly Sorted | , , | Sorted | Sorted | Poorly Sorted | , , | Sorted | Poorly Sorted | Sorted |
| 3 | | | | | | | | | Slightly | | | Slightly | |
| | | | | | | | | | Gravelly | | | Gravelly | |
| textural group (GRADISTAT) | | S | In-house | | Gravelly Sand | Sandy Gravel | Gravel | Muddy Sand | Muddy Sand | Sandy Gravel | Muddy Sand | Muddy Sand | Muddy Sand |
| , | | | | | ĺ | ĺ | | , | Slightly | | | Slightly Very | |
| | | | | | | Sandy Very | | Very Coarse | Medium | | Very Coarse | Fine Gravelly | Very Coarse |
| | | | | | Fine Gravelly | Coarse | Very Coarse | Silty Very | Gravelly | Sandy Coarse | Silty Fine | Coarse Silty | Silty Fine |
| sediment name | | S | In-house | | Medium Sand | Gravel | Gravel | Fine Sand | Coarse Silty | Gravel | Sand | Medium Sand | Sand |
| arithmetic mean (method of moments) | | S | In-house | um | 2370 | 15600 | 24000 | 165 | 445 | 15200 | 117 | 274 | 173 |
| arithmetic sorting (method of moments) | | S | In-house | um | 4420 | 16200 | 20300 | 200 | 983 | 12500 | 124 | 172 | 177 |
| arithmetic skewness (method of moments) | | S | In-house | um | 2.61 | 0.343 | 0.396 | 1.49 | 8.61 | 0.417 | 1.88 | 2.45 | 1.19 |
| arithmetic kurtosis (method of moments) | | S | In-house | um | 9.25 | 1.39 | 1.65 | 4.19 | 79.3 | 2.01 | 8.01 | 33.9 | 3.91 |
| geometic mean (method of moments) | | S | In-house | um | 713 | 3240 | 8540 | 62.2 | 231 | 6180 | 51.1 | 194 | 71.6 |
| geometic sorting (method of moments) | | S | In-house | um | 4.26 | 9.76 | 11.3 | 5.47 | 4.05 | 6.59 | 5.22 | 3.12 | 5.41 |
| geometic skewness (method of moments) | | S | In-house | um | 0.339 | -0.235 | -2.36 | -0.870 | -2.10 | -1.34 | -1.17 | -2.84 | -1.03 |
| geometic kurtosis (method of moments) | | S | In-house | um | 5.43 | 1.75 | 9.04 | 3.92 | 9.28 | 4.68 | 4.27 | 13.7 | 3.95 |
| logarithmic mean (method of moments) | | S | In-house | phi | 0.488 | -1.70 | -3.10 | 4.01 | 2.11 | -2.63 | 4.29 | 2.37 | 3.80 |
| logarithmic sorting (method of moments) | | S | In-house | phi | 2.09 | 3.29 | 3.50 | 2.45 | 2.02 | 2.72 | 2.38 | 1.64 | 2.44 |
| logarithmic skewness (method of moments) | | S | In-house | phi | -0.339 | 0.235 | 2.36 | 0.870 | 2.10 | 1.34 | 1.17 | 2.84 | 1.03 |
| logarithmic kurtosis (method of moments) | | S | In-house | phi | 5.43 | 1.75 | 9.04 | 3.92 | 9.28 | 4.68 | 4.27 | 13.7 | 3.95 |
| mean (Folk and Ward method - um) | | S | In-house | um | 804 | 4810 | 12600 | 71.8 | 300 | 5570 | 54.8 | 236 | 82.5 |
| sorting (Folk and Ward method - um) | | S | In-house | um | 3.95 | 7.50 | 8.30 | 5.39 | 2.62 | 6.16 | 4.73 | 2.26 | 4.86 |
| skewness (Folk and Ward method - um) | | S | In-house | um | 0.627 | -0.494 | -0.582 | -0.143 | -0.468 | -0.603 | -0.394 | -0.267 | -0.345 |
| kurtosis (Folk and Ward method - um) | | S | In-house | um | 1.01 | 0.489 | 1.58 | 1.04 | 2.39 | 0.866 | 1.01 | 1.94 | 0.928 |



Results Summary PSA Results

| | | | Customer S | ample No | BH4 ES1 | BH4 ES19 | BH4 ES40 | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 |
|---|--------|-------|--------------|-------------|--------------------------|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | | Customer | Sample ID | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | RPS | Sample No | 398229 | 398230 | 398231 | 398232 | 398233 | 398234 | 398235 | 398236 | 398237 |
| | | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | le Location | 0.00.0.50 | 4.50.5.00 | 0.50.40.0 | 0.00.0.50 | 2.50.2.00 | E 00 E E0 | 0.00.0.50 | 1 00 1 50 | 2.00.2.50 |
| | | | | | 0.00-0.50m 11/03/2019 | 4.50-5.00m | 9.50-10.0m 11/03/2019 | 0.00-0.50m 13/03/2019 | 2.50-3.00m 13/03/2019 | 5.00-5.50m 13/03/2019 | 0.00-0.50m 16/03/0320 | 1.00-1.50m 16/03/2019 | 2.00-2.50m 16/03/2019 |
| | | | | ipling Date | | 11/03/2019 | 11/03/2019 | 13/03/2019 | 13/03/2019 | 13/03/2019 | 10/03/0320 | 10/03/2019 | 10/03/2019 |
| | | | - Cui | .pgc | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| mean (Folk and Ward method - phi) | | S | In-house | phi | 0.315 | -2.27 | -3.65 | 3.80 | 1.74 | -2.48 | 4.19 | 2.08 | 3.60 |
| sorting (Folk and Ward method - phi) | | S | In-house | phi | 1.98 | 2.91 | 3.05 | 2.43 | 1.39 | 2.62 | 2.24 | 1.18 | 2.28 |
| skewness (Folk and Ward method - phi) | | S | In-house | phi | -0.627 | 0.494 | 0.582 | 0.143 | 0.468 | 0.603 | 0.394 | 0.267 | 0.345 |
| kurtosis (Folk and Ward method - phi) | | S | In-house | phi | 1.01 | 0.489 | 1.58 Medium | 1.04 | 2.39 | 0.866 | 1.01 | 1.94 | 0.928 |
| many description (Fell, and Mond mathed) | | S | In-house | | Coores Cond | Fine Curvel | Gravel | Very Fine Sand | Madium Cand | Fine Gravel | Very Coarse Silt | | Very Fine Sand |
| mean description (Folk and Ward method) | | 5 | In-nouse | | Coarse Sand | Very Poorly | Very Poorly | Very Poorly | Medium Sand | Very Poorly | Very Poorly | Fine Sand | Very Poorly |
| sorting description (Folk and Ward method) | | S | In-house | | Poorly Sorted | Sorted | Sorted | Sorted | Poorly Sorted | | Sorted | Poorly Sorted | Sorted |
| sorting description (Fork and Ward method) | | | III IIousc | | Very Coarse | Very Fine | Very Fine | Sorted | Very Fine | Very Fine | Very Fine | 1 doily Sorted | Very Fine |
| skewness description (Folk and Ward method) | | S | In-house | | Skewed | Skewed | Skewed | Fine Skewed | Skewed | Skewed | Skewed | Fine Skewed | Skewed |
| chemicas accompact (Felicana traia medica) | | | 111 110 0000 | | Cherrou | very | very | Time enerred | very | Diterred | Diterred | very | <u> </u> |
| kurtosis description (Folk and Ward method) | | S | In-house | | Mesokurtic | Platykurtic | Leptokurtic | Mesokurtic | Leptokurtic | Platykurtic | Mesokurtic | Leptokurtic | Mesokurtic |
| MODE 1 - um | | S | In-house | um | 428 | 38300 | 54000 | 108 | 428 | 27000 | 215 | 215 | 215 |
| MODE 2 - um | | S | In-house | um | 6800 | 428 | 27000 | 605 | | 428 | 108 | | 38.1 |
| MODE 3 - um | | S | In-house | um | 19200 | | 9600 | 38.1 | | | 38.1 | | 9.43 |
| MODE 1 - phi | | S | In-house | phi | 1.25 | -5.24 | -5.74 | 3.24 | 1.25 | -4.73 | 2.24 | 2.24 | 2.24 |
| MODE 2 - phi | | S | In-house | phi | -2.74 | 1.25 | -4.73 | 0.747 | | 1.25 | 3.24 | | 4.74 |
| MODE 3 - phi | | S | In-house | phi | -4.24 | | -3.24 | 4.74 | | | 4.74 | | 6.75 |
| D10 - um | | S | In-house | um | 218 | 250 | 573 | 6.1 | 32.3 | 329 | 4.7 | 60.1 | 6.6 |
| D50 - um | | S | In-house | um | 430 | 10700 | 19700 | 77.3 | 333 | 13300 | 80.2 | 243 | 113 |
| D90 - um | | S | In-house | um | 7840 | 39000 | 55000 | 515 | 600 | 33100 | 255 | 489 | 433 |
| (D90/D10) - um | | S | In-house | um | 36.0 | 156 | 96.1 | 84.5 | 18.6 | 101 | 54.0 | 8.15 | 65.3 |
| (D90 - D10) - um | | S | In-house | um | 7620 | 38800 | 54400 | 509 | 568 | 32800 | 250 | 429 | 427 |
| (D75/D25) - um | | S | In-house | um | 5.57 | 87.8 | 9.34 | 8.30 | 2.12 | 11.3 | 7.81 | 2.05 | 9.84 |



Results Summary PSA Results

| | | | Customer S | Sample No | BH4 ES1 | BH4 ES19 | BH4 ES40 | BH5 ES1 | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 |
|--|----------|-------|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | Customer | Sample ID | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | RPS | Sample No | 398229 | 398230 | 398231 | 398232 | 398233 | 398234 | 398235 | 398236 | 398237 |
| | | | | | SEDIMENT |
| | | | Samp | ole Location | | | | | | | | | |
| | | | | | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m |
| | | | | | 11/03/2019 | 11/03/2019 | 11/03/2019 | 13/03/2019 | 13/03/2019 | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 |
| | | | Sar | npling Time | | | | | | | | | ļ |
| Determinand | CAS No | Codes | SOP | Units | | | | | | | | | |
| (D75 - D25) - um | 0.10.110 | S | In-house | um | 1350 | 31200 | 39700 | 183 | 241 | 22400 | 156 | 180 | 237 |
| D10 - phi | | S | In-house | phi | -2.97 | -5.29 | -5.78 | 0.958 | 0.736 | -5.05 | 1.97 | 1.03 | 1.21 |
| D50 - phi | | S | In-house | phi | 1.22 | -3.42 | -4.30 | 3.69 | 1.59 | -3.73 | 3.64 | 2.04 | 3.15 |
| D90 - phi | | S | In-house | phi | 2.20 | 2.00 | 0.805 | 7.36 | 4.95 | 1.60 | 7.73 | 4.06 | 7.24 |
| (D90/D10) - phi | | S | In-house | phi | -0.740 | -0.379 | -0.139 | 7.68 | 6.73 | -0.317 | 3.92 | 3.94 | 6.00 |
| (D90 - D10) - phi | | S | In-house | phi | 5.17 | 7.29 | 6.59 | 6.40 | 4.22 | 6.65 | 5.76 | 3.03 | 6.03 |
| (D75/D25) - phi | | S | In-house | phi | -2.45 | -0.297 | 0.411 | 2.35 | 1.96 | 0.243 | 2.20 | 1.69 | 2.71 |
| (D75 - D25) - phi | | S | In-house | phi | 2.48 | 6.46 | 3.22 | 3.05 | 1.08 | 3.50 | 2.97 | 1.04 | 3.30 |
| % gravel | | S | In-house | % | 23.8 | 52.1 | 84.0 | 0.00 | 1.38 | 75.3 | 0.00 | 0.03 | 0.00 |
| % sand | | S | In-house | % | 75.0 | 47.1 | 10.6 | 54.6 | 85.8 | 23.2 | 54.8 | 89.9 | 57.3 |
| % mud | | S | In-house | % | 1.12 | 0.88 | 5.47 | 45.4 | 12.8 | 1.47 | 45.2 | 10.1 | 42.7 |
| % very coarse gravel (>32<64mm or <-5>-6phi) | | S | In-house | % | 0.00 | 24.0 | 31.9 | 0.00 | 0.00 | 11.1 | 0.00 | 0.00 | 0.00 |
| % coarse gravel (>16<32mm or <-4>-5phi) | | S | In-house | % | 3.78 | 21.7 | 23.6 | 0.00 | 0.00 | 32.1 | 0.00 | 0.00 | 0.00 |
| % medium gravel (>8<16mm or <-3>-4phi) | | S | In-house | % | 5.97 | 5.15 | 11.2 | 0.00 | 1.03 | 21.6 | 0.00 | 0.00 | 0.00 |
| % fine gravel (>4<8mm or <-2>-3phi) | | S | In-house | % | 8.16 | 0.57 | 10.6 | 0.00 | 0.13 | 7.35 | 0.00 | 0.00 | 0.00 |
| % very fine gravel (>2<4mm or <-1>-2phi) | | S | In-house | % | 5.94 | 0.62 | 6.59 | 0.00 | 0.22 | 3.12 | 0.00 | 0.03 | 0.00 |
| % very coarse sand (>1<2mm or <0>-1phi) | | S | In-house | % | 3.44 | 0.49 | 3.40 | 0.00 | 0.21 | 1.74 | 0.00 | 0.05 | 0.00 |
| % coarse sand (>0.5<1mm or <1>0phi) | | S | In-house | % % | 12.2 45.9 | 7.64 29.8 | 4.05 3.11 | 10.8 9.98 | 16.2 51.3 | 4.65 12.5 | 1.90 8.44 | 8.97 38.6 | 6.26 20.5 |
| % medium sand (>0.25<0.5mm or <2>1phi) | | | In-house | | 13.3 | 8.95 | 0.00 | 15.9 | 17.0 | 4.08 | 26.4 | 37.1 | 20.5 |
| % fine sand (>0.125<0.25mm or <3>2phi) % very fine sand (>0.0625<0.125mm or <4>3phi) | | S | In-house In-house | % | 0.27 | 0.21 | 0.00 | 18.0 | 17.0 | 4.08 0.22 | 18.1 | 5.21 | 8.88 |
| % very line sand (>0.0625<0.125mm or <4>3pm) % very coarse silt (>0.03125<0.0625mm or <5>4phi | | S | | % | 0.27 | 0.21 | 0.00 | 16.0 | 2.96 | 0.22 | 14.4 | 2.94 | 14.6 |
| % very coarse siit (>0.03125<0.0625fffff of <5>4pfff % coarse silt (>0.015625<0.03125mm or <6>5phi) | | S | In-house In-house | % | 0.34 | 0.28 | 0.00 | 11.4 | 3.24 | 0.31 | 10.8 | 2.94 | 14.6 |
| % coarse siit (>0.013625<0.03125fffff of <6>5pfff) % medium silt (>0.007813<0.015625mm or <7>6phi) | | S | In-house | % | 0.23 | 0.19 | 0.09 | 5.80 | 1.88 | 0.31 | 5.60 | 1.09 | 5.35 |
| % fine silt (>0.007813<0.01362311111 01 <7>6pril) | | S | In-house | % | 0.07 | 0.07 | 1.22 | 5.56 | 2.04 | 0.24 | 5.92 | 1.20 | 4.94 |
| % tille silt (>0.003906<0.00781311111 of <6>7piii) % very fine silt (>0.001953<0.003906mm or <9>8phi | | S | In-house | % | 0.08 | 0.07 | 0.99 | 3.20 | 1.31 | 0.22 | 4.00 | 0.83 | 3.06 |
| % clay (<0.001953mm or >9phi) | | S | In-house | % | 0.32 | 0.07 | 2.20 | 3.39 | 1.36 | 0.15 | 4.45 | 1.11 | 3.23 |
| 70 clay (<0.00133311111 of >3p(11) | | 3 | III-IIOUSE | 70 | 0.32 | 0.21 | 2.20 | 2.33 | 1.30 | 0.23 | CF.F | 1.11 | 5.25 |



Results Summary PSA Results

Report No.:19-81762Customer Reference:G191005UCustomer Order No:78367KB-WAL

| | | | DDC | Sample No | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
|--|--------|-------|----------|-------------|---------------|-------------|----------------------|---------------|-------------|---------------|
| | | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | le Location | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | | | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | | | npling Time | 07/03/2013 | 07/03/2013 | 07/03/2013 | 03/03/2013 | 03/03/2013 | 03/03/2013 |
| | | | | · | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | |
| | | | | | | Trimodal, | | Bimodal, | Unimodal, | |
| | | | | | Unimodal, | Very Poorly | Unimodal, | Very Poorly | Moderately | Unimodal, |
| sample type | | S | In-house | | Poorly Sorted | Sorted | Poorly Sorted | Sorted | Well Sorted | Poorly Sorted |
| | | | | | Slightly | | , | | | , |
| | | | | | Gravelly | | Slightly | | | |
| textural group (GRADISTAT) | | S | In-house | | Muddy Sand | Muddy Sand | Gravelly Sand | Gravelly Sand | Sand | Sand |
| | | | | | Slightly Fine | | | | | |
| | | | | | Gravelly Very | Very Coarse | Slightly Very | Coarse | Moderately | |
| | | | | | Coarse Silty | Silty Fine | Fine Gravelly | Gravelly | Well Sorted | Poorly Sorted |
| sediment name | | S | In-house | | Medium Sand | Sand | Medium Sand | Medium Sand | Medium Sand | Medium Sand |
| arithmetic mean (method of moments) | | S | In-house | um | 305 | 170 | 441 | 5480 | 331 | 284 |
| arithmetic sorting (method of moments) | | S | In-house | um | 349 | 167 | 544 | 9840 | 134 | 161 |
| arithmetic skewness (method of moments) | | S | In-house | um | 10.9 | 1.24 | 5.51 | 1.56 | 0.724 | 0.597 |
| arithmetic kurtosis (method of moments) | | S | In-house | um | 165 | 4.28 | 41.6 | 3.61 | 4.33 | 3.55 |
| geometic mean (method of moments) | | S | In-house | um | 199 | 76.8 | 294 | 850 | 287 | 206 |
| geometic sorting (method of moments) | | S | In-house | um | 3.39 | 5.05 | 2.91 | 6.51 | 2.04 | 3.01 |
| geometic skewness (method of moments) | | S | In-house | um | -2.58 | -1.20 | -2.67 | 0.692 | -5.56 | -3.06 |
| geometic kurtosis (method of moments) | | S | In-house | um | 12.0 | 4.52 | 16.6 | 3.58 | 49.2 | 15.7 |
| logarithmic mean (method of moments) | | S | In-house | phi | 2.33 | 3.70 | 1.77 | 0.235 | 1.80 | 2.28 |
| logarithmic sorting (method of moments) | | S | In-house | phi | 1.76 | 2.34 | 1.54 | 2.70 | 1.03 | 1.59 |
| logarithmic skewness (method of moments) | | S | In-house | phi | 2.58 | 1.20 | 2.67 | -0.692 | 5.56 | 3.06 |
| logarithmic kurtosis (method of moments) | | S | In-house | phi | 12.0 | 4.52 | 16.6 | 3.58 | 49.2 | 15.7 |
| mean (Folk and Ward method - um) | _ | S | In-house | um | 246 | 88.4 | 325 | 1260 | 306 | 247 |
| sorting (Folk and Ward method - um) | | S | In-house | um | 2.39 | 4.44 | 2.02 | 6.43 | 1.50 | 2.17 |
| skewness (Folk and Ward method - um) | | S | In-house | um | -0.340 | -0.378 | -0.200 | 0.739 | -0.012 | -0.309 |
| kurtosis (Folk and Ward method - um) | | S | In-house | um | 2.03 | 0.989 | 1.98 | 1.87 | 1.04 | 1.84 |

Customer Sample No

BH7 ES1 BH7 ES14 BH7 ES27

Customer Sample ID 0.00-0.50m 3.00-3.50m 6.00-6.50m

BH8 ES1

BH8 ES11

0.00-0.50m 2.50-3.00m 5.00-5.50m

BH8 ES21



Results Summary PSA Results

| | | C | Customer S | ample No | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
|---|--------|-------|--------------|--------------|---------------|---------------------|----------------|---------------------|---------------------------|---------------|
| | | | Customer | Sample ID | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | RPS | Sample No | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | ole Location | | | | | | |
| | | | | Depth (m) | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | San | npling Date | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | | San | npling Time | | | | | | |
| | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | 2.02 | 2.50 | 4.60 | 0.227 | 4.74 | 2.02 |
| mean (Folk and Ward method - phi) | | S | In-house | phi | 2.02 | 3.50 | 1.62 | -0.337 | 1.71 | 2.02 |
| sorting (Folk and Ward method - phi) | | S | In-house | phi | 1.26 | 2.15 | 1.02 | 2.68 | 0.588 | 1.12 |
| skewness (Folk and Ward method - phi) | | S | In-house | phi | 0.340 | 0.378 | 0.200 | -0.739 | 0.012 | 0.309 |
| kurtosis (Folk and Ward method - phi) | | S | In-house | phi | 2.03 | 0.989 | 1.98 | 1.87 Very Coarse | 1.04 | 1.84 |
| and a suitable of Cally and Mandana All and | | _ | T 1 | | Fire Cond | Very Fine | Madium Cand | , | Madiana Cand | Fire Count |
| mean description (Folk and Ward method) | | S | In-house | | Fine Sand | Sand Very Poorly | Medium Sand | Sand Very Poorly | Medium Sand Moderately | Fine Sand |
| sorting description (Folk and Ward method) | | S | In-house | | Poorly Sorted | Sorted | Poorly Sorted | Sorted | Well Sorted | Poorly Sorted |
| oording description (1 on did traid metrod) | | | 211 110 0000 | | Very Fine | Very Fine | . con y contou | Very Coarse | 110 00.100 | Very Fine |
| skewness description (Folk and Ward method) | | S | In-house | | Skewed | Skewed | Fine Skewed | Skewed | Symmetrical | Skewed |
| | | | | | very | | very | very | | very |
| kurtosis description (Folk and Ward method) | | S | In-house | | Leptokurtic | Mesokurtic | Leptokurtic | Leptokurtic | Mesokurtic | Leptokurtic |
| MODE 1 - um | | S | In-house | um | 303 | 215 | 303 | 303 | 303 | 303 |
| MODE 2 - um | | S | In-house | um | | 38.1 | | 27000 | | |
| MODE 3 - um | | S | In-house | um | | 9.43 | | | | |
| MODE 1 - phi | | S | In-house | phi | 1.75 | 2.24 | 1.75 | 1.75 | 1.75 | 1.75 |
| MODE 2 - phi | | S | In-house | phi | | 4.74 | | -4.73 | | |
| MODE 3 - phi | | S | In-house | phi | | 6.75 | | | | |
| D10 - um | | S | In-house | um | 45.1 | 7.7 | 166 | 212 | 188 | 64.6 |
| D50 - um | | S | In-house | um | 262 | 122 | 331 | 400 | 306 | 262 |
| D90 - um | | S | In-house | um | 504 | 406 | 622 | 25200 | 495 | 491 |
| (D90/D10) - um | | S | In-house | um | 11.2 | 53.0 | 3.75 | 118 | 2.63 | 7.59 |
| (D90 - D10) - um | | S | In-house | um | 459 | 398 | 456 | 24900 | 307 | 426 |
| (D75/D25) - um | | S | In-house | um | 2.10 | 7.96 | 1.89 | 3.01 | 1.72 | 2.01 |



Results Summary PSA Results

| | | (| Customer S | ample No | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
|---|--------|-------|------------|-------------|------------|------------|------------|------------|------------|------------|
| | | | Customer | Sample ID | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | RPS | Sample No | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | | | le Location | _ | | | | | _ |
| | | | Sample | Depth (m) | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | | San | npling Date | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | | San | npling Time | | | | | | |
| | | | | | | | | | | |
| Determinand | CAS No | Codes | SOP | Units | | | | | | |
| (D75 - D25) - um | | S | In-house | um | 199 | 219 | 214 | 567 | 169 | 185 |
| D10 - phi | | S | In-house | phi | 0.990 | 1.30 | 0.685 | -4.65 | 1.02 | 1.03 |
| D50 - phi | | S | In-house | phi | 1.93 | 3.04 | 1.60 | 1.32 | 1.71 | 1.94 |
| D90 - phi | | S | In-house | phi | 4.47 | 7.03 | 2.59 | 2.24 | 2.41 | 3.95 |
| (D90/D10) - phi | | S | In-house | phi | 4.52 | 5.41 | 3.78 | -0.480 | 2.38 | 3.85 |
| (D90 - D10) - phi | | S | In-house | phi | 3.48 | 5.73 | 1.91 | 6.89 | 1.40 | 2.92 |
| (D75/D25) - phi | | S | In-house | phi | 1.77 | 2.50 | 1.81 | 7.75 | 1.60 | 1.70 |
| (D75 - D25) - phi | | S | In-house | phi | 1.07 | 2.99 | 0.921 | 1.59 | 0.784 | 1.00 |
| % gravel | | S | In-house | % | 0.47 | 0.00 | 2.66 | 24.1 | 0.00 | 0.00 |
| % sand | | S | In-house | % | 88.4 | 61.8 | 91.3 | 74.5 | 97.7 | 90.1 |
| % mud | | S | In-house | % | 11.1 | 38.2 | 6.06 | 1.45 | 2.26 | 9.86 |
| % very coarse gravel (>32<64mm or <-5>-6phi) | | S | In-house | % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % coarse gravel (>16<32mm or <-4>-5phi) | | S | In-house | % | 0.00 | 0.00 | 0.00 | 18.0 | 0.00 | 0.00 |
| % medium gravel (>8<16mm or <-3>-4phi) | | S | In-house | % | 0.00 | 0.00 | 0.00 | 3.83 | 0.00 | 0.00 |
| % fine gravel (>4<8mm or <-2>-3phi) | | S | In-house | % | 0.32 | 0.00 | 0.48 | 1.53 | 0.00 | 0.00 |
| % very fine gravel (>2<4mm or <-1>-2phi) | | S | In-house | % | 0.15 | 0.00 | 2.18 | 0.71 | 0.00 | 0.00 |
| % very coarse sand (>1<2mm or <0>-1phi) | | S | In-house | % | 0.06 | 0.00 | 2.12 | 0.65 | 0.00 | 0.00 |
| % coarse sand (>0.5<1mm or <1>0phi) | | S | In-house | % | 9.65 | 5.19 | 12.4 | 9.74 | 9.23 | 8.98 |
| % medium sand (>0.25<0.5mm or <2>1phi) | | S | In-house | % | 43.0 | 19.8 | 55.7 | 49.3 | 61.5 | 44.4 |
| % fine sand (>0.125<0.25mm or <3>2phi) | | S | In-house | % | 31.2 | 24.4 | 20.1 | 14.5 | 26.5 | 31.9 |
| % very fine sand (>0.0625<0.125mm or <4>3phi) | | S | In-house | % | 4.43 | 12.4 | 1.02 | 0.25 | 0.52 | 4.88 |
| % very coarse silt (>0.03125<0.0625mm or <5>4phi | | S | In-house | % | 3.09 | 13.3 | 1.93 | 0.38 | 0.69 | 4.00 |
| % coarse silt (>0.015625<0.03125mm or <6>5phi) | | S | In-house | % | 3.03 | 10.1 | 1.43 | 0.35 | 0.50 | 2.54 |
| % medium silt (>0.007813<0.015625mm or <7>6phi) | | S | In-house | % | 1.43 | 4.63 | 0.68 | 0.12 | 0.18 | 0.74 |
| % fine silt (>0.003906<0.007813mm or <8>7phi) | | S | In-house | % | 1.39 | 4.47 | 0.74 | 0.13 | 0.20 | 0.79 |
| % very fine silt (>0.001953<0.003906mm or <9>8phi | | S | In-house | % | 0.92 | 2.71 | 0.52 | 0.13 | 0.18 | 0.67 |
| % clay (<0.001953mm or >9phi) | | S | In-house | % | 1.25 | 2.95 | 0.75 | 0.35 | 0.51 | 1.13 |



Results Summary PSA Size Class & Statistics

| | | | | | Т | 1 | ı | | | | ı | | 1 | 1 | | 1 | |
|--------------------|--------------------|------------|---------|------------------------------|------------------|------------------------------|------------|---------------|------------|-----------------|-----------------|---------------|---------------|--------------|------------|------------|---------------|
| | Custo | omer Sam | ple No | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 | BH4 ES1 | BH4 ES19 | BH4 ES40 | BH5 ES1 | BH5 ES12 |
| | Cus | stomer Sai | mple ID | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m |
| | | RPS Sar | nple No | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 | 398226 | 398227 | 398228 | 398229 | 398230 | 398231 | 398232 | 398233 |
| | | | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | | Sample L | ocation | | | | | | | | | | | | | | |
| | 9 | Sample De | pth (m) | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m | 2.50-3.00m |
| | | Samplii | ng Date | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 | 11/03/2019 | 11/03/2019 | 11/03/2019 | 13/03/2019 | 13/03/2019 |
| | | Samplir | ng Time | | | | | | | | | | | | | | |
| Sediment | mm | phi φ | Units | | | | | | | | | | | | | | |
| Very coarse gravel | >32<64 | <-5>-6 | | 0.00 | 10.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 24.00 | 31.90 | 0.00 | 0.00 |
| Coarse gravel | >16<32 | <-4>-5 | % | 0.00 | 6.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.78 | 21.70 | 23.60 | 0.00 | 0.00 |
| Medium gravel | >8<16 | <-3>-4 | % | 0.00 | 4.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.46 | 5.97 | 5.15 | 11.20 | 0.00 | 1.03 |
| Fine gravel | >4<8 | <-2>-3 | % | 0.00 | 1.24 | 0.41 | 0.00 | 0.01 | 0.00 | 0.25 | 0.02 | 2.15 | 8.16 | 0.57 | 10.60 | 0.00 | 0.13 |
| Very fine gravel | >2<4 | <-1>-2 | % | 0.21 | 0.98 | 0.36 | 0.00 | 0.05 | 0.00 | 0.46 | 0.20 | 2.53 | 5.94 | 0.62 | 6.59 | 0.00 | 0.22 |
| Very coarse sand | >1<2 | <0>-1 | % | 0.40 | 0.83 | 0.43 | 0.09 | 0.10 | 0.00 | 0.28 | 1.89 | 3.26 | 3.44 | 0.49 | 3.40 | 0.00 | 0.21 |
| Coarse sand | >0.5<1 | <1>0 | % | 16.90 | 12.00 | 17.20 | 14.30 | 16.70 | 4.25 | 14.50 | 26.40 | 29.60 | 12.20 | 7.64 | 4.05 | 10.80 | 16.20 |
| Medium sand | >0.25<0.5 | <2>1 | % | 64.90 | 40.00 | 56.50 | 61.20 | 46.80 | 10.10 | 55.50 | 48.10 | 51.30 | 45.90 | 29.80 | 3.11 | 9.98 | 51.30 |
| Fine sand | >0.125<0.25 | <3>2 | % | 15.40 | 17.60 | 21.30 | 19.10 | 9.34 | 6.65 | 24.50 | 12.40 | 6.23 | 13.30 | 8.95 | 0.00 | 15.90 | 17.00 |
| Very fine sand | >0.0625<0.125 | <4>3 | % | 0.25 | 1.30 | 1.61 | 0.64 | 0.68 | 11.50 | 1.44 | 1.18 | 1.64 | 0.27 | 0.21 | 0.00 | 18.00 | 1.10 |
| Very coarse silt | >0.03125<0.0625 | <5>4 | % | 0.51 | 1.40 | 0.88 | 1.42 | 5.78 | 21.20 | 1.02 | 0.40 | 0.09 | 0.34 | 0.28 | 0.00 | 16.00 | 2.96 |
| Coarse silt | >0.015625<0.03125 | <6>5 | % | 0.44 | 0.91 | 0.36 | 1.20 | 6.92 | 16.50 | 0.57 | 0.28 | 0.17 | 0.23 | 0.19 | 0.09 | 11.40 | 3.24 |
| Medium silt | >0.007813<0.015625 | <7>6 | % | 0.15 | 0.45 | 0.10 | 0.53 | 4.41 | 8.57 | 0.20 | 1.87 | 0.46 | 0.07 | 0.07 | 0.97 | 5.80 | 1.88 |
| Fine silt | >0.003906<0.007813 | <8>7 | % | 0.15 | 0.47 | 0.12 | 0.57 | 4.41 | 9.05 | 0.22 | 2.10 | 0.39 | 0.08 | 0.07 | 1.22 | 5.56 | 2.04 |
| Very fine silt | >0.001953<0.003906 | <9>8 | % | 0.15 | 0.44 | 0.14 | 0.40 | 2.54 | 6.15 | 0.20 | 1.58 | 0.39 | 0.08 | 0.07 | 0.99 | 3.20 | 1.31 |
| Clay | <0.001953 | >9 | % | 0.45 | 0.94 | 0.57 | 0.58 | 2.33 | 6.05 | 0.56 | 3.65 | 1.34 | 0.32 | 0.21 | 2.20 | 3.39 | 1.36 |
| Statistics* | Mean (phi) | | | 1.49 | -0.315 | 1.57 | 1.62 | 2.74 | 4.88 | 1.65 | 1.48 | 1.17 | 0.315 | -2.27 | -3.65 | 3.80 | 1.74 |
| | Sorting | | | 0.555 | 3.01 | 0.684 | 0.730 | 2.28 | 2.59 | 0.682 | 1.57 | 0.892 | 1.98 | 2.91 | 3.05 | 2.43 | 1.39 |
| | Skewness | | | 0.072 | -0.621 | 0.161 | 0.222 | 0.720 | 0.055 | 0.097 | 0.541 | -0.029 | -0.627 | 0.494 | 0.582 | 0.143 | 0.468 |
| | Kurtosis | | | 0.984 | 2.09 | 1.05 | 1.40 | 0.945 | 1.06 | 1.03 | 3.07 | 2.30 | 1.01 | 0.489 | 1.58 | 1.04 | 2.39 |
| | % Silt/Clay | | % | 1.85 | 4.61 | 2.17 | 4.70 | 26.39 | 67.52 | 2.77 | 9.88 | 2.84 | 1.12 | 0.89 | 5.47 | 45.35 | 12.79 |
| | Textural Group* | * | | Slightly Gravelly Sand | Gravelly Sand | Slightly Gravelly Sand | Sand | Gravelly Mudo | Sandy Mud | htly Gravelly S | htly Gravelly S | Gravelly Sand | Gravelly Sand | Sandy Gravel | Gravel | Muddy Sand | Gravelly Mude |

^{*} Folk & Ward

^{**} GRADISTAT classification system (Blott, S. J. & Pye, K., 2001)



Results Summary PSA Size Class & Statistics

| | | | | | | ı | | | | 1 | | | |
|--------------------|--------------------|-----------|----------|--------------|------------|---------------|------------|---------------|-----------------|-----------------|---------------|------------|------------|
| | Custo | mer Sam | ple No | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
| | Cus | tomer Sar | mple ID | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | RPS Sar | nple No | 398234 | 398235 | 398236 | 398237 | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | | |
| | | Sample L | ocation. | | | | | | | | | | |
| | S | Sample De | pth (m) | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | | Samplii | ng Date | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | | Samplir | ng Time | | | | | | | | | | |
| Sediment | mm | phi ø | Units | | | | | | | | | | |
| Very coarse gravel | >32<64 | <-5>-6 | % | 11.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Coarse gravel | >16<32 | <-4>-5 | % | 32.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.00 | 0.00 | 0.00 |
| Medium gravel | >8<16 | <-3>-4 | % | 21.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.83 | 0.00 | 0.00 |
| Fine gravel | >4<8 | <-2>-3 | % | 7.35 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.48 | 1.53 | 0.00 | 0.00 |
| Very fine gravel | >2<4 | <-1>-2 | % | 3.12 | 0.00 | 0.03 | 0.00 | 0.15 | 0.00 | 2.18 | 0.71 | 0.00 | 0.00 |
| Very coarse sand | >1<2 | <0>-1 | % | 1.74 | 0.00 | 0.05 | 0.00 | 0.06 | 0.00 | 2.12 | 0.65 | 0.00 | 0.00 |
| Coarse sand | >0.5<1 | <1>0 | % | 4.65 | 1.90 | 8.97 | 6.26 | 9.65 | 5.19 | 12.40 | 9.74 | 9.23 | 8.98 |
| Medium sand | >0.25<0.5 | <2>1 | % | 12.50 | 8.44 | 38.60 | 20.50 | 43.00 | 19.80 | 55.70 | 49.30 | 61.50 | 44.40 |
| Fine sand | >0.125<0.25 | <3>2 | % | 4.08 | 26.40 | 37.10 | 21.70 | 31.20 | 24.40 | 20.10 | 14.50 | 26.50 | 31.90 |
| Very fine sand | >0.0625<0.125 | <4>3 | % | 0.22 | 18.10 | 5.21 | 8.88 | 4.43 | 12.40 | 1.02 | 0.25 | 0.52 | 4.88 |
| Very coarse silt | >0.03125<0.0625 | <5>4 | % | 0.31 | 14.40 | 2.94 | 14.60 | 3.09 | 13.30 | 1.93 | 0.38 | 0.69 | 4.00 |
| Coarse silt | >0.015625<0.03125 | <6>5 | % | 0.31 | 10.80 | 2.95 | 11.50 | 3.03 | 10.10 | 1.43 | 0.35 | 0.50 | 2.54 |
| Medium silt | >0.007813<0.015625 | <7>6 | % | 0.24 | 5.60 | 1.09 | 5.35 | 1.43 | 4.63 | 0.68 | 0.12 | 0.18 | 0.74 |
| Fine silt | >0.003906<0.007813 | <8>7 | % | 0.22 | 5.92 | 1.20 | 4.94 | 1.39 | 4.47 | 0.74 | 0.13 | 0.20 | 0.79 |
| Very fine silt | >0.001953<0.003906 | <9>8 | % | 0.15 | 4.00 | 0.83 | 3.06 | 0.92 | 2.71 | 0.52 | 0.13 | 0.18 | 0.67 |
| Clay | < 0.001953 | >9 | % | 0.25 | 4.45 | 1.11 | 3.23 | 1.25 | 2.95 | 0.75 | 0.35 | 0.51 | 1.13 |
| Statistics* | Mean (phi) | | | -2.48 | 4.19 | 2.08 | 3.60 | 2.02 | 3.50 | 1.62 | -0.337 | 1.71 | 2.02 |
| Statistics | Sorting | | | 2.62 | 2.24 | 1.18 | 2.28 | 1.26 | 2.15 | 1.02 | 2.68 | 0.588 | 1.12 |
| | Skewness | | | 0.603 | 0.394 | 0.267 | 0,345 | 0.340 | 0.378 | 0.200 | -0.739 | 0.012 | 0.309 |
| | Kurtosis | | | 0.866 | 1.01 | 1.94 | 0.928 | 2.03 | 0.989 | 1.98 | 1.87 | 1.04 | 1.84 |
| | % Silt/Clay | | % | 1.48 | 45.17 | 10.12 | 42.68 | 11.11 | 38.16 | 6.05 | 1.46 | 2.26 | 9.87 |
| | 70 Sing Siay | | | | | | | | 22.20 | 2.00 | 23.10 | | 2.37 |
| | Textural Group* | * | | Sandy Gravel | Muddy Sand | Gravelly Mudo | Muddy Sand | Gravelly Mudo | Muddy Sand | htly Gravelly S | Gravelly Sand | Sand | Sand |

^{*} Folk & Ward

^{**} GRADISTAT classification system (Blott, S. J. & Pye, K., 2001)



Results Summary PSA Wentworth Scale

| | | | 1 | | 1 | | 1 | 1 | | | | | , | |
|------------------|--------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|------------|------------|------------|
| Customer Samp | le No | BH1 ES1 | BH1 ES25 | BH1 E51 | BH2 ES1 | BH2 ES5 | BH2 ES11 | BH3 ES1 | BH3 ES25 | BH3 ES45 | BH4 ES1 | BH4 ES19 | BH4 ES40 | BH5 ES1 |
| Customer Sam | ple ID | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.50-11.00m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m |
| RPS Samp | ple No | 398220 | 398221 | 398222 | 398223 | 398224 | 398225 | 398226 | 398227 | 398228 | 398229 | 398230 | 398231 | 398232 |
| Sample | Type | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| Sample Lo | | | | | | | | | | | | | | |
| | | 0.00-0.50m | 6.00-6.50m | 12.5-13.0m | 0.00-0.50m | 1.00-1.50m | 2.50-3.00m | 0.00-0.50m | 5.50-6.00m | 10.5-11.0m | 0.00-0.50m | 4.50-5.00m | 9.50-10.0m | 0.00-0.50m |
| | | 04/03/2019 | 04/03/2019 | 04/03/2019 | 02/03/2019 | 02/03/2019 | 02/03/2019 | 08/03/2019 | 08/03/2019 | 08/03/2019 | 11/03/2019 | 11/03/2019 | 11/03/2019 | 13/03/2019 |
| Sampling | J Time | | | | | | | | | | | | | |
| Parameter | Units | | | | | | | | | | | | | |
| Pebble | % | 0.00 | 22.76 | 0.41 | 0.00 | 0.01 | 0.00 | 0.59 | 0.02 | 2.61 | 17.91 | 51.42 | 77.30 | 0.00 |
| Granule | % | 0.21 | 0.98 | 0.36 | 0.00 | 0.05 | 0.00 | 0.46 | 0.20 | 2.53 | 5.94 | 0.62 | 6.59 | 0.00 |
| Very coarse sand | % | 0.40 | 0.83 | 0.43 | 0.09 | 0.10 | 0.00 | 0.28 | 1.89 | 3.26 | 3.44 | 0.49 | 3.40 | 0.00 |
| Coarse sand | % | 16.90 | 12.00 | 17.20 | 14.30 | 16.70 | 4.25 | 14.50 | 26.40 | 29.60 | 12.20 | 7.64 | 4.05 | 10.80 |
| Medium sand | % | 64.90 | 40.00 | 56.50 | 61.20 | 46.80 | 10.10 | 55.50 | 48.10 | 51.30 | 45.90 | 29.80 | 3.11 | 9.98 |
| Fine sand | % | 15.40 | 17.60 | 21.30 | 19.10 | 9.34 | 6.65 | 24.50 | 12.40 | 6.23 | 13.30 | 8.95 | 0.00 | 15.90 |
| Very fine sand | % | 0.25 | 1.30 | 1.61 | 0.64 | 0.68 | 11.50 | 1.44 | 1.18 | 1.64 | 0.27 | 0.21 | 0.00 | 18.00 |
| Silt Clay | % | 1.85 | 4.61 | 2.17 | 4.70 | 26.39 | 67.52 | 2.77 | 9.88 | 2.84 | 1.12 | 0.89 | 5.47 | 45.35 |
| Total | % | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 99.9 | 100.0 |



Results Summary PSA Wentworth Scale

| | | | | | | 1 | 1 | | | | 1 | |
|------------------|---------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | Customer Sample No | BH5 ES12 | BH5 ES22 | BH6 ES1 | BH6 ES5 | BH6 ES9 | BH7 ES1 | BH7 ES14 | BH7 ES27 | BH8 ES1 | BH8 ES11 | BH8 ES21 |
| | Customer Sample ID | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | RPS Sample No | 398233 | 398234 | 398235 | 398236 | 398237 | 398238 | 398239 | 398240 | 398241 | 398242 | 398243 |
| | Sample Type | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT |
| | Sample Location | | | | | | | | | | | |
| | Sample Depth (m) | 2.50-3.00m | 5.00-5.50m | 0.00-0.50m | 1.00-1.50m | 2.00-2.50m | 0.00-0.50m | 3.00-3.50m | 6.00-6.50m | 0.00-0.50m | 2.50-3.00m | 5.00-5.50m |
| | Sampling Date | 13/03/2019 | 13/03/2019 | 16/03/0320 | 16/03/2019 | 16/03/2019 | 07/03/2019 | 07/03/2019 | 07/03/2019 | 05/03/2019 | 05/03/2019 | 05/03/2019 |
| | Sampling Time | | | | | | | | | | | |
| Parameter | Units | | | | | | | | | | | |
| Pebble | % | 1.16 | 72.15 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.48 | 23.36 | 0.00 | 0.00 |
| Granule | % | 0.22 | 3.12 | 0.00 | 0.03 | 0.00 | 0.15 | 0.00 | 2.18 | 0.71 | 0.00 | 0.00 |
| Very coarse sand | % | 0.21 | 1.74 | 0.00 | 0.05 | 0.00 | 0.06 | 0.00 | 2.12 | 0.65 | 0.00 | 0.00 |
| Coarse sand | % | 16.20 | 4.65 | 1.90 | 8.97 | 6.26 | 9.65 | 5.19 | 12.40 | 9.74 | 9.23 | 8.98 |
| Medium sand | % | 51.30 | 12.50 | 8.44 | 38.60 | 20.50 | 43.00 | 19.80 | 55.70 | 49.30 | 61.50 | 44.40 |
| Fine sand | % | 17.00 | 4.08 | 26.40 | 37.10 | 21.70 | 31.20 | 24.40 | 20.10 | 14.50 | 26.50 | 31.90 |
| Very fine sand | % | 1.10 | 0.22 | 18.10 | 5.21 | 8.88 | 4.43 | 12.40 | 1.02 | 0.25 | 0.52 | 4.88 |
| Silt Clay | % | 12.79 | 1.48 | 45.17 | 10.12 | 42.68 | 11.11 | 38.16 | 6.05 | 1.46 | 2.26 | 9.87 |
| Total | % | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 |



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Report No.: 19-81762 Customer Reference: G191005U Customer Order No: 78367KB-WAL

Comments

| RPS Sample Number | Customer Number | Sample Comments |
|-------------------|-----------------|--|
| 398220 | BH1 ES1 | Visual Inspection: Colour: Light brown Texture: Sandy Odour: Sea Biota: none Anthropogenic Inputs: none |
| 398221 | BH1 ES25 | Visual Inspection: Colour: Light brown Texture: Sandy Odour: none Biota: none Anthropogenic Inputs: none |
| 398222 | BH1 E51 | Visual Inspection: Colour: Light brown Texture: Sandy Odour: Sea Biota: Rocks Anthropogenic Inputs: none |
| 398223 | BH2 ES1 | Visual Inspection: Colour: Dark brown/black Texture: Sandy Odour: Sea Biota: none Anthropogenic Inputs: none |
| 398224 | BH2 ES5 | Visual Inspection: Colour: Black Texture: Sandy Odour: none Biota: none Anthropogenic Inputs: none |
| 398225 | BH2 ES11 | Visual Inspection: Colour: Black Texture: Clay Odour: Sulphur Biota: none Anthropogenic Inputs: none |
| 398226 | BH3 ES1 | Visual Inspection: Colour: Grey Texture: Sand Odour: Sea Sweet Biota: none Anthropogenic Inputs: none |
| 398227 | BH3 ES25 | Visual Inspection: Colour: Brown Texture: Sand Odour: none Biota: none Anthropogenic Inputs: none |
| 398228 | BH3 ES45 | Visual Inspection: Colour: Light brown Texture: Sand Odour: Sweet Biota: none Anthropogenic Inputs: none |
| 398229 | BH4 ES1 | Visual Inspection: Colour: Brown Texture: Sandy/Rocky Odour: Sea Biota: Rocks Anthropogenic Inputs: none |



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Report No.: 19-81762 Customer Reference: G191005U Customer Order No: 78367KB-WAL

Comments

| RPS Sample Number | Customer Number | Sample Comments |
|-------------------|-----------------|--|
| 398230 | BH4 ES19 | Visual Inspection: Colour: Brown Texture: Clay/Rocky Odour: none Biota: Rocks Anthropogenic Inputs: none |
| 398231 | BH4 ES40 | Visual Inspection: Colour: Black Texture: Sandy/Rocky Odour: none Biota: Rocks Anthropogenic Inputs: none |
| 398232 | BH5 ES1 | Visual Inspection: Colour: Black Texture: Sludge Odour: Fish Biota: none Anthropogenic Inputs: none |
| 398233 | BH5 ES12 | Visual Inspection: Colour: Black Texture: Sand Odour: none Biota: none Anthropogenic Inputs: none |
| 398234 | BH5 ES22 | Visual Inspection: Colour: Brown Texture: Sandy rock Odour: none Biota: Rock Anthropogenic Inputs: none |
| 398235 | BH6 ES1 | Visual Inspection: Colour: Black Texture: Sludge/Sandy Odour: Light Sulphur Biota: none Anthropogenic Inputs: none |
| 398236 | BH6 ES5 | Visual Inspection: Colour: Black Texture: Sandy Odour: none Biota: none Anthropogenic Inputs: none |
| 398237 | BH6 ES9 | Visual Inspection: Colour: Brown/Black Texture: Sludge/Sandy Odour: Sulphur Biota: none Anthropogenic Inputs: none |
| 398238 | BH7 ES1 | Visual Inspection: Colour: Brown/grey Texture: Sandy Odour: Sweet Biota: none Anthropogenic Inputs: none |
| 398239 | BH7 ES14 | Visual Inspection: Colour: Brown Texture: Clay/Sandy Odour: Sulphur Biota: none Anthropogenic Inputs: none |



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Report No.: 19-81762 Customer Reference: G191005U Customer Order No: 78367KB-WAL

Comments

| RPS Sample Number | Customer Number | Sample Comments |
|-------------------|-----------------|---|
| 398240 | BH7 ES27 | Visual Inspection: Colour: Brown Texture: Sandy Odour: none Biota: Shell Anthropogenic Inputs: none |
| 398241 | BH8 ES1 | Visual Inspection: Colour: Brown Texture: Sandy Odour: Sea Biota: Shell/Rock Anthropogenic Inputs: none |
| 398242 | BH8 ES11 | Visual Inspection: Colour: Brown Texture: Sandy Odour: none Biota: none Anthropogenic Inputs: none |
| 398243 | BH8 ES21 | Visual Inspection: Colour: Dark brown Texture: Clay/Sandy Odour: Sulphur Biota: none Anthropogenic Inputs: none |



398243

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BH8 ES21

Deviating Samples

 Report No.:
 19-81762

 Customer Reference:
 G191005U

 Customer Order No:
 78367KB-WAL

Our policy on Deviating Samples and reference list of Holding Times applied can be supplied on request. These have been implemented in accordance with UKAS Policy on Deviating Samples (TPS63).

RPS is not responsible for the integrity of samples as received, unless RPS personnel performed the sampling, and it is possible that samples submitted may be declared to be deviating.

Where applicable the analysis method remains UKAS accredited, however results reported for a deviating sample may be invalid. The reason for a sample being declared to be deviating is indicated below.

Where no sampling date was supplied, samples have been declared to be deviating. However, if a date of sampling can be supplied, the results may be reissued with the deviating sample status removed. Where the sample container used was unsuitable, the appropriate Holding Time was exceeded, or the sample is flagged as deviating for some other reason, re-sampling/re-submisson may be required.

05/03/2019

| RPS No. | Customer No. | Customer ID | Date Sampled | Containers Received | Deviating Sample | Reason for Sample Deviation |
|---------|--------------|-------------|--------------|----------------------------|------------------|-----------------------------|
| 398220 | BH1 ES1 | | 04/03/2019 | plastic & metal containers | No | • |
| 398221 | BH1 ES25 | | 04/03/2019 | plastic & metal containers | No | |
| 398222 | BH1 E51 | | 04/03/2019 | plastic & metal containers | No | |
| 398223 | BH2 ES1 | | 02/03/2019 | plastic & metal containers | No | |
| 398224 | BH2 ES5 | | 02/03/2019 | plastic & metal containers | No | |
| 398225 | BH2 ES11 | | 02/03/2019 | plastic & metal containers | No | |
| 398226 | BH3 ES1 | | 08/03/2019 | plastic & metal containers | No | |
| 398227 | BH3 ES25 | | 08/03/2019 | plastic & metal containers | No | |
| 398228 | BH3 ES45 | | 08/03/2019 | plastic & metal containers | No | |
| 398229 | BH4 ES1 | | 11/03/2019 | plastic & metal containers | No | |
| 398230 | BH4 ES19 | | 11/03/2019 | plastic & metal containers | No | |
| 398231 | BH4 ES40 | | 11/03/2019 | plastic & metal containers | No | |
| 398232 | BH5 ES1 | | 13/03/2019 | plastic & metal containers | No | |
| 398233 | BH5 ES12 | | 13/03/2019 | plastic & metal containers | No | |
| 398234 | BH5 ES22 | | 13/03/2019 | plastic & metal containers | No | |
| 398235 | BH6 ES1 | | 16/03/320 | plastic & metal containers | No | |
| 398236 | BH6 ES5 | | 16/03/2019 | plastic & metal containers | No | |
| 398237 | BH6 ES9 | | 16/03/2019 | plastic & metal containers | No | |
| 398238 | BH7 ES1 | | 07/03/2019 | plastic & metal containers | No | |
| 398239 | BH7 ES14 | | 07/03/2019 | plastic & metal containers | No | • |
| 398240 | BH7 ES27 | | 07/03/2019 | plastic & metal containers | No | • |
| 398241 | BH8 ES1 | | 05/03/2019 | plastic & metal containers | No | |
| 398242 | BH8 ES11 | | 05/03/2019 | plastic & metal containers | No | • |
| | | | | 1 | | |

plastic & metal containers



2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Report Information

| Kov to Donort Codo | | |
|--------------------|--------------|-----|
| | to Report Co | 291 |

U UKAS Accredited
F UKAS Flexible Scope
M MCERTS Accredited
N Not Accredited

O Marine Management Organisation (MMO) Validated

S Subcontracted to approved laboratory

US Subcontracted to approved laboratory UKAS Accredited for the test

MS Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test

SI Subcontracted to internal RPS Group Laboratory

USI Subcontracted to internal RPS Group Laboratory UKAS Accredited for the test

MSI Subcontracted to internal RPS Group Laboratory MCERTS/UKAS Accredited for the test

I/S (in results)
U/S (in results)
U/S (in results)
S/C (in results)
ND (in results)
Insufficient Sample
Unsuitable Sample
See Comments
Not Detected

DW (in units) Results are expressed on a dry weight basis

Sample Retention and Disposal

Samples will generally* be retained for the following times prior to disposal:

Perishables, e.g. foodstuffs 1 month (if frozen) from the issue date of this report

Waters 2 weeks from the issue date of this report
Other Liquids 1 months from the issue date of this report
Solids (including Soils) 1 months from the issue date of this report

Analytical Methods

PAH's and PCB's GCMS analysis following extraction of the wet sediment with DCM:acetone by ASE 350

extraction. Extract cleaned-up with silica and activated copper.

Metals ICP-MS analysis following microwave assisted digestion in hydrofluoric acid of the dried

(<30°C) and ground sediment.

TOC Combustion and infrared analysis following carbonate removal with hydrochloric acid.

PSA Wet and dry sieving followed by laser diffraction analysis.

Density Determination of density from the dry sediment by gravimetric analysis of a known

volume of sediment.

Dry solids at 105°C A portion of the wet sediment is dried at 105°C to constant weight.

TBT and DBT GCMS analysis following the extraction of the wet sediment and subsequent

derivatisation.

Please note: All testing carried out using the <2mm fraction

Laboratories

RPS Letchworth UKAS Accreditation Laboratory No. 1663 RPS Manchester (Metals only) UKAS Accreditation Laboratory No. 0605

Ocean Ecology PSA only NMBAQC

RPS Letchworth and Manchester Laboratories participate in the QUASIMEME Proficiency Testing Scheme

^{*}Sample retention may be subject to agreement with the customer for particular projects

GLOBAL ENERGY NIGG LIMITED EAST QUAY DEVELOPMENT - MARINE GROUND INVESTIGATION



G. SURVEY

Mean Position Reports

18 Pages

STARFIX

MEAN POSITION REPORT



| Project ID | C1982 | | | | | | |
|--------------|---|----------|----------|--|--|--|--|
| Project Name | 192186 Nigg East Quay Development | | | | | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg | | | | |
| Client | Fugro Geoservices Ltd | Vessel | Skate 3A | | | | |
| Comment | DTM = 5.50m, DTW = 3.40m Deck Height Above CD = 6.35m | | | | | | |

Session Name: C1982 BH01 Records Used: 294 of 301
Start Time: 04 Mar 2019, 00:03:01+00:00 End Time: 04 Mar 2019, 00:08:02+00:00 Session Length: 00:05:01

| | Mean Position for Skate 3A CommonRefere | encePoint |
|-----------|--|-------------------|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) |
| Latitude | 57°41'40.35536"N | 57°41'39.30291"N |
| Longitude | 004°01'25.47428"W | 004°01'30.48544"W |
| Height | 57.109m Ell. | 57.109m Ell. |
| Easting | 279,383.704m E(SD: ±0.01m) | |
| Northing | 868,963.576m N(SD: ±0.01m) | |
| Height | 4.295m Ort. (SD: ±0.02m Ort.) | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 50.00°T 51.71°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| | | |
| Depth (Manual) | 0.0m | N/A |

DTM = 5.50m, DTW = 3.40m Deck Height Above CD = 6.35m

| Mean Position to Waypoint | | |
|---------------------------|----------------|--|
| Waypoint | BH12 | |
| Easting | 279,384.000m E | |
| Northing | 868,964.000m N | |
| Range | 0.52m Geodetic | |
| Bearing TO | 33.18°True | |
| Bearing FROM | 213.18°True | |

Jimmy Wilson

Party Chief

FGSL (Fugro GeoServices Ltd UK)

Theo Cleave
Party Chief

Fugro Geoservices Ltd



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | C | 1982 | | Vessel | Skate 3 | BA | | Date | Saturday 02-Mar-19 |
|----------|-----------------|--------------|--------------|--------------------------|------------------|---|---|--|--|--|--|
| То | ANeillings@a | rch-hendersc | n.co.uk | | | Attn. A | dy Neillings | | No./email | 0141 227 30 | 60 |
| СС | mshuttlewort | th@arch-hen | derson.co.uk | | | Attn. M | ichael Shuttleworth | | No./email | Redac | 4 |
| СС | stuart.innes@ | | | | | | uart Innes | | No./email | Neuac | l . |
| CC | 122.2.111103(6 | | _ | | | Attn. | | | No./email | ed | |
| CC | m.chappell@t | fugro com | | | | | athew Chappell - Nearsho | ore Manager | No./email | 00 | |
| | | | | | | | | | | | |
| cc | n.armstrong@ | | | | | | cholas Armstrong - Rep | | | | |
| СС | g.crisp@fugro | | | | | Attn. G | en Crisp - Project Mana | ager | No./email | <u> </u> | |
| Ol | oserved Weath | | | ind | Sv | vell (Hs) | Sea State | V | isibility | | Weather Forecast |
| | Time 00:00 | S | peed Knts | Dir | | | | | | | |
| | 00:00 | | 5 | SW | | N/A | smooth | | good | | |
| | 06:00 | | 10 | SW | | N/A | smooth | | good | | See Below |
| | 12:00 | | 8 | S | | N/A | smooth | | good | | |
| | 18:00 | | 20 | S | | N/A | smooth | | good | | |
| | 00:00 | | 31 | SSW | | N/A | smooth | | good | | |
| | | | | etration (m) | • | | | | | | |
| | | | | | | • | | | | Operation | onal Status |
| | BH no. | | 1 | 2 | 3 | 4 | | | | | |
| | BH02 | | 3.3 | 1.9 | 2.6 | 1.3 | | | | | |
| | | | + | | | | | | | | |
| | | | | | | | | Jacked in | Moray Firt | h awaiting tide/v | veather for towage to Nigg Energy Park |
| | | | | | - | | 7 | | | | |
| | | | | | | | | D-1111 | 100 | | |
| | | | | | | summary of | Operations / Borehole | rilling - l | ast 24hrs: | | |
| | From | То | | irs (No.) | Code | | | | | Descriptio | |
| | 00:00 | 05:4 | 5 | 5.75 | Single Shift Sta | andby Jacke | d in Moray Firth / Awaiti | ing towage | to Nigg Ene | rgy Park at high v | vater slack. |
| | 05:45 | 06:30 | 0 | 0.75 | Crew Change / | TBT Daysh | ift Trasfer to JUB from | Inverness N | //arina / TBT | on Towing Opera | ations |
| | 06:30 | 07:20 | | 0.83 | Moving & Jac | | lown and move NE into | | | | |
| | 07:20 | 08:00 | | 0.67 | Moving & Jac | | | | | | e and towing bridle connected and secured |
| | 08:00 | 11:3 | | 3.58 | Moving & Jac | | | | | | Arrival at Nigg Energy Park / Lower legs and disconnect tow. |
| | 11:35 | 12:10 | | 0.58 | Moving & Jac | | JUB alongside Berth 3 | | | | |
| | 12:10 | 15:40 | | 3.50 | Mobilisatio | | | | | | s, consumables / General R&M on deck. |
| | 15:40 | 17:2 | | 1.75 | Moving & Jac | | lown and move to BH02 | | | | |
| | | | | | | | | | | | |
| | 17:25 | 19:1 | | 1.83 | Cable Percus | | | | | | =14.10m / High winds observed, continue to monitor |
| | 19:15 | 20:00 | | | Crew Change / | | | | | Nightshift transfe | r to JUB / TBT on Rig Abandonment Drill |
| | 20:00 | 23:30 | | 3.50 | Cable Percus | | ence CP drilling from 0 | | | | |
| | 23:30 | 00:00 |) | 0.50 | Moving & Jac | king Jack ι | p another 1.50m as wir | nd continue: | s to increase | >30kts and swel | I >1.00m. |
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| | | | | | | | Weather forecas | | | | |
| | | | | | Sat 02-N | | | 3-Mar-2019 | | | |
| | | | - | Wind Dim | 06 0 SW V | | 5 18 21 00 SE SW SSW SSW | 03 06 SSW SSV | 09 12 V SW SV | 15 18 V SW SSW 14 10 20 14 19 14 27 21 21 15 30 22 9.0 99.0 99.0 | |
| | | | | 10m Wnd Spd 10m Gust | 6 5 | 4 8 6 1 | SE SW SSW SSW 5 12 17 2 7 17 24 | 22 18 | 16 16 | V SW SSW 14 10 20 14 19 14 27 20 21 15 | |
| | | | | 10m Gust 50m Wnd Spd | 8 7 | 5 1 | 7 17 24 | 31 25 | 22 23 | 20 14 | |
| | | | | 50m Gust | 8 6 | 7 1 | 9 18 21 12 25 30 | 39 35 | 31 32 | 27 20 | |
| | | | | 100m Wnd Spd | 18: 7 | 5 1 | 9 20 23 | 30 27 | 24 25 | 21 15 | |
| | | | | 100m Gust Sig Wav Hgt | -99.0 - | 0 8 1 99.0 -99.0 -9 99.0 -99.0 -5 | 7 17 24 3 9 18 21 3 12 25 30 9 20 23 9 13 27 32 9 0 -99 0 -99 0 -99 0 9 0 -99 0 -99 0 -99 0 | SSW SSV 22 18 31 25 28 25 39 35 30 27 42 38 -99.0 -99.0 | V SW SV 16 16 16 22 23 22 23 31 32 24 25 34 34 0 -99.0 -99 0 -99.0 -99 | 30 22 9.0 -99.0 -99.0 | |
| | | | | Max Way Hgt | -99.0 - | 99.0 -99.0 -9 | 9.0 -99.0 -99.0 1-99.0 | | | | |
| | | | | Sig Wav Prd Swell Dim | N/A N | 99 -99 -9 I/A N/A N | A N/A N/A N/A | -99 -99 N/A N/A | N/A N/A | 9 -99 -99 A N/A N/A | |
| | | | - 11 | Swell Hgt Swell Prd | -99.0 - | 99.0 -99.0 -9 | 9.0 -99.0 -99.0 -99.0 | -99.0 -99. -99 -99 | 99.0 -99 | | |
| Healti | h Safety & the | Environmo | nt I | owell PIU | 1-99 | oo 99 4 | 9 -99 -99 (-99 | -99 -99 | -99 -95 | , 99 99 | |
| . roarti | . Juicty & tile | | | | | | | | | | |
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| FGS | L Rep: Theo | Cleave | | | | | Clie | ent Rep: | | | |
| | - | | | | | | | • | | | |
| Sign | ed: | | | | | | Sign | ned: | | | |
| | | | | | | | 13.9 | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time Su | mmary | | Today | To Da | | Da | ay Shift | | Night | | Comp | any | Posi | tion |
|---|----------|-------|----------|-------|------|----------|-----------|------------|-------------|---------|-----------|-----------|-------------|-------------|
| Mobilisation | | | 0.00 | 0.00 | | | | | Onboard J | | | | | |
| Moving & Jacking | | | 0.00 | 0.00 | | | ny Wilso | | Joshua | | Fugro Geo | | Barger | |
| Rotary Drilling (Coring) | | | 0.00 | 0.00 | _ | | es Lawso | | Adam | | Fugro Geo | | Dril | |
| Cable Percussion | | | 0.00 | 0.00 | | | n Allardy | | Ashley L | owthian | Fugro Geo | | Assistar | |
| Standby (Fugro) | | | 0.00 | 0.00 | | Stı | uart Nye | | | | Fugro Geo | Services | Assistar | t Driller |
| Standby (Other) | | | 0.00 | 0.00 | | | | | | | | | | |
| Standby weather | | | 0.00 | 0.00 | | Rich | ard Luke | er | Bart | Kot | Fugi | то | Geotechnic | al Engineer |
| Single Shift Standby | | | 0.00 | 0.00 | | | | | | | | | | |
| Other Operations | | | 0.00 | 0.00 | | The | o Cleave | е | | | Fugro Geo | Services | Project E | Ingineer |
| Crew Change / TBT | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | Total Man | | | |
| | To | tal | 0.00 | 0.00 | | No F | Personn | el | 10 | , | Hours | | 120 | |
| | 10 | tai | 0.00 | 0.00 | | 140.1 | CISCIIII | | | • | Worked | | 120 | |
| | | | | | | | | | | | | | | |
| Project Program / Pr | | | rogramme | | | Today | | | ctual To Da | | H | % Progran | n Completed | |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 0 | | | |
| General Items, Provisional Services | Α | | 1 | | | | | | | | U | | | 400.0 |
| Establish all plant, equipment, crew on site | A2 | 1 | 1.0 | | | 1.0 | | 0 | 1 | 0.00 | | | | 100.0 |
| | | 1 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, equipment and crew | B11 C19 | | | R/O | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | 1 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory h | ole B1 | | 8.00 | | | 1 | | 0 | 1 | 0.00 | 12.5 | | | |
| Extra over B1 for setting up on a gradient >20 | | 1 | R/O | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | 1 | | R/O | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m de | | 80.00 | | | 3.00 | | | 3 | 0 | 0.00 | 3.8 | | | |
| As B4 but between 10m and 20m | B5 | 36.50 | | | 0.00 | | | | 0 | | 0.0 | | | |
| As B4 but between 20m and 30m | B6 | R/O | | | | | | 0 | | 0.00 | 0.0 | | | |
| | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | B7 | R/O | | D/0 | | | | 0 | 0 | 0.00 | | | | |
| Advance BH through hard stratum or obstructi | on B9 | _ | | R/O | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | С | | | | | | | | | | 0.0 | | | |
| Move rotary plant to site of each exploratory h | ole C15 | | 6.00 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| RC drilling between groundlevel and 10m dept | n C41 | R/O | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Core box to be retained by client | C49 | | 21.00 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| , | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | Е | | | | | | | - 0 | - 0 | 0.00 | 0.0 | | | |
| Small Disturbed Sample | E1 | | 59.00 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Bulk Disturbed Sample | E2 | 1 | 59.00 | | | | | | | | 0.0 | | | |
| | | - | | | | | | 0 | 0 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | | R/O | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | | 40 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | L | | | | | | | | | | 0.0 | | | |
| Marine Scotland Sample | L2 | | 121 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | 1 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | | | | | | 0.0 | | | |
| | | 1 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | 1 | 1 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | + | 1 | 1 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | + | | | | | | | | | 0.0 | | | |
| | | + | | | | | | 0 | 0 | 0.00 | | | | |
| 1114-0-0-6 | | _ | Tarini | | | | 1-4- | 0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Sur | imary | - | Today | | Act | ual To E | Jate | | | | Lost & D | amaged | | |
| Hoc Cards Safety Drills | | | 2 | | | 5 4 | | l | | | | | | |
| Tool Box Talks | | | 1 | | | 3 | | l | | | | | | |
| HSE Meetings | | | 1 | | | 1 | | l | | | | | | |
| Incidents/Near M | SS | | | | | 0 | | l | | | | | | |
| Environmental | | 1 | | | | 0 | | 1 | | | | | | |
| Hours Worked | | | 120 | | | 120 | | ĺ | | | | | | |
| | nments | | | | | | ent Repr | resentativ | e Commen | ts | | | | |
| Fugro GeoServices Representative Con | nments | | | | | Clie | ent Repr | resentativ | e Commen | ts | | | | |
| 1 | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | Cli | ent Re | p: | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | | | p: | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | | ent Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | C19 | 82 | | Ves | sel | Skate 3A | | Date Sunday 03-Mar-19 |
|--------|-----------------------|-----------------|---------------|--|---|--|---|---|---|--|
| То | ANeillings@arch-he | enderson co uk | | | | Attn. | Andy Nei | lings | No./email | 0141 227 3060 |
| CC | mshuttleworth@ar | | | | | Attn. | - | huttleworth | No./email | |
| | | | CO.UK | | | | | | | Redact |
| CC | stuart.innes@gegro | oup.com | | | | Attn. | Stuart In | nes | No./email | Redact |
| CC | | | | | | Attn. | | | No./email | |
| CC | m.chappell@fugro. | .com | | | | Attn. | Mathew | Chappell - Nearshore Manag | ger No./email | |
| СС | n.armstrong@fugro | | | | | Attn. | Nicholas | Armstrong - Reporting M | lana No./email | Dodost |
| CC | g.crisp@fugro.com | | | | | Attn. | | sp - Project Manager | No./email | Redact |
| | bserved Weather | - | Wind | 1 | | r | | | 1 | L-Redact |
| | | | | | Sw | ell (Hs) | | Sea State | Visibility | Weather Forecast |
| | Time 00:00 | Speed I | Knts | Dir | | | | | | |
| | 00:00 | 28 | | S | | N/A | | Slight | Poor | |
| | 06:00 | 34 | | SW | | N/A | | Slight/Moderate | Very Poor | See Below |
| | 12:00 | 35 | | SW | | N/A | | Slight/Moderate | Very Poor | |
| | 18:00 | 21 | | SSW | | N/A | | Slight | moderate | |
| | 00:00 | 10 | | SW | | N/A | _ | Smooth | | |
| | 00.00 | | | | | IVA | | SIIIOOUI | good | |
| | | | Leg Penetra | ation (m) | | | | | | 0 |
| | BH no. | | 1 | 2 | 3 | 4 | 1 | | | Operational Status |
| | | | | | | | | | | |
| | BH02 | | 3.3 | 1.9 | 2.6 | 1.3 | .3 | | | |
| | BH01 | | 1.0 | 1.0 | 2.2 | 3. | 4 | | | Jacked up on BH02. |
| | ВПОТ | | 1.0 | 1.0 | 2.2 | э. | . ! | | | Cable percussion drilling underway. |
| | | | | | | 1 | 7 | | | • |
| | | | | | | | | | 1 | |
| | | | | | S | ummary o | of Operati | ons / Borehole Drilling | - last 24hrs: | |
| | From | То | Hrs | (No.) | Code | | | | | Description |
| | 00:00 | 02:15 | | .25 | Cable Percuss | ion Cor | ntinue CP | from 3.00m to 6.00m RM | /L / Secure de | ck against gale force winds / |
| | 02:15 | 03:00 | | .75 | Other Operation | | | | | |
| | | | | | | | | | | ncrease / Secure RHIB and measure wind speed / >35kts |
| | 03:00 | 05:00 | | .00 | Standby weath | | | | | periodically confirm conditions from shore. |
| | 05:00 | 07:30 | | .50 | Standby weath | ner Cor | nditions st | ill in excess of operationa | al limits / RHIB | checked at low water / wind >30kts, swell >1m |
| | 07:30 | 08:00 | 0 | .50 | Crew Change / | TBT E.C | D.S / Night | shift handover at accome | odation / TBT o | n Operational Limitations and Emergency Drills |
| | 08:00 | 14:00 | | .00 | Standby weath | | | | | nemeter / Wind dropping after 1200 / Transit to CTV Quay |
| | 14:00 | 14:30 | | .50 | Other Operation | | | sfer to JUB / Prepare drill | | ., , |
| | | | | | | | | | | |
| | 14:30 | 18:30 | | .00 | Cable Percuss | | | | | 18.50mCD / Rockhead encountered. |
| | 18:30 | 19:15 | 0 | .75 | Other Operation | | | | | & RHIB / Begin pulling all casing to deck. |
| | 19:15 | 20:00 | 0 | .75 | Crew Change / ' | TBT Day | yshift tran | sfer to shore / Handover | on CTV Quay / | Nightshift transfer to JUB / TBT on Lifting Operations |
| | 20:00 | 22:00 | 2 | .00 | Standby (Tide | e) Wa | aiting on ti | de to move to BH01 / Pre | pare JUB for m | ove / Jack down and pull legs |
| | 22:00 | 23:45 | | .75 | Moving & Jack | | | H02 to BH01 / Preload ar | • | |
| | 23:45 | 00:00 | | .25 | Cable Percuss | | | to mudline and prepare | | |
| | 23.43 | 00.00 | U | .20 | Cable Felcuss | ion Rui | II III Casiii | to mudime and prepare | deck for CF of | S / DTM-5.30III |
| | | | | | | | | | | |
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| | | | | | | | ٧ | Veather forecast | | |
| | | | | Local time | 0.00 7 | 00 2.00 3.00 | 400 500 6 | 00 7:00 2:00 9:00 10:00 11:00 12:00 | 13.00 14.00 15.00 16.0 | 0 17:40 48.00 19:00 20:00 21:00 22:40 23:00 |
| | | | | Wind direction | | | | | | SW SW SW SW SW SW |
| | | | | Wind speed (I | 30 3 | 29 29 26 | 28 27 | 25 26 26 26 27 | 24 24 | 16 14 13 13 12 12 14 |
| | | | | | | | | 2 | 20 10 | 16 14 13 13 12 12 14 |
| | | | | | | | - | | | |
| | | | | Wind gusts (n Cloud cover | 47 | 4 | 6 44 | | H H 20 | |
| | | | | Precipitation ty | 99 | 0 0 0 | 0 0 | 00000 | | |
| | | | | Precipitation (| mm/h) 52 6 | 2 61 61 | 61 61 6 | 0 0 0 0 0 1 07 02 02 81 83 | 0.1 | |
| | | | | | | | | | | |
| | | | | Air temperatur | e (°C) | | | the second second second | | |
| | | | | Feels like (°C | e (°C) | 1 1 1 | 2 2 | 2 2 2 3 2 3 | 3 3 3 3 | 2 2 4 1 1 1 1 |
| | | | | | e (°C) (8) (8) (8) (8) (8) (8) (8) (8) (8) (8 | 82 81 82 | 75 77 8 | 3 83 81 79 78 82 79 | 86 75 78 80 | 2 2 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| | | | | Feels like (°C) Relative humin | e (°C) | 82 81 82 75 874 974 | 975 976 93 | 3 83 81 79 78 82 79 6 876 977 978 978 879 979 | 86 75 75 80 979 979 968 980 | 01 85 86 19 88 86 87 979 979 978 978 978 978 977 |
| | | | | Feels like (°C) Relative humin Air pressure (| e (°C) 1) 19 (%) 85 (1) 1976 9 | 82 81 82 75 874 974 | 975 975 91 975 976 91 34 30 | 3 83 81 79 78 82 79 8 876 977 978 978 979 979 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 96 75 75 80 975 979 988 980 3 10 30 | 81 85 86 89 88 86 87 979 978 978 978 978 978 977 17 64 22 81 |
| | | | | Feels like (*C) Relative humi Air pressure (Tide type | e (°C) 1) 19 (%) 85 (1) 1976 9 | 82 81 82 75 874 974 | 975 975 91 975 976 91 34 30 | 3 83 81 79 78 82 79 8 876 977 978 978 979 979 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 96 75 75 80 975 979 988 980 3 10 30 | et 66 66 89 88 66 87 979 976 679 872 978 978 977 28 8 8 8 8 7 7 7 |
| lealti | h Safety & the Envi | ironment | | Feels like (*C) Relative humi Air pressure (Tide type | e (°C) 1) 19 (%) 85 (1) 1976 9 | 82 81 82 75 874 974 | 975 975 91 975 976 91 34 30 | 3 83 81 79 78 82 79 8 876 977 978 978 979 979 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 96 75 75 80 975 979 988 980 3 10 30 | 81 85 86 89 88 86 87 979 978 978 978 978 978 977 17 64 22 81 |
| | - | | gency limits. | Feets like ("C Relative humi Air pressure (Tide type Time Tide height (n | e (°C) | 82 81 82 75 874 974 3 3 8 (4 2 18 | 78 77 4 975 976 93 330 17 13 2 | 3 83 81 79 78 82 79 8 876 977 978 978 979 979 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 86 75 78 80 979 979 988 980 × × 5 3 28 2 1.7 1.5 | at 86 .06 19 .98 30 80 87 979 978 979 978 978 978 977 26 A A A A A A A 251 1.4 18 .27 28 .33 .36 .38 |
| Vinds | s in excess of operat | tional and emer | gency limits. | Feets like ("C Relative humi Air pressure (Tide type Time Tide height (n | e (°C) | 82 81 82 75 874 974 3 3 8 (4 2 18 | 78 77 4 975 976 93 330 17 13 2 | 3 83 81 79 76 82 79 8 876 977 978 976 879 879 879 8 8 70 879 978 879 879 8 8 70 879 978 978 978 9 27 32 36 38 36 32 er and updated forecasts | 85 75 75 80 979 979 988 980 25 2 1.7 15 | at 86, 86, 99, 98, 86, 87 291 578 979 578 378 378 378 977. 26 A A A A A A A 26 1764 18, 27 28, 33, 36, 38 |
| Vinds | - | tional and emer | gency limits. | Feets like ("C Relative humi Air pressure (Tide type Time Tide height (n | e (°C) | 82 81 82 75 874 974 3 3 8 (4 2 18 | 78 77 4 975 976 93 330 17 13 2 | 3 83 81 79 78 82 79 6 876 977 978 978 979 979 6 2 7 2 7 2 2 3 10,00 1 27 32 35 38 35 32 | 85 75 75 80 979 979 988 980 25 2 1.7 15 | 41 86 85 95 98 86 87 297 978 979 978 978 978 977 28 4 月 月 月 月 月 月 7764 13 27 28 33 36 38 |
| Vinds | s in excess of operat | tional and emer | gency limits. | Feets like ("C Relative humi Air pressure (Tide type Time Tide height (n | e (°C) | 82 81 82 75 874 974 3 3 8 (4 2 18 | 78 77 4 975 976 93 330 17 13 2 | 3 83 81 79 76 82 79 8 876 977 978 976 879 879 879 8 8 70 879 978 879 879 8 8 70 879 978 978 978 9 27 32 36 38 36 32 er and updated forecasts | 85 75 75 80 979 979 988 980 25 2 1.7 15 | 81 86 85 95 98 86 87 291 593 979 978 978 978 978 977 26 A A A A A A A 25 774 18 25 26 33 36 38 |



Daily Report No.

02

| Activity Time Su | ımmary | | T | oday | To Da | ite | D | ay Shift | | Night | Shift | Com | pany | Posi | ition |
|---|---------|----------|-------|----------------|---------------|----------|--------------|-----------|------------|-------------|------------|------------|-----------|------------|-------------|
| Mobilisation | | | | 0.00 | 3.50 | | | | | | JUB (mobil | | | | |
| Moving & Jacking | | • | _ | 1.75 | 9.67 | _ | | my Wilso | | Joshua | | Fugro Geo | | Barger | |
| Rotary Drilling (Coring) | | | | 0.00 | 0.00 | _ | | es Lawso | | Adam | | Fugro Geo | | Dri | |
| Cable Percussion | | | | 3.50 | 11.83 | | | m Allardy | rce | Ashley L | owthian | Fugro Geo | | Assistar | |
| Standby (Fugro) | | | | 0.00 | 0.00 | | St | uart Nye | | | | Fugro Geo | Services | Assistar | nt Driller |
| Standby (Tide) Standby weather | | | | 2.00 | 2.00 | | Dick | nard Luke | NF. | Bart | Kot | E | ro | Gastash:- | al Engineer |
| Standby weather Single Shift Standby | | | | 0.50 | 10.50 5.75 | | Ricr | nard Luke | er | вап | Kot | Fug | ro | Geotechnic | ai Engineer |
| Other Operations | | | | 2.00 | 2.00 | | The | eo Cleave | 9 | | | Fugro Geo | Services | Project E | Engineer |
| Crew Change / TBT | | | _ | 1.25 | 2.75 | _ | | | | | | . 19.0 00 | | , 10,001 1 | J |
| j j | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | (| 0.00 | 0.00 |) | | | | | | | | | |
| | | | _ | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | (| 0.00 | 0.00 | <u> </u> | | | | | | Total Man | | | |
| | | Tota | 1 2 | 4.00 | 24.0 | 0 | No. I | Personn | el | 1 | 0 | Hours | | 120 | |
| | | | | | | | | | | | | Worked | 41- | | |
| Project Program / Project Program / Project Program / Project Program / Project Program / Project Project Project Program / Project Project Program / Project Project Program / Project Project Program / Project | rogress | BoQ Item | m. | grammed No. | Hours | m. | Today No. | Hours | m. | ctual To Da | Hours | ł | % Program | Completed | |
| General Items, Provisional Services | | A | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | | | | 0 | 1 | 0.00 | | | | 100.0 |
| , , , , , , | | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | | B11 C19 | | | R/O | | | 10.50 | 0 | 0 | 10.50 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | | | R/O | | | 2.00 | 0 | 0 | 2.00 | 0.0 | | | |
| | | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory hol | le | B1 | | 8.00 | | | 1 | | 0 | 2 | 0.00 | | 25.0 | | |
| Extra over B1 for setting up on a gradient >20% | | B2 | | R/O | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | | B3 | | | R/O | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | th | B4 | 80.00 | | | 6.40 | | | 9 | 0 | 0.00 | 11.8 | | | |
| As B4 but between 10m and 20m | | B5 | 36.50 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | | В7 | R/O | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | n | B9 | | | R/O | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | | С | | | | | | | | | | 0.0 | | | |
| Move rotary plant to site of each exploratory hole | | C15 | | 6.00 | | | 1 | | 0 | 1 | 0.00 | 16 | / | | |
| RC drilling between groundlevel and 10m depth | | C41 | R/O | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | | C42 | 20.50 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | | Е | | | | | | | | | | 0.0 | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | | 19 | | 0 | 19 | 0.00 | | 32.2 | | |
| Bulk Disturbed Sample | | E2 | | 59.00 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Large Bulk disturbed sample | | E3 | | R/0 | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Incity Testing | | | | | — | | | \vdash | 0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | | H | | 40 | | | | | | 1 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Borehole | | H1 H2 | | 40 B/O | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/0 | | 1 | | | 0 | 0 | 0.00 | 0.0 | | | |
| Goognyironmontal Laboratory Tastin | | | | | | - | | | 0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing Marine Scotland Sample | | L2 | | 121 | | - | 8 | | _ | 0 | 0.00 | 0.0 6.6 | | | |
| манно эконани затире | | LZ | | 121 | | | 0 | | 0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | - | | | U | U | 0.00 | 0.0 | | | |
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| | -+ | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | -+ | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | -+ | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Sui | mmary | | | Today | | Act | tual To [| Date | | | | Lost & D | amaged | | |
| Hoc Cards | | | | 1 | | | 6 | | | | | | | | |
| Safety Drills | | | | 0 | | | 4 | | | | | | | | |
| Tool Box Talks | | | | 1 | | | 4 | | | | | | | | |
| HSE Meetings | | | | 0 | | | 1 | | | | | | | | |
| Incidents/Near M | | | | 0 | | | 0 | | | | | | | | |
| Environmenta Hours Worked | | | | 120 | | | 0 240 | | | | | | | | |
| Fugro GeoServices Representative Com | | | | 120 | | | | ent Repr | esentativa | e Commen | ts | | | | |
| | | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | | Cli | ent Re | p: | | | | | | |
| Signed: | | | | | | | Sic | gned: | | | | | | | |
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Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | | C1982 | | | Vessel | Skate 3A | | | Date | Monday 04-Mar-19 |
|--------|-----------------|---------------|-------------|----------|---------------------------------|-------------|---------------|---------------|---|-------------|-----------------|----------------------------|--------------------------------|
| То | ANeillings@ai | rch-hend | erson.co.uk | | | | Att | n. And | y Neillings | N | lo./email | 0141 227 30 | 60 |
| СС | mshuttlewort | | | o.uk | | | Att | | nael Shuttleworth | | lo./email | I | |
| cc | stuart.innes@ | | | | | | Att | | art Innes | | lo./email | Redac | |
| CC | Studi tillies(u | всвіоир | | | | | Att | | are million | | lo./email | Redac | T |
| | m shaII O | fuere | | | | | | | ham Channell March and the | | | I | |
| СС | m.chappell@1 | | | | | | Att | | hew Chappell - Nearshore Man | - | lo./email | 1 | |
| СС | n.armstrong@ | | <u>om</u> | | | | Att | | nolas Armstrong - Reporting | | lo./email | Redac | t l |
| СС | g.crisp@fugro | | | | | | Att | n. Gle | n Crisp - Project Manager | N | lo./email | Redac | |
| 0 | bserved Weatl | her | | | /ind | | Swell (| He) | Sea State | Vie | ibility | | Weather Forecast |
| | Time 00:00 | | Speed K | nts | Dir | | | | Jea State | VIS | Jiiity | | Weather I Diecast |
| | 00:00 | | 10 | | SW | | N/A | | smooth | g | ood | | |
| | 06:00 | | 11 | | W | | N/A | | smooth | | ood | | See Below |
| | 12:00 | | 18 | | W | | N/A | | smooth | | ood | | |
| | 18:00 | -+ | 20 | | W | -+ | N/A | | smooth | | ood | | |
| | 00:00 | \rightarrow | 17 | | SW | | N/A | | | | | | |
| | 00:00 | | | | | | N/A | | smooth | g | ood | | |
| | | | ı | eg Pen | etration (m) | | | | | | | Onoroti | anal Status |
| | BH no. | | | 1 | 2 | 3 | | 4 | | | | Operati | onal Status |
| | | • | | | | | | | | | | | |
| | BH01 | | 1 | 1.0 | 1.0 | 2.2 | | 3.1 | | | | | |
| | | | | | | | | | | | | | up on BH01 |
| ⊢ | | | | | | | | | | | F | Ready to commer | nce CP from mudline |
| L | | | | | | | | | | | | | |
| | | | | | | | Sumi | nary of On | erations / Borehole Drilling | ı - last | 24hrs: | | |
| | Erom | | То | | Hro (No.) | | | , J. Jp | | , | | D | |
| | From | | То | | Hrs (No.) | | ode | | | | | Description | JII |
| | 00:00 | | 7:15 | <u> </u> | 7.25 | | ercussion | | nce CP drilling from 0.00m to | | | | |
| | 07:15 | | 08:00 | | 0.75 | | ange / TBT | | ft transfer to shore / Handove | | TV Quay | / Dayshift transfer | to JUB / TBT on Site Rules |
| | 08:00 | | 17:20 | | 9.33 | | ercussion | | e CP from 10.00m to 17.35n | n BML | | | |
| | 17:20 | 1 | 18:50 | | 1.50 | Rotary Dril | ling (Coring | g) Run in (| Geobor to depth / Flush hole | | | | |
| | 18:50 | | 19:15 | | 0.42 | | perations | | plant / Wash down and clear | deck fo | or E.O.S | | |
| | 19:15 | | 20:00 | | 0.75 | | ange / TBT | | transfer to shore / Handover | | | Nightshift transfer | to JUB / TBT on Site Rules |
| | 20:00 | | 00:00 | | 4.00 | Rotary Dril | | | | | | | mCD / CD 0.85m below mudline |
| | 20.00 | | 70.00 | | 4.00 | riolary Din | 9 (00 | 9) 001111110 | iss its arming item interest | 10 20.0 | | | nee / es e.com selem maaime |
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| | | 1 | | 1 | | | | | Westers | | | | |
| | | | | | | | | | Weather forecast | | | | |
| | | | | | Local time | | 0.00 1.00 | 200 300 400 | 500 800 700 800 900 1000 110 | 00 12:00 13 | 3.00 14.00 15.0 | 00 16:00 17:00 15:00 19:00 | 20.00 21.00 22.00 23.00 |
| | | | | | Wind direction | | SW SW V | AZM MEM MEM | Man wan wan wan wa wa | M. MSM. W | NOW MOW WO | W WSW WSW WSW SW | W W SW SW |
| | | | | | Wind speed (| MIS) | 12 | 11 12 14 | 16 16 13 15 17 18 20 | 21 | 21 20 20 | 20 16 10 17 | 15 19 15 19 |
| I | | | | | | | 14 9 | 11 12 14 | | | | | |
| | | | | | Wind gusts (r | nax kts) | 100 | 8 3 5 | | - 11 | EE 27 26 | 29 29 25 27 | 24 29 25 25 |
| | | | | | Cloud cover | | 0.0 | - 0 0 | 0000000 | | | | 4 4 6 5 |
| | | | | | Precipitation to | | | 81 | | | | 0.1 | M. |
| | | | | | Air temperatur | | 7 7 | 0 3 10 | 2 2 2 1 2 2 2 | 100 | rimin | 4 9 9 9 9 | |
| | | | | | Feets like (*C | | 1 2 | 1 1 1 | 0 0 0 0 7 1 1 | 1 | 2 2 2 | 1 1 0 0 | 7 7 7 1 |
| | | | | | Relative humi Air pressure (| | \$27° \$26. 1 | STT STE - 076 | 83 81 84 83 79 75 76 976 978 978 976 976 977 978 | 979 9 | 979 976 BM | 660 501 601 902 | 84 82 84 83 602 802 802 602 |
| | | | | | Tide type | | N N | 2 2 2 | S(0) UP 0/0 0/0 0/2 0/0 0/2 0/0 0/2 0/0 0/0 0/0 | - N | 3 3 3 | 3 3 34 3 | 2 7 2 79 |
| | | | | | Time | | | | 500 101 | 14 | | 17.35 | 23:30 |
| | | _ | | | Tide height (r | 1) | 35. 24 | 2.2 18 17 | 16 17 22 28 35 38 4 | 17 7 | 3.6 2.5 68 | 15 (2 12 14 | Z4 31 36 35 |
| Healti | h Safety & the | Environ | ment | | | | | | | | | | |
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| ECC | L Rep: Theo | Clear | | | | | | | Client De | n. | | | |
| 1.03 | ∟ nep. meo | , Cleave | • | | | | | | Client Re | η. | | | |
| ۵. | | | | | | | | | l | | | | |
| Sign | ea: | | | | | | | | Signed: | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | | | | | | | | | | | | | <u> </u> | | |
|---|---------|----------|-------|----------|----------|-------|-----------|------------|-------|------------|-----------|-----------|------------|--------------|------------|
| Activity Time S | ummary | | T | oday | To Da | ite | D | ay Shift | | Night | Shift | Con | npany | Position | on |
| Mobilisation | | | | 0.00 | 3.50 |) | | | | Onboard . | JUB (mobi | lisation) | | | |
| Moving & Jacking | | | | 0.00 | 9.67 | 7 | Jim | my Wilso | n | Joshua | | | eoServices | Bargema | aster |
| Rotary Drilling (Coring) | | | _ | 5.50 | 5.50 | | | es Lawso | | Adam | | | eoServices | Drille | |
| Cable Percussion | | | | 16.58 | 28.4 | | | m Allardy | | Ashley L | | | eoServices | Assistant | |
| Standby (Fugro) | | | _ | 0.00 | 0.00 | | | uart Nye | | , - | | _ | eoServices | Assistant | |
| Standby (Tide) | | | _ | 0.00 | 2.00 | | | | | | | 1 - 9 - 1 | | | |
| Standby weather | | | _ | 0.00 | 10.5 | _ | Rick | nard Luke | er | Bart | Kot | Fo | igro | Geotechnical | Engineer |
| Single Shift Standby | | | _ | 0.00 | 5.75 | | 1 1101 | iara Laite | , | Duit | 1101 | | .g. 0 | Cootooninoan | Linguitooi |
| Other Operations | | | | 0.42 | 2.42 | | The | eo Cleave | , | | | Fuaro G | eoServices | Project En | gineer |
| Crew Change / TBT | | | | 1.50 | 4.25 | | TIK | JO Olcave | , | | | i agio o | COOCIVICCS | 1 TOJOULET | giricci |
| Crew Change / TDT | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | _ | | | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | , | | | | | | Total Man | | | |
| | | Tota | | 24.00 | 24.0 | 0 | No | Personn | ام | 1 | n | Hours | | 120 | |
| | | 1016 | " 2 | 24.00 | 24.0 | o | NO. | reisoilli | ei ei | | U | Worked | | 120 | |
| | | | | | • | | | | | | | | | | |
| Project Program / P | rogress | | | ogrammed | | | Today | | | ctual To D | | | % Program | Completed | |
| Activity | | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | | | |
| General Items, Provisional Services | | Α | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100.0 |
| , , | | | | | | Ī | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant areas at MEATINES | | B11 C19 | | | R/O | 1 | | 10.50 | 0.0 | 0 | 10.50 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | | | | 1 | R/O | | | 2.00 | | | | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | | 1 | K/U | - | | 2.00 | 0.0 | 0 | 2.00 | | | | |
| | | | | ļ | | | | | 0.0 | 0 | 2.00 | 0.0 | | | |
| Percussion Boring | | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory ho | le | B1 | | 8.00 | | L | L | | 0.0 | 2 | 0.00 | | 25.0 | | |
| Extra over B1 for setting up on a gradient >20% | | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | | B3 | | | R/O | Ī | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | th | B4 | 80.00 | | | 17.35 | | | | | | | 33.4 | | |
| As B4 but between 10m and 20m | | B5 | 36.50 | | | 17.00 | | | 26.8 | 0 | 0.00 | 0.0 | 55.4 | | |
| | | | | | 1 | | | | 0.0 | 0 | 0.00 | 40 | | | |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstructio | n | B9 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | | С | | | | | | | 5.0 | | 5.50 | 0.0 | | | |
| Move rotary plant to site of each exploratory hol | | C15 | | 6.00 | | 1 | | | | | 0.00 | | 16.7 | | |
| | | | R/O | 0.00 | | | | - | 0.0 | 1 | 0.00 | | | | |
| RC drilling between groundlevel and 10m depth | | C41 | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | | C42 | 20.50 | | | 2.65 | | | 2.7 | 0 | 0.00 | 12. | | | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | 3.35 | | | 3.4 | 0 | 0.00 | | 35.3 | | |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | | E | | | | | | | 3.0 | T . | 2.00 | 0.0 | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | 1 | 35 | | | | 0.00 | | | | 91.5 |
| | | E2 | | 59.00 | | | 33 | | 0.0 | 54 | 0.00 | 0.0 | | | 31.3 |
| Bulk Disturbed Sample | | | | | | 1 | | | 0.0 | 0 | 0.00 | 40 | | | |
| Large Bulk disturbed sample | | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | | Н | | | | | | | | | L | 0.0 | | | |
| Standard Penetration Test in Borehole | | H1 | - | 40 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| • | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | | L | | † | † | 1 | | | 5.0 | 0 | 0.00 | 0.0 | | | |
| | | L2 | | 121 | | | 26 | | | ^4 | 0.00 | 0.0 | 28.1 | | |
| Marine Scotland Sample | | L2 | | 121 | | 1 | 20 | | 0.0 | 34 | 0.00 | 0.0 | 20.1 | | |
| | | | | | | ļ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | | | | | | | 0.0 | | | |
| | | | | | <u></u> | | <u></u> | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | 1 | | Ì | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmarv | | | Today | | Act | tual To I | Date | 3.0 | | | | Damaged | | |
| | aı y | | | | | AUL | | | | | | LUSI O | geu | | |
| Hoc Cards Safety Drills | | | | 0 | | | 7 | | | | | | | | |
| Tool Box Talk | s | | | 1 | | | 5 | | | | | | | | |
| HSE Meeting | | | | 0 | | | 1 | | | | | | | | |
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| Incidents/Near M | | | | 0 | | | 0 | | | | | | | | |
| Environmenta | | | | 120 | | | 0 360 | | | | | | | | |
| 11101 | | | | 120 | | | | ont D | | e Commen | in. | | | | |
| Hours Worke Fugro GeoServices Representative Com | | | | | | | | Порт | | | | | | | |
| Hours Worke Fugro GeoServices Representative Com | | | | | | | | | | | | | | | |
| | | | | | | | Cli | ient Re | p: | | | | | | |
| Fugro GeoServices Representative Con | | | | | | | | ient Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | | Vessel | Skate 3A | | | Date | Tuesday 05-Mar-19 |
|------------|-----------------|--------------|----------|----------------------|---------------------|--------------|------------------------|--|------------|-------------------------------|-------------------------------|--|
| То | ANeillings@ar | ch-henderson | .co.uk | | | Att | n. Andv | / Neillings | | No./email | 0141 227 306 | 50 |
| cc | mshuttleworth | | | | | Att | | ael Shuttleworth | | No./email | | |
| | stuart.innes@ | | | | | | | art Innes | | No./email | Deriver | |
| cc | scuar cinnes(@) | gegroup.com | | | | Att | | ar antes | | | | |
| СС | | | | | | Att | | | | No./email | | |
| СС | m.chappell@f | | | | | Att | | new Chappell - Nearshore N | | No./email | | |
| СС | n.armstrong@ | fugro.com | | | | Att | n. Nich | olas Armstrong - Reporti | ng Mana | No./email | Redact | • |
| СС | g.crisp@fugro | .com | | | | Att | n. Gler | Crisp - Project Manager | | No./email | Redact | |
| 0 | bserved Weath | er | V | Vind | | | | 00 | | | — IXELIALI | |
| | Time 00:00 | | eed Knts | Dir | | Swell (| ns) | Sea State | V | isibility | | Weather Forecast |
| | 00:00 | | 6 | SSW | | N/A | | smooth | | good | | |
| — | 06:00 | | 4 | SSW | | N/A | | smooth | -1- | good | | See Below |
| \vdash | 12:00 | | | SW | | N/A | | | - | | | |
| ├ ─ | | _ | 5 | | | | | smooth | _ | good | | |
| <u> </u> | 18:00 | | 8 | NE | | N/A | | smooth | | good | | |
| | 00:00 | | 9 | NE | | N/A | | smooth | | good | | |
| | | | Leg Per | netration (m) | | | | | | | | |
| | BH no. | | 1 | 2 | 3 | | 4 | | | | Operatio | onal Status |
| | | | ' | 2 | | | | | | | | |
| | BH01 | | 1.0 | 1.0 | 2.2 | | 3.1 | | | | | |
| | BH08 | | 0.3 | | | | - 4.0 | | | | Rotary drilling u | Inderway on BH01 |
| — | БПОВ | | 0.3 | 0.9 | 1.4 | | 1.3 | _ | | F | Prepare to move to | BH08 at high water |
| I | | | I | | | | | | | | | |
| | | | | | | Sum | mary of One | erations / Borehole Dril | lina - lee | st 24hre | | |
| | | | | 11 (11.) | | | J. Opt | | y - ias | J. 471113. | | |
| | From | To | | Hrs (No.) | | ode | | | | | Description | |
| | 00:00 | 00:20 | | 0.33 | | lling (Corin | | | | | | nCD / CD 0.85m below mudline |
| | 00:20 | 02:30 | 1 | 2.17 | Other C | perations | Pull all G | Geobor to deck / Pull all c | asing to | deck / Was | h down and clear d | leck |
| | 02:30 | 07:00 | 1 | 4.50 | Stand | by (Tide) | Unable to | o move JUB until high wa | ater / Pre | epare, secu | re deck for move / 0 | General R&M |
| | 07:00 | 08:00 | | 1.00 | Crew Ch | ange / TBT | Nightshif | t transfer to shore / Hand | dover on | CTV Quay | / Dayshift transfer | to JUB / TBT on Rotary Drilling Operations |
| | 08:00 | 10:30 | | 2.50 | | by (Tide) | | o move JUB until high wa | | | | |
| \vdash | 10:30 | 11:50 | | 1.33 | | & Jacking | | e move from BH01 to BH | | | | |
| \vdash | 11:50 | 18:45 | | 6.92 | | ercussion | | asing to mudline / Comm | | | | |
| _ | 18:45 | 19:15 | | 0.50 | | perations | | nd clear down deck for E. | | | | |
| - | | 20:00 | | | | | | | | | Nightehift transf | to JUB / TBT on Rotary Drilling Operations |
| \vdash | 19:15 | | | 0.75 | | ange / TBT | | | | | rugnisiiit transfer | to 300 / 101 on Rotary Drilling Operations |
| <u></u> | 20:00 | 00:00 | 1 | 4.00 | Cable F | ercussion | Continue | CP drilling from 7.00m | io 13.00i | m RMF | | |
| | | | | | | | | | | | | |
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| | | | | | | | | Weather forecast | | | | |
| | | | | | | | | | | | | |
| 1 | | | | Local fir Wind di | | 800 100 | 200 100 40 3W 5W 5V | 0 500 600 700 800 800 6 9 5W SW SW SW N | | 2:00 13:00 14:00 INI NE NE | NO. OF THE PART AND ASSESSED. | 000 20 00 21 00 22 00 23 00 001 1201 5000 10 10 |
| | | | | | ection eed (kts) | 244 244 | | | | | NE ENG. ENG. NO. IN | NO THE NAME OF THE PERSON OF T |
| | | | | | | 14 14 | 14 12 10 | 1 1 2 1 2 | 0 0 | 10 12 13 | 11 7 5 | 6 4 8 8 8 |
| | | | | | | 24 24 | 71 10 10 | T 10 11 3 | | 0 0 00 | 9 11 11 | 11 TO 15 TO |
| | | | | Wind gu Cloud o | sts (max kts) | 2 2 | 2 8 3 | | | | 0000 | 0 0 0 0 0 |
| | | | | | over tion type | | | | | | 8 0 0 8 | 0 0 |
| | | | | | dion (mm/h) | | | | | | 03 04 03 01 | 0.4 0.1 0.2 |
| | | | | Air tomp Feets M | erature (°C) | -1 -1 | 4 4 4 | 4 4 4 9 9 | 2 2 | 1 1 1 | 1 1 1 1 | 1 1 1 1 1 |
| | | | | | humidity (%) | | | -1 -1 -1 0 0 5 00 00 80 04 01 | | | | 94 95 DH 92 96 |
| 1 | | | | | ure (NPa) | NEE DES | DES 1005 100 | 0 800 007 107 107 107 0 | en test t | 500 500 | 000 000 001 000 0 | 90 900 990 090 Sep. |
| 1 | | | | Tide typ Time | | 8 3 | 3 3 3 | 527 | | 132 | 3 3 3 3¢ . | |
| 1 | | | | Tide hei | ght (m) | 33. 34 | 20 10 10 | 14 14 18 25 32 1 | 18 41 3 | at 36 28 | 2 15 12 11 1 | X 18 27 34 X8 |
| Healt | h Safety & the | Environment | | | | | | | | | | |
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| FGS | L Rep: Theo | Cleave | | | | | | Client | Rep: | | | |
| 1 | | | | | | | | | | | | |
| Sign | ed: | | | | | | | Signe | d: | | | |
| | | | | | | | | 1 | | | | |



Daily Report No.

04

| Activity Time S | ımmarv | т | oday | To Da | ate | D | ay Shift | | Night | Shift | Com | pany | Position |
|---|-----------------|--|------------------|--------------|----------|------------------------------|-----------------------|------------|------------------|------------|------------|------------|-------------------------------------|
| obilisation | | | 0.00 | 3.50 | | ٥. | a, omit | | | JUB (mobil | | rwity | rosition |
| oving & Jacking | | | 1.33 | 11.0 | | lim | ny Wilso | | | Sandy | Fugro Geo | Services | Bargemaster |
| oving & Jacking otary Drilling (Coring) | | | 0.33 | 11.0 5.83 | | | ny vviiso es Lawso | | Josnua | | Fugro Geo | | Bargemaster Driller |
| able Percussion | | | 0.33 | 39.3 | _ | | es Lawso m Allardy | | Adam Ashley L | | Fugro Geo | | Assistant Driller |
| able Percussion tandby (Fugro) | | _ | 0.00 | 0.00 | _ | | m Allardy uart Nye | OC. | Ashley L | _owu iidfi | Fugro Geo | | Assistant Driller Assistant Driller |
| tandby (Fugro) | | | 7.00 | 9.00 | _ | ગ | uant INYE | | | | i agio dec | DOC! VIUES | Assistant Driller |
| tandby (Tide) | | _ | 0.00 | 10.5 | _ | Pick | ard Luke | er . | Bart | t Kot | Fug | ro | Geotechnical Engine |
| ingle Shift Standby | | | 0.00 | 5.75 | _ | rici | iaiu LuKt | 41 | Ddfl | . NOI | rug | 10 | Geoleciilicai Engine |
| ther Operations | | | 2.67 | 5.08 | | The | o Cleave | | | | Fugro Geo | Services | Project Engineer |
| rew Change / TBT | | | 1.75 | 6.00 | | 1116 | .o oreave | - | | | i agio dec | DOC! VIUES | r roject Engineer |
| rew Change / TDT | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | | | | | | | | | Total Man | | |
| | Tot | al 2 | 24.00 | 24.0 | 0 | No. I | Personn | el | 1 | 0 | Hours | | 120 |
| | | | | | | | | | | | Worked | | |
| Project Program / F | rogress | Pre | ogrammed | i . | | Today | | Δ | ctual To D | ate | | % Program | Completed |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 1 | ,og.an | |
| eneral Items, Provisional Services | Α | | | | | | | | | | 0 | | |
| stablish all plant, equipment, crew on site | A2 | 1 | 1.0 | | | | | 0.0 | 1 | 0.00 | | | |
| Sabron an plant, equipment, crew on site | AZ. | 1 | | | ı | | | 0.0 | 0 | 0.00 | 0.0 | | |
| anding Time for plant WEATHER | P44 C40 | 1 | | R/O | 1 | | | | 0 | 10.50 | 0.0 | | |
| anding Time for plant, crew, etc - WEATHER | B11 C19 | 1 | | R/O | | | 7.00 | 0.0 | | | 0.0 | | |
| anding Time for plant, crew, etc - TIDE | B11 C19 | | | K/U | - | - | 7.00 | 0.0 | 0 | 9.00 | | | |
| | | 1 | | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | |
| ercussion Boring | В | 1 | 0.00 | | | | | | | 1 | 0.0 | 0 | |
| ove boring plant to site of each exploratory ho | | | 8.00 | | ! | 1 | | 0.0 | 3 | 0.00 | 0.0 | 37.5 | |
| ktra over B1 for setting up on a gradient >20% | | ļ | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| reak out surface obstructions where present | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| dvance BH between groundlevel and 10m de | th B4 | 80.00 | | | 10.00 | | | 29.4 | 0 | 0.00 | | 36.8 | |
| s B4 but between 10m and 20m | B5 | 36.50 | | | 3.00 | | | 10.4 | 0 | 0.00 | | 28.4 | |
| s B4 but between 20m and 30m | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| s B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| dvance BH through hard stratum or obstruction | n B9 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| otary Drilling | С | | | | | | | 0.0 | | 0.00 | 0.0 | | |
| ove rotary plant to site of each exploratory ho | | | 6.00 | | | | | 0.0 | 1 | 0.00 | 16 | .7 | |
| C drilling between groundlevel and 10m depti | | R/O | | | | | | 0.0 | 0 | | 0.0 | | |
| s C41 but between 10m and 20m | C42 | 20.50 | | | | | | | | 0.00 | 12.9 | | |
| | C42 | | | | | | | 2.7 | 0 | 0.00 | 12.9 | 35.3 | |
| s C41 but between 20m and 30m | C43 | 9.50 | 04.00 | | | | | 3.4 | 0 | 0.00 | 0.0 | 33.3 | |
| ore box to be retained by client | C49 | - | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | _ | | | | | | | 0.0 | 0 | 0.00 | 40 | | |
| ampling, Monitoring during investigation | Е | | | | | | | | | | 0.0 | | |
| mall Disturbed Sample | E1 | | 59.00 | | | | | 0.0 | 54 | 0.00 | | | |
| ulk Disturbed Sample | E2 | | 59.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| arge Bulk disturbed sample | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| situ Testing | Н | | | | | | | | | | 0.0 | | |
| andard Penetration Test in Borehole | H1 |] | 40 | | l | | | 0.0 | 0 | 0.00 | 0.0 | | |
| andard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | \bot | L | L | 0.0 | 0 | 0.00 | 0.0 | | |
| eoenvironmental Laboratory Testing | L | | | | | | | | | | 0.0 | | |
| arine Scotland Sample | L2 | | 121 | | | | | 0.0 | 34 | 0.00 | | 28.1 | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| dditional Items | | | | | | | | | | | 0.0 | | |
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| | | 1 | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Health & Safety St | mmarv | | Today | | Act | tual To [| Date | 3.0 | | | Lost & D | amaged | |
| Hoc Cards | • | | 1 | | , | 8 | | | | | | J | |
| Safety Drills | | 1 | 0 | | | 4 | | | | | | | |
| Tool Box Tall | s | | 1 | | | 6 | | | | | | | |
| HSE Meeting | | | 0 | | | 1 | | | | | | | |
| Incidents/Near | | 1 | 0 | | | 0 | | | | | | | |
| Environment | | | 0 | | | 0 | | | | | | | |
| Hours Worke | | | 120 | | | 480 | | L | | | | | |
| ugro GeoServices Representative Cor | ments | | | | | Clie | ent Repr | esentative | e Commen | its | | | |
| Safety Drills Tool Box Tall HSE Meeting Incidents/Near I Environment Hours Worke | s Miss Il | | 0 1 0 0 | | | 4 6 1 0 0 480 | ent Repr | esentative | e Commen | ıts | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | | Vessel | Skate 3A | | Date | Wednesday 06-Mar-19 |
|----------|---------------|--------------|------------|--|------------|-------------|-----------|--------------------------------------|--------------|-------------------------|---|
| То | ANeillings@ar | rch-henderso | on.co.uk | | | Attn. | Andy | / Neillings | No./en | nail 0141 227 306 | 0 |
| СС | mshuttlewortl | | | | | Attn. | | ael Shuttleworth | No./en | | |
| | | | | | | | | | | Dedaci | |
| cc | stuart.innes@ | gegroup.cor | <u>11</u> | | | Attn. | Stua | art Innes | No./en | | |
| СС | | | | | | Attn. | | | No./en | | |
| СС | m.chappell@f | fugro.com | | | | Attn. | Math | new Chappell - Nearshore Mana | ger No./en | nail | |
| СС | n.armstrong@ | fugro.com | | | | Attn. | Nich | olas Armstrong - Reporting N | lana No./en | nail Redact | · |
| СС | g.crisp@fugro | | | | | Attn. | | n Crisp - Project Manager | No./en | TVE-CIPICA | |
| CC Ot | served Weath | | | Wind | | | | 1 7 | , | Redact | |
| | | | | _ | _ | Swell (Hs |) | Sea State | Visibility | y | Weather Forecast |
| | Time 00:00 | | Speed Knts | Dir | | | | | | | |
| | 00:00 | | 7 | ENE | | N/A | | smooth | good | | |
| | 06:00 | | 15 | ENE | | N/A | | smooth | good | | See Below |
| | 12:00 | | 27 | ENE | | N/A | | smooth | good | | |
| | 18:00 | | 25 | ENE | | N/A | | smooth | good | | |
| | 00:00 | | 21 | NE. | | N/A | | smooth | good | - | |
| | 00.00 | | | | | IN/A | | SHIOOTH | good | | |
| | | | Leg Pe | netration (m) | | | | | | | |
| | BH no. | | 1 | 2 | 3 | | 4 | | | Operatio | onal Status |
| | | | | | | | - | | | | |
| | BH08 | | 0.3 | 0.9 | 1.4 | | 1.3 | | | | |
| | | | | | | | | | | OD deilling | dam BUI00 |
| | | | | | | | | | | CP arilling un | derway on BH08 |
| | | | I | | | | | I | | | l l |
| | | | + | | | _ | | | 1 | | |
| | | | | | | | ry of Ope | erations / Borehole Drilling | - last 24hrs | | |
| | From | To | | Hrs (No.) | Cod | le | | | | Description | n |
| | 00:00 | 02:4 | | 2.75 | Cable Per | | Continue | CP from 13.00m to 15.82m | BML / -15r | | |
| | 02:45 | 04:3 | | 1.75 | Cable Per | | | ntinued from 15.82 to 19.00r | | | onfirmed |
| | | | | | | | | | | | |
| <u> </u> | 04:30 | 07:0 | | 2.50 | Standby | | | on high water to move to BH0 | | | |
| | 07:00 | 08:0 | | 1.00 | Crew Chan | | | t transfer to shore / Handove | | | |
| _ | 08:00 | 10:4 | 15 | 2.75 | Moving & | Jacking | Pull legs | and start move to BH07 / Wi | nd speed a | nd swell increasing / M | ove aborted |
| | 10:45 | 12:1 | 5 | 1.50 | Moving & | Jacking | JUB ~30 | m from BH07 / wind, swell ar | d steep cor | ntours preventing move | / Preload and jack up to await safe weather window. |
| | 12:15 | 14:0 | 00 | 1.75 | Standby (v | | | | | | ssing attempted move from shore. |
| | 14:00 | 19:0 | | 5.00 | Standby (v | | | | | | ove / Client Rep transits to shore after inspection |
| | | | | | | | | | | | |
| | 19:00 | 20:0 | | 1.00 | Crew Chan | | | transfer to shore / Handover | | | |
| | 20:00 | 00:0 | 00 | 4.00 | Standby (v | weather) | Wind rec | corded at 24kt average, swell | <1m / Cont | tinue to monitor weathe | r and await window to complete move. |
| | | | | | | | | | | | |
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| | | | | - 1 | | | | 144 | | | |
| | | | | | | | | Weather forecast | | | |
| | | | | Local time | 0.00 1.0 | | | 100 7:00 E.OS 9:00 10:00 11:00 12:00 | | | 21:00 27:00 23:00 |
| | | | | Wind direction Wind speed (kts) | 16 16 | E DIE DIE I | ENE ENE E | DIE ENE ENE ENE ENE ENE | | | NNE fine 10 |
| | | | | Wind speed (kts) | | 66 197 | | 15 18 19 19 22 22 21 | 20 21 22 | 21 20 20 20 47 | 96 44 44 |
| | | | | | | 10 12 | 11 . 9 | | | | 34 12 |
| | | | | Wind gusts (max k | 10 11 1 | 100 | all et l | 24 25 25 26 20 20 | 76 20 29 | 77 25 24 25 BI | AND LOSS DANS |
| | | | | Cloud cover | Dist. | 0.0 | 0.0 | 0000000 | 0.0.0 | 00000 | 0.0.0 |
| | | | | Precipitation type | | | | 0 0 0 0 0 | 0 0 0 | 0 0 0 0 0 | W A 0 |
| | | | | Precipitation (mm.) Air temperature (*C | | | | 12 04 02 OY 58 14 | 10 10 12 | 12 1 00 02 03 | 93 09 03 |
| | | | | Feets like (°C) | 0 1 | 4: 11 | 4 4 | 0 0 0 0 0 1 1 | 4 4 4 | | (1) |
| | | | | Relative humidity (| %) 80 S | 2 90 00 | 100 93 | 83 93 91 92 54 96 96 | 90 57 97 | 97 97 97 96 94 | Nr. Mr. Nr. |
| | | | | Air pressure (hPa) | 992 99 | 2 991 991 1 | NE SEE 1 | ME 007 506 905 904 903 912 | | 978 979 977 971 976 | 976 076 676 |
| | | | | Tide type Time | 004 | 7 3 | n 2 | 5 7 7 7 7 7 7 7 7 150 120l | 9 7 3 | 0 3 <u>34</u> 3 3 | 7 7 5 |
| | | | | | 4 3 | 21 72 | 10 13 | 12 15 21 29 36 4 43 | 41 33 34 | 10 32 69 1 35 | 23 37 36 |
| Health | Safety & the | Environme | nt | | | | | | | | |
| | , | 2 | | | | | | | | | |
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| l | | | | | | | | | | | I |
| FGSI | Rep: Theo | Cleave | | | | | | Client Re | n: | | |
| . 551 | | -10010 | | | | | | Short Ne | ٠. | | |
| C1 | d. | | | | | | | | | | |
| Signe | eu: | | | | | | | Signed: | | | |
| | | | | | | | | | | | |



Daily Report No.

05

| Activity Time Su | nmary | 1 | oday | To Da | ite | D | ay Shift | | Night | Shift | Com | pany | Position |
|--|--|--|-----------|---------|------|----------|-----------|------------|------------|------------|-----------|------------|-----------------------|
| Mobilisation | | | 0.00 | 3.50 |) | | | | Onboard . | JUB (mobil | isation) | | |
| Moving & Jacking | | | 4.25 | 15.2 | 5 | Jimi | my Wilso | n | Joshua | Sandy | Fugro Ge | oServices | Bargemaster |
| Rotary Drilling (Coring) | | | 0.00 | 5.83 | | | es Lawso | | Adam | | Fugro Ge | | Driller |
| Cable Percussion | | | 4.50 | 43.8 | | | m Allardy | | Ashley L | | Fugro Ge | oServices | Assistant Driller |
| Standby (Fugro) | | | 0.00 | 0.00 | | | tuart Nye | | -,- | | Fugro Ge | | Assistant Driller |
| Standby (Tide) | | _ | 2.50 | 11.5 | _ | | , | | | | 3 - | | |
| Standby (weather) | | | 10.75 | 21.2 | _ | Rich | hard Luke | er | Bart | Kot | Fug | ıro | Geotechnical Engineer |
| Single Shift Standby | | | 0.00 | 5.75 | | 1 (10) | nara Lane | , | Duit | 1101 | . 48 | ,,,, | Cookermied Engineer |
| Other Operations | | | 0.00 | 5.08 | | The | eo Cleave | | | | Fugro Ge | oServices | Project Engineer |
| Crew Change / TBT | | | 2.00 | 8.00 | | 1110 | co olcave | , | | | i ugio oc | OOCI VICES | 1 Toject Engineer |
| Clew Change / TB1 | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | | | _ | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | Total Man | 1 | |
| | Tot | tal . | 24.00 | 24.0 | 0 | No | Personn | el l | 1 | n | Hours | Ī | 120 |
| | 101 | iai ' | 24.00 | 24.0 | o | NO. | reisoilli | ei . | | U | Worked | | 120 |
| | | | | | | | | | | | | • | |
| Project Program / Pr | | | ogramme | | | Today | | | ctual To D | | | % Progran | Completed |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | | |
| General Items, Provisional Services | Α | | | | | | | | | | 0 | | |
| Establish all plant, equipment, crew on site | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | 100.0 |
| p.a, -q-priority state on site | / - | 1 | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Standing Time for plant arms at MEATIES | B11 C19 | 1 | 1 | R/O | 1 | | 10.75 | | 0 | 21.25 | 0.0 | | |
| Standing Time for plant, crew, etc - WEATHER | | 1 | | R/O | | | 2.50 | 0.0 | | | 0.0 | | |
| Standing Time for plant, crew, etc - TIDE | B11 C19 | 1 | - | K/U | | | 2.50 | 0.0 | 0 | 11.50 | | | |
| | | 1 | ļ | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Percussion Boring | В | | | | | | | | | | 0.0 | | |
| Move boring plant to site of each exploratory hole | B1 | <u> </u> | 8.00 | | L | L | \perp | 0.0 | 3 | 0.00 | | 37.5 | |
| Extra over B1 for setting up on a gradient >20% | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Break out surface obstructions where present | B3 | 1 | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Advance BH between groundlevel and 10m dept | | 80.00 | | | | | | | 0 | | | 36.8 | |
| | B5 | 36.50 | | | 6.00 | | | 29.4 | | 0.00 | | _ | 44.0 |
| As B4 but between 10m and 20m | | | | | 6.00 | | | 16.4 | 0 | 0.00 | | | 44.8 |
| As B4 but between 20m and 30m | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| As B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Advance BH through hard stratum or obstruction | B9 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Rotary Drilling | С | | | | | | | 0.0 | | 0.00 | 0.0 | | |
| Move rotary plant to site of each exploratory hole | C15 | | 6.00 | | | | | 0.0 | | 0.00 | 16 | · 7 | |
| | | D/O | 0.00 | | | | | 0.0 | 1 | 0.00 | | , <u>.</u> | |
| RC drilling between groundlevel and 10m depth | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | | | | 2.7 | 0 | 0.00 | 12.9 | | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 3.4 | 0 | 0.00 | | 35.3 | |
| Core box to be retained by client | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Sampling, Monitoring during investigation | Е | | | | | | | | | | 0.0 | | |
| Small Disturbed Sample | E1 | | 59.00 | | | 19 | | 0.0 | 73 | 0.00 | | | |
| Bulk Disturbed Sample | E2 | + | 59.00 | | | 19 | | 0.0 | | | | 32.2 | |
| · | E3 | + | R/O | | | | | | 19 | 0.00 | 0.0 | OZ.Z | |
| Large Bulk disturbed sample | ES | 1 | N/O | | | | | 0.0 | 0 | 0.00 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Insitu Testing | Н | | | | | | | | | | 0.0 | | |
| Standard Penetration Test in Borehole | H1 | | 40 | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Standard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Geoenvironmental Laboratory Testing | L | | | | | | | | | | 0.0 | | |
| Marine Scotland Sample | L2 | | 121 | | | 11 | | 0.0 | 45 | 0.00 | | 37.2 | |
| | | 1 | | | l | | | 0.0 | 0 | 0.00 | 0.0 | U2 | |
| Additional Items | | 1 | 1 | 1 | | | 1 | 0.0 | - | 0.00 | 0.0 | | |
| Auditional Items | | | - | - | | | 1 | 0.0 | _ | 0.00 | | | |
| | | | ļ | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | 1 | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| | | <u> </u> | | L | | | <u> </u> | 0.0 | 0 | 0.00 | 0.0 | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | |
| Health & Safety Sur | mary | | Today | | Act | ual To I | Date | | | | | amaged | |
| Hoc Cards | | | 1 | | | 9 | | | | | | | |
| Safety Drills | | | 0 | | | 4 | | | | | | | |
| Tool Box Talks | | | 1 | | | 7 | | | | | | | |
| HSE Meetings | | | 0 | | | 1 | | | | | | | |
| Incidents/Near M | SS | | 0 | | | 0 | | | | | | | |
| Environmental | | 1 | 0 | | Ì | 0 | | | | | | | |
| | | | 120 | | | 600 | | | | | | | |
| Hours Worked | nents | | | | | | ent Repr | esentative | Commen | ts | | | |
| Fugro GeoServices Representative Com | | | m rockhea | d. | | | | | | | | | |
| Fugro GeoServices Representative Com BH08 was continued bei JUB was waitin | ow scheduled depth of -15m g on tide during this addition al data down to rockhead av be charged at standing rate | nal drilling tin /ailable, | ne. | | | | | | | | | | |
| Fugro GeoServices Representative Com BH08 was continued bel JUB was waiti Additior | g on tide during this addition al data down to rockhead av | nal drilling tin /ailable, | ne. | | | CII | ient Re | p: | | | | | |
| Fugro GeoServices Representative Com BH08 was continued bel JUB was waitin Addition Alternatively, this period may | g on tide during this addition al data down to rockhead av | nal drilling tin /ailable, | ne. | | | | ient Re | p: | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | | C1982 | • | V | essel | Skate 3A | | | Date | Thursday 07-Mar-19 |
|----------|----------------------------|------------|----------|------------|---------------------------------------|----------------------------|----------------|-------------|---|-----------|------------------------|-----------------|---|
| То | ANeillings@ar | | | | | | Attn. | | Neillings | | No./email | 0141 227 306 | 60 |
| СС | mshuttlewort | | | <u>.uk</u> | | | Attn. | | ael Shuttleworth | | No./email | Redact | |
| CC CC | stuart.innes@ | gegroup.co | <u>m</u> | | | | Attn. Attn. | Stua | rt Innes | | No./email No./email | Redact | |
| CC | m.chappell@f | ugro.com | | | | | Attn. | Math | ew Chappell - Nearshore Man | | No./email | | |
| СС | n.armstrong@ | | | | | | Attn. | | olas Armstrong - Reporting | | No./email | Redact | |
| CC | g.crisp@fugro | | | | | | Attn. | Glen | Crisp - Project Manager | | No./email | Redact | |
| OI | served Weath Time 00:00 | | Speed Kn | | /ind Dir | | Swell (Hs) | | Sea State | Vis | sibility | | Weather Forecast |
| | 00:00 | | 21 | 113 | NE | | N/A | | smooth/slight | 9 | good | | |
| | 06:00 | | 24 | | E | | N/A | | slight | 9 | good | | See Below |
| | 12:00 | | 28 | | NE | | N/A | | slight | _ | good | | |
| | 18:00 00:00 | | 19 16 | | NNW | | N/A N/A | | smooth smooth | _ | good good | | |
| | 00.00 | | | og Pon | etration (m) | | IN/A | | SHOOTH | ١ | good | | |
| | BH no. | | 1 1 | _ | 2 | 3 | 1 | 4 | _ | | | Operation | onal Status |
| | BH07 | | 3. | | 4.4 | 4.4 | _ | 3.4 | | | | | |
| | DITO | | ٠, | _ | 4.4 | 4.4 | | 3.4 | | | Jacke | ed up ~30m from | BH07 after aborted move |
| | | | - | | | | | | _ | | | | r window to complete move. |
| _ | | | | | | | | | | | | | |
| | | | | | | | Summar | y of Ope | erations / Borehole Drilling | g - last | t 24hrs: | | |
| | 00:00 | 07: | | | Hrs (No.) | Code Standby (we | ather\ | II IR inni- | ad up ~30m from PH07 / | wait ···- | other wir - | Description | |
| | 07:00 | 07: | | | 7.00 1.00 | Standby (we Crew Change | | _ | ed up ~30m from BH07 / av t transfer to shore / Handov | | | | fer to JUB / TBT on Moving & Jacking Ops |
| | 08:00 | 16: | | | 8.50 | Standby (we | | | | | | | nal limits / Dayshift continue to monitor conditions |
| | 16:30 | 17: | | | 1.00 | Standby (we | , | | ns settling as winds move fro | | | | |
| | 17:30 | 19: | | | 2.25 | Moving & Ja | | | | | | | to BH07 / Preload and jack up to safe working height |
| | 19:45 20:15 | 20: | | | 0.50 3.75 | Crew Change Cable Percu | | | | | | | g / Dayshift transfer to shore / TBT as above BML / Seabed below CD = 4.01m |
| | 20.10 | 00. | 00 | | 0.70 | Odbio i Groc | | tuii 00 | ionig to maamio / Commone | | aniing non | | 2.112.7 334234 251311 32 4.13.111 |
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| | | | | | | | | | | | | | |
| | | | | | | | | | Weather forecast | | | | |
| | | | | | Local time Wind direction | 194 N | | | #00 7:00 0:00 0:00 10:00 17:00 12:00 14 N N N N N N N N | | | | |
| | | | | | Wind speed (kts | 0 11 | | 14 16 | 15 17 19 28 25 27 28 | 24 2 | 25 24 23 | 22 20 18 17 1 | 7 18 17 |
| | | | | | Wind gusts (ma | | | | | | | | |
| | | | | | Cloud cover | 6 6 | | 200 | | | 8 0 0 | 0 0 0 0 | in 28 30 3 ≤1 8 |
| | | | | | Precipitation typ Precipitation (m | | 8 8 | 0 8 | | | | | |
| | | | | | Air temperature Feets like (°C) | (°C) | 19191 | | | 13.1 | | | F. ITEL SHIP |
| | | | | | Relative humidit Air pressure (hi | | | | 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 | | | | |
| | | | | | Tide type | | | | 977 978 979 989 982 984 \$\frac{1}{2}\$ 27 27 27 27 27 27 27 27 27 27 27 27 27 | 71 | | | |
| | | | | | Time Tide height (m) | 4 41 | 18 24 | 14 15 | 11 12 17 25 33 38 42 | 1238 | 18 28 19 | 13 1 18 12 1 | 9 27 34 |
| Health | Safety & the | Environme | ent | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| FGSI | Rep: Theo | Cleave | | | | | | | Client Re | ер: | | | |
| Sign | ed: | | | | | | | | Signed: | | | | |
| - 9.1 | | | | | | | | | 0.504. | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time S | ummary | | Т | oday | To Da | ite | D | ay Shift | | Night | Shift | | Comp | any | Po | sition |
|--|----------------------------------|---------|-------|----------|----------------|-------|-----------|----------------------|-----------|--------------|------------|----------|----------|-----------|-------------|--------------|
| Mobilisation | | | | 0.00 | 3.50 | | | | | | JUB (mobil | isation) | | • | | |
| Moving & Jacking | | | | 2.25 | 17.50 | 0 | Jim | my Wilso | n | Joshua | | | | Services | Barg | emaster |
| Rotary Drilling (Coring) | | | 0.00 | 5.83 | 3 | Jam | es Lawso | on | Adam | Cook | Fug | gro Geo | Services | D | riller | |
| Cable Percussion | | | 3.75 | 47.58 | | Callu | m Allardy | /се | Ashley L | owthian | Fuç | gro Geo | Services | | ant Driller | |
| Standby (Fugro) | | | | | | | | tuart Nye | | | | Fuç | gro Geo | Services | Assista | ant Driller |
| Standby (Tide) | | | | 0.00 | 11.50 37.75 | | | - | | | | | | | | |
| Standby (weather) | | | | | | | | hard Luke | er | Bart | Kot | | Fugre | 0 | Geotechn | cal Engineer |
| Single Shift Standby | | | | 0.00 | 5.75 | _ | | | | | | | | | | |
| Other Operations | | | | | | | | eo Cleave | Э | | | Fug | gro Geo | Services | Project | Engineer |
| Crew Change / TBT | | | | 1.50 | 9.50 | | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | | |
| | | | | 0.00 | 0.00 | _ | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | | |
| | | | _ | 0.00 | 0.00 | | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | | |
| | | | _ | 0.00 | 0.00 | _ | | | | | | Total | Man | | | |
| | | Tota | 1 2 | 24.00 | 24.00 | 0 | No. | Personn | el | 1 | 0 | Hou | ırs | | 120 | |
| | | | | | | | | | | | | Worl | ked | | | |
| Project Program / F | rogress | | Pro | ogrammed | | | Today | | 4 | Actual To Da | ate | | | % Program | Completed | |
| Activity | Activity BoQ Item | | | | | | | Hours | m. | No. | Hours | <u> </u> | | | | |
| General Items, Provisional Services | al Items, Provisional Services A | | | | | | | | | | | 0 | | | | |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | | 100.0 |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Standing Time for plant, crew, etc - WEATHER | | B11 C19 | | | R/O | L | L | 16.50 | 0.0 | 0 | 37.75 | 0.0 | | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Percussion Boring | | В | | | | | | | | | | 0.0 | | | | |
| Move boring plant to site of each exploratory ho | ole | B1 | | 8.00 | | | 1 | | 0.0 | 4 | 0.00 | | | | 50.0 | |
| Extra over B1 for setting up on a gradient >20% | | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Break out surface obstructions where present | | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Advance BH between groundlevel and 10m de | oth | B4 | 80.00 | | | 8.00 | | | 37.4 | 0 | 0.00 | | | | 46.8 | |
| As B4 but between 10m and 20m | | B5 | 36.50 | | | | | | 16.4 | 0 | 0.00 | | | | 44.8 | |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| As B4 but between 30m and 40m | | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Advance BH through hard stratum or obstruction | n | B9 | 100 | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| 9 | | | | | 100 | | | | | 0 | | 0.0 | | | | |
| Rotary Drilling | | С | | | | | | | 0.0 | U | 0.00 | 0.0 | | | | |
| Move rotary plant to site of each exploratory ho | lo. | C15 | | 6.00 | | | 1 | | | 2 | 0.00 | 0.0 | | 33.3 | | |
| RC drilling between groundlevel and 10m depth | | C41 | R/O | 0.00 | | | | | 0.0 | _ | 0.00 | 0.0 | | 00.0 | | |
| | <u>'</u> | C41 | 20.50 | | | | | - | 0.0 | 0 | 0.00 | 0.0 | 12.9 | | | |
| As C41 but between 10m and 20m | | | | | | | | | 2.7 | 0 | 0.00 | | 12.9 | 05.0 | | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | | | | 3.4 | 0 | 0.00 | 0.0 | | 35.3 | | |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| | | _ | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Sampling, Monitoring during investigation | | E | | 50.00 | | | | | | | | 0.0 | | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | | | | 0.0 | 73 | 0.00 | _ | | | | |
| Bulk Disturbed Sample | | E2 | | 59.00 | | | | | 0.0 | 19 | 0.00 | | | 32.2 | | |
| Large Bulk disturbed sample | | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Insitu Testing | | Н | | | | | | | | | | 0.0 | | | | |
| Standard Penetration Test in Borehole | | H1 | | 40 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Geoenvironmental Laboratory Testing | | L | | | | | | | | | | 0.0 | | | | |
| Marine Scotland Sample | | L2 | | 121 | | | | | 0.0 | 45 | 0.00 | | | 37.2 | | |
| | | | | | | | | <u> </u> | 0.0 | 0 | 0.00 | 0.0 | | | | |
| Additional Items | | | | | | | | | | | | 0.0 | | | | |
| | | | | | | L | L | | 0.0 | 0 | 0.00 | 0.0 | | | | |
| | | | | | | L | L | | 0.0 | 0 | 0.00 | 0.0 | | | | |
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| Health & Safety Su | ımmary | | | Today | | Act | tual To | Date | | | | Lo | ost & Da | maged | | |
| Hoc Cards | | | | 1 | | | 10 | | | | | | | | | |
| Safety Drills | | 0 | | | 4 | | | | | | | | | | | |
| Tool Box Talk HSE Meeting | | 0 | | | 8 | | | | | | | | | | | |
| Incidents/Near I | | | | 0 | | | 0 | | | | | | | | | |
| Environmenta | | | | 0 | | | 0 | | | | | | | | | |
| Hours Worke | | | | 120 | | | 720 | | | | | | | | | |
| Fugro GeoServices Representative Con | | | | | | | | ent Repr | esentativ | e Commen | ts | | | | | |
| | | | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | | | ient Re _l | p: | | | | | | | |
| Signed: | | | | | | | Si | gned: | | | | | | | | |
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Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | • | Vess | el | Skate 3A | | | Date | Friday 08-Mar-19 |
|----------|-------------------------------|--------------|--------------|-----------------------|------------------------------|--------------|----------------|---|-----------|------------------|-----------------------|---|
| То | ANeillings@ar | rch-henderso | on.co.uk | | | Attn. | Andy Neillings | S | No./ | /email | 0141 227 306 | 0 |
| СС | mshuttlewort | :h@arch-hen | derson.co.ul | <u>k</u> | | Attn. | Michael Shutt | leworth | No./ | /email | Redact | |
| СС | stuart.innes@ | gegroup.cor | <u>n</u> | | | | Stuart Innes | | | /email | Redact | |
| СС | | | | | | Attn. | | | | /email | | |
| CC | m.chappell@f | | | | | | | pell - Nearshore Manag | | /email | | |
| CC CC | n.armstrong@ g.crisp@fugro | | | | | | | nstrong - Reporting M Project Manager | | /email /email | Redact | • |
| | served Weath | | | Wind | | | Oleff Orisp - | | | | _Redact | |
| | Time 00:00 | , | Speed Knts | Dir | SW | ell (Hs) | | Sea State | Visibi | ility | | Weather Forecast |
| | 00:00 | | 16 | NW | | N/A | | smooth | good | _ | | Cara Balann |
| | 06:00 | | 8 | SW | | N/A | | smooth | good | _ | | See Below |
| | 12:00 18:00 | | 21 25 | SSW | | N/A N/A | _ | smooth | good | | | |
| | 00:00 | | 20 | SSW | | N/A | + | smooth smooth | good | _ | | |
| | 00.00 | | | Penetration (m) | | . 47.1 | | Silloui. | goo | , | | |
| | BH no. | | 1 | 2 | 3 | 4 | | | | | Operatio | onal Status |
| | BH07 | | 3.2 | 4.4 | 4.4 | 3.4 | | | | | | |
| - | BH03 | | 2.3 | 0.8 | 1.9 | 2.7 | | | | | Jacked u | p on BH07 |
| | БПОЗ | | 2.3 | 0.8 | 1.5 | 2.1 | | | | C | CP underway at a | approx12.00mCD |
| | | | <u> </u> | | | | | (D l . l . D | 1 | | | |
| | Erom | | | Hro (N-) | | urnmary of | Operations | / Borehole Drilling - | - iast 24 | mrs: | Do | |
| | 00:00 | To 07:1 | | Hrs (No.) 7.25 | Code Cable Percuss | ion Cont | tinue CP drill | ling from 8.00m to 18. | 45m RM | Л | Description | |
| | 07:15 | 08:0 | | 0.75 | Crew Change / | | | | | | Davshift transfer to | o JUB / TBT on Working at Height |
| | 08:00 | 09:3 | | 1.50 | Cable Percuss | | | | | | | ient at -23.51mCD / SPT tested to -23.62mCD |
| | 09:30 | 10:1 | | 0.67 | Other Operation | | | Vash down and clear | | | | |
| | 10:10 | 12:4 | | 2.58 | Moving & Jack | | | | | | | to safe working height |
| | 12:45 | 19:0 | | 6.25 | Cable Percuss | | | | | | | BML / Seabed = -0.75mCD |
| | 19:00 | 19:3 | | 0.50 | Other Operation | | | clear deck for E.O.S | | | | |
| | 19:30 20:00 | 20:0 | | 0.50 4.00 | Crew Change / Cable Percuss | | | to shore / Handover of ling from 8.00m to 13 | | | lightshift transfer t | to JUB / TBT on Working at Height |
| | 20.00 | 00.0 | 10 | 4.00 | Cable Felcuss | ion Com | unue CF unii | ing nom 6.00m to 13 | .UU DIVIL | | | |
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| | | | | Local tin | | | 4.00 5.00 8.00 | 7:00 6:00 9:00 10:00 11:00 | | | | |
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| | | | | | | | 1. 1. 1 | s to to 11 13 | | | 67 18 67 17 | |
| | | | | Wind gu | sts (max kts) 21 5 | 1 7 | to 21 U | 11 11 11 11 | 20 | 27 10 | (2 20 34 32 | ti 27 27 29 |
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| Health | Safety & the | Environme | nt | | | | | | | | | |
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| FGSI | Rep: Theo | Cleave | | | | | | Client Rep |): | | | |
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| Sign | ed: | | | | | | | Signed: | | | | |
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Daily Report No.

07

| 2.75 | | | | | | | | | | | | | | | | |
|--|--|----------------|----------------|-----------|----------|----------|---------|--------|-----------------------|------------|------------|---------|-----------|-----------|----------------|--------------|
| 100 2.50 2 | Activity Time S | ımmary | | Т | oday | To Da | te | 0 | Day Shift | | Night | Shift | Com | oany | Posi | tion |
| 100 2.50 2 | Mobilisation | | | | - | 3.50 |) | | | | | | | | | |
| See Programm | | | | _ | | | | lim | my Wileo | | | | | Sanicas | Barger | naeter |
| 1900 | | | | _ | | | _ | | | | | | | | | |
| | Rotary Drilling (Coring) | | | | | | _ | | | | | | - | | | |
| antity (15th) 1001 1975 Prichard Lubr 1001 1 | Cable Percussion | | | 1 | 9.00 | 66.58 | 8 | Callu | um Allardy | rce | Ashley Lo | owthian | Fugro Geo | Services | Assistar | t Driller |
| antity (15th) 1001 1975 Prichard Lubr 1001 1 | Standby (Fugro) | | | | 0.00 | 0.00 | | S | tuart Nye | | | - | Fugro Geo | Services | Assistar | t Driller |
| 100 3775 Ribbert Learn Bert feet Figure Goodeniness Expriser Figure Goodeniness Expriser Figure Figu | Standby (Tide) | | | | 0.00 | 11.50 | 0 | | | | | | | | | |
| Project Engineer Project Eng | | | | | | | | Ric | hard Luke | er | Rart | Kot | Fire | ro | Geotechnic | al Engineer |
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| 1.25 | | | | _ | | | _ | т, | 00 CI | | | | Eu C | Consinc - | D1 | nainee- |
| 0.00 | | | | | | | _ | ın | ieo Cleave | 9 | | | Fugro Geo | Services | Project E | ngineer |
| 0.00 | Crew Change / TBT | | | | | | | | | | | | | | | |
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| Maintain planet, concert asks | General Items, Provisional Services | | Α | | | | | | | | | | 0 | | | |
| March Marc | stablish all plant, equipment, crew on site | Δ | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100.0 |
| anderly These for search comes dec. YMEATER 611.11 1 1 1 1 1 1 1 1 | an plant, equipment, elew on site | | | | | | | | 1 | | | | 0.0 | | | |
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| Section Section Sectio | Standing Time for plant, crew, etc - WEATHER | B11 | C19 | | | | | | | 0.0 | 0 | 37.75 | | | | |
| Section Bording | Standing Time for plant, crew, etc - TIDE | B11 | C19 | | 1 | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| New Control Section | | | | | | | | | | | | | 0.0 | | | |
| The bording parts valle of each explosionary role in the case B1 training on a graduate 20%. 83 RIO | Danis Barina | | В | | | | | | + | 5.0 | - | 5.00 | | | | |
| Its cover B1 for welling up on a gradient 25% 80 80 10 120 10 10 10 10 10 | · · | | | | | | | | | | | | 0.0 | | | |
| Set of the first extend colorations where present State | love boring plant to site of each exploratory ho | le B | 31 | | | | | 1 | | 0.0 | 5 | 0.00 | | | 62.5 | |
| Section of the content of the cont | xtra over B1 for setting up on a gradient >20% | В | 32 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Name Bit Netween groundered and 10m depth B4 B8.00 | | | | | | R/O | | | | | | | | | | |
| Bit but between 10th and 20th 65 86.50 12.50 | | | | 00.00 | | .00 | 10.00 | | + | | | | | | 04.0 | |
| 18-bit bit bit bears 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit 18-bit bit 18-bit bit bit 18-bit bit bit 18-bit bit bit bit bit 18-bit bit bit bit bit bit bit bit bit bit | | | | | | | | | | 49.4 | | 0.00 | | | 61.8 | |
| 18 bit Delivered 20 may of 30 may 18 may 1 | s B4 but between 10m and 20m | В | 35 | 36.50 | | | 12.50 | | | 28.9 | 0 | 0.00 | | | | 79.0 |
| Bit but between 30m and 40m | s B4 but between 20m and 30m | В | 36 | R/O | | | | | | | | | 0.0 | | | |
| Name Principal Part distaltum or obstinction Principal Part distal | | | | | | | | | | | | | | | | |
| Color Colo | | | | R/U | | | | | | | | | 48 | | | |
| Committee Comm | dvance BH through hard stratum or obstruction | n B | 39 | | | R/O | | | 3.00 | 0.0 | 0 | 3.00 | 0.0 | | | |
| Composition | | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Second color Seco | Rotary Drilling | | C | | | | | | | | - | 0.00 | 0.0 | | | |
| Cell by between groundwest and 10m depth | | | | | 0.00 | | | 4 | | | | | | | E0.0 | |
| Cold File Methoren 10m and 20m | | | | | 6.00 | | | 1 | | 0.0 | 3 | 0.00 | | | 50.0 | |
| Cest but between 20m and 30m | RC drilling between groundlevel and 10m depth | C- | 41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Cest but between 20m and 30m | As C41 but between 10m and 20m | C- | :42 | 20.50 | | | | | | | 0 | | 12.9 | | | |
| Verbot to be retained by client | As C41 but between 20m and 30m | C | 43 | 0.50 | | | | | | | | | | 35.3 | | |
| | | | | 9.50 | | | | | | | | | | 33.3 | | |
| Indicated Sample | Jore box to be retained by client | C. | 49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Note Section | | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Second Control Seco | Sampling, Monitoring during investigation | | E | | | | | | | | | | 0.0 | | | |
| A continue E2 Section Sectio | | | | | 50.00 | | | 21 | | | 0.4 | 0.00 | | | | |
| Signature E3 | | | | | | | | | | | | | | | | |
| Name | | | | | | | | 19 | | 0.0 | 38 | 0.00 | | | 64.4 | |
| Situ Testing | arge Bulk disturbed sample | E | ≣3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Situ Testing | | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| andard Penetration Test in Bonehole H1 | nsitu Testina | | н | | | | | | | 0.0 | | 3.50 | # | | | |
| Actual To Destriction Test in Rotary Drill Hole | | | | | 40 | | | | - | | - | 0.00 | 0.0 | 27.5 | | |
| | | | | | | | | 11 | | | | | | 27.5 | | |
| Companies Comp | Standard Penetration Test in Rotary Drill Hole | Н | 12 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Companies Comp | | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| 121 | Secenyironmental Laboratory Testing | | | | | | | | | | | | # | | | |
| | | | _ | | 104 | | | 40 | | | | 0.00 | 5.5 | | 50.4 | |
| Iditional Items | varine ocotiano sample | | | | 127 | | | 16 | | | | | | | 50.4 | |
| Health & Safety Summary Today Actual To Date Health & Safety Summary Today Actual To Date Lost & Damaged Hoc Cards 1 11 Safety Drills 0 0 4 Tool Box Talks 1 9 HSE Meetings 0 11 Incidents/Near Miss 0 0 0 Environmental 0 0 0 Environmental 0 0 0 Hours Worked 120 840 Client Representative Comments Client Representative Comments Client Representative Comments Client Representative Comments "As per our discussion, please continue the BH to a level of -24mCD. This should allow you to complete and move before 10AM." GSL Rep: Theo Cleave Client Rep: | | | | | | | | | | 0.0 | 0 | 0.00 | | | | |
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| Safety Drills Tool Box Talks 1 9 HSE Meetings 0 1 Incidents/Near Miss 0 0 0 Environmental 0 Hours Worked 120 840 GSL Rep: Theo Cleave Client Rep: Client Rep: Client Rep: Client Rep: Client Rep: Client Rep: | • | | | | | | - 701 | | | | | | _03t & D | uguu | | |
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| Client rep contacted at shift change to update on forecasted high winds and current stage of BH07. Agreement to continue BH07 to -24mCD and then pull casing to allow a move before conditions deteriorate. Client Representative Comments "As per our discussion, please continue the BH to a level of -24mCD. This should allow you to complete and move before 10AM." Client Representative Comments "As per our discussion, please continue the BH to a level of -24mCD. This should allow you to complete and move before 10AM." Client Representative Comments "As per our discussion, please continue the BH to a level of -24mCD. This should allow you to complete and move before 10AM." | | | | | | | | | | | | | | | | |
| Client rep contacted at shift change to update on forecasted high winds and current stage of BH07. Agreement to continue BH07 to -24mCD and then pull casing to allow a move before conditions deteriorate. "As per our discussion, please continue the BH to a level of -24mCD. This should allow you to complete and move before 10AM." Client Rep: Client Rep: | mours worke | | | | 120 | | | | iont Dev | 000nt-ti | Com | • | | | | |
| Agreement to continue BH07 to -24mCD and then pull casing to allow a move before conditions deteriorate. Client Rep: | | ments | | | | | | Cli | ient Repr | esentative | Comment | S | | | | |
| Agreement to continue BH07 to -24mCD and then pull casing to allow a move before conditions deteriorate. Client Rep: | ugro GeoServices Representative Con | | | | | | | | | | | | | | | |
| deteriorate. GSL Rep: Theo Cleave Client Rep: | | | ecasted high | | | | | | "As per c | our discus | | | | | D. This should | allow you to |
| deteriorate. GSL Rep: Theo Cleave Client Rep: | Client rep contacted at shift change | | | | move bef | ore cond | ditions | | | | | | | | | • |
| GSL Rep: Theo Cleave Client Rep: | Client rep contacted at shift change | | | o allow a | | | | | | | | | | | | |
| | Client rep contacted at shift change | 4mCD and then | pull casing to | o allow a | | | | | | | | | | | | |
| | Client rep contacted at shift change | 4mCD and then | pull casing to | o allow a | | | | | | | | | | | | |
| | Client rep contacted at shift change | 4mCD and then | pull casing to | o allow a | | | | | | | | | | | | |
| igned: Signed: | Client rep contacted at shift change Agreement to continue BH07 to -2 | 4mCD and then | pull casing to | o allow a | | | | | | | | | | | | |
| igned: Signed: | Client rep contacted at shift change | 4mCD and then | pull casing to | o allow a | | | | CI | lient Re _l | p: | | | | | | |
| guesa. | Client rep contacted at shift change Agreement to continue BH07 to -2 | 4mCD and then | pull casing to | o allow a | | | | | | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | | | | | | | | | <u>_</u> | |
|----------|----------------|------------------|-------------|---------------------|-----------------------------------|----------------|---|-------------------------|--|--|
| | Job No | | | C1982 | | Vessel | Skate 3A | | Date Saturday 09-Mar-19 | |
| | | and the state of | | | | | | Na fr | | |
| То | | rch-hendersor | | | | | ly Neillings | No./email | 0141 227 3060 | |
| cc | mshuttlewort | th@arch-hend | erson.co.uk | | | Attn. Mi | hael Shuttleworth | No./email | Redact | |
| СС | stuart.innes@ | gegroup.com | | | | Attn. Stu | art Innes | No./email | | |
| | | 8-8 | | | | | | No./email | Redact | |
| СС | | | | | | Attn. | | | | |
| cc | m.chappell@t | fugro.com | | | | | thew Chappell - Nearshore Mana | ger No./email | | |
| СС | n.armstrong@ | fugro.com | | | | Attn. Nic | holas Armstrong - Reporting N | Mana No./email | Redact | |
| CC | g.crisp@fugro | | | | | | n Crisp - Project Manager | No./email | | |
| | bserved Weat | | | Wind | | | j-ot managol | 1 | L-Redact | |
| U | | | | | Sw | ell (Hs) | Sea State | Visibility | Weather Forecast | |
| | Time 00:00 | S | peed Knts | Dir | | | | - | | |
| | 00:00 | | 20 | SSW | | N/A | smooth/slight | good | | |
| | 06:00 | | 31 | SSW | | N/A | slight | good | See Below | |
| _ | | | | | | | | | | |
| | 12:00 | | 28 | WSW | | N/A | slight | good | | |
| | 18:00 | | 26 | W | | N/A | slight | good | | |
| | 00:00 | | 19 | WSW | | N/A | smooth/slight | good | | |
| | | | 1 a = Da | | • | | | | | |
| | | | Leg Pe | enetration (m) | | | | | Operational Status | |
| | BH no | L | 1 | 2 | 3 | 4 | | | Operational otatus | |
| | | | - | | | | | | | |
| | BH03 | | 2.3 | 0.8 | 1.9 | 2.7 | | | | |
| | | | | + | | | | • | D deilling agreeting and make DU02 | |
| L | | | | | | | | C | P drilling operations underway on BH03 | |
| | | | | | | | | | | |
| | | | | | | L | | | | |
| | | | | | S | ummary of O | perations / Borehole Drilling | - last 24hrs: | | |
| | From | To | | Hrs (No.) | Code | | | | Description | |
| | 00:00 | | , | | | ion Cortin | o CD drilling from 42 00 4- | 17.00 DML /!!- | | |
| <u> </u> | | 06:30 | | 6.50 | Cable Percuss | | | | able to advance casing further | |
| Щ. | 06:30 | 07:00 | | 0.50 | Rotary Drilling (C | | | | Run in Geobor S and continue BH from 17.00m | |
| | 07:00 | 08:00 |) | 1.00 | Crew Change / | TBT Nightsh | ift transfer to shore / Handove | er at CTV Quay | / Dayshift transfer to JUB / TBT | |
| | 08:00 | 09:00 |) | 1.00 | Rotary Drilling (C | oring) Continu | e BH from 17 00m to 22 50m | BMI / F O H @ | 2-23.25mCD / begin to pull casing to deck | |
| | 09:00 | 19:00 | | 10.00 | | | | | | |
| | | | | | Standby (weath | | | | weather window to move / Crew onboard monitoring conditions | |
| | 19:00 | 20:00 | | 1.00 | Crew Change / | | | | Nightshift transfer to JUB / TBT | |
| | 20:00 | 00:00 |) | 4.00 | Standby (weath | er) Winds | marginal with gusts in excecss | of limits / Swel | >1m on shelving beach / Wait for suitable weather window to move | |
| | | | | | | | | | | |
| - | | | | | | | | | | |
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| _ | | | | | | | | | | |
| | | | | | | | Weather forecast | | | |
| | | | | | Local time | 000 100 200 | 100 400 5.00 8.00 7.00 8.00 9.00 | 10.00 11.00 12.00 13:00 | 34.00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 | |
| | | | | | Wind direction | | WAN MAN MAN MAN MAN M. M. | W W W W | W W W W WSW SW SW WSW W WSW | |
| | | | | | Wind speed (kts) | | | nd 11 11 29 | 28 25 23 46 | |
| | | | | | | 12 15 14 | 15. 18. 72. 22 23 23 25 | 20 27 27 | 25 23 16 14 t3 t2 12 t) t2 | |
| | | | | | | | | | | |
| | | | | | Wind gusts (max kts) | 25 8 6 | 23 25 25 25 26 43 | | | |
| | | | | | Cloud cover Precipitation type | | * * * * * * * * | | · · · · · · · · · · · · · · · · · · · | |
| | | | | | Precipitation (mm / h) | AT | | | | |
| | | | | | Air temperature (°C) | 9.2 | | -1-1-1- | | |
| 1 | | | | | Feels like (°C) | 4 4 4 | -3 -3 -3 -4 -3 -3 76 77 75 75 74 73 68 | 2 2 1 1 | -1 -1 -1 -1 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 | |
| I | | | | | Relative humidity (%) | 81 73 77 | 76 77 75 75 74 73 68 | 65 67 63 60 | 59 65 61 66 79 80 63 61 81 83 | |
| I | | | | | Air pressure (hPa) | 991 891 991 | 991 891 891 991 892 993 | 793 995 966 706 | 997 907 968 998 108 998 998 998 997 967 | |
| I | | | | | Tide type | | 721 | 4 6 9 8 | 74 × × × × × × × × × × × × × × × × × × × | |
| I | | | | | Time Tide height (m) | 37 4 41 | 16 20 48 13 3 44 18 | 25 35 36 42 | 43 38 28 18 13 1 00 12 18 28 | |
| Health | n Safety & the | Environment | | | An integral (in) | | | 22 25 25 | | |
| | | | | | | | | | | |
| | | | | ned of very loose i | material. | | | | | |
| | | | | anging contours. | | | | | | |
| | | | | | I need to be consid | dered when ju- | lging weather windows. | | | |
| | | | | | | | | | | |
| FGSI | L Rep: Theo | Cleave | | | | | Client Re | p: | | |
| I | | | | | | | | | | |
| Sian | od: | | | | | | Signed: | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time St | ımmary | | 1 | Гoday | To Da | ate | D | ay Shift | | Night | Shift | Comp | oany | Position | |
|---|--|---------------------|-------|--|--|--|-----------|------------|-----------|-------------|------------|-----------|-----------|-----------------|---------|
| Mobilisation | | | | 0.00 | 3.50 | | | | | | JUB (mobil | | | | |
| Moving & Jacking | | | | 0.00 | 20.0 | | .lim | my Wilso | n | Joshua | | Fugro Geo | Services | Bargemaste | er |
| Rotary Drilling (Coring) | | | | | | | | _ | | | | _ | | Driller | ٠. |
| | | | | 1.50 | 7.33 | | | nes Lawso | | Adam | | Fugro Geo | | | |
| Cable Percussion | | | | 6.50 | 73.0 | | | ım Allardy | | Ashley L | owthian. | Fugro Geo | | Assistant Dri | |
| Standby (Fugro) | | | | 0.00 | 0.00 | _ | St | tuart Nye | | | | Fugro Geo | Services | Assistant Dri | ııer |
| Standby (Tide) | | | | 0.00 | 11.5 | 0 | | | | | | | | | |
| Standby (weather) | | | | 14.00 | 51.7 | | Ricl | hard Luke | er | Bart | Kot | Fug | ro | Geotechnical En | ngineer |
| Single Shift Standby | | | | 0.00 | 5.75 | 5 | | | | | | | | | |
| Other Operations | | | | 0.00 | 6.25 | 5 | The | eo Cleave | е | | | Fugro Geo | Services | Project Engin | eer |
| Crew Change / TBT | | | | 2.00 | 12.7 | | | | | | | | | , , | |
| oron onlinger 121 | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | _ | | | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | | | | | | | | | | Total Man | | | |
| | | Tota | al 2 | 24.00 | 24.0 | 0 | No. | Personn | el | 1 | 0 | Hours | | 120 | |
| | | | | | | _ | | | | | | Worked | | | |
| Project Program / P | rogress | | Pr | ogramme | d | | Today | , | Δ | Actual To D | ate | | % Program | n Completed | |
| Activity | Ţ | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | ,ug.un | | |
| | | | | 1 | 1 | | | 54.5 | | 7,10. | | 0 | | | |
| General Items, Provisional Services | | Α | | 4.0 | | | | - | | | | · · | | | 400.0 |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | — | | | 0.0 | 1 | 0.00 | 0.0 | | | 100.0 |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | T | B11 C19 | | 1 | R/O | | | 14.00 | 0.0 | 0 | 51.75 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | | 1 | R/O | 1 | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| rano to past, dow, do - HDE | | 3 319 | | 1 | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | 1 | - | | | 1 | 0.0 | U | 0.00 | | | | |
| Percussion Boring | | В | | | | ! | | 1 | | | 1 | 0.0 | | | |
| Move boring plant to site of each exploratory ho | | B1 | | 8.00 | | | <u> </u> | | 0.0 | 5 | 0.00 | | | 62.5 | |
| Extra over B1 for setting up on a gradient >20% | | B2 | | R/O | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | th | B4 | 80.00 | | | 1 | | | 49.4 | 0 | | | | 61.8 | |
| - | ui | | 36.50 | | | 4.00 | | | | | 0.00 | | | 01.0 | 00.0 |
| As B4 but between 10m and 20m | | B5 | | | | 4.00 | | | 32.9 | 0 | 0.00 | | | | 90.0 |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | n | B9 | | | R/O | | | | 0.0 | 0 | 3.00 | 0.0 | | | |
| | | | | | | | | | | | | 0.0 | | | |
| Deter Delline | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | | С | | | | | | | | | | 0.0 | | | |
| Move rotary plant to site of each exploratory hol | е | C15 | | 6.00 | | | | | 0.0 | 3 | 0.00 | | | 50.0 | |
| RC drilling between groundlevel and 10m depth | | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | | C42 | 20.50 | | | 3.00 | | | 5.7 | 0 | 0.00 | | 27.6 | | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | 2.50 | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| | | | 9.50 | 04.00 | | 2.50 | | - | | | | 0.0 | | 01.0 | |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | | E | | | | | | | | | | 0.0 | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | | 22 | | 0.0 | 116 | 0.00 | | | | |
| Bulk Disturbed Sample | | E2 | | 59.00 | | | 16 | | 0.0 | 54 | 0.00 | | 1 | | 91.5 |
| Large Bulk disturbed sample | | E3 | | R/O | | | | | | | | 0.0 | | | |
| Large bulk disturbed sample | | | | 100 | | | | | 0.0 | 0 | 0.00 | | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | | H1 | | 40 | | | 10 | | 0.0 | 21 | 0.00 | | | 52.5 | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| , | | | | | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Goognyironmontal Laboratory Testing | | | | 1 | | 1 | | 1 | 0.0 | U | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | | L | | 401 | | 1 | | | | | 1 | 0.0 | | | |
| Marine Scotland Sample | _ | L2 | | 121 | | ! | 22 | | 0.0 | 83 | 0.00 | | | 68.6 | |
| | | | | | | Ь | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | 1 | | | | | | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | l | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | + | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | - | | | | # | | | |
| | _ | | | 1 | — | ! | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmary | | | Today | | Act | tual To I | Date | | | | Lost & D | amaged | | |
| Hoc Cards | | | | 1 | | | 12 | | | | | | | | |
| Safety Drills | | | | 0 | | | 4 | | | | | | | | |
| Tool Box Talk | s | | | 1 | | | 10 | | | | | | | | |
| HSE Meeting | | | | 0 | | | 1 | | | | | | | | |
| Incidents/Near N | | | | 0 | | | 0 | | 1 | | | | | | |
| Environmenta | | | | 0 | | l | 0 | | 1 | | | | | | |
| Hours Worker | | | | 120 | | | 960 | | 1 | | | | | | |
| Fugro GeoServices Representative Com | | | | .20 | | | | ent Perr | esentativ | e Commen | ts | | | | |
| _ · | Vind speed recorded and monitored using forecasting systems (Met Office, WindFinder anonometers; handheld and station mounted. | | | | | | | | | | | | | | |
| | eters; hand | uneid and station i | | | | | | | | | | | | | |
| anonome | eters; hand | uneid and station i | | | | | CII | ient Re | p: | | | | | | |
| | eters; hand | uneid and station i | | | | | CI | ient Re | p: | | | | | | |
| anonome | eters; hand | uneid and station i | | | | | | ient Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | Ves | sel | Skate 3A | | Date | Sunday 10-Mar-19 |
|-------|--------------------|---------------|----------------|--|-------------------|-------------|-------------|-----------------------------|----------------------------|--|--|
| Ŧ. | | | | | | | | | Na (amail | 0141 227 3060 | |
| То | ANeillings@ar | | | | | Attn. | Andy Ne | | No./email | | |
| cc | mshuttleworth | | | | | Attn. | 1 | Shuttleworth | No./email | Redact | |
| СС | stuart.innes@ | gegroup.com | 1 | | | Attn. | Stuart In | nnes | No./email | Redact | |
| СС | | | | | | Attn. | | | No./email | | |
| СС | m.chappell@f | ugro.com | | | | Attn. | | Chappell - Nearshore Mana | | | |
| cc | n.armstrong@ | fugro.com | | | | Attn. | Nichola | s Armstrong - Reporting I | Mana No./email | Redact | |
| СС | g.crisp@fugro | .com | | | | Attn. | Glen Cr | isp - Project Manager | No./email | Redact | |
| 0 | bserved Weath | er | V | Vind | C.u. | oll (Ho) | | Sea State | Visibility | | Weather Forecast |
| | Time 00:00 | S | peed Knts | Dir | - Sw | ell (Hs) | | Sea State | Visibility | | Weather Forecast |
| | 00:00 | | 19 | WSW | | N/A | | smooth | good | | |
| | 06:00 | | 20 | W | | N/A | | smooth/slight | good | | See Below |
| | 12:00 | | 25 | W | | N/A | | slight | poor | | |
| | 18:00 | | 39 | W | | N/A | | slight | poor | | |
| | 00:00 | | 28 | W | | N/A | | smooth/slight | poor | | |
| | | | | | | | | I | | | |
| | | | Leg Per | netration (m) | | | | | | Operational Sta | tus |
| | BH no. | | 1 | 2 | 3 | 4 | | | | | |
| | BH03 | | 2.3 | 0.8 | 1.9 | 2. | 7 | | | | |
| _ | | | ! | | | | | | | BH03 complete | d |
| | BH04 | | 2.4 | 0.7 | 1.6 | 2. | 9 | | Awaitin | g suitable weather windo | |
| | | | | | | | | Ī | | | |
| | | | | | | | f O==== | tions / Paralt alla Dailli | loot 24har | | |
| | | | | | | ummary o | T Operat | tions / Borehole Drilling | - last 24nrs: | | |
| | From | То | | Hrs (No.) | Code | | | | | Description | |
| | 00:00 | 03:0 | | 3.00 | Standby (weath | | | | | | Vait for suitable weather window to move |
| | 03:00 | 03:3 | | 0.50 | Standby (weat | | | | | t continue to monitor condit | |
| | 03:30 | 06:0 |) | 2.50 | Moving & Jack | ting Cor | nditions r | marginal / BM jacks down | and pulls legs / | Spin JUB to BH04 / Preloa | d and jack to sage working height |
| | 06:00 | 07:3 |) | 1.50 | Cable Percuss | ion Rur | n in casir | ng to depth / Commence | CP drilling from | 0.00m to 1.00m BML | |
| | 07:30 | 08:0 |) | 0.50 | Crew Change / | TBT Day | /shift tran | nsfer to JUB / Handover of | onboard for drilli | ng continuation / TBT with a | all crew - Crew Transfers |
| | 08:00 | 11:0 |) | 3.00 | Cable Percuss | sion Cor | ntinue CF | drilling from 1.00m to 4 | .00m BML | | |
| | 11:00 | 11:4 | 5 | 0.75 | Other Operation | ons Pre | pare dec | k for forecast storm / jacl | k up beyond fore | ecast Hmax and secure all | deck items |
| | 11:45 | 12:0 |) | 0.25 | Crew Change / | TBT Tra | nsfer Da | yshift to shore as a preca | aution / Forecast | far in excess of deck oper | ations and evacuation limits. |
| | 12:00 | 19:0 |) | 7.00 | Standby (weat | her) Cor | ntinue to | monitor storm from shore | e / Avg. 35-40kt | winds, gusting >40kts | |
| | 19:00 | 19:4 | 5 | 0.75 | Crew Change / | TBT Har | ndover w | ith nightshift at accomoda | ation / Nightshift | transfer CTV Quay | |
| | 19:45 | 00:00 |) | 4.25 | Standby (weat | her) Cor | ntinue to | monitor storm from shore | e / Avg. 25-30kt | winds, gusting >30kts | |
| | | | | | , , | | | | | | |
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| | | | | | | | | Weather forecast | | | |
| | | | | Local time | | | | | | 16.00 17.00 18.00 19.00 29.00 21.00 | |
| | | | | Wind direction | WSW WSW W | SW SSW SW | SSW SSV | y SW SSE SSE SSE ESE : | SSW SW SW WSW | W WHEN WHEN THE THE WHEN | Allend, March. |
| | | | | Wind speed (kts) | | | | | 27 32 30 | 34 37 36 35 36 39 | 23 22 |
| | | | | | | | 6 6 | 5 5 9 14 15 | | | |
| | | | | Wind gusts (max k) | (5) | N 11 13 | | | at 47 46 | 47 ST 49 48 49 | |
| | | | | Cloud cover | 107 - 07 - | 2 2 0 | 0.0 | 00000 | 0.00 | 0 0 0 0 0 0 | 0.0 |
| | | | | Precipitation type | Au | | | 0 % | 7 0 | 0 4 4 6 6 6 | |
| | | | | Precipitation (mm / Air temperature (*C | | NE THE TWO | | 81 16 | | DR 05 03 NA B1 D2 | |
| | | | | Feels like (*C) | | 1 7 7 | 7 10 | 8 0 0 1 3 | 1 2 3 3 | 4 4 4 4 4 4 | 2 2 |
| | | | | Relative humidity (| | 10 12 10 | | | | 79 76 77 76 78 42 | |
| | | | | Air pressure (hPa) Tide type | | 07 997 998 | | | 100 000 001 007 2 2 2 2 | 987 088 088 892 093 095 5- 3- 3- 3- 3- 37 | 966 966 |
| | | | | Time | | 66 | | 101 N. N. W. 107 | 3 3 24 5 | 2018 | |
| | | | | Tide height (m) | 24 28 4 | 1 39 33 | 2.7 1.5 | 12 14 10 2 20 | 16 4 12 4) | 24 23 16 12 1 14 | 15 23 |
| Healt | h Safety & the | Environmen | i | | | | | | | | |
| | | | | | | | | | | | |
| Met C | Office - "High for | r unsettlad ~ | nditions for m | ich of the period | hut Medium hecor | nina I ow o | n Monda | v for details due to come | lexity in movem | ent and development of the | synontic pattern " |
| | | | | | days, forecasts u | | | | | and dovolopmont of the | |
| | | | | | ,., | | | | | | |
| rGS | L Rep: Theo | Cleave | | | | | | Client Re | p: | | |
| L. | | | | | | | | I | | | |
| Sian | ed: | | | | | | | Signed: | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time S | ımmary | | Т | oday | To Da | te | D | ay Shift | | Night | Shift | Comp | oany | Po | sition |
|--|--|----------|-------|-------------|----------|------|---------|------------|--------------|--------------|-----------|------------|-----------|-------------|----------------|
| Mobilisation | | | | 0.00 | 3.50 | | | | | Onboard . | JUB (mobi | lisation) | | | |
| Moving & Jacking | | | | 2.50 | 22.5 | 3 | Jim | my Wilso | n | Joshua | | Fugro Geo | Services | Barg | jemaster |
| Rotary Drilling (Coring) | | | | 0.00 | 7.33 | | Jam | es Lawso | on | Adam | Cook | Fugro Geo | Services | | Driller |
| Cable Percussion | | | | 4.50 | 77.5 | | | ım Allardy | | Ashley L | | Fugro Geo | | | tant Driller |
| Standby (Fugro) | | | _ | 0.00 | 0.00 | | | tuart Nye | | | | Fugro Geo | | | tant Driller |
| Standby (Tide) | | | _ | 0.00 | 11.5 | _ | | | | | | | | | |
| Standby (weather) | | | _ | 14.75 | 66.5 | _ | Ric | hard Luke | er | Bart | Kot | Fug | ro | Geotechr | nical Engineer |
| Single Shift Standby | | | _ | 0.00 | 5.75 | | 1 110 | nara zano | | Duit | 1101 | , ag | | Coologiii | nour Engineer |
| Other Operations | | | | 0.75 | 7.00 | | The | eo Cleave | ρ. | | | Fugro Geo | Services | Projec | t Engineer |
| Crew Change / TBT | | | | 1.50 | 14.2 | | | co olcave | | | | r ugro occ | OCI VICCS | 110,00 | it Engineer |
| Crew Change / TDT | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | _ | | | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | _ | | | | | | Total Man | | | |
| | | Tota | ı l : | 24.00 | 24.0 | 0 | No. | Personn | el | 1 | 0 | Hours | | 120 | |
| | | | | | 2 | | | . 0.00 | | • | • | Worked | | .20 | |
| | | | | | | | | | | | | | | | |
| Project Program / P | rogress | D 0 " | | ogrammed | | | Today | | | Actual To Da | | 4 | % Program | n Completed | |
| Activity | | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | | | |
| General Items, Provisional Services | | Α | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100.0 |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | | B11 C19 | | | R/O | | | 14.75 | 0.0 | 0 | 66.50 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| g rano to past, dow, do - HDE | | 3 5/5 | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussian Pering | | В | | | - | | - | | 0.0 | - 0 | 0.00 | 0.0 | | | |
| Percussion Boring | lo. | B P1 | | 0.00 | | | | | - | | | 0.0 | | | 75.0 |
| Move boring plant to site of each exploratory ho | | B1 | | 8.00 | | | 1 | | 0.0 | 6 | 0.00 | 0.0 | | | 75.0 |
| Extra over B1 for setting up on a gradient >20% | _ | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | th | B4 | 80.00 | | _ | 4.00 | | | 53.4 | 0 | 0.00 | | | 6 | 6.8 |
| As B4 but between 10m and 20m | | B5 | 36.50 | | | | | | 32.9 | 0 | 0.00 | | | | 90.0 |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstructio | 1 | B9 | | | R/O | | | 1 | 0.0 | 0 | 3.00 | 0.0 | | | |
| , tavanoo Bir anoogii nara osataani oi obostaosio | | 50 | | | 100 | | | | | | | 0.0 | | | |
| Date of Date of | | | | | | | | | 0.0 | 0 | 0.00 | - 11 | | | |
| Rotary Drilling | | С | | | | | | | | | | 0.0 | | | 1 |
| Move rotary plant to site of each exploratory hol | | C15 | | 6.00 | | | 1 | | 0.0 | 4 | 0.00 | | | 6 | 6.7 |
| RC drilling between groundlevel and 10m depth | | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | | C42 | 20.50 | | | | | | 5.7 | 0 | 0.00 | | 27.6 | | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | ; |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| • | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | | Е | | | | | | 1 | 0.0 | | 0.00 | 0.0 | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | | | | | | | 0.0 | | | |
| · · · · · · · · · · · · · · · · · · · | | | | | | | | | 0.0 | 116 | 0.00 | | | _ | 04.5 |
| Bulk Disturbed Sample | | E2 | | 59.00 | | | | | 0.0 | 54 | 0.00 | | | | 91.5 |
| Large Bulk disturbed sample | | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | | H1 | | 40 | | | | | 0.0 | 21 | 0.00 | | | 52.5 | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | | L | | | | | | | | | | 0.0 | | | |
| Marine Scotland Sample | | L2 | | 121 | | | | | 0.0 | 83 | 0.00 | | | | 68.6 |
| | | - | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | - | | - | | 0.0 | - 0 | 0.00 | 0.0 | | | |
| | | | | | - | | | | | - | 0.00 | 0.0 | | | |
| | | | | - | | | | 1 | 0.0 | 0 | 0.00 | -11 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | _ | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmary | | | Today | | Act | tual To | Date | | | | Lost & D | amaged | | |
| Hoc Cards | | | | 1 | | | 13 | | | | | | | | |
| Safety Drills | | | | 0 | | | 4 | | | | | | | | |
| Tool Box Talk | | | | 1 | | | 11 | | | | | | | | |
| HSE Meeting | | | | 0 | | | 1 | | | | | | | | |
| | Incidents/Near Miss | | | | | | 0 | | | | | | | | |
| Environmenta | | | | 0 | | | 0 | | | | | | | | |
| Hours Worke | | | | 120 | | | 1080 | | | | | | | | |
| | ro GeoServices Representative Comments First complex low passes over this 24 Second low currently tracking East towards North Sea, for | | | | | | Cli | ent Repr | esentativ | e Commen | IS | | | | |
| Fugro GeoServices Representative Com First com | | | | rive on sit | e in 48h | rs. | | | | | | | | | |
| Fugro GeoServices Representative Com First com | | | | rive on sit | e in 48h | rs. | CI | ient Re | p: | | | | | | |
| Fugro GeoServices Representative Con First com Second low currently tracking | | | | rive on sit | e in 48h | rs. | | ient Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | Vessel | Skate 3A | | Date | Monday 11-Mar-19 |
|-------|------------------|--------------|----------------|--------------------------------|---------------------|------------------------------------|---------------------------------------|------------------|---------------------------------|--|
| То | ANeillings@ar | ch-hendersor | n.co.uk | | | Attn. And | dy Neillings | No./email | 0141 227 3060 | |
| СС | mshuttleworth | | | | | | chael Shuttleworth | No./email | | |
| cc | stuart.innes@ | | | | | | art Innes | No./email | INCUMUI | |
| cc | ocaar chimicoes | девгоир.сот | | | | Attn. | iait iiiioo | No./email | | |
| CC | m.chappell@f | iaro com | | | | | thew Chappell - Nearshore Mana | | | |
| | n.armstrong@ | | | | | | | ~ | | |
| cc | | | | | | | holas Armstrong - Reporting I | | RECACI | |
| cc | g.crisp@fugro | | | | | Attn. Gle | en Crisp - Project Manager | No./email | —Redact— | |
| 0 | bserved Weath | | | Vind | Sw | ell (Hs) | Sea State | Visibility | | Weather Forecast |
| | Time 00:00 | S | peed Knts | Dir | | | | - | | |
| | 00:00 | | 28 | W | | N/A | smooth/slight | good | | 0 01 |
| | 06:00 | | 19 | SW | | N/A | smooth | good | | See Below |
| | 12:00 | | 20 | WSW | | N/A | smooth | good | | |
| | 18:00 | | 8 | SW | | N/A | smooth | good | | |
| | 00:00 | | 29 | SSW | | N/A | slight | good | | |
| | | | Leg Per | netration (m) | | | | | | |
| | PU no | | 1 | | 3 | 1 4 | | | Operational Sta | tus |
| | BH no. | | 1 | 2 | 3 | 4 | | | | |
| | BH04 | | 2.4 | 0.7 | 1.6 | 2.9 | | | | |
| | | | † | | | | | | CP drilling underway | on BH04 |
| | | | | | | | | | Rockhead expected at app | orox19mCD |
| | | | <u> </u> | | | | | | | |
| | | | • | | s | ummary of O | perations / Borehole Drilling | - last 24hrs: | | |
| | From | To | | Hre (Ne) | | 1 | 2. illing | | Docarintian | |
| | From | To | | Hrs (No.) | Code | \ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | -fli-sit- /C | Description (1) | 11-14 f |
| | 00:00 | 02:15 | | 2.25 | Standby (weath | | | | I ~1m on sneiving beach / v | Vait for suitable weather window to move |
| | 02:15 | 02:45 | | 0.50 | Crew Change / | | ift transfer to JUB from CTV C | | | (|
| | 02:45 | 07:00 | | 4.25 | Cable Percuss | | e deck for drilling operations / | | a scraps etc. / Continue CP | from 4.00m to 7.50m BML |
| | 07:00 | 07:15 | | 0.25 | Other Operation | | plant / Wash down and clear | | | |
| | 07:15 | 08:00 | | 0.75 | Crew Change / | | ift transfer to shore / Handove | | | |
| | 08:00 | 15:40 | | 7.67 | Cable Percuss | | ie CP drilling from 7.50m to 1 | | | e gravels |
| | 15:40 | 19:20 | | 3.67 | Cable Percuss | | 7" casing and continue CP dri | ū | | |
| | 19:20 | 20:00 |) | 0.67 | Crew Change / | TBT Dayshit | t transfer to shore / Handover | on CTV Quay | Nightshift transfer to JUB / | TBT & Fire Drill |
| | 20:00 | 22:35 | 5 | 2.58 | Cable Percuss | ion Continu | ie CP drilling from 18.00m to | 22.10m BML / I | E.O.H @ -24.10mCD / Seat | ped below Chart Datum = 2.00m |
| | 22:35 | 00:00 |) | 1.42 | Other Operation | ns Pull all | casing to deck / Wash down a | and clear deck f | or E.O.H / Fuel all plant / Ge | eneral R&M |
| | | | | | | | | | | |
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| | | | | | II | | | | | |
| | | | | | | | Weather forecast | | | |
| | | | | Local time Wind directi | | | 100 500 600 700 800 900 10 | | | |
| l | | | | Wind directi Wind speed | ALTREE A | MANY ARMY AMAN A | NOW AND MANY AND A AND A | y wsw w wsv | v sw ssw ssw s ssw ss | W S SSE SSE S |
| | | | | | 22 | 20 to ta | 10 17 10 15 14 15 15 | 5 16 18 15 | 14 16 16 12 12 1 | 7 15 21 17 14 |
| l | | | | | | | | | المستوالات | |
| l | | | | Wind gusts | | 00 00 70 | 25 21 24 M 25 2 | C IN IN IN | | 0 11 04 29 00 |
| l | | | | Cloud cover | | 0 0 0 | | | 000000 | |
| | | | | Precipitation Precipitation | | | 01 01 | | | 0 0 0 0 0 02 04 08 18 |
| | | | | Air tempera | | | | | | |
| | | | | Feels like (| | 2 2 2 | 2 2 2 1 1 1 1 | 0 0 1 | 1 1 0 0 0 | 1 -1 -1 0 1 |
| | | | | Relative hur | | | 79 78 82 82 82 70 7 | | | 2 83 80 82 82 |
| | | | | Air pressure | | 001 1002 1003 1 | | | | |
| | | | | Tide type Time | .71 | A A 74 | 811 811 | 7 7 7 2 | 7 74 2 2 2 2 | 20.38 |
| l | | | | Tide height | (m) 3.9 | | 35 26 18 13 12 13 1 | 6 24 32 37 | | 4 12 12 14 19 |
| Healt | h Safety & the | Environment | | | | | | | | |
| | | | | | | | | | | |
| Me+ C | office - "Comple | v low poor E | annee and inte | the northern Ma | orth Sea tracks con | t or SE trouch | Mon while transient ridge buil | de over LIK and | I drifts into the control and a | outhern North Sea " |
| | | | | | days, forecasts u | | | us over UN and | anno inio une central and s | oddieni iyoldi 96a. |
| | | | | | , 5, 10.000313 0 | F .3 aa 0x00 | | | | |
| FGS | L Rep: Theo | Cleave | | | | | Client Re | p: | | |
| l | | | | | | | | | | |
| Sign | ed: | | | | | | Signed: | | | |



Daily Report No.

10

| Activity Time Summ Mobilisation Moving & Jacking Rotary Drilling (Coring) Cable Percussion Standby (Fugro) Standby (Tide) Standby (Weather) Stingle Shift Standby Other Operations Crew Change / TBT | | 1 | 0.00 0.00 0.00 0.00 8.17 0.00 0.00 0.00 2.25 0.00 | 3.50 22.5 7.33 95.7 0.00 11.5 68.7 5.75 | 8 55 00 55 66 | Jam Callu St | my Wilso es Lawso m Allardy uart Nye | on yce | Joshua Adam Ashley L | Cook | Fugro Geo Fugro Geo Fugro Geo Fugro Geo | Services Services | Dr Assista | master iller nt Driller nt Driller |
|--|--------------------|----------|--|--|----------------|--------------------|---|-----------|----------------------------|----------------|--|----------------------|---------------|---|
| Rotary Drilling (Coring) Cable Percussion Standby (Fugro) Standby (Tide) Standby (weather) Single Shift Standby Other Operations | | 1 | 0.00 8.17 0.00 0.00 0.00 2.25 0.00 | 7.33 95.7 0.00 11.5 68.7 5.75 | 55 00 00 55 66 | Jam Callu St | es Lawso m Allardy uart Nye | on yce | Joshua Adam Ashley L | Sandy Cook | Fugro Geo Fugro Geo Fugro Geo | Services Services | Dr Assista | iller nt Driller |
| Cable Percussion Standby (Fugro) Standby (Tide) Standby (weather) Single Shift Standby Other Operations | | 1 | 8.17 0.00 0.00 0.00 2.25 0.00 | 95.7 0.00 11.5 68.7 5.75 | 5 0 5 5 5 6 | Callu St | m Allardy uart Nye | yce | Ashley L | | Fugro Geo | Services | Assista | nt Driller |
| Standby (Fugro) Standby (Tide) Standby (weather) Single Shift Standby Other Operations | | (| 0.00 0.00 2.25 0.00 1.67 | 0.00 11.5 68.7 5.75 | 0 5 6 | St | uart Nye | | | owthian | | | | |
| Standby (Tide) Standby (weather) Single Shift Standby Other Operations | | (| 0.00 2.25 0.00 1.67 | 11.5 68.7 5.75 | 5 | | | | | | Fugro Geo | Services | Assista | nt Driller |
| Standby (weather) Single Shift Standby Other Operations | | | 2.25 0.00 1.67 | 68.75 5.75 | 5 | Rich | nard Luke | or | | | | | | |
| Single Shift Standby Other Operations | | | 0.00 1.67 | 5.75 | 5 | 11101 | iaia Lak | | | Kot | Fug | ro | Geotechnic | al Engineer |
| Other Operations | | | 1.67 | | _ | | | CI | Duit | TOU | i ug | 10 | Geoleciiii | ai Engineer |
| Crew Change / TBT | | | 1.00 | | | The | eo Cleave | е | | | Fugro Geo | Services | Project | Engineer |
| | | | 1.92 | 16.1 | 7 | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | | | | | | | | Total Man | | I | |
| | Tota | al 2 | 4.00 | 24.0 | 0 | No. | Personn | iel | 10 | 0 | Hours Worked | | 120 | |
| | | | | | H | | | | | | Worked | | | |
| Project Program / Program | | | ogrammed | | | Today | | | ctual To Da | | H | % Progran | n Completed | |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 0 | | | |
| General Items, Provisional Services | A | | 1.0 | | | | | 0.0 | | 0.00 | U | | | 100.0 |
| Establish all plant, equipment, crew on site | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | 0.0 | | | 100.0 |
| Standing Time for plant are the MEATUES | P11 C10 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER Standing Time for plant, crew, etc - TIDE | B11 C19 B11 C19 | - | | R/O | 1 | | | 0.0 | 0 | 66.50 11.50 | 0.0 | | | |
| orang time for plant, crew, etc - TIDE | 011 019 | | | .00 | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | В | | | | 1 | | | 5.0 | | 5.00 | 0.0 | | | |
| Move boring plant to site of each exploratory hole | B1 | | 8.00 | | | | | 0.0 | 6 | 0.00 | | | | 75.0 |
| Extra over B1 for setting up on a gradient >20% | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m depth | B4 | 80.00 | | | 6.00 | | | 59.4 | 0 | 0.00 | | | | 74.3 |
| As B4 but between 10m and 20m | B5 | 36.50 | | | 10.00 | | | 42.9 | 0 | 0.00 | | | | |
| As B4 but between 20m and 30m | B6 | R/O | | | 2.10 | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | B9 | | | R/O | | | 6.08 | 0.0 | 0 | 9.08 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | С | | | | | | | | | | 0.0 | | | |
| Move rotary plant to site of each exploratory hole | C15 | | 6.00 | | | | | 0.0 | 4 | 0.00 | | | 66 | .7 |
| RC drilling between groundlevel and 10m depth | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | | | | 5.7 | 0 | 0.00 | | 27.6 | | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| Core box to be retained by client | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Occupitant Manifestory during to continue to | - | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation Small Disturbed Sample | E E1 | | 59.00 | | | 25 | | | | | 0.0 | | | |
| Bulk Disturbed Sample | E2 | | 59.00 | | | 21 | | 0.0 | 141 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | | R/O | | | 21 | | 0.0 | 75 0 | 0.00 | 0.0 | | | |
| zargo zant alotarzoa campio | 20 | | 100 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | | 40 | | | 12 | | 0.0 | 33 | 0.00 | | | | 82.5 |
| Standard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | L | | | | | | | | | | 0.0 | | | |
| Marine Scotland Sample | L2 | | 121 | | | 21 | | 0.0 | 104 | 0.00 | | | | 86.0 |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | | | | | | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | ļ | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
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| Haalth 9 Cafaty Comme | | | Today | | A == | tual To I | Dato | 0.0 | 0 | 0.00 | 0.0 Lost & D | amanod | | |
| Health & Safety Summa Hoc Cards | У | | Today 1 | | ACI | 14 | Jale | | | | LOST & D | amayea | | |
| Safety Drills | | | 1 | | | 5 | | 1 | | | | | | |
| Tool Box Talks | | | 1 | | | 12 | | 1 | | | | | | |
| 11000111 | | | 0 | | | 1 | | | | | | | | |
| HSE Meetings | | | 0 | | | 0 | | 1 | | | | | | |
| Incidents/Near Miss | | | 0 | | i | 0 | | 1 | | | | | | |
| | | | 120 | | | 1200 | | | | | | | | |



FGSL Rep: Theo Cleave

Signed:

NEARSHORE DAILY PROGRESS REPORT

Nigg Energy Park - Marine Ground Investigation

Daily Report No.

11

| | Job No | | | C1982 | | V | essel | Skate 3A | | Date | Tuesday 12-Mar-19 |
|-----|-------------------|--------------|----------------|--------------|--------------------------------|-----------|----------------|---------------------------|------------------|--|-----------------------------------|
| | ANeillings@ard | ch-hendersor | n.co.uk | | | Attn. | Andy Ne | eillings | No./email | 0141 227 3060 | |
| | mshuttleworth | @arch-hend | erson.co.uk | | | Attn. | Michael | Shuttleworth | No./email | Redact | |
| | stuart.innes@g | gegroup.com | | | | Attn. | Stuart I | nnes | No./email | Redact | |
| | | | | | | Attn. | | | No./email | Redaci | |
| | m.chappell@fu | igro com | | | | Attn. | Mathew | Chappell - Nearshore Mana | | | |
| | n.armstrong@ | | | | | Attn. | | s Armstrong - Reporting N | | | |
| | | | | | | Attn. | | isp - Project Manager | No./email | RECIACI | |
| _ | g.crisp@fugro. | | | | | Attn. | Gien Ci | isp - Project Manager | No./email | Redact | |
| U | bserved Weath | | | /ind | Sv | well (Hs) | | Sea State | Visibility | | Weather Forecast |
| | Time 00:00 | S | peed Knts | Dir | | | | | | | |
| | 00:00 | | 28 | W | | N/A | | slight | good | | |
| | 06:00 | | 20 | SW | | N/A | | smooth/slight | good | | See Below |
| | 12:00 | | 31 | SW | | N/A | | slight | good | | |
| | 18:00 | | 36 | SSW | | N/A | | slight | good | | |
| | 00:00 | | 23 | W | | N/A | | slight | good | | |
| | 00.00 | | | | | 14/73 | | Slight | good | | |
| | | | Leg Pen | etration (m) | | | | | | Operational Statu | s |
| | BH no. | | 1 | 2 | 3 | | 4 | | | | |
| - | BH04 | | 2.4 | 0.7 | 1.6 | | 2.9 | | | | |
| | 504 | | | J., | 1.0 | + | | 1 | | Pulling casing on BI | |
| | | | <u></u> | | <u> </u> | | | ĺ | | Complete to -24.10m | |
| | | | | | | | | 1 | Mon | itor weather for suitable wi | ndow to move. |
| | | | | | | | | | | | |
| | | | | | | Summar | y of Operat | tions / Borehole Drilling | - last 24hrs: | | |
| | From | To | | Hrs (No.) | Code | | | | | Description | |
| | 00:00 | 00:45 | 5 | 0.75 | Other Operat | ions F | Pull all casir | ng to deck / Wash down a | nd clear deck fo | or E.O.H / Fuel all plant / Gen | eral R&M |
| | 00:45 | 07:00 | | 6.25 | Standby (wea | | | ner system moving over si | | | |
| | 07:00 | 08:00 | | 1.00 | Crew Change | | | | | transfer to quayside to monitor | or weather |
| | 08:00 | 19:00 | | 11.00 | Standby (wea | | | | | | not onboard through v.high winds |
| | 19:00 | 20:00 | | 1.00 | Crew Change | | | TV Quay / Handover with r | | ookis, gusis - ookis / Orew i | lot onboard through viriigh winds |
| | | | | | | | | | | 0011 1 : 0011 / | |
| | 20:00 | 00:00 |) | 4.00 | Standby (wear | itner) L | arge weatr | ner system moving over si | te / winds avg. | ~22kts, gusts >30kts / | |
| | | | | | | | | | | | |
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| | | | | | | T | | | | | |
| | | | | | | | | Weather forecast | | | |
| | | | | | cal time | 0.00 | | | 10.00 GLE 153- 1 | 300 1400 1500 1600 1700 1800 190 | N 10 2100 2100 2100 |
| | | | | | cal time nd direction | 59W 98W | | | | 3.00 14.00 15.00 16.00 17.00 18.00 19.00 SW SW SSW SSW SW SSW WSW | |
| | | | | | nd direction nd speed (kts) | som: all | State Str. | an an an an aw | | | |
| | | | | *** | ne speed (Att) | 23 25 | 20 46 | a a a w | 21 26 28 | 32 34 34 35 20 21 23 | 23 20 20 10 |
| | | | | | | | 29 16 | 16 15 16 17 20 17 | | | ev 24 18 |
| | | | | w | nd gusts (max kts) | | | X X 77 | | | The second second |
| | | | | | oud cover | 44 | | n h D N W 30 | | 0 4 3 3 6 3 | A 11 13 11 |
| | | | | | ecipitation type | 67 65 | 0 0 | | | | 2 2 2 2 |
| | | | | | ecipitation (mm / h) | | AT D1 1 | 0 0 0 0 | 0.1 | 0.1 10 04 13 | 08 04 05 72 |
| | | | | Air | temperature (°C) | | 19119 | | | | THE REPORT OF |
| | | | | | els like (°C) | 1 1 | 1 1 | | 8 -7 -1 | 1 2 2 3 3 1 1 | 6 -1 3 6 |
| | | | | | lative humidity (%) | 76 B3. | 86 10 | 87 86 86 86 81 84 | 73 75 73 | 1 -2 -2 3 3 0 d 69 71 75 81 92 86 89 | 6 -1 3 6 65 66 81 64 |
| | | | | | pressure (hPa) | 966 985 | 986 986 9 | THE PRO MAD MAD 280 280 | 987 -581 980 1 | ote one oth orn oth occ see | 966 965 965 966 |
| | | | | | le type | 3 3 | 7 78 | 2 | A 2 A | 2 2 24 2 2 2 2 N | S 34 3 3 |
| | | | | Tie | | 27 2- | 306 | 8.28 | 15 2 36 | 1518 33 37 4 39 34 26 (8 | 20.56 |
| | | | | Tie | le height (m) | 47 23 | a. 30 . | 21 42 19 12 13 | 2 23 | ec. 41 9 42 28 28 18 | 14 14 19 11 |
| ,le | th Safety & the E | = | | | | | | | | | |

Client Rep: Signed:



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | | | | | _ | | | | | | | | | |
|---|---|-------|------------|-------|-----|-----------|-----------|-----------|------------|----------|-----------------|-----------|-------------|--------------|
| Activity Time Su | mmary | | Today | To Da | te | D | ay Shift | | Night | Shift | Comp | oany | Pos | sition |
| Mobilisation | | | 0.00 | 3.50 | | | | | Onboard . | | | | | |
| Moving & Jacking | | | 0.00 | 22.58 | | | my Wilso | | Joshua | | Fugro Geo | | _ | emaster |
| Rotary Drilling (Coring) | | | 0.00 | 7.33 | | | es Lawso | | Adam | | Fugro Geo | | | riller |
| Cable Percussion | | | 0.00 | 95.75 | | | m Allardy | | Ashley L | owthian. | Fugro Geo | | | nt Driller |
| Standby (Fugro) | | | 0.00 | 0.00 | _ | St | tuart Nye | | | | Fugro Geo | Services | Assista | int Driller |
| Standby (Tide) | | | 0.00 | 11.50 | _ | | | | | | _ | | | |
| Standby (weather) | | | 21.25 | 90.00 | | Rich | hard Luke | er | Bart | Kot | Fugi | ro | Geotechni | cal Engineer |
| Single Shift Standby | | | 0.00 | 5.75 | | Th | 01 | | | | F C | Ci | Desir et | Fi |
| Other Operations | | | 0.75 | 9.42 | | ine | eo Cleave | е | | | Fugro Geo | Services | Project | Engineer |
| Crew Change / TBT | | - | 0.00 | 18.17 | | | | | | | | | | |
| | | + | 0.00 | 0.00 | | | | | | | | | | |
| | | -+ | 0.00 | 0.00 | _ | | | | | | | | | |
| | | -+ | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | | | | | | | | Total Man | | | |
| | | Total | 24.00 | 24.00 | 0 | No. | Personn | el | 1 | 0 | Hours Worked | | 120 | |
| | | | | | | | | | | | Worked | | | |
| Project Program / P | | | Programmed | | | Today | | Α | ctual To D | | 1 | % Progran | n Completed | |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | | | 1 |
| General Items, Provisional Services | Α | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100.0 |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | B11 C19 | | | R/O | | | 21.25 | 0.0 | 0 | 87.75 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | B11 C19 | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory ho | e B1 | | 8.00 | | | | | 0.0 | 6 | 0.00 | | | | 75.0 |
| Extra over B1 for setting up on a gradient >20% | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | th B4 | 80.00 | 0 | | | | | 59.4 | 0 | 0.00 | | | | 74.3 |
| As B4 but between 10m and 20m | B5 | 36.50 | 0 | | | | | 42.9 | 0 | 0.00 | | | | |
| As B4 but between 20m and 30m | B6 | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | в В9 | | | R/O | | | | 0.0 | 0 | 9.08 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | С | | | | | | | 0.0 | | 0.00 | 0.0 | | | |
| Move rotary plant to site of each exploratory hole | | | 6.00 | | | | | 0.0 | 4 | 0.00 | | | 66 | 5.7 |
| RC drilling between groundlevel and 10m depth | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | | | | 5.7 | 0 | 0.00 | | 27.6 | | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 5.7 | 0 | 0.00 | | | 61.6 | |
| Core box to be retained by client | C49 | 3.50 | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | 01.0 | |
| core box to be retained by enem | 0.0 | _ | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | Е | | _ | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Small Disturbed Sample | E1 | | 59.00 | | | | | 0.0 | 444 | 0.00 | 0.0 | | | |
| Bulk Disturbed Sample | E2 | _ | 59.00 | | | | | 0.0 | 141 75 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | _ | R/O | | | | | 0.0 | | 0.00 | 0.0 | | | |
| Large Bulk distarbed sample | | _ | 100 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | _ | 40 | | | | | 0.0 | 33 | 0.00 | 0.0 | | | 82.5 |
| Standard Penetration Test in Boteriole Standard Penetration Test in Rotary Drill Hole | H2 | _ | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | 02.5 |
| Standard Penetration Test III Notary Drill Flore | 112 | _ | - NO | | | | | 0.0 | | | H | | | |
| Goognaironmental Laboratory Tastin | | _ | | 1 | | | 1 | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | L | | 121 | | | - | | | 10. | 0.00 | 0.0 | | | 86.0 |
| Marine Scotland Sample | L2 | + | 121 | | | | 1 | 0.0 | 104 | 0.00 | 0.0 | | | 80.0 |
| Additional Items | | _ | | 1 | | | 1 | 0.0 | 0 | 0.00 | 0.0 | | | |
| nuuruolidi iteliis | | 4- | | 1 | | | 1 | 0.0 | - | 0.00 | 0.0 | | | |
| | | +- | | 1 | | | 1 | 0.0 | 0 | 0.00 | 0.0 | | | |
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| | | +- | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmary | | Today | 1 | Act | tual To I | Date | 0.0 | U | 0.00 | 0.0 Lost & D | honeme | | |
| Health & Sarety Su Hoc Cards | aı y | _ | | | Act | | Dait | | | | LUST & D | umayeu | | |
| Hoc Cards Safety Drills | | + | 0 | | | 15 5 | | ł | | | | | | |
| Tool Box Talk | 3 | | 1 | | | 13 | | 1 | | | | | | |
| | HSE Meetings | | | | | | | 1 | | | | | | |
| Incidents/Near N | Incidents/Near Miss | | | | | | | 1 | | | | | | |
| | Environmental | | | | | | | | | | | | | |
| Hours Worked | | | 120 | | | 1320 | | <u> </u> | | | | | | |
| Fugro GeoServices Representative Com | Gap between weather systems developing over the Monitor development for possible move win | | | | | | | esentativ | e Commen | ts | | | | |
| | | | | | | | | | | | | | | |
| Monitor de | | | | | | CI | ient Re | p: | | | | | | |
| | | | | | | | ient Re | p: | | | | | | |



Daily Report No.

12

Nigg Energy Park - Marine Ground Investigation

C1982 Skate 3A Wednesday 13-Mar-19 0141 227 3060 ANeillings@arch-henderson.co.uk No./emai Attn. Andy Neillings nshuttleworth@arch-henderson.co.uk Michael Shuttleworth No./email Redact Redact cc cc cc cc stuart.innes@gegroup.com Attn. Stuart Innes No./email Attn. No./email Mathew Chappell - Nearshore Manager No./email Nicholas Armstrong - Reporting Mana No./email m.chappell@fugro.com Attn. Redact n.armstrong@fugro.com lttn. g.crisp@fugro.com Glen Crisp - Project Manager

| | | | | | | REDACI |
|------------------|------------|------|------------|---------------|------------|------------------|
| Observed Weather | W | /ind | Swell (Hs) | Sea State | Visibility | Weather Forecast |
| Time 00:00 | Speed Knts | Dir | Swell (HS) | Sea State | Visibility | Weather Forecast |
| 00:00 | 28 | W | N/A | slight | good | |
| 06:00 | 37 | WNW | N/A | smooth | good | See Below |
| 12:00 | 21 | W | N/A | smooth | good | |
| 18:00 | 34 | WSW | N/A | slight | good | |
| 00:00 | 23 | SSW | N/A | smooth/slight | good | |

 Leg Penetration (m)

 BH no.
 1
 2
 3
 4

 BH04
 2.4
 0.7
 1.6
 2.9

Operational Status

BH04 complete
Awaiting weather window to move to BH05

| | | | | 1 |
|-------|-------|-----------|-------------------|---|
| | | | | ry of Operations / Borehole Drilling - last 24hrs: |
| From | То | Hrs (No.) | Code | Description |
| 00:00 | 00:45 | 0.75 | Standby (weather) | Await weather window for move to BH05 / Nightshift continue to monitor |
| 00:45 | 07:00 | 6.25 | Standby (weather) | Await weather window for move to BH05 / Wind average <30kts |
| 07:00 | 08:00 | 1.00 | Crew Change / TBT | Nightshift transfer to shore / Handover at CTV Quay / Dayshift transfer to JUB / TBT & Abandonment Drill |
| 08:00 | 13:00 | 5.00 | Standby (weather) | Await weather window for move to BH05 / Wind dropping to within operational limits / Monitor closely |
| 13:00 | 15:15 | 2.25 | Moving & Jacking | Jack down and pull legs / Move ~53m directly S from BH04 / Cannot pull JUB West against wind / Abort move |
| 15:15 | 16:45 | 1.50 | Standby (weather) | Jack up and await window / Client contacted / Client Instruction to commence drilling 17m from BH05 |
| 16:45 | 19:00 | 2.25 | Cable Percussion | Run in 8" casing to mudline / Commence CP drilling from 0.00m to 2.00m BML |
| 19:00 | 19:20 | 0.33 | Other Operations | Fuel all plant and RHIB / Wash down for E.O.S |
| 19:20 | 20:00 | 0.67 | Crew Change / TBT | Dayshift transfer to shore / Handover on CTV Quay / Nightshift transfer to JUB / TBT & Abandonment Drill |
| 20:00 | 00:00 | 4.00 | Cable Percussion | Continue CP drilling from 2.00m to 7.00m BML |
| | | | | |
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Health Safety & the Environment

Met Office - "Deep low in central North Sea moves east to reach northern Denmark by this evening then to Sweden by Thur. Another low moves from near Iceland on a similar track on Thur with ridge briefly moving east over central and southern North Sea overnight into Fri."

Continue to monitor onditions closely, forecasts up to and exceeding 40kts.

| ı | FGSL Rep: Theo Cleave | Client Rep: |
|---|-----------------------|-------------|
| | Signed: | Signed: |



Daily Report No.

12

| Activity Time Summ | ary | T | oday | To Da | ite | D | ay Shift | | Night | Shift | Com | pany | Posi | tion |
|--|----------|-------|-----------------|-------|------|--------------|-----------|------------|--------------------|------------|-----------------|-----------|------------|---------------|
| Mobilisation | | (| 0.00 | 3.50 |) | | | | Onboard . | JUB (mobil | lisation) | | | |
| Moving & Jacking | - | _ | 2.25 | 24.8 | | | ny Wilso | n | Mark | Bray | Fugro Geo | | Barger | |
| Rotary Drilling (Coring) | | | 0.00 | 7.33 | | | m Allardy | /ce | Adam | | Fugro Geo | | Dril | |
| Cable Percussion | | | 6.25 | 102.0 | | St | uart Nye | | Ashley L | .owthian | Fugro Geo | | Assistar | |
| Standby (Fugro) | | | 0.00 | 0.00 | | | | | | | Fugro Geo | oservices | Assistar | t Driller |
| Standby (Tide) Standby (weather) | | | 0.00 3.50 | 11.5 | | Dick | ard Luke | or. | Bart | Kot | Fug | Iro | Geotechnic | al Engineer |
| Single Shift Standby | | | 0.00 | 5.75 | | IXICI | iaiu Luke | 21 | Dan | Rot | rug | 10 | Geolecinic | ai Liigiileei |
| Other Operations | | | 0.33 | 9.75 | | The | o Cleave | Э | | | Fugro Geo | Services | Project E | ngineer |
| Crew Change / TBT | | | 1.67 | 19.8 | | | | | | | 3 | | | <u> </u> |
| , | | | 0.00 | 0.00 | | | | | | | | | | |
| | | (| 0.00 | 0.00 |) | | | | | | | | | |
| | | (| 0.00 | 0.00 |) | | | | | | | | | |
| | | _ | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | J.00 | 0.00 | _ | | | | | | Total Man | l l | | |
| | Tota | al 2 | 4.00 | 24.0 | 0 | No. I | Personn | el | 9 |) | Hours Worked | | 108 | |
| | | | | | | | | | | | worked | | | |
| Project Program / Program Activity | BoQ Item | m. | ogrammed No. | Hours | m. | Today No. | Hours | m. | ctual To Da No. | Hours | 1 | % Program | Completed | |
| General Items, Provisional Services | A | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100.0 |
| , , , , , | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | B11 C19 | | | R/O | | | | 0.0 | 0 | 87.75 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | B11 C19 | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| . , , | 1 | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | В | | | | | | | | T - | 1 | 0.0 | | | |
| Move boring plant to site of each exploratory hole | B1 | | 8.00 | | | 1 | | 0.0 | 7 | 0.00 | | | | 87.5 |
| Extra over B1 for setting up on a gradient >20% | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m depth | B4 | 80.00 | | | 7.00 | | | 66.4 | 0 | 0.00 | | | | 83.0 |
| As B4 but between 10m and 20m | B5 | 36.50 | | | | | | 42.9 | 0 | 0.00 | | | | |
| As B4 but between 20m and 30m | B6 | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | В7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | B9 | | | R/O | | | | 0.0 | 0 | 9.08 | 0.0 | | | |
| | † | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | С | | | | | | | 0.0 | | 5.00 | 0.0 | | | |
| Move rotary plant to site of each exploratory hole | C15 | | 6.00 | | | 1 | | 0.0 | 5 | 0.00 | | | | 83.3 |
| RC drilling between groundlevel and 10m depth | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | | | | 5.7 | 0 | 0.00 | | 27.6 | | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| Core box to be retained by client | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | Е | | | | | | | | | | 0.0 | | | |
| Small Disturbed Sample | E1 | | 59.00 | | | | | 0.0 | 142 | 0.00 | | | | |
| Bulk Disturbed Sample | E2 | | 59.00 | | | | | 0.0 | 75 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | | 40 | | | | | 0.0 | 33 | 0.00 | | | | 82.5 |
| Standard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | L | | | | | | | | | | 0.0 | | | |
| Marine Scotland Sample | L2 | | 121 | | | | | 0.0 | 104 | 0.00 | | | | 86.0 |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | | | | | | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Summa | ry | | Today | | Act | tual To [| Date | | | | Lost & D | amaged | | |
| Hoc Cards | | | 1 | | | 16 | | | | | | | | |
| Safety Drills | | | 1 1 | | | 6 | | | | | | | | |
| Tool Box Talks HSE Meetings | | | 0 | | | 14 | | | | | | | | |
| Incidents/Near Miss | | | 0 | | | 0 | | | | | | | | |
| Environmental | | | 0 | | | 0 | | | | | | | | |
| Hours Worked | | | 108 | | | 1428 | | | | | | | | |
| Fugro GeoServices Representative Commen | ts | | | | | Clie | ent Repr | esentative | Comment | ts | | | | |
| | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | Cli | ent Re | p: | | | | | | |
| p oo∟ nep. Hieu cieave | | | | | | 1 " | - 1 | - | | | | | | |
| • | | | | | | I. | _ | | | | | | | |
| Signed: | | | | | | Siç | gned: | | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | JOD NO | | | C1902 | | vessei | J. | ale SA | | Date | mursuay 14-Mar-19 |
|---------|---------------------|--------------|-------------|--|---------------------|---------------|----------------------|----------------|------------------|-------------------------------------|--|
| То | ANeillings@arch | -henderson. | co.uk | | | Attn. An | dy Neillings | | No./email | 0141 227 3060 | |
| СС | mshuttleworth@ | | | | | | chael Shuttleworth | | No./emai | | |
| СС | stuart.innes@ge | | | | | | uart Innes | | No./email | NEGGGG | |
| cc | | | | | | Attn. | • | | No./email | | |
| cc | m.chappell@fugi | ro.com | | | | | thew Chappell - Nea | arshore Manag | | | |
| cc | n.armstrong@fu | | | | | | cholas Armstrong - | | | | |
| CC | g.crisp@fugro.co | | | | | | en Crisp - Project I | | No./email | | |
| | bserved Weather | _ | ٧ | Vind | | | | | | Renaci- | |
| | Time 00:00 | | eed Knts | Dir | Sw | ell (Hs) | Sea Sta | ate | Visibility | | Weather Forecast |
| | 00:00 | | 23 | SSW | | N/A | smoot | h | good | | |
| | 06:00 | | 25 | WSW | | N/A | smoot | h | good | | See Below |
| | 12:00 | | 22 | WSW | | N/A | smoot | h | good | | |
| | 18:00 | | 22 | SW | | N/A | smoot | h | good | | |
| | 00:00 | | 22 | WSW | | N/A | smoot | h | good | | |
| | | • | Lea Per | netration (m) | • | | | | | | |
| | DU | | | . ` ' | 3 | 4 | | | | Operationa | al Status |
| _ | BH no. | | 1 | 2 | | | | | | | |
| | BH05 | | 1.8 | 1.7 | 2.5 | 2.6 | | | | | |
| | | | | | | | | | | CP drilling unde | erway on BH05 |
| | | | | | | | | | | = | - |
| | | | | | | | | | | | |
| | | | | | S | ummary of O | perations / Boreh | ole Drilling - | last 24hrs: | | |
| | From | То | | Hrs (No.) | Code | | | | | Description | |
| | 00:00 | 07:00 | | 7.00 | Cable Percuss | ion Continu | ue CP drilling from | 7.00m to 12. | .00m BML / B | reak down and swap o | over bailer |
| | 07:00 | 07:15 | | 0.25 | Other Operation | ns Wash | down clear down fo | or E.O.S / Fue | el all plant | | |
| | 07:15 | 08:00 | | 0.75 | Crew Change / | | | | | | JUB / TBT & Man Overboard Drill |
| | 08:00 | 12:15 | | 4.25 | Cable Percuss | ion Continu | ue CP drilling from | 12.00m to 1 | 4.50m BML / | Chisel between 12.20 | - 12.50m, large gravels |
| | 12:15 | 16:00 | | 3.75 | Rotary Drilling (Co | | | | | | 25mCD / Pull all casing to deck |
| | 16:00 | 19:30 | | 3.50 | Standby (weath | | | | | r operational limits for | |
| | 19:30 | 20:15 | | 0.75 | Crew Change / | | | | | | JUB / TBT & Man Overboard Drill |
| | 20:15 | 00:00 | | 3.75 | Standby (weath | ner) Await v | eather window for | move to BH0 | 05 / Nightshift | continue to monitor | |
| | | | | | | | | | | | |
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| | | | | | | • | Weather fore | caet | | | |
| | | | | Local time | 0.00 1.00 2.00 | 300 400 500 | | | 200 1300 1400 | 15.00 16.00 17.00 18.00 19.0 | 00 30:00 21:00 27:00 27:00 |
| | | | | Wind direction | sw sw w | | | | | WSW WSW WSW SW. SW | |
| | | | | Wind speed (kts) | | | | | | 16 16 15 14 16 | |
| | | | | | 14 11 14 | 14 13 14 | 15 17 15 11 | | 11 11 12 | 10 10 15 14 10 | 13 |
| l | | | | Wind gusts (max kts) | 00 33 32 | D 26 | 25 25 25 25 | 20 20 | 21 21 31 | 20 20 21 71 11 | FOR STATE OF |
| I | | | | Cloud cover | 2 2 1 | 1 1 2 | | | | * * 0 0 h | |
| I | | | | Precipitation type | | 9 | 8 0 | | 0 0 | | |
| | | | | Precipitation (mm / h) Air temperature (°C) | N 100 1 100 | 0.3 | | | 0.1 0.1 | | 1 02 1 08 |
| I | | | | Feels like (°C) | | | 0 0 0 1 | 1. 2. | 2 2 2 | 2 2 2 1 1 | |
| I | | | | Relative humidity (%) | | | | | | 81 80 81 83 84 | |
| I | | | | Air pressure (hPa) Tide type | | | | | | 992 992 993 993 기 기 가 뇌 뇌 | |
| I | | | | Tide type Time | | 433 | | 9.56 | | 17.03 | 22'46 |
| | | | | Tide height (m) | 19 23 28 | | | | 1.9 22 28 | 31 34 36 35 3 | |
| Healt | th Safety & the En | vironment | | | | | | | | | |
| Met (| Office: "A low move | es east near | Shetland on | Friday morning t | hen fills near Norw | ay on Saturda | y morning. Anothe | er low is expe | ected over Irela | and deepening as it pu | ushes northeast through the UK. This low continues to |
| | en as as it moves i | | | | | | | | | | - |
| FGS | L Rep: Theo C | leave | | | | | | Client Rep |): | | |
| ľ | | | | | | | | | | | |
| Sigr | ned: | | | | | | | Signed: | | | |
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Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time So | ımmarv | <u> </u> | Today | To Da | ıto. | D | ay Shift | | Night | Shift | Com | pany | Posit | ion |
|---|----------|----------|----------|-------|------|-----------|--|------------|------------|------------|--------------------|-----------|-------------|------------|
| Mobilisation Activity Time St | | | 0.00 | 3.50 | | J. | ay Oillit | | | JUB (mobil | | pany | Fosit | |
| Moving & Jacking | | | 0.00 | 24.8 | | Jimi | my Wilso | | Mark | | Fugro Ge | oServices | Bargem | aster |
| Rotary Drilling (Coring) | | | 3.75 | 11.0 | _ | | m Allardy | | Adam | | Fugro Ge | | Drille | |
| Cable Percussion | | | 11.25 | 113.2 | | | stin Smith | | Ashley L | | - | oServices | Assistant | |
| Standby (Fugro) | | | 0.00 | 0.00 | | | | | | | | oServices | Assistant | |
| Standby (Tide) | | | 0.00 | 11.5 | | | | | | | | | | |
| Standby (weather) | | | 7.25 | 110.7 | | Rich | nard Luke | er | Bart | Kot | Fug | ıro | Geotechnica | l Engineer |
| Single Shift Standby | | | 0.00 | 5.75 | | | | | | | - | | | |
| Other Operations | | | 0.25 | 10.0 | 0 | The | eo Cleave | е | | | Fugro Ge | oServices | Project Er | ngineer |
| Crew Change / TBT | | | 1.50 | 21.3 | 3 | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 |) | | | | | | | | | |
| | т | otal | 24.00 | 24.0 | 0 | No. I | Personn | ol. | g | | Total Man Hours | | 108 | |
| | • | Jiai | 24.00 | 24.0 | o l | 140.1 | reisoiiii | CI . | ٠ | ' | Worked | | 100 | |
| | | | | • | | | | | | | | • | | |
| Project Program / P | | | rogramme | | | Today | | | ctual To D | | | % Prograi | m Completed | |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 0 | | | |
| General Items, Provisional Services | Α | | 4.0 | | | | | l | | _ | 0 | | | 400.0 |
| Establish all plant, equipment, crew on site | A2 | | 1.0 | | | | l | 0.0 | 1 | 0.00 | 0.0 | | | 100.0 |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | B11 C19 | | | R/O | | | | 0.0 | 0 | 87.75 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | B11 C19 | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory ho | e B1 | | 8.00 | | | | | 0.0 | 7 | 0.00 | | | | 87.5 |
| Extra over B1 for setting up on a gradient >20% | B2 | | R/O | | Ĺ | L | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | | 80.00 | | | 3.00 | | | 69.4 | 0 | 0.00 | | | | 86.8 |
| As B4 but between 10m and 20m | B5 | 36.50 | | | 4.50 | | | 47.4 | 0 | 0.00 | | | | |
| As B4 but between 20m and 30m | B6 | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | | | | R/O | | | | 0.0 | 0 | 9.08 | 0.0 | | | |
| | - | | | 100 | | | | | | | 0.0 | | | |
| Rotary Drilling | С | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | 6.00 | | | | | | | | 0.0 | | | 83.3 |
| Move rotary plant to site of each exploratory hol | | R/O | 0.00 | | | | | 0.0 | 5 | 0.00 | 0.0 | | | 00.0 |
| RC drilling between groundlevel and 10m depth | C41 | | | | 0.00 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 20.50 | | | 3.00 | | | 8.7 | 0 | 0.00 | | | 42.2 | |
| As C41 but between 20m and 30m | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| Core box to be retained by client | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | E | | | | | | | | | | 0.0 | | | |
| Small Disturbed Sample | E1 | | 59.00 | | | 16 | | 0.0 | 158 | 0.00 | | | | |
| Bulk Disturbed Sample | E2 | | 59.00 | | | 14 | | 0.0 | 89 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | | 40 | | | 8 | | 0.0 | 41 | 0.00 | | | | |
| Standard Penetration Test in Rotary Drill Hole | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| • | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | L | | 1 | | | | | 3.0 | Ť | 2.00 | 0.0 | | | |
| Marine Scotland Sample | L2 | | 121 | | | 10 | | 0.0 | 114 | 0.00 | | | | 94.2 |
| | - | 1 | <u> </u> | | | | | 0.0 | 0 | 0.00 | 0.0 | | | U T.Z |
| Additional Items | | | 1 | | | | | 0.0 | U | 0.00 | 0.0 | | | |
| - Maria Italia | | | 1 | - | | | 1 | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | + | + | - | | - | | 0.0 | | 0.00 | 0.0 | | | |
| | | + | 1 | | | | l | 0.0 | 0 | 0.00 | # | | | |
| | | - | 1 | - | | | - | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | _ | | | | | ļ | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | . | | _ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmary | | Today | | Act | tual To [| Date | | | | Lost & D | Damaged | | |
| Hoc Cards | | | 1 | | | 17 | | l | | | | | | |
| Safety Drills Tool Box Talk | | | 1 | | | 7 15 | | l | | | | | | |
| HSE Meeting: | | | 0 | | | 1 | | l | | | | | | |
| Incidents/Near N | | + | 0 | | | 0 | | l | | | | | | |
| Environmenta | | + | 0 | | | 0 | | l | | | | | | |
| Hours Worker | | | 108 | | | 1536 | | 1 | | | | | | |
| Fugro GeoServices Representative Com | | | | | | | ent Repr | esentative | Commen | s | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | Cli | ient Re | p: | | | | | | |
| FGSL Rep: Theo Cleave Signed: | | | | | | | ient Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | | Vessel | Skate 3A | ١. | | Date | Friday 15-Mar-19 |
|-------|------------------|----------------|----------------|---------------------------------|-----------|------------|--|---------------------------|-----------------|----------------|----------------------|--|
| То | ANeillings@ar | rch-henderso | n.co.uk | | | Attn. | And | y Neillings | | No./email | 0141 227 30 | 60 |
| СС | mshuttlewort | | | | | Attn. | | nael Shuttleworth | | No./email | Redac | + |
| cc | stuart.innes@ | | | | | Attn. | | rt Innes | | No./email | Redac | |
| CC | | | - | | | Attn. | | | | No./email | KEOSC | ! |
| CC | m.chappell@f | ugro.com | | | | Attn. | Mat | hew Chappell - Nearshore | Manager | No./email | | |
| CC | n.armstrong@ | | | | | Attn. | | olas Armstrong - Reportin | | | Desta | |
| CC | g.crisp@fugro | | | | | Attn. | | Crisp - Project Manager | -6 ivianagei | No./email | Redac | |
| | bserved Weath | | | Wind | | | | | | | ⊥Redac | |
| Ť | Time 00:00 | | Speed Knts | Dir | | Swell (H | s) | Sea State | V | /isibility | | Weather Forecast |
| | 00:00 | | 22 | WSW | | N/A | | smooth | | good | | |
| | 06:00 | | 25 | W | | N/A | | smooth/slight | | good | | See Below |
| | 12:00 | | 38 | W | | N/A | | slight | | good | | |
| | 18:00 | | 29 | W | | N/A | | slight | | good | | |
| | 00:00 | | 23 | SW | | N/A | | smooth | | good | | |
| | | | | netration (m) | | | | | | 3 | | |
| | | | | | | | | | | | Operati | onal Status |
| | BH no. | | 1 | 2 | 3 | | 4 | | | | | |
| | BH05 | | 1.8 | 1.7 | 2.5 | | 2.6 | | | | | |
| | | | | | | | | | | Δw | aiting weather w | indow to move to BH06 |
| | | | | | | | | | | Α | aiting weather w | indow to move to Bride |
| | | | | | | | | | | | | |
| | | | | | | Summa | ary of Op | erations / Borehole Dr | rilling - las | st 24hrs: | | |
| | From | То | | Hrs (No.) | Cod | de | | | | | Description | on |
| | 00:00 | 07:0 | 0 | 7.00 | Standby (| | Await we | eather window for move | to BH05 / | / Nightshift o | | |
| | 07:00 | 08:0 | | 1.00 | Crew Char | | | | | | | to JUB to continue to monitor weather |
| | 08:00 | 11:0 | 0 | 3.00 | Standby (| _ | | onboard to monitor wea | | | _ | |
| | 11:00 | 14:0 | 0 | 3.00 | Standby (| weather) | Dayshift | transfer to shore ahead | d of foreca | ast gales / Si | horeside storage a | area prepared for demobilisation |
| | 14:00 | 19:0 | 0 | 5.00 | Standby (| weather) | Dayshift | continue to monitor wea | ather for c | opportunity t | o move to BH06 | |
| | 19:00 | 20:0 | | 1.00 | Crew Char | nge / TBT | Dayshift | transfer to shore / Hand | dover at a | ccomodatio | n / Nightshift trans | fer to Quay to continue monitoring conditions |
| | 20:00 | 00:0 | 0 | 4.00 | Standby (| weather) | Nightshi | ft continue to monitor w | eather for | opportunity | to move to BH06 | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | | | | | | | | Weather forecast | | | | |
| | | | | Local time | | | 300 400 SW SW | 500 800 700 800 500 to | 1.00 11.00 12.0 | | | 90 20:00 21:00 22:00 23:00 W W W WSW SW |
| | | | | Wind direction Wind speed (| | 3W 3W 3W | Ser Ser | | | | | |
| | | | | | | 12 12 14 | 15 13 | 16 20 24 27 27 3 | N 30 31 | 34 33 | M 52 10 29 3 | 6 26 21 17 14 |
| | | | | | | 12 12 14 | 17 | | | | | |
| | | | | Wind gusts (r Cloud cover | nax kfs) | B [B] 21 | 25. | 21 21 H H H | 65 E5 E5 | K1 48 | 57 50 43 41 | |
| | | | | Precipitation t | ype | 4 4 7 | 7 | | | | | |
| | | | | Precipitation | | | 0.3 | 29 62 63 81 8 | 4 62 | | | |
| | | | | Air temperatu Feets like (*C | | 1 1 1 | 4 1 | 1 1 4 4 2 3 | 2 2 4 | તે ત | 1 2 2 2 3 | 3 3 3 3 3 |
| | | | | Relative humi | | | | 90 83 80 78 75 7 | 74 74 74 | M 72 | 71 71 71 75 7 | |
| | | | | Air pressure | | | - | 983 984 984 985 986 98 | | | | |
| | | | | Tide type Time | | | | 4.38 | 11.27 | | 10.16 | |
| | | | | Tide height (r | n) | 18 2 23 | 27 11 | 34 34 32 27 22 1 | 9 18 18 | 18 2 3 | 24 28 31 35 3 | 4 51 27 25 2 |
| Healt | h Safety & the | Environmen | it | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | Norway on | Saturday | morning. Another low i | is expecte | ed over Irelai | nd deepening as i | pushes northeast through the UK. This low continues to |
| deepe | en as as it move | es into the ce | ntral North Se | a early on Sunday | ." | | | | | | | |
| FGS | L Rep: Theo | Cleave | | | | | | Clien | nt Rep: | | | |
| | - | | | | | | | | • | | | |
| Sign | ed: | | | | | | | Signe | ed: | | | |
| | | | | | | | | | | | | |



Daily Report No.

14

| Activity Time Sum | nary | Т | oday | To Date | | Da | ay Shift | | Night | Shift | Com | pany | Posi | tion |
|--|----------|-------|-------------|------------------|------|----------|-----------|-----------|-------------|-----------|-----------|------------|--------------|-------------|
| Mobilisation | | _ | 0.00 | 3.50 | | | | | | JUB (mobi | | | | |
| loving & Jacking | | | 0.00 | 24.83 | | | ny Wilso | | Mark | | Fugro Ge | | Barger | |
| otary Drilling (Coring) | | | 0.00 | 11.08 | | | m Allardy | | Adam | | Fugro Ge | | Dril | |
| able Percussion | | | 0.00 | 113.25 | | Jus | tin Smith | 1 | Ashley L | owthian | Fugro Ge | | Assistar | |
| tandby (Fugro) | | | 0.00 | 0.00 | | | | | | | Fugro Ge | oServices | Assistar | t Driller |
| tandby (Tide) | | | 0.00 | 11.50 | | | | | | | | | | |
| tandby (weather) | | | 22.00 | 132.75 | | Rich | ard Luke | er | Bart | Kot | Fug | ro | Geotechnic | al Engineer |
| ingle Shift Standby | | | 0.00 | 5.75 | | | | | | | | | | |
| ther Operations | | | 0.00 | 10.00 | | The | o Cleave | 9 | | | Fugro Ge | oServices | Project E | ngineer |
| rew Change / TBT | | | 2.00 | 23.33 | | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | 0.00 | 0.00 | - | | | | | | | | | |
| | | | 0.00 | 0.00 | | | | | | | Total Man | ı | | |
| | Tota | al 2 | 24.00 | 24.00 | | No. I | Personn | el | 9 |) | Hours | | 108 | |
| | | | | | | | | | | | Worked | | | |
| Project Program / Prog | ress | Pre | ogrammed | 1 | | Today | | Δ. | Actual To D | ate | | % Program | n Completed | |
| Activity | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 1 | /01 logial | ii Compicica | |
| eneral Items, Provisional Services | Α | | | | | | | | | | 0 | | | |
| stablish all plant, equipment, crew on site | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100 |
| an plain, equipment, frew on aire | - FIL | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| anding Time for plant, crew, etc - WEATHER | B11 C19 | | | R/O | | | 22.00 | 0.0 | 0 | 132.75 | 0.0 | | | |
| tanding Time for plant, crew, etc - WEATHER tanding Time for plant, crew, etc - TIDE | B11 C19 | | | R/O | -+ | | 50 | 0.0 | 0 | 11.50 | 0.0 | | | |
| arrowing rime for plant, crew, etc - TIDE | 011 019 | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| ercussion Boring | В | | | + | -+ | | | 0.0 | U | 0.00 | 0.0 | | | |
| ercussion Boring ove boring plant to site of each exploratory hole | B B1 | | 8.00 | | -+ | | | | | 0.00 | 0.0 | | | 87 |
| | B1 B2 | | 8.00 R/O | | | | - | 0.0 | 7 | 0.00 | 0.0 | | | 0/ |
| eak out surface obstructions where present | | | K/U | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | B3 | 00.00 | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | 00 |
| dvance BH between groundlevel and 10m depth | B4 | 80.00 | | \vdash | | | | 69.4 | 0 | 0.00 | | | | 86. |
| s B4 but between 10m and 20m | B5 | 36.50 | | \vdash | | | | 47.4 | 0 | 0.00 | | | | |
| s B4 but between 20m and 30m | B6 | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| s B4 but between 30m and 40m | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| dvance BH through hard stratum or obstruction | B9 | | | R/O | | | | 0.0 | 0 | 9.08 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| otary Drilling | С | | | | | | | | | | 0.0 | | | |
| love rotary plant to site of each exploratory hole | C15 | | 6.00 | | | | | 0.0 | 5 | 0.00 | | | | 83.3 |
| C drilling between groundlevel and 10m depth | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| s C41 but between 10m and 20m | C42 | 20.50 | | | | | | 8.7 | 0 | 0.00 | | 4 | 12.2 | |
| s C41 but between 20m and 30m | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| ore box to be retained by client | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| ampling, Monitoring during investigation | Е | | | | | | | | | | 0.0 | | | |
| imall Disturbed Sample | E1 | | 59.00 | | | | | 0.0 | 158 | 0.00 | | | | |
| ulk Disturbed Sample | E2 | | 59.00 | | | | | 0.0 | 89 | 0.00 | | | | |
| arge Bulk disturbed sample | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| situ Testing | Н | | | | | | | | | | 0.0 | | | |
| tandard Penetration Test in Borehole | H1 | | 40 | | | | | 0.0 | 41 | 0.00 | | | | |
| tandard Penetration Test in Rotary Drill Hole | H2 | | R/O | | -+ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| , <u>-</u> | 1 | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| ecenvironmental Laboratory Testing | L | | | | | | | 5.0 | | 5.00 | 0.0 | | | |
| larine Scotland Sample | L2 | | 121 | | -+ | | | 0.0 | 114 | 0.00 | | | | 9 |
| | | | .21 | | -+ | | | | | | 0.0 | | | |
| dditional Items | | | | \vdash | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | \vdash | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | + | | | + | -+ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | + | | | \vdash | -+ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | + | | | \vdash | -+ | | | | | | 0.0 | | | |
| | + | | | 1 | -+ | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Sumn | iary | | Today | + | Actu | ıal To E | ate | 0.0 | U | 0.00 | Lost & D | amaged | | |
| Hoc Cards | , | | 10uay | | ACIU | 18 | -410 | | | | LUSI & L | unugeu | | |
| Safety Drills | | | 0 | | | 7 | | | | | | | | |
| Tool Box Talks | | | 1 | | | 16 | | | | | | | | |
| HSE Meetings | | | 0 | | | 1 | | | | | | | | |
| Incidents/Near Miss | | | 0 | | | 0 | | | | | | | | |
| Environmental | | | 0 | | | 0 | | | | | | | | |
| Hours Worked | | | 108 | | | 1644 | | | | | | | | |
| | nts | | 100 | | | | ent Repr | esentativ | e Commen | ts | | | | |
| Eugro GeoServices Representative Comme | | | | | | | | | | | | | | |
| Fugro GeoServices Representative Comme FGSL Rep: Theo Cleave Signed: | | | | | | | ent Re | p: | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| | Job No | | | C1982 | | Vess | el | Skate 3A | | 1 | Date | Saturday 16-Mar-19 | | | |
|----------|-----------------|----------------|--------------|---|----------------------------------|--------------|--|--|---|------------|---------------------|--|--|--|--|
| То | ANeillings@ai | rch-henderson | .co.uk | | | Attn. | Andy Nei | llings | No | o./email | 0141 227 30 | 60 | | | |
| СС | mshuttlewort | h@arch-hende | erson.co.uk | | | Attn. | Michael S | Shuttleworth | No | o./email | Redac | t . | | | |
| СС | stuart.innes@ | gegroup.com | | | | Attn. | tuart In | nes | No | o./email | Redac | | | | |
| СС | | | | | | Attn. | | | No | o./email | Tet and | | | | |
| СС | m.chappell@t | ugro.com | | | | Attn. | Nathew | Chappell - Nearshore Mana | ger No. | o./email | | | | | |
| СС | n.armstrong@ | fugro.com | | | | Attn. | Vicholas | Armstrong - Reporting Man | agei No. | o./email | Redac | t . | | | |
| СС | g.crisp@fugro | | | | | Attn. | Glen Cris | p - Project Manager | No | o./email | Redac | † | | | |
| 0 | bserved Weatl | | | Vind | Swe | ell (Hs) | | Sea State | Visib | bility | | Weather Forecast | | | |
| | Time 00:00 | Sp | eed Knts | Dir | | | | | | - | | | | | |
| | 00:00 | | 23 | SW | | N/A | | smooth | god | | | See Below | | | |
| | 06:00 12:00 | | 3 | SW NE | | N/A N/A | - | smooth | god | | | 000 201011 | | | |
| | 18:00 | | 8 | NNW | | N/A | - | smooth smooth | god | | | | | | |
| | 00:00 | | 22 | NW | | N/A | - | smooth | god | | | | | | |
| | 00.00 | | | | | 14/74 | | SHOOLI | got | ,ou | | | | | |
| | | | | netration (m) | | | | | | | Operati | ional Status | | | |
| | BH no. | | 1 | 2 | 3 | 4 | | | | | | | | | |
| | BH05 | | 1.8 | 1.7 | 2.5 | 2.6 | | | | | | | | | |
| | BH06 | | 3.2 | 5.2 | 3.4 | 2.9 | | | | Awa | aiting weather w | rindow to move to BH06 | | | |
| | | | | | | | | | | | | | | | |
| | | | | | ^ | | Onc 1 | iono / Borobala Daill' | loct C | Abre | | | | | |
| | F | - | | Hee (No.) | | unmary of | operati | ions / Borehole Drilling | - iast 24 | 4NFS: | D | | | | |
| | From 00:00 | To | | Hrs (No.) | Code Standby (weath | or) Ni:-1 | obift - | ntinua ta marit | for | norte-it i | Description | | | | |
| - | 00:00 04:20 | 04:30 06:25 | | 4.50 2.08 | Standby (weath Moving & Jacki | | | ntinue to monitor weather | | | | 6 / Preload and jack up to safe working height | | | |
| <u> </u> | 06:25 | 06.25 | | 0.83 | Other Operatio | | | deck for operations / rem | | | | | | | |
| | 07:15 | 07:10 | | 0.50 | Crew Change / | | | | | | | to JUB / TBT on CP Operations | | | |
| | 07:45 | 18:45 | | 11.00 | Cable Percussi | | | to -9.60mCD/ Commence CP drilling from 0.00m to 10.50m BML | | | | | | | |
| | 18:45 | 19:15 | | 0.50 | Other Operatio | | | | sh down deck for E.O.S / Fuel all plant | | | | | | |
| | 19:15 | 20:00 | | 0.75 | Crew Change / 7 | TBT Days | hift tran | sfer to shore / Handover | on CTV | / Quay / N | Nightshift transfer | r to JUB / TBT on CP Operations | | | |
| | 20:00 | 00:00 | | 4.00 | Cable Percussi | ion Conti | nue CP | CP drilling from 10.50m to 15.00m BML / E.O.H @ -24.6mCD | | | | | | | |
| | | | | | | | | | | | | | | | |
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| \vdash | | | | | | | | | | | | | | | |
| H | | | | | | | | | | | | | | | |
| | | 1 | | | | | V | Veather forecast | | | | | | | |
| | | | | Local time | 600 100 200 | 300 400 50 | | 700 800 900 1000 1100 12 | 13,00 | 14:00 15:0 | 0 16:00 17:00 18:00 | 19:00 20:00 21:00 22:00 23:00 | | | |
| | | | | Wind direction | | | | SSW SW SSW SSW N | | | | | | | |
| | | | | Wind speed (kts) | 13 14 13 | 11 10 10 | 9 | 9. 7 5 1 . | | | | 9 10 11 14 15 | | | |
| | | | | | | | | 9 7 5 3 1 | | | | | | | |
| | | | | Wind gusts (max kts) | 6 6 6 | | - 6 | 0 0 0 0 0 | | | | 8 8 8 8 8 | | | |
| | | | | Cloud cover Precipitation type | 30 00 30 | Se 30 S | 36 | 0 0 0 0 0 | | 0.0 | | 4 4 | | | |
| | | | | Precipitation (mm / h) | | | | 01 03 04 03 02 0 | .1 | | 0.3 1.6 | 0.4 0.3 | | | |
| | | | | Air temperature (°C) Feels like (°C) | ने न न | 0 0 0 | Q | -1 0 0 1 3 | 4 2 | 2 2 | 2 1 -1 | 4 -1 -1 -1 -1 | | | |
| | | | | Relative humidity (%) | 82 82 84 | 34 80 33 | 36. | 91 93 95 94 92 8 | 18 85 | 82 79 | 74 80 92 | 88 87 82 79 78 | | | |
| | | | | Air pressure (hPa) | | | | 990 999 988 988 9 | | | | 384 364 364 365 365 | | | |
| | | | | Tide type Time | 0:52 | 6 5 5 | - 31 | 74 Y Y Y Y Y (657 | 26 24 | 14.01 | 4 4 3 | 1941 | | | |
| | | | | Tide height (m) | | 21 25 3 | 3 33 34 33 29 25 21 18 17 18 17 21 26 32 35 36 14 3 25 | | | | | | | | |
| Healt | h Safety & the | Environment | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | es NE across | Ireland the central | UK and into the I | North Sea to | day an | d then into southern Scar | ndinavia | a on Sund | day. A ridge of hi | gh pressure then topples across the UK and surrounding | | | |
| water | s from the west | on Monday" | | | | | | | | | | | | | |
| FGS | L Rep: Theo | Cleave | | | | | | Client Rep | o: | | | | | | |
| ٥. | | | | | | | | a | | | | | | | |
| Sign | ed: | | | | | | | Signed: | | | | | | | |
| | | | | | | | | | | | | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| Activity Time So | ımmanı | | Т. | oday | To Da | ıto. | | ay Shift | | Night | Shiff | Com | nany | Posi | tion |
|--|-----------------|----------|--|--------------|---------------|-------|-------------|------------------------|------------|-------------------|------------|--------------------|-----------|----------------------|-------------|
| Mobilisation Activity Time St | ullillary | | | 0.00 | 3.50 | | | ay Siliit | | | JUB (mobil | | parry | FUSI | lion |
| Moving & Jacking | | | | 1.92 | 26.7 | | lim | my Wilso | | Onboard . Mark | | Fugro Geo | Services | Barger | naster |
| Rotary Drilling (Coring) | | | _ | | 11.0 | _ | | my vviiso m Allardy | | Adam | | Fugro Geo | | Barger | |
| | | | | 0.00 | | | | | | | | _ | | | |
| Cable Percussion Standby (Fugro) | | | | 0.00 | 128.2 | | Jus | stin Smith | 1 | Ashley L | owman | Fugro Geo | | Assistar Assistar | |
| | | | | | | | | | | | | rugio Geo | Joervices | Assistal | t Dilliel |
| Standby (Tide) Standby (weather) | | | | 0.00 | 11.5 137.2 | | Diel | hard Luke | | Bart | Vot | Fue | ro | Contonhain | l Engineer |
| Single Shift Standby | | | | 4.50 0.00 | | | RIG | Idiu Luke | 31 | Dait | RUL | Fug | 10 | Geotechnic | ai Engineei |
| - | | | | | 5.75 | | The | eo Cleave | | | | Fugra Car | Continos | Droinet F | nginoor |
| Other Operations | | | | 1.33 | 11.3 | | ine | eo Cleave | , | | | Fugro Geo | Services | Project E | ngineer |
| Crew Change / TBT | | | | 1.25 | 24.5 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 |) | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | - | 0.00 | 0.00 |) | | | | | | | | | |
| | | T-4 | | 4.00 | 04.0 | • | | | | | | Total Man Hours | | 100 | |
| | | Tota | 41 2 | 24.00 | 24.0 | U | NO. | Personn | eı | 9 | 1 | Worked | | 108 | |
| | | | | | _ | | | | | | | | | | |
| Project Program / P | rogress | | Pro | ogrammed | d | | Today | | A | ctual To Da | | | % Progra | m Completed | |
| Activity | | BoQ Item | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | | | | |
| General Items, Provisional Services | | Α | | | | | | | | | | 0 | | | |
| Establish all plant, equipment, crew on site | | A2 | | 1.0 | | | | | 0.0 | 1 | 0.00 | | | | 100 |
| . , , , , , | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | | B11 C19 | | | R/O | 1 | | 4.50 | 0.0 | 0 | 137.25 | 0.0 | | | |
| | | | | | R/O | | | | | | | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | | B11 C19 | l | | K/U | | | 1 | 0.0 | 0 | 11.50 | | | | |
| | | | | | 1 | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Percussion Boring | | В | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory ho | le | B1 | | 8.00 | | | 1 | | 0.0 | 8 | 0.00 | | | | 100. |
| Extra over B1 for setting up on a gradient >20% | , | B2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | | B3 | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | oth | B4 | 80.00 | | .,,,, | 10.00 | | | | | | | | | 99 |
| | ru i | | | | - | | | 1 | 79.4 | 0 | 0.00 | | | | 99 |
| As B4 but between 10m and 20m | | B5 | 36.50 | | | 5.00 | | | 52.4 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 20m and 30m | | B6 | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | | B7 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | n | B9 | | | R/O | | | 1.50 | 0.0 | 0 | 10.58 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Rotary Drilling | | С | | | | | | | 0.0 | | 0.00 | 0.0 | | | |
| Move rotary plant to site of each exploratory hol | 0 | C15 | | 6.00 | | | 1 | | 0.0 | _ | 0.00 | *** | | | 100 |
| | | | D/O | 0.00 | | | - 1 | | 0.0 | 6 | 0.00 | 0.0 | | | 100. |
| RC drilling between groundlevel and 10m depth | 1 | C41 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | | C42 | 20.50 | | | | | | 8.7 | 0 | 0.00 | | | 42.2 | |
| As C41 but between 20m and 30m | | C43 | 9.50 | | | | | | 5.9 | 0 | 0.00 | | | 61.6 | |
| Core box to be retained by client | | C49 | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | | Е | | | | | | | 0.0 | | 0.00 | 0.0 | | | |
| Small Disturbed Sample | | E1 | | 59.00 | | | 15 | | 0.0 | 470 | 0.00 | *** | | | |
| | | E2 | | | | | 15 | | 0.0 | 173 | 0.00 | | _ | | |
| Bulk Disturbed Sample | | | | 59.00 | | | 10 | | 0.0 | 104 | 0.00 | | | | |
| Large Bulk disturbed sample | | E3 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | | Н | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | | H1 | | 40 | | | 8 | | 0.0 | 49 | 0.00 | | | | |
| Standard Penetration Test in Rotary Drill Hole | | H2 | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| • | | | | | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | | | | | | 1 | | | 3.0 | | 5.00 | 0.0 | | | |
| Marine Scotland Sample | | L2 | | 121 | | | 5 | | | 440 | 0.00 | 0.0 | | | 98 |
| мание эсопана эаптріе | | LZ. | | 121 | | 1 | J | | 0.0 | 119 | 0.00 | 0.0 | | | 98. |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | | | | | | | | | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | [| | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | 1 | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | mmarv | | | Today | | Δct | tual To I | Date | 3.0 | Ť | | Lost & D | amaged | | |
| Hoc Cards | | | | 1 | | 701 | 19 | | | | | | 904 | | |
| Safety Drills | | | | 0 | | | 7 | | | | | | | | |
| Tool Box Talk | | | | 1 | | | 17 | | | | | | | | |
| | | | | 0 | | | 1 | | | | | | | | |
| | s | | l | 0 | | | 0 | | | | | | | | |
| HSE Meeting | | | | 0 | | | | | | | | | | | |
| HSE Meeting: Incidents/Near M | ∕liss | | | | | | 0 | | | | | | | | |
| HSE Meeting Incidents/Near M Environmenta | ∕liss al | | | | | | 17F0 | | | | | | | | |
| HSE Meeting Incidents/Near M Environmenta Hours Worker | Miss al d | | | 108 | | | 1752 Cli | ent Repr | esentative | Commen | ts | | | | |
| HSE Meeting Incidents/Near M Environmenta Hours Worker | Miss al d | | | | | | | ent Repr | esentative | Commen | is | | | | |
| HSE Meeting Incidents/Near M Environmenta Hours Worke Fugro GeoServices Representative Com | Miss al d | | | | | | Cli | | | Commen | ds. | | | | |
| HSE Meeting Incidents/Near M Environmenta | Miss al d | | | | | | Cli | ent Repr | | Commen | ts | | | | |
| HSE Meeting Incidents/Near M Environmenta Hours Worke Fugro GeoServices Representative Com | Miss al d | | | | | | Cli | | | Commen | ds | | | | |



Nigg Energy Park - Marine Ground Investigation

Daily Report No.

| 300 | UNU | | | C1902 | | Vessei | Skale SA | | Date Sunday 17-Mai-19 |
|-----------|--------------------|-------------|-------------|------------------|-------------------|---------------|--------------------------------|-------------------|--|
| To AN | leillings@arch-hei | nderson.co | .uk | | | Attn. And | y Neillings | No./email | 0141 227 3060 |
| | shuttleworth@arc | | | | | | nael Shuttleworth | No./email | DorDo |
| | | ricriuci3 | co.un | | | IVIICI | inductional | | RecRe. |
| СС | | | | | | L — | | L | |
| cc | | | | | | Attn. | | No./email | ·= = |
| cc m.c | chappell@fugro.c | om | | | | Attn. Mat | hew Chappell - Nearshore Mana | ger No./email | |
| | armstrong@fugro | | | | | | nolas Armstrong - Reporting N | | Dadad |
| | | .com | | | | | | | Redact |
| | risp@fugro.com | | | | | Attn. Gle | n Crisp - Project Manager | No./email | Redact |
| Obser | rved Weather | | W | Vind | | . II (II.) | 00 | N.C 11. 1114 | |
| Ti | ime 00:00 | Spee | d Knts | Dir | SW | ell (Hs) | Sea State | Visibility | Weather Forecast |
| | 00:00 | | | NW | | N/A | amouth | good | |
| | | | 25 | | | | smooth | good | C P-I |
| | 06:00 | | 21 | NW | | N/A | smooth | good | See Below |
| | 12:00 | | 26 | NNW | | N/A | smooth/slight | good | |
| | 18:00 | 1 | 27 | NW | | N/A | smooth/slight | good | |
| | | | | | | | | | |
| | 00:00 | | 16 | WSW | | N/A | smooth | good | |
| | | | Lea Pen | netration (m) | | | | | |
| | | | | | | | _ | | Operational Status |
| | BH no. | | 1 | 2 | 3 | 4 | | | |
| | BH06 | | 3.2 | 5.2 | 3.4 | 2.9 | | | |
| | DI 100 | | 3.2 | 5.2 | 3.4 | 2.9 | | | |
| | | | | | | | | | Finishing BH06 and pulling casing. |
| | | | | | | | | Awaiting | weather window to move to park up location |
| | | | | | | | | | |
| | | | | | _ | | | 1 | |
| | | | | | s | ummary of Op | erations / Borehole Drilling | - iast 24hrs: | |
| Fre | om | To | | Hrs (No.) | Code | | | | Description |
| | 0:00 | 03:00 | | 3.00 | Other Operation | ne Pull all - | asing to deck / Prock socia- | down onto otili- | · |
| | | | _ | | | | | | ges / Clear down and fuel all plant |
| | 3:00 | 07:30 | | 4.50 | Standby (weath | ner) Await we | eather window for move to pa | k up location / l | Nightshift continue to monitor |
| 07: | ':30 | 08:00 | | 0.50 | Crew Change / | TBT Nightshi | ft transfer to shore / Handove | at CTV Quav | / Dayshift transfer to JUB / TBT |
| | 3:00 | 19:00 | | 11.00 | Standby (weath | | eather window for move to pa | | · |
| | | | _ | | | | | | Daysiii Condide to Hollio |
| | 0:00 | 19:30 | | 0.50 | Crew Change / | | transfer to shore for end of s | | |
| 19: | 9:30 | 00:00 | | 4.50 | Single Shift Star | ndby No Nigh | tshift as crew prepares for de | mobilisation / N | ightshift resting to change shift pattern |
| | | | | | _ | | | | |
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| | | | | | | | Weather foreset | | |
| | | | | | | | Weather forecast | | |
| | | | Local time | | | | | | 1700 1000 19:00 20:00 21:00 22:00 23:00 |
| | | | Wind dire | | | | NNW NNW NNW N NNW NNW | | |
| | | | Wind spe | sed (RIS) | 20 72 72 4 | 18 | 17 16 20 10 10 | 21 22 21 | t0 17 18 17 15 10 7 |
| | | | | 16 | | 14 13 | 17 15 16 20 19 19 | | 17 15 10 7 |
| | | | | | | | | | |
| | | | | its (max kts) 27 | | 29 9 | | | 26 20 27 76 25 25 11 |
| | | | Cloud cov | | | | 0 11 1 1 1 1 0 | H H R | |
| | | | Precipitat | | 0 0 | 0 | 0 0 0 | | |
| | | | | tion (mm/h) 9.2 | | | 82 81 81 62 | | |
| | | | | erature (°C) | | | 1 1 1 1 1 1 1 1 | | |
| | | | Feels like | | | | 0 1 0 1 1 0 | | |
| | | | | | | | | | 72 76 77 78 78 79 77 |
| | | | | | 983 983 983 98 | 4 184 185 986 | 987 989 991 993 996 996 | 998 1000 1001 | 1002 1004 1005 1006 1007 1008 1009 |
| | | | Tide type | 3 | 3 4 34 1 | 7 7 7 | 24 2 2 2 2 2 2 | A 77 3 | K F F R R K |
| | | | Time | | 2.12 | | 821 | 15:22 | 2100 |
| | | | Tide heig | nt (m) 2.1 | 19 17 17 1 | 24 29 34 | 36 35 32 27 21 17 | 15 13 14 | 18 25 32 36 38 17 32 |
| Health Sa | afety & the Enviro | onment | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | shift as crew adji | | | | | | | | |
| Single Sh | nift Standby from | 19:30 to (| 7:30 to all | ow move to coir | cide with benine | forecast on M | londay. | | |
| | | | | | | | | | |
| rGSL R | ep: Theo Clea | ive | | | | | Client Re |) : | |
| | | | | | | | | | |
| Signed: | | | | | | | Signed: | | |
| 1 | | | | | | | 13 | | |
| | | | | | | | | | |



Daily Report No.

16

| | | | 1 | | | _ | | | _ | | | | | 1 | |
|---|-------------------------|----------|-------|---------|-------|----------|-----------|---------------------|-----------|------------|------------|-----------|-------------|--|-------------|
| Activity Time St | ımmary | | | oday | To Da | | Da | y Shift | | Night | | Com | pany | Posi | tion |
| Mobilisation | | | | 0.00 | 3.50 | _ | | | | | JUB (mobil | | | _ | |
| Moving & Jacking | | | _ | 0.00 | 26.75 | _ | | ny Wilso | | Mark | | Fugro Geo | | Bargen | |
| Rotary Drilling (Coring) | | | _ | 0.00 | 11.08 | | | n Allardy | | Adam | | Fugro Geo | | Dril | |
| Cable Percussion | | | | 0.00 | 128.2 | 5 | Jus | tin Smith | | Ashley L | owthian | Fugro Geo | Services | Assistan | t Driller |
| Standby (Fugro) | | | | 0.00 | 0.00 | | | | | | | Fugro Geo | Services | Assistan | t Driller |
| Standby (Tide) | | | (| 0.00 | 11.50 |) | | | | | | | | | |
| Standby (weather) | | | | 5.50 | 152.7 | | Rich | ard Luke | er | Bart | Kot | Fug | ro | Geotechnica | al Engineer |
| Single Shift Standby | | | | 4.50 | 10.25 | | | | | | | | | | <u> </u> |
| Other Operations | | | | 3.00 | 14.33 | | The | o Cleave | 9 | | | Fugro Geo | Services | Project E | naineer |
| Crew Change / TBT | | | | 1.00 | 25.58 | | | 0 0.0010 | | | | , agre co | 300111000 | 1 10,000 2 | goo. |
| Orow Orlange / TDT | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | _ | 0.00 | 0.00 | _ | | | | | | | | | |
| | | | | 0.00 | 0.00 | | | | | | | | | | |
| | | | (| 0.00 | 0.00 | 1 | | | | | | | | | |
| | | | | | | | | | | | | Total Man | | | |
| | | Total | 2 | 4.00 | 24.00 | 0 | No. I | Personn | el | 9 | 9 | Hours | | 108 | |
| | | | | | | | | | | | | Worked | | | |
| Project Program / P | rogress | | Pro | grammed | | | Today | | Δ | ctual To D | ate | | % Program | n Completed | |
| Activity | BoQ Item | | m. | No. | Hours | m. | No. | Hours | m. | No. | Hours | 1 | , or Togram | completed | |
| | | | | | | -111. | 1 | , .oui 3 | 111. | 110. | | 0 | | | |
| General Items, Provisional Services | A | _ | | 1.0 | | - | - | | | | | , i | | | 100. |
| Establish all plant, equipment, crew on site | A2 | —⊢ | | 1.0 | | | | | 0.0 | 1 | 0.00 | 0.0 | | | 100. |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Standing Time for plant, crew, etc - WEATHER | B11 C19 | I ¯ | | | R/O | | | 15.50 | 0.0 | 0 | 152.75 | 0.0 | | | |
| Standing Time for plant, crew, etc - TIDE | B11 C19 | | | | R/O | | | | 0.0 | 0 | 11.50 | 0.0 | | | |
| , hand and one upp | | - | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | - 0 | 0.00 | | | | |
| Percussion Boring | В | | | | | | | | | | | 0.0 | | | |
| Move boring plant to site of each exploratory ho | | | | 8.00 | | | | | 0.0 | 8 | 0.00 | | | | 100. |
| Extra over B1 for setting up on a gradient >20% | B2 | | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Break out surface obstructions where present | B3 | | | | R/O | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH between groundlevel and 10m dep | | \$ | 30.00 | | | | | | 79.4 | 0 | 0.00 | | | | 99. |
| As B4 but between 10m and 20m | B5 | | 36.50 | | | | | | | | | | | _ | 00. |
| | | | | | | | | | 52.4 | 0 | 0.00 | | | | |
| As B4 but between 20m and 30m | B6 | | R/O | | | | | | 2.1 | 0 | 0.00 | 0.0 | | | |
| As B4 but between 30m and 40m | B7 | 1 | R/O | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Advance BH through hard stratum or obstruction | n B9 | | | | R/O | | | | 0.0 | 0 | 10.58 | 0.0 | | | |
| | | - | | | | | | | | | | 0.0 | | | |
| Potons Drilling | | _ | | | | - | - | | 0.0 | 0 | 0.00 | JI | | | |
| Rotary Drilling | С | | | | | | | | | | | 0.0 | | | |
| Move rotary plant to site of each exploratory hol | | | | 6.00 | | | | | 0.0 | 6 | 0.00 | | | | 100. |
| RC drilling between groundlevel and 10m depth | C41 | | R/O | |] | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| As C41 but between 10m and 20m | C42 | 2 | 20.50 | | | | | | 8.7 | 0 | 0.00 | | 4 | 12.2 | |
| As C41 but between 20m and 30m | C43 | | 9.50 | | | | | | | 0 | | | | 61.6 | |
| | | | 9.50 | 04.00 | | | | | 5.9 | | 0.00 | 0.0 | | 01.0 | |
| Core box to be retained by client | C49 | | | 21.00 | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Sampling, Monitoring during investigation | E | | | | | | | | | | | 0.0 | | | |
| Small Disturbed Sample | E1 | | | 59.00 | | | | | 0.0 | 173 | 0.00 | | | | |
| Bulk Disturbed Sample | E2 | - | | 59.00 | | | | | 0.0 | 104 | 0.00 | | | | |
| Large Bulk disturbed sample | E3 | - | | R/O | | | | | | | | 0.0 | | | |
| Large Bulk disturbed sample | | | | 100 | | | | | 0.0 | 0 | 0.00 | | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Insitu Testing | Н | | | | | | | | | | | 0.0 | | | |
| Standard Penetration Test in Borehole | H1 | | | 40 | | | | | 0.0 | 49 | 0.00 | | | | |
| Standard Penetration Test in Rotary Drill Hole | H2 | | | R/O | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| • | 1 | \neg | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Geoenvironmental Laboratory Testing | | | | | | - | 1 | | 0.0 | - 0 | 0.00 | 0.0 | | | |
| | 10 | _ | | 104 | | - | - | | | | 0.00 | 0.0 | | | |
| Marine Scotland Sample | L2 | —⊢ | | 121 | | | | | 0.0 | 119 | 0.00 | | | | 98. |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Additional Items | | | | <u></u> | | <u> </u> | | | <u></u> | | | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | \neg | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | - | \dashv | | | | | 1 | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | - | + | | | | - | - | | | | | # | | | |
| | $-\!\!+\!\!-\!\!-\!\!-$ | —⊢ | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| | | | | | | | | | 0.0 | 0 | 0.00 | 0.0 | | | |
| Health & Safety Su | nmary | | | Today | | Ac | tual To D | ate | | | | Lost & D | amaged | | |
| Hoc Cards | | | | 1 | | | 20 | | | | | | | - | |
| Safety Drills | | | | 0 | | | 7 | | | | | | | | |
| Tool Box Talk | 5 | | | 1 | | | 18 | | | | | | | | |
| HSE Meeting: | 3 | | | 0 | | | 1 | | | | | | | | |
| Incidents/Near N | | \neg | | 0 | | | 0 | | | | | | | | |
| Environmenta | | \neg | | 0 | | | 0 | | | | | | | | |
| Hours Worker | | \neg | | 108 | | | 1860 | | | | | | | | |
| Fugro GeoServices Representative Com | | | | | | | | nt Renr | osontativ | e Commen | te | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| FGSL Rep: Theo Cleave | | | | | | | Cli | ent Re _l | p: | | | | | | |
| FGSL Rep: Theo Cleave Signed: | | | | | | | | ent Rep | p: | | | | | | |

MEAN POSITION REPORT



Geodetic Parameters

| Name : OSGB 1936 / British National Grid [C | • | | | | | | |
|---|-----------------------|-------------|--|--|--|--|--|
| EPSG Code | EPSG::27700 | | | | | | |
| Local Geodetic Datum Parameters | | | | | | | |
| Datum | OSGB 1936 | EPSG::6277 | | | | | |
| Ellipsoid | Airy 1830 | | | | | | |
| Semi major axis | a = 6,377,563.396 m | | | | | | |
| Inverse flattening | 1/f = 299.3249646 | | | | | | |
| Datum Transformation Parameters from ETI | R\$89 to OSGB 1936 | | | | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | | | | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | | | | | | |
| Local Projection Parameters | | | | | | | |
| Map Projection | Transverse Mercator | | | | | | |
| Grid System | British National Grid | EPSG::19916 | | | | | |
| Latitude Origin | 49°00'00.000"N | | | | | | |
| Central Meridian | 002°00′00.000"W | | | | | | |
| Scale Factor on Central Meridian | 0.999601272 | | | | | | |
| False Easting | 400,000 m | | | | | | |
| False Northing | -100,000 m | | | | | | |

MEAN POSITION REPORT



| Project ID | C1982 | | |
|--------------|--|----------|----------|
| Project Name | 192186 Nigg East Quay Development | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg |
| Client | Fugro Geoservices Ltd | Vessel | Skate 3A |
| Comment | DML=14.6m DWL=4.2m Height above C | D=5.5m | |

Session Name: 20190303-160430 Records Used: 301 of 301
Start Time: 03 Mar 2019, 16:05:44+00:00 End Time: 03 Mar 2019, 16:10:45+00:00 Session Length: 00:05:01

| Mean Position for Skate 3A CommonReferencePoint | | | |
|---|--|-------------------|--|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) | |
| Latitude | 57°41'39.38423"N | 57°41'38.33184"N | |
| Longitude | 004°01'27.88485"W | 004°01'32.89565"W | |
| Height | 56.111m Ell. | 56.111m Ell. | |
| Easting | 279,342.906m E(SD: ±0.01m) | | |
| Northing | 868,934.747m N(SD: ±0.02m) | | |
| Height | 3.295m Ort. (SD: ±0.03m Ort.) | | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 5.61°T 7.32°G | ±0.1° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | | | |
|---------------------------|----------------|--|--|--|
| Waypoint | BH2 | | | |
| Easting | 279,344.000m E | | | |
| Northing | 868,935.000m N | | | |
| Range | 1.12m Geodetic | | | |
| Bearing TO | 75.28°True | | | |
| Bearing FROM | 255.28°True | | | |

Jimmy Wilson Barge/Rig Superintendent FGSL (Fugro GeoServices Ltd UK) Theo Cleave Site Manager/Supervisor Fugro Geoservices Ltd

MEAN POSITION REPORT



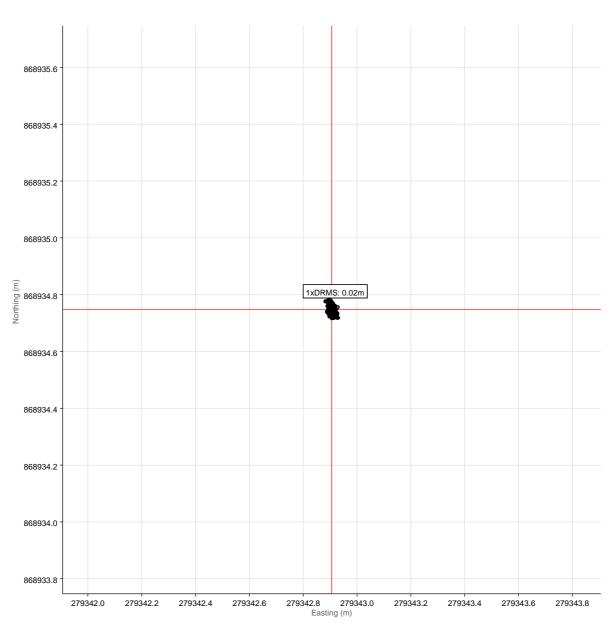
Geodetic Parameters

| Name : OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | | | | |
|---|-----------------------|---------------------|--|--|
| EPSG Code | EPSG::27700 | · | | |
| Local Geodetic Datum Parameters | | | | |
| Datum | OSGB 1936 | EPSG::6277 | | |
| Ellipsoid | Airy 1830 | Airy 1830 | | |
| Semi major axis | a = 6,377,563.396 m | a = 6,377,563.396 m | | |
| Inverse flattening | 1/f = 299.3249646 | 1/f = 299.3249646 | | |
| Datum Transformation Parameters from ETRS89 to OSGB 1936 | | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | | |
| Local Projection Parameters | | | | |
| Map Projection | Transverse Mercator | Transverse Mercator | | |
| Grid System | British National Grid | EPSG::19916 | | |
| Latitude Origin | 49°00'00.000"N | 49°00′00.000″N | | |
| Central Meridian | 002°00'00.000"W | 002°00′00.000″W | | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | | |
| False Easting | 400,000 m | 400,000 m | | |
| False Northing | -100,000 m | -100,000 m | | |

MEAN POSITION REPORT



Scatter Plot



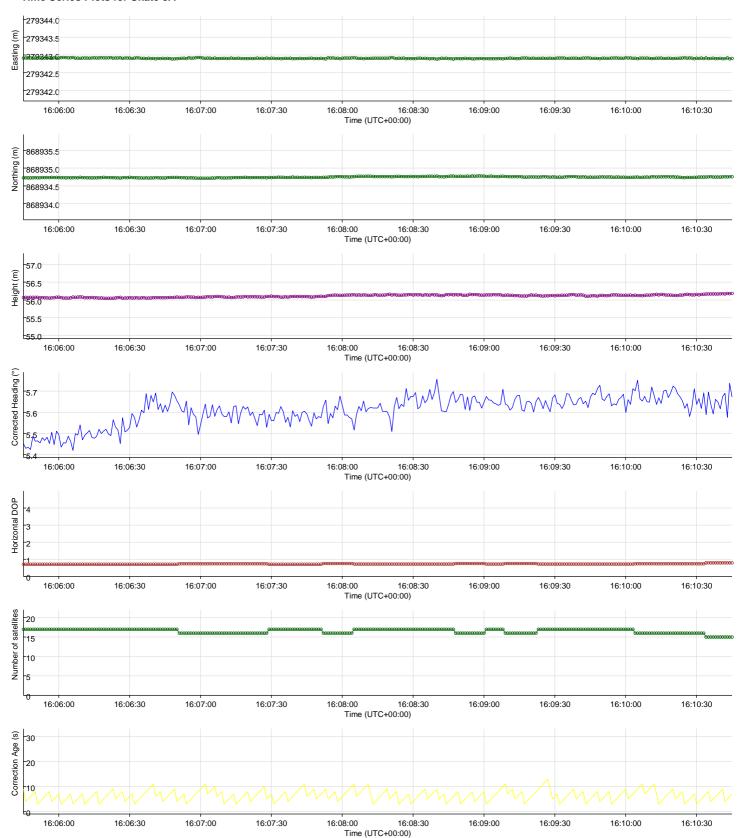
Mean Position

| | Easting | Northing |
|----------|----------------|----------------|
| Skate 3A | 279.342.906m E | 868,934.747m N |

MEAN POSITION REPORT



Time Series Plots for Skate 3A



MEAN POSITION REPORT



| Project ID | C1982 | | |
|--------------|---|----------|------|
| Project Name | 192186 Nigg East Quay Development | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg |
| Client | Fugro Geoservices Ltd Vessel Skate 3A | | |
| Comment | DTM = 6.90m, DTW = 2.40m Deck Height Above CD = 6.15m | | |

Session Name: MorganMap 20190308-131604 Records Used: 291 of 301
Start Time: 08 Mar 2019, 13:16:04+00:00 End Time: 08 Mar 2019, 13:21:05+00:00 Session Length: 00:05:01

| Mean Position for Skate 3A CommonReferencePoint | | | |
|---|--|-------------------|--|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) | |
| Latitude | 57°41'38.95397"N | 57°41'37.90167"N | |
| Longitude | 004°01'25.58768"W | 004°01'30.59877"W | |
| Height | 56.815m Ell. | 56.815m Ell. | |
| Easting | 279,380.533m E(SD: ±0.01m) | | |
| Northing | 868,920.311m N(SD: ±0.02m) | | |
| Height | 4.001m Ort. (SD: ±0.02m Ort.) | | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 44.11°T 45.83°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | | |
|---------------------------|----------------|--|--|
| Waypoint BH3 | | | |
| Easting | 279,382.000m E | | |
| Northing 868,920.000m N | | | |
| Range 1.50m Geodetic | | | |
| Bearing TO 100.25°True | | | |
| Bearing FROM | 280.25°True | | |

Jimmy Wilson

Party Chief

FGSL (Fugro GeoServices Ltd UK)

Theo Cleave
Party Chief

Fugro Geoservices Ltd

MEAN POSITION REPORT



| Name : OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | | | | |
|---|--|-----------------|--|--|
| EPSG Code | EPSG::27700 | - | | |
| Local Geodetic Datum Parameters | ocal Geodetic Datum Parameters | | | |
| Datum | OSGB 1936 | EPSG::6277 | | |
| Ellipsoid | Airy 1830 | | | |
| Semi major axis | a = 6,377,563.396 m | | | |
| Inverse flattening | 1/f = 299.3249646 | | | |
| Datum Transformation Parameters from | Datum Transformation Parameters from ETRS89 to OSGB 1936 | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | NTv2 EPSG::5338 | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | | |
| Local Projection Parameters | | | | |
| Map Projection | Transverse Mercator | | | |
| Grid System | British National Grid | EPSG::19916 | | |
| Latitude Origin | 49°00'00.000"N | 49°00'00.000"N | | |
| Central Meridian | 002°00'00.000"W | 002°00′00.000″W | | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | | |
| False Easting | 400,000 m | 400,000 m | | |
| False Northing | -100,000 m | | | |

MEAN POSITION REPORT



| Project ID | C1982 | | | |
|--------------|--|----------|------|--|
| Project Name | 192186 Nigg East Quay Development | | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg | |
| Client | Fugro Geoservices Ltd Vessel Skate 3A | | | |
| Comment | DTM = 10.00m, DTW = 4.60m Deck Height Above CD = 7.98m | | | |

Session Name: MorganMap 20190311-023904 Records Used: 301 of 301
Start Time: 11 Mar 2019, 02:39:04+00:00 End Time: 11 Mar 2019, 02:44:05+00:00 Session Length: 00:05:01

| Mean Position for Skate 3A CommonReferencePoint | | | |
|---|--|-------------------|--|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) | |
| Latitude | 57°41'37.36438"N | 57°41'36.31226"N | |
| Longitude | 004°01'25.48464"W | 004°01'30.49567"W | |
| Height | 58.729m Ell. | 58.729m Ell. | |
| Easting | 279,380.771m E(SD: ±0.01m) | | |
| Northing | 868,871.120m N(SD: ±0.02m) | | |
| Height | 5.915m Ort. (SD: ±0.02m Ort.) | | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 27.61°T 29.32°G | ±0.1° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | | |
|---------------------------|----------------|--|--|
| Waypoint BH4 | | | |
| Easting | 279,382.000m E | | |
| Northing 868,872.000m N | | | |
| Range 1.51m Geodetic | | | |
| Bearing TO 52.68°True | | | |
| Bearing FROM | 232.68°True | | |

Jimmy Wilson

Party Chief

FGSL (Fugro GeoServices Ltd UK)

Theo Cleave
Party Chief
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MEAN POSITION REPORT



| Name : OSGB 1936 / British National Gri | d [OSGB-UK Gbr02 NT] | DSGB-UK Gbr02 NT] | | | |
|---|--|-------------------|--|--|--|
| EPSG Code | EPSG::27700 | | | | |
| Local Geodetic Datum Parameters | | | | | |
| Datum | OSGB 1936 | EPSG::6277 | | | |
| Ellipsoid | Airy 1830 | | | | |
| Semi major axis | a = 6,377,563.396 m | | | | |
| Inverse flattening | 1/f = 299.3249646 | | | | |
| Datum Transformation Parameters from | Datum Transformation Parameters from ETRS89 to OSGB 1936 | | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | NTv2 EPSG::5338 | | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | | | |
| Local Projection Parameters | | | | | |
| Map Projection | Transverse Mercator | | | | |
| Grid System | British National Grid | EPSG::19916 | | | |
| Latitude Origin | 49°00'00.000"N | 49°00'00.000"N | | | |
| Central Meridian | 002°00'00.000"W | 002°00'00.000"W | | | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | | | |
| False Easting | 400,000 m | 400,000 m | | | |
| False Northing | -100,000 m | | | | |

MEAN POSITION REPORT



| Project ID | C1982 | | | |
|--------------|--|----------|------|--|
| Project Name | 192186 Nigg East Quay Development | | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg | |
| Client | Fugro Geoservices Ltd Vessel Skate 3A | | | |
| Comment | DTM = 12.50m, DTW = 3.20m Deck Height Above CD = 5.75m | | | |

Session Name: MorganMap 20190313-174839 Records Used: 296 of 301 Start Time: 13 Mar 2019, 17:48:39+00:00 End Time: 13 Mar 2019, 17:53:39+00:00 Session Length: 00:05:00

| Mean Position for Skate 3A CommonReferencePoint | | | |
|---|--|-------------------|--|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) | |
| Latitude | 57°41'35.68569"N | 57°41'34.63376"N | |
| Longitude | 004°01'25.45040"W | 004°01'30.46137"W | |
| Height | 56.419m Ell. | 56.419m Ell. | |
| Easting | 279,379.788m E(SD: ±0.01m) | | |
| Northing | 868,819.209m N(SD: ±0.02m) | | |
| Height | 3.605m Ort. (SD: ±0.04m Ort.) | | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 55.42°T 57.13°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | |
|---------------------------|-----------------|--|
| Waypoint | BH5 | |
| Easting | 279,367.000m E | |
| Northing | 868,808.000m N | |
| Range | 17.01m Geodetic | |
| Bearing TO | 227.05°True | |
| Bearing FROM | 47.05°True | |

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MEAN POSITION REPORT



| Name : OSGB 1936 / British National Gri | d [OSGB-UK Gbr02 NT] | | |
|--|-----------------------|-----------------------------------|--|
| EPSG Code | EPSG::27700 | | |
| Local Geodetic Datum Parameters | | | |
| Datum | OSGB 1936 | EPSG::6277 | |
| Ellipsoid | Airy 1830 | | |
| Semi major axis | a = 6,377,563.396 m | | |
| Inverse flattening | 1/f = 299.3249646 | | |
| Datum Transformation Parameters from ETRS89 to OSGB 1936 | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | |
| Local Projection Parameters | | | |
| Map Projection | Transverse Mercator | | |
| Grid System | British National Grid | British National Grid EPSG::19916 | |
| Latitude Origin | 49°00'00.000"N | 49°00'00.000"N | |
| Central Meridian | 002°00'00.000"W | 002°00'00.000"W | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | |
| False Easting | 400,000 m | 400,000 m | |
| False Northing | -100,000 m | -100,000 m | |

MEAN POSITION REPORT



| Project ID | C1982 | | |
|--------------|--|----------|----------|
| Project Name | 192186 Nigg East Quay Development | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg |
| Client | Fugro Geoservices Ltd | Vessel | Skate 3A |
| Comment | DTM = 13.80m, DTW = 2.30m Deck Height Above CD = 4.20m | | |

Session Name: MorganMap 20190316-100855 Records Used: 301 of 301 Start Time: 16 Mar 2019, 10:08:56+00:00 End Time: 16 Mar 2019, 10:13:56+00:00 Session Length: 00:05:00

| Mean Position for Skate 3A CommonReferencePoint | | |
|---|--|-------------------|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) |
| Latitude | 57°41'33.34574"N | 57°41'32.29407"N |
| Longitude | 004°01'25.20824"W | 004°01'30.21914"W |
| Height | 54.946m Ell. | 54.946m Ell. |
| Easting | 279,381.637m E(SD: ±0.01m) | |
| Northing | 868,746.754m N(SD: ±0.01m) | |
| Height | 2.133m Ort. (SD: ±0.03m Ort.) | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 88.51°T 90.22°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | |
|---------------------------|----------------|--|
| Waypoint | BH6 | |
| Easting | 279,382.000m E | |
| Northing | 868,746.000m N | |
| Range | 0.84m Geodetic | |
| Bearing TO | 152.56°True | |
| Bearing FROM | 332.56°True | |

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MEAN POSITION REPORT



| Name : OSGB 1936 / British National Gri | d [OSGB-UK Gbr02 NT] | | |
|--|-----------------------|-----------------------------------|--|
| EPSG Code | EPSG::27700 | | |
| Local Geodetic Datum Parameters | | | |
| Datum | OSGB 1936 | EPSG::6277 | |
| Ellipsoid | Airy 1830 | | |
| Semi major axis | a = 6,377,563.396 m | | |
| Inverse flattening | 1/f = 299.3249646 | | |
| Datum Transformation Parameters from ETRS89 to OSGB 1936 | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | |
| Local Projection Parameters | | | |
| Map Projection | Transverse Mercator | | |
| Grid System | British National Grid | British National Grid EPSG::19916 | |
| Latitude Origin | 49°00'00.000"N | 49°00'00.000"N | |
| Central Meridian | 002°00'00.000"W | 002°00'00.000"W | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | |
| False Easting | 400,000 m | 400,000 m | |
| False Northing | -100,000 m | -100,000 m | |

MEAN POSITION REPORT



| Project ID | C1982 | | |
|--------------|--|----------|----------|
| Project Name | 192186 Nigg East Quay Development | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg |
| Client | Fugro Geoservices Ltd | Vessel | Skate 3A |
| Comment | DTM = 11.20m, DTW = 6.40m Deck Height Above CD = 7.19m | | |

Session Name: MorganMap 20190307-201214 Records Used: 299 of 301 Start Time: 07 Mar 2019, 20:12:14+00:00 End Time: 07 Mar 2019, 20:17:14+00:00 Session Length: 00:05:00

| Mean Position for Skate 3A CommonReferencePoint | | |
|---|--|-------------------|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) |
| Latitude | 57°41'33.41635"N | 57°41'32.36476"N |
| Longitude | 004°01′21.01763″W | 004°01'26.02909"W |
| Height | 57.844m Ell. | 57.844m Ell. |
| Easting | 279,451.072m E(SD: ±0.01m) | |
| Northing | 868,746.866m N(SD: ±0.01m) | |
| Height | 5.035m Ort. (SD: ±0.02m Ort.) | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 83.63°T 85.34°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | |
|---------------------------|----------------|--|
| Waypoint | BH7 | |
| Easting | 279,450.000m E | |
| Northing | 868,746.000m N | |
| Range | 1.38m Geodetic | |
| Bearing TO | 229.36°True | |
| Bearing FROM | 49.36°True | |

Jimmy Wilson Party Chief

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Fugro Geoservices Ltd

MEAN POSITION REPORT



| Name : OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | | | | |
|---|-----------------------|---------------------|--|--|
| EPSG Code | EPSG::27700 | EPSG::27700 | | |
| Local Geodetic Datum Parameters | | | | |
| Datum | OSGB 1936 | EPSG::6277 | | |
| Ellipsoid | Airy 1830 | Airy 1830 | | |
| Semi major axis | a = 6,377,563.396 m | a = 6,377,563.396 m | | |
| Inverse flattening | 1/f = 299.3249646 | 1/f = 299.3249646 | | |
| Datum Transformation Parameters from | ETRS89 to OSGB 1936 | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | | |
| Local Projection Parameters | | | | |
| Map Projection | Transverse Mercator | | | |
| Grid System | British National Grid | EPSG::19916 | | |
| Latitude Origin | 49°00'00.000"N | 49°00′00.000″N | | |
| Central Meridian | 002°00'00.000"W | 002°00'00.000"W | | |
| Scale Factor on Central Meridian | 0.999601272 | 0.999601272 | | |
| False Easting | 400,000 m | | | |
| False Northing | -100,000 m | | | |

MEAN POSITION REPORT



| Project ID | C1982 | | |
|--------------|---|----------|----------|
| Project Name | 192186 Nigg East Quay Development | | |
| Fugro OPCO | FGBNM (Fugro Great Britain North Marine) | Location | Nigg |
| Client | Fugro Geoservices Ltd | Vessel | Skate 3A |
| Comment | Comment DTM = 6.00m, DTW = 1.60m Dech Height Above CD = 5.18m | | |

Session Name: MorganMap 20190305-114536 Records Used: 300 of 301 Start Time: 05 Mar 2019, 11:45:36+00:00 End Time: 05 Mar 2019, 11:50:36+00:00 Session Length: 00:05:00

| Mean Position for Skate 3A CommonReferencePoint | | | |
|---|--|-------------------|--|
| | OSGB 1936 / British National Grid [OSGB-UK Gbr02 NT] | ETRS89(2D) | |
| Latitude | 57°41'35.22782"N | 57°41'34.17603"N | |
| Longitude | 004°01'21.30072"W | 004°01'26.31222"W | |
| Height | 55.914m Ell. | 55.914m Ell. | |
| Easting | 279,448.057m E(SD: ±0.01m) | | |
| Northing | 868,803.004m N(SD: ±0.01m) | | |
| Height | 3.104m Ort. (SD: ±0.02m Ort.) | | |

| Sensors | Sensor Averages | SD |
|-----------------|-----------------|--------|
| Heading | 46.50°T 48.21°G | ±0.0° |
| Pitch | | |
| Roll | | |
| Depth (Sounder) | 0.0m | ±0.00m |
| Depth (Manual) | 0.0m | N/A |

| Mean Position to Waypoint | | | |
|---------------------------|----------------|--|--|
| Waypoint | BH8 | | |
| Easting | 279,448.000m E | | |
| Northing | 868,803.000m N | | |
| Range | 0.06m Geodetic | | |
| Bearing TO | 264.09°True | | |
| Bearing FROM | 84.09°True | | |

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MEAN POSITION REPORT



| Name : OSGB 1936 / British National Gr | id [OSGB-UK Gbr02 NT] | | | |
|--|-----------------------|---------------------|--|--|
| EPSG Code | EPSG::27700 | - | | |
| Local Geodetic Datum Parameters | | | | |
| Datum | OSGB 1936 | EPSG::6277 | | |
| Ellipsoid | Airy 1830 | | | |
| Semi major axis | a = 6,377,563.396 m | a = 6,377,563.396 m | | |
| Inverse flattening | 1/f = 299.3249646 | 1/f = 299.3249646 | | |
| Datum Transformation Parameters from | ETRS89 to OSGB 1936 | | | |
| OSGB 1936 to ETRS89 (1) | NTv2 | EPSG::5338 | | |
| Latitude and longitude difference file | OSTN02_NTv2.gsb | OSTN02_NTv2.gsb | | |
| Local Projection Parameters | | | | |
| Map Projection | Transverse Mercator | | | |
| Grid System | British National Grid | EPSG::19916 | | |
| Latitude Origin | 49°00'00.000"N | 49°00′00.000″N | | |
| Central Meridian | 002°00'00.000"W | 002°00'00.000"W | | |
| Scale Factor on Central Meridian | 0.999601272 | | | |
| False Easting | 400,000 m | | | |
| False Northing | -100,000 m | | | |

GLOBAL ENERGY NIGG LIMITED EAST QUAY DEVELOPMENT - MARINE GROUND INVESTIGATION



H. MARINE ACTIVITIES

Daily Progress Reports

32 Pages

GLOBAL ENERGY NIGG LIMITED EAST QUAY DEVELOPMENT - MARINE GROUND INVESTIGATION



I. VESSEL AND PLANT DATA SHEETS

Skate 3A

Comacchio MC1200

Terracore S-Geobor



FUGRO SKATE 3

The Skate 3 range consists of medium sized, high payload, container transportable jack-up platforms. These platforms have low international transport cost coupled with high performance capabilities.

Skate 3's modular design means that jack-ups can be provided in a variety of sizes, with deck areas ranging from 178 m² to 238.1 m² and the capability of operating in water depths between 1-30 m. Each craft in the Skate range has a rapid deck elevating system and is equipped with four legs mounted externally to provide maximum stability.

All pontoon components and equipment are designed around the container freight concept. In transit, the pontoons double as containers in which the jack-up legs, power units and all other ancillary equipment are housed. This allows cost-effective international transportation by road, rail or container ship. Assembly and

commissioning of the jack-up is achieved in under two shifts.

The jack-ups can be fitted with one of the range of Fugro hydraulic thrusters to provide self-propulsion. In compact configurations, these fast elevating, self propelled jack-up craft are ideal for confined intertidal areas, where swift, accurate moving and positioning is required. In their larger configuration, Skate 3 jack-ups are capable of working safely in exposed open seas.

For maximum safety, they are equipped with rigid steel bulwarks and 110 V fluorescent lights providing full inboard and outboard illumination for 24 hour working.

All Fugro jack-ups are equipped with VHF radios, life saving and first aid equipment, and high speed outboard driven personnel launches.

Operated and maintained exclusively by Fugro's trained and experienced marine engineers, the Skate 3 jack-up is a versatile, stable, self-elevating platform for overwater work.



Skate 3 on site in Uruguay.

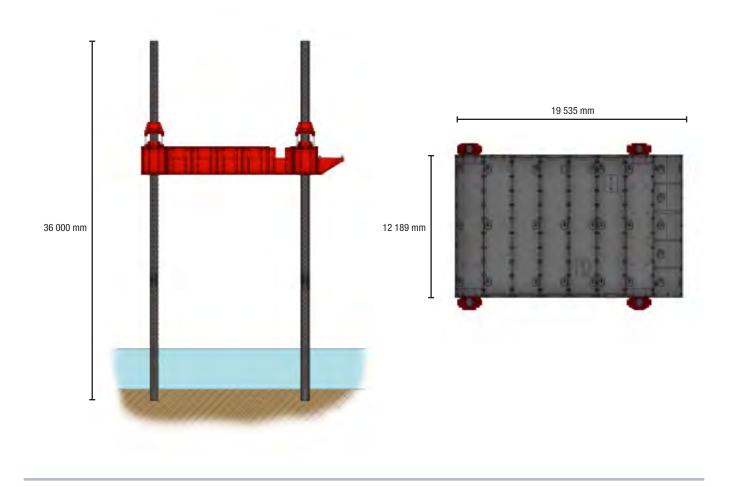
EQUIPMENT FLYER



SPECIFICATIONS

Skate 3 Jack-up Barge

| Max. separation: | 32 m |
|--------------------|------------------------------|
| Working draft: | 0.985 m |
| No. of containers: | 7 |
| Deck area: | 238.1 m ² |
| Leg size: | 762 mm diameter |
| Elevating system: | Hydraulic ram & duo pin rack |
| Accommodation: | Workshop/canteen container |





FUGRO COMACCHIO MC1200

The MC1200 is a hydraulic skid mounted drilling rig capable of operating all rotary and/or rotary percussive drilling systems.

During the design stage, Fugro worked closely with Comacchio to ensure the development of a fully integrated drilling unit capable of withstanding both the complex and rigorous nature of marine works. For example, the MC1200 has a unique triple holding clamp and breakout arrangement for handling the various casings required. These are complimented by a set of hydraulically adjusted drill string centralisers.

The main mast is equipped with a crane boom and a drill string manipulator arm that enables drill rods and casings to be manoeuvred to and from the working deck with minimal manual intervention.

The main power supply is fully silenced and the hydraulics operate a closed system with biodegradable oil.

The control console is deployed on a multipositional arm, providing the driller with an uninterrupted view of all drilling activities. All rotating parts are guarded within a fully interlocked cage.

The MC1200 is suitable for all aspects of rotary soil investigations, core drilling as well as specialised civil engineering works such as micropiles, anchors and ground consolidation works.



MC1200 deck layout on Excalibur jack-up.

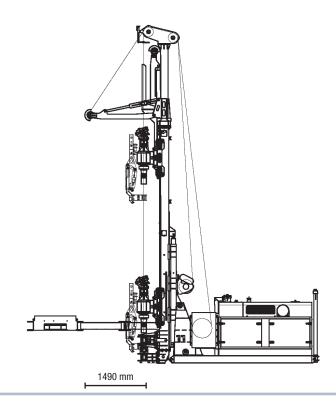


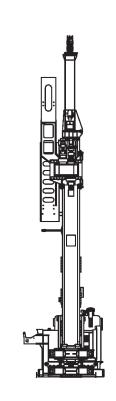
SPECIFICATIONS

MC1200 Marine Drill

| Power Pack | |
|--------------------|---|
| Discal ansina. | Now governion 100 kW DELTZ discal angine series 2010 |
| Diesel engine: | New generation 132 kW DEUTZ diesel engine series 2012 |
| Engine power: | 132 kW (180 HP)/2300 rpm |
| Main pump: | 2 x 190 lt/min./2 x 50, 2 gal/min. |
| Oil tank: | 400 lt / 105.6 gal |
| Fuel tank: | 350 lt / 92.5 gal |
| Mank | |
| Mast | |
| Feed stroke: | 4750/7200/10 200 mm |
| Total length: | 7100/9550/12 550 mm/ 23,3/31,3/41,2 ft |
| Feed force: | 7000 daN/ 15 736 lbs |
| Retract force: | 7000 daN/ 15 736 lbs |
| Clamps | |
| Naire learned in a | 45 mm /d 02 |
| Min. handling: | 45 mm / 1,8" |
| Max. handling: | 360 mm /14.1" |
| Clamping force: | 280 kN / 62 946 lbs |
| Breaking torque: | 3500 daNm / 25 814 lb ft |

| Rotary Head | | |
|-----------------|-----------------------|--|
| | | |
| Gears: | 6 | |
| Max torque: | 1230 daNm/ 9072 lb ft | |
| Max speed: | 340 (550) rpm | |
| Head passage: | 93 mm/3,6" | |
| Swivel passage: | 2" | |
| | | |
| Winch | | |
| Max line pull: | 2000 daN/4496 lbs | |
| Drum capacity: | 50 mt/164 ft | |
| Rope speed: | 30 mt/min./98 ft/min | |
| Rope diameter: | 10 mm/0.39" | |





9076 mm

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FUGROGEOBOR-S

With 40 years of drilling experience, Fugro has examined and tested many methods of coring - aiming to minimise core disturbance and maximise core recovery and quality.

GEOBOR-S SYSTEM

Our experience leads us to recommend the use of Geobor-S triple tube wireline drilling system, which has been specially developed for core drilling and undisturbed sampling in a wide variety of soil and rock formations. The Geobor-S is a triple tube core barrel which cuts an "S" size core sample. It has a plastic core liner, which is seated within the inner barrel assembly, considerably reducing friction between the core and the inner tube and enhancing core recovery.

SAMPLE RECOVERY

A nominal 102 mm diameter core sample is recovered from this system, generally in 1.5 m lengths.

The relatively large diameter enhances drilling performance whilst obtaining high-quality core samples, for soil and rock testing.

We provide a wide range of coring bits including but not limited to:

- annular and face discharge,
- surface set and impregnated diamond,
- tungsten carbide saw tooth,
- PCD (polycrystalline diamond).

The core barrel itself is designed for flushing with water, mud or air, and can easily be adapted for most soil and rock conditions by the use of an appropriate core bit or non-coring device.





EQUIPMENT FLYER

CORE LINER

The core liner is a rigid, transparent PVC tube with a wall thickness of approximately 1 mm that fits snugly inside the Geobor-S core barrel inner tube, trimmed to 1.5 m lengths. This is provided for all coring works.

The core samples are recovered within the core liner tube and removed from the inner barrel between each consecutive run. The sample can be retained within the core liner tube sealed at both ends and placed into the core box. This minimises handling induced core disturbance, both on the drill deck and during subsequent transport of the core sample to the onshore core store and testing laboratories.

From our experience, the combination of the Geobor-S system used with core liners:

- reduces coring and transport induced disturbance,
- maintains sample quality,
- significantly enhances recovery especially in mixed formations.

Furthermore, we monitor the effectiveness of the various bit types throughout drilling, selecting bits appropriate to varying ground conditions as each borehole progresses. This allows us to maximise core quality and recovery in an appropriate and cost effective manner.

Four methods can be used to suit varying ground conditions:

- In medium to hard formations, many types of core bits can be used depending on the formation.
- For coring in soft soil formations, TC-set bits are used and the bit consists of two parts (pilot and reamer).



Geobor-S Core Liner.

| Technical Specifications | Metric | Imperial |
|---------------------------------|-------------------------------|-----------------------------|
| | | |
| Hole diameter, method 1 & 4: | 146.0 mm | 5.75 in |
| Hole diameter, method 2 & 3: | 150.0 mm | 5.90 in |
| Drill bit outer diameter: | 145.6 / 149.6 mm | 5.73 / 5.90 in |
| Drill rod outer diameter: | 139.7 mm | 5.58 in |
| Bit kerf, method 1: | 21.8 mm | 0.86 in |
| Bit kerf, method 2 & 3: | 23.8 mm | 0.94 in |
| Core diameter: | 102.0 mm | 4.05 in |
| Hole area (od 146/150): | 167.3 / 176.7 cm ² | 26.0 / 27.4 in ² |
| Core area: | 81.7 cm ² | 12.7 in ² |
| Cutting area in % of hole area: | 51.7 % | 51.7 % |

- For coring in very soft or loose formations, TC-set bits are used. The bit is in two parts as in method two but one core lifter is extended to run 25 mm in front of the bit.
- 4. For coring in very soft, loose formations with varying layers. The spring-loaded inner tube assembly is extended to run in front of the bit, but is retractable for optimised adaptation to the consistency and density of the ground.

OTHER ADVANTAGES

The advantages of wireline coring over conventional coring (using drill rods and core barrels) include:

- Separate temporary lining casing for borehole stabilisation may not be required.
- The drill string is more rigid.
- The core barrel may be recovered without removing the outer drill rod, thus reducing disturbance to the borehole wall.
- The small annulus between the drill pipe and borehole wall requires significantly lower volumes of flush fluid compared to conventional drilling to achieve adequate uphole velocity for removal of cuttings from the hole. As a consequence, erosion of the formation (particulary at the bit face) is reduced.

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