G DREDGING BEST PRACTICABLE ENVIRONMENTAL OPTION REPORT



Scapa Deep Water Quay (SDWQ)
Dredging Best Practicable Environmental Option
Report

May 2025



CONTROL SHEET

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1 INTRODUCTION

EnviroCentre Ltd. has been appointed by Orkney Islands Council Harbour Authority (OICHA) to undertake a Best Practicable Environmental Options appraisal (BPEO) in support of the dredge licence for capital dredging to help develop the deepwater quay at Scapa. The development of Scapa Deep Water Quay comprises the design and construction of a new harbour facility comprising approx. 597m long main quayside berth with general -15m Chart Datum (CD) water depth, incorporating a 135m quayside pocket with -20m CD water depth. There is a further north tug (3No.) and pilot boat (2No.) berth approx. 180m long with depths between -6 and -9m CD. A laydown area will be directly behind the quay face which is approx. 22.85 Hectares. There will also be an access road from the A961 to the site.

The main purpose of this facility would be to undertake any/multiple industry activity that requires both deep-water berthing and large laydown area. There are specific market opportunities in the offshore wind and oil and gas sectors.

As part of the licensing process applicants are required to undertake a Best Practicable Environmental Option (BPEO) assessment for the disposal routes for the prospective dredge material in conjunction with the assessment of the chemical and physical properties of the same material to ensure that quality of the material is suitable for the identified disposal route(s).

The original BPEO was produced in 2023. This update reflects a change to the construction method whereby concrete caissons (precast concrete units) will be installed to form the quay. Additional dredging is required to accommodate the caissons.

1.1 Background Information

As outlined above, the works will comprise an element of dredging split into three phase areas.

Sampling was undertaken in March and April 2022 which comprised collection of 13 boreholes and Washprobe samples from the dredge areas. The samples were predominately sand with variable silt and gravel content. Additional sediment samples are due to be collected in June 2025 to provide additional data that reflects an increase in sediment volume that requires be dredged associated with the change to the current caisson design from the original exemplar design. The increase in volume is related to a deeper dredge required to facilitate the installation of the caissons. Further detail on this is presented within Scapa Deep Water Quay Supplementary Environmental Information Report (EnviroCentre Report 15243. May 2025).

The proposed dredge areas and volumes are detailed in Table 1-1 with the dredge areas presented and sample locations provided in drawing 21-1031-EHL-001 in Appendix A. Table 1-2 below gives an estimate of material types based on existing sample data and the proposed dredge volume.

Table 1-1: Proposed Dredge Areas and Dredge Volumes for Caisson Design

Dredge Area	Approximate Total Dredge Volume (m³)	Target Dredge Depth (m below Chart Datum)	Dredge Thickness range (m)*
Caisson Design	364,508	-15m & -20m – operational berth depths and -20.5 for caisson dredge pocket	Variable <1.0m to c7m

Table 1-2: Dredge Material (Caisson Design)

Material type	Total volume dredged (m³)	Volume reused on site (m³)	Volume disposed offshore (m³)
Sand	249,859	49,972	199,887
Clay	53,022	0	53,022
Rock	61,627	61,627	0
TOTAL	364,508	111,599	252,909

1.2 Scope of Report

The purpose of this report is to review each of the available potential disposal options for the dredged materials. The options which are not considered to be practicable are rejected and the reasons for doing so are explained.

Those options which are practicable are examined in detail and assessed against the following considerations: -

- Environmental;
- Strategic; and
- Cost.

The report then compares the practicable disposal options and draws a conclusion on the BPEO.

1.3 Sediment Sampling and Nature of Marine Sediments on Site

Samples from the proposed dredge area were collected in March and April 2022 and submitted for analysis in line with Marine Directorate's guidance and the agreed sampling plan. The sample logs are provided in Appendix B with Laboratory certificates and data summary tables in Appendix C.

Due to extreme weather conditions during the sampling and extensive weather related delays, and associated mounting costs, a number of the original boreholes were abandoned, and samples collected and tested from the ones achieved. Correspondence was undertaken with Marine Directorate in December 2022 to highlight these constraints, and it was agreed that the available information was considered suitable for the dredge application and that no further sampling would be required.

Sediment type across all dredge areas was predominately sand with varying gravel and silt content.

The following sections details the exceedances of the Revised Action Levels (RALs) with further consideration of these exceedances undertaken in Section 3.

1.3.1 **Metals**

Exceedances of the RALs for metals can be summarised as follows:

- Arsenic –5 of 34 samples recorded arsenic levels above RAL1. The maximum concentration recorded was 27.8mg/kg.
- Cadmium –0 of 34 samples recorded cadmium levels above RAL1. The maximum concentration recorded was 0.13 mg/kg.
- Copper 3 of 34 samples recorded copper levels above RAL1. The maximum concentration recorded was 84.1 mg/kg.

- Chromium 1 of 34 samples recorded chromium levels above RAL1. The maximum concentration recorded was 51.4 mg/kg.
- Lead 1 of 34 samples recorded lead levels above RAL1. The maximum concentration recorded was 50.7 mg/kg.
- Mercury 0 of 34 samples recorded mercury levels above RAL1. The maximum concentration recorded was 0.13 mg/kg.
- Nickel 1 of 34 samples recorded nickel levels above RAL1. The maximum concentration recorded was 31.8 mg/kg.
- Zinc 1 of 34 samples recorded zinc levels above RAL1. The maximum concentration recorded was 161 mg/kg.

There were no exceedances of RAL2 for metals recorded within any of the 34 samples collected.

1.3.2 Tributyl Tin (TBT)

All samples were recorded below the laboratory limit of detection (LOD) and all samples recorded below RAL1.

1.3.3 Polyaromatic Hydrocarbons (PAHs)

No samples recorded PAH concentrations above RAL1.

1.3.4 Polychlorinated Biphenyls (PCBs)

All samples recorded individual PCB congeners below RAL1. The highest recorded total ICES 7 concentration was 0.0019 mg/kg.

1.3.5 Total Hydrocarbons (THC)

1 of 34 samples recoded hydrocarbons above RAL1. The maximum recorded is 123 mg/kg.

1.4 Additional samples – June 2025

As a result of detailed design for the project, there is a requirement to dredge additional material to facilitate this design (principally there is an increase in the dredge depth and volume requirement as a result of the proposed installation of caissons). As a result of this, additional samples will be collected from overwater boreholes which are scheduled to commence in June 2025. Samples will be collected from an additional 10 boreholes and tested at the frequency of 3 per borehole for the same suite of determinands as previous samples as agreed with MD-LOT by email 21st January 2025.

The additional sample analysis is due to be returned by the end of July 2025 and these additional samples will be screened and information provided to MD-LOT as part of the application. Given the results of previous sampling and the location of the works, there is not anticipated to be any significant contamination encountered with the samples being recovered from undisturbed geological material, so the existing sampling data is considered to be representative of the additional material to be dredged.

1.5 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

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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.

Further details on methodology are provided within each section.

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?
Shore/Estua ry/	Leave in situ	Not an option due to the project specific requirements to create berthing at the pier and navigable approaches.	No
	Infilling of an existing dry dock/harbour facility/develop ment site (reuse)	The project requires a significant amount of infill behind for reclamation. It is envisaged that approximately 31% of all dredged material from Phase 1 and Phase 2 will be utilised as infill, with the remainder of structurally unsuitable material proposed to be disposed of at sea at a licensed disposal ground. It is likely that the volume of material suitable for reuse will increase following analysis of the additional marine borehole data.	Yes
		As outlined previously, further marine site investigation works are programmed to be undertaken by the contractor Acciona Jones (AJ) in June 2025 for 3 weeks. Based on site investigation information to date, AJ have confirmed that due to potential mix of both sand and clay within dredge depth horizons, it may be difficult to separate out the clay from sand which is required if it is to be made suitable for beneficial reuse within the permanent works. Once additional dredge sample test results are available then a further assessment can be completed to ascertain potential quantity of material that can be used within permanent marine works vs quantity that requires to be deposited at the offshore disposal site. Current volume estimates as detailed in Table 1-1 report should be used at this time as a worst-case estimate.	
		Dredge material that is deemed suitable for reuse will be transferred to within the marine development area primarily along the existing shoreline above MLWS and only after the permanent revetments have progressed from the shoreline in order to provide partial containment of dredge material until such time as it is transferred into the permanent works. The dredge disposal area will be monitored and suitable additional screening including silt booms can be deployed if required.	

	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.	No
		The dredge material comprises a mixture of gravel, sand and silt. Fine sediments (i.e. silt) is not suitable for beach nourishment in the traditional sense.	
Land	Landfill Disposal	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 likely to require treatment first in a dewatering facility. 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. OIC were contacted with regards to landfills in proximity to the site. Bossack Waste Transfer and Landfill Facility near Kirkwall has a daily capacity of 225 tonnes of inert waste or 5,000 tonnes /year so would not be a viable option for disposal. Transporting to another landfill would require marine transport plus road transport.	No
	Land Incineration	The dredged material consists of non-combustible material (silts, sands, gravels, shells) with a low combustible component and very high-water content.	No
	Application to Agricultural Land	The dredged material would need to be treated to reduce salt concentrations to acceptable levels. Would require detailed chemical analysis and assessment as well as a Waste Management License Exemption. Would require special precautions 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. Large volumes each year are unlikely to be viable to dispose of in this manner and would potentially have a detrimental effect on existing terrestrial habitats.	No
	Recycling	Recycling of dredged material is theoretically possible, however, due to the varied lithology there would need to be either segregation during dredging works to minimise the entrainment of fine-grained material into the sands, or energy and water rich processing on land.	No

Sea	Aquatic	Relatively low cost, minimal transportation requirements compared to all other options and	Yes
	disposal direct	potential for low environmental risk. The proposed disposal site is at Stromness A (FIO40)	
	to seabed.	approximately 30km west.	
		It would be proposed that material either unsuitable, or surplus to design fill requirements be deposited within the disposal site as per Table 2-2. Further review of final volumes will be undertaken on conclusion of pending site investigation data.	

2.2 Summary of Identified BPEO Options

Following review of the available options and the proposed construction requirements a combination of proposed reuse/sea disposal has been identified as the BPEO. The remote nature of the site and distance from the mainland, precludes the majority of the other options on the basis of not being practical options.

The chemical quality of the material is typically acceptable for sea based disposal, however further consideration of the RAL1 exceedances outlined previously is provided in Section 3.

3 FURTHER ASSESSMENT

3.1 Chemical Quality

Up to 5 samples from 34 in total recorded exceedances of RAL1 for metals and one sample recorded a marginal exceedance of Total Petroleum Hydrocarbons (TPH).

Further consideration is given to this result using the Canadian Council Ministers of the Environment (CCME) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life considering both the Effects Range Low (ERL) and Probable Effects Level (PEL). This is summarised in the table below.

Table 3-1: Further Assessment Summary

Contaminant	Number of RAL1 Exceedances of 34 samples	Number of ERL Exceedances of 34 samples	Number of PEL Exceedances of 34 samples
Arsenic	5	N/A	0
Copper	3	3	0
Chromium	1	0	0
Lead	1	1	0
Nickle	1	N/A	N/A
Zinc	1	1	0
TPH	1	N/A	N/A

In summary, there are no exceedances of Probable Effect Levels or RAL2 where one is available for review.

3.2 Water Framework Directive Assessment

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

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

A WFD assessment has not been undertaken as the proposed works have an accompanying Environmental Impact Assessment Report detailing all of this information.

3.3 Potential Risk to Water Quality and Marine Life

The potential risks to water quality at the dredge sites and disposal site are further considered below.

Contaminant levels within the proposed dredge material for sea disposal are considered to be very low and not considered to represent a significant risk to the overall water quality either at the dredge site or proposed disposal site(s). The key risks to water quality are from the dredging exercise and also

disposal where there may be periods of higher suspended solids which are likely to be both localised and temporary in nature. The larger grained material like gravel and sands will drop to the sea floor quickly, and any changes in suspended solids/turbidity will be driven by the finer grained material content, silts and clay sized particles. Where finer grained materials are cohesive, they will sink to the sea floor rapidly. 31 % of the dredge total will be utilised in the reclamation works which comprises materials with good engineering properties (Sand and rock), with the remaining sand and unsuitable clay materials deposited within Stromness A disposal site. The split of material types to be dredged and deposited offshore are summarised in Table 3-2.

Table 3-2: Summary of Sediment Types

Material type	Total volume dredged (m³)	Volume disposed offshore (m³)	% of Dredge Total for Sea Disposal
Sand	249,859	199,887	55%
Clay	53,022	53,022	14.5%
Rock	61,627	0	0
TOTAL	364,508	252,909	-

The dominant sediment type across the majority of the dredge areas is sand. Considering the dredge volume as a whole using averaged particle size analysis data, the dominant sediment type is sand comprising 60% of the total and the remainder made up of 23% silt and 17% comprising gravel sized fractions.

Given that an average of 60% of the sediment across all dredge areas comprises sand and gravel, it is considered that the majority of the deposited sediment will fall out of suspension quickly at the disposal site with limited lateral spread.

53,022m³ of dredge material comprises silt/clay sized particles. This material is considered to have a longer suspension time than sand and gravel sized particles when in suspension. It is understood that the unsuitable material for engineering purposes may be disposed offshore and would likely have a larger proportion of silt. Any effects from the disposal of the material is considered to be both localised and temporary.

Marine Directorate do not hold any information on the disposal site.

In summary, the associated risk with degradation of water quality directly associated with the proposed disposal is considered to be Low i.e. unlikely to cause a change in status of the waterbodies in question at both the dredge and disposal sites.

3.4 Conclusions and Recommendations

Review of available chemical quality information has low level/frequency exceedances for arsenic (5), copper (3), Total Hydrocarbon content, chromium, lead, nickel and zinc recorded a single exceedance for their respective RAL1. The contaminants of concern levels recorded in the sediment are not considered likely to have a significant adverse impact on the sediment quality already located within the disposal grounds as the majority of the samples and associated contaminants of concern were recorded below RAL1.

Overall, based on the multiple lines of evidence approach adopted to further assess the exceedances identified in the sediment assessment, the material proposed for dredging is considered suitable for sea disposal. Based on current understanding of material quality, approximately a third of the material to be dredged will be re-used within the construction of the proposed quay, with material which does

not meet the requirements for engineering purposes proposed to be of disposed of at Stromness A disposal site.

Based on the chemical quality of the sediment samples retrieved and tested from the dredge site, the sea disposal and re-use of the material is considered to have no significant long-term impact on the marine environment.

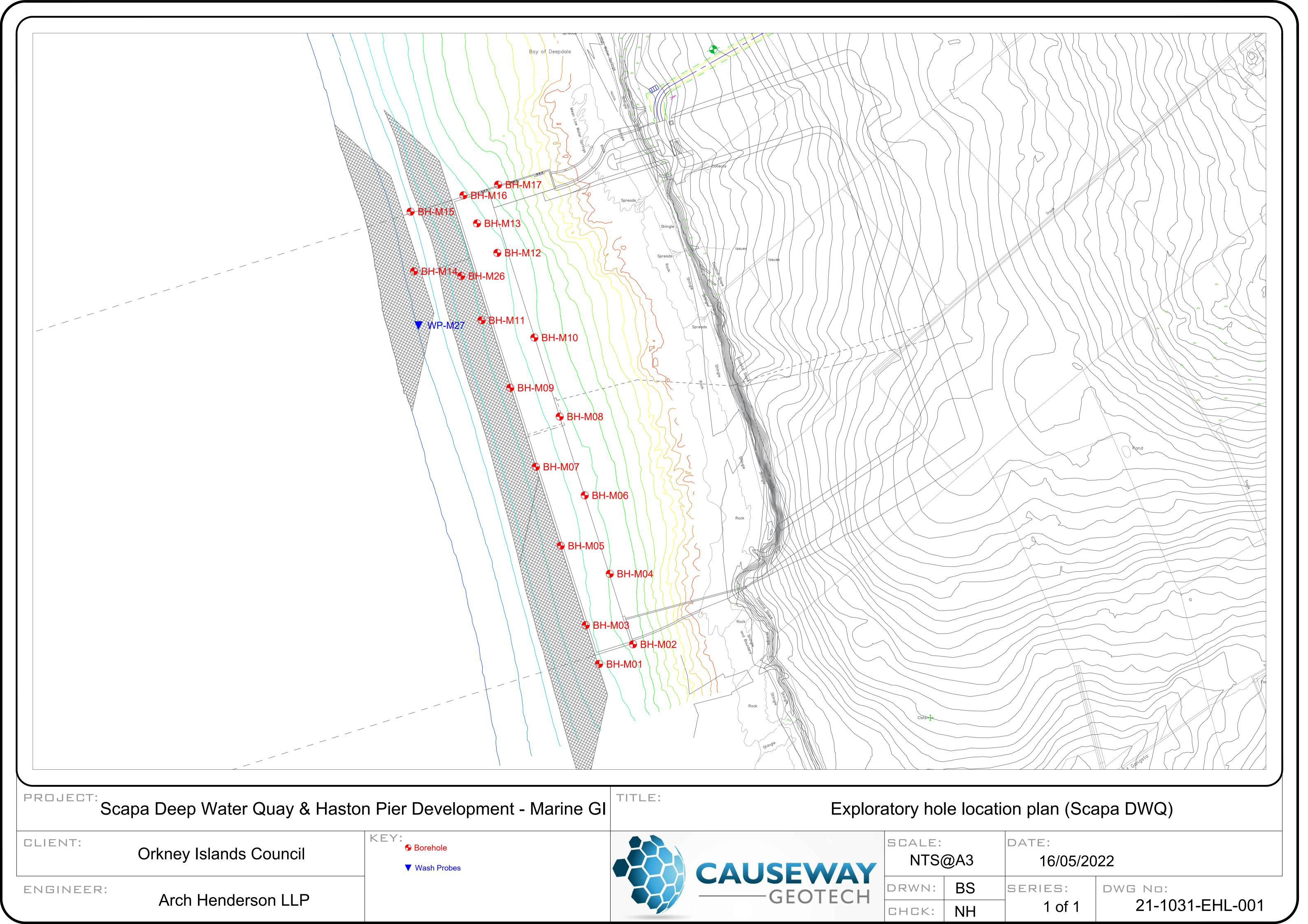
Findings of the June 2025 site investigation will be issued in due course and are not considered likely to change the conclusions of this report.

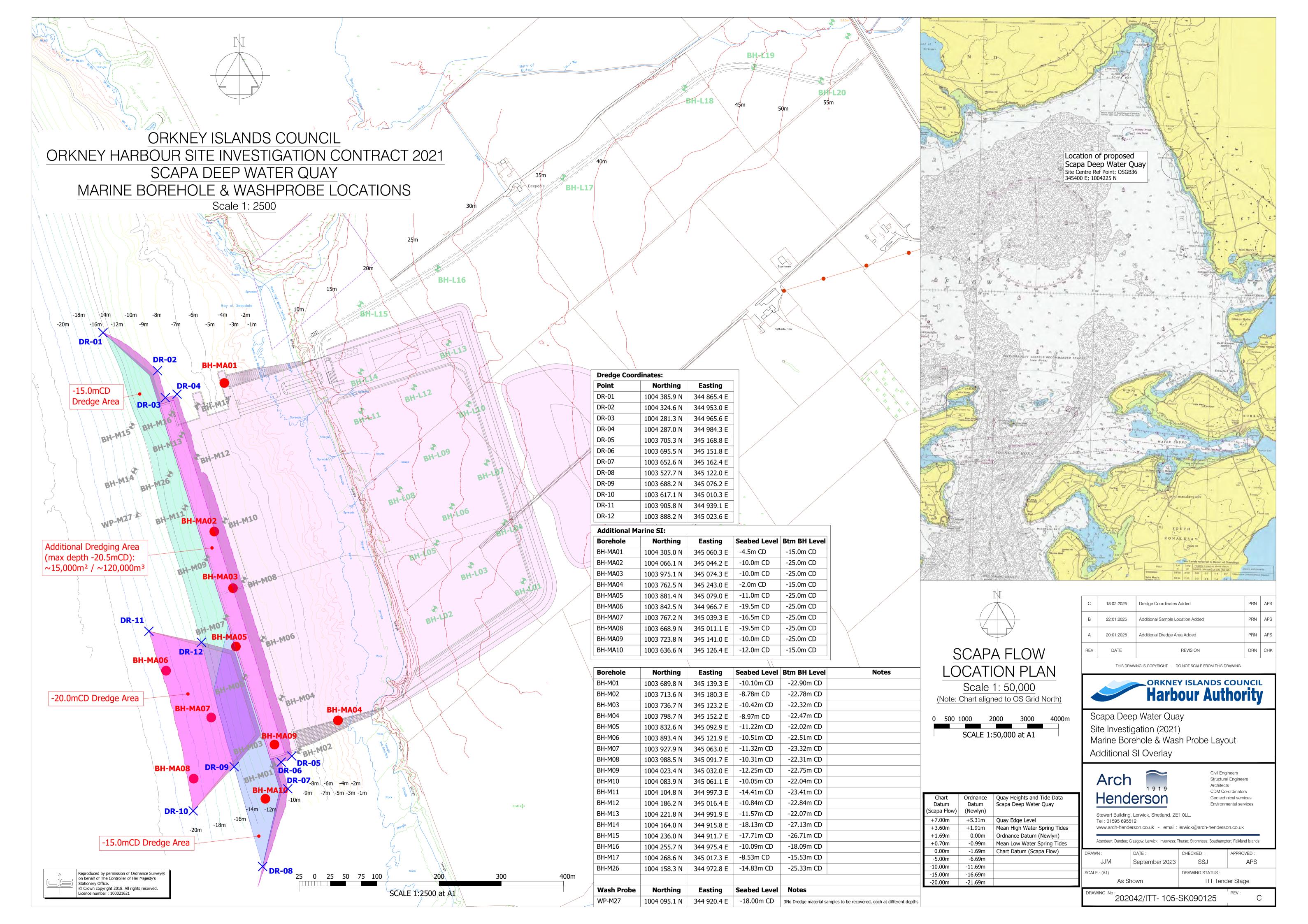
REFERENCES

Marine Scotland (2017). Pre-Dredge Sampling Guidance Version 2: Scottish Government. Marine Scotland (2015). Guidance for Marine Licence Applicants Version 2: Scottish Government.

APPENDICES

A FIGURES





B SAMPLE LOGS



APPENDIX B
BOREHOLE LOGS



CAUSEWAY									Project 21-1		Project Client:	Name: Scapa Deep Orkney I	Water Quay & slands Cour		elopment -	Marine GI		orehole BH-MC	
			EC		-C1	Н					Client's	Rep: Arch Her	nderson LLF						
Meth Sonic D		Plant I	uo C			(m) 00	Base (3.0)		Coord 34513		Final De	pth: 12.80 m	Start Date:	14/01/2022	Driller:	MJ/KW		Sheet 1 o Scale: 1:	
Rotary (Coring	Rotosonic						80	100368		Elevatio	n: -10.10 mCD	End Date:	15/01/2022	Logger:	JG+RC		FINAL	-
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing 1 Depth 1 (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	ription			Water	Backfill	
0.00 - 0.50 0.50 0.50 - 1.50 00 - 1.50	ES9 ES1 B4 ES10	Marine Scotl Marine Scotl										Medium dense grey shell fragments (up of various lithologie	to 5mm). Gra						0.5
1.50 1.50 - 2.50 1.50 - 1.95	D7 B5	N=18 (1,1/3,4,5,6) Hammer SN = 1.50 1353																	1.5
2.50 - 3.00 2.50 - 3.00	B6 ES11	Marine Scotl	SS3					-12.60	2.50	X X X X X X X X X X X X X X X X X X X	Orangish brown thin SAND. Gravel is ang							2.5	
3.00 3.00 3.00 - 3.45		D8					3.00		-13.10 -13.50	3.00 (0.40) 3.40	*****	Dark grey clayey slig angular fine to coar Possible weathered	se of sandstor	ie.					3.0
3.70 3.80	Hamme C1	SPT(S) N=30 (4,6/7,7,8,8) Hammer SN = 1353 C1							-13.80	3.70		clayey gravelly fine sandstone. Weak (locally media grained light brown	um strong) ind	istinctly thinly la	minated f	ine			4.0
3.80	C2		100	85	47							weathered: reduced Discontinuities: 1. 0 to 20 degree jo unstained and clear	d strength and ints closely sp	much closer fra	cture spac	cing.			4.5
1.95 5.30	C3					15						2. 55 to 75 degree j 5.20m to 5.30m and clean.	oints from 4.5						5.0
i.40 i.60	C4 C5					12				(3.30)									5.5
			97	81	33	16													6.0
5.80																			
7.10 7.25	C6 C7		100	93	53	7			-17.10	7.00		Medium strong (loc grained light brown weathered: slightly occasional heavy da clay infill. Discontinuities: 1. 0 to 20 degree jo	ish orange and reduced stren ark orangish bi	d whitish grey SA gth, closer fracti own discolourat	NDSTONE ure spacin tion and o	. Partially g ccasional			7.0
3.30 3.50	C8				27							occasional clay infill 2. 55 to 75 degree j 10.30m to 10.40m, brown staining on ju	on joint surfa oints from 8.6 planar, rough	ces up to 40mm 0m to 8.90m, 9.1 and occasional h	deep. 50m to 9.6 neavy dark	60m and			8.5
	Water	r Strikes	TCR	SCR	_	_{FI} ema	rks												_
ruck at (m)) Time (min)	Rose	e to (n	n) _N	narine eck to	Boreh Bed =	19.0			jack-up barş ı mCD	ge							
3.00	Diam (mm 177	Water) From (m)		ed o (m)															
12.80	80 150 Core Barrel					1	Flush Type Termination Reason Last Up Polymer Terminated at scheduled depth 29/06,							pdated I					

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Rotary C	-	Rotosonic 345139.28 E								Logger:			Scale: 1:5						
Depth (m)	Samples	Rotoso / Field Records		SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			ription	55	1	Water	Backfill	_
9.70 9.80 10.45 C10				75	37	9	(m)	(m)	illeb	,			ish orange and reduced strem ark orangish but ints closely sp I on joint surfa	d whitish grey SA gth, closer fracti rown discolourat aced (30/140/30 ces up to 40mm	ANDSTONE ure spacin ion and or	. Partially g ccasional rough,	>		9.5
0.75	C11		83	,3	37	AZCL				(5.80)		occasional clay infill on joint surfaces up to 40mm deep. 2. 55 to 75 degree joints from 8.60m to 8.90m, 9.50m to 9.60m and 10.30m to 10.40m, planar, rough and occasional heavy dark orangish brown staining on joint surfaces up to 40mm deep. 11.00m to 11.30m: AZCL - Probable bed of extremely weak sandstone washed out during drilling.							
1.30 1.50	C12		100	97	67	8	-								11.5 12.0 -				
2.50 2.65 2.80	C13 C14								-22.90	12.80			End of Bore	hole at 12.80m					12.5
																			13.0 -
																			14.0 ·
																			15.0 -
																			15.5
																			16.5
																			17.0 ·
																			18.0
																			18.5
	Water	Strikes	rcR	SCR	KQD	FI	Chis	ellin	g Details		Remarks						<u> </u>		
ick at (m) (Time (min)	Rose	e to (r	n) F	rom (To (e (hh:mm)	Marine Bo Deck to Be	rehole drilled off OCI d = 19.00m ns/reduced levels gi		arge					
Casing E To (m) [3.00 12.80	Details Diam (mm) 177 150	Water From (m)		ed o (m)															
12.00	130					Core	Barı K6L	rel	Flush Poly			ion Reason d at scheduled depth				29/06/		ed L	l

	C	AUS		W					Proje 21 -1	ct No.	Project Client:	•	Water Quay & Slands Cour	ncil	relopment - N	Marine GI		orehol	
Meth	nod	Plant U	Jsed		Тор	(m)	Base	(m)	Coord	inates							S	heet 1	of 2
Sonic Di		Fraste Du	uo C)		_	00	1.2	_			Final De	epth: 14.00 m	Start Date:	20/01/2022	Driller:	KW		Scale: 1	
Rotary C	Coring	Rotoso Fraste Du Rotoso	io C)	XL	1.	20	14.0	00	100371	0.32 E 3.59 N	Elevatio	on: -8.78 mCD	End Date:	20/01/2022	Logger:	JG+RC		FINA	۸L
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfil	ı
0.00 - 0.70 0.50 0.70 - 1.00 1.00 - 1.20	ES1 B3								-9.48 -9.78	0.70		Grey very gravelly s to 5mm). Gravel is s various lithologies. Orangish brown thi Yellowish brown fin	subangular to	subrounded fine	e to coarse o	of			0.5 -
					1	AZCL			-9.98	1.20		Dark brownish grey			coarse SAN	ID.			
					_	NI				(0.50)		Gravel is subrounde	ed fine to coar	se of mixed litho	ologies.				1.5 -
1.70	C1		75	18	0	141			-10.48	1.70	7.	Very weak thinly la							
2.00 2.00	C2 14 14 150 71 23									(1.20)		brownish white SAI and much closer fra Discontinuities: 1. 5 to 15 degree be	NDSTONE. Part acture spacing	ially weathered	: reduced st	trength			2.0 —
3.00	C3	71	23				-11.68	2.90		planar, smooth, uns 2. 55 to 65 degree j undulating, rough, Weak indistinctly th	stained and cle oints from 2.3 unstained and	an. 5m to 2.55m an clean.	nd 2.80m to	2.90m,			2.5		
3.20	C3 C4 >20											and light brownish reduced strength, rebrownish black discontinuities:	nuch closer fra	cture spacing a	nd occasion				3.5 -
3.80	C5		41	25	0	AZCL				(2.10)		1. 0 to 20 degree be planar, smooth, uns 2. 55 to 65 degree j 3.80m to 3.90m, un staining on joint sus 4.10m to 5.00m: AZCL - I drilling.	stained, clean. joints from 3.3 indulating, roug rfaces up to 0.	0m to 3.50m, 3. h, occasional he 5mm deep and	.60m to 3.70 eavy brow b clean.	Om and llack			4.0 -
5.00									-13.78	5.00		Weak (locally media							5.0 —
5.45	C6		97	74	26	20				(1.35)		grained dark brown slightly reduced str occasional heavy da surfaces. Discontinuities: 1. 0 to 15 degree be	ength, much c ark orangish bi edding fracture	loser fracture sp rown discoloura es very closely s	pacing and tion on fraction paced (10/5	ture 50/150)m			5.5
6.30 6.50	С7								-15.13	6.35		planar, smooth, occ fracture surfaces up Medium strong (loo grained light greyis)	to 40mm dee cally weak) ind	ep. istinctly thinly la	aminated fir	ne	-		6.5
6.85	C8		100	95	63	7						Partially weathered and occasional hear surfaces. Discontinuities: 1. 0 to 15 degree be	l: slightly reduction of the state of the st	ced strength, clo sh brown discolo	oser fracture ouration on	e spacing fracture			7.0 -
7.60 7.70	C9 C10											planar, smooth, occ fracture surfaces up 2. 25 to 45 degree j	o to 100mm de oints medium	eep. spaced (200/47	'0/1500) pla	anar,			7.5 -
8.00 8.00	C11		100	00	70	11						smooth, occasional surfaces up to 5mm 3. 65 to 75 degree j dark brown staining	n deep. joint from 11.4	0m to 11.65m,	planar, roug				8.0 -
9.00	C12		100	90	79	11													9.0 —
	\A/a+a :-	Ctribos	TCR	SCR	Ч-		rks												
Struck at (m) (Strikes Time (min)	Rose	e to (r	n) _N	eck to	Borel Bed	= 19.			jack-up baı n mCD	rge							
Casing I	Details Diam (mm)	Water From (m)		ed o (m)															
1.20 14.00	177 150	FIOIII (M)	10	(۱۱۱) د		Core	Barre	el	Flush	Туре	Terminat	tion Reason				Last Up	date	d 🔳	
						S	K6L				Terminate	d at scheduled depth	1			29/06/			(LS

			GEC	TI	ECI	Н				1031	Client: Orkney Islands Council Client's Rep: Arch Henderson LLP			BH-M02
	thod Drilling	Plant U			-	(m) 00	Base 1.2		Coord	dinates	Final Depth: 14.00 m Start Date: 20/01/202	Driller: KW		Sheet 2 of 2
	Coring	Rotos Fraste Di Rotos	onic uo C>		1.3		14.	00		30.32 E 13.59 N	Elevation: -8.78 mCD	Logger: JG+RC		Scale: 1:50 FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend Description		Water	Backfill
1.00 1.00 1.00 2.50 3.75 4.00	C13 C14		96	53	45	8 8 >20 9			-22.78	(7.65)	Medium strong (locally weak) indistinctly thinl grained light greyish orange and light brownish Partially weathered: slightly reduced strength, and occasional heavy dark orangish brown dissurfaces. Discontinuities: 1. 0 to 15 degree bedding fractures, closely sp planar, smooth, occasional heavy dark orangish fracture surfaces up to 100mm deep. 2. 25 to 45 degree joints medium spaced (200, smooth, occasional heavy dark orangish brown surfaces up to 5mm deep. 3. 65 to 75 degree joint from 11.40m to 11.65 dark brown staining on joint surface., 10mm dispute the strength of the streng	n orange SANDSTONE. closer fracture spacin colouration on fracture aced (10/150/500) h brown staining on /470/1500) planar, n staining on joint m, planar, rough, heaveep.	g	10.6 11.6 11.6 12.6 12.6 13.6 14.6 14.9 15.6 16.6 17.6 17.6
			TCR	SCR	RQD	FI	<u></u>		D					
		Strikes Time (min) Water From (m)	Add		m) Fr			elling To (n	Details	ie (hh:mm)	emarks Iarine Borehole drilled off OCM 80 jack-up barge eck to Bed = 19.60m Il elevations/reduced levels given in mCD			
14.00	150					Core	Barr	el	Flush	Туре	ermination Reason	Last	Jpdate	ed T
							K6L				erminated at scheduled depth		06/2022	

		AUS	E	W	A ECI	Y			Projec 21-1		Project Client: Client's		o Water Quay & slands Cou nderson LLF	ncil	elopment -	Marine GI		oreholo BH-M	
Metl Sonic D		Plant I Fraste Di Rotos	uo C			(m) 00	Base 4.5		Coord 34512		Final De	epth: 11.90 m	Start Date:	24/01/2022	Driller:	MJ		Sheet 1 o Scale: 1	
Rotary	Coring	Fraste Di Rotos		XL	4.	50	11.9	90	100373	6.66 N	Elevatio	-10.42 mCD	End Date:	25/01/2022	Logger:	JG+RC		FINA	L
Depth (m)	Sample / Tests		eld Re				Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	
0.00 - 0.50 0.00 - 1.50	ES11 B5	Marine Scotl	land -	SS1							x × ×	Loose to medium d with shell fragment				arse SAND			
.50	ES1										×××× ×××	subrounded fine of	various litholo	ogies.					0.5
00 00 - 1.50	ES2 ES12	Marine Scotl	land -	· SS2							X X X X X X X X X X X X X X X X X X X								1.0 -
50 50 - 3.00 50 - 1.95	D8 B6 SPT (S)	N=10 (1,0/2, 1353	,2,3,3) Ham	nmer	SN =	1.50				× × × × × × × × × × × ×								1.5 2.0
.00	ES3										x								2.0
.50 - 3.00	ES13	Marine Scotl	land -	SS3							X X X X X X X X X X X X X X X X X X X								2.5
.00 .00 .00 - 4.30 .00 - 3.45	D9 ES4 B7 SPT (S)	N=18 (3,4/4, 1353	,5,4,5) Ham	nmer	SN =	3.00		-13.42	3.00	× × × × × × × × × × × × × × × × × × ×	Medium dense greshell fragments (up various lithologies.					_		3.0
									-14.72	4.30	* * * * * * * * * *								4.0
.50	D10		ı				4.50		-14.72	Ē	X—	Stiff yellowish brow	n very sandy s	silty CLAY. Sand is	s fine to me	edium.			4.5
.50 - 4.95	SPT(S) N (5,6/7,7								-15.22	(0.50) 4.80	× ′	Very stiff light yello	wish grev sand	dv slightly gravel	lv siltv CLA	Y. Sand is	-		
.70		er SN = 1353	96	16	13					(0.80)	X	fine to medium. Gr. (Possible weathere	avel is angular						5.0
									-16.02	5.60	× × ×	Medium strong (loc	ally weak) ind	listinctly thinly la	ıminated fi	ne	-		5.5
.90												grained light yellow reduced strength, o	ish grey SAND	STONE. Partially	weathere	d: slightly			6.0
.15	C3											orangish brown dis Discontinuities: 1. 10 to 20 degree	pedding fractu	ıres medium spa	ced (20/22				6.5
i.80 i.95	C4 C5		100	89	56	8				(3.10)		planar, rough, occar fracture surfaces up 2. 65 to 75 degree j planar, rough, occar surfaces up to 0.5m	o to 2mm deep oints from 7.4 sional heavy d	p. 10m to 8.30m an	d 8.30m to	8.70m,			7.0
.40			97	77	33	9													7.5 8.0
3.70	C6								-19.12	8.70		Medium strong (loc grained light orangi					1		8.5
.90						1						reduced strength. Discontinuities:			1.40= 6	10/400			9.0
.90 .20	C7 C8										: : : : :	1. 10 to 20 degree l planar, rough, unsta	-		aced (20/2:	10/400)			
	Mate	r Strikes	TCR	SCR	_	FI Rema	rks												
uck at (m)		Time (min)	Rose	e to (n	n) _N	/larine	e Borel o Bed :	= 18.			jack-up bai	rge							
Casing		Water																	
4.50	Diam (mm 177) From (m)	Тс	o (m)															
11.90	11.90 150 Core							el l	Flush	Туре	Terminat	tion Reason				Last Up	odate	ed	I
	SK6L								Polyn	ner	Terminate	d at scheduled depth				29/06,	/2022	\mathbf{A}	H

	rilling Fraste Duo CXL 0.00 Rotosonic Coring Fraste Duo CXL 4.50 Rotosonic Samples / Field Records TCR SCR RQD F1								21-1	ct No. L 031	Project Client: Client's		slands Cou	ncil	eropment - M	arine GI		orehole BH-M(
Meth Sonic Di				ΧL			Base 4.5	_	Coord	inates	Final De	pth: 11.90 m	Start Date:	24/01/2022	Driller:	MJ		heet 2 c Scale: 1:	
Rotary C	Coring	Fraste Du	uo C	ΧL	4.	50	11.	90	34512 100373	3.20 E 6.66 N	Elevatio	n: -10.42 mCD	End Date:	25/01/2022	Logger:	JG+RC		FINA	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	
45 80 0.40	C9		95	95	79	5			-20.82	(1.70)		Medium strong (log grained light orangi reduced strength. Discontinuities: 1. 10 to 20 degree I planar, rough, unsta	sh grey SAND pedding fractu ained and clea	STONE. Partially v ires, medium spa in.	weathered: s	slightly 0/400)			9.5
1.50	C11 C12		100	83	31	9				(1.50)		orange SANDSTONE and closer fracture Discontinuities: 1. 5 to 15 degree be planar, rough, unsta 2. 55 to 65 degree j 11.90m, planar, rou	E. Partially we spacing. edding fractur ained and clea oints from 11	es closely spaced in. .10m to 11.25m a	reduced stre	ength			11.0
.90									-22.32	11.90			End of Bore	ehole at 11.90m			ļ		12.0
																			12.5 13.0 13.5 14.0 15.5 16.0 16.5 17.0
		Strikes		SCR					Details		Remarks								18.0
Casing [Water From (m)	Add		n) F	rom (m)	To (ı	n) Time	e (hh:mm)	Deck to Be	rehole drilled off OC ed = 18.60m ons/reduced levels gi		oarge					
11.90	150					Core	Barr	el	Flush	Туре	Terminat	ion Reason				Last Upd	late	d	I
						S	K6L		Polyr	mer	Terminate	d at scheduled depth	ı			29/06/2	.022	A	G

			GEC	TC	EC	Н				1031	Project Client: Client's	,	o Water Quay & slands Cour nderson LLF	ncil	elopment -	- Marin	ne GI	Borehole ID BH-M04
Metho Sonic Dri		Plant U Fraste Du			_	(m) 00	Base 3.0		Coord	inates	Final Dep	oth: 13.50 m	Start Date:	04/03/2022	Driller:	MJ		Sheet 1 of 2
Rotary Co	Ū	Rotoso Fraste Di Rotoso	onic uo C			00	13.		34515 100379		Elevation	-8.97 mCD	End Date:	05/03/2022	Logger	: NP-	+RC	Scale: 1:50 FINAL
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Desc	ription				Backfill
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	and -	- SS1							×. ×	Loose to medium d with shell fragment medium of various	s (up to 5mm)				ND	
1.00 1.00 - 1.50 1.50 1.50 - 3.00 1.50 - 1.95	ES1 ES2 ES6 D10 B9 SPT (S)	Marine Scotl N=10 (1,1/2,			nmer	SN =	1.50		-10.47	1.50		Very stiff grey slight coarse. Gravel is sul					e to	1.0 -
2.00 2.50 - 3.00	ES3	1353 Marine Scotl	and -	- SS3							X							2.0 -
3.00 3.00 3.00 - 3.45						AZCL	3.00		-11.87 -11.97	2.90 - 3.00	***************************************	Weathered SANDST medium sand. Weathered SANDST sandy gravelly clay. coarse of sandstone 3.00m to 3.55m: AZCL - I material.	ONE recovere Sand is fine to	d as firm light b coarse. Gravel i	ownish ye s subangu	ellow v ular fin		3.0 -
3.70	ES4								-13.07	4.10		Medium strong (loc grained light brown					ially	4.0 —
4.50 5.00	C2	30	13 >20			-13.47	4.50		weathered: reduced occasional clay infill Discontinuities: 1. 0 to 15 degree be planar, rough, unstaup to 20mm thick. 2. 65 to 75 degree junstained, clay infill Medium strong (loc grained light yellow Partially weathered	edding fracture substituted and occasionts from 3.5 Il on joint surfatally weak) indicated and brown	arfaces. es, closely space sional clay infill 5m to 3.85m, pl eces up to 20mn istinctly thinly la and whitish gre	d (10/150 on fractur anar, roug n thick. minated f	o)/300) re surfigh, fine FONE.	faces	5.0 – 5.5 ·			
5.00 5.00 5.40 5.50 5.90	C3 C4 C5 C6		87	73	29	18			-16.17	7.20		spacing and occasion fracture surface. Discontinuities: 1. 10 to 25 degree to planar, rough, occasion fracture surfaces up	onal heavy dar bedding fractu sional heavy da	c orangish brow res clsoely space ark ornagish bro	n discolou ed (10/120	uration 0/250)	n on	6.5
7.50 7.70	C8		100	89	58	AZCL			10.17			Medium strong indi SANDSTONE. Partia fracture spacing, oc fracture surfaces ar Discontinuities: 1. 0 to 20 degree be planar rough, occas surfaces up to 0.5m	Ily weathered: casional light nd occasional c edding fracture ional light bro	slightly reduced brownish orange lay infill on fract es, medium space wnish orange st	d strength e discolou cure surface ced (30/21 aining on	ration ces. 10/550 fractur	on O) re	7.5
3.60 9.00	C9										1	thick. 2. 55 to 75 degree j 10.50m to 10.80m, staining on joint sur 7.30m to 7.50m: AZCL - I	planar, rough, faces up to 0.1	occasional light 5mm deep.	brownish	orang		8.5 - 9.0 -
			TCP	SCR	POD	FI						drilling.		_				
ruck at (m) Ca		r Strikes			n) N	lema Marine Deck to	e Bore o Bed	= 16.			jack-up barg	ge						
Casing Do To (m) D 3.00 13.50	etails Diam (mm 177 150	Water) From (m)		ed o (m)														
13.30							Barr K6L	el	Flush Polyr			on Reason					1 st Upd 29/06/20	

			GEC	DTI	EC	Н			21-	ect No. 1031	Client:		slands Coul	ncil				вн-м	
Met Sonic D		Plant U				(m) 00	Base 3.		Coor	dinates	Final De	epth: 13.50 m	Start Date:	04/03/2022	Driller:	MJ		heet 2 d	
Rotary		Rotose Fraste Di Rotose	onic uo C>			00	13			52.16 E 98.70 N	Elevatio	on: -8.97 mCD	End Date:	05/03/2022	Logger:	: NP+RC		Scale: 1 FINA	
Depth (m)	Sample	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend	,	Des	cription			Water	Backfill	T
9.40	C10										: : : : :	Medium strong indi SANDSTONE. Partia							9.5
.70	C11					4						fracture spacing, oc	casional light	brownish orange	discoloui	ration on			
0.00	C12		100	100	100							fracture surfaces an Discontinuities: 1. 0 to 20 degree be planar rough, occas surfaces up to 0.5m	edding fractur	es, medium spac wnish orange sta	ed (30/21 aining on f	.0/550) fracture			10.0
0.50												thick. 2. 55 to 75 degree j. 10.50m to 10.80m, staining on joint sur	oints from 7.5 planar, rough,	Om to 7.70m, 8.2 occasional light	20m to 8.4	40m and			10.5
1.20	C13		97	87	55	13				(6.30)		10.80m to 10.95m: Very v			ish green MUI	DSTONE.			11.5
.2.00										E									12.0
2.25	C14									É									
.2.45	C15		100	91	77	7													12.5
										Ė									13.0
3.25	C16																		
3.50									-22.47	13.50			End of Bore	hole at 13.50m					13.5
										F									14.0
										Ē									14.5
										F									15.0
										Ē									15.5
										Ē									
																			16.0
										ŧ									
										E									16.
										E									
																			17.0
										Ē									
										E									17.
										Ė									
										E									18.0
										Ė									
			TCR	SCR	RQD	FI				F								<u> </u>	18.5
	Wate	r Strikes		1			Chis	ellin	g Details	;	Remarks	<u> </u>							
uck at (m)	Casing to (n	Time (min)	Rose	to (r	n) F	rom (m)	То	(m) Tin	ne (hh:mm)	Deck to B	orehole drilled off OCI ed = 16.10m ons/reduced levels giv		parge					
Casing	Details	Water	Add	ed	\dashv														
To (m)	Diam (mm			(m)															
3.00 13.50	177 150					C	Par	·ol	El., -1	Tunn	Torreit	tion Posser				l net II	dat:	<u> </u>	
						core	Barı	eı	Flush	Туре	iermina	tion Reason				Last Upo	uate	.u	

	<u>C</u>	AUS	E	W	A EC	Y			Proje 21 -1	ct No. L 031	Project Client: Client's	•	o Water Quay 8 Islands Cou nderson LLI	ncil	elopment -	Marine GI		oreho BH-N	
Metho		Plant U			<u> </u>	• •	Base	• '	Coord	inates	Final De	pth: 10.80 m	Start Date:	05/03/2022	Driller:	MJ		Sheet 1	
Sonic Dri	IIIIIIg	Fraste Di Rotos		ΧL	0.	.00	4.5	U	34509	2.93 E		•						Scale:	1:50
Rotary Co	oring	Fraste Di Rotos		XL	4.	.50	10.8	80	100383	2.55 N	Elevatio	n: -11.22 mCD	End Date:	06/03/2022	Logger	: NP+EM		FINA	łL
Depth (m)	Sample / Tests			cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Water	Backfi	.II
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	land -	SS1							××××	Loose to medium d SAND with shell fra	gments (up to						
0.50	ES1										× × ×	medium of various	lithologies.						0.5
											× × ×								
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	land -	. 552							× × ×								1.0
	D11 B9 SPT (S) N=23 (2,5/5,6,6,6) Hammer SN = 1.50 1353 ES3 Marine Scotland - SS3										× × × × ×								
1.50 1.50 - 3.00											××××								1.5
1.50 - 1.95											××××								
2.00											× × ×								2.0
2.50 - 3.00									-13.72	2.50	×××								2.5
2.00										<u> </u>	<u> </u>	Stiff grey slightly sa coarse Gravel is su	ıbangular fine	to medium of va					
3.00											×	and shell fragments	s (up to 4mm)						3.0
3.00 3.00 - 4.50											X								
3.00 - 3.45	SPT (S)	l I									X								3.5
		1333								×									
											X—. —								4.0
1.50	D13						4.50		-15.72	4.50	4 00 0	Very stiff brown slig							4.5
1.50 - 4.87	SPT(S) N for 220r	l=50 (8,8/50 nm)				AZCL						content. Sand is fin sandstone. Cobbles 4.50m to 5.00m: AZCL -							
	Hamme	r SN = 1353								- (1.00)		material.		_					5.0
			60	46	23							Weak indistinctly the Partially weathered	l: slightly redu	ced strength, slig	ghtly close	er fracture			
5.60	C1					11			-16.72	5.50		spacing with discolo surfaces.	ouration and o	clay deposits on s	some fract	ture			5.5
5.90	C2					11						Discontinuities: 1. 35 to 25 degree l	bedding fractu	ıres, medium spa	aced (150)	/408/450)			6.0
5.00	62											slightly undulating, brown staining on s	rough with st	rong patchy brov					
6.30	C3					5				(1.90)		2. 0 to 5 degree join	nt at 6.50m, p	lanar, rough, clea		. ,			6.5
			100	90	53						: : : : :	3. 60 to 80 degree j with strong dark br	own staining a	and patchy greyis		-			
						18						deposists (up to 4m Weak thinly lamina			um graine	ed \			7.0
												moderately cement strength, slightly clo							
7.50	C4								-18.62	7.40		deposits on fracture		. 5		1			7.5
7.50	C4									E		1. 20 to 30 degree l							
										(1.45)	:::::	plana, rough with p surfaces and light o		-					8.0
			100	94	26	10				[fracture surfaces. 2. 70 to 80 degree j	oint at 8.20m	to 8.33m, plana	r, smooth	to rough,			
8.50	C5											clean. Weak (locally medi							8.5
2 00									-20.07	8.85		medium grained wo	ell cemented S	SANDSTONE. Part	tially weat	hered:			
9.00	05									<u> </u>		fracture surfaces.			.,				9.0
9.30	C6		TCR	SCR	Ь.					-									ユ
ruck at (m) C		Strikes Time (min)	Rose	e to (r	_	Rema √arine		nole	drilled off	OCM 80	jack-up bai	rge							
					D	eck t	o Bed =	= 18.				-							
Casing D)otaile	Water	V 41 41	6 4	\dashv														
To (m) D	Diam (mm)			ea o (m)	\exists														
4.50 10.80	0.00 150							·I I	Flush	Type	Terminat	tion Reason				Last Up	date	ed ■	_
	Core Barr								riusii	·ype	ieriiiiidi	ion neason				Last Up	ualt	.u	4 8'

		W DTE	EC	Н				1031	Client:		slands Cou				١	вн-мо	15		
Meth Sonic Dr		Plant U			_	(m) .00	Base 4.5		Coor	dinates	Final De	pth: 10.80 m	Start Date:	05/03/2022	Driller:	MJ		Sheet 2 o	
Rotary C	_	Rotoso Fraste Do Rotoso	onic uo C)			.50	10.			92.93 E 32.55 N	Elevatio	n: -11.22 mCD	End Date:	06/03/2022	Logger:	NP+EM		Scale: 1:	
Depth (m)	Samples	/ Field Records		SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend	(Des	cription			Water	Backfill	
0.50 0.60 0.80 Casing E	C7 C8	Strikes Time (min)	100 TCR Rose	96 83 scr	26 50 RQD		Chis		-22.02	10.80	Remarks Marine Bc Deck to B	Weak (locally medium grained wo closer fracture space fracture surfaces. 1. 20 to 30 degree I planar, rough, with some fracture surfadeposits (up to 3mi 2. 50 to 60 degree I slightly undulating I joint surface. 9.70m to 9.85m: Bed of edgree i surface.	um strong) thi ell cemented s cing with disco pedding fractu occasional pa aces and occas m thick) on so foint at 9.15m rough with pa extremely weak san End of Bore	nly laminated liginal sanDSTONE. Part plouration and claures closely space to the dark brown in the same part of the same par	ially weat by deposits d (560/16 discoloura t greyish v aces. 90m to 10	hered: s on (2/300) ation on white clay	s		10.0 - 10.5 11.0 - 11.5 12.0 - 13.5 14.0 - 15.5 16.0 - 17.5 18.0 - 18.5
10.80	150					Core	Barr	el	Flush	Туре	Terminat	ion Reason				Last Up	date	ed	I
						S	K6L		Poly	mer	Terminate	d at scheduled depth	1			29/06,	/2022		H

		CAUS	E	OT E	A ECH	1		21	-1031		slands Council nderson LLP			вн-мо	16
Metl	hod	Plant l	Jsed		Тор	m)	Base (r	n) Coo	rdinates				S	heet 1 of	 f 2
Sonic D		Fraste D	uo C		0.0		3.00			Final Depth: 12.00 m	Start Date: 06/03/2022	Driller: MJ		Scale: 1:5	
Rotary	Coring	Rotos Fraste D Rotos	uo C	ΚL	3.0	0	12.00		121.94 E 393.44 N	Elevation: -10.51 mCD	End Date: 07/03/2022	Logger: NP+RC		FINAL	-
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Wa Depth Dep (m) (n	Level mCD	Depth (m)	Legend	Description		Water	Backfill	
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	and -	SS1							ense grey slightly gravelly silty fi				
0.50	ES1									medium.	s (up to 4mm). Graver is subang	ulai lille to			0.5
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	and -	SS2											1.0
1.50 1.50 - 3.00 1.50 - 1.95	D10 B9 SPT (S)	N=11 (1,2/2, 1353	3,3,3) Ham	ımer S	N =	1.50	-12.01	1.50		cly sandy slightly gravelly silty CL bangular fine to medium of vario				1.5
2.00	ES3	1333							Ē	× × ×					2.0
2.50 - 3.00	ES7	Marine Scoti	and -	SS3						100 mg/d 100 mg/d 100 mg/d 100 mg/d 100 mg/d					2.5
3.00	D11						3.00	12.71	2.20						3.0
3.00 3.00 - 3.45 3.15			84			6		-13.71	. 3.20	grained orangish gr	um strong) indistinctly thinly lam ey SANDSTONE. Partially weathe ser fracture spacing, occasional l colouration on fracture surfaces	ered: reduced neavy dark			3.5
3.30	C1 C2									planar, smooth, occ	edding fractures, closely spaced assional heavy dark orangish bro	wn staining on			4.0
4.50 4.70	C3								Ė	fracture surfaces u					4.5
4.70			94							5.60m, 6.30m to 6. 8.80m, 9.00m ti 9.4	oints from 3.10m to 4.10m, 5.20 50m, 6.80m to 6.90m, 7.60m to 0m, undulating, smooth and occ n staining on joint surfaces up to	8.00m, 8.20m to casional heavy			5.0
									Ė						5.5
5.90 6.00	C4				Щ	10			<u> </u>						6.0
6.30	C5								(8.80)						
6.55	C6		88												6.5 7.0
7.50															7.5
7.90	C7		94			9									8.0
9.00															9.0
			TCR	SCR	RQD	FI			F						
truck at /m\l		r Strikes	Ross	to /n	_	mai		12 2 20 7	.#.00:	Nigola van kan					
iuck at (M)	casing to (m	me (min)	NUSE	. to (n	De	ck to	Bed =	17.00m	off OCM 80 vels given i) jack-up barge n mCD					
Casing	Details	Water	Add	ed											
	Diam (mm			(m)											
12.00	150				\vdash	ore	Barrel	Flus	h Type	Termination Reason		Last U	odate	d 🔳	-

Meth		W DTE	C	Н	Base	(m)		1031	Client: Client's	•	slands Coui nderson LLF					BH-M(
Sonic D		Fraste Du	uo C			00	3.0	$\overline{}$			Final Dep	12.00 m	Start Date:	06/03/2022	Driller:	MJ		Scale: 1:	
Rotary (Coring	Rotoso Fraste Do Rotoso	uo C	KL	3.	00	12.	.00		21.94 E 93.44 N	Elevation	: -10.51 mCD	End Date:	07/03/2022	Logger:	NP+RC		FINAL	-
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Water	Backfill	
80 9.50 9.50	C8		51			7 >20						Weak (locally medit grained orangish gris strength, much clos orangish brown disc sandy clay infill on f Discontinuities: 1. 5 to 20 degree be planar, smooth, occ fracture surfaces up fracture surfaces up fracture surfaces up 5.60m, 6.30m to 6.5 8.80m, 9.00m ti 9.4 dark orangish brow 10.50m: Firm sandy clay. 11.25m to 12.00m: AZCL borehole due to fractured	ey SANDSTON eer fracture sp colouration or fracture surface edding fractur asional heavy to 1mm deep to 30mm this oints from 3.1 50m, 6.80m tc 0m, undulatin n staining on j infill on joint surface 1 uner half of core 1 contents of the surface of	E. Partially weatlacing, occasional fracture surface es. es, closely spacedark orangish broand occasional ck. Om to 4.10m, 5.1 e, 6.90m, 7.60m to g, smooth and ooint surfaces up to somm deep.	nered: red heavy dai s and occa d (10/125/ own stain sandy clay 20m to 5.5 o 8.00m, 8 ccasional I to 1mm th	aced (300) ing on infill on 0m to .20m to neavy nick.			9.5
2.00						AZCL			-22.51	12.00		boreriole due lo fractured							12.0 -
00									22.51	12.00			End of Bore	hole at 12.00m					
																			12.5
																			13.0
																			13.5
																			14.0
																			14.5
																			15.0
																			15.5
																			16.0
																			16.5
																			17.0
																			17.5
																			18.0
				00-	no-					=									18.5
	Water	Strikes	TCR	SCR	RQD	FI	Chis	elling	Details	<u> </u>	Remarks								
ck at (m)) Time (min)	Rose	e to (m	n) F	rom (To (ne (hh:mm)	Marine Bor Deck to Bed	ehole drilled off OCI d = 17.00m ns/reduced levels giv		parge					
Casing I	Details Diam (mm)	Water From (m)		ed (m)															
3.00 12.00	177 150				-	Coro	Barr	اه	Flush	Type	Terminati	on Reason				Last Up	data	d =	<u> </u>
						core	Ddff	CI	riusn	ype	ieiiiiiiia()	UII NEASUII				Last UP	uale	.u	_

		1	GEC	TC	ECI	Н			21 -1	ct No.	Project Client: Client's	•	o Water Quay & Islands Cour nderson LLF	ncil	elopment -	Marine GI	E	orehol BH-M	07
Metho Sonic Dr		Plant U				(m) 00	Base 4.5		Coord	inates	Final De	pth: 12.00 m	Start Date:	07/03/2022	Driller:	MJ		heet 1 o Scale: 1	
Rotary C	oring	Rotoso Fraste Du Rotoso	uo C	XL	4.	50	12.	00	34506 100392	2.99 E 7.90 N	Elevatio	n: -11.32 mCD	End Date:	09/03/2022	Logger:	RC+NP		FINA	
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Desc	cription	,	,	Water	Backfill	
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	and -	SS1							×××	Medium dense grey fragments (up to 5r							
0.50	ES1										* * * * * * * * *	various lithologies.							0.5 —
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	and -	- SS2															1.0 — — —
1.50 1.50 - 3.00 1.50 - 1.95	D11 B9 SPT (C)	N=20 (3,4/4,1353	5,5,6) Ham	nmer	SN =	1.50				x								7. 1.5 — — — — — —
2.00 2.50 - 3.00	ES3	Marine Scotl	and -	- SS3					-13.82	2.50	X X X X X X X X X	Medium dense grev	v verv gravelly	silty fine to coa	SA SAND	Gravel is			2.5
3.00 3.00	D12 ES4											subangular fine of v			SC SAIND.	Oravei is			3.0 —
3.00 - 4.50 3.00 - 3.45	B10 SPT (S)	N=26 (5,6/6, 1353	7,6,7) Ham	nmer	SN =	3.00		-14.72	3.40	× × × × × × × × × × × × × × × × × × ×	Stiff to very stiff bro to coarse. Gravel is							3.5 —
									-15.42	4.10	X	Very stiff dark greyi medium cobble cor subangular fine to o mudstone.	ntent. Sand is f	ine to coarse. G	ravel is ang	gular to			4.0 -
4.50 4.50 - 4.93	for 280	N=50 (8,9/50 mm) er SN = 1353				AZCL	4.50					4.50m to 5.50m: AZCL - I material. 6.00m to 6.50m: AZCL - I material.		_					4.5 —
		3.1 2333	33	0	0					(3.00)		Weak indistinctly the light orangish grey strength, much closs orange discolouration infill on fracture sur	SANDSTONE. F ser fracture sp on on fracture	Partially weather acing, occasiona	ed: reduce I light brov	ed wnish			5.5 —
6.00 6.00 - 6.40	SPT(C) I (9,12/5 245mm SN = 13	0 for) Hammer				AZCL	6.00					Discontinuities: 1. 5 to 20 degree be planar, rough, occasurfaces up to 1mm thick. 2. 65 to 75 degree j	sional light bro	ownish orange st casional sandy cl	aining on a ay infill up	fracture to 10mm			6.0 —
7.45	64		60	9	0	>20			-18.42	7.10		7.60m to 7.90m, ur staining and occasion Very weak (locally wooderately cement weathered: reducer	ndulating, roug onal sandy clay weak) indistinc ted light greyis	th, occasional lig y infill up to 3mr tly thinly lamina h orange SANDS	ht brownis n thick. Ited fine gi TONE. Par	sh orange rained rtially			7.0 —
7.45 7.50	C1					>20				(1.10)		heavy brownish ora Discontinuities: 1. 5 to 20 degree be planar, rough and fi	edding fracture	es closely space	e surfaces. d (30/130/	⁷ 450),			7.5 — - - - - - - 8.0 —
8.20	C2		80	28	0	10			-19.52	8.20		to the entire diame 2. 25 to 45 degree j rough and frequent diameter of core.	oints medium						8.5 —
9.00	C3					AZCL						3. 65 to 75 degree j and 10.70m to 11.0 brownish orange st	00m, undulatin aining up to er	g, rough and fre	quent hea f core.	vy light			9.0 —
9.10 9.30	C4 C5		TCR	SCR	RQD	FI				ŧ	: : : : :	8.65m to 9.00m: AZCL - I drilling.	riopaple bed of exti	ernery weak sandston	e wasned out o	uunng			
Struck at (m) C		r Strikes n) Time (min)			n) N	ema Iarine eck to	Bore Bed	= 22.			jack-up bar	ge							<u>'</u>
Casing D	etails Diam (mm	Water) From (m)		ed o (m)															
4.50 12.00	177 150			. ,			Barr	el	Flush			tion Reason				Last Up			
						S	K6L		Polyr	mer	Terminate	d at scheduled depth	1			29/06,	/2022		<u> </u>

8			GEC	OT I	EC	Н	L			1031	Client:		slands Cour		T			вн-мс	
Meth Sonic D		Plant U		ΧL		(m) 00	Base 4.	e (m) 50	Coor	dinates	Final Dep	12.00 m	Start Date:	07/03/2022	Driller:	MJ		Sheet 2 o Scale: 1:	
Rotary (Coring	Rotoso Fraste Do Rotoso	uo C	ΚL	4.	50	12	.00		62.99 E 27.90 N	Elevation	: -11.32 mCD	End Date:	09/03/2022	Logger:	RC+NP		FINAL	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend	1	Des	cription	<u>!</u>		Water	Backfill	
0.50	C6		93	59	24	10 >20				(3.80)		Very weak (locally v moderately cement weathered: reduced heavy brownish ora Discontinuities: 1. 5 to 20 degree be planar, rough and fr to the entire diame 2. 25 to 45 degree j rough and frequent diameter of core.	ed light greyis d strength, clo inge discolour edding fractur requent heavy ter of core. oints medium	h orange SANDS ser fracture space ation on fracture es closely spaced light brownish o spaced (150/290	TONE. Parting and from surfaces. I (30/130/brange stail)	tially equent 450), ining up nar,			9.5
1.20	C7		53	0	0	AZCL	-					3. 65 to 75 degree ju and 10.70m to 11.0 brownish orange sta 11.30m to 12.00m: AZCL borehole due to fractured	0m, undulatin aining up to en - Lower half of core	g, rough and free ntire diameter of	quent hea core.	vy light			11.0
2.00									-23.32	12.00			End of Bore	hole at 12.00m					12.0
																			12.5
																			13.0
																			13.5
																			14.0
																			14.5
																			15.0
																			15.5
																			16.0
																			16.5
																			17.0
																			17.5
																			18.0
			TCR	SCR	RQD	FI													18.5
		Strikes	I_						Detail:		Remarks								
ck at (m)	Casing to (m) Time (min)	Kose	e to (r	n) F	rom (m)	To (m) Tin	ne (hh:mm)	Deck to Bed	ehole drilled off OCI d = 22.00m ns/reduced levels given		arge					
Casing o (m)	Details Diam (mm)	Water From (m)		ed o (m)															
4.50 12.00	177 150	()		. ,		C	De:	·o.	Flore	Tues	Torm:	on Bosses				l net 11	d-+	.d	_
50	130					Core	Barı	rei	Flush	Туре	Termination	on Reason				Last Up	date	d	Ī

	C	AUS	E	W	A EC	Y H			Proje- 21 -1	ct No.	Project Client: Client's		Water Quay & slands Cou nderson LLF	ncil	elopment -	Marine GI		orehole BH-M0	
Meth Sonic D		Plant U	uo C	XL		(m)	Base 3.0		Coord 34509	inates 1.71 E	Final De	pth: 12.00 m	Start Date:	22/03/2022	Driller:	MJ		Sheet 1 o Scale: 1:	
Rotary (Coring	Fraste Di Rotos		XL	3.	.00	12.	.00	100398	8.52 N	Elevatio	n: -10.31 mCD	End Date:	23/03/2022	Logger:	NP+EM		FINAL	-
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	
0.00 - 1.50 0.50 1.00	ES1 ES2										X X X X X X X X X X X X X X X X X X X	Medium dense grey fragments (up to 9r lithologies.							0.5
1.50 1.50 - 3.00 1.50 - 1.95 2.00	D7 B6 SPT (S) ES3	N=15 (2,2/4, 1353	3,4,4) Ham	nmer	SN =	1.50		-11.81	1.50		Stiff to very stiff bro CLAY with low cobb subangular fine to r subangular.	le content. Sa	nd is fine to coar	is			2.0	
3.00 3.00 3.00 - 3.45	D8 ES4 SPT(S) N (6,7/7,7 Hamme		26			AZCL	3.00		-13.31	- 3.00		Very stiff dark greyi medium cobble cor fine to coarse of va mudstone. 3.00m to 4.10m: AZCL - I material.	ntent. Sand is f rious lithologi	fine to coarse. Gr es. Cobbles are s	oangular d of			3.0	
4.50 4.50 4.50 - 4.65	90mm/5					AZCL	4.50		-15.31	- (2.00) - 5.00		4.50m to 4.90m: AZCL - I material. Weak (locally media		_				4.5	
4.90 5.85 5.00	60mm) = 1353 C1	Hammer SN	76	60	26	6						fine to medium gra weathered: slightly with clay deposits of Discontinuities: 1. 10 to 20 degree b planar, rough, with	ined moderate reduced strer on fracture sur pedding fractu patchy light o	ely cemented SA ngth, slightly clos faces. ures, medium spa	NDSTONE. er fracture	Partially e spacing, 407/500),			5.5
5.20 5.90 7.05	C3 C4 C5		83	63	30	12 AZCL				(4.30)		thick) on few fractu 2. 60 to 90 degree j patchy light greyish 3. Possible 90 degre rough with orangisl otherwise clean. 4. 45 degree joint a 7.20m to 7.50m: AZCL - I drilling.	oint at 5.50m white clay de ee joint at 6.30 n brown patch t 5.85m, slight	posits on joint su Om to 7.10m, pro y staining on joir tly undulating, ro	urface. bbably und nt surface, ough, clear	lulating,			7.0
7.50	C6		100	25	16	12													8.0
9.00						NI			-19.61	9.30									9.0
	\A/=+-	Ctribes	TCR	SCR			rke.		13.01	9.30									L
ruck at (m) (Strikes Time (min)	Rose	e to (r	n) N	eck to	e Bore o Bed	= 16.			jack-up bar	ge							
Casing I To (m) 3.00 12.00	Details Diam (mm) 177 150	Water From (m)		ed o (m)		Core	Rarr	ام	Flush	Type	Terminat	ion Reason				Last U	ndət	ad I	_
							K6L		Polyr			d at scheduled depth	ı			29/06			Ġ

Some Drilling Frash Day CXL Sold Rotosomic Sold R				GEC	ITC	EC	Н		, .1		1031	Client: Client's	·	slands Cour nderson LLF		T			BH-M	
Rotatopic Rota						_		_	_	Coord	inates	Final De	pth: 12.00 m	Start Date:	22/03/2022	Driller:	MJ	1	heet 2 o	
Per		8	Rotoso	onic						34509	1.71 E								Scale: 1	:50
7 Section 2 Se	Rotary Co	oring			XL	3.	.00	12.0	00	100398	8.52 N	Elevatio	n: -10.31 mCD	End Date:	23/03/2022	Logger:	NP+EM		FINA	L
Mater Strikes Mater Strikes C12 100 87 46 100 87 46 100 87 46 100 87 46 100 87 46 100 100 87 46	(m)		/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)									Water	Backfill	
much closer fracture springs, slightly reduced started, with the discolorations and daily deposits on fracture surfaces. Discordantification fractures unificate unificate fractures, closely speed (40),166/800, plans (rough well healthy fractive) springs (rough well healthy fractive) springs (rough well healthy fractive) springs (rough well health) springs (rough											E	: : : : :								9.5
2.70 to 90 degree point at 8.10 m to 9.00m, and 9.90m to 19.30m, and 9.9	0			100	87	46							much closer fractur discolouration and Discontinuities: 1. 15 to 25 degree b planar, rough with p	e spacing, slig clay deposits o pedding fractu patchy brown	htly reduced stre on fracture surfac- res, closely spac- clay deposits and	ength with ces. ed (40/16 d orangish	5/800)			10.0 -
100 95 65	50						4				(2.70)		2. 70 to 90 degree j undulating, rough v surfaces, otherwise	oint at 8.10m vith patchy fai clean.	to 9.00m, and 9. nt orangish brow	90m to 10 staining o	on joint			10.5
Water Strikes Water Strikes Casing Details Water Added Tos SoR Roo in Tos	00	C11		100	95	65									to 7.80m, 11.75i	m to 12.00)m,			11.0
Water Strikes Water Strikes Water Inma (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] From (m) To [m] Time (min) Rose to [m] Rose to [m] From (m) To [m] Time (min) Rose to [m] Rose to [m] From (m) To [m] Time (min) Rose to [m] R		C12																		11.5
Water Strikes Chiselling Details Remarks Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 16.50m All elevations/reduced levels given in mCD Casing Details Water Added Remarks Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 16.50m All elevations/reduced levels given in mCD																				12.5 13.0 13.5 14.0 15.0 15.5 16.0
Casing Details Water Added All elevations/reduced levels given in mCD	ck at (m) Ca					Έ						Marine Bo	rehole drilled off OCI	M 80 jack-up b	oarge			_		18.0
3.00 177	o (m) D	Diam (mm) 177	1											ven in mCD						
12.00 150 Core Barrel Flush Type Termination Reason Last Updated	2.00	150					Core	Barre	el	Flush	Туре	Terminat	ion Reason				Last Up	date	d	I

		AUS		W					Projec 21 -1		Project Client: Client's	•	o Water Quay & Islands Coul Inderson LLF	ncil	elopment -	Marine GI		oreholo BH-M	
Meth	hod	Plant I	Used	l	Тор	(m)	Base	(m)	Coord	inates		•					S	Sheet 1 o	 of 2
Sonic D	rilling	Fraste D Rotos			-	00	3.0		34503	2.04 E	Final De	•	Start Date:	23/03/2022	Driller:	MJ		Scale: 1	
Rotary (Coring	Fraste D Rotos		XL	3.	00	10.5	50	100402	3.35 N	Elevatio	n: -12.25 ^{mCD}	End Date:	24/03/2022	Logger:	RC+NP		FINA	L
Depth (m)	Sample / Tests	Fi	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scot	land -	- SS1						Ē		Medium dense green fragments (up to 8)							
0.50	ES1										××××	various lithologies.							0.5
											××××								
1.00 1.00 - 1.50	ES2 ES6	Marine Scot	land .	. 552							× × ×								1.0 -
		iviarine scot	iaiiu	- 332							^* * * * *								
1.50 1.50 - 3.00	D10 B9										× × ×								1.5
1.50 - 1.95	SPT (S)	N=15 (2,3/3, 1353	,4,4,4) Han	nmer	SN =	1.50				× × ×								2.0 -
2.00	ES3										××××								2.0
2.50 - 3.00	ES7	Marine Scot	land -	- SS3					-14.75	2.50	X. X.	C::(() .:(()		1 11 11	CLAY C	1			2.5
											<u> </u>	Stiff to very stiff bro							
3.00	D11						3.00		-15.25	3.00	× × -	mudstone. Medium strong (loc	cally weak) ind	istinctly thinly la	minated f	ine	-		3.0 -
3.00 3.00 - 3.45	ES4 SPT(S) N	J=34										grained, moderatel reduced strength, r	y cemented SA	ANDSTONE. Parti	ally weath	ered:			
3.43	(6,7/8,8	3,9,9)				AZCL						brownish black disc Discontinuities:				nui neuvy			3.5
	натте	er SN = 1353	27	3	0							1. 5 to 20 degree be							
										-		planar, rough and o fracture surfaces up		•	k staining	on			4.0
						>20				(2.00)		2. 65 to 75 degree jundulating, rough a							
I.50 I.50	C1									(3.00)		joint surfaces up to 3.00m to 4.10m: AZCL -		SPT has lead to subsec	quent wash ou	nt of			4.5
1.60	C2					>20						material.		_					5.0 -
5.10	C3		53	20	0									_					
												5.30m to 6.00m: AZCL - drilling.	Probable bed of ext	remely weak sandstone —	e washed out o	during			5.5
						AZCL													
5.00 5.10	C4								-18.25	6.00		Medium strong to s	strong (locally	weak) indistinctl	y thinly la	minated	ł		6.0 -
5.10	C4											fine grained moder Partially weathered							
												spacing, occasional surfaces and occasi	heavy browni	sh ornate discolo	ouration o	n fracture			6.5
5.90	C5		100	89	55	10						Discontinuities:							
												1. 5 to 25 degree be	sional heavy b	rownish orange s	staining or	n fracture			7.0 -
7.30 7.50	C6											surfaces up to 1mm surfaces up to 40m	m thick.	·	•				7.5
.50										(4.50)		2. 25 to 45 degree j							
												up to 2mm deep. 3. 65 to 75 degree j	oints from 7.5	0m to 7.80m. 7.8	80m to 8.0	00m.			8.0 -
3.10	C7		100	61	12	12						8.40m to 8.50m, 9. rough and occasion	50m to 9.40m	and 9.90m to 10).50m, und	lulating,			
										<u> </u>		deep.	J 2. 0 WII		5 - 5 00 0				8.5
9.00						20				-									9.0 -
			TCR	SCR	RQD	FI					:::::								
		r Strikes	l.			Rema													-
ruck at (m)	Casing to (m	Time (min)	Rose	e to (r	C	eck to	o Bed :	= 19.			jack-up barı	ge							
Casing I	Details	Water	Add	led	\dashv														
To (m) 3.00	Diam (mm) From (m)	To	o (m)															
10.50	150				\vdash	Core	Barre	el	Flush	Туре	Terminat	ion Reason				Last Up	date	ed 📕	╗
							K6L		Polyn		-	d at scheduled depth				29/06,			$\overline{}$

			EC	OTE	EC	Н	ln -	7		1031	Client:	•	Islands Cou nderson LLF					BH-M09	
Metho Sonic Dr		Plant U				(m) 00	Base 3.	e (m) 00	Coord	linates	Final De	pth: 10.50 m	Start Date:	23/03/2022	Driller:	MJ		Sheet 2 of Scale: 1:50	
Rotary Co	oring	Rotoso Fraste Du Rotoso	io C)	K L	3.	00	10	.50	34503 100402	2.04 E 3.35 N	Elevatio	n: -12.25 ^{mCD}	End Date:	24/03/2022	Logger:	RC+NP		FINAL	
Depth (m)	Samples /	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Water	Backfill	
	C8 C9	Strikes	100	SCR 56	26	14			-22.75	10.50		Medium strong to see fine grained moder Partially weathered spacing, occasional surfaces and occasi Discontinuities: 1. 5 to 25 degree be planar, rough, occas surfaces up to 1mm surfaces up to 40m 2. 25 to 45 degree jerough and frequent up to 2mm deep. 3. 65 to 75 degree jerough and occasion deep.	strong (locally ately cemente it: slightly redu heavy browni onal sandy cla edding fractur sional heavy b n deep and oo m thick. ioints medium t heavy brown ijoints from 7.550m to 9.40m hal light brown	weak) indistinct! d light orangish g ced strength, clo sh ornate discolo y infill on fractur es closely spaced rownish orange s casional sandy cla spaced (200/500 ish orange stainin 0m to 7.80m, 7.8 and 9.90m to 10	grey SAND. Ser fracture buration or e surfaces. I (20/140/staining on ay infill on 0/1000) plang on joint 80m to 8.0.50m, und	stone. e n fracture 300) fracture fracture anar, surfaces 0m, ulating,	Wate	11 12 12 12 12 12 12 12 12 12 12 12 12 1	9.5 9.5 11.0 11.0 11.0 11.0 11.0 11.0 11.0 11
Casing D		Time (min) Water			n) F	rom (m)	To (m) Tim	e (hh:mm)	Deck to Be	rehole drilled off OC ed = 19.00m ons/reduced levels gi		oarge					
To (m) D	Diam (mm) 177		_	(m)															
10.50	150					Core	Barı	rel	Flush	Туре	Terminat	ion Reason				Last Up	date	ed 💮	T

	C	AUS		W OTI					Proje- 21 -1	ct No.	Project Client:	,	o Water Quay & Hai slands Counci nderson LLP		lopment - M	∕larine GI	Borehole II
Meth		Plant l			-		Base		Coord	inates	Final De	•	Start Date: 24	u /n2 /2n22	Driller:	MI	Sheet 1 of 2
Sonic D	J	Fraste Di Rotosi Fraste Di Rotosi	onic uo C			00	12.		34506 100408		Elevatio	•		5/03/2022	Logger:		Scale: 1:50
Depth	Sample / Tests			cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth	Legend		Descrip	tion			Nackfill Backfill
(m) 0.00 - 1.50	B5						(m)	(m)	МСБ	(m)	× × ×	Loose to medium d					8
0.50 1.00	ES1											with shell fragment medium of various		oravei is subai	nguiar fine	to	0
1.50 1.50 - 3.00	D7 B6								-11.54	1.50		Stiff to very stiff bro					1
1.50 - 1.95 2.00	SPT (S) ES3	N=10 (1,1/2, 1353	,2,3,3) Han	nmer	SN =	1.50				X - X - X - X - X - X - X - X - X - X -	Sand is fine to coan lithologies.	se. Gravei is subai	ngular fine to	meaium of	rvarious	2
									-12.54	2.50	× · · · · ·	Highly weathered b					2
3.00 3.00	D8 ES4					AZCL	3.00		-12.90 -13.04	2.85		Light brown and on description) Weathered SANDS sandy gravelly CLAY	ONE recovered a	s: stiff dark gr	eyish orang	ge very	3
3.00 - 3.42	for 275r	N=50 (6,7/50 mm) or SN = 1353	67	17	0				-13.84	3.80		coarse of sandstone 3.00m to 3.50m: AZCL - material. Weak thinly lamina	Disturbance due to SPT				3
1.35 1.50	C1					12				(1.15)		Partially weathered spacing, frequent h fracture surfaces. Discontinuities:	: significantly red	uced strength	, closer fra	cture	4
1.50 1.60	C2 C3					13			-15.00	4.95		1. 5 to 20 degree by planar rough, freque whole diameter of clay infill on fracture.	ent heacy dark bi core deep and fre	rownish orang	ge staining ι	up to	5
			100	57	0							Weak indistinctly the SANDSTONE. Partial fracture spacing an on fracture surface surfaces.	ninly laminated fir Ily weathered: re d occasional heav	duced strengt y brownish bl	h, much clo ack discolo	oser ouration	5
5.00 5.20	C4		100	78	21	9				(2.75)		Discontinuities: 1. 5 to 25 degree by planar, rough, occasion occasional sandy cl 2. 65 to 75 degree j	sional orangish br al brownish black ay infill up to 10m oints from 4.95m	rown staining of to staining up to mm thick.	up to full di 0 0.5mm de 05m to 5.45	iameter eep and om,	6
												5.90m to 6.20m, 6. rough and frequent	heavy brownish	black staining	up to 1mm	n deep.	7
7.30 7.50	C5								-17.74	7.70		Medium strong (loo grained light yellow reduced strength, c black and brownish	rish grey SANDSTO loser fracture spa	ONE. Partially acing and occa	weathered Isional brov	: slightly wnish	7
7.95	C6											Discontinuities: 1. 5 to 15 degree be	-			,	8
3.30	C7		100	85	55	13						planar, rough and o 1mm deep. 2. 45 to 55 degree j and occasional brow 3. 65 to 75 degree j	oints at 9.20m, 10 wnish black staini	0.00m and 11 ng up to 10mi	.70m, plana m deep.	ar, rough	8
9.00												8.60m to 9.00m an heavy brownish bla up to 3mm deep.	d 9.00m to 9.50m	, undulating,	rough and f	frequent	9
	\A/=+-	, Ctribaa	TCR	SCR	_		rks										
ruck at (m) (r Strikes) Time (min)	Rose	e to (r	n) _N	eck t	e Bore o Bed	= 17.			jack-up bai	rge					
Casing I	Details Diam (mm	Water) From (m)	-	ed o (m)													
3.00 12.00	177 150					Core	Barre	el	Flush	Туре	Terminat	tion Reason				Last Up	dated
						S	K6L		Polyr	ner	Terminate	d at scheduled depth	ı			29/06/	2022 A C

DA-st			GEC	OTE	EC	Н	Base	(m)		1031	Client: Client's	·	Islands Cou nderson LLF		ı			ВН-М1	
Meth Sonic Dr		Fraste Du	uo C			(m) 00	3.0	$\overline{}$		dinates	Final De	pth: 12.00 m	Start Date:	24/03/2022	Driller:	MJ	1	Sheet 2 o Scale: 1:	
Rotary C	Coring	Rotoso Fraste Do Rotoso	uo C	ΚL	3.	00	12.	00		51.10 E 83.93 N	Elevatio	n: -10.05 mCD	End Date:	25/03/2022	Logger:	NP+RC		FINAL	-
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Water	Backfill	
70 0.00 0.50 0.60 0.20		Strikes Time (min)		SCR		3 FI	Chis		-22.04 m) Tin	12.00	Remarks Marine Bo Deck to Be	Medium strong (loc grained light yellow reduced strength, collack and brownish Discontinuities: 1. 5 to 15 degree be planar, rough and of 1mm deep. 2. 45 to 55 degree j and occasional brown 3. 65 to 75 degree j and prownish blaup to 3mm deep.	vish grey SAND closer fracture orange discol edding fractur cocasional heav joints at 9.20n whish black sta orange from 7.7 d 9.00m to 9.5 eck and orangis	estrone. Partially spacing and occaouration on fractives closely spaced by brownish blacks, 10.00m and 11 anining up to 10m om to 7.80m, 7.9.00m, undulating sh brown staining whole at 12.00m	weathere asional broture surfacture surfacture surfacture staining and the staining and the surface su	d: slightly ownish des. 400) up to har, rough 15m,			9.5 10.0 - 10.5 11.0 - 11.5 12.0 - 13.5 14.0 - 15.5 16.0 - 17.5 18.0 - 18.5
Casing D		Water																	
To (m) [3.00 12.00	Diam (mm) 177 150	From (m)	To	(m)		Coro	Barr	ol T	Flush	Tune	Tormina	ion Reason				Last Up	vd a+	ad I	
							: Barr 5K6L	CI		mer		i on Keason d at scheduled depth				29/06/		- 1	4

8	1							Pro	oject No.	Project	t Name: Scapa Deep	Water Quay & Hatstor	n Pier Devel	opment -	Marir	ne GI	Во	rehol	le ID
		CAUS						2:	1-1031	Client:	Orkney l	slands Council					В	н-М	11
			GEC	ITC	EC	Н				Client's	s Rep: Arch He	nderson LLP							
Metl	hod	Plant l	Used		Тор	(m)	Base (n) Co	ordinates	F;		Chart Data: 20/0	2/2022	D=!II · ·			Sł	neet 1	of 2
Sonic D	rilling	Fraste Di Rotos			0.	00	3.00		1997.29 E	Final De	eptn: 9.00 m	Start Date: 26/03	3/2022	Driller:	IVIJ		S	cale: 1	L:50
Rotary (Coring	Fraste Di Rotos	uo C		3.	00	9.00	1004	1104.77 N	Elevatio	on: -14.41 mCD	End Date: 27/03	3/2022	Logger:	NP			FINA	۱L
Depth (m)	Sample / Tests			cords			Casing W Depth De (m) (ter Leve		Legend		Description					Water	Backfill	ı
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	land -	- SS1						* × × * × ×		y very gravelly silty fir mm). Gravel is subang				hell			
0.50	ES1								ŧ	×.×.×.	various lithologies.								0.5
										×. ×).
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	land .	cco					F	× × ×									1.0
1.00 - 1.50	E30	iviai irie scoti	iaiiu -	- 332						X X X X X									
1.50 1.50 - 3.00	D10 B9								E	x. × ×									1.5
1.50 - 1.95	SPT (S)	N=16 (2,3/3, 1353	,4,4,5) Han	nmer	SN =	1.50	16	11 200	*.×.×.									
2.00	ES3							-16.4	11 = 2.00			white SANDSTONE rec		sandy su	bangı	ular			2.0
2.50 - 3.00	ES7	Marine Scotl	land -	- SS3					Ē			Ç							2.
									ŧ										
3.00	D11			<u> </u>	<u> </u>		3.00		E			Disturbance due to SPT has le	ead to subsequ	ıent wash oı	ut of				3.
3.00 3.00 - 3.29	ES4	N=50 (6,8/50							Ē			CL - Disturbance due to SPT has lead to subsequent wash out of bably thinly laminated, medium grained, well corangish brown SANDSTONE. Iy laminated, fine grained, poorly cemented, ligh actured SANDSTONE. Partially weathered, reduce closer fracture spacing with pervasive orangish because of the same of th							
	for 140					AZCL			(2.10)		Very weak, thinly la	minated, fine grained	d, poorly ce		_	11.1			3.5
	, iaiiiile	1333	30	0	0				E		strength, much clos	er fracture spacing w				111			
1.20	C1							-18.5	E		discolouration, clos Discontinuities:								4.
1.50						12		-18.9	(0.40) 1 4.50	:::::		pedding fractures, ver h pervasive light brov				0),			4.
						>20		-19.1	(0.25)		surfaces. 2. 80 to85 degree in	oints, probably very c	losely spac	ed, undu	ılating	g,			
						/20		-19.5	(0.35) 51 5.10		smooth.	d, medium grained, n				/			5.
5.30	C2		100	72	40			-19.5	51 5.10		orangish brown SAI	NDSTONE. Partially wo	eathered,	reduced :	stren	gth,			
5.60	C3					3			(1.10)		Discontinuities:	pedding fractures, thi	•						5.
									(1.10)		planar, rough, with	orangish brown stain	ing on frac	ture surf	aces.				
5.00								-20.6	6.20		orangish brown fine	t 4.80m to 4.90m, un e sand deposits and o	-			on			6.0
5.40	C4									:::::		oint at 4.90m to 5.10			gh, wi	ith			6.5
			100	97	55				Ē			brown staining on joi obably very thinly lan			rown	and			
									-			STONE. Highly weath greenish grey discolo	_						7.0
7.30	C5								E		6.05m Discontinuities:								
7.50 7.50	C6					5			(2.80)			g fracture at 5.60m, p grey staining on fract			1				7.
											2. 70 degree joints	at 5.15m to 5.25m and sive greenish grey sta	nd 5.20m to	5.40m,		ar,			
3.15	C7		100	100	24				E		Medium strong (loc	cally weak), thinly lam	ninated to	thinly be	dded,				8.0
			100	100	54				Ė			closer fracture spacin							8.
3.60	C8								E		Discontinuities:		adium sas	od (100/	215/	800)			
9.00								-23.4	9.00	:::::	planar, rough, with	pedding fractures, me dark orangish brown							9.0
			TOP	SCR	POD	FI			ŧ		surfaces.						-		4
	Wate	r Strikes	ICR	ack	_	ema	rks												
ruck at (m)	Casing to (m	n) Time (min)	Rose	e to (r	D	eck t	o Bed =	20.20m	off OCM 80 evels given i		rge								
Casing	Details	Water	Add	led															
	Diam (mm) From (m)	To	o (m)															
9.00	150					Core	Barrel	Flu	sh Type	Terminat	tion Reason				La	ast Upd	ate	t I	
						9	K6L	P	olymer	Terminate	ed at scheduled depth					- 29/06/20	022		ri

Water Strikes Total goods No. See No. Progress No.	5			EC	OTE	EC	Н	D-	(- · · ·		-1031	Client's		Islands Coul					BH-M1	
The following in the control of the								_		Coo	rdinates	Final De	pth: 9.00 m	Start Date:	26/03/2022	Driller:	MJ			
Water Strives Water Strives Into Guesig to Jin Jimon (rank) Road of Jimon (rank) Note of Jimon (rank) Not	Rotary Co	oring	Fraste Du	io C)	ΚL	3.	00	9.0	00			Elevatio	n: -14.41 mCD	End Date:	27/03/2022	Logger:	NP			
Moretum farce (Dice) wealt, mink permanente to this yellow decide, the grained, well emember (all pits variety appears) mink permanente to this yellow permanents (all pits variety object from the permanents) and permanents (all pits variety appears) with occasional orangish brown statismic on some fracture surface. 1. 10 to 2 degree bedding fracture, make regists brown statismic on some fracture surface. 2. 1. 10 to 2 degree bedding fracture, make regists brown statismic on some fracture surface. 3. 1. 10 to 2 degree bedding fracture, make regists brown statismic on some fracture surface. 3. 1. 10 to 2 degree bedding fracture, make regists brown statismic on some fracture surface. 3. 1. 10 to 2 degree bedding fracture, make regists of the sea of the permanents of the per	Depth (m)	Samples			SCR	RQD	FI	Casing Depth	Water Depth			Legend		Des	cription			/ater	Backfill	
Deck to Bed = 20.20m All elevations/reduced levels given in mCD Casing Details Water Added (m) Diam (mm) From (m) To (m) 00 177 00 150	(m)	Water	Strikes	TCR	SCR	RQD	FI	Chis	ellinį	g Detai	ils	Remarks	grained, well cemer weathered, slightly brown discolouratic Discontinuities: 1. 10 to 25 degree the planar, rough, with surfaces. 2. 25 degree joint a 3. 65 to 75 degree joint a 8.50m to 8.65m, sligon 6.90m to 7.20m strata. 8.25m to 8.65m: 65 to 75	cally weak), thinted, light oral closer fracture on. bedding fractured and closer fracture on. bedding fractured and control of the control	inly laminated to ngish brown SAN e spacing with or ares, medium spabrown staining of 15m, planar, smoon to 7.20m, 8.10r ng, rough, with dipenetrating to the space of the spa	ccasional of ccasional of cced (100/2 on some fr oth. n to 8.25m lark brown he base of	Partially rangish 845/800), acture a and a staining	Maria	Backfill	10.0 10.5 11.0 12.0 12.5 13.0 14.5 15.0 16.5 17.0 17.5
(m) Diam (mm) From (m) To (m) 00 177							,		•		,	Deck to Be	ed = 20.20m		-0-					
00 450		iam (mm)																		
· · · · · · · · · · · · · · · · · · ·	9.00					-	Core	Barr	el	Flus	h Type	Terminat	ion Reason				Last Up	date	ed I	_

	C	AUS		W OT I					Proje 21 -1	ct No. L 031	Project Name: Scapa Deep Water Quay & Hatston Pier Development - Marin Client: Orkney Islands Council Client's Rep: Arch Henderson LLP	Borehole ID BH-M12
Meth Sonic Di		Plant U Fraste Di Rotos	uo C		Top 0.		Base 1.5			linates 6.39 E	Final Depth: 12.00 m Start Date: 27/03/2022 Driller: MJ	Sheet 1 of 2 Scale: 1:50
Rotary C	Coring	Fraste Di Rotos		ΧL	1.	50	12.	00	100418	6.20 N	Elevation: -10.84 mCD	+NP FINAL
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend Description	Na Backfill
0.00 - 1.50 0.50 1.00	ES1								-11.34	0.50	Medium dense grey very gravelly very silty fine to coarse SAND w shell fragments (up to 5mm). Gravel is subangular fine to coarse various lithologies. Highly weathered brown SANDSTONE recovered as subangular fi coarse gravel and subangular cobbles.	of
1.50 1.50 - 1.95 2.35	D4 SPT(S) N (6,7/7,9 Hamme		50	30	15	AZCL	1.50		-12.34	1.50	Medium strong indistinctly thinly laminated light creamy brown in grained moderately cemented SANDSTONE. Partially weathered: closer fracture spacing, slightly reduced strength with sandy clay deposits and discolouration on fracture surfaces. Discontinuities: 1. 30 to 40 degree bedding fractures closely spaced (40/93/150)	
											planar, rough with patchy orangish brown sandy clay deposits (1r thick) on rare surfaces and strong patchy orangish brown staining	
2.75 3.00	C2					6				(2.90)	most fracture surfaces. 2. 75 to 85 degree joint at 3.20m to 3.45m, planar, rough with pa	tchy 3.0 -
3.00	C3										brown staining on joint surface. 3. 50 to 60 degree joint at 3.80m to 4.00m, planar, rough with	
3.45	C4		100	85	38	16					orangish brown staining on joint surface. 1.5m to 2.25m: AZCL - Disturbance due to SPT has lead to subsequent wash out of material.	3.5
4.50									-15.24	4.40	Medium strong (locally weak) thickly laminated light greyish whit fine grained moderately cemented SANDSTONE. Partially weathe	
4.80	C5		100	82	42	7					closer fracture spacing, slightly reduced strength with discoloura and clay deposits and clay infill on fracture surfaces. Discontinuities: 1. 5 to 15 degree bedding fractures medium spaced (85/400/650 planar, rough with strong orangish brown staining on most fractus surfaces, patchy black staining on few fracture surfaces and patcles orangish brown sandy clay deposits (up to 5mm thick) on some	tion 5.0 -) re
5.80 6.00	C6					NI					fracture surfaces. 2. 50 to 60 degree joints at 5.10m to 5.40m, 5.60m to 5.80m, 6.6 to 6.95m, 7.50m to 7.70m, 8.10m to 8.25m, 8.50m to 8.65m, 10.	70m
6.40	C7		100	86	38	5				(7.60)	to 10.85m, 10.95m to 11.15m, planar, rough with strong orangist brown staining on most joint surfaces, patchy black staining on fe surfaces and occasional patchy light brown clay deposits on few surfaces. 3. 80 to 90 degree joint at 5.35m to 5.60m, 6.40m to 6.90m, 8.60 8.90m, planar to slightly undulating rough with orangish brown staining and black staining on some fracture surfaces.	6.5
7.50 7.70	C9										7.50m to 7.60m: Light grey and orangish brown gravelly clay infill.	7.5
3.25	C10		100	96	83	4						8.5
9.00												9.0 -
	Mata	Strikes	TCR	SCR	_	FI ema	rks					
ruck at (m) (Time (min)	Rose	e to (r	n) _N	1arine eck to	Bore Bed	= 16.			k-up barge	
Casing [Water										
1.50	Diam (mm) 177	From (m)	To	o (m)								
12.00	150						Barr	el	Flush			st Updated
						S	K6L		Polyr	mer	erminated at scheduled depth	^{29/06/2022} AGS

Meth	9/ -	Plant	GEC	OTE	EC	Н	Base	(m)		1031	Client: Client's	,	slands Coui					BH-M1	
Sonic Dr		Fraste Du	uo C			(m) 00	1.5				Final De	pth: 12.00 m	Start Date:	27/03/2022	Driller:	MJ		Sheet 2 o Scale: 1:	
Rotary C	Coring	Rotoso Fraste Do Rotoso	uo CX	ΚL	1.	50	12.	.00		16.39 E 86.20 N	Elevation	1: -10.84 mCD	End Date:	28/03/2022	Logger:	EM+NP		FINAL	-
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Water	Backfill	
	C11 C12 C13 C14 Water	Strikes Time (min)	93 TCR	84 81	73	4	Chis		-22.84	12.00	Remarks Marine Bol Deck to Be	Medium strong (loc fine grained moders closer fracture space and clay deposits at Discontinuities: 1. 5 to 15 degree be planar, rough with a surfaces, patchy blad orangish brown san fracture surfaces. 2. 50 to 60 degree j to 6.95m, 7.50m to to 10.85m, 10.95m brown staining on r surfaces and occasi surfaces. 3. 80 to 90 degree j 8.90m, planar to sli, staining and black s	ally weak) this ately cementer ing, slightly rementer ing, slightly rementer ind clay infill or edding fracture strong orangistick staining on dy clay depose oints at 5.10m 7.70m, 8.10m to 11.15m, planest joint surfonal patchy ligo int at 5.35m ghtly undulatitatining on son End of Bore	ckly laminated light of SANDSTONE. Produced strength of a fracture surface is medium space in brown staining few fracture surfacture surfacture surfacture, and the substitution of the su	artially we with discoles. ed (85/400 on most f faces and nick) on sc in to 5.80 nin to 8.65 m strong orack staining eposits on to 6.90 m angish broadlist of the strong of the strong orack staining eposits on to 6.90 m angish broadlist or the strong or the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the face of the strong orack staining eposits on the strong oracle or	eathered: louration 0/650) rracture patchy me n, 6.60m n, 10.70m nngish on few few	M .		9.5 10.0 - 10.5 11.0 - 11.5 12.0 - 13.5 14.0 - 15.5 16.0 - 17.5 18.0 -
Casing E To (m) [1.50	Details Diam (mm) 177	Water From (m)		ed o (m)															
12.00	150					Core	Barr	el	Flush	Туре	Terminati	ion Reason				Last Up	date	ed	I
						S	K6L		Poly	mer	Terminated	d at scheduled depth				29/06/	/2022		A

			GEC	ITC	EC	Н		,		1031	roject Name: Scapa Deep Water Quay ient: Orkney Islands Co ient's Rep: Arch Henderson L	uncil	- Marine GI	Borehole ID BH-M13
Metho Sonic Dr		Plant U			_	(m) 00	Base 3.0		Coord	inates	nal Depth: 10.50 m Start Date	e: 28/03/2022 Driller :	: MJ	Sheet 1 of 2
Rotary Co		Rotoso Fraste Du Rotoso	onic uo C			00	10.		34499 100422		evation: -11.57 mCD End Date	29/03/2022 Logger	r: NP	Scale: 1:50 FINAL
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	egend D	escription		Backfill Backfill
0.00 - 0.50 0.00 - 1.50	ES5 B8	Marine Scotl	and -	- SS1							Medium dense light grey grave fragments (up to 7mm). Gravel			_
0.50	ES1										lithologies.			0.5
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	and -	- SS2										1.0
1.50 1.50 - 3.00 1.50 - 1.95	D10 B9 SPT (S)	N=13 (1,2/3,	3,3,4) Han	nmer	SN =	1.50				1.50m to 2.00m: Very silty from 1.50m			1.5
2.00	ES3	1353							-13.57	2.00	Highly weathered brown SAND gravel and subangular cobbles.	STONE recovered as subang	gular coarse	2.0 —
2.50 - 3.00	ES7	Marine Scotl	and -	- SS3						3.00				2.5 —
3.00 3.00 3.00 - 3.44	for 290	N=50 (6,8/50 mm) er SN = 1353	40	0	0	AZCL	3.00		-14.57	(1.50)	Weathered SANDSTONE recove gravel and subangular cobbles. 3.00m to 3.90m: AZCL - Disturbance due material.	·		3.5
4.10	C1					NI	-				Weak light brown indistinctly the grained SANDSTONE. Partially v	•	VI	4.0
4.50						9	-		-16.07	4.50	slightly closer fracture spacing discolouration. Discontinuities:	with dark orangish brown		4.5
5.00 5.20 5.25	C2 C3 C4		95	70	16				-16.72	5.15	1. Probable 5 to 15 degree bed (40/160/215) undulating, smood 2. 70 to 75 degree joints at 4.5.	th. 5m to 4.80m, 4.80m to 5.00	ım,	5.0 — - - -
						>20			-17.47	5.90	\surfaces, penetrating up to 3m \text{Weak (locally medium strong) I} \text{poorly cemented fine grained S}	ght orangish brown thickly ANDSTONE. Partially weath	ered:	5.5 — — — —
6.00 6.10	C5										slightly reduced strength, close brown discolouration. Discontinuities: 1. 0 to 5 degree bedding fractu			6.0 —
6.60	C6		97	97	53						planar, smooth, with orangish I surfaces. 2. 40 to 45 degree joint at 5.15 planar, smooth. 3. 70 to 90 degree joints at 5.6 orangish brown staining on joir	m to 5.20m, an 5.50m to 5.5 Sm to 5.90m, undulating, ro	55m ough with	7.0
7.50						6				(4.60)	from joint surfaces. Medium strong to strong light bedded moderately, well ceme Partially weathered: slightly rec	nted fine grained SANDSTO	NE.	7.5 —
8.00	C7		96	80	33						spacing with localised pervasiv Discontinuities: 1. 15 to 25 degree bedding frac planar, smooth with orangish b penetrating up to 6mm fractur 2. 50 to 70 degree joints, proba	e orangish brown discoloura tures, medium spaced (40/: rown staining on joint surfa e surfaces.	ation. 350/820) ces, locally	8.0 — - - 8.5 — -
9.00 9.00 9.25	C8 C9		TCP	SCR	RUD	FI					undulating with orangish brow penetrating up to 5mm from jc 8.50m to 9.00m: Dark orangish brown sta	n staining on joint surfaces, int surface.	I	9.0
	Wate	r Strikes	ick	JUR		ema	rks			<u> </u>				
itruck at (m) Ca	asing to (m	Time (min)	Rose	e to (r	D	eck t	o Bed	= 18	drilled off .00m duced leve					
Casing D	etails	Water	Add	led										
	Diam (mm			o (m)										
10.50	150						Barr	el	Flush Polyr		rmination Reason minated at scheduled depth		29/06/2	

			GEC	OTE	ECI	Н	le.	, .		1031	Client:		Islands Coul nderson LLF					BH-M13	
Meth Sonic Dr		Plant U				(m) 00	Base 3.	e (m) 00	Coor	dinates	Final De	pth: 10.50 m	Start Date:	28/03/2022	Driller:	MJ		Sheet 2 of 2 Scale: 1:50	
Rotary C	Coring	Rotoso Fraste Du Rotoso	uo C)	ΚL	3.	00	10	.50		91.90 E 21.83 N	Elevatio	n: -11.57 mCD	End Date:	29/03/2022	Logger:	NP		FINAL	_
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	
0.10	C10	Strikes Time (min)	100	96	59		Chis		-22.07	10.50	Remarks Marine Bc Deck to Bc	Medium strong to seedded moderately Partially weathered spacing with localis Discontinuities: 1. 15 to 25 degree to planar, smooth with penetrating up to 6. 2. 50 to 70 degree; undulating with orapenetrating up to 5. 10 to 70 degree to to 70	strong light ora, well cements is slightly reduced pervasive of pedding fracture in orangish brown in fracture is significant from join. End of Bore	angish brown ind ed fine grained Sced strength, slig brangish brown dures, medium spawn staining on jourfaces. y medium space: taining on joint staining on 10 to	ANDSTONI thtly closed liscolouraticed (40/38) bint surfaced d, planar a	F. fracture from from from from from from from from	M	10. 11. 12. 12. 13. 14. 14. 15. 16. 16. 17. 17.	9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5
	Diam (mm)	Water From (m)		ed															
3.00 10.50	177 150				-	Core	Barı	rel	Flush	Туре	Terminat	ion Reason				Last Up	date	ed 📕 i	ī
						ς	K6L		Poly	mer	Terminate	d at scheduled depth	1			29/06/	วกวว		Ť

Sonic Drilling Frank Duc XL Sol So		9 –		SEC	ITC	EC	Н				1031	Project Client: Client's	•	o Water Quay & Islands Cour nderson LLF	ncil	elopment -	· Marine		Boreholo BH-M	14
Rotsonic South Control Rotsonic Ro						_			_	Coord	inates	Final De	epth: 9.00 m	Start Date:	29/03/2022	Driller:	MJ		Sheet 1	
10.00 - 15.00 ESS			Rotoso Fraste Du	onic uo C								Elevatio	n: -18.13 mCD	End Date:	30/03/2022	Logger	: EM+l	NP	FINA	
State			Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)			Legend		Desc	ription			Water	Backfill	
1.00			Marine Scotl	and -	SS1							×××								-
1.00 - 1.50 1.50	0.50	ES1										x. x. x. x. x. x. x. x.	19mm). Gravel is su	ıbangular fine	to medium of v	arious lith	ologies.			0.5 - -
15.0 3.00			Marine Scotl	and -	- SS2							X X X X X X X X X X X X X X X X X X X								1.0
2.50 - 3.00	1.50 - 3.00 1.50 - 1.95	B9 SPT (S)		2,3,4) Han	nmer	SN =	1.50				X:								1.5 — - - - 2.0 —
101			Marine Scotl	and -	- SS3							X, X, X, X, X, X, X, X, X, X, X, X,								2.5
3.00 2.1 3.00 2.1.1.5 3.00 2.1.1.5 3.00												* * * * * *								- -
1.00	3.00	ES4 SPT(S) 1 (3,4/6,6	5,7,9)					3.00			(0.30)		high cobble content Weak thinly lamina SANDSTONE. Partia	t. Cobbles are ted light brow lly weathered:	subrounded of some of some of some of some of some of some of slightly closer f	sandstone ell cemen ractures s	ted pacing,	h		3.0
4.50 August		C1	r SN = 1353	100	63	23	11				(1.10)		fracture surfaces. Discontinuities: 1. 30 to 40 degree l	bedding fractu	res closely space	ed (30/92,	/120)			4.0
Section Sect	4.50						>20				(0.35)		surfaces and patchy most fracture surfa 2. 60 to 70 degree j patchy brown andy	y light brown s ces. oint at 3.65m clay deposits	andy clay depos to 3.80m, undul up to 2mm thic	its (<1mm	thick) o			4.5
1. 30 to 40 degree bedding fractures very closely spaced (10/28/80) slightly undulating, rough with frequent patchy light grey clay (deposits (up to 4mm thick) on most fracture surface. Weak indistinctly thicky laminated light brown fine grained medium cemented SANDSTONE. Partially exathered; slightly closer fractures spacing with clay deposits and discolouration. Discontinuities: 1. 25 to 35 degree bedding fractures closely spaced (30/150/230) undulating, rough with patchy brown clay deposits (2-mm thick) on some fracture surfaces. 2. 1 to 5 degree point at 4.85m, slightly undulating, rough with patchy brown clay deposits (2-mm thick) on some fracture surfaces. 3. 80 to 85 degree joint at 5.0m to 5.30m planar, rough with patchy light brown clay deposits (2-mm thick) on joint surface. 4. 100 92 51	5.40	C3		100	88	43	7				(1.25)		Weak thinly lamina cemented SANDSTO clay deposits.	ted orangish b	rown fine graine					5.0 —
6.50 C5 6.50 C6 7.05 C7 7.40 C8 7.50 C9 8.40 C9 100 92 51 100 92 51 100 92 51 100 92 51 100 98 R4 100 98 R4 100 P7		C4											1. 30 to 40 degree l)		-
Spacing with clay deposits and discolouration. Spacing with clay deposits and discolouration. Spacing with clay deposits (<2 mm thick) on some fracture surfaces.		C5								-24.13	6.00		deposits (up to 4mi	m thick) on mo	st fracture surfa	ace.	-	 n		6.0 —
Some fracture surfaces. 2. 0 to 5 degree joint at 4.85m, slightly undulating, rough with patchy light brown clay deposits (<1mm thick) on joint surface. 3. 80 to 85 degree joint at 5.20m to 5.30m planar, rough with patchy light brown clay deposits (<1mm thick) on joint surface. 3. 80 to 85 degree joint at 5.20m to 5.30m planar, rough with patchy light brown clay deposits (<1mm thick) on joint surface. Medium strong thinly laminated light grey fine grained well cemented SANDSTONE. Partially weathered: slightly closer fracture spacing. Discolouration on fracture surfaces. Discolouration on fracture surfaces. Discolouration on fracture surfaces. Discolouration on fracture surfaces, or angle brown clay deposits (<1mm thick) on joint surface. Medium strong thinly laminated light grey fine grained well cemented SANDSTONE. Partially weathered: slightly closer fracture spacing. Discolouration on fracture surfaces. Discolouration on fracture surfaces. Discolouration on fracture surfaces and patchy dark reddish brown discolouration on some fracture surfaces and patchy dark reddish brown discolouration on some fracture surfaces, otherwise clean. Weak (locally medium strong) thinly laminated light brown fine Remarks Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 25.00m All elevations/reduced levels given in mCD	6.50	C6		100	98	84	2				(1.40)		spacing with clay do Discontinuities:	eposits and dis	colouration.			S		6.5 —
7.50 C8	7.05	C7											some fracture surfa	ices.		·				7.0
C9 Saturation C9 C9 C9 C9 C9 C9 C9 C		C8					16			-25.53	7.40		light brown clay de 3. 80 to 85 degree j light brown clay de	posits (<1mm joint at 5.20m posits (<1mm	hick) on joint so to 5.30m planar hick) on joint so	urface. , rough wi urface.	th patch	.		7.5 — - 7.5 — -
Water Strikes Truck at (m) Casing to (m) Time (min) Rose to (m) Casing Details Water Added To (m) Diam (mm) From (m) To (m) Water Strikes Remarks Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 25.00m All elevations/reduced levels given in mCD	3.40	C9		100	92	51	7				(1.60)		cemented SANDSTO spacing. Discoloura Discontinuities: 1. 20 to 30 degree l	ONE. Partially vition on fracture	veathered: sligh e surfaces. res closely space	itly closer ed (10/20	fracture 0/800)			8.0 — - - - 8.5 —
Water Strikes Struck at (m) Casing to (m) Time (min) Rose to (m) Casing Details Water Added To (m) Diam (mm) From (m) To (m) Remarks Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 25.00m All elevations/reduced levels given in mCD	9.00									-27.13	9.00		from fracture surfacture surfacture su	ces and patchy urfaces, othery	dark reddish bi vise clean.	rown disco	olouratio	on		9.0 -
truck at (m) Casing to (m) Time (min) Rose to (m) Casing Details Water Added To (m) Diam (mm) From (m) To (m) Time (min) Rose to (m) Marine Borehole drilled off OCM 80 jack-up barge Deck to Bed = 25.00m All elevations/reduced levels given in mCD Casing Details Water Added To (m) Diam (mm) From (m) To (m)		\\$/=±-	r Ctribas	TCR	SCR	Ч-		rles												<u></u>
To (m) Diam (mm) From (m) To (m)	truck at (m) C			Rose	e to (r	n) _N	/larine	e Bore o Bed	= 25.	00m			ge							
	To (m)	Diam (mm																		
3.00 177 9.00 150 Core Barrel Flush Type Termination Reason Last Updated SK6L Polymer Terminated at scheduled depth 29/06/2022	3.00 9.00	177 150							el									-		

									roje	ct No.	Project	Name: Scapa Deep	water Quay &	Hatston Pier Deve	nopment - i	viai iiie Gi	В	orehol	e ID
	C	AUS	E	W	A	Y			21-1	L031	Client:	Orkney I	slands Cour	ncil			ı	BH-M:	14
			EC	TE	CI	-					Client's		nderson LLF						
Meth	hod	Plant U	Jsed	-	qoT	(m)	Base (r	n) (Coord	linates		•	.acidon EEF				ς.	heet 2 o	of 2
Sonic D		Fraste Du	ıo CX	_	0.0		3.00				Final De	pth: 9.00 m	Start Date:	29/03/2022	Driller:	MJ		Scale: 1	
Rotary (Coring	Rotoso Fraste Du		L	3.0	00	9.00			5.81 E 4.01 N	Elevatio	n: -18.13 mCD	End Data:	30/03/2022	Logger	EVV-ND			
	-	Rotoso	onic								Lievatio	-10.13 IIICD	enu Date:	JU/U3/2U22	Logger:	LIVITINY		FINA	_
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Wa Depth Dep (m) (n	er L th) I	evel nCD	Depth (m)	Legend			ription			Water	Backfill	L
	Water	Strikes Time (min)	TCR	SCR	RQD	FI	Chisell		etails		Remarks Marine Bc Deck to Be	weak (locally media grained moderately much closer fractur fracture surfaces. Discontinuities: 1. 0 to 10 degree be smooth with orangi light brown sandy c surfaces. 8.40m: Black staining on. 8.70m to 8.72m: Light brown sandy cons/reduced levels given to the surfaces.	um strong) thin cemented SA e spacing with edding fracture sh brown stain lay deposits (understure surface. We sandy clay infill. End of Bore	hylaminated ligi NDSTONE. Partia discolouration a es, closely spaced ing on some fra p to 20mm thick hole at 9.00m	lly weathe and clay de d (5/80/18 cture surfa	red: posits on 0) planar, ices and	PW PW		9.5 10.0 10.5 11.0 12.5 13.0 14.5 15.0 16.5 17.0 18.5
Casing I	Details	Water	Adde	ed															
(m)	Diam (mm)			(m)	1														
.00	177 150				-	Core	Barrel	-	Flush	Type	Terminat	ion Reason			1	Last Up	dato	d =	_
.00		•	i		, ,		-uncl		iusii	. ypc	- criminal	11.03011					ualt		

		1	GEC	TC	EC	Н		,	21 -1	ct No.	Project Client: Client's	·	o Water Quay & slands Cour nderson LLF	ncil	elopment	- Ma	arine GI		BH-N	115
Meth Sonic D		Plant U			_	(m) .00	Base 3.0		Coord	inates	Final De	epth: 9.00 m	Start Date:	30/03/2022	Driller:	: 1	MJ		Sheet 1	
Rotary (Rotoso Fraste Do Rotoso	onic uo C			.00	9.0		34491 100423	1.66 E 5.99 N	Elevatio	n: -17.71 mCD	End Date:	31/03/2022	Logger	r: N	NP		Scale: FIN	
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription				Water	Backf	ill
0.00 - 0.50 0.00 - 1.50 0.50	ES5 B8 ES1	Marine Scotl	land -	- SS1							X X X X X X X X X X X X X X X X X X X	Loose to medium d with shell fragment brachiopod shells (u of various lithologie	s (up to 8mm) up to 31mm).	and unfragmen	ted articu	ulate	ed			0.5
1.00 1.00 - 1.50	ES2 ES6	Marine Scotl	land -	- SS2																1.0
1.50 1.50 - 3.00 1.50 - 1.95 2.00	SPT (S) N=11 (1,1/2,3,3,3) Hammi 1353						1.50		-19.21	1.50		Medium dense grey content and shell fr gastropod shells (up of various lithologie	agments (up to to 12mm). G	o 7mm) and unf ravel is subangu	ragmente lar fine to	ed o me				2.0
2.50 - 3.00	ES7	Marine Scotl	land -	- SS3							***** ***** *****									2.5
3.00 3.00 3.00 - 3.45	D11 ES4 SPT(S) I (4,6/8,8 Hamme		33	0	0	AZCL	3.00		-20.71	3.00		Weathered SANDST gravel of sandstone of sandstone. 3.00m to 4.10m: AZCL - I material.	with low cobl	ole content. Cob SPT has lead to subsective as silty	bles are s quent wash of fine sand.	suba	angular r]		3.5
4.35	C1					NI			-22.11	(4:49)		Medium strong ligh grained moderately slightly reduced stro brown discolouration Discontinuities:	well cemente ength, closer f	d SANDSTONE.	Partially w	weat	thered:			4.0
4.50	62					11			-22.21	4:50		1. 5 to 15 degree be planar, smooth with surfaces ad light bro surfaces.	n patchy dark o own patchy cla	orangish brown ny deposits on so	staining o	on fr ure	acture			5.0
5.205.406.00	C2 C3		100	73	0					(1.80)		2. 70 to 90 degree j 5.65m, 5.70m to 6.3 dark orangish brow surfaces and patchy Weak light brown n partly cemented fin	15, and 6.15m n staining, per r light brown c nottled orangis e grained SAN	to 6.30m, undu netrating up to 5 lay deposits on th brown indisti DSTONE. Partia	lating, sm mm from some join nctly thinl lly weathe	noot n joii nt su ily be ered	th with nt urfaces. edded d:			5.5
6.20	C4								-24.01	6.30		slightly reduced stro orangish brown disc Discontinuities: 1. 15 to 20 degree b	colouration. pedding fractu	res, closely spac	ed 930/8	35/1	10)			6.5
			100	92	0	15 >20			-24.61	6.90		planar, smooth with surfaces and occasi 2. 80 to 85 degree j undulating, smooth joint surfaces and o	onal light brow oints at 6.30m with patchy o	vn clay deposits to 6.70m and 6 ark orangish bro	on joint s 35m to 6 own stain	surfa 6.70 ning	aces. Im, on			7.0
7.50						14			-25.11 -25.61	7.40 (0.50) 7.90		surfaces. 2. 80 to 85 degree j undulating, smooth joint surfaces.	oints at 6.30m	to 6.70m and 6	.35m to 6	6.70)m,			7.5
8.20	C5		100	95	19							Medium strong ora fine grained SANDS	-							8.0
8.50	C6									(1.10)		closer fracture space Discontinuities: 1. 15 to 20 degree by planar, smooth with	ing with perva	re, very closely	own disco	olou .0/2!	uration. 5/70)			8.5
9.00									-26.71	9.00		surfaces. 2. 85 to 90 degree j								9.0
			TCR	SCR	_	_				-										
Struck at (m)		r Strikes n) Time (min)	Rose	e to (r	m) N	Deck t	e Bore o Bed	= 24.			jack-up bar n mCD	rge								
Casing To (m)	Details Diam (mm	Water) From (m)		l ed																
3.00 9.00	177 150	,		~ (!!! <i>)</i>		Core	Barr	el	Flush	Туре	Terminat	tion Reason				T	Last U	pdate	ed	
						S	K6L		Polyr	mer	Terminate	d at scheduled depth					29/06	5/2022	2	AG:

	C	AUS		W						ject No. -1031	Project Client: Client's	•	Water Quay & Islands Coul	ncil	elopment -	Marine GI		oreholo	
Meth Sonic D		Plant U	uo C			(m) 00	Base 3.0			rdinates 911.66 E	Final De	<u> </u>		30/03/2022	Driller:	MJ		Sheet 2 o	
Rotary C	Coring	Fraste Di Rotos	uo C	XL	3.	00	9.0	00		235.99 N	Elevatio	1: -17.71 mCD	End Date:	31/03/2022	Logger:	NP		FINA	L
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription			Water	Backfill	L
uck at (m)lo		Strikes		scr eto (r				ellin _i	g Deta i (m)	ils (ht:mm)	Remarks Marine Bo	Medium strong ora fine grained SANDS closer fracture space Discontinuities: 1. 15 to 20 degree iplanar, smooth with surfaces. 2. 85 to 90 degree ipundulating, smooth surfaces. 7.25m: Thick light brown Medium strong lightine grained SANDS strength, slightly clediscolouration. Discontinuities: 1. 5 to 15 degree bplanar, smooth, with surfaces. Medium strong (loobeded very well converted to the surfaces.) Medium strong (loobeded very well converted to the surfaces.) 1. 15 to 25 degree iplanar, smooth with surfaces. 2. 70 to 80 degree ipundulating, rough very menetrating up to 7 in the surfaces. 8. 15m to 8.25m: Weak the surfaces.	TONE. Partiallicing with pervasive ora pedding fracture in pervasive ora with dark ora soft clay infili on 15 it brown indist TONE. Partiallicoser fracture in patchy orangish brown and pedding fracture in p	y weathered: recisive orangish brown stand to 7.25m and 7 ingish brown stand degree bedding fracture inctly thinly beddy weathered: slig pacing with patches, closely spacegish brown stain at orangish brown stain at orangish brown staining on the standard shown staining on the standard should be shown staining on the standard should be shown and greenish brown and greenish	duced streetown disco repaced (10 ining on fr .05m to 7. ining on jo e ded well c shtly reduct thy orangis d (50/70/1 ing on fract n indistinc DNE. Partia er fracture discolourat ed (30/110 ng on fract .80m to 9. n joint surfa	ngth, louration. /25/70) acture 40m, int emented led h brown 20) ture tily thinly lily e spacing ion. 0/350) cure 00m, faces,			9.5 10.0 10.5 11.0 11.5 12.0 13.5 14.0 15.5 16.0 17.5 18.0
. 1	_ , ,	. ,		,		,		,			Deck to Be	d = 24.00m ins/reduced levels gi		o-					
Casing I	Details Diam (mm)	Water From (m)		ed o (m)															
3.00 9.00	177 150	(111)		,		Ca	Par	·ol	EJ	h Tunc	Torminat	ion Posson				Lock U.	do±-	.d =-	_
						core	Barr	eı	Flus	h Type	ierminat	on Reason				Last Up	aate	a a	

		AUS	GEC	OTE	EC	Н		21-1	1031	Client: Client's		Islands Coul					BH-M1	.0
Meth Sonic Dr		Plant U			_	(m)	Base (m 2.00) Coord	inates	Final De	pth: 8.00 m	Start Date:	02/04/2022	Driller:	KW		Sheet 1 o	
Rotary C		Rotoso Fraste Do	onic uo C			00	8.00	34497 100425	5.43 E 5.73 N	Elevation	n: -10.09 mCD	End Date:	02/04/2022	Logger:	RC +TMcA		Scale: 1: FINAL	
Depth (m)	Sample / Tests			cords			Casing Water Depth Depth (m) (m)	Level mCD	Depth (m)	Legend		Des	cription		-	Water	Backfill	
0.00 - 0.50	ES3 B5	Marine Scotl	and -	SS1			()		(,	. × ×	Loose to medium d					>		
0.50 0.50 0.00 0.00 - 1.50 0.00 - 1.50 0.50 0.50 - 1.95	ES1 ES2 B6 ES4 D7	Marine Scotl			ımer	SN =	1.50				brachiopod shells (ulithologies.	up to 25mm).	Gravel is subang	ular fine o				1.0
		1353						-11.89	1.80	X	Weathered yellowis description)	sh white band	ed SANDSTONE.	(Drillers	\			
2.85 3.00 3.00 - 3.45	C2 D8 SPT(S) N (4,5/8,9 Hamme		100	38	13	>20	3.00	-12.09	2.00		Medium strong (loc grained light yellow reduced strength, c orange discolourati- infill on fracture sur Discontinuities: 1. 5 to 25 degree be planar, rough, occas deep and occasiona- thick.	rish grey SAND closer fracture on on fracture rfaces. edding fracture sional light bro al sandy clay in	esclosely spaces swifaces and occupants spacing. occasion surfaces and occupants spaces swifaces and occupants spaces swifaces and occupants spaces s	weathere nal light bi casional sa d (10/115/ aining up t urfaces up	d: rownish andy clay 300), to 1mm to 1mm			2.5
l.10	C3		100	65	19	14			(4.30)		2. 25 to 45 degree j and 4.70m, planar, deep. 3. 65 to 75 degree j 3.80m to 4.10m, 4.: light brownish oran	rough and stai oints from 2.3 10m to 4.40m	ining on joint sur i0m to 2.60m, 3. , undulating, rou	faces up to 10m to 3.5 gh ad occa	o 1mm 60m, asional			4.0
5.00	C4		100	63	9			-16.39	6.30		Weak (locally medii grained dark yellow	O,	, ,					5.5
′.30 ′.50 ′.75	C5 C6 C7		100	62	29	9			(1.70)		reduced strength, c brownish orange di Discontinuities: 1. 5 to 25 degree be planar, rough and fr 10mm deep. 2. 65 to 75 degree j undulating, rough a	closer fracture scolouration c edding fractur requent heavy oints from 6.7	spacing and frecon fracture surface es closely spaced brownish orang	quent heav ces. d (10/130/ e staining d 7.10m to	350) up to 5 7.50m,			7.0
3.00								-18.09	8.00		1mm deep.	End of Bore	ehole at 8.00m					8.0
	Mate	, Strikas	TCR	SCR	Ц—		rks									-		9.0
ruck at (m) C		Time (min)	Rose	to (n	_	lema ⁄larine		e drilled off	OCM 80	jack-up barg	ge							
Casing D	Details Diam (mm	Water) From (m)		ed o (m)	D	eck to	Bed = 1											
2.00	177	,	10	· (111)														
8.00	150					Core	Barrel	Flush	Туре	Terminati	ion Reason				Last Up	date	ed	
						S	K6L	Polyr	mer	Terminated	d at scheduled depth	ı			29/06/	/2022	A	Ĉ

			iEC	OTE	EC	Н			21-3	ct No. 1031	Project Client: Client's		o Water Quay & Islands Cou nderson LLF	ncil	elopment -	Marine (GI	Borehole BH-M17	7
Metho Sonic Dri		Plant U Fraste Du				(m)		(m) 00	Coord	linates	Final De	epth: 7.00 m	Start Date:	01/04/2022	Driller:	KW		Sheet 1 of Scale: 1:5	
Rotary Co		Rotoso Fraste Du Rotoso	onic uo C)			00		00	34501 100426	.7.31 E 88.57 N	Elevatio	on: -8.53 mCD	End Date:	01/04/2022	Logger:	NP +TMc		FINAL	
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend			cription			Motor	Backfill	
0.00 - 0.50 0.00 - 0.50 0.50	B3 ES2 ES1	Marine Scotl	and -	SS1					-9.03	0.50	*	Grey very gravelly s to 3mm). Gravel is s Weathered yellowis	subangular fin	e to medium of	various lith				0.5
1.00	C1								-9.53	1.00		description) Highly weathered S					у		1.0 -
1.45	C2		100	12	8	NI >20			-9.98	1.45		fine to coarse SANE fine to coarse. Cobb Weak (locally very v brown moderately weathered: slightly orangish brown disc Discontinuities:	bles are suban weak) indistind well cemented reduced strer	gular. ctly thinly bedde d fine grained SA	d light ora	ngish . Partiall	у		1.5 —
2.50 2.65 2.80	C3 C4											1. 15 to 20 degree I planar, smooth with surfaces, penetratir clay deposits on soo 2. 55 to 65 degree j undulating, smooth	h dark orangis ng up to 3mm me fracture su joints, widely s	h brown staining from fracture su Irfaces. spaced (120/111	on fractu rfaces, ligh 8/1550) pl	re nt browi lanar an	n		2.5 —
3.30 4.00	C5		100	59	0							surfaces. 3. 75 to 85 degree j to 2.95m, 3.50m to with dark orangish from joint surface.	4.70m and 4.	60m to 5.15m, u	ndulating,	smooth	۱		3.5 —
4.15 4.30	C6 C7		100	30	0	10				(5.55)									4.5 —
5.50 5.65	C8		65	0	0	14 AZCL						6.10m to 7.00m; AZCL - borehole due to fractured			ieved from ba:	se of			5.5 — - - - 6.0 — - - 6.5 —
7.00									-15.53	7.00			End of Bore	ehole at 7.00m					7.0 —
Struck at (m)(c		r Strikes		SCR	R	lema		bha!	المالماء - ١٩	- COLVECTION OF THE PROPERTY O	ingly use h							:	8.0
Casing D		Time (min) Water			D	eck to	o Bed	= 15			jack-up bar n mCD	rge							
	Diam (mm 177) (m)															
7.00	150					Core	Barı K6L	el	Flush Polyi			tion Reason	1				Upda /06/20:		<u> </u>

			GEC	ITC	EC	Н			Projec 21-1	.031	Project Client: Client's	Orkney Islands Council	Borehole ID BH-M26
Meti Sonic D		Plant U			_	(m) 00	Base 3.0		Coord	inates	Final De	pth: 10.50 m Start Date: 31/03/2022 Driller: MJ	Sheet 1 of 2
Rotary	J	Rotos Fraste Di Rotos	onic uo C			00	10.		34497 100415		Elevatio	n: -14.83 mCD End Date : 01/04/2022 Logger : NP+RC	Scale: 1:50 FINAL
Depth (m)	Sample / Tests	Fie	eld Re	cords			Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend	Description	Backfill
0.00 - 1.50	B5										× × ×	Loose grey gravelly silty fine to coarse SAND with shell fragments (up to 3mm). Gravel is subangular fine to medium of various lithologies.	
0.50	ES1										* * * * * * * * * * * * * * * * * * *		0.5 —
1.50 1.50 - 3.00 1.50 - 1.95									-16.03	1.20		Medium dense grey very gravelly silty fine to coarse SAND with shell fragments (up to 4mm). Gravel is subangular fine to medium of various lithologies.	1.5
2.00	ES3								-17.33	2.50	* * * * * * * * * *	Highly weathered orangish brown SANDSTONE. (Drillers Description)	2.0 —
3.00 3.00 3.00 - 3.45	(5,5/6,6,7,8)								-17.83	3.00		Weak (locally medium strong) indistinctly thinly bedded fine grained light orangish grey SANDSTONE. Partially weathered: reduced strength, much closer fracture spacing, occasional light brownish orange discolouration on fracture surfaces and frequent sandy clay	3.0 —
3.40 3.60	Hamme C1 C2	r SN = 1353	100	6	0	>20						infill on fracture surfaces. Discontinuities: 1. 5 to 20 degree bedding closely spaced (10/90/150) planar, smooth, occasional light brownish ornate staining up to 2m deep and frequent sandy clay infill on fracture surfaces up to 50mm thick.	4.0 —
4.45 4.50	C3					_				(3.20)		2. 65 to 75 degree joints from 4.20m to 4.50m, 4.50m to 5.00m and 6.00m to 6.20m, planar, smooth and occasional light brownish orange staining up to 2mm deep.	4.5
5.25	C4		61	5	0	AZCL						5.40m to 6.00m: AZCL - Probable bed of extremely weak sandstone washed out during drilling. Weak indistinctly thinly laminated fine grained light orangish grey	
6.00 6.10	C5					19			-21.03	6.20		SANDSTONE. Partially weathered: reduced strength, much closer fractures spacing and frequent heavy dark brownish orange discolouration on fracture surfaces. Discontinuities:	6.0 — - - -
6.60	C6		100	17	0	>20				(1.80)		1. 10 to 25 degree bedding fractures, closely spaced (10/90/200) planar, rough and frequent heavy dark brownish orange staining up to 30mm deep. 2. 45 to 55 degree joints closely spaced (50/180/450) planar, rough and frequent heavy dark brownish orange staining up to 50mm deep. 3. 65 to 75 degree joints from 7.50m to 7.80m and 7.90m to 8.00m, planar, rough and frequent heavy dark brownish orange staining up	7.0 —
7.50	100 19 0								-22.83	- 8.00		/Weak (locally medium strong) indistinctly thinly laminated fine grained light orangish grey SANDSTONE. Partially weathered: slightly reduced strength, much closer fracture spacing and occasional heavy dark brownish orange discolouration on fracture surfaces. Discontinuities:	7.5 — — — 8.0 —
8.50 9.00	C7 100 19 0 17									(2.50)		1. 15 to 25 degree bedding fractures, medium spaced (50/22/350) planar rough and occasional heavy dark brownish orange staining up to 0.5mm deep. 2. 65 to 75 degree joints from 8.00m to 8.40m, 8.40m to 8.80m and	8.5 — - - - - -
9.20	C8 TCR SCR RQD FI											9.30m to 9.70m, planar, rough and occasional dark brownish orange staining up to 0.5mm deep.	9.0 —
	147:-	Chuil	TCR	SCR	Ь—								
Struck at (m)		Time (min)	Rose	e to (r	n) N	eck t	e Bore o Bed	= 21.			jack-up baı ı mCD	ge	
Casing Details Water Added To (m) Diam (mm) From (m) To (m) 3.00 177 10.50 To (m) Core Barrel Flus									Eluch '	Type	Termina	ion Reason Last Upda	ted ==
	0.50 Core Barre SK6L								Polyr			d at scheduled depth 29/06/20	

			GEC	OT I	EC	Н				1031	Client:		slands Coui		T			BH-M2	
Meth Sonic Dr		Plant U Fraste Du		ΧL		(m) .00	Base 3.	(m) 00	Coord	linates	Final De	pth: 10.50 m	Start Date:	31/03/2022	Driller:	MJ		heet 2 of Scale: 1:5	
Rotary C	Coring	Rotoso Fraste Du Rotoso	uo C	ΧL	3.	.00	10	.50	34497 100415	72.76 E 58.34 N	Elevatio	n: -14.83 mCD	End Date:	01/04/2022	Logger:	NP+RC		FINAL	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mCD	Depth (m)	Legend		Des	cription		1	Water	Backfill	
.50	C9	Strikes Time (min)	71	25	RQD	AZCL	Chis		-25.33	10.50	Remarks Marine Bc Deck to B	Weak (locally meding grained light oranging reduced strength, rodark brownish oranging to the continuities: 1. 15 to 25 degree in planar rough and onto 0.5mm deep. 2. 65 to 75 degree journed to 9.30m to 9.70m, plustaining up to 0.5mm 10.00m to 10.50m. AZCL borehole due to fractured to the construction of the construction of the construction of the continuity of the construction of	um strong) indish grey SANDi much closer fra ge discolourat beedding fractuccasional heavisints from 8.0 anar, rough an m deep. - Lower section of Inature of material. End of Bore	listinctly thinly la STONE. Partially vacture spacing arion on fracture sures, medium spary dark brownish of the second dark occasional darion or run unable to be respectively.	weathered nd occasion surfaces. nced (50/2) orange sta 40m to 8.8 k brownish	l: slightly nal heavy 2/350) sining up 00m and n orange	MA MA		9.5 10.0 - 10.5 11.0 - 11.5 12.0 - 12.5 13.0 - 14.5 14.0 - 15.5 16.0 - 17.5 18.0 -
Casing D	Details Diam (mm)	Water From (m)		ed (m)															
3.00 10.50	177 150	113111 (111)	10	· (111)		Core	Barı	rel	Flush	Туре	Terminat	tion Reason				Last Up	date	ed 🔳	_
							K6L		Poly			d at scheduled depth	1			29/06/			ż

C DATA SUMMARY TABLES AND LAB CERTIFICATES

Summary Table A

Sampling Results Incorporated with BPEO Assessment (mg/kg)

			, ,	C ,																	D 1 D 1	4 151																							
	AL1 AI	L2 BA	AC ERL	PEL			I	T	Τ		Т	Т	I	I	T	I	I			Т	Dredge Ph	ase 1 and Pha	se 2		T				Т		Т	T		Т	Т	Т	Т		\vdash						
Source	7.5	cs	SEMP CSEM	P Canada	BH-M01 (SS1) 0.00- 0.50m	BH-M01 (SS2) 1.00- 1.50m	BH-M01 (SS3) 2.50- 3.00m	BH-M03 (SS1) 0.00- 0.50m	BH-M03 (SS2) 1.00- 1.50m	BH-M03 - (SS3) 2.50- 3.00m	BH-M07 (SS1) 0.00- 0.50m	BH-M07 (SS2) 1.00- 1.50m	BH-M07 (SS3) 2.50-3.00m	BH-M09 (SS1) 0.00-0.50m	BH-M09 (SS2) 1.00-1.50m	BH-M09 (SS3) 2.50-3.00m	BH-M11 (SS1) 0.00-0.50m	BH-M11 (SS2) 1.00-1.50m	BH-M11 (SS3) 2.50-3.00m	BH-M13 (SS1) 0.00-0.50m	BH-M13 (SS2) 1.00-1.50m	3H-M13 (SS3) 2.50-3.00m	H-M14 (SS1) 0.00-0.50m	BH-M14 (SS2) 1.00-1.50m	BH-M14 (SS3) 2.50-3.00m	BH-M15 (SS1) 0.00-0.50m	BH-M15 (SS2) 1.00-1.50m	BH-M15 (SS3) 2.50-3.00m	WP-M27 (SS1) 0.00-0.15m	BH-M16 (SS1) 0.00-0.50m	BH-M16 (SS2) 1.00-1.50m	BH-M17 (SS1) 0.00-0.50m	BH-M04 (SS1) 0.00-0.50m	BH-M04 (SS2) 1.00-1.50m	BH-M04 (SS3) 2.50-3.00m	H-M05 (SS1) 0.00-0.50m	BH-M05 (SS2) 1.00-1.50m	BH-M05 (SS3) 2.50-3.00m) MAX	AVERAGE	No. Exceed RAL 1	No. Exceed RAL 2	No.Exceed BAC?	No. Exceed ERL	No. Exceed PEL?
Arsenic	20	70	25	41.6	3.5	3.7	27.8	7.9	19.5	21	10.4	4.1	5.1	13.3	12.6	19.6	19	17.9	27.8	9.2	5.2	4.9	7.1	6.8	7.2	5.1	5.7	9.3	6.2	10	11.3	7.6	24.6	23.8	19.9	16.6	14.5	11.7	27.8	12.1	,5 5	0	2	N/A	0
Cadmium	0.4	4	0.31	1.2 4.2	0.07	0.1	0.07	0.14	0.11	0.11	0.07	0.06	0.05	0.07	0.09	0.13	0.15	0.1	0.16	0.1	0.09	0.31	0.15	0.13	0.15	0.1	0.08	0.11	0.1	0.17	0.14	0.07	0.29	0.19	0.32	0.17	0.11	0.15	0.32	0.1	.3 0	0	2	0	0
Chromium	50	370	81	81 160	6.8	6.9	8.3	10.6	14.6	13.1	14.9	8.1	7.8	11.2	11.8	26.1	27.4	17.6	14.9	11.1	10.1	11.6	14.8	13.1	12.7	9.7	10.3	16.6	11.2	16	19.7	6.4	51.4	34.5	36.5	27.8	24.6	23.3	51.4	16.5	₂ 1 1	0	0	0	0
Copper	30	300	27	34 108	5.5	5.4	8.4	8.1	12.6	84.1	12.4	5.7	8.2	6.9	7.3	14.7	15	8	21.6	9.5	5.9	46.4	18.3	8.9	10.1	6.2	6	10	8	8.6	11.7	7.1	40	18.4	21.4	11.9	9.9	10.3	84.1	14./	,9 3	0	3	3	0
Mercury	0.25	1.5	0.07	0.15 0.7	0.02	0.01	0.09	0.01	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.05	0.02	0.01	0.03	0.01	0.01	0.13	0.04	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.12	0.04	0.03	0.01	0.01	0.01	0.13	0.0	/3 0	0	3	0	0
Nickel	30	150	36 -	-	4.8	4.7	3.2	8.7	16.1	11.4	14.1	6.8	7.6	8.9	9.1	22.9	24.2	11.4	20.6	10.8	8	8.3	12.2	10.7	10.5	7.7	8.8	14.5	9.9	13.6	16.3	5.1	31.8	27.4	29	18.6	16.3	15.7	31.8	13.7	.3 1	0	0	N/A	N/A
Lead	50	400	38	47 112	4.7	3.5	7.6	5.6	10.8	10.3	12.4	4.9	5.2	7.2	8.1	15.5	17.7	9.8	15.4	7	5	16.6	10.6	7.5	9.3	5.6	5.5	9.1	6.4	8.9	11.5	23.6	50.7	25.8	23.5	12.8	10.2	8.9	50.7	11.F	8 1	0	1	1	0
Zinc	130	600	122	150 271	13.8	11.4	15.5	19	32.4	18.6	32.5	12.6	21	15.6	16.5	46.3	47.3	21.9	46.8	21.8	15	15.8	26.6	23.6	39.7	17.4	17	27.2	24.3	29	33.6	9.1	161	80.8	82.1	46.6	45.8	36.7	161	33.0	1	0	1	1	0
Napthalene	0.1		0.08	0.16 0.391	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00138	0.00138	0.00143	0.00128	0.00122	0.00402	0.00402	0.0	J1 0	N/A	0	0	0
Acenaphthylene	0.1			0.128	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00116	0.00116	0.0	J1 0	N/A	N/A	N/A	0
Acenaphthene	0.1			0.0889	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00134	0.00134	0.0	J1 0	N/A	N/A	N/A	0
Fluorene	0.1			0.144	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00177	0.00177	0.00	<i>γ</i> 1 0	N/A	N/A	N/A	0
Phenanthrene	0.1		0.032	0.24 0.544	0.001	0.001	0.001	0.00161	0.00185	0.001	0.00166	0.00166	0.001	0.001	0.0012	0.00157	0.00129	0.00176	0.001	0.00107	0.001	0.001	0.00296	0.00115	0.001	0.001	0.001	0.001	0.00155	0.00415	0.00148	0.001	0.0036	0.00448	0.00281	0.0011	0.00114	0.00667	0.00667	0.00	,2 0	N/A	0	0	0
Anthracene	0.1		0.05	0.085 0.245	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00161	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00192	0.00192	0.00	/1 O	N/A	0	0	0
Fluoranthene	0.1		0.039	0.6 1.494	0.001	0.001	0.001	0.00152	0.00166	0.001	0.00111	0.00133	0.001	0.00105	0.00142	0.00152	0.00106	0.00216	0.001	0.00159	0.00126	0.001	0.001	0.00205	0.00145	0.001	0.001	0.001	0.00269	0.0114	0.001	0.001	0.00174	0.00179	0.00123	0.00108	0.00154	0.00994	0.0114	0.00	/2 0	N/A	0	0	0
Pyrene	0.1		0.024	0.665 1.398	0.00202	0.00171	0.001	0.00198	0.00212	0.001	0.00218	0.00196	0.001	0.0018	0.00249	0.0029	0.00207	0.00355	0.001	0.00196	0.00181	0.001	0.00133	0.0026	0.00189	0.001	0.00103	0.00131	0.00318	0.0106	0.00108	0.001	0.00288	0.00264	0.00306	0.00305	0.00178	0.00932	0.0106	0.00	,2 0	N/A	0	0	0
Benzo(a)anthracene	0.1		0.016	0.693	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00127	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00116	0.00526	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00494	0.00526	0.00	/1 0	N/A	0	0	0
Chrysene	0.1		0.02	0.846	0.00302	0.0026	0.001	0.00381	0.003	0.00133	0.0034	0.00237	0.00106	0.00262	0.00404	0.00479	0.00371	0.00746	0.001	0.00297	0.00273	0.001	0.00167	0.00207	0.00183	0.00137	0.0016	0.00178	0.00257	0.00688	0.00171	0.001	0.00443	0.00383	0.00309	0.00322	0.00209	0.00767	0.00767	0.00	<i>,</i> 3 0	N/A	0	0	0
Benzo(b)fluoranthene	0.1			-	0.00146	0.00113	0.001	0.00157	0.00172	0.001	0.00115	0.00165	0.001	0.00121	0.00185	0.00219	0.00107	0.00286	0.001	0.00222	0.00153	0.001	0.001	0.00234	0.00159	0.001	0.001	0.001	0.00235	0.00494	0.001	0.001	0.00183	0.00145	0.00165	0.0017	0.00184	0.00687	0.00687	0.00	,2 0	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1			-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00143	0.001	0.001	0.001	0.001	0.00133	0.00289	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00305	0.00305	0.00	1 0	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1		0.03	0.763	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00103	0.001	0.001	0.001	0.001	0.00136	0.00478	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00571	0.00571	0.00	1 0	N/A	0	0	0
Indeno(1,2,3cd)pyrene	0.1		0.103	0.24 -	0.001	0.001	0.001	0.001	0.00108	0.001	0.001	0.00104	0.001	0.001	0.001	0.001	0.001	0.0011	0.001	0.00119	0.001	0.001	0.001	0.00193	0.001	0.001	0.001	0.001	0.00223	0.00309	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0042	0.0042	0.00	1 0	N/A	0	0	N/A
Benzo(ghi)perylene	0.1		0.08).085 -	0.001	0.001	0.001	0.00147	0.00167	0.00138	0.00127	0.00161	0.001	0.00102	0.00116	0.00125	0.00116	0.00176	0.001	0.00153	0.00127	0.001	0.001	0.00232	0.00126	0.001	0.001	0.001	0.00247	0.00394	0.001	0.001	0.00175	0.00145	0.00144	0.00107	0.0013	0.00515	0.00515	0.00	1 0	N/A	0	0	N/A
Dibenzo(a,h)anthracene	0.01			0.135	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00128	0.00128	0.00	1 0	N/A	N/A	N/A	0
TPH	100			-	8.68	10.6	2.58	40.9	25.3	34.4	13.2	12	9.73	9.76	21.2	36.5	14	16.1	38.9	21.5	15.5	3.83	9.28	14.2	18.6	8.15	8.23	11.7	17.4	11.2	13.5	7.09	59.9	46.8	123	42.2	20.2	23.6	123	22.6	4 1	N/A	N/A	N/A	N/A
																																									A = -				
PCBs	0.02	0.18		0.189	0.00056		0.00056		0.00056				0.00056	0.00056	0.00056	0.00056	0.00056	0.00056	0.00056		0.00075	0.00056	0.00199	0.00056		0.00056	0.00056	0.00056	0.00056	0.00056	0.00056	0.00056	0.00056	0.00056	0.0006	0.00056	0.00056	0.00056	0.00199	0.000	6 0	0	N/A	N/A	0
TBT	0.1	0.5		-	<u>0.001</u>	<u>0.001</u>	<u>0.001</u>	<u>0.001</u>	<u>0.001</u>	<u>0.001</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.001</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.005</u>	<u>0.00500</u>	0.004	2 0	0	N/A	N/A	N/A									

Note: Underlined Values are LOD. Values highlighted red are equal to or greater than AL1.

PEL Data Source: http://ceqg-rcqe.ccme.ca/en/index.html#void

Summary Table B

SDWQ Phase 1 and Phase 2 Dredge Areas All units in mg/kg

All units in mg/kg	AL1	AL2	BAC	<erl< th=""><th>PEL</th><th>Dredge Average</th><th>Exceed AL1?</th><th>Exceed AL2?</th><th>Exceed BAC?</th><th>Exceed ERL?</th><th>Exceed PEL?</th></erl<>	PEL	Dredge Average	Exceed AL1?	Exceed AL2?	Exceed BAC?	Exceed ERL?	Exceed PEL?
Source			CSEMP	CSEMP	Canada	, ,					
Arsenic	20	70	25	-	41.6	12.4	No	No	No	N/A	No
Cadmium	0.4	4	0.31	1.2	4.2	0.1	No	No	No	No	No
Chromium	50	370	81	81	160	16.5	No	No	No	No	No
Copper	30	300	27	34	108	14.5	No	No	No	No	No
Mercury	0.25	1.5	0.07	0.15	0.7	0.0	No	No	No	No	No
Nickel	30	150	36		-	13.2	No	No	No	N/A	N/A
Lead	50	400	38		112	11.7	No	No	No	No	No
Zinc	130	600	122	150	271	33.1	No	No	No	No	No
Napthalene	0.1	-	0.08	0.16	0.319	0.00	No	N/A	No	No	No
Acenaphthylene	0.1	-	-	-	0.128	0.00	No	N/A	N/A	N/A	No
Acenaphthene	0.1	-	-	-	0.0889	0.00	No	N/A	N/A	N/A	No
Fluorene	0.1	-	-	-	0.144	0.00	No	N/A	N/A	N/A	No
Phenanthrene	0.1	-	0.032	0.24	0.544	0.00	No	N/A	No	No	No
Anthracene	0.1	-	0.05	0.085	0.245	0.00	No	N/A	No	No	No
Fluoranthene	0.1	-	0.039	0.6	1.494	0.00	No	N/A	No	No	No
Pyrene	0.1	-	0.024	0.665	1.398	0.00	No	N/A	No	No	No
Benzo(a)anthracene	0.1	-	0.016	0.261	0.693	0.00	No	N/A	No	No	No
Chrysene	0.1	-	0.02	0.384	0.846	0.00	No	N/A	No	No	No
Benzo(b)fluoranthene	0.1	-	ı	-	-	0.00	No	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	0.1	-	ı	-	-	0.00	No	N/A	N/A	N/A	N/A
Benzo(a)pyrene	0.1	-	0.03	0.384	0.763	0.00	No	N/A	No	No	No
Indeno(1,2,3cd)pyrene	0.1	-	0.103	0.24	-	0.00	No	N/A	No	No	N/A
Benzo(ghi)perylene	0.1	-	0.08	0.085	-	0.00	No	N/A	No	No	N/A
Dibenzo(a,h)anthracene	0.01	-	-	-	0.135	0.00	No	N/A	N/A	N/A	No
TPH	100	-	-	-	-	22.64	No	N/A	N/A	N/A	N/A
PCBs	0.02	0.18	-	-	0.189	0.001	No	No	N/A	N/A	No
TBT	0.1	0.5	1	-	-	0.0042	No	No	N/A	N/A	N/A



Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR1394

Issue Version 1

Customer Causeway Geotech Ltd, 8 Drumahiskey Road, Ballymoney, Co. Antrim, BT53 7QL

Customer Reference Scapa Flow Marie Scotland Sediment Testing

Date Sampled 23-Mar- 02-Apr-2022

Date Received 11-Apr-22

Date Reported 09-May-22

Condition of samples Cold Satisfactory

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ



Test Report ID MAR1394

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	%	%	%	%	%	Mg/m3	N/A
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*	SUB_02*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	Total Moisture @ 120°C	Total Solids	Gravel (>2mm)	Sand (63-2000 µm)	Silt (<63 µm)	Particle Density	Asbestos
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	16.3	83.7	7.6	73.8	18.6	2.72	NAIIS
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	14.6	85.4	5.5	82.4	12.1	2.69	NAIIS
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	11.6	88.4	10.1	47.9	42.0	2.66	NAIIS
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	14.3	85.7	8.3	64.6	27.0	2.71	NAIIS
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	13.8	86.2	11.0	53.1	35.9	2.74	NAIIS
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	14.3	85.7	10.4	25.8	63.9	Not Amenable*	NAIIS
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	16.1	83.9	20.9	57.8	21.2	2.51	NAIIS
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	18.7	81.3	19.1	60.9	20.0	Not Amenable*	NAIIS
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	14.3	85.7	17.6	67.8	14.6	Not Amenable*	NAIIS
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	23.0	77.0	23.5	52.9	23.6	0.72	NAIIS
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	17.5	82.5	11.6	64.9	23.5	2.76	NAIIS
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	12.7	87.3	25.2	54.2	20.7	Not Amenable*	NAIIS
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	12.9	87.1	17.8	65.2	17.0	2.69	NAIIS
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	13.1	86.9	8.7	61.9	29.4	2.70	NAIIS
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	12.6	87.4	20.0	45.3	34.7	Not Amenable*	NAIIS
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	19.3	80.7	9.3	75.3	15.4	Not Amenable*	NAIIS
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	17.1	82.9	10.3	59.4	30.3	2.71	NAIIS
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	12.0	88.0	20.8	40.2	39.0	2.69	NAIIS
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	17.9	82.1	22.9	61.9	15.2	Not Amenable*	NAIIS
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	23.3	76.7	20.6	63.8	15.6	Not Amenable*	NAIIS
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	16.0	84.0	19.9	63.2	16.8	2.66	NAIIS
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	20.3	79.7	34.4	47.8	17.9	2.72	NAIIS
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	17.2	82.8	28.6	48.8	22.5	2.68	NAIIS
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	15.5	84.5	32.4	50.2	17.3	2.71	NAIIS
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	22.4	77.6	21.5	57.5	21.0	2.66	NAIIS
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	16.5	83.5	27.4	51.7	20.9	2.69	NAIIS
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	13.3	86.7	30.4	51.8	17.8	Not Amenable*	NAIIS
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	12.2	87.8	20.1	42.9	37.1	2.71	NAIIS
	Reference	Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A	N/A

^{*} See Report Notes

NAIIS - No Asbestos Identified In Sample



Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR1394

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	тос
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	0.22
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	0.17
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	0.05
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	0.26
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	0.18
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	0.07
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	0.17
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	0.25
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	0.15
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	0.27
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	0.25
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	0.21
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	0.17
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	0.23
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	0.13
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	0.30
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	0.28
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	0.05
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	0.27
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	0.23
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	0.17
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	0.38
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	0.36
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	0.26
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	0.28
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	0.24
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	0.28
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	0.24
	Reference	Material (% Recovery)	95
		QC Blank	<0.02

^{*} See Report Notes

NAIIS - No Asbestos Identified In Sample





Test Report ID MAR1394

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units mg/Kg (Dry Weight)								
		Method No				ICP	MSS*			
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	3.5	0.07	6.8	5.5	0.02	4.8	4.7	13.8
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	3.7	0.10	6.9	5.4	0.01	4.7	3.5	11.4
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	27.8	0.07	8.3	8.4	0.09	3.2	7.6	15.5
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	7.9	0.14	10.6	8.1	<0.01	8.7	5.6	19.0
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	19.5	0.11	14.6	12.6	0.02	16.1	10.8	32.4
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	21.0	0.11	13.1	84.1	0.03	11.4	10.3	18.6
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	10.4	0.07	14.9	12.4	<0.01	14.1	12.4	32.5
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	4.1	0.06	8.1	5.7	<0.01	6.8	4.9	12.6
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	5.1	0.05	7.8	8.2	<0.01	7.6	5.2	21.0
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	13.3	0.07	11.2	6.9	<0.01	8.9	7.2	15.6
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	12.6	0.09	11.8	7.3	<0.01	9.1	8.1	16.5
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	19.6	0.13	26.1	14.7	0.05	22.9	15.5	46.3
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	19.0	0.15	27.4	15	0.02	24.2	17.7	47.3
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	17.9	0.10	17.6	8.0	0.01	11.4	9.8	21.9
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	27.8	0.16	14.9	21.6	0.03	20.6	15.4	46.8
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	9.2	0.10	11.1	9.5	0.01	10.8	7.0	21.8
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	5.2	0.09	10.1	5.9	<0.01	8.0	5.0	15.0
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	4.9	0.31	11.6	46.4	0.13	8.3	16.6	15.8
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	7.1	0.15	14.8	18.3	0.04	12.2	10.6	26.6
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	6.8	0.13	13.1	8.9	0.02	10.7	7.5	23.6
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	7.2	0.15	12.7	10.1	0.03	10.5	9.3	39.7
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	5.1	0.10	9.7	6.2	0.01	7.7	5.6	17.4
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	5.7	0.08	10.3	6.0	<0.01	8.8	5.5	17.0
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	9.3	0.11	16.6	10.0	<0.01	14.5	9.1	27.2
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	6.2	0.10	11.2	8.0	<0.01	9.9	6.4	24.3
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	10.0	0.17	16.0	8.6	0.01	13.6	8.9	29.0
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	11.3	0.14	19.7	11.7	0.01	16.3	11.5	33.6
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	7.6	0.07	6.4	7.1	0.02	5.1	23.6	9.1
Ce	ertified Reference Material SE	, .,	99	96	93	97	90	99	93	98
		QC Blank	<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

^{*} See Report Notes



Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR1394

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dr	ry Weight)
		Method No	ASC/S	OP/301
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	<1	<1
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	<1	<1
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	<1	<1
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	<1	<1
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	<1	<1
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	<1	<1
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	<5	<5
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	<5	<5
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	<5	<5
Certified	Reference Material QS	P076MS(% Recovery)	51	56
		QC Blank	<1	<1

^{*} See Report Notes

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)			
		Method No	ASC/S	OP/301		
		Limit of Detection	1	1		
		Accreditation	UKAS	UKAS		
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)		
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	<5	<5		
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	<5	<5		
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	<5	<5		
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	<5	<5		
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	<5	<5		
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	<5	<5		
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	<5	<5		
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	<5	<5		
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	<5	<5		
Cert	ified Reference Material QSF	P076MS (% Recovery)	85	60		
		QC Blank	<1	<1		

^{*} See Report Notes

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)			
		Method No	ASC/S	OP/301		
		Limit of Detection	1	1		
		Accreditation	UKAS	UKAS		
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)		
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	<5	<5		
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	<5	<5		
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	<1	<1		
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	<5	<5		
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	<5	<5		
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	<5	<5		
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	<5	<5		
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	<5	<5		
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	<5	<5		
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	<5	<5		
Cer	tified Reference Material QSP	077MS (% Recovery)	116	169		
		QC Blank	<1	<1		

^{*} See Report Notes

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP	BBF
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	<1	<1	<1	<1	<1	1.46
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	<1	<1	<1	<1	<1	1.13
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	<1	<1	<1	<1	<1	<1
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	<1	<1	<1	<1	<1	1.57
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	<1	<1	<1	<1	<1	1.72
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	<1	<1	<1	<1	<1	<1
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	<1	<1	<1	<1	<1	1.15
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	<1	<1	<1	<1	<1	1.65
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	<1	<1	<1	<1	<1	<1
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	<1	<1	<1	<1	<1	1.21
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	<1	<1	<1	<1	<1	1.85
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	<1	<1	<1	<1	<1	2.19
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	<1	<1	<1	<1	<1	1.07
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	<1	<1	<1	1.27	<1	2.86
Certified Reference	e Material Quasimeme QPI	H105MS (% Recovery)	82	140	90	81	86	70
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BENZGHIP	BKF	CHRYSENE	DBENZAH	FLUORANT	FLUORENE
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	<1	<1	3.02	<1	<1	<1
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	<1	<1	2.60	<1	<1	<1
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	<1	<1	<1	<1	<1	<1
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	1.47	<1	3.81	<1	1.52	<1
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	1.67	<1	3.00	<1	1.66	<1
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	1.38	<1	1.33	<1	<1	<1
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	1.27	<1	3.40	<1	1.11	<1
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	1.61	<1	2.37	<1	1.33	<1
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	<1	<1	1.06	<1	<1	<1
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	1.02	<1	2.62	<1	1.05	<1
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	1.16	<1	4.04	<1	1.42	<1
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	1.25	<1	4.79	<1	1.52	<1
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	1.16	<1	3.71	<1	1.06	<1
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	1.76	<1	7.46	<1	2.16	<1
Certified Referenc	e Material Quasimeme QPI	, -,	100	85	80	87	82	87
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)				
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	SOCOTEC Ref:	Matrix	INDPYR	NAPTH	PHENANT	PYRENE	THC
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	<1	<1	<1	2.02	8680
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	<1	<1	<1	1.71	10600
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	<1	<1	<1	<1	2580
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	<1	<1	1.61	1.98	40900
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	1.08	<1	1.85	2.12	25300
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	<1	<1	<1	<1	34400
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	<1	<1	1.66	2.18	13200
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	1.04	<1	1.66	1.96	12000
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	<1	<1	<1	<1	9730
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	<1	<1	<1	1.80	9760
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	<1	<1	1.20	2.49	21200
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	<1	<1	1.57	2.90	36500
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	<1	<1	1.29	2.07	14000
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	1.10	<1	1.76	3.55	16100
Certified Reference	Material Quasimeme QPF	1105MS (% Recovery)	88	100	85	88	98~
		QC Blank	<1	<1	<1	<1	<100

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For full analyte name see method summaries

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP	BBF
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	<1	<1	<1	<1	<1	<1
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	<1	<1	<1	<1	<1	2.22
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	<1	<1	<1	<1	<1	1.53
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	<1	<1	<1	<1	<1	<1
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	<1	<1	<1	<1	<1	<1
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	<1	<1	<1	<1	1.03	2.34
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	<1	<1	<1	<1	<1	1.59
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	<1	<1	<1	<1	<1	<1
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	<1	<1	<1	<1	<1	<1
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	<1	<1	<1	<1	<1	<1
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	<1	<1	<1	1.16	1.36	2.35
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	<1	<1	1.61	5.26	4.78	4.94
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	<1	<1	<1	<1	<1	<1
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	<1	<1	<1	<1	<1	<1
Certified Referen	ce Material Quasimeme QPI	1105MS (% Recovery)	81	113	92	76	78	66
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BENZGHIP	BKF	CHRYSENE	DBENZAH	FLUORANT	FLUORENE
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	<1	<1	<1	<1	<1	<1
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	1.53	<1	2.97	<1	1.59	<1
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	1.27	<1	2.73	<1	1.26	<1
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	<1	<1	<1	<1	<1	<1
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	<1	<1	1.67	<1	<1	<1
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	2.32	1.43	2.07	<1	2.05	<1
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	1.26	<1	1.83	<1	1.45	<1
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	<1	<1	1.37	<1	<1	<1
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	<1	<1	1.60	<1	<1	<1
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	<1	<1	1.78	<1	<1	<1
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	2.47	1.33	2.57	<1	2.69	<1
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	3.94	2.89	6.88	<1	11.4	<1
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	<1	<1	1.71	<1	<1	<1
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	<1	<1	<1	<1	<1	<1
Certified Referen	ce Material Quasimeme QPF	1105MS (% Recovery)	83	85	78	74	83	80
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

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Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)				
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	SOCOTEC Ref:	Matrix	INDPYR	NAPTH	PHENANT	PYRENE	THC
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	<1	<1	<1	<1	38900
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	1.19	<1	1.07	1.96	21500
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	<1	<1	<1	1.81	15500
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	<1	<1	<1	<1	3830
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	<1	<1	2.96	1.33	9280
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	1.93	<1	1.15	2.60	14200
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	<1	<1	<1	1.89	18600
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	<1	<1	<1	<1	8150
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	<1	<1	<1	1.03	8230
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	<1	<1	<1	1.31	11700
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	2.23	<1	1.55	3.18	17400
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	3.09	<1	4.15	10.6	11200
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	<1	<1	1.48	1.08	13500
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	<1	<1	<1	<1	7090
Certified Reference N	Material Quasimeme QPF	,	76	93	90	87	100~
		QC Blank	<1	<1	<1	<1	<100

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.





MAR1394 Test Report ID

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)						
		Method No	ASC/SOP/302						
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS						
Client Reference:	SOCOTEC Ref:	Matrix	PCB28	PCB52	PCB101	PCB118	PCB138	PCB153	PCB180
BH-M01 (SS1) 0.00-0.50m	MAR1394.01	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M01 (SS2) 1.00-1.50m	MAR1394.02	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M01 (SS3) 2.50-3.00m	MAR1394.03	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M03 (SS1) 0.00-0.50m	MAR1394.04	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M03 (SS2) 1.00-1.50m	MAR1394.05	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M03 (SS3) 2.50-3.00m	MAR1394.06	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M07 (SS1) 0.00-0.50m	MAR1394.07	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M07 (SS2) 1.00-1.50m	MAR1394.08	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M07 (SS3) 2.50-3.00m	MAR1394.09	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M09 (SS1) 0.00-0.50m	MAR1394.10	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M09 (SS2) 1.00-1.50m	MAR1394.11	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M09 (SS3) 2.50-3.00m	MAR1394.12	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M11 (SS1) 0.00-0.50m	MAR1394.13	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M11 (SS2) 1.00-1.50m	MAR1394.14	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M11 (SS3) 2.50-3.00m	MAR1394.15	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M13 (SS1) 0.00-0.50m	MAR1394.16	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M13 (SS2) 1.00-1.50m	MAR1394.17	Sediment	<0.08	<0.08	<0.08	<0.08	0.13	0.22	<0.08
BH-M13 (SS3) 2.50-3.00m	MAR1394.18	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M14 (SS1) 0.00-0.50m	MAR1394.19	Sediment	0.21	0.26	0.28	0.31	0.30	0.29	0.34
Certified Referenc	Certified Reference Material Quasimeme QOR145MS (% Recovery)			87	96~	96~	98~	97~	96~
		QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.





MAR1394 Test Report ID

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)						
		Method No	ASC/SOP/302						
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS						
Client Reference:	SOCOTEC Ref:	Matrix	PCB28	PCB52	PCB101	PCB118	PCB138	PCB153	PCB180
BH-M14 (SS2) 1.00-1.50m	MAR1394.20	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M14 (SS3) 2.50-3.00m	MAR1394.21	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M15 (SS1) 0.00-0.50m	MAR1394.22	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M15 (SS2) 1.00-1.50m	MAR1394.23	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M15 (SS3) 2.50-3.00m	MAR1394.24	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
WP-M27 (SS1) 0.00-0.15m	MAR1394.25	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M16 (SS1) 0.00-0.50m	MAR1394.26	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M16 (SS2) 1.00-1.50m	MAR1394.27	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M17 (SS1) 0.00-0.50m	MAR1394.28	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Ma	Certified Reference Material Quasimeme QOR145MS (% Recovery)			87	98~	88	97~	98~	98~
		QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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For full analyte name see method summaries

[~] Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

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Test Report ID MAR1394

Issue Version 1

Customer Reference Scapa Flow Marie Scotland Sediment Testing

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR1394.01-28	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR1394.01-28	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR1394.01-28	Analysis was conducted by an internal SOCOTEC laboratory.
SOCOTEC Doncaster*	MAR1394.06, 08, 09, 12, 15, 16, 19, 20, 27	Unsuitable to test due to Gravel and Shell content.
SUB_01*	MAR1394.01-28	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR1394.01-28	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR1394.07-20, 22-28	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304		Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene). This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Sample Contaminated through Damaged Packaging	N/A	N/A
D3	Sample Contaminated through Sampling	N/A	N/A
D4	Inappropriate Container/Packaging	N/A	N/A
D5	Damaged in Transit	N/A	N/A
D6	Insufficient Quantity of Sample	N/A	N/A
D7	Inappropriate Headspace	N/A	N/A
D8	Retained at Incorrect Temperature	N/A	N/A
D9	Lack of Date & Time of Sampling	N/A	N/A
D10	Insufficient Sample Details	N/A	N/A
D11	Sample integrity compromised or not suitable for analysis	N/A	N/A

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Test Report ID MAR1394

Issue Version

Customer Reference Scapa Flow Marie Scotland Sediment Testing

Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content). Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and seived to <63μm	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

		Analyte Defir	itions		
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorcyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	НСВ	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichlorodiphenyldichloroethylene
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichlorodiphenyltrichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		



Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01357

Issue Version

Customer Causeway Geotech Ltd, 8 Drumahiskey Road, Ballymoney, Co. Antrim, BT53 7QL

Customer Reference Scapa Flow Marine Scotland Sediment Testing

Date Sampled 04-05-Mar-2022

Date Received 16-Mar-22

Date Reported 12-Apr-22

Condition of samples Cold Satisfactory

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ





Test Report ID MAR01357

Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

	<u>.</u>								
		Units	%	%	%	%	%	Mg/m3	N/A
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*	SUB_02*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	Total Moisture @ 120°C	Total Solids	Gravel (>2mm)	Sand (63-2000 µm)	Silt (<63 µm)	Particle Density	Asbestos
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	15.6	84.4	14.1	69.1	16.8	2.66	NAIIS
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	13.3	86.7	14.2	66.6	19.2	2.72	NAIIS
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	13.3	86.7	20.0	65.8	14.2	2.67	NAIIS
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	12.7	87.3	15.1	59.5	25.4	2.73	NAIIS
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	12.9	87.1	14.2	69.6	16.2	2.72	NAIIS
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	21.0	79.0	10.9	72.6	16.5	2.54	NAIIS
	Reference I	Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A	N/A

^{*} See Report Notes

NAIIS - No Asbestos Identified In Sample





Test Report ID MAR01357

Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

		Units	% M/M
		Method No	WSLM59*
		Limit of Detection	0.02
		Accreditation	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	TOC
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	0.26
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	0.21
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	0.23
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	0.22
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	0.25
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	0.27
	Reference	Material (% Recovery)	105
		QC Blank	<0.02

^{*} See Report Notes

NAIIS - No Asbestos Identified In Sample



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Test Report ID MAR01357

Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

		Units				mg/Kg (D	ry Weight)			
		Method No				ICPI	MSS*			
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	24.6	0.29	51.4	40.0	0.12	31.8	50.7	161
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	23.8	0.19	34.5	18.4	0.04	27.4	25.8	80.8
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	19.9	0.32	36.5	21.4	0.03	29.0	23.5	82.1
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	16.6	0.17	27.8	11.9	<0.01	18.6	12.8	46.6
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	14.5	0.11	24.6	9.9	<0.01	16.3	10.2	45.8
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	11.7	0.15	23.3	10.3	<0.01	15.7	8.9	36.7
Cert	Certified Reference Material SETOC 774 (% Recovery)				109	108	101	107	103	103
		QC Blank	<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

^{*} See Report Notes



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Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

		Units	μg/Kg (Di	ry Weight)		
		Method No	ASC/S	OP/301		
		Limit of Detection	1 1			
		Accreditation	UKAS	UKAS		
Client Reference:	SOCOTEC Ref:	Matrix	Dibutyltin (DBT)	Tributyltin (TBT)		
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	<5	<5		
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	<5	<5		
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	<5	<5		
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	<5	<5		
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	<5	<5		
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	<5	<5		
Certified I	Certified Reference Material QSP076MS (% Recovery)					
		QC Blank	<1	<1		

^{*} See Report Notes

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Test Report ID MAR01357

Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	ACENAPTH	ACENAPHY	ANTHRACN	BAA	ВАР	BBF
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	<1	<1	<1	<1	<1	1.83
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	<1	<1	<1	<1	<1	1.45
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	<1	<1	<1	<1	<1	1.65
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	<1	<1	<1	<1	<1	1.70
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	<1	<1	<1	<1	<1	1.84
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	1.34	1.16	1.92	4.94	5.71	6.87
Certified Referen	ce Material Quasimeme QPI	1105MS (% Recovery)	88	127	97	89	91	73
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference

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Test Report ID MAR01357

Issue Version

Customer Reference Scapa Flow Marine Scotland Sediment Testing

		Units	μg/Kg (Dry Weight)					
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	SOCOTEC Ref:	Matrix	BENZGHIP	BKF	CHRYSENE	DBENZAH	FLUORANT	FLUORENE
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	1.75	<1	4.43	<1	1.74	<1
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	1.45	<1	3.83	<1	1.79	<1
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	1.44	<1	3.09	<1	1.23	<1
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	1.07	<1	3.22	<1	1.08	<1
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	1.30	<1	2.09	<1	1.54	<1
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	5.15	3.05	7.67	1.28	9.94	1.77
Certified Referer	nce Material Quasimeme QPH	105MS (% Recovery)	96	99	90	96	98	86
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference





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Issue Version

Test Report ID

Customer Reference Scapa Flow Marine Scotland Sediment Testing

MAR01357

		Units	μg/Kg (Dry Weight)				
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	N	N
Client Reference:	SOCOTEC Ref:	Matrix	INDPYR	NAPTH	PHENANT	PYRENE	THC
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	<1	1.38	3.60	2.88	59900
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	<1	1.38	4.48	2.64	46800
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	<1	1.43	2.81	3.06	123000
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	<1	1.28	1.10	3.05	42200
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	<1	1.22	1.14	1.78	20200
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	4.20	4.02	6.67	9.32	23600
Certified Reference	ce Material Quasimeme QPF	1105MS (% Recovery)	90	103	94	101	92~
		QC Blank	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference





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		Units	μg/Kg (Dry Weight)						
		Method No	ASC/SOP/302						
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS						
Client Reference:	SOCOTEC Ref:	Matrix	PCB28	PCB52	PCB101	PCB118	PCB138	PCB153	PCB180
BH-M04 (SS1) 0.00-0.50m	MAR01357.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M04 (SS2) 1.00-1.50m	MAR01357.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M04 (SS3) 2.50-3.00m	MAR01357.003	Sediment	<0.08	0.12	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M05 (SS1) 0.00-0.50m	MAR01357.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M05 (SS2) 1.00-1.50m	MAR01357.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH-M05 (SS3) 2.50-3.00m	MAR01357.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference M	aterial Quasimeme QOF	R143MS (% Recovery)	79	103	96	108	98	101	91
	QC Blank				<0.08	<0.08	<0.08	<0.08	<0.08

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

For full analyte name see method summaries

[~] Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ



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Issue Version 1

Customer Reference Scapa Flow Marine Scotland Sediment Testing

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01357.001-006	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ICPMSS*	MAR01357.001-006	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR01357.001-006	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR01357.001-006	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR01357.001-006	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR01357.001-006	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304		Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene). This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	N/A
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A





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Method	Sample and Fraction Size	Method Summary			
Total Solids	Wet Sediment	Calculation (100%-Moisture Content). Moisture content determined by drying a portion of the sample at 120°C to constant weight.			
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.			
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.			
Metals	Air dried and seived to <63μm	Aqua-regia extraction followed by ICP analysis.			
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.			
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.			
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.			
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.			

	Analyte Definitions										
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name						
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content						
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorcyclohexane						
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane						
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane						
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin						
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene						
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane						
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichlorodiphenyldichloroethylene						
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichlorodiphenyltrichloroethane						
C1N	C1-naphthalenes	PHENANT	Phenanthrene								
C1PHEN	C1-phenanthrene	PYRENE	Pyrene								