Lighthouse GREEN FUELS

The Lighthouse Green Fuels Order

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Abbreviations

Abbreviation	In Full / Term
AL	Action Level
BGS	British Geological Survey
DG	0.1 m^2 Day grab
MMO	Marine Management Organisation
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PSA	Particle Size Analysis
THC	Total Hydrocarbon Content
TOC	Total Organic Carbon
VC	Vibrocore

1 Introduction

1.1.1 This appendix presents the results of the site-specific freshwater and marine ecology surveys undertaken to inform the assessment of the Proposed Development. It includes:

- sediment quality survey results (Section 2);
- biological survey results (Section 3); and
- marine mammal observation results (Section 4).

1.1.2 The survey results should be read in conjunction with **Chapter 11: Freshwater and Marine Ecology (ES Volume I, Application Document Ref. 6.1),** which sets out the assessment methodology, baseline conditions, and assessed the likely impacts and effects of the Proposed Development on freshwater and marine ecology receptors.

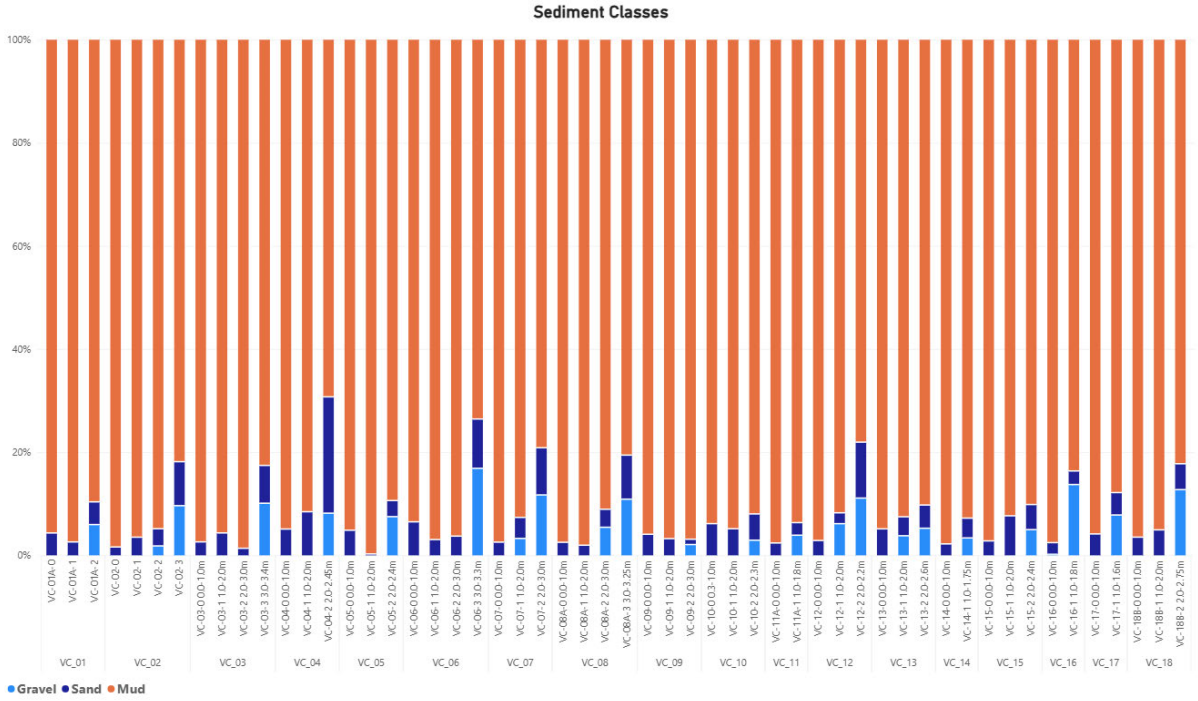
2 Sediment Quality Survey Results

2.1 Particle Size Analysis (PSA)

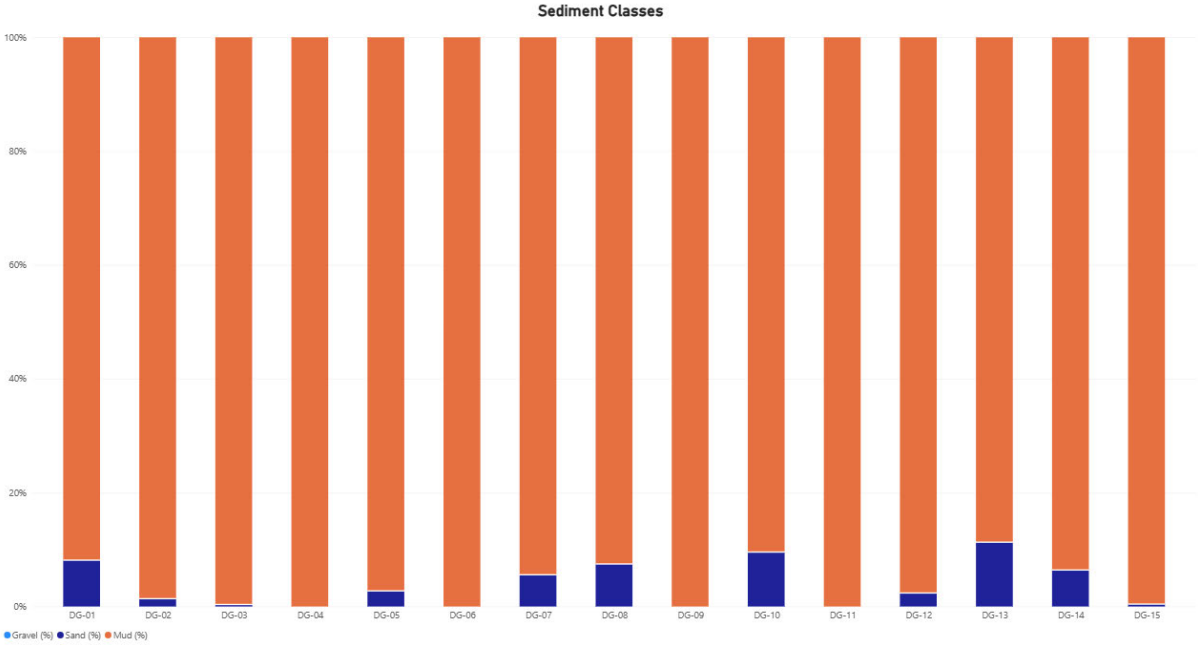
2.1.1 The sediment particle size analysis (PSA) was undertaken to characterise the seabed sediments within the study area. Sediment fractions were classified in accordance with the Wentworth (1922) [Ref 1] grain-size scale, and sediment descriptions were assigned using the British Geological Survey (BGS) modified Folk sediment classification [Ref 2].

2.1.2 Class limits are defined as follows:

- Gravel: ≥ 2 mm (φ ≤ −1)
- Sand: ≥ 0.063 mm and < 2 mm (−1 < φ ≤ 4)
- Mud: < 0.063 mm (φ > 4)



Inset 2.1 Sediment classes: Gravel in light blue, sand in blue and mud in orange for Vibrocore stations.



Inset 2.2 Sediment classes: Gravel in light blue, sand in blue and mud in orange for day grab stations.

Table 2.1 Bulk fraction composition (gravel; sand; mud) of vibrocore (VC) stations and sub-samples.

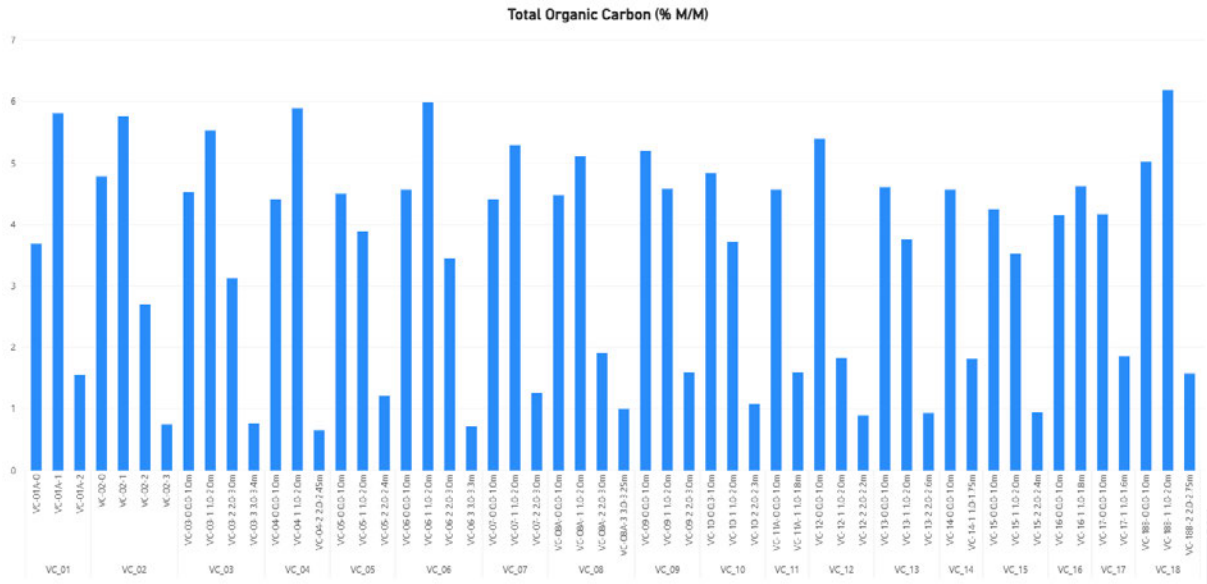
Sample	Station	Depth	Gravel (%)	Sand (%)	Mud (%)
VC-01A-0	VC-01A	0.0m - 1.0m	0	4.2	95.78
VC-01A-1	VC-01A	1.0m - 2.0m	0	2.46	97.52
VC-01A-2	VC-01A	2.0m - 3.0m	5.83	4.4	89.76
VC-02-0	VC-02	0.0m - 1.0m	0	1.48	98.5
VC-02-1	VC-02	1.0m - 2.0m	0	3.38	96.61
VC-02-2	VC-02	2.0m - 3.0m	1.69	3.33	94.97
VC-02-3	VC-02	3.0m - 3.4m	9.5	8.53	81.99
VC-03-0 0.0-1.0m	VC-03	0.0m - 1.0m	0	2.47	97.53
VC-03-1 1.0-2.0m	VC-03	1.0m - 2.0m	0	4.21	95.79
VC-03-2 2.0-3.0m	VC-03	2.0m - 3.0m	0	1.23	98.78
VC-03-3 3.0-3.4m	VC-03	3.0m - 3.4m	9.97	7.33	82.69
VC-04-0 0.0-1.0m	VC-04	0.0m - 1.0m	0	4.96	95.05
VC-04-1 1.0-2.0m	VC-04	1.0m - 2.0m	0	8.32	91.69

Sample	Station	Depth	Gravel (%)	Sand (%)	Mud (%)
VC-04-2 2.0-2.45m	VC-04	2.0m - 2.45m	8.04	22.56	69.4
VC-05-0 0.0-1.0m	VC-05	0.0m - 1.0m	0	4.73	95.26
VC-05-1 1.0-2.0m	VC-05	1.0m - 2.0m	0	0.13	99.87
VC-05-2 2.0-2.4m	VC-05	2.0m - 2.4m	7.37	3.12	89.53
VC-06-0 0.0-1.0m	VC-06	0.0m - 1.0m	0	6.36	93.64
VC-06-1 1.0-2.0m	VC-06	1.0m - 2.0m	0	2.92	97.06
VC-06-2 2.0-3.0m	VC-06	2.0m - 3.0m	0	3.59	96.42
VC-06-3 3.0-3.3m	VC-06	3.0m - 3.3m	16.74	9.56	73.68
VC-07-0 0.0-1.0m	VC-07	0.0m - 1.0m	0	2.42	97.59
VC-07-1 1.0-2.0m	VC-07	1.0m - 2.0m	3.14	4.08	92.76
VC-07-2 2.0-3.0m	VC-07	2.0m - 3.0m	11.58	9.15	79.28
VC-08A-0 0.0-1.0m	VC-08A	0.0m - 1.0m	0	2.39	97.63
VC-08A-1 1.0-2.0m	VC-08A	1.0m - 2.0m	0	1.83	98.18
VC-08A-2 2.0-3.0m	VC-08A	2.0m - 3.0m	5.31	3.49	91.21
VC-08A-3 3.0-3.25m	VC-08A	3.0m - 3.25m	10.76	8.54	80.71
VC-09-0 0.0-1.0m	VC-09	0.0m - 1.0m	0	3.95	96.03
VC-09-1 1.0-2.0m	VC-09	1.0m - 2.0m	0	3.1	96.91
VC-09-2 2.0-3.0m	VC-09	2.0m - 3.0m	1.96	1.03	97.03
VC-10-0 0.3-1.0m	VC-10	0.3m - 1.0m	0	6.01	94
VC-10-1 1.0-2.0m	VC-10	1.0m - 2.0m	0	5.02	94.98
VC-10-2 2.0-2.3m	VC-10	2.0m - 2.3m	2.8	5.09	92.1

Sample	Station	Depth	Gravel (%)	Sand (%)	Mud (%)
VC-11A-0 0.0-1.0m	VC-11A	0.0m - 1.0m	0	2.26	97.72
VC-11A-1 1.0-1.8m	VC-11A	1.0m - 1.8m	3.77	2.44	93.81
VC-12-0 0.0-1.0m	VC-12	0.0m - 1.0m	0	2.74	97.25
VC-12-1 1.0-2.0m	VC-12	1.0m - 2.0m	6	2.11	91.87
VC-12-2 2.0-2.2m	VC-12	2.0m - 2.2m	10.97	10.85	78.19
VC-13-0 0.0-1.0m	VC-13	0.0m - 1.0m	0	5	95
VC-13-1 1.0-2.0m	VC-13	1.0m - 2.0m	3.66	3.68	92.64
VC-13-2 2.0-2.6m	VC-13	2.0m - 2.6m	5.12	4.5	90.38
VC-14-0 0.0-1.0m	VC-14	0.0m - 1.0m	0	2.08	97.92
VC-14-1 1.0-1.75m	VC-14	1.0m - 1.75m	3.24	3.84	92.94
VC-15-0 0.0-1.0m	VC-15	0.0m - 1.0m	0	2.66	97.33
VC-15-1 1.0-2.0m	VC-15	1.0m - 2.0m	0	7.53	92.46
VC-15-2 2.0-2.4m	VC-15	2.0m - 2.4m	4.85	4.87	90.28
VC-16-0 0.0-1.0m	VC-16	0.0m - 1.0m	0.07	2.26	97.66
VC-16-1 1.0-1.8m	VC-16	1.0m - 1.8m	13.6	2.63	83.78
VC-17-0 0.0-1.0m	VC-17	0.0m - 1.0m	0	4.01	95.99
VC-17-1 1.0-1.6m	VC-17	1.0m - 1.6m	7.69	4.35	87.98
VC-18B-0 0.0-1.0m	VC-18B	0.0m - 1.0m	0	3.39	96.63
VC-18B-1 1.0-2.0m	VC-18B	1.0m - 2.0m	0	4.8	95.21
VC-18B-2 2.0-2.75m	VC-18B	2.0m - 2.75m	12.61	5.02	82.39
DG-01			0	8.03	91.97
DG-02			0	1.26	98.75

Sample	Station	Depth	Gravel (%)	Sand (%)	Mud (%)
DG-03			0	0.24	99.78
DG-04			0	0	99.98
DG-05			0	2.63	97.38
DG-06			0	0	100.01
DG-07			0	5.46	94.54
DG-08			0	7.36	92.65
DG-09			0	0	99.98
DG-10			0	9.45	90.55
DG-11			0	0	100.02
DG-12			0	2.26	97.74
DG-13			0	11.19	88.81
DG-14			0	6.3	93.7
DG-15			0	0.31	99.7

2.2 Total Organic Carbon (TOC)



Inset 2.3 Total Organic Carbon (% M/M)

Table 2.2 Total Organic Carbon (% M/M)

Station	Station	Sample	TOC
VC-01A-0	VC-01A	-	3.68
VC-01A-1	VC-01A	-	5.81
VC-01A-2	VC-01A	-	1.55
VC-02-0	VC-02	-	4.78
VC-02-1	VC-02	-	5.76
VC-02-2	VC-02	-	2.7
VC-02-3	VC-02	-	0.74
VC-03-0 0.0-1.0m	VC-03	0.0 - 1.0m	4.52
VC-03-1 1.0-2.0m	VC-03	1.0 - 2.0m	5.53
VC-03-2 2.0-3.0m	VC-03	2.0 - 3.0m	3.12
VC-03-3 3.0-3.4m	VC-03	3.0 - 3.4m	0.76
VC-04-0 0.0-1.0m	VC-04	0.0 - 1.0m	4.41
VC-04-1 1.0-2.0m	VC-04	1.0 - 2.0m	5.89
VC-04-2 2.0-2.45m	VC-04	2.0 - 2.45m	0.65
VC-05-0 0.0-1.0m	VC-05	0.0 - 1.0m	4.5
VC-05-1 1.0-2.0m	VC-05	1.0 - 2.0m	3.89
VC-05-2 2.0-2.4m	VC-05	2.0 - 2.4m	1.21
VC-06-0 0.0-1.0m	VC-06	0.0 - 1.0m	4.57
VC-06-1 1.0-2.0m	VC-06	1.0 - 2.0m	5.99
VC-06-2 2.0-3.0m	VC-06	2.0 - 3.0m	3.45
VC-06-3 3.0-3.3m	VC-06	3.0 - 3.3m	0.71
VC-07-0 0.0-1.0m	VC-07	0.0 - 1.0m	4.41
VC-07-1 1.0-2.0m	VC-07	1.0 - 2.0m	5.29
VC-07-2 2.0-3.0m	VC-07	2.0 - 3.0m	1.26
VC-08A-0 0.0-1.0m	VC-08A	0.0 - 1.0m	4.47
VC-08A-1 1.0-2.0m	VC-08A	1.0 - 2.0m	5.11
VC-08A-2 2.0-3.0m	VC-08A	2.0 - 3.0m	1.91

Station	Station	Sample	TOC
VC-08A-3 3.0-3.25m	VC-08A	3.0 - 3.25m	1
VC-09-0 0.0-1.0m	VC-09	0.0 - 1.0m	5.2
VC-09-1 1.0-2.0m	VC-09	1.0 - 2.0m	4.58
VC-09-2 2.0-3.0m	VC-09	2.0 - 3.0m	1.59
VC-10-0 0.3-1.0m	VC-10	0.3 - 1.0m	4.83
VC-10-1 1.0-2.0m	VC-10	1.0 - 2.0m	3.72
VC-10-2 2.0-2.3m	VC-10	2.0 - 2.3m	1.08
VC-11A-0 0.0-1.0m	VC-11A	0.0 - 1.0m	4.57
VC-11A-1 1.0-1.8m	VC-11A	1.0 - 1.8m	1.59
VC-12-0 0.0-1.0m	VC-12	0.0 - 1.0m	5.4
VC-12-1 1.0-2.0m	VC-12	1.0 - 2.0m	1.83
VC-12-2 2.0-2.2m	VC-12	2.0 - 2.2m	0.89
VC-13-0 0.0-1.0m	VC-13	0.0 - 1.0m	4.61
VC-13-1 1.0-2.0m	VC-13	1.0 - 2.0m	3.76
VC-13-2 2.0-2.6m	VC-13	2.0 - 2.6m	0.93
VC-14-0 0.0-1.0m	VC-14	0.0 - 1.0m	4.57
VC-14-1 1.0-1.75m	VC-14	1.0 - 1.75m	1.81
VC-15-0 0.0-1.0m	VC-15	0.0 - 1.0m	4.25
VC-15-1 1.0-2.0m	VC-15	1.0 - 2.0m	3.52
VC-15-2 2.0-2.4m	VC-15	2.0 - 2.4m	0.94
VC-16-0 0.0-1.0m	VC-16	0.0 - 1.0m	4.15
VC-16-1 1.0-1.8m	VC-16	1.0 - 1.8m	4.62
VC-17-0 0.0-1.0m	VC-17	0.0 - 1.0m	4.17
VC-17-1 1.0-1.6m	VC-17	1.0 - 1.6m	1.85
VC-18B-0 0.0-1.0m	VC-18B	0.0 - 1.0m	5.02
VC-18B-1 1.0-2.0m	VC-18B	1.0 - 2.0m	6.18
VC-18B-2 2.0-2.75m	VC-18B	2.0 - 2.75m	1.57

Summary of Sediment Quality Results

2.2.1 Sediment quality was assessed through the use of a 6m VC with 96mm diameter and 0.1m^2 Day grab. The VC was used to interrogate subsurface sediments until refusal at competent substrata and the Day grab was used for surficial sampling. The sample stations were offset to achieve greatest spatial coverage of the capital dredge area of the Proposed Development.

2.2.2 Analysis of contaminant determinands were carried out by Socatec in line with the Marine Management Organisation's (MMO) requirements and adhered to all laboratory standards.

2.2.3 All VC stations contained at least one contaminant determinand that exceeded Cefas Action Level (AL) 1. One station, VC-18, contained concentrations of mercury and cadmium which exceed Cefas AL2 (Table 2.3).

2.2.4 Concentrations of Dibutyltin and Tributyltin were all below Cefas AL1 with the exception of VC-01 for Tributyltin (Table 2.4).

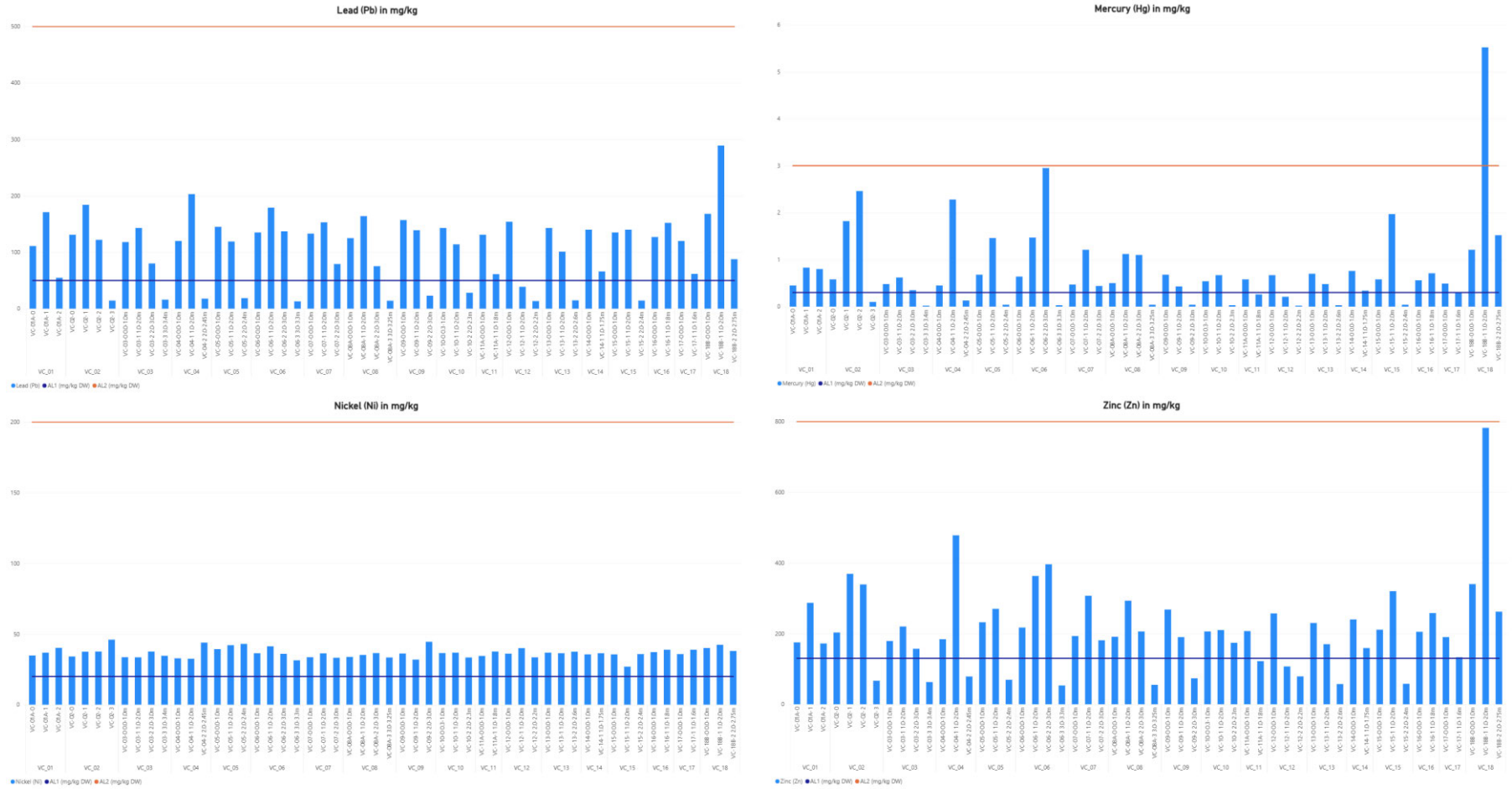
2.2.5 All stations contained elevated levels of Polycyclic Aromatic Hydrocarbons (PAHs) as is expected within the Tees estuarine sediments. However, station VC-09, contained markedly elevated concentrations of PAHs at 1m – 2m below surface (Table 2.5).

2.2.6 Concentrations of Polychlorinated Biphenyls (PCBs) summed cogeners (PCB7 and PCB25) exceeded Cefas Al1 in eight stations.

2.3 Trace Metals



Inset 2.4 As, Cd, Cr and Cu (mg/kg) and Cefas AL limits



Inset 2.5 Pb, Hg, Ni and Zn (mg/kg) and Cefas AL limits

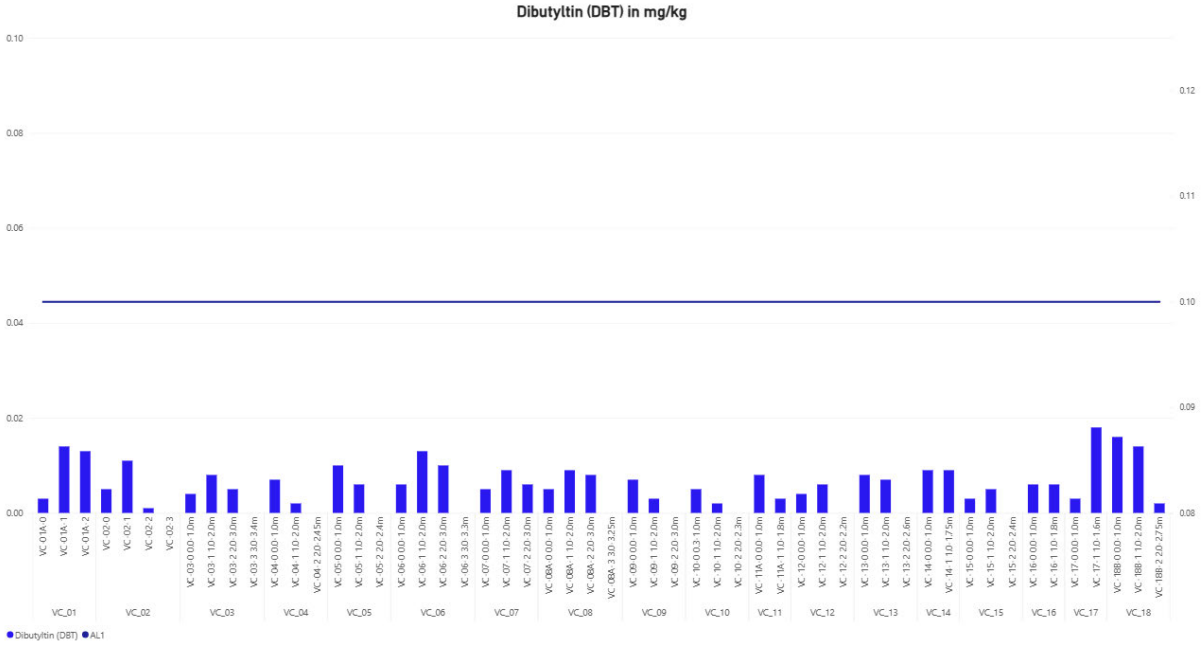
Table 2.3 Trace metals in mg/kg. In blue are values above Cefas action level (AL) 1 and in red above AL 2

Station	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
VC-01A-0	22.8	0.43	58.8	52.2	0.45	34.8	111	175
VC-01A-1	25.1	1.02	91.8	111	0.83	36.8	171	287
VC-01A-2	12.9	0.72	73.9	55.9	0.80	40.2	54.8	172
VC-02-0	25.8	0.56	66.8	60.0	0.58	34.1	131	203
VC-02-1	28.9	1.74	145	136	1.82	37.5	184	369
VC-02-2	25.3	1.73	176	205	2.46	37.6	122	339
VC-02-3	5.6	0.16	48.7	20.2	0.10	46.0	14.4	66.7
VC-03-0 0.0-1.0m	25.0	0.38	57.8	49.0	0.48	33.6	118	179
VC-03-1 1.0-2.0m	28.7	0.60	63.9	65.6	0.62	33.5	143	220
VC-03-2 2.0-3.0m	16.4	0.48	56.6	49.2	0.35	37.6	80.1	157
VC-03-3 3.0-3.4m	5.9	0.16	31.8	19.0	0.02	34.6	16.0	62.9
VC-04-0 0.0-1.0m	22.1	0.44	55.2	50.9	0.45	32.8	120	184
VC-04-1 1.0-2.0m	29.4	2.18	180	265	2.28	32.5	203	478
VC-04-2 2.0-2.45m	5.7	0.20	58.0	25.2	0.13	43.9	17.8	78.6
VC-05-0 0.0-1.0m	26.3	0.73	82.6	73.9	0.68	39.3	145	232
VC-05-1 1.0-2.0m	20.0	1.49	129	131	1.46	42.1	119	270
VC-05-2 2.0-2.4m	6.2	0.19	39.0	20.0	0.04	43.0	18.7	69.3
VC-06-0 0.0-1.0m	25.0	0.62	71.8	65.6	0.64	36.4	135	217

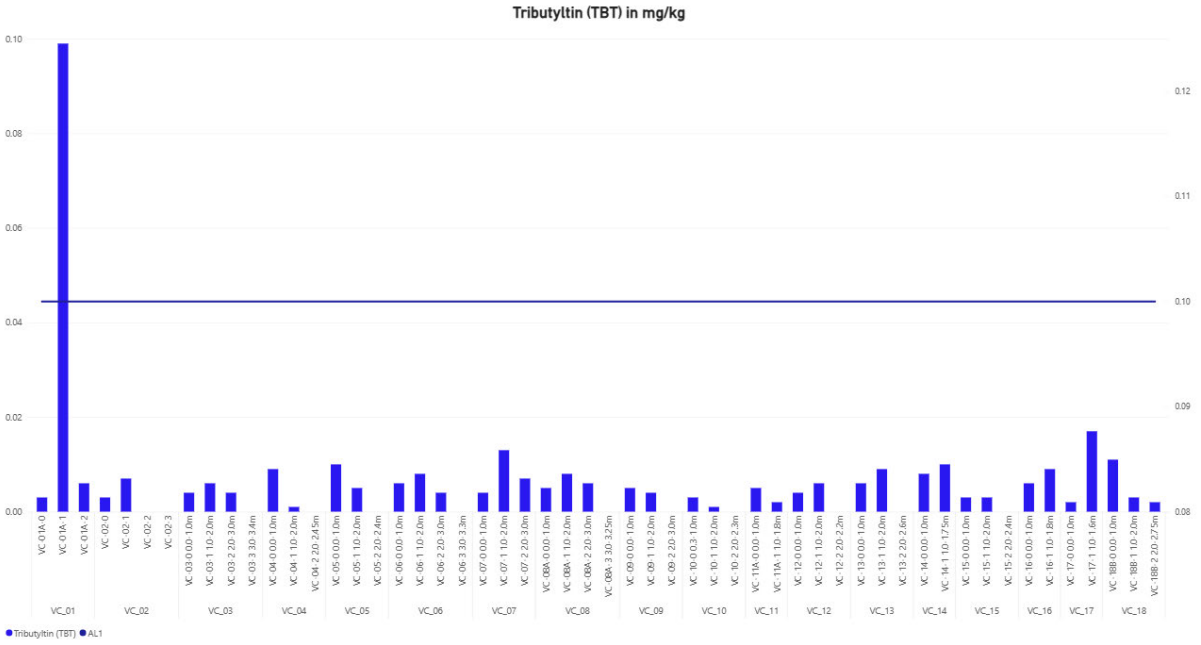
Station	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
VC-06-1 1.0-2.0m	27.2	1.78	155	162	1.47	41.3	179	363
VC-06-2 2.0-3.0m	23.0	2.10	181	169	2.95	36.0	137	396
VC-06-3 3.0-3.3m	5.6	0.16	29.8	16.2	0.03	31.4	13.0	53.2
VC-07-0 0.0-1.0m	26.2	0.43	58.1	50.2	0.47	33.6	133	193
VC-07-1 1.0-2.0m	25.7	1.53	105	85.9	1.21	36.3	153	307
VC-07-2 2.0-3.0m	14.8	0.59	55.3	45.6	0.44	33.2	79.1	181
VC-08A-0 0.0-1.0m	24.2	0.49	60.3	52.6	0.50	33.8	125	191
VC-08A-1 1.0-2.0m	28.6	1.10	96.9	105	1.12	35.2	164	293
VC-08A-2 2.0-3.0m	14.6	0.96	93.4	80.0	1.10	36.5	75.3	206
VC-08A-3 3.0-3.25m	6.0	0.16	29.9	16.0	0.04	33.4	14.1	55.1
VC-09-0 0.0-1.0m	24.6	0.94	84.2	93.6	0.68	36.2	157	268
VC-09-1 1.0-2.0m	25.5	0.46	54.6	45.5	0.43	31.9	139	190
VC-09-2 2.0-3.0m	7.6	0.18	38.8	21.2	0.04	44.5	23.1	73.5
VC-10-0 0.3-1.0m	26.4	0.52	63.4	55.9	0.54	36.5	143	206
VC-10-1 1.0-2.0m	20.0	0.76	74.6	65.9	0.67	36.8	114	210
VC-10-2 2.0-2.3m	5.8	0.36	28.1	19.2	0.03	33.4	28.2	174
VC-11A-0 0.0-1.0m	24.1	0.56	65.9	60.1	0.58	34.5	131	207
VC-11A-1 1.0-1.8m	13.0	0.37	48.6	38.4	0.26	37.6	61.2	122
VC-12-0 0.0-1.0m	23.8	0.92	84.5	96.8	0.67	36.1	154	257
VC-12-1 1.0-2.0m	8.6	0.39	54.4	39.5	0.21	40.0	38.8	107

Station	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
VC-12-2 2.0-2.2m	6.7	0.23	30.0	17.0	0.02	33.5	13.5	78.9
VC-13-0 0.0-1.0m	26.7	0.64	70.6	65.2	0.70	36.8	143	230
VC-13-1 1.0-2.0m	20.2	0.44	56.2	49.6	0.48	36.4	101	170
VC-13-2 2.0-2.6m	6.4	0.16	34.0	17.7	0.03	37.5	14.8	57.2
VC-14-0 0.0-1.0m	24.3	0.81	80.7	84.0	0.76	35.6	140	240
VC-14-1 1.0-1.75m	10.8	0.66	67.5	62.7	0.34	36.4	66	159
VC-15-0 0.0-1.0m	23.1	0.58	67.5	61.5	0.58	35.6	135	211
VC-15-1 1.0-2.0m	23.7	1.98	135	109	1.97	26.9	140	320
VC-15-2 2.0-2.4m	6.2	0.16	33.8	17.2	0.04	35.8	14.4	57.9
VC-16-0 0.0-1.0m	23.1	0.54	65.3	61.4	0.56	37.2	127	205
VC-16-1 1.0-1.8m	22.3	0.84	80.0	87.0	0.71	38.9	152	258
VC-17-0 0.0-1.0m	23.8	0.46	60.9	53.4	0.49	35.8	120	190
VC-17-1 1.0-1.6m	13.6	0.39	54.8	42.9	0.29	38.9	61.7	133
VC-18B-0 0.0-1.0m	26.0	1.49	130	131	1.21	40.1	168	340
VC-18B-1 1.0-2.0m	38.3	5.60	352	254	5.52	42.4	289	782
VC-18B-2 2.0-2.75m	16.6	1.30	113	167	1.52	38.0	87.7	262
Limit of detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2

2.4 Organotins



Inset 2.6 Dibutyltin (DBT)



Inset 2.7 Tributyltin (TBT)

Table 2.4 Concentrations of Dibutyltin (DBT) and Tributyltin (TBT)

Station	Dibutyltin (DBT)	Tributyltin (TBT)
VC-01A-0	0.003	0.003
VC-01A-1	0.014	0.099
VC-01A-2	0.013	0.006
VC-02-0	0.005	0.003
VC-02-1	0.011	0.007
VC-02-2	0.001	<0.001
VC-02-3	<0.001	<0.001
VC-03-0 0.0-1.0m	0.004	0.004
VC-03-1 1.0-2.0m	0.008	0.006
VC-03-2 2.0-3.0m	0.005	0.004
VC-03-3 3.0-3.4m	<0.001	<0.001
VC-04-0 0.0-1.0m	0.007	0.009
VC-04-1 1.0-2.0m	0.002	0.001
VC-04-2 2.0-2.45m	<0.001	<0.001
VC-05-0 0.0-1.0m	0.010	0.010
VC-05-1 1.0-2.0m	0.006	0.005
VC-05-2 2.0-2.4m	<0.001	<0.001
VC-06-0 0.0-1.0m	0.006	0.006
VC-06-1 1.0-2.0m	0.013	0.008
VC-06-2 2.0-3.0m	0.010	0.004
VC-06-3 3.0-3.3m	<0.001	<0.001
VC-07-0 0.0-1.0m	0.005	0.004
VC-07-1 1.0-2.0m	0.009	0.013
VC-07-2 2.0-3.0m	0.006	0.007
VC-08A-0 0.0-1.0m	0.005	0.005
VC-08A-1 1.0-2.0m	0.009	0.008
VC-08A-2 2.0-3.0m	0.008	0.006
VC-08A-3 3.0-3.25m	<0.001	<0.001
VC-09-0 0.0-1.0m	0.007	0.005
VC-09-1 1.0-2.0m	0.003	0.004
VC-09-2 2.0-3.0m	<0.001	<0.001
VC-10-0 0.3-1.0m	0.005	0.003
VC-10-1 1.0-2.0m	0.002	0.001
VC-10-2 2.0-2.3m	<0.001	<0.001

Station	Dibutyltin (DBT)	Tributyltin (TBT)
VC-11A-0 0.0-1.0m	0.008	0.005
VC-11A-1 1.0-1.8m	0.003	0.002
VC-12-0 0.0-1.0m	0.004	0.004
VC-12-1 1.0-2.0m	0.006	0.006
VC-12-2 2.0-2.2m	<0.001	<0.001
VC-13-0 0.0-1.0m	0.008	0.006
VC-13-1 1.0-2.0m	0.007	0.009
VC-13-2 2.0-2.6m	<0.001	<0.001
VC-14-0 0.0-1.0m	0.009	0.008
VC-14-1 1.0-1.75m	0.009	0.010
VC-15-0 0.0-1.0m	0.003	0.003
VC-15-1 1.0-2.0m	0.005	0.003
VC-15-2 2.0-2.4m	<0.001	<0.001
VC-16-0 0.0-1.0m	0.006	0.006
VC-16-1 1.0-1.8m	0.006	0.009
VC-17-0 0.0-1.0m	0.003	0.002
VC-17-1 1.0-1.6m	0.018	0.017
VC-18B-0 0.0-1.0m	0.016	0.011
VC-18B-1 1.0-2.0m	0.014	0.003
VC-18B-2 2.0-2.75m	0.002	0.002

Polycyclic Aromatic Hydrocarbons (PAHs) and Total Hydrocarbon Content (THC)

Table 2.5 PAHs and THC. In blue are values above Cefas AL 1.

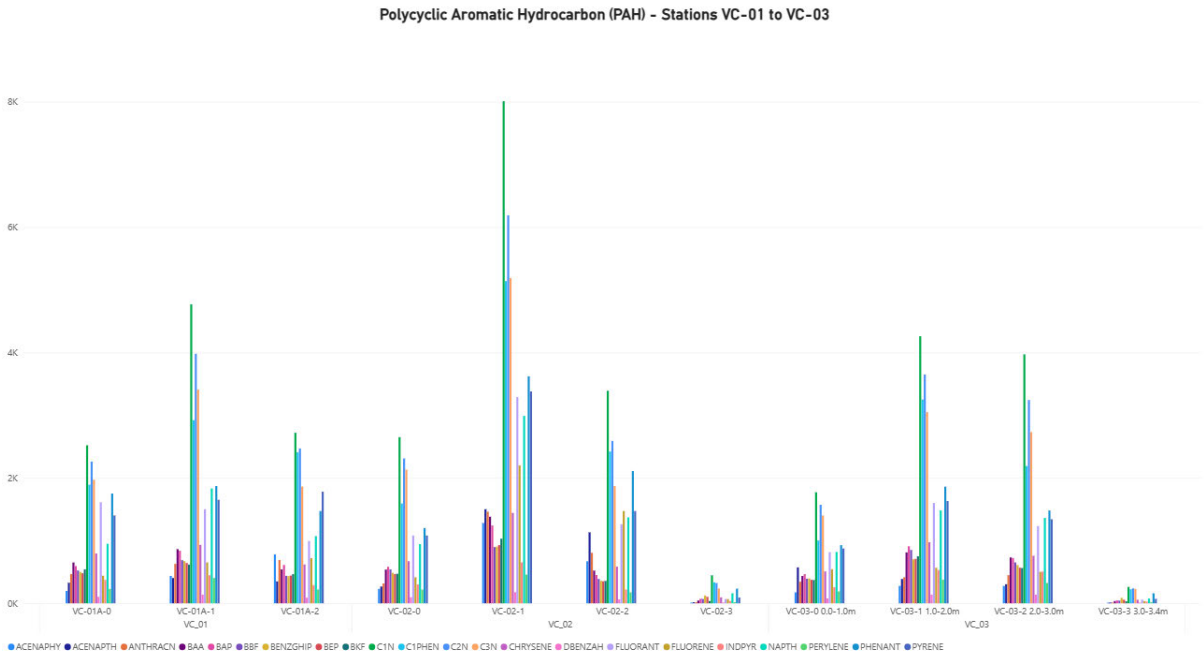
Station	Acenaphthene (ACENAPTH)	Acenaphthylene (ACENAPHY)	Anthracene (ANTHRACN)	Benzo[a]anthracene (BAA)	Benzo[a]pyrene (BAP)	Benzo[b]fluoranthene (BBF)	Benzo[ghi]perylene (BENZGHIP)	Benzo[e]pyrene (BEP)	Benzo[k]fluoranthene (BKF*)	C1-naphthalenes (C1N)	C1-phenanthrene (C1PHEN)	C2-naphthalenes (C2N)	C3-naphthalenes (C3N)	Chrysene (CHRYSENE*)	Dibenzo[ah]anthracene (DBENZAH)	Fluoranthene (FLUORANT)	Fluorene (FLUORENE)	Indeno[1,2,3-cd]pyrene (INDPYR)	Naphthalene (NAPTH)	Perylene (PERYLENE)	Phenanthrene (PHENANT)	Pyrene (PYRENE)	THC
VC-01A-0	325	196	466	649	593	521	499	478	541	2520	1890	2260	1970	793	102	1610	439	370	949	228	1750	1400	417
VC-01A-1	402	436	627	863	837	686	671	641	617	4770	2920	3980	3410	931	138	1500	650	447	1830	402	1870	1650	447
VC-01A-2	348	780	689	539	609	437	430	441	464	2720	2410	2470	1860	618	87.3	992	720	289	1070	219	1470	1780	1055
VC-02-0	266	229	315	535	581	539	485	466	470	2650	1590	2310	2130	671	95.3	1080	413	299	944	216	1200	1080	409
VC-02-1	1500	1280	1460	1380	1240	896	903	927	1030	8010	5140	6190	5190	1440	176	3290	2200	652	2990	456	3620	3380	1238
VC-02-2	1130	669	805	519	450	386	358	350	355	3390	2420	2590	1870	583	60.4	1260	1470	217	1370	172	2110	1470	1657
VC-02-3	15.0	8.59	17.1	43.1	70.0	67.5	123	100	35	444	333	321	234	93.3	12.3	65.9	66.3	36.5	158	17.0	232	89.4	121
VC-03-0 0.0-1.0m	572	174	343	435	463	392	394	374	369	1770	1000	1570	1400	507	77.5	814	542	254	818	187	926	873	228
VC-03-1 1.0-2.0m	386	276	414	811	909	848	701	707	750	4260	3250	3650	3050	973	137	1600	565	530	1480	376	1860	1630	489
VC-03-2 2.0-3.0m	303	275	447	731	721	651	607	567	561	3970	2190	3240	2730	756	137	1230	501	504	1360	324	1480	1340	1113
VC-03-3 3.0-3.4m	11.7	3.70	12.3	34.6	44.4	40.9	85.1	54.9	30.3	261	222	237	229	55.8	9.90	56.3	33.8	24.6	75.6	18.8	159	68.1	35.2
VC-04-0 0.0-1.0m	420	318	576	957	1070	1010	893	820	831	4850	2870	4100	3620	1090	178	1730	626	670	1600	444	1970	1810	240
VC-04-1 1.0-2.0m	1070	965	1160	1170	1060	887	772	771	878	5870	3420	4590	3740	1220	155	2510	1710	607	2610	426	2850	2700	1133
VC-04-2 2.0-2.45m	<1	3.58	<1	<1	<1	<1	<1	<1	<1	1.81	<1	<1	<1	<1	<1	<1	<1	<1	1.45	<1	<1	<1	<1
VC-05-0 0.0-1.0m	395	320	387	719	780	796	590	602	717	3370	1880	3010	2360	852	123	1380	586	490	1280	308	1560	1450	848
VC-05-1 1.0-2.0m	713	592	647	754	761	584	643	604	568	4150	3040	3490	2830	865	120	1570	1070	463	1640	302	2090	1740	656
VC-05-2 2.0-2.4m	13.6	7.27	11.1	41.8	55.8	60.6	92.1	62.1	27.8	261	197	218	215	63.6	12.0	72.0	43.9	32.5	74.7	25.8	164	85.0	12.0

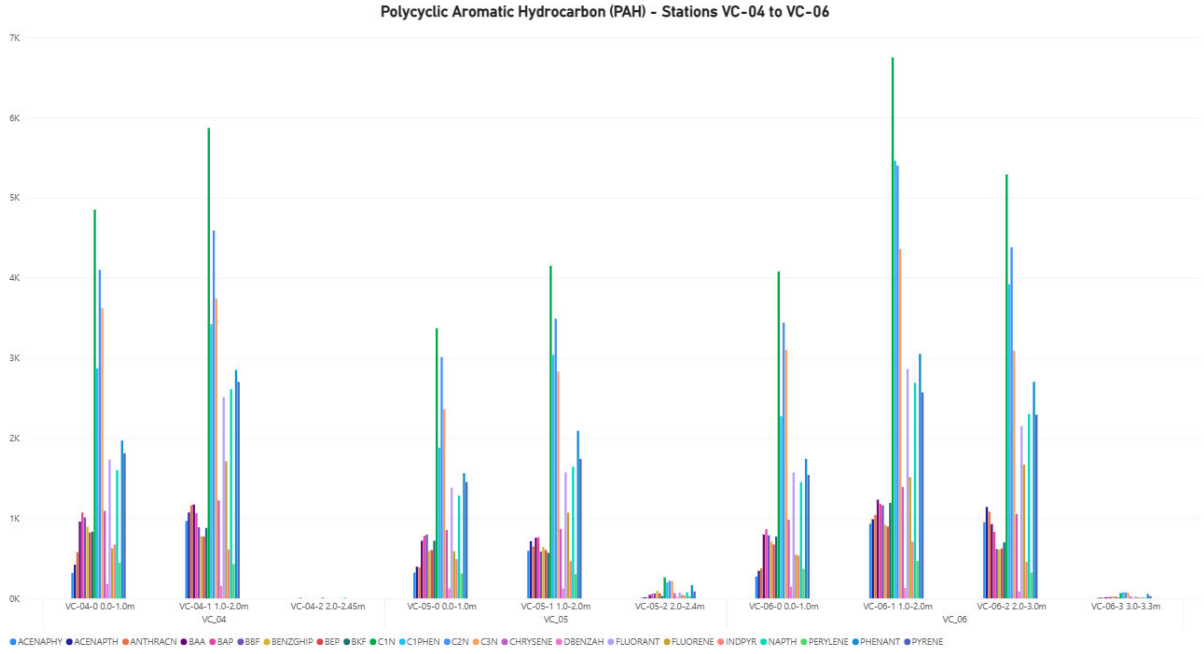
Station	Acenaphthene (ACENAPTH)	Acenaphthylene (ACENAPHY)	Anthracene (ANTHRACN)	Benzo[a]anthracene (BAA)	Benzo[a]pyrene (BAP)	Benzo[b]fluoranthene (BBF)	Benzo[ghi]perylene (BENZGHIP)	Benzo[e]pyrene (BEP)	Benzo[k]fluoranthene (BKF*)	C1-naphthalenes (C1N)	C1-phenanthrene (C1PHEN)	C2-naphthalenes (C2N)	C3-naphthalenes (C3N)	Chrysene (CHRYSENE*)	Dibenzo[ah]anthracene (DBENZAH)	Fluoranthene (FLUORANT)	Fluorene (FLUORENE)	Indeno[1,2,3-cd]pyrene (INDPYR)	Naphthalene (NAPTH)	Perylene (PERYLENE)	Phenanthrene (PHENANT)	Pyrene (PYRENE)	THC
VC-06-0 0.0-1.0m	343	272	375	796	861	786	707	671	770	4080	2270	3440	3100	980	146	1570	544	532	1450	367	1740	1540	422
VC-06-1 1.0-2.0m	987	930	1040	1230	1180	1160	917	895	1190	6750	5460	5400	4360	1390	128	2860	1510	706	2690	464	3050	2570	2473
VC-06-2 2.0-3.0m	1140	950	1080	925	829	614	607	621	697	5290	3920	4380	3090	1050	86.2	2150	1670	454	2300	320	2700	2290	749
VC-06-3 3.0-3.3m	4.44	2.37	4.18	13.0	16.4	16.2	26.2	18.7	8.69	64.8	75.3	73.0	72.1	21.2	3.75	20.8	13.2	8.39	10.9	6.08	52.0	24.9	129
VC-07-0 0.0-1.0m	324	242	348	792	840	845	704	686	863	3970	2140	3380	2980	967	145	1560	490	466	1410	323	1710	1500	543
VC-07-1 1.0-2.0m	1670	947	1120	1200	1210	952	920	895	1130	5610	3910	4690	3830	1340	195	2650	1990	749	2150	477	2840	2860	2331
VC-07-2 2.0-3.0m	393	329	391	708	813	718	654	624	649	3490	2080	3020	2600	848	139	1370	575	476	1270	350	1570	1490	408
VC-08A-0 0.0-1.0m	364	315	400	680	726	577	601	574	575	3540	2050	2950	2690	796	125	1340	567	414	1240	311	1580	1390	489
VC-08A-1 1.0-2.0m	558	529	717	1060	1050	1830	837	792	1840	4840	3260	3970	3490	1110	165	1740	840	751	1750	466	2120	2050	1049
VC-08A-2 2.0-3.0m	712	810	920	775	760	558	579	565	434	4250	3280	3320	2810	846	82.0	1720	1190	391	1680	268	2230	2040	1710
VC-08A-3 3.0-3.25m	17.0	4.64	25.5	71.8	93.2	89.6	148	83.9	47.6	235	304	256	314	90.4	14.9	115	45.8	50.0	61.0	31.4	214	138	155
VC-09-0 0.0-1.0m	203	149	248	532	578	473	515	474	548	2560	1770	2250	1810	668	108	1080	313	367	872	246	1160	1000	500
VC-09-1 1.0-2.0m	2160	1560	2630	5320	5630	5530	4710	4890	4200	29300	16600	25700	23400	6380	1090	10800	3520	4130	9470	2330	11900	10400	340
VC-09-2 2.0-3.0m	148	118	184	356	374	366	323	303	309	1740	972	1410	1270	421	62.4	696	220	205	582	142	744	677	102
VC-10-0 0.3-1.0m	238	190	294	570	599	586	517	485	495	2780	1560	2260	2030	675	100	1110	353	329	932	228	1190	1080	302
VC-10-1 1.0-2.0m	41.5	31.2	45.0	71.8	80.2	72.3	66.3	67.7	58.7	428	279	383	342	88.4	13.5	139	69.2	48.8	144	37.1	209	160	311
VC-10-2 2.0-2.3m	20.6	3.76	14.6	50.6	65.7	72.5	104	83.2	34.1	356	317	349	363	83.9	10.3	82.0	57.1	29.2	64.3	21.9	234	100	272

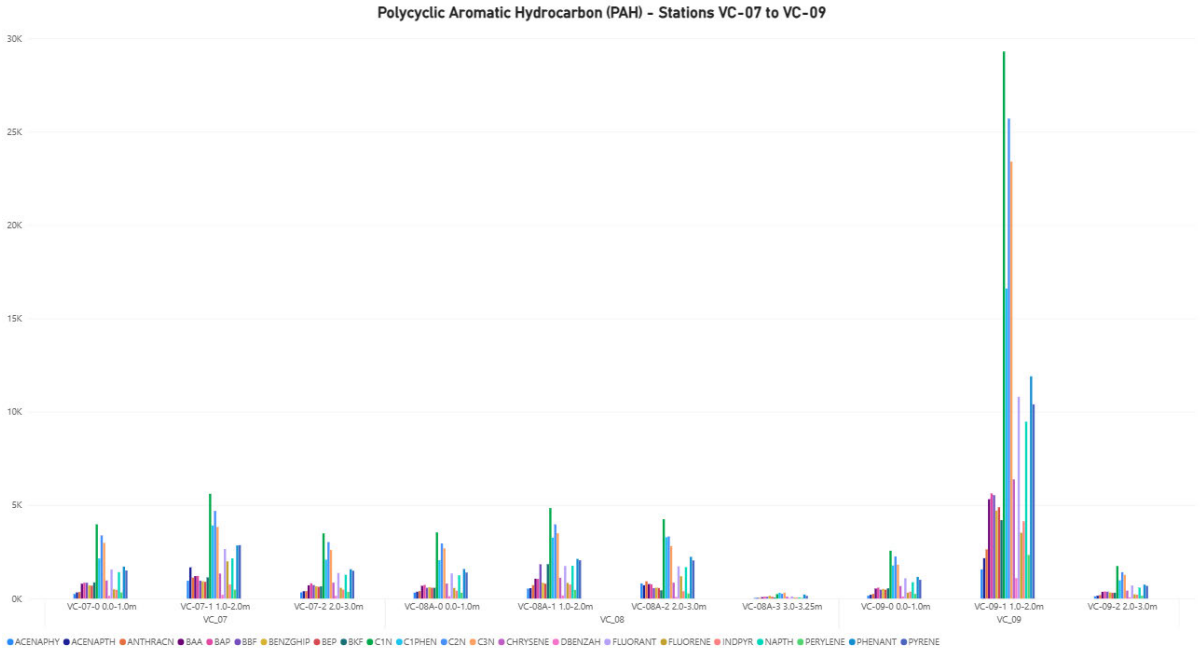
Station	Acenaphthene (ACENAPTH)	Acenaphthylene (ACENAPHY)	Anthracene (ANTHRACN)	Benzo[a]anthracene (BAA)	Benzo[a]pyrene (BAP)	Benzo[b]fluoranthene (BBF)	Benzo[ghi]perylene (BENZGHIP)	Benzo[e]pyrene (BEP)	Benzo[k]fluoranthene (BKF*)	C1-naphthalenes (C1N)	C1-phenanthrene (C1PHEN)	C2-naphthalenes (C2N)	C3-naphthalenes (C3N)	Chrysene (CHRYSENE*)	Dibenzo[ah]anthracene (DBENZAH)	Fluoranthene (FLUORANT)	Fluorene (FLUORENE)	Indeno[1,2,3-cd]pyrene (INDPYR)	Naphthalene (NAPTH)	Perylene (PERYLENE)	Phenanthrene (PHENANT)	Pyrene (PYRENE)	THC
VC-11A-0 0.0-1.0m	361	311	431	794	810	778	616	694	763	4150	2070	3730	3500	932	143	1430	556	477	1500	313	1650	1580	1472
VC-11A-1 1.0-1.8m	185	163	249	482	648	738	768	606	489	3080	2330	2390	2250	707	82.6	850	391	361	969	259	1520	1000	181
VC-12-0 0.0-1.0m	267	228	316	703	771	620	648	596	735	3350	2280	2810	2390	807	92.4	1320	412	446	1160	310	1430	1360	291
VC-12-1 1.0-2.0m	179	268	285	297	455	376	407	347	388	1740	1290	1420	1160	396	69.7	516	300	245	544	182	765	883	308
VC-12-2 2.0-2.2m	13.8	3.76	15.7	41.8	55.3	51.6	78.6	52.3	37.1	116	185	157	187	56.5	9.78	69.1	33.5	25.1	19.5	30.1	131	84.4	14.4
VC-13-0 0.0-1.0m	318	270	475	771	845	661	698	660	896	3580	2270	3090	2640	914.0	94.8	1550	490	549	1220	349	1620	1570	175
VC-13-1 1.0-2.0m	169	136	210	446	498	446	440	392	500	1790	1160	1630	1400	541	81.9	872	273	274	599	250	939	847	91.3
VC-13-2 2.0-2.6m	16.5	3.31	16.6	58.3	74.0	89.0	112	95.6	38.1	411	304	317	303	101	16.3	91.6	63.4	35.4	143	29.5	256	117	11.4
VC-14-0 0.0-1.0m	448	493	569	757	989	864	774	765	894	4800	3180	3760	3070	969	160	1420	684	580	1620	392	1980	1960	201
VC-14-1 1.0-1.75m	76	88	119	143	167	158	173	157	154	906	552	714	624	188	22.3	231	134	96	284	72	391	332	72.1
VC-15-0 0.0-1.0m	339	286	395	697	781	840	639	633	685	3580	2470	2910	2600	837	133	1330	488	444	1220	273	1550	1420	51.8
VC-15-1 1.0-2.0m	420	497	556	545	612	588	492	483	484	3050	2350	2430	1990	668	74.2	1190	654	337	1060	239	1420	1420	203
VC-15-2 2.0-2.4m	14.7	3.90	17.6	51.7	65.8	72.9	97.8	72.5	34.2	298	260	273	283	73.7	12.9	81.3	49.7	31.9	84.5	32.8	204	99.1	11.5
VC-16-0 0.0-1.0m	373	256	464	731	809	726	681	653	749	3750	2360	3050	2420	870	98.7	1420	514	489	1200	421	1560	1440	278
VC-16-1 1.0-1.8m	310	292	375	649	707	498	600	562	636	3210	2760	2720	2190	730	118	1150	468	437	1280	413	1450	1310	113
VC-17-0 0.0-1.0m	268	216	349	705	759	668	669	622	748	3450	1970	2840	2760	855	102	1340	423	478	1140	341	1490	1330	221
VC-17-1 1.0-1.6m	178	144	211	353	412	339	346	339	350	1790	1270	1500	1410	406	61.4	677	267	252	624	143	788	765	98.6

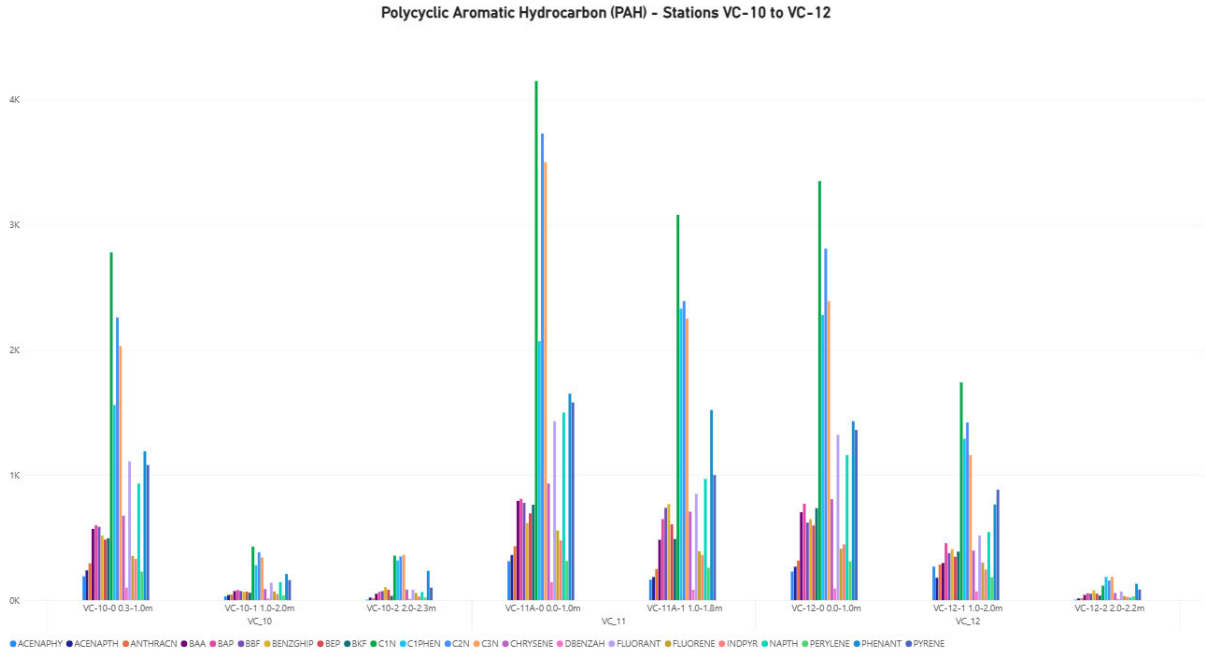
Station	Acenaphthene (ACENAPTH)	Acenaphthylene (ACENAPHY)	Anthracene (ANTHRACN)	Benzo[a]anthracene (BAA)	Benzo[a]pyrene (BAP)	Benzo[b]fluoranthene (BBF)	Benzo[ghi]perylene (BENZGHIP)	Benzo[e]pyrene (BEP)	Benzo[k]fluoranthene (BKF*)	C1-naphthalenes (C1N)	C1-phenanthrene (C1PHEN)	C2-naphthalenes (C2N)	C3-naphthalenes (C3N)	Chrysene (CHRYSENE*)	Dibenzo[ah]anthracene (DBENZAH)	Fluoranthene (FLUORANT)	Fluorene (FLUORENE)	Indeno[1,2,3-cd]pyrene (INDPYR)	Naphthalene (NAPTH)	Perylene (PERYLENE)	Phenanthrene (PHENANT)	Pyrene (PYRENE)	THC
VC-18B-0 0.0-1.0m	579	476	666	835	864	792	658	651	791	3910	2160	3140	2630	942	135	1810	805	458	1500	337	1790	1740	531
VC-18B-1 1.0-2.0m	1980	1860	2050	1880	1570	1420	1080	1120	1220	7800	5440	6170	4680	2000	211	4480	2930	739	3360	642	4360	4130	441
VC-18B-2 2.0-2.75m	58.9	72.9	70.7	62.4	61.4	43.1	56.4	55.8	54.8	402	285	306	243	80.0	69.1	156	112	30.9	130	22.1	208	163	241

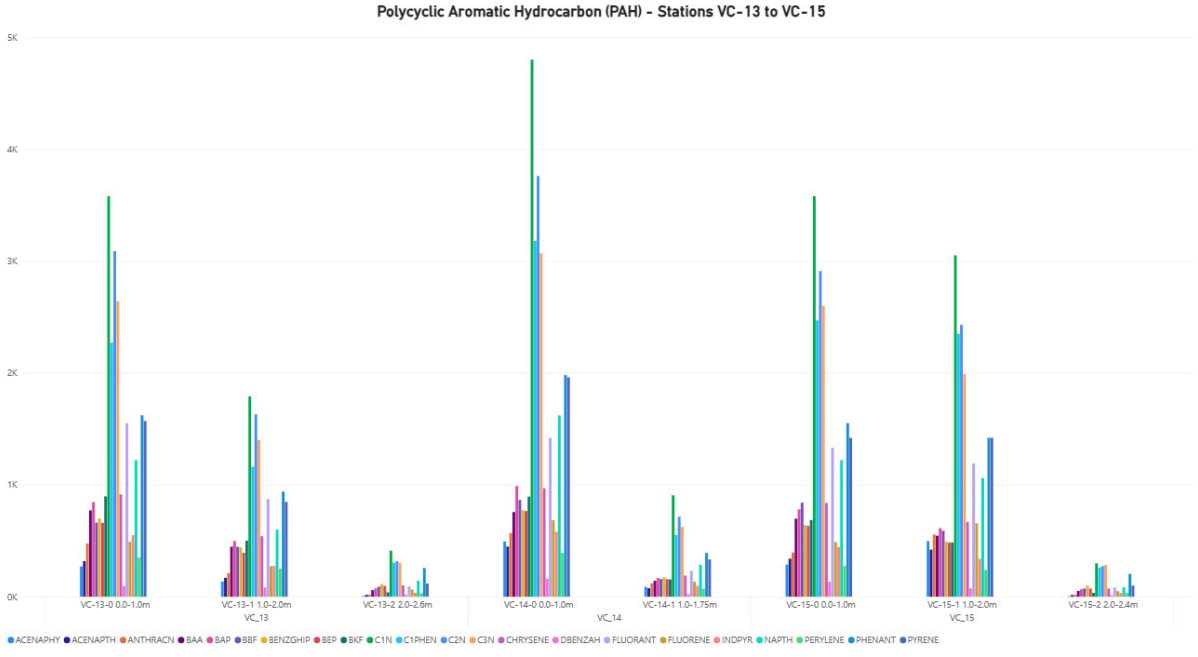
Polycyclic Aromatic Hydrocarbons (PAHs)

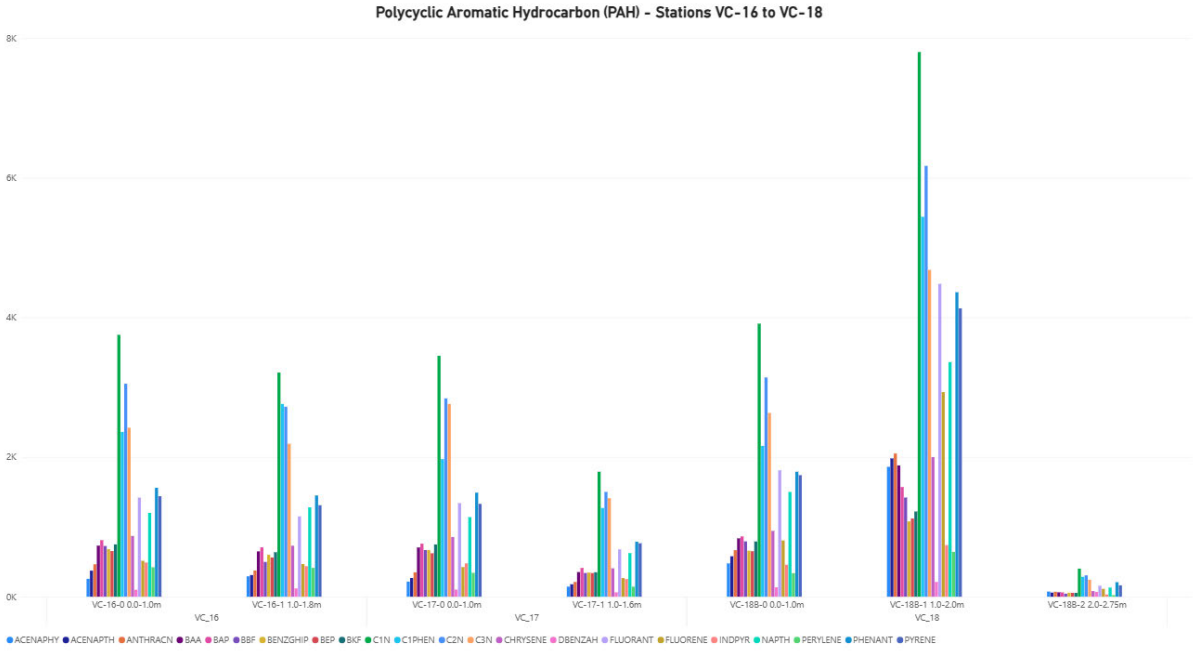





Polycyclic Aromatic Hydrocarbon (PAH) - Stations VC-07 to VC-09
30K
25K
20K
15K
10K
5K
0K
VC-07-0 0.0-1.0m
VC-07-1 1.0-2.0m
VC-07-2 2.0-3.0m
VC_07
VC-08A-0 0.0-1.0m
VC-08A-1 1.0-2.0m
VC-08A-2 2.0-3.0m
VC-08A-3 3.0-3.25m
VC_08
VC-09-0 0.0-1.0m
VC-09-1 1.0-2.0m
VC-09-2 2.0-3.0m
VC_09
ACENAPHY ACENAPTH ANTHRACN BAA BAP BBF BENZGHIP BEP BKF C1N C1PHEN C2N C3N CHRYSENE DBENZAH FLUORANT FLUORENE INDPYR NAPTH PERYLENE PHENANT PYRENE

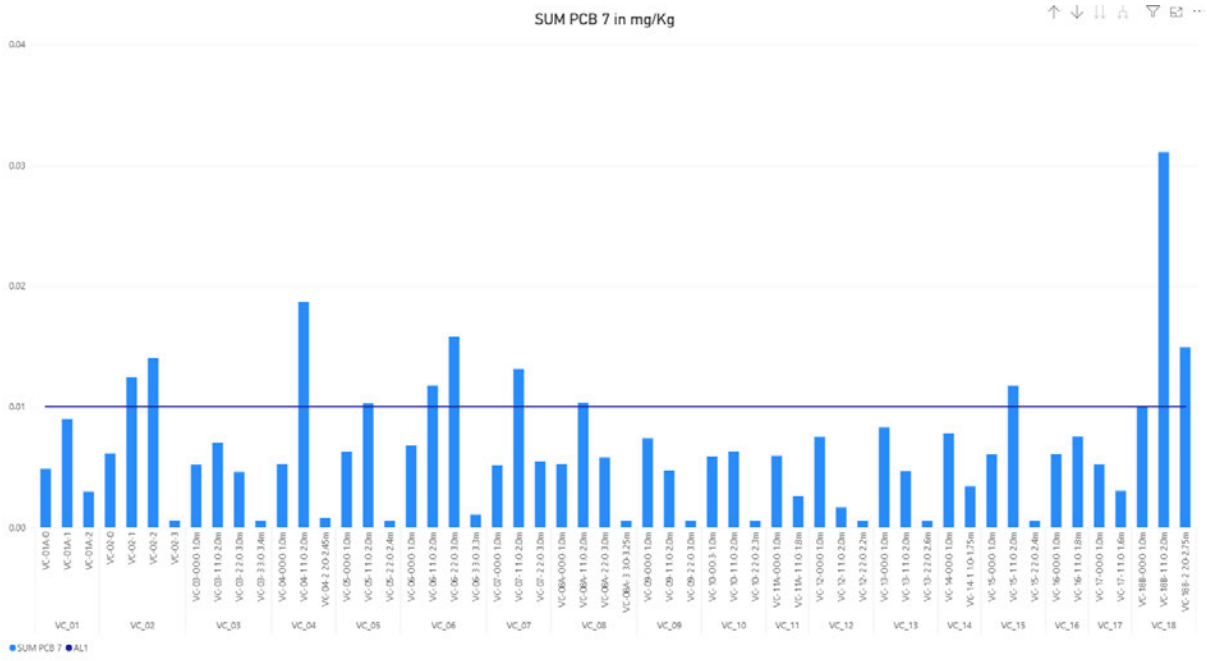

Polycyclic Aromatic Hydrocarbon (PAH) - Stations VC-10 to VC-12
4K
3K
2K
1K
0K
VC-10-0 0.3-1.0m
VC-10-1 1.0-2.0m
VC-10-2 2.0-2.3m
VC_10
VC-11A-0 0.0-1.0m
VC-11A-1 1.0-1.8m
VC_11
VC-12-0 0.0-1.0m
VC-12-1 1.0-2.0m
VC-12-2 2.0-2.2m
VC_12
ACENAPHY ACENAPTH ANTHRACN BAA BAP BBF BENZGHIP BEP BKF C1N C1PHEN C2N C3N CHRYSENE DBENZAH FLUORANT FLUORENE INDPYR NAPTH PERYLENE PHENANT PYRENE


Polycyclic Aromatic Hydrocarbon (PAH) - Stations VC-13 to VC-15
5K
4K
3K
2K
1K
0K
VC-13-0 0.0-1.0m
VC-13-1 1.0-2.0m
VC-13-2 2.0-2.6m
VC-14-0 0.0-1.0m
VC-14-1 1.0-1.75m
VC-15-0 0.0-1.0m
VC-15-1 1.0-2.0m
VC-15-2 2.0-2.4m
VC_13
VC_14
VC_15
ACENAPHY ACENAPTH ANTHRACN BAA BAP BBF BENZGHIP BEP BKF C1N C1PHEN C2N C3N CHRYSENE DBENZAH FLUORANT FLUORENE INDPYR NAPTH PERYLENE PHENANT PYRENE

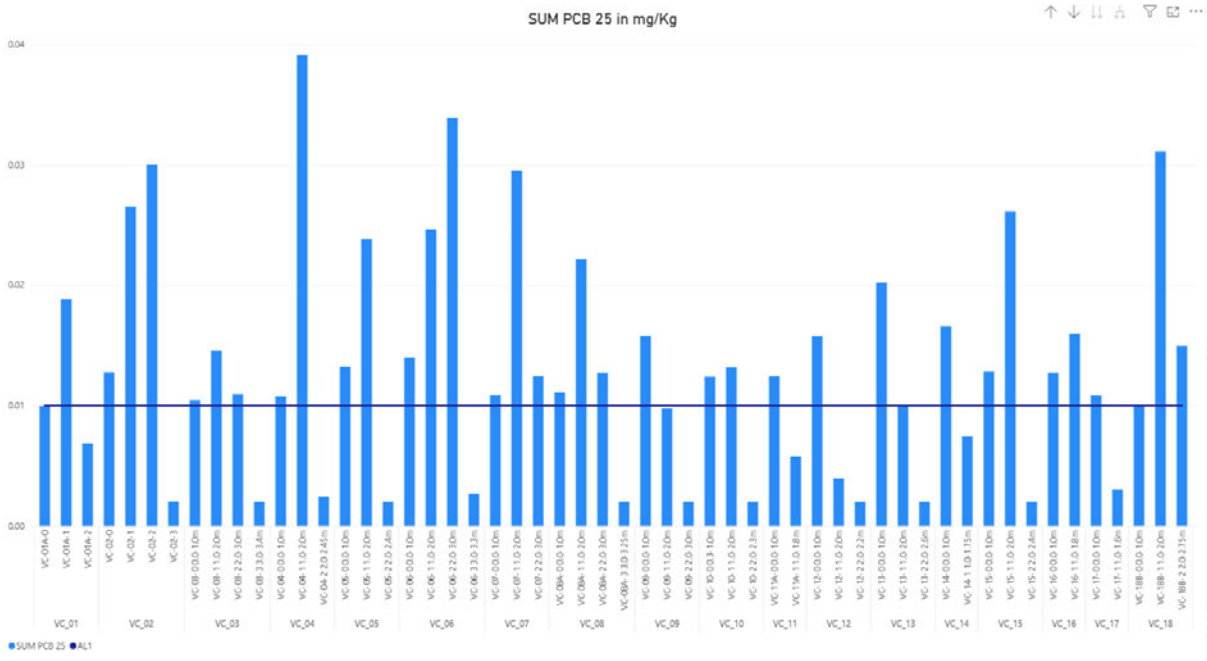

Polycyclic Aromatic Hydrocarbon (PAH) - Stations VC-16 to VC-18
8K
6K
4K
2K
0K
VC-16-0 0.0-1.0m
VC-16-1 1.0-1.8m
VC-17-0 0.0-1.0m
VC-17-1 1.0-1.6m
VC-18B-0 0.0-1.0m
VC-18B-1 1.0-2.0m
VC-18B-2 2.0-2.75m
VC_16
VC_17
VC_18
ACENAPHY ACENAPTH ANTHRACN BAA BAP BBF BENZGHIP BEP BKF C1N C1PHEN C2N C3N CHRYSENE DBENZAH FLUORANT FLUORENE INDPYR NAPTH PERYLENE PHENANT PYRENE

Polychlorinated Biphenyls (PCBs)

2.4.1 Polychlorinated Biphenyls (PCBs) are reported as ΣPCB7 and ΣPCB25. ΣPCB7 represents the sum of seven indicator PCBs (PCB 28, 52, 101, 118, 138, 153 and 180) and is commonly used as a screening measure of PCB contamination. ΣPCB25 represents the sum of 25 PCB compounds and provides a more comprehensive assessment of total PCB contamination.



Inset 2.8 ΣPCB7 and CEFAS AL1



Inset 2.9 ΣPCB25 and CEFAS AL1

Table 2.6 Polychlorinated Biphenyls (PCBs) ΣPCB7 and ΣPCB77. In blue are values above CEFAS AL 1.

Sample	SUM PCB 7	SUM PCB 25
VC-01A-0	0.00484	0.00997
VC-01A-1	0.00901	0.01881
VC-01A-2	0.00299	0.00687
VC-02-0	0.00613	0.01275
VC-02-1	0.01247	0.02652
VC-02-2	0.01406	0.03000
VC-02-3	0.00058	0.00203
VC-03-0 0.0-1.0m	0.00522	0.01044
VC-03-1 1.0-2.0m	0.00702	0.01454
VC-03-2 2.0-3.0m	0.00460	0.01096
VC-03-3 3.0-3.4m	0.00056	0.00200
VC-04-0 0.0-1.0m	0.00528	0.01075
VC-04-1 1.0-2.0m	0.01869	0.03914
VC-04-2 2.0-2.45m	0.00081	0.00241
VC-05-0 0.0-1.0m	0.00626	0.01324
VC-05-1 1.0-2.0m	0.01029	0.02381
VC-05-2 2.0-2.4m	0.00056	0.00200
VC-06-0 0.0-1.0m	0.00679	0.01401
VC-06-1 1.0-2.0m	0.01177	0.02464
VC-06-2 2.0-3.0m	0.01579	0.03391
VC-06-3 3.0-3.3m	0.00107	0.00265
VC-07-0 0.0-1.0m	0.00515	0.01088
VC-07-1 1.0-2.0m	0.01314	0.02949
VC-07-2 2.0-3.0m	0.00549	0.01243
VC-08A-0 0.0-1.0m	0.00528	0.01111
VC-08A-1 1.0-2.0m	0.01035	0.02215
VC-08A-2 2.0-3.0m	0.00579	0.01272
VC-08A-3 3.0-3.25m	0.00056	0.00200
VC-09-0 0.0-1.0m	0.00737	0.01578

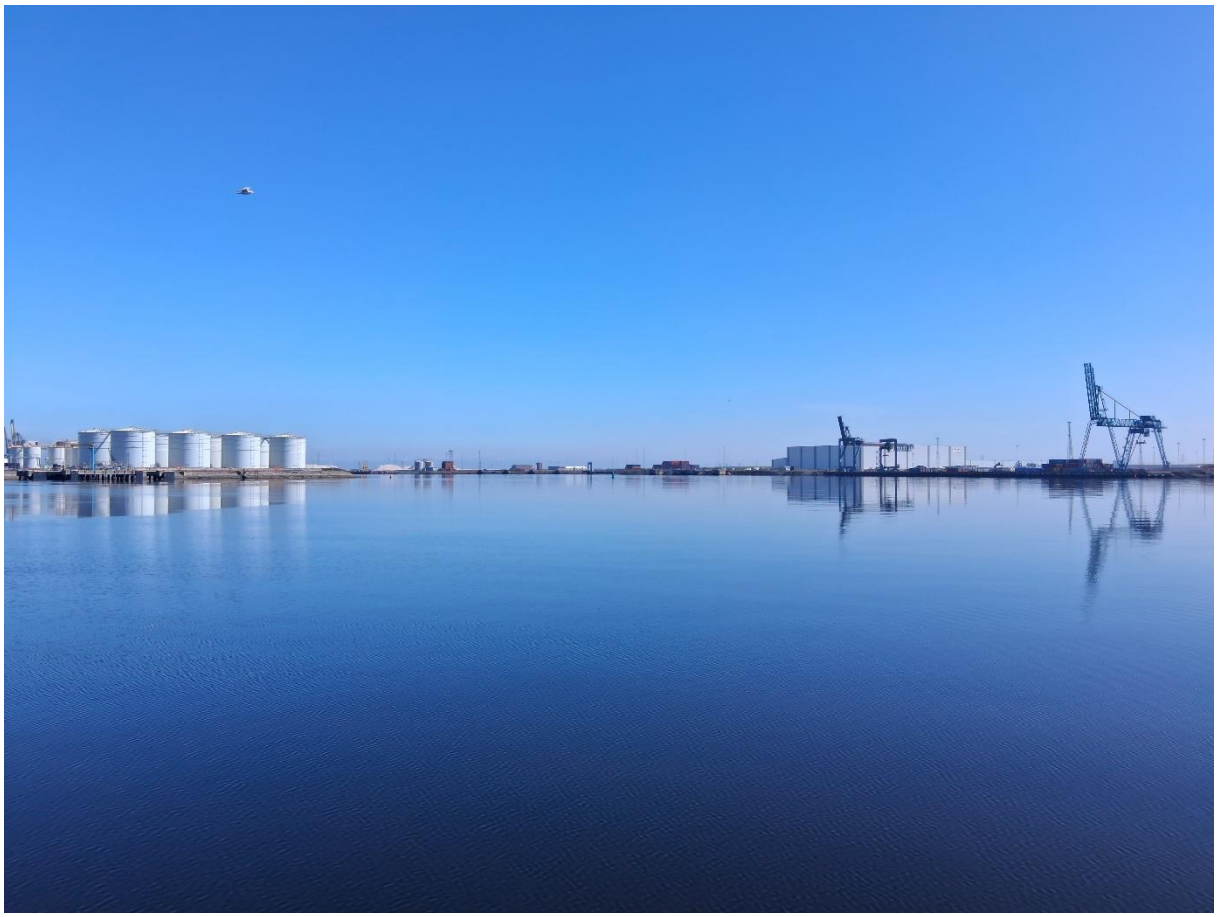
Sample	SUM PCB 7	SUM PCB 25
VC-09-1 1.0-2.0m	0.00473	0.00974
VC-09-2 2.0-3.0m	0.00056	0.00200
VC-10-0 0.3-1.0m	0.00589	0.01239
VC-10-1 1.0-2.0m	0.00628	0.01318
VC-10-2 2.0-2.3m	0.00056	0.00200
VC-11A-0 0.0-1.0m	0.00594	0.01243
VC-11A-1 1.0-1.8m	0.00260	0.00576
VC-12-0 0.0-1.0m	0.00751	0.01576
VC-12-1 1.0-2.0m	0.00167	0.00395
VC-12-2 2.0-2.2m	0.00056	0.00200
VC-13-0 0.0-1.0m	0.00830	0.02018
VC-13-1 1.0-2.0m	0.00465	0.01001
VC-13-2 2.0-2.6m	0.00056	0.00200
VC-14-0 0.0-1.0m	0.00782	0.01659
VC-14-1 1.0-1.75m	0.00342	0.00744
VC-15-0 0.0-1.0m	0.00606	0.01280
VC-15-1 1.0-2.0m	0.01176	0.02610
VC-15-2 2.0-2.4m	0.00056	0.00200
VC-16-0 0.0-1.0m	0.00608	0.01272
VC-16-1 1.0-1.8m	0.00754	0.01593
VC-17-0 0.0-1.0m	0.00525	0.01086
VC-17-1 1.0-1.6m	0.00304	0.00304
VC-18B-0 0.0-1.0m	0.01005	0.01005
VC-18B-1 1.0-2.0m	0.03110	0.03110
VC-18B-2 2.0-2.75m	0.01493	0.01493

2.5 Sediment Quality Survey Results

envirocentre

part of CuraTerrae

River Tees, Seal Sands
Sediment Sampling Summary Report



June 2026

CONTROL SHEET

Client: Marshall Jakeman Marine Ltd.
Project Title: River Tees, Seal Sands
Report Title: Sediment Sampling Summary Report
Document number: 16244
Project number: 483316

Issue Record

Issue	Status	Author	Reviewer	Approver	Issue Date
1	FINAL	MMF	CCAS	FR	01/06/2026
2					

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1 INTRODUCTION

1.1 Terms of Reference

EnviroCentre were commissioned by Marshall Jakeman Marine Ltd, on behalf of their Client, to undertake sediment sampling and logging to inform proposed dredging works in the River Tees estuary, at Seal Sands.

This summary report details the sampling and logging methodology and record of sediment composition within the proposed dredge area.

1.2 Sampling Works and Vessel

Braeside Marine Ltd. chartered MJM Enterprise, a high-performance survey vessel with suitable crane and deck space, owned and operated by Marshall Jakeman Marine Ltd.

Vibrocore sampling works were undertaken by Exploration Electronics Ltd. (EEL), under instruction and with assistance from EnviroCentre. Cores were collected using a 6 metre (m) OSIL Vibrocorer and operated by a specialist engineer from EEL. The unit incorporates a 6-metre long, 96mm diameter barrel, fitted with a core catcher, and cutting shoe affixed to the Vibrocorer head within a frame A single-use plastic core liner is used within the barrel. The Vibrocorer specification is provided within Appendix C.

1.3 Project Team

The onsite works were undertaken by an experienced two-person team, made up of the following personnel:

- Campbell Stewart – Project Manager, Chartered Scientist
- Alan Kelly – Senior Sampling Specialist
- Fraser Russell – Principal Consultant
- Magnus MacFarlane – Senior Consultant

1.4 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 FIELD BASED WORKS

2.1 Mobilisation

Mobilisation and demobilisation were both undertaken at the Hartlepool Fish Quay.

Mobilisation occurred on Tuesday 21st April 2026 with sediment sampling works undertaken between Wednesday 22nd April 2026 and completed by Sunday 26th April 2026.

Demobilisation was undertaken on Monday 27th April 2026.

2.2 Field Works

2.2.1 Sampling Locations and Sampling Depths

The sediment sampling details are provided below in Table 2-1 and locations are outlined within Drawing 483316-GIS001, in Appendix A.

Table 2-1: Sediment Sample Stations

Sample Station ID	Easting	Northing	Date	Sequence	Time	Water Depth (m)	Target Core Depth (m)	Obtained Core Depth (m)	Logged?	Sent for Laboratory Analysis?	Comment
VC-01	453988.83	523635.72	26/04/26	19	07:20	6.6	6.0	-	No	No	Vibrocore tipped over - possible side slope. Repeated as VC-01A.
VC-01A	453983.77	523638.09	26/04/26	20	07:55	6.6	6.0	2.60	Yes	Yes	Refusal at boulder clay.
VC-02	453982.95	523710.59	22/04/26	2	15:30	5.0	6.0	3.40	Yes	Yes	Refusal at boulder clay.
VC-03	454039.38	523703.53	22/04/26	1	14:00	5.0	6.0	3.45	Yes	Yes	Refusal at boulder clay.
VC-04	453932.86	523605.82	26/04/26	21	08:35	6.6	6.0	2.45	Yes	Yes	Refusal at boulder clay.
VC-05	453977.57	523785.34	23/04/26	5	09:50	8.2	6.0	2.40	Yes	Yes	Repositioned due to uneven seabed. Refusal at boulder clay.
VC-06	454034.19	523778.28	23/04/26	6	10:45	8.1	6.0	3.30	Yes	Yes	Refusal at boulder clay.
VC-07	453927.67	523680.57	23/04/26	3	08:00	8.4	6.0	2.50	Yes	Yes	Refusal at boulder clay.
VC-08	453971.47	523860.56	24/04/26	8	09:00	8.3	6.0	1.80	Yes	No	Power failure during coring. Repeated as VC-08A.
VC-08A	453972.38	523860.09	24/04/26	9	09:30	8.3	6.0	3.25	Yes	Yes	Refusal at boulder clay.
VC-09	454028.81	523853.03	24/04/26	7	08:30	10.5	6.0	3.10	Yes	Yes	Refusal at boulder clay.
VC-10	453922.30	523755.32	23/04/26	4	08:45	8.3	6.0	2.30	Yes	Yes	Refusal at boulder clay. 0.0m – 0.3m core section spilled.
VC-11	453966.83	523935.20	25/04/26	13	08:00	8.1	6.0	-	No	No	Vibrocore tipped over - possible side slope. Repeated as VC-11A.
VC-11A	453967.00	523932.85	25/04/26	14	09:00	8.1	6.0	1.80	Yes	Yes	Vibrocore tipped over - possible side slope. Repeated as VC-11B
VC-11B	453966.90	523917.24	25/04/26	15	09:55	8.1	6.0	1.10	Yes	No	Refusal at boulder clay.
VC-12	454023.44	523927.78	25/04/26	12	07:15	8.1	6.0	2.20	Yes	Yes	Refusal at boulder clay.
VC-13	453916.93	523830.06	24/04/26	10	10:20	8.3	6.0	2.60	Yes	Yes	Refusal at boulder clay.
VC-14	454020.25	523999.77	25/04/26	16	10:40	9.1	6.0	1.75	Yes	Yes	Refusal at boulder clay.
VC-15	453911.56	523904.81	24/04/26	11	12:30	8.3	6.0	2.40	Yes	Yes	Refusal at boulder clay.

Sample Station ID	Easting	Northing	Date	Sequence	Time	Water Depth (m)	Target Core Depth (m)	Obtained Core Depth (m)	Logged?	Sent for Laboratory Analysis?	Comment
VC-16	454132.08	524087.66	25/04/26	18	12:10	9.5	6.0	1.80	Yes	Yes	Refusal at boulder clay.
VC-17	454084.41	524036.70	25/04/26	17	11:30	9.7	6.0	1.60	Yes	Yes	Refusal at boulder clay.
VC-18B	453908.62	523552.74	26/04/26	22	09:50	6.6	6.0	2.75	Yes	Yes	Repositioned 3 times due to uneven seabed. Refusal at boulder clay on third attempt.

* Where a dash ('-') is noted, no sediment core was recovered on this attempt.

2.2.2 Core Losses

A small quantity of material was lost during sub-sampling works:

- The 2.0m – 2.1m section of VC-04 was lost due to spillage
- The 0.0m – 0.3m section of VC-10 was lost due to spillage.

2.2.3 Core Sampling Procedure

- Equipment was cleaned and assembled prior to deployment;
- The boat was manoeuvred onto fixed stations (with pre-programed points) by using the vessel's dynamic positioning capability, operated by the Master. Fixes at each location were recorded by Sand Geophysics;
- The sampling position was fixed on position using the vessel's dynamic positioning system, where conditions allowed. Where sampling was not possible at the chosen location, the location was moved and the location recorded by Sand Geophysics;
- The Vibrocorer was craned and lowered off the port side of the vessel until it reached the seabed;
- The Vibrocorer was switched on and allowed to penetrate the seabed for a maximum of 2 and half minutes, as this generally is sufficient time to allow full penetration to refusal. Where insufficient material was recovered, or in some instances where the Vibrocorer toppled over due to the gradient of the seabed, the Vibrocorer was redeployed and the process was repeated;
- When it was anticipated that the corer has reached its maximum depth, or where it required to be retrieved for other reasons, the unit was switched off, and the crane was used to lift the corer out of the water and on to the deck;
- The core barrel was removed from the corer head, the core liner extracted and then cut into one-metre sections and the depth of material obtained within the sample barrel was obtained using a tape measure. The depth was noted and compared against the target depth. The base of the core and core catcher were inspected to identify the reason for further refusal and was recorded;
- The corer was re-deployed as noted above if an unsatisfactory sample return was obtained; and
- The metre long core sections were stored on deck for sub-sampling the same day.

2.2.4 Sampling and Logging Procedure

Core samples were sub-sampled as per MMO/Cefas guidance and best practice:

- The metre-long core sub-sections were extruded (where possible) into a core holder where it was split down the middle horizontally into two halves and photographed;
- The sample was then logged based on visual and tactile assessment of material;
- Samples were collected away from the core edge where possible to ensure that any potential cross contamination from smear on the outer core is minimised;
- Sample intervals were from (seabed) 0.0m to 1.0m, 2.0m to 3.0m, and 3.0m to recovered base. No cores recovered material deeper than 4.0m;

- Samples for organics analysis were collected using a stainless steel sampling scoop and samples for metals/inorganic analysis were collected using a plastic sampling scoop;
- Samples for organics analysis were stored in glass jars and inorganic analysis were stored in plastic tubs, the frozen the same day to be sent for chemical testing;
- All samples were labelled with unique IDs as provided to EnviroCentre by the Client;
- The sampling scoops were cleaned either with sea water, or pressure washed using the vessel's freshwater supply between samples to minimise the risk of cross-contamination between samples. Disposable nitrile gloves were worn at all times and changed between handlings of each sample for the same purpose.

Any additional core lengths that were not sub-sampled for laboratory analysis were logged and photographed as requested by the ultimate client's representative, Arup.

Dispatch of samples for chemical analysis to Socotec was undertaken by Braeside Marine Ltd.

3 SEDIMENT CONDITIONS

Sediment logs for each core and photographs are provided within Appendix B.

3.1 Sediment Conditions

Sediment was logged by visual and tactile assessment in the field, in line with BS5930:2015 *Code of practice for ground investigations*.

In general, sediment conditions across locations were noted to comprise grey very soft silt in the surface and near-surface, with horizons of dark grey/black very soft clayey silt or silty clay underlying this. Brown stiff to very stiff gravelly clay was generally recorded at the base of each core

Detailed sediment logs for each location are provided within Appendix B.

3.1.1 Biota and Vegetation

Evidence of biota and vegetation present within samples is outlined within Table 3-1 below.

Table 3-1: Encountered Evidence of Biota and Vegetation

Sample Station ID	Depth Top (m)	Depth Base (m)	Evidence of Biota and Vegetation Encountered
VC-04	0.60	1.40	Worm burrows
VC-08	1.40	-	Plant debris
VC-11A	0.00	0.55	Worm burrows
VC-14	0.20	-	Ragworm

3.1.2 Anthropogenic Materials

Anthropogenic materials present within samples are outlined within Table 3-2 below.

Table 3-2: Encountered Anthropogenic Materials

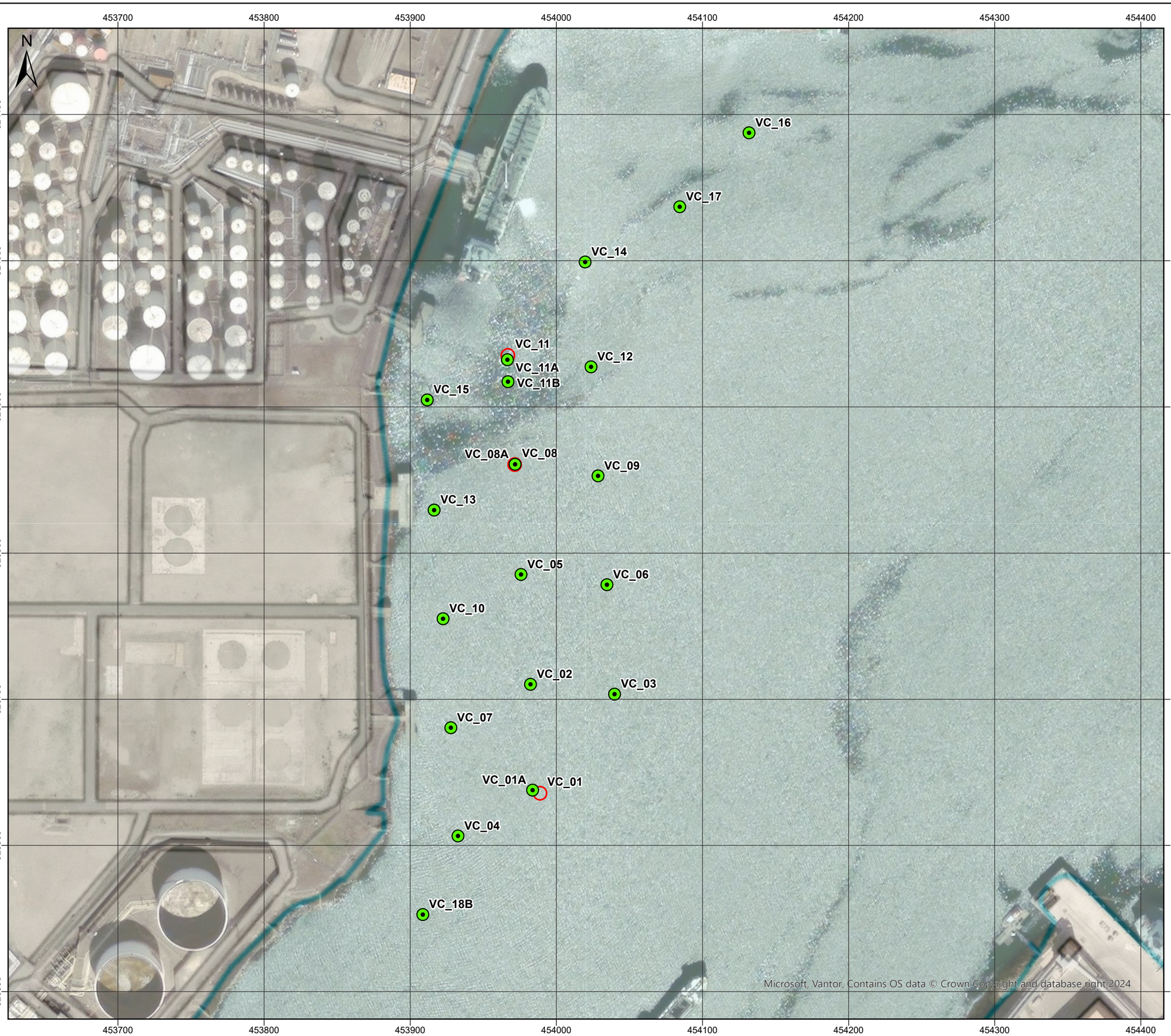
Sample Station ID	Depth Top (m)	Depth Base (m)	Anthropogenic Material Encountered
VC-14	1.20	-	Small (2cm) piece of soft blue plastic sheet
VC-15	1.75	-	Thin strands of elastic
VC-17	0.80	-	Small (5cm) fibrous string-like material

3.1.3 Visual and Olfactory Indications of Contamination

Within VC-11A, evidence of hydrocarbons was noted at a depth of 0.1m represented by a small area of sheen.

APPENDICES

A DRAWINGS



Legend

Sediment Sample Stations

- Not Sent for Lab Analysis
- Sent for Lab Analysis

Do not scale this map

Client
Marshall Jakeman Marine Ltd.

Project
River Tees

Title
Sediment Sample Stations Plan

Status
FINAL

Drawing No.	Revision	Date
483316-GIS001	-	21 May 2026
Drawn	**Checked**	**Approved**
MMF	FR	CCAS

Scale
1:2,500 @A3
0 20 40 80 Metres

Rev	Date	Amendment	Initials
-	-	-	-

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B VIBROCORE LOGS

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Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample
AMAL - Amalgamated sample
B - Bulk disturbed sample
BLK - Block sample
C - Core sample
CBR - CBR test sample
D - Disturbed sample
ES - Environmental sample
EW - Environmental water sample
G - Gas sample
J - Jar sample
L - Liner sample
TW - Pushed thin wall sample
U - Undisturbed sample
UT - Undisturbed thin wall sample
W - Water sample

IN-SITU TESTS

HV - Hand shear vane
HV(r) - Hand shear vane residual
PID - Photo ionisation detector
PP - Hand penetrometer
SPT - Standard penetration test
SPT(C) - SPT using cone

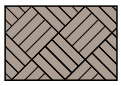
GROUNDWATER

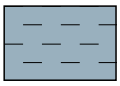
Groundwater strike
Groundwater rest level

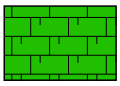
ROTARY CORE DETAILS

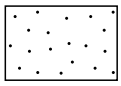
TCR - Total core recovery (%)
SCR - Solid core recovery (%)
RQD - Rock quality designation (%)
FI - Fracture index
NI - Non-intact core
AZCL - Assumed zone of core loss

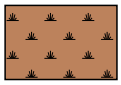
LEGEND

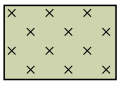

Topsoil

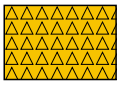

Clay

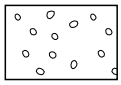

Chalk

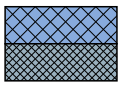

Sand backfill

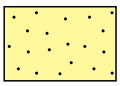

Peat

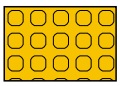

Silt

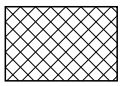

Breccia

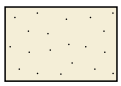

Gravel backfill

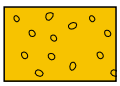

Made ground [cohesive]


Sand

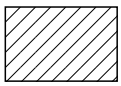

Conglomerate

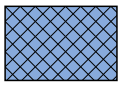

Arisings

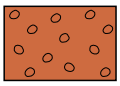

Concrete

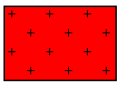

Gravel

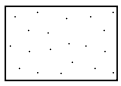

Metamorphic

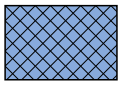

Bentonite

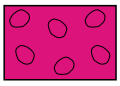

Wood


Cobbles


Igneous

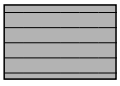

Concrete


Brick


Boulders

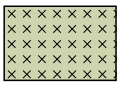

Grout


Bituminous material

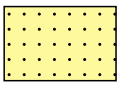

Mudstone


Plain pipe

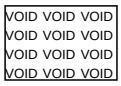

Gypsum


Siltstone

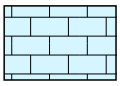

Coal


Sandstone


Slotted pipe



Void


Limestone

Borehole Log

VC-01A
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453983.77	523638.09		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-01A-0		(0.35) 0.35		Very soft grey/greyish-brown SILT.
						(0.90)		Very soft dark grey/black SILT.
		1.00-2.00	CS	VC-01A-1		1.25		
						(0.50)		Very soft dark grey/black silty CLAY.
		2.00-2.60	CS	VC-01A-1		1.75		Very soft dark grey/black slightly clayey SILT.
						(0.60)		
						2.35		
						(0.25)		Stiff to very stiff brown gravelly CLAY. Gravel is fine to coarse and sub-angular to sub-rounded.
						2.60		*End of Borehole at 2.60m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
2nd deployment as VC-01 toppled over on the riverbed. No odours, biota or anthropogenic inputs noted in the obtained VC-01A core.

Method, Plant, Stability, Dimensions
0.00 - 2.60m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-01A
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453983.77	523638.09		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-26	2026-04-26

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
2nd deployment as VC-01 toppled over on the riverbed. No odours, biota or anthropogenic inputs noted in the obtained VC-01A core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.60m	CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-01A
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453983.77	523638.09		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
2nd deployment as VC-01 toppled over on the riverbed. No odours, biota or anthropogenic inputs noted in the obtained VC-01A core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.60m	CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-02
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453982.95	523710.59		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-02-0		(1.00)		Very soft brownish-grey SILT (Firmer with depth but remains very soft).
		1.00-2.00	CS	VC-02-1		1.00 (0.30) 1.30		Very soft dark grey SILT. Very soft dark grey/black CLAY.
		2.00-3.00	CS	VC-02-2		(1.40)		
		3.00-3.40	CS	VC-02-3		2.70 (0.60) 3.30		Very stiff brown slightly gravelly CLAY. Gravel is fine to coarse and angular.
						(0.10) 3.40		Very stiff brown slightly sandy gravelly CLAY. Gravel is fine to coarse and angular. Sand is fine and reddish in colour. *End of Borehole at 3.40m*

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.40m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-02
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453982.95	523710.59		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.40m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-02
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453982.95	523710.59		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.40m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-03
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454039.38	523703.53		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-03-0		(0.30)		Very soft grey slightly clayey SILT.
						0.30 (0.05)		Very soft light brown slight clayey SILT.
						0.35 (0.05)		Very soft brownish-grey slightly clayey SILT.
						0.40		Very soft dark grey/black slightly clayey SILT.
		1.00-2.00	CS	VC-03-1				
						(2.35)		
		2.00-3.00	CS	VC-03-2				
						2.75		Stiff to very stiff brown CLAY with frequent fine gravel and rare coarse sub-angular gravel. Gravel is grey, red, yellow, and black in colour.
		3.00-3.45	CS	VC-03-3		(0.70)		
						3.45		*Fine reddish-brown sand (3.40m)*
								End of Borehole at 3.45m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.45m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-03
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454039.38	523703.53		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.45m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-03
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454039.38	523703.53		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-22	2026-04-22

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.45m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-04
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453932.86	523605.82		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-04-0		(0.35) 0.35		Very soft grey/greyish-brown SILT.
								Very soft dark grey/black slightly clayey SILT.
								Worm burrows present (0.60 - 1.40m)
		1.00-2.00	CS	VC-04-1		(1.30)		
						1.65 (0.07)		Soft dark grey/black silty CLAY with a light brown lens of clay.
						1.72 (0.10)		Greyish-brown silty fine SAND.
						1.82 (0.38)		Soft brown gravelly CLAY. Gravel is medium to coarse and sub-rounded.
		2.10-2.45	CS	VC-04-2		2.20 (0.40)		Very stiff brown slightly sandy gravelly CLAY. Sand is coarse. Gravel is fine to medium and angular.
								Grey lenses of clay throughout. (2.20 - 2.60m)
						2.60		*End of Borehole at 2.60m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core. Core lost between 2.0m to 2.1m due to spill during sub-sampling.

Method, Plant, Stability, Dimensions
0.00 - 2.45m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-04
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453932.86	523605.82		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core. Core lost between 2.0m to 2.1m due to spill during sub-sampling.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.45m	CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-04
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453932.86	523605.82		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core. Core lost between 2.0m to 2.1m due to spill during sub-sampling.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.45m	CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-05
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453977.57	523785.34		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-05-0		(0.60)		Very soft dark brown/grey SILT.
						0.60		Very soft dark grey/black clayey SILT.
		1.00-2.00	CS	VC-05-1		(1.00)		
						1.60		Soft brown CLAY.
		2.00-2.40	CS	VC-05-2		(0.60)		*Thin laminations of silty fine sand (1.80 - 1.85m)*
						2.20		Very stiff brown slightly sandy CLAY with rare fine to medium sub-angular gravel.
						(0.20)		*Piece of coarse sub-angular gravel (2.20m)*
						2.40		*End of Borehole at 2.40m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.40m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

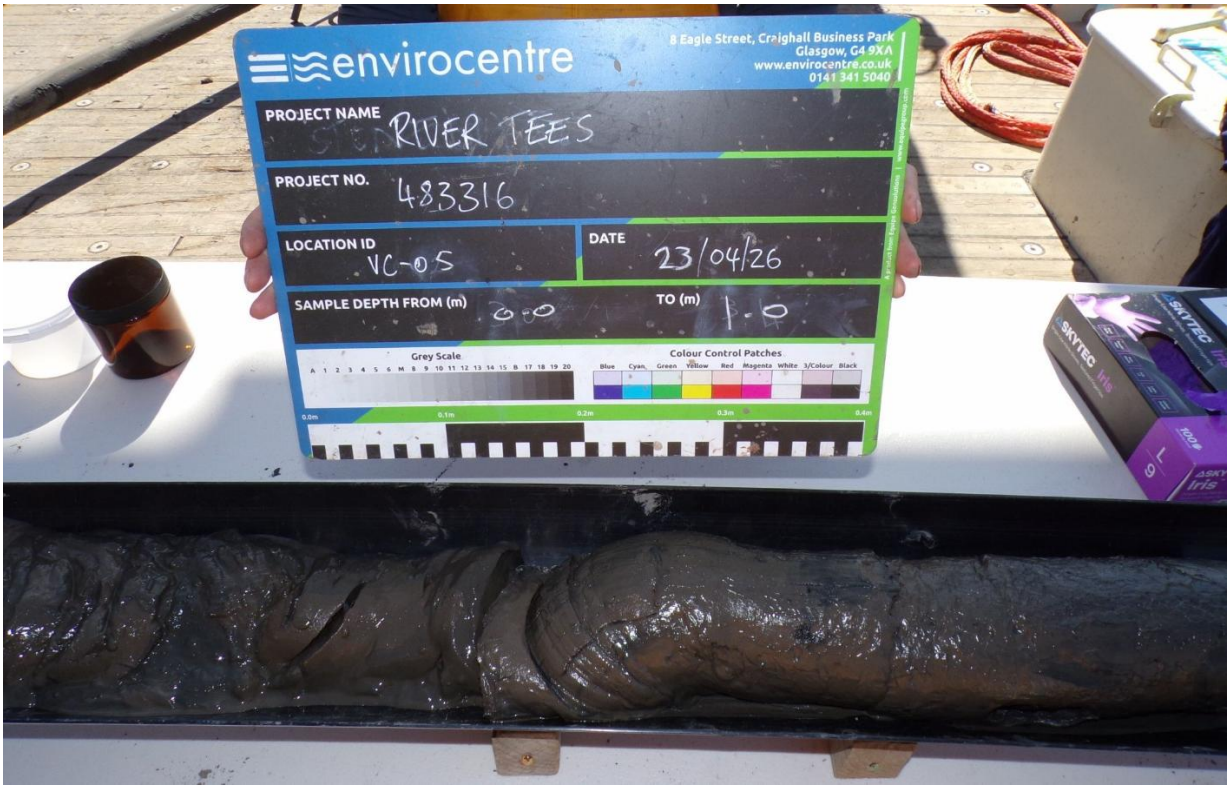
Borehole Log

VC-05
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453977.57	523785.34		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.40m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-05
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453977.57	523785.34		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.40m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-06

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454034.19	523778.28		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-06-0		(0.10) 0.10		Very soft greyish-brown SILT.
						(0.60) 0.70		Very soft dark greyish-brown SILT. Slightly firmer than 0.0-0.1m horizon.
		1.00-2.00	CS	VC-06-1		(0.75) 1.45		Very soft dark grey/black slightly clayey SILT. Slightly firmer than 0.1-0.7m horizon.
		2.00-3.00	CS	VC-06-2		(1.35) 2.80		Very soft dark grey/black silty CLAY.
						(0.10) 2.90		Very soft dark grey/black clayey sandy SILT.
		3.00-3.30	CS	VC-06-3		(0.40) 3.30		Very soft brown gravelly CLAY. Gravel is fine to coarse and angular.
								End of Borehole at 3.30m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
TerVibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.30m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-06
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454034.19	523778.28		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-23	2026-04-23

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.





Remarks
TerVibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.30m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-06
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454034.19	523778.28		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
TerVibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.30m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-07
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453927.67	523680.57		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-07-0		(0.25)		Very soft greyish-brown SILT.
						0.25		Very soft greyish-brown SILT (Firmer than 0.0-0.25m horizon).
						(0.55)		
						0.80		Very soft dark grey silty CLAY.
		1.00-2.00	CS	VC-07-1				
						(1.45)		
		2.00-2.50	CS	VC-07-2				
						2.25		Very stiff brown slightly sandy gravelly CLAY. Sand is fine. Gravel is fine to coarse and angular.
						(0.25)		
						2.50		*End of Borehole at 2.50m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.50m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-07
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453927.67	523680.57		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.50m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-07
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453927.67	523680.57		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.50m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-08

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453971.47	523860.56		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-26	2026-04-26

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(0.60)		Very soft greyish-brown SILT.
						0.60		Very soft dark grey silty CLAY. Sticky in texture.
						(1.20)		*Plant debris. (1.40m)*
						1.80		*End of Borehole at 1.80m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore launched with power supply issue midway through coring. Power supply connector disconnected from vibrocore. Core retained for inspection and secondary core undertaken as VC-08A. No odours or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.80m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-08
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453971.47	523860.56		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-26	2026-04-26

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.





Remarks
Vibrocore launched with power supply issue midway through coring. Power supply connector disconnected from vibrocore. Core retained for inspection and secondary core undertaken as VC-08A. No odours or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.80m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-08A

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453972.38	523860.09		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-08A-0		(0.55)		Very soft greyish-brown SILT.
						0.55		Very soft dark grey/black slightly clayey SILT. Sticky in texture.
		1.00-2.00	CS	VC-08A-1		(1.95)		
		2.00-3.00	CS	VC-08A-2		2.50		
						(0.20)		Soft light brown CLAY.
						2.70		
		3.00-3.25	CS	VC-08A-3		(0.50)		Very stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
						3.20		*End of Borehole at 3.20m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.25m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-08A
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453972.38	523860.09		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.25m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-08A
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453972.38	523860.09		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-24	2026-04-24

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.25m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-09
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454028.81	523853.03		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-09-0		(0.50)		Very soft greyish brown SILT.
						0.50		Dark grey/black silty CLAY. Sticky in texture.
		1.00-2.00	CS	VC-09-1		(1.45)		
						1.95		Stiff brown CLAY. Very sticky in texture. Thin laminations of light brown silt and fine sand throughout.
		2.00-3.00	CS	VC-09-2		(0.85)		
						2.80		Very stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-angular.
						(0.30)		
						3.10		*End of Borehole at 3.10m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 3.10m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-09
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454028.81	523853.03		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.10m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-09
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454028.81	523853.03		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 3.10m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-10
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453922.30	523755.32		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.30-1.00	CS	VC-10-0		(0.45)		Very soft light brown/grey SILT.
						0.45		Very soft greyish-brown clayey SILT (Firmer with depth but remains very soft).
		1.00-2.00	CS	VC-10-1		(0.85)		
						1.30		Very soft grey/brown silty CLAY.
						(0.20)		
						1.50		Very stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
		2.00-2.30	CS	VC-10-2		(0.80)		
						2.30		*End of Borehole at 2.30m*

Remarks
Top 0.3m of the sample spilt from core liner and therefore not sub-sampled. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.30m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-10
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453922.30	523755.32		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Top 0.3m of the sample spilt from core liner and therefore not sub-sampled. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.30m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-10
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453922.30	523755.32		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-23	2026-04-23

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Top 0.3m of the sample spilt from core liner and therefore not sub-sampled. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.30m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-11A

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453967.00	523932.85		1:25

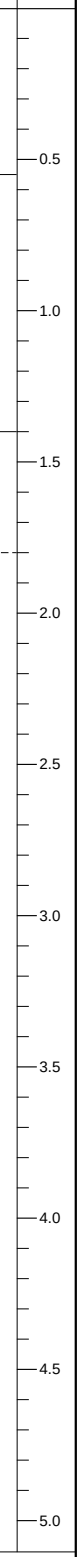
Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-11-0		(0.55)		Very soft grey/greyish brown SILT. *Hydrocarbon bloom present (0.10m)* *Worm burrows present (0.00 - 0.55m)*
						0.55		Very soft dark grey/black silty CLAY.
		1.00-1.80	CS	VC-11-1		(0.85)		*Singular piece of fine gravel (0.90m)* *Lenses of very soft brown clay (1.25 - 1.60m)*
						1.40		Stiff to very stiff light brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
						(0.40)		*Thin lamination of light brown silty fine sand (1.60m)*
						1.80		*End of Borehole at 1.80m*



Remarks
2nd deployment as VC-11 toppled over on the riverbed. Vibrocore progressed until refusal. No odours or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.80m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

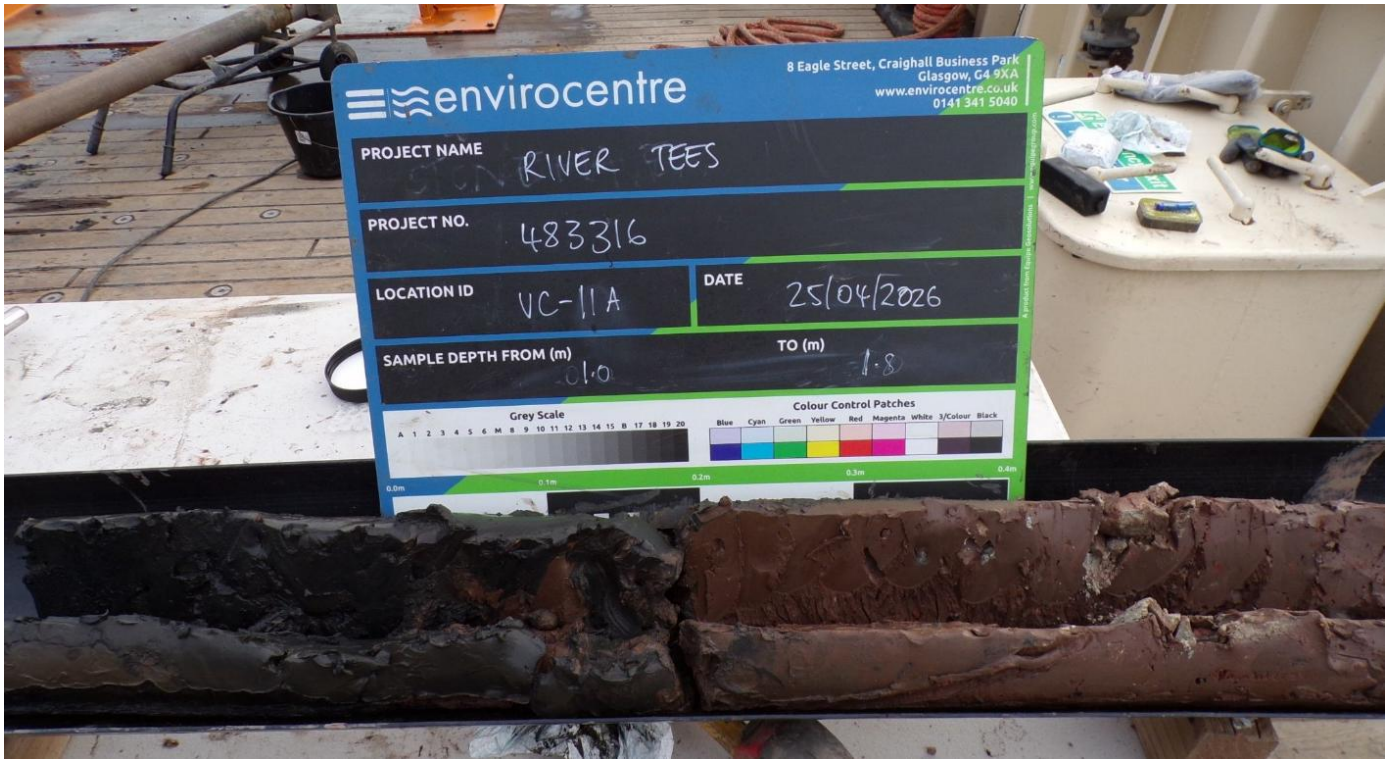
Borehole Log

VC-11A
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453967.00	523932.85		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
2nd deployment as VC-11 toppled over on the riverbed. Vibrocore progressed until refusal. No odours or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.80m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-11B

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453966.90	523917.24		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(0.30)		Very soft grey/greyish-brown SILT.
						0.30		
						(0.50)		Very soft dark grey/black slightly clayey SILT.
						0.80		
						(0.30)		Very soft dark grey/black slightly clayey SILT. Rare shell fragments.
						1.10		
						(0.50)		Stiff to very stiff brown gravelly CLAY. Gravel is fine to medium and angular. *Single piece of coarse sub-rounded gravel (1.10m)*
						1.60		*End of Borehole at 1.60m*

0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

Remarks
Very stiff clay at base of core caused damage to core catcher. Core retained for inspection purposes. Core VC-11A was sub-sampled owing to its location closer to the original VC-11 location.

Method, Plant, Stability, Dimensions

Logger

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-11B
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453966.90	523917.24		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Very stiff clay at base of core caused damage to core catcher. Core retained for inspection purposes. Core VC-11A was sub-sampled owing to its location closer to the original VC-11 location.

Method, Plant, Stability, Dimensions

Logger

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-12
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454023.44	523927.78		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-12-0		(0.30) 0.30		Very soft dark greyish-brown SILT. Rare mussel shells.
						(0.95) 1.25		Very soft dark grey/black silty CLAY. *Mussel shell fragment. (0.65m)*
		1.00-2.00	CS	VC-12-1		(0.30) 1.55		Soft brown CLAY.
						(0.43) 1.98		Firm to stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded. *Thin lamination of silt/fine sand (1.55m)*
		2.00-2.20	CS	VC-12-2		(0.12) 2.10		Brown gravelly fine to coarse SAND. Gravel is fine and angular to sub-angular.
						(0.45) 2.55		Firm to stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
						(0.05) 2.60		Soft brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
								End of Borehole at 2.60m

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.20m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-12
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454023.44	523927.78		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-25	2026-04-25

Client Braeside Marine Ltd.
Consultant EnviroCentre Ltd.
Contractor EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.20m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-12
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454023.44	523927.78		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions	Logger
0.00 - 2.20m CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-13
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453916.93	523830.06		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-13-0		(0.40) 0.40		Very soft greyish-brown SILT.
						(0.80)		Very soft dark grey SILT.
		1.00-2.00	CS	VC-13-1		1.20		
						(0.55)		Very soft dark grey slightly clayey SILT.
						1.75 (0.05) 1.80		Stiff brown CLAY.
		2.00-2.60	CS	VC-13-2		(0.80)		Very stiff brown gravely CLAY. Gravel is fine to coarse and angular.
						2.60		*End of Borehole at 2.60m*

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.60m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-13
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453916.93	523830.06		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.60m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-13
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453916.93	523830.06		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.60m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-14
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454020.25	523999.77		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-14-0		(0.30) 0.30		Very soft dark grey/greyish-brown SILT. *Ragworm present (0.20m)*
						(1.00)		Very soft dark grey/black slightly clayey SILT. *Lens of very soft light brown clay (1.10 - 1.20m)* *Small (2cm) piece of soft blue plastic sheet (1.20m)*
		1.00-1.75	CS	VC-14-1		1.30 (0.45) 1.75		Stiff brown gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded. *End of Borehole at 1.75m*

Remarks
Vibrocore progressed until refusal. No odours noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.75m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-14
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454020.25	523999.77		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.75m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-15
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453911.56	523904.81		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-15-0		(0.45)		Very soft dark grey slightly clayey SILT. *Thick lamination of light brown silt (0.26 - 0.35m)*
						0.45		Very soft dark grey/black slightly clayey SILT.
		1.00-2.00	CS	VC-15-1		(0.93)		
						1.38 (0.03) 1.41		Soft light brown CLAY.
						(0.39)		Soft dark grey/black silty CLAY.
						1.80 (0.10) 1.90		*Thin strands of elastic (1.75m)* Soft greyish-brown silty fine to medium SAND.
		2.00-2.40	CS	VC-15-2		(0.50)		Very stiff brown sandy gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
						2.40		*End of Borehole at 2.40m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours or biota noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.40m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-15
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453911.56	523904.81		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours or biota noted in the core.

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.40m	CO OSIL 6m Vibrocorer	FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-15
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453911.56	523904.81		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-24	2026-04-24

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
Vibrocore progressed until refusal. No odours or biota noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.40m CO OSIL 6m Vibrocorer

Logger
FR/MMF

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-16
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454132.08	524087.66		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-16-0		(0.25) 0.25		Very soft dark grey SILT. Thick laminations of greyish-brown silt.
						(0.90)		Very soft dark grey/black slightly clayey SILT.
		1.00-1.80	CS	VC-16-1		1.15		
						(0.45)		Very soft dark grey/black silty clay. Sticky in texture.
						1.60		*Lens of soft light brown clay (1.57 - 1.58m)*
						(0.20)		Very stiff brown gravelly CLAY. Gravel is fine to coarse and sub-angular to sub-rounded.
						1.80		*End of Borehole at 1.80m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.80m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-16
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454132.08	524087.66		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions	Logger
0.00 - 1.80m CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-17
Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454084.41	524036.70		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-17-0		(0.30) 0.30		Very soft grey SILT. Thick laminations of greyish-brown silt.
						(0.35) 0.65		Very soft dark grey/black slightly clayey SILT (Firmer with depth but remains very soft).
						(0.35) 1.00		Very soft dark grey/black silty CLAY. Sticky in texture. *Small (5cm) fibrous string-like material (0.80m)*
		1.00-1.60	CS	VC-17-1		(0.35) 1.35		Very soft dark grey/black slightly clayey SILT.
						(0.25) 1.60		Very stiff brown very gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
								End of Borehole at 1.60m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
Vibrocore progressed until refusal. No odours or biota noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.60m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-17
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	454084.41	524036.70		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.





Remarks
Vibrocore progressed until refusal. No odours or biota noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 1.60m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-18B

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453908.44	523552.88		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.00-1.00	CS	VC-18B-0		(0.25) 0.25		Very soft grey/greyish-brown SILT.
		1.00-2.00	CS	VC-18B-1		(1.50) 1.75		Very soft dark grey/black slightly clayey SILT.
		2.00-2.75	CS	VC-18B-2		(0.40) 2.15		Very soft dark grey/black silty slightly gravelly CLAY. Gravel is fine to medium and sub-rounded.
						(0.60) 2.75		Stiff to very stiff brown gravelly CLAY. Gravel is fine to medium and sub-angular to sub-rounded.
								End of Borehole at 2.75m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
3rd deployment as VC-18 and VC-18A toppled over with no recovery. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.75m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Created using Pebble Geo

Borehole Log

VC-18B
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453908.44	523552.88		1:25
Project Name		**Project No.**	**Start Date**	**End Date**
River Tees, Teesport		483316	2026-04-25	2026-04-25

Client
Braeside Marine Ltd.

Consultant
EnviroCentre Ltd.

Contractor
EEL Ltd.





Remarks
3rd deployment as VC-18 and VC-18A toppled over with no recovery. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions
0.00 - 2.75m CO OSIL 6m Vibrocorer

Logger
FR/AK

Checked By: FR **Approved By:** CCAS

Borehole Log

VC-18B
PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
CO	453908.44	523552.88		1:25

Project Name	Project No.	Start Date	End Date
River Tees, Teesport	483316	2026-04-25	2026-04-25

Client	Consultant	Contractor
Braeside Marine Ltd.	EnviroCentre Ltd.	EEL Ltd.



Remarks
3rd deployment as VC-18 and VC-18A toppled over with no recovery. Vibrocore progressed until refusal. No odours, biota or anthropogenic inputs noted in the core.

Method, Plant, Stability, Dimensions	Logger
0.00 - 2.75m CO OSIL 6m Vibrocorer	FR/AK

Checked By: FR **Approved By:** CCAS

C VIBROCORER SPECIFICATION

OSIL Vibrocorer

Description

A large vibrocorer that extracts 96-millimetre diameter sediment samples from the seabed, at lengths ranging from two to six metres. This modular unit is easy to assemble and can be deployed with a crane or A-frame.



OSIL Vibrocorer

Key data	
Electrical supply	415V or 440V
Input frequency	50Hz or 60Hz
Start-up current	32A
Running current	8A
Max. water depth	250 metres
Vibration force	48 kN
Sample diameter	96 mm
Sample length	2–6 metres

2.6 Particle Size Analysis (PSA)

Station	22.4mm	16mm	11.2mm	8mm	5.6mm	4mm	2.8mm	2mm	1.4mm	1mm	707µm	500µm	353.6µm	250µm	176.8µm	125µm	88.39µm	63µm
	-4.5	-4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
VC-01A-0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.51	0.74	0.07	2.87
VC-01A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.27	0.03	2.07
VC-01A-2	0.00	1.14	0.92	0.38	1.24	0.68	0.81	0.66	0.63	0.50	0.00	0.00	0.00	0.00	0.46	0.95	0.07	1.79
VC-02-0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48
VC-02-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.66	0.06	2.49
VC-02-2	0.00	0.00	0.00	0.00	0.43	0.25	0.49	0.52	0.51	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.04	2.33
VC-02-3	0.00	3.37	0.75	0.55	1.09	1.29	1.45	1.00	1.29	1.05	0.00	0.00	0.00	0.00	0.68	2.53	0.21	2.77
VC-03-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.42	0.04	1.88
VC-03-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.41	0.06	3.46
VC-03-2 2.0-3.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.23
VC-03-3 3.0-3.4m	0.00	1.89	1.60	1.28	1.09	1.18	1.74	1.19	1.33	1.00	0.00	0.00	0.00	0.00	0.38	2.00	0.35	2.27
VC-04-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.59	0.91	0.10	3.35
VC-04-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.25	2.65	3.09	0.15	2.17
VC-04-2 2.0-2.45m	0.00	0.00	0.00	0.13	0.81	1.12	2.90	3.08	4.37	3.61	0.00	0.00	0.00	0.67	3.87	6.07	0.92	3.05
VC-05-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	1.41	0.09	2.56
VC-05-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
VC-05-2 2.0-2.4m	0.00	5.09	0.00	0.14	0.56	0.54	0.48	0.56	0.62	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.02	1.89
VC-06-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.97	1.96	0.15	3.27
VC-06-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.42	0.04	2.32
VC-06-2 2.0-3.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.61	1.18	0.08	1.71
VC-06-3 3.0-3.3m	5.54	5.87	0.00	0.37	1.36	1.15	1.38	1.07	1.21	0.96	0.00	0.00	0.00	0.00	0.35	3.95	0.87	2.22
VC-07-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.41
VC-07-1 1.0-2.0m	0.00	0.00	0.00	0.25	1.04	0.40	0.86	0.59	0.76	0.64	0.00	0.00	0.00	0.00	0.07	0.21	0.04	2.36
VC-07-2 2.0-3.0m	0.00	3.30	0.98	1.67	1.85	1.33	1.32	1.13	1.21	0.93	0.00	0.00	0.00	0.00	0.47	3.76	0.75	2.03
VC-08A-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	2.37
VC-08A-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	1.82
VC-08A-2 2.0-3.0m	0.00	0.00	0.87	1.19	1.24	0.35	0.80	0.86	0.83	0.65	0.00	0.00	0.00	0.00	0.08	0.70	0.13	1.10
VC-08A-3 3.0-3.25m	0.00	2.67	1.77	2.07	0.98	1.09	1.18	1.00	1.18	0.98	0.00	0.00	0.00	0.01	1.15	2.47	0.18	2.57
VC-09-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.35	0.09	3.33
VC-09-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	3.06

VC-09-2 2.0-3.0m	0.00	0.00	0.81	0.13	0.18	0.25	0.32	0.27	0.24	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56
VC-10-0 0.3-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	2.08	0.22	3.30
VC-10-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.36	0.17	3.24
VC-10-2 2.0-2.3m	0.00	0.00	0.00	0.00	0.87	0.59	0.70	0.64	0.63	0.50	0.00	0.00	0.00	0.00	0.29	1.01	0.09	2.57
VC-11A-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.25
VC-11A-1 1.0-1.8m	0.00	0.00	0.00	0.55	0.94	0.77	0.76	0.75	0.77	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
VC-12-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.54	0.03	1.88
VC-12-1 1.0-2.0m	0.00	1.92	0.53	0.60	0.88	0.67	0.77	0.63	0.72	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76
VC-12-2 2.0-2.2m	0.00	0.00	0.31	1.27	1.98	2.02	2.74	2.65	3.77	3.09	0.00	0.00	0.00	0.00	0.21	1.87	0.37	1.54
VC-13-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.11	0.11	3.50
VC-13-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.32	1.36	1.23	0.75	0.69	0.52	0.00	0.00	0.00	0.00	0.07	0.20	0.03	2.17
VC-13-2 2.0-2.6m	0.00	0.00	1.01	0.00	1.02	0.81	1.26	1.02	1.14	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	2.30
VC-14-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.07
VC-14-1 1.0-1.75m	0.00	0.00	0.00	0.69	0.68	0.39	0.76	0.72	0.85	0.74	0.00	0.00	0.00	0.00	0.17	0.41	0.03	1.64
VC-15-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	2.63
VC-15-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.46	4.20	0.46	1.38
VC-15-2 2.0-2.4m	0.00	0.00	1.47	0.69	0.46	0.75	0.70	0.78	0.76	0.63	0.00	0.00	0.00	0.00	0.25	1.36	0.24	1.63
VC-16-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.04	0.00	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.23
VC-16-1 1.0-1.8m	9.71	0.00	0.00	0.64	0.37	0.90	1.05	0.93	1.01	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86
VC-17-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.50	0.07	3.29
VC-17-1 1.0-1.6m	0.00	0.00	0.00	0.86	1.79	1.72	1.85	1.47	1.55	1.16	0.00	0.00	0.00	0.00	0.03	0.31	0.07	1.23
VC-18B-0 0.0-1.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	1.23	0.24	1.80
VC-18B-1 1.0-2.0m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	2.49	0.35	1.37
VC-18B-2 2.0-2.75m	0.00	3.44	1.66	1.55	1.18	1.85	1.55	1.38	1.43	1.11	0.00	0.00	0.00	0.00	0.18	1.07	0.17	1.06

Station	44.2µm	31.3µm	22.1µm	15.6µm	11µm	7.8µm	5.5µm	3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm	0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm	<0.04µm
	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	>14.5
VC-01A-0	7.16	6.66	7.99	10.29	9.76	9.53	10.71	9.87	6.88	3.91	2.50	2.08	1.94	1.80	1.57	1.25	0.86	0.57	0.32	0.12	0.01	0.00
VC-01A-1	7.05	6.52	7.46	10.02	8.25	8.23	10.70	10.68	7.70	4.66	3.32	2.82	2.50	2.25	1.96	1.52	0.96	0.56	0.27	0.08	0.01	0.00
VC-01A-2	5.00	4.89	5.47	8.15	7.68	7.02	9.18	9.48	6.78	4.42	3.86	3.61	3.15	2.82	2.58	2.19	1.58	1.07	0.60	0.21	0.02	0.00
VC-02-0	6.90	5.96	7.56	9.53	8.60	9.97	11.30	9.96	6.94	4.32	3.17	2.84	2.64	2.40	2.07	1.66	1.18	0.82	0.48	0.18	0.02	0.00
VC-02-1	8.33	6.56	8.42	9.35	8.41	10.33	11.47	9.84	6.75	4.06	2.73	2.21	1.96	1.75	1.50	1.18	0.81	0.53	0.30	0.11	0.01	0.00
VC-02-2	4.86	4.84	5.23	7.82	8.19	5.64	8.44	9.99	7.30	4.79	4.38	4.10	3.58	3.44	3.50	3.25	2.48	1.73	1.00	0.37	0.04	0.00
VC-02-3	6.62	5.13	5.48	7.12	5.91	6.35	7.75	7.28	5.20	3.68	3.41	3.39	3.16	2.91	2.63	2.22	1.64	1.15	0.68	0.25	0.03	0.00
VC-03-0 0.0-1.0m	7.18	6.58	7.76	10.10	9.24	10.08	11.18	9.75	6.68	4.02	2.83	2.47	2.28	2.06	1.76	1.39	0.97	0.66	0.38	0.14	0.02	0.00
VC-03-1 1.0-2.0m	8.66	7.45	8.73	10.43	9.39	9.75	10.78	9.48	6.42	3.57	2.16	1.71	1.59	1.49	1.34	1.09	0.78	0.53	0.31	0.12	0.01	0.00
VC-03-2 2.0-3.0m	6.17	5.50	6.46	8.83	6.73	8.15	10.44	9.79	6.87	4.75	4.36	4.22	3.82	3.45	3.10	2.54	1.72	1.09	0.57	0.20	0.02	0.00
VC-03-3 3.0-3.4m	6.29	5.11	5.85	7.10	5.56	6.40	7.92	7.39	5.22	3.66	3.44	3.50	3.31	3.06	2.76	2.31	1.68	1.17	0.68	0.25	0.03	0.00
VC-04-0 0.0-1.0m	8.09	7.21	8.53	10.18	9.20	9.47	10.62	9.48	6.45	3.61	2.29	1.92	1.82	1.70	1.49	1.19	0.82	0.55	0.31	0.11	0.01	0.00
VC-04-1 1.0-2.0m	6.60	6.08	7.10	8.98	7.76	7.98	10.04	9.84	7.07	4.35	3.19	2.73	2.40	2.14	1.87	1.49	1.00	0.62	0.33	0.11	0.01	0.00
VC-04-2 2.0-2.45m	6.94	5.13	5.84	6.42	5.27	6.21	6.79	5.79	4.14	3.04	2.75	2.58	2.23	1.83	1.45	1.12	0.80	0.57	0.34	0.14	0.02	0.00
VC-05-0 0.0-1.0m	7.89	6.84	8.41	9.83	8.41	9.26	10.73	9.63	6.60	3.87	2.65	2.26	2.07	1.87	1.62	1.30	0.91	0.61	0.35	0.13	0.02	0.00
VC-05-1 1.0-2.0m	1.93	2.91	4.53	6.57	4.67	7.55	11.01	10.95	7.74	5.91	6.20	6.06	5.38	5.06	4.84	4.00	2.51	1.35	0.55	0.14	0.01	0.00
VC-05-2 2.0-2.4m	5.69	4.93	5.78	7.25	6.00	7.58	9.10	8.18	5.75	4.18	3.99	3.96	3.69	3.43	3.15	2.65	1.90	1.29	0.73	0.27	0.03	0.00
VC-06-0 0.0-1.0m	8.35	7.27	8.54	9.45	7.84	8.40	9.77	9.00	6.42	3.89	2.67	2.29	2.15	2.01	1.78	1.45	1.04	0.72	0.42	0.16	0.02	0.00
VC-06-1 1.0-2.0m	7.66	6.86	7.86	9.59	7.92	8.24	10.51	10.28	7.40	4.56	3.32	2.84	2.49	2.18	1.87	1.46	0.97	0.61	0.32	0.11	0.01	0.00
VC-06-2 2.0-3.0m	5.34	5.10	5.68	8.19	7.38	6.52	9.24	10.02	7.13	4.95	4.90	4.71	3.94	3.39	3.08	2.65	1.91	1.29	0.72	0.25	0.03	0.00
VC-06-3 3.0-3.3m	6.10	4.61	5.31	6.64	5.13	5.73	6.87	6.33	4.48	3.12	2.88	2.91	2.78	2.62	2.41	2.08	1.57	1.13	0.69	0.26	0.03	0.00
VC-07-0 0.0-1.0m	8.79	7.52	9.30	9.59	8.13	9.43	10.44	9.13	6.41	4.00	2.84	2.42	2.19	2.00	1.75	1.41	1.00	0.68	0.39	0.15	0.02	0.00

Station	44.2µm	31.3µm	22.1µm	15.6µm	11µm	7.8µm	5.5µm	3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm	0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm	<0.04µm
	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	>14.5
VC-07-1 1.0-2.0m	7.35	6.59	7.95	9.45	7.42	7.88	9.80	9.32	6.58	4.14	3.19	2.81	2.46	2.18	1.91	1.54	1.04	0.66	0.36	0.12	0.01	0.00
VC-07-2 2.0-3.0m	5.79	4.67	5.32	7.31	5.70	6.21	7.67	7.11	4.94	3.43	3.25	3.29	3.10	2.88	2.63	2.24	1.64	1.15	0.67	0.25	0.03	0.00
VC-08A-0 0.0-1.0m	8.56	7.26	8.88	10.32	8.44	9.47	10.59	9.29	6.48	3.98	2.79	2.33	2.10	1.91	1.69	1.37	0.97	0.66	0.38	0.14	0.02	0.00
VC-08A-1 1.0-2.0m	8.19	7.37	8.64	10.30	8.27	9.19	10.89	9.94	6.97	4.19	2.86	2.38	2.14	1.94	1.69	1.33	0.89	0.57	0.31	0.11	0.01	0.00
VC-08A-2 2.0-3.0m	5.25	5.17	5.58	8.75	6.74	6.93	9.58	9.52	6.60	4.50	4.24	4.04	3.46	3.00	2.66	2.17	1.46	0.91	0.47	0.16	0.02	0.00
VC-08A-3 3.0-3.25m	6.02	4.78	5.58	7.17	5.81	5.77	7.55	7.44	5.21	3.59	3.44	3.44	3.15	2.88	2.65	2.29	1.71	1.21	0.72	0.27	0.03	0.00
VC-09-0 0.0-1.0m	7.56	6.90	8.18	9.86	9.04	9.13	10.69	10.06	7.08	4.11	2.71	2.25	2.03	1.84	1.59	1.25	0.83	0.53	0.28	0.10	0.01	0.00
VC-09-1 1.0-2.0m	7.91	7.43	8.39	10.06	8.67	8.37	9.99	9.60	6.85	4.07	2.83	2.50	2.34	2.16	1.90	1.53	1.06	0.70	0.39	0.14	0.02	0.00
VC-09-2 2.0-3.0m	4.88	4.49	7.47	10.44	10.10	11.25	11.13	8.66	5.61	3.71	3.22	3.20	3.04	2.70	2.27	1.81	1.31	0.93	0.56	0.22	0.03	0.00
VC-10-0 0.3-1.0m	8.99	7.31	9.23	9.57	7.88	9.36	10.26	8.66	5.88	3.63	2.61	2.18	1.91	1.71	1.50	1.24	0.91	0.63	0.37	0.15	0.02	0.00
VC-10-1 1.0-2.0m	8.71	7.07	8.56	9.44	7.60	9.02	10.58	9.43	6.55	4.00	2.84	2.40	2.14	1.92	1.65	1.28	0.85	0.54	0.29	0.10	0.01	0.00
VC-10-2 2.0-2.3m	7.24	6.04	7.20	8.83	7.04	7.48	9.19	8.57	5.94	3.92	3.45	3.38	3.12	2.81	2.48	2.05	1.48	1.03	0.60	0.22	0.03	0.00
VC-11A-0 0.0-1.0m	8.48	7.49	9.63	10.31	8.31	9.32	10.21	8.86	6.13	3.86	2.91	2.56	2.29	2.03	1.75	1.40	0.98	0.66	0.38	0.14	0.02	0.00
VC-11A-1 1.0-1.8m	5.06	4.54	5.50	8.09	6.39	6.93	9.30	9.12	6.35	4.45	4.39	4.40	4.03	3.76	3.54	3.06	2.22	1.50	0.85	0.30	0.03	0.00
VC-12-0 0.0-1.0m	7.18	6.40	7.95	9.86	8.80	9.68	11.51	10.61	7.36	4.13	2.56	2.12	2.03	1.93	1.71	1.37	0.94	0.62	0.35	0.13	0.01	0.00
VC-12-1 1.0-2.0m	5.28	4.92	6.08	8.45	6.86	8.29	10.12	9.28	6.59	4.49	3.91	3.76	3.40	2.97	2.52	1.98	1.36	0.90	0.51	0.18	0.02	0.00
VC-12-2 2.0-2.2m	5.72	4.54	5.38	7.03	5.26	6.17	7.76	7.20	4.99	3.50	3.34	3.32	3.06	2.81	2.57	2.16	1.54	1.03	0.58	0.21	0.02	0.00
VC-13-0 0.0-1.0m	9.45	7.80	9.27	9.46	8.73	10.38	10.95	9.02	5.96	3.41	2.16	1.74	1.58	1.42	1.22	0.96	0.67	0.45	0.26	0.10	0.01	0.00
VC-13-1 1.0-2.0m	7.15	6.63	7.79	9.49	7.93	8.19	9.97	9.50	6.77	4.09	2.87	2.48	2.27	2.07	1.81	1.45	1.00	0.66	0.37	0.13	0.02	0.00
VC-13-2 2.0-2.6m	4.50	4.35	4.45	6.89	7.05	4.82	7.12	8.34	6.16	4.14	3.87	3.74	3.51	3.71	4.12	4.24	3.70	2.94	1.89	0.75	0.09	0.00
VC-14-0 0.0-1.0m	7.85	7.03	8.83	10.42	8.48	9.22	10.87	9.85	6.83	4.12	2.88	2.42	2.15	1.95	1.71	1.36	0.92	0.59	0.32	0.11	0.01	0.00

Station	44.2µm	31.3µm	22.1µm	15.6µm	11µm	7.8µm	5.5µm	3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm	0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm	<0.04µm
	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	>14.5
VC-14-1 1.0-1.75m	5.86	5.62	6.05	8.87	7.38	6.66	9.15	9.54	6.85	4.65	4.24	3.94	3.33	2.90	2.60	2.16	1.49	0.95	0.51	0.17	0.02	0.00
VC-15-0 0.0-1.0m	8.43	7.59	9.07	10.00	7.99	8.86	10.38	9.49	6.75	4.16	2.89	2.40	2.14	1.94	1.71	1.38	0.97	0.65	0.37	0.14	0.02	0.00
VC-15-1 1.0-2.0m	6.55	5.85	7.17	9.00	7.39	9.10	11.06	9.96	6.84	4.26	3.21	2.77	2.38	2.02	1.69	1.32	0.89	0.57	0.31	0.11	0.01	0.00
VC-15-2 2.0-2.4m	5.49	4.89	5.56	7.83	6.27	6.66	8.74	8.50	5.92	4.15	4.05	4.05	3.73	3.50	3.31	2.88	2.12	1.46	0.84	0.30	0.03	0.00
VC-16-0 0.0-1.0m	8.23	7.11	8.81	10.18	9.25	10.56	11.56	9.91	6.66	3.72	2.28	1.85	1.73	1.61	1.40	1.11	0.77	0.51	0.29	0.11	0.01	0.00
VC-16-1 1.0-1.8m	5.81	5.49	6.83	8.07	6.21	8.01	9.42	8.35	5.95	4.06	3.26	2.79	2.36	2.03	1.74	1.39	0.94	0.61	0.33	0.12	0.01	0.00
VC-17-0 0.0-1.0m	8.87	7.79	9.23	10.01	8.43	9.22	10.19	8.89	6.11	3.64	2.50	2.16	2.01	1.86	1.63	1.32	0.94	0.65	0.38	0.14	0.02	0.00
VC-17-1 1.0-1.6m	6.21	5.50	6.98	8.66	6.70	7.97	9.66	8.72	6.02	3.96	3.31	3.05	2.70	2.37	2.05	1.65	1.14	0.75	0.41	0.15	0.02	0.00
VC-18B-0 0.0-1.0m	7.70	6.43	8.00	9.42	7.33	8.99	10.97	9.97	6.96	4.40	3.34	2.91	2.54	2.20	1.86	1.46	0.99	0.65	0.36	0.13	0.02	0.00
VC-18B-1 1.0-2.0m	6.01	5.44	6.37	8.84	7.34	8.22	11.23	11.12	7.80	4.79	3.70	3.27	2.82	2.43	2.07	1.61	1.05	0.65	0.33	0.11	0.01	0.00
VC-18B-2 2.0-2.75m	5.11	4.77	5.60	7.63	5.81	6.29	8.55	8.46	5.89	4.11	3.97	3.80	3.19	2.67	2.27	1.81	1.20	0.74	0.38	0.13	0.01	0.00

3 Biological Survey Results

3.1 Environmental DNA Project Summary Report

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ENVIRONMENTAL DNA PROJECT SUMMARY REPORT

METATAXONOMIC ANALYSIS OF ENVIRONMENTAL DNA (EDNA) SAMPLES

Project number	26014_01
Client	Braeside Marine
Contact	Andrew Ridley
Reporting date	22 June 2026

PROJECT SUMMARY

Table 1. Overview of project.

Sample Type and Numbers:	3 x inDepth Water samples 3 x Field Negative Controls 1 x Extraction Negative Control
Target Sequencing Markers:	Fish – 12S Tele Vertebrates – 16S MV3

SUMMARY

The metabarcoding survey identified a diverse assemblage of freshwater, estuarine, and marine vertebrates characteristic of a highly connected UK estuary. The detected community included commercially important fish species, migratory taxa of conservation concern, and several protected marine mammals, highlighting the ecological significance of the estuary as a transition zone between freshwater and marine environments.

Several commercially important fish species were detected, including European seabass (*Dicentrarchus labrax*), Atlantic herring (*Clupea harengus*), Atlantic cod (*Gadus* sp.), haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*), turbot (*Scophthalmus maximus*), horse mackerel (*Trachurus trachurus*), European pilchard (*Sardina pilchardus*), European sprat (*Sprattus sprattus*), and Atlantic salmon (*Salmo salar*). The presence of these

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species demonstrates the importance of the estuary as a feeding, nursery, and migration habitat supporting both coastal fisheries and wider marine food webs.

Several species of conservation importance were recorded. European eel (*Anguilla anguilla*), listed as Critically Endangered by the IUCN, was detected alongside Atlantic salmon (*Salmo salar*) and sea lamprey (*Petromyzon marinus*), all of which are migratory species of significant conservation concern. The presence of brook lamprey (*Lampetra planeri*) further indicates the availability of habitats suitable for these sensitive species. The detection of water vole (*Arvicola amphibius*), one of the UK's most threatened native mammals, provides additional evidence of the ecological value of the estuarine corridor.

The estuary also supported a diverse assemblage of coastal and estuarine fish species associated with shallow-water and benthic habitats, including hooknose (*Agonus cataphractus*), greater sand eel (*Ammodytes marinus*), common dragonet (*Callionymus lyra*), lumpfish (*Cyclopterus lumpus*), gobies (*Pomatoschistus microps, P. minutus, P. pictus*), shanny (*Lipophrys pholis*), butterfish (*Pholis gunnellus*), and long-spined sea scorpion (*Taurulus bubalis*). These species are important components of estuarine and coastal food webs and indicate habitat diversity within the survey area.

Several protected marine mammals were detected, including harbour seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*), harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), and dolphin taxa identified to genus level (*Delphinus* sp.). These species are recognised indicators of productive marine ecosystems and highlight the ecological connectivity between the estuary and adjacent coastal waters.

A number of ecologically important bird species were also identified, including puffin (*Fratercula arctica*), common guillemot (*Uria aalge*), Eurasian oystercatcher (*Haematopus ostralegus*), cormorant (*Phalacrocorax carbo*), and shelduck (*Tadorna tadorna*), reflecting the importance of the estuary as a feeding and foraging habitat for coastal and migratory birds.

Overall, the results demonstrate that the estuary supports a diverse and ecologically valuable vertebrate community, including commercially important fish, protected marine mammals, migratory fish of conservation concern, and characteristic estuarine species. The detection of European eel, Atlantic salmon, sea lamprey, and multiple marine mammal species highlights the importance of maintaining habitat connectivity and environmental quality within this dynamic estuarine ecosystem.

PROJECT BACKGROUND

Braeside Marine commissioned collection of three high-volume time-integrated filtered water samples, using Applied Genomics' automated inDepth eDNA water sampler. These samples were analysed targeting genetic markers for identification of vertebrates.

To achieve DNA-based biodiversity monitoring, Applied Genomics have supplied and inDepth sampler, along with 3 x inDepth filtrations kits for water collection.

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METHODOLOGY

Field Sampling

Samples were collected by Braeside Marine personnel and partners using methods specified by Applied Genomics. It is assumed that the sampling protocol was followed without deviation.

Sample Processing & Sequencing

The workflow of the procedure from sample collection through to receiving the full report is shown in Figure 1.

Samples were extracted for DNA using the QIAGEN QIAwave DNA Blood and Tissue Kit. The DNA was eluted into 200 µL and concentrations were quantified using Qubit Fluorometry.
The remaining NAP DNA preservative for each filter was extracted and used as a field negative control to be used as part of the downstream analyses.

After DNA extraction, samples were amplified for the target markers based on the project requirements. The markers used for this project are specified in Table 2.

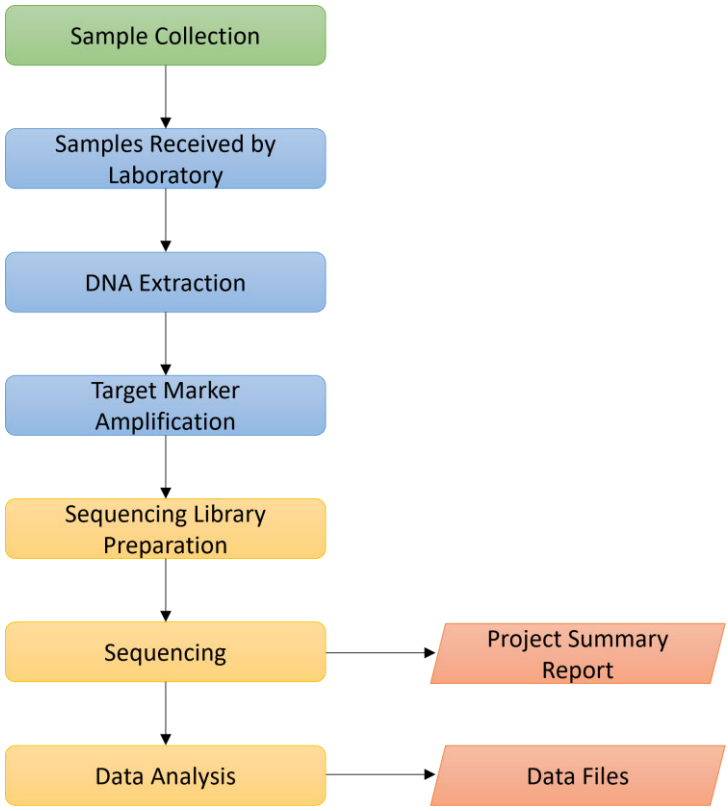


Figure 1. Flow chart of project pipeline. Quality checks are taken throughout the pipeline to monitor sample performance. Steps in blue have been completed by Applied Genomics Laboratory. Processes in yellow are downstream procedures.

Table 2. Amplification markers used for samples in this project.

TARGET SPECIES/GROUP	GENE	MARKER NAME	PRIMER REFERENCE
FISH	12S	12STele	(Taberlet et al., 2018)
FISH	16S	16SMV3	(Valsecchi et al., 2020)

The amplification process employed AmpliTaq Gold 360 Master Mix (Applied Biosystems), bovine serum albumin (ThermoScientific) and assay-specific primers designed to target the

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desired species/groups. Each sample was amplified in triplicate to provide better sequencing resolution of the sample compared to a single replicate. PCRs were quality-checked via capillary electrophoresis using a QIAxcel and DNA Screening kit (QIAGEN). Sample amplicon replicates were pooled and then purified using Cytiva Sera-Mag Select magnetic beads. A second round of PCR enabled unique index tags (Nextera XT Index Kit v2, Illumina) to be bound to the amplicons for identification during the bioinformatics process. The indexed-amplicons underwent a second clean up using Sera-Mag beads followed by quantification by Qubit. The cleaned indexed amplicons were pooled at equimolar concentrations. Library concentrations were quantified, adjusted, pooled, denatured with NaOH, and supplemented with *PhiX* control following Illumina's protocols. The eDNA amplicon library was sequenced by Source Bioscience on an Element Biosciences AVITI sequencer using the Medium Output Kit (2x300bp chemistry).

As part of the rigorous quality control procedures, Applied Genomics included a negative control extraction sample from the DNA purification step for each DNA extraction batch (called "EXT NEG" hereafter), an amplification negative control for each barcoding primer taken from the PCR amplification step ("PCR NEG"), and an indexing negative control ("IDX NEG") during the indexing PCR step. All negative control samples were included in all downstream processes and any resulting data were used to inform algorithmic decontamination of the sample data.

Bioinformatics & Taxonomic Assignment

We conducted all analyses in R using core packages specified in Figure 2 (R Core Team, 2021).

To ensure comparability of detected sequences across studies, we utilised the DADA2 algorithm for creating exact amplicon sequence variants (ASVs). This approach models and corrects sequenced amplicon errors, providing a significant advantage over operational taxonomic units (OTUs) by enabling direct comparison of ASVs between studies. OTU methods group similar sequences based on an arbitrary similarity threshold, while DADA2 infers the underlying sample sequences by modelling amplicon errors, leading to

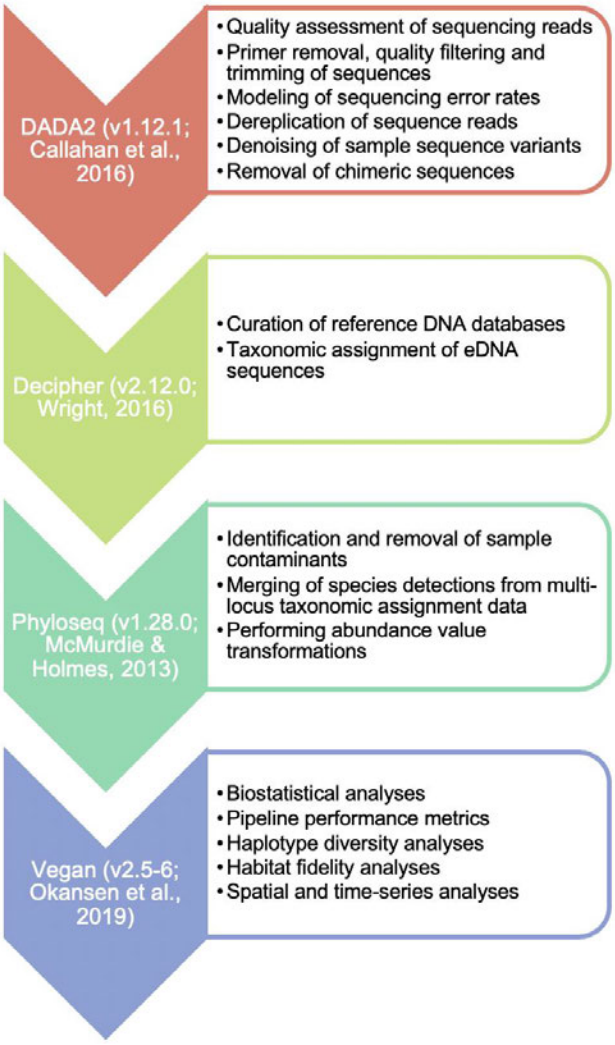


Figure 2. Bioinformatic pipeline and taxonomic assignment using various packages in R (DADA2, Decipher, Phyloseq, Vegan) (Callahan et al., 2016; McMurdie & Holmes, 2013; Oksanen et al., 2020; Wright, 2016).

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improved specificity and sensitivity in identifying true sequence variance and rare variants.

Custom DNA databases were created by downloading sequence data from publicly accessible databases. Taxonomic ranks were standardized using records from the Global Biodiversity Information Facility (GBIF). To curate the data, a recursive machine-learning algorithm was applied to identify and remove redundant or misclassified sequences.

The taxonomic assignment algorithm employed a hybrid approach, combining features of phylogenetic, distance-based, and machine learning classification methods to minimize overclassification and misclassification errors. Spurious sequences were eliminated through algorithmic curation of the reference databases, which also helped identify putative mislabelling errors. Taxonomic assignments were performed by matching eDNA sequences against the curated custom-built reference sequence databases.

Due to biases inherent in metabarcoding workflows, sequencing read abundance values were transformed into sequence detection (presence/absence) for downstream analyses. Following taxonomic assignment, sequences matching the same species were considered haplotypic variants, representing genetic diversity within the sampled population. Haplotype diversity reflects the genetic diversity of breeding individuals rather than the number of individuals.

In summary, our analysis workflow involved DADA2-based ASV generation, custom-built curated databases, a hybrid taxonomic assignment algorithm, and transformation of read abundance values for downstream analyses, considering haplotype diversity as an indication of genetic diversity within the population.

Performance Metrics

We assessed the performance of our bioinformatics and statistical analyses using various techniques. The accuracy of taxonomic assignments relied on the quality of our curated reference databases and the specificity of barcode loci for discriminating closely related species. The confidence scores for taxonomic assignment of each ASV were visualized, showing the range based on the fraction of bootstrap replicates assigned to the species rank.

To evaluate the risk of false detections or misclassification errors, we conducted false-positive detection analyses. This involved a naïve Bayesian approach, considering uncertainties in taxonomic assignments, incorporating historical data of prior detections for each species, and the resulting data credibility score was parameterised by the statistical power of the study and the intrinsic credibility statistic ($p < 0.001$). Thus, each species detection is given a credibility score. In a sufficiently powered study, each detected species would have lower false-positive risk and higher credibility.

To ensure credibility and reproducibility, we considered results statistically significant at $p < 0.05$, following convention, and intrinsically credible at $p < 0.001$.

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RESULTS

DNA CONCENTRATION

Figure 3 shows the purified DNA concentrations using a colour key to categorise samples based on their concentrations, indicating potential downstream performance. Sample DNA concentrations can be found in the file '26014_01 - Braeside Marine - Teesport Biodiversity - Data Output_17.06.2026 .xlsx' in the 'Metadata' tab in column J. Different Quality Control (QC) groups highlight variations in sequencing quality. DNA yields can differ between samples due to factors such as substrate type (i.e turbid waters typically yield higher volumes of DNA than clearer waters), DNA degradation over time, and the volume of substrate sampled. Extraction negative controls (EXT NEGs) were included throughout the process and used during sequencing analysis to eliminate potential contaminants.

All samples passed QC with high yields.

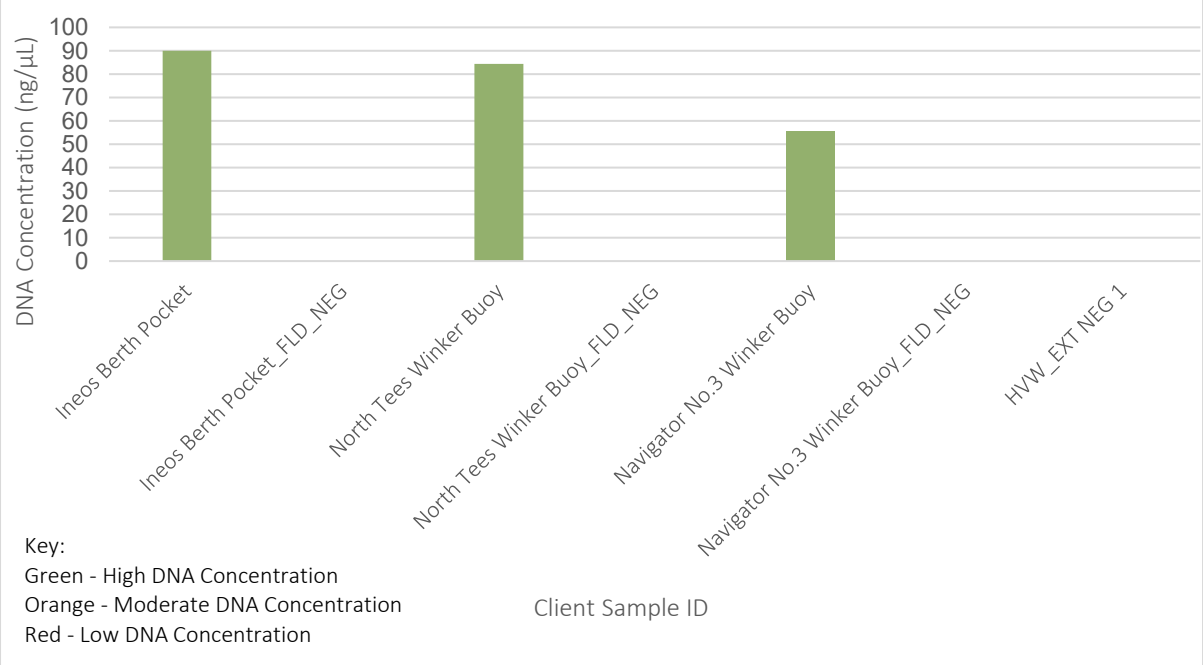


Figure 3. Overview of DNA concentrations for all water samples in this project. Key: Green – Concentration ≥10 ng/µL = High, Orange - Concentration ≥1 - 10< ng/µL = Moderate, Red - Concentration <1 ng/µL = Low. FLD NEG: Field Negative Control; HVW: inDepth Water; EXT NEG: Extraction Negative Control. Generally, better yields will result in better sequencing data as more DNA is sampled and thus increases the ability to capture more DNA. Please refer to the Data Output file for further details.

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Amplification Performance

Figure 4 displays the PCR amplification concentration for each sample per marker. All samples passed with high PCR amplification concentration for all marker.

Sample amplification concentrations for each marker can be found in the file '26014_01 - Braeside Marine - Teesport Biodiversity - Data Output_17.06.2026 .xlsx' in the 'Metadata' tab in columns L-O. High concentration amplifications are not highlighted. Moderate amplifications are indicated in orange Samples with low amplification for a particular marker are highlighted in red. PCR negative controls were included in all setups.

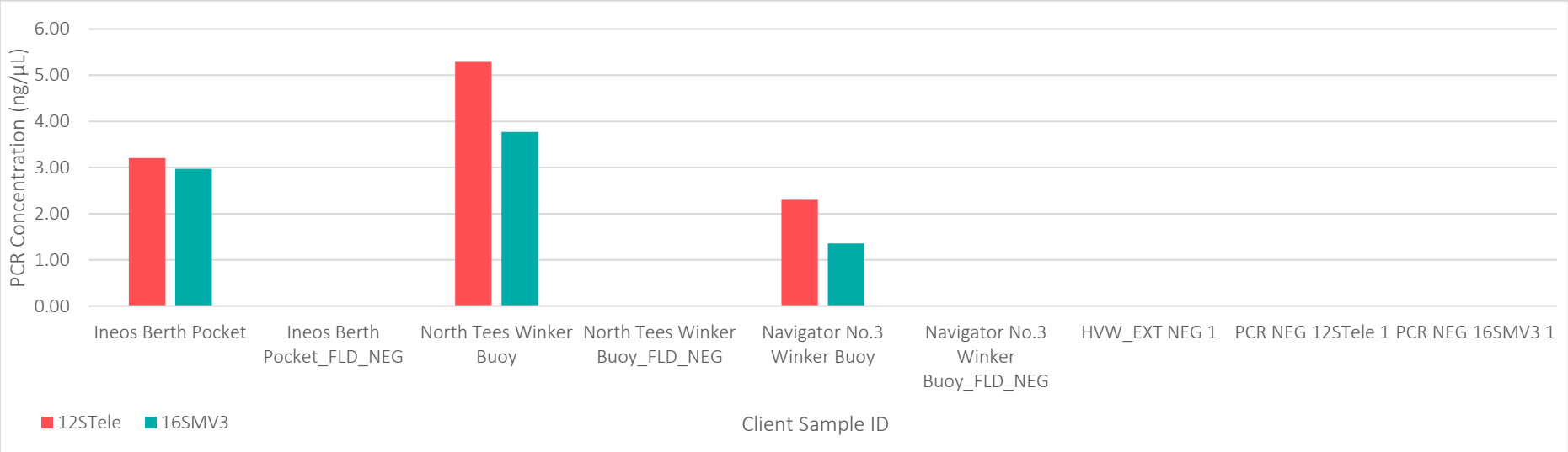


Figure 4. Overview of average sample PCR amplification concentrations for each marker. FLD NEG: Field Negative Control; HVW: inDepth Water; EXT NEG: Extraction Negative Control; PCR NEG: PCR Negative Control. Generally, a sample is considered being amplified well if the PCR concentrations are above 1 ng/µL. Please refer to the Data Output file for the figure in full resolution and for further details.

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Bioinformatics Performance

A summary of the bioinformatics pipeline throughput is given in Figure 5, showing the mean and standard deviation for all samples. The red boxplots show the 12S rRNA gene sequence reads, while the blue boxplots refer to the 16S rRNA gene sequence reads. The bioinformatic process is broken down into the steps indicated below.

1. '*input*' gives the number of raw sequence reads produced by the MiSeq sequencer;
2. '*filt*' are the number of sequences remaining after trimming and quality filtering the sequences;
3. '*denoised*' shows the number of inferred sequence variants calculated from modelled sequencing errors;
4. '*merged*' is the number of successful mergers of forward and reverse sequence paired reads;
5. '*nonchim*' are the numbers of reads remaining after filtering of chimeric sequence reads, which may occur as artefacts of PCR amplification or sequencing misreads;
6. '*decont*' shows the number of reads after removing contaminant sequences based on frequency (concentration of amplified DNA) and/or prevalence (number of reads) of negative control samples;
7. '*assigned*' indicates the number of reads which could be assigned to a sufficient taxonomic level

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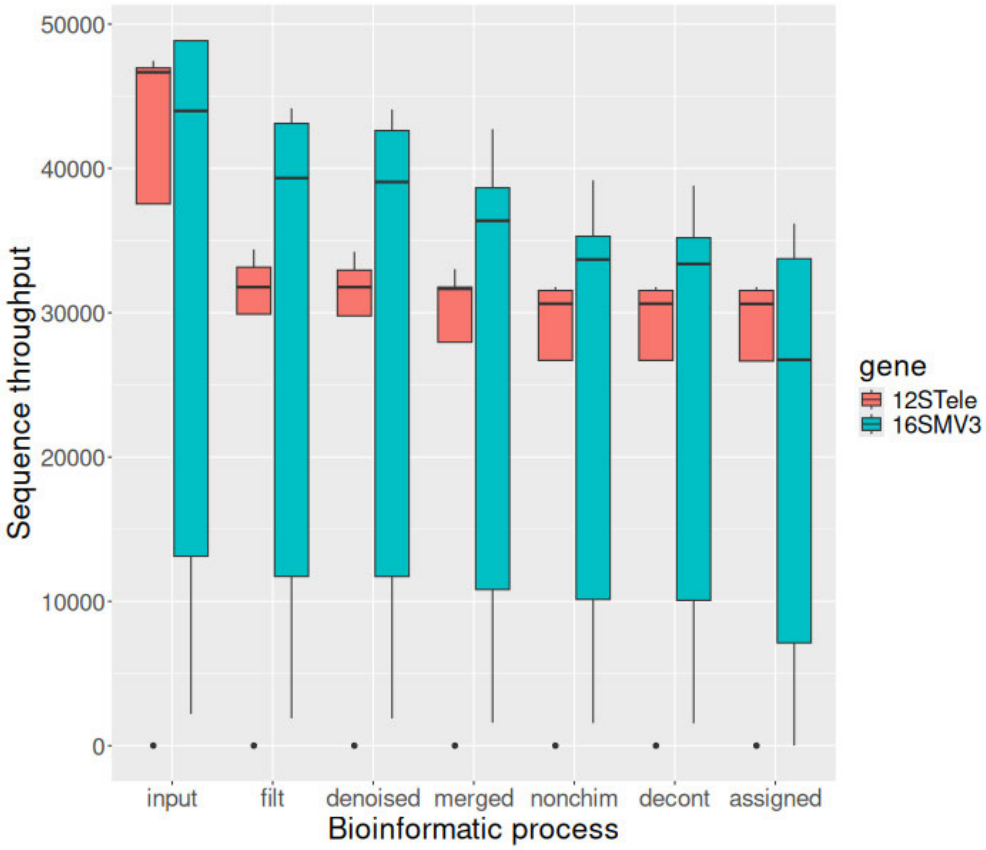


Figure 5. Summary of bioinformatic pipeline throughput for each marker.

A summary of the taxonomic assignment for all sequences are given in Figure 6. Each bar plot indicates the number of amplicon sequence variants (ASVs) that were identifiable to each taxonomic rank. As indicated earlier on Figure 5, red indicates 12S and blue shows 16S gene sequences.

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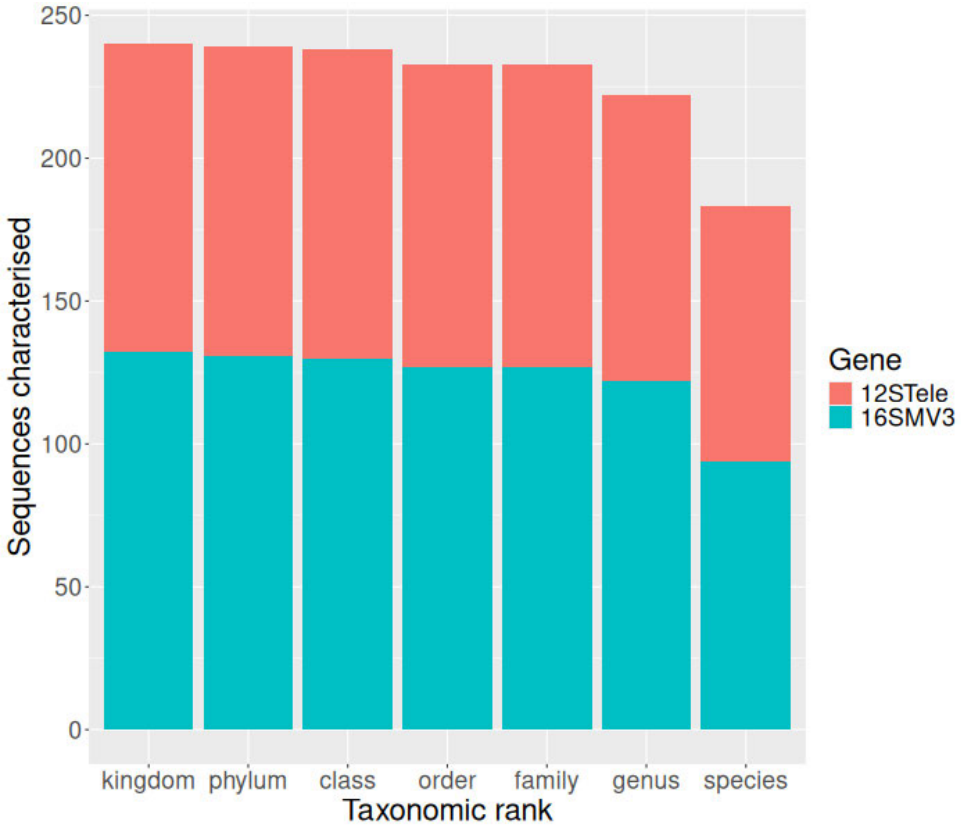


Figure 6. Relative number of eDNA amplicon sequence variants (ASVs) assigned to each taxonomic rank.

Following taxonomic assignment, a number of amplicon sequence variants may be assigned to the same species. Where these occurred, the detected variants may be regarded as haplotypic variants for the same genetic locus. Each individual within a population will have one genetic haplotype but several closely related individuals may share the same haplotype, usually through maternal inheritance. Thus, whilst not an indication of numbers of individuals, haplotype diversity is an indication of the genetic diversity of breeding individuals within the sampled population.

The range of confidence in taxonomic assignments is shown in the attached 'eDNA Full Data Set' document, where confidence was calculated as the fraction of bootstrap replicates that were assigned to the species rank. A risk-based analysis of detection credibility is shown in the attached files 'False-Detection Risk Analysis' and 'Haplotypes with population status', indicated in the column "*score*". This analysis examined the risk of having committed a false detection or misclassification error, known as a false- positive. This was accomplished by modelling the uncertainties of the taxonomic assignments and incorporating historical data of previous detections of each species (i.e. from GBIF (Global Biodiversity Information Facility). The Credibility

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score was classified as “Low”, “Moderate” and “High”. The threshold for “High” credibility was defined by the intrinsic credibility statistic ($p < 0.001$). The threshold for the “Low” credibility category is a function of the statistical power of the study (8.2%). Thus, in a sufficiently powered study, each detected species would have lower false-positive risk and higher credibility (*score*).

The accompanying data files incorporate the following:

1. Summary – A summary of the project details and the results presented.
2. Metadata – Sample metadata includes unique sample identifiers, collection locations with geographic coordinates, laboratory processing results, genetic marker amplification outcomes, and, where available, associated environmental parameters.
3. eDNA Full Sequence Dataset – Contains all assigned amplicon sequence variants (ASVs) with taxonomic ranks, taxonomic assignment confidence values and targeted marker genes. Sequence reads are shown for each sample column for each ASV, along with extraction (EXT NEG) and amplification negative (PCR NEG) controls.
4. eDNA Full Taxonomy Dataset - Provides a summary of the eDNA Full Sequence Dataset merging each unique taxonomic rank that could be assigned to the lowest taxonomic level. The numbers simply indicate presence or absence of the taxa at the assigned rank in each sample. Negative controls are excluded.
5. Credibility Analysis – This analysis employs risk-based naïve Bayesian methods to assess the likelihood of false detection or misclassification for each haplotype, using historical data from the Global Biodiversity Information Facility (GBIF). The *'GBIF'* column indicates whether a taxon has been previously detected in the area. The *'risk'* column shows the probability of a false-positive detection, while the *'score'* column reflects the detection credibility of each taxon. A higher risk corresponds to lower credibility, while a lower risk indicates higher credibility for the detected taxon.
6. Haplotypes with population status – Shows the number of haplotypes (ASVs identified to genus or species) detected for each taxon, along with their taxonomic ranks, common names, IUCN RedList status and false-detection credibility score.

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Terms and Conditions

The (VERY) fine print ...

Application and entire agreement

1. These Terms and Conditions apply to the provision of the services detailed in our quotation (**Services**) by Applied Genomics Ltd. a company registered in England and Wales under number 9180742 whose registered office is at Brixham Environmental Laboratory, Freshwater Quarry, Devon, TQ5 8AY (**we** or **us**) to the person or legal entity buying the services (**you**).
2. You are deemed to have accepted these Terms and Conditions when you accept our quotation or from the date of any performance of the Services (whichever happens earlier) and these Terms and Conditions and our quotation (**the Contract**) are the entire agreement between us.
3. You acknowledge that you have not relied on any statement, promise or representation made or given by or on our behalf. These Conditions apply to the Contract to the exclusion of any other terms that you try to impose or incorporate, or which are implied by trade, custom, practice or course of dealing.

Interpretation

4. A "business day" means any day other than a Saturday, Sunday or bank holiday in England and Wales.
5. The headings in these Terms and Conditions are for convenience only and do not affect their interpretation.
6. Words imparting the singular number shall include the plural and vice-versa.

Services

7. We warrant that we will use reasonable care and skill in our performance of the Services which will comply with the quotation, including any specification in all material respects. We can make any changes to the Services which are necessary to comply with any applicable law or safety requirement, and we will notify you if this is necessary.
8. We will use our reasonable endeavours to complete the performance of the Services within the time agreed or as set out in the quotation; however, time shall not be of the essence in the performance of our obligations.
9. All of these Terms and Conditions apply to the supply of any goods as well as Services unless we specify otherwise.

Your obligations

10. You must obtain any permissions, consents, licences or otherwise that we need and must give us access to any and all relevant information, data, materials, properties and any other matters which we need to provide the Services.
11. If you do not comply with clause 10, we can terminate the Services.
12. We are not liable for any delay or failure to provide the Services if this is caused by your failure to comply with the provisions of this section (**Your obligations**).

Fees and Deposit

13. The fees (**Fees**) for the Services are set out in the quotation and are on a time and materials basis.
14. In addition to the Fees, we can recover from you a) reasonable incidental expenses including, but not limited to, travelling expenses, hotel costs, subsistence and any associated expenses, b) the cost of services provided by third parties and required by us for the performance of the Services, and c) the cost of any materials required for the provision of the Services.
15. You must pay us for any additional services provided by us that are not specified in the quotation in accordance with our then current, applicable daily rate in effect at the time of performance or such other rate as may be agreed between us. The provisions of clause 14 also apply to these additional services.
16. The Fees are exclusive of any applicable VAT and other taxes or levies which are imposed or charged by any competent authority.
17. You must pay a deposit ("Deposit") as detailed in the quotation within 10 days of acceptance.
18. If you do not pay the Deposit to us according to the clause above, we can either withhold provision of the Services until the Deposit is received or can terminate under the clause below (**Termination**).
19. The Deposit is non-refundable unless we fail to provide the Services and are at fault for such failure (where the failure is not our fault, no refund will be made).

Cancellation and amendment

20. We can withdraw, cancel or amend a quotation if it has not been accepted by you, or if the Services have not started, within a period of 10 days from the date of the quotation, (unless the quotation has been withdrawn).
21. Either we or you can cancel an order for any reason prior to your acceptance (or rejection) of the quotation.
22. If you want to amend any details of the Services you must tell us in writing as soon as possible. We will use reasonable endeavours to make any required changes and additional costs will be included in the Fees and invoiced to you.
23. If, due to circumstances beyond our control, including those set out in the clause below (**Circumstances beyond a party's control**), we have to make any change in the Services or how they are provided, we will notify you immediately. We will use reasonable endeavours to keep any such changes to a minimum.

Payment

24. We will invoice you for payment of the Fees either:
    a. when we have completed the Services; or
    b. on the invoice dates set out in the quotation.
25. You must pay the Fees due within 30 days of the date of our invoice or otherwise in accordance with any credit terms agreed between us.
26. Time for payment shall be of the essence of the Contract.
27. Without limiting any other right or remedy we have for statutory interest, if you do not pay within the period set out above, we will charge you interest at the rate of 5% per annum above the base lending rate of the Bank of England from time to time on the amount outstanding until payment is received in full.
28. All payments due under these Terms and Conditions must be made in full without any deduction or withholding except as required by law and neither of us can assert any credit, set-off or counterclaim against the other in order to justify withholding payment of any such amount in whole or in part.
29. If you do not pay within the period set out above, we can suspend any further provision of the Services and cancel any future services which have been ordered by, or otherwise arranged with, you.
30. Receipts for payment will be issued by us only at your request.
31. All payments must be made in British Pounds unless otherwise agreed in writing between us.

Sub-Contracting and assignment

32. We can at any time assign, transfer, charge, subcontract or deal in any other manner with all or any of our rights under these Terms and Conditions and can subcontract or delegate in any manner any or all of our obligations to any third party.
33. You must not, without our prior written consent, assign, transfer, charge, subcontract or deal in any other manner with all or any of your rights or obligations under these Terms and Conditions.

Termination

34. We can terminate the provision of the Services immediately if you:
    a. commit a material breach of your obligations under these Terms and Conditions; or
    b. fail to make pay any amount due under the Contract on the due date for payment; or
    c. are or become or, in our reasonable opinion, are about to become, the subject of a bankruptcy order or take advantage of any other statutory provision for the relief of insolvent debtor; or
    d. enter into a voluntary arrangement under Part 1 of the Insolvency Act 1986, or any other scheme or arrangement is made with its creditors; or
    e. convene any meeting of your creditors, enter into voluntary or compulsory liquidation, have a receiver, manager, administrator or administrative receiver appointed in respect of your assets or undertakings or any part of them, any documents are filed with the court for the appointment of an administrator in respect of you, notice of intention to appoint an administrator is given by you or any of your directors or by a qualifying floating charge holder (as defined in para. 14 of Schedule B1 of the Insolvency Act 1986), a resolution is passed or petition presented to any court for your winding up or for the granting of an administration order in respect of you, or any proceedings are commenced relating to your insolvency or possible insolvency.

Intellectual property

35. You agree to treat all information presented as commercial-in-confidence.
36. We reserve all copyright and any other intellectual property rights which may subsist in any goods supplied in connection with the provision of the Services.
37. All data generated as a result of the provision of the Services shall be wholly owned by us.
38. We reserve the right to take any appropriate action to restrain or prevent the infringement of such intellectual property rights.

Liability and indemnity

39. Our liability under these Terms and Conditions, and in breach of statutory duty, and in tort or misrepresentation or otherwise, shall be limited as set out in this clause.
40. The total amount of our liability is limited to the total amount of Fees payable by you under the Contract.
41. We are not liable (whether caused by our employees, agents or otherwise) in connection with our provision of the Services or the performance of any of our other obligations under these Terms and Conditions or the quotation for:
    a. any indirect, special or consequential loss, damage, costs, or expenses or;
    b. any loss of profits; loss of anticipated profits; loss of business; loss of data; loss of reputation or goodwill; business interruption; or, other third-party claims; or
    c. any failure to perform any of our obligations if such delay or failure is due to any cause beyond our reasonable control; or
    d. any losses caused directly or indirectly by any failure or your breach in relation to your obligations; or
    e. any losses arising directly or indirectly from the choice of Services and how they will meet your requirements or your use of the Services or any goods supplied in connection with the Services.
42. You must indemnify us against all damages, costs, claims and expenses suffered by us arising from any loss or damage to any equipment (including that belonging to third parties) caused by you or your agents or employees.
43. Nothing in these Terms and Conditions shall limit or exclude our liability for death or personal injury caused by our negligence, or for any fraudulent misrepresentation, or for any other matters for which it would be unlawful to exclude or limit liability.

Data Protection

44. When supplying the Services to the Customer, the Service Provider may gain access to and/or acquire the ability to transfer, store or process personal data of employees of the Customer.
45. The parties agree that where such processing of personal data takes place, the Customer shall be the 'data controller' and the Service Provider shall be the 'data processor' as defined in the General Data Protection Regulation (**GDPR**) as may be amended, extended and/or re-enacted from time to time.
46. For the avoidance of doubt, 'Personal Data', 'Processing', 'Data Controller', 'Data Processor' and 'Data Subject' shall have the same meaning as in the GDPR.
47. The Service Provider shall only Process Personal Data to the extent reasonably required to enable it to supply the Services as mentioned in these terms and conditions or as requested by and agreed with the Customer, shall not retain any Personal Data longer than necessary for the Processing and refrain from Processing any Personal Data for its own or for any third party's purposes.
48. The Service Provider shall not disclose Personal Data to any third parties other than employees, directors, agents, sub-contractors or advisors on a strict "need-to-know" basis and only under the same (or more extensive) conditions as set out in these terms and conditions or to the extent required by applicable legislation and/or regulations.
49. The Service Provider shall implement and maintain technical and organisational security measures as are required to protect Personal Data Processed by the Service Provider on behalf of the Customer.
50. Further information about the Service Provider's approach to data protection are specified in its Data Protection Policy, which can be found on our website. For any enquiries or complaints regarding data privacy, you can contact our Data Protection Officer at the following e-mail address: sebastian@appliedgenomcs.co.uk.

Circumstances beyond a party's control

51. Neither of us is liable for any failure or delay in performing our obligations where such failure or delay results from any cause that is beyond the reasonable control of that party. Such causes include, but are not limited to: power failure, Internet Service Provider failure, industrial action, civil unrest, fire, flood, storms, earthquakes, acts of terrorism, acts of war, governmental action or any other event that is beyond the control of the party in question. If the delay continues for a period of 90 days, either of us may terminate or cancel the Services to be carried out under these Terms and Conditions.

Communications

52. All notices under these Terms and Conditions must be in writing and signed by, or on behalf of, the party giving notice (or a duly authorised officer of that party).
53. Notices shall be deemed to have been duly given:
    a. when delivered, if delivered by courier or other messenger (including registered mail) during the normal business hours of the recipient;
    b. when sent, if transmitted by fax or email and a successful transmission report or return receipt is generated;
    c. on the fifth business day following mailing, if mailed by national ordinary mail; or
    d. on the tenth business day following mailing, if mailed by airmail.
54. All notices under these Terms and Conditions must be addressed to the most recent address, email address or fax number notified to the other party.

No waiver

55. No delay, act or omission by a party in exercising any right or remedy will be deemed a waiver of that, or any other, right or remedy nor stop further exercise of any other right, or remedy.

Severance

56. If one or more of these Terms and Conditions is found to be unlawful, invalid or otherwise unenforceable, that / those provisions will be deemed severed from the remainder of these Terms and Conditions (which will remain valid and enforceable).

Law and jurisdiction

57. This Agreement shall be governed by and interpreted according to the law of England and Wales and all disputes arising under the Agreement (including non-contractual disputes or claims) shall be subject to the exclusive jurisdiction of the English and Welsh courts.

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3.2 Benthic Survey Report

OCEAN ECOLOGY

A DNV COMPANY

Teesport Benthic Surveys 2026:

Survey Report

OEL_BRAMAR1225_SYR



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Details

Version	Date	Description	Author(s)	Reviewed By	Approved By
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Section	Description	Page

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1. Introduction

1.1. Background Information

Lighthouse Green Fuels are preparing to submit a Development Consent Order (DCO) application for the development of a Sustainable Aviation Fuel (SAF) plant on the Tees. This SAF plant, and SAF production in general aims to reduce carbon emissions from aviation and support UK and global net zero targets. As part of the DCO application, an Environmental Impact Assessment (EIA) is required.

1.2. Project Overview

Ocean Ecology Limited (OEL) have been contracted by Marshall Jakeman Marine Limited (MJM Ltd) on behalf of ARUP and Lighthouse Green Fuels to conduct a benthic survey within the Tees estuary.

1.3. Aims and Objectives

The key aim of the survey was to:

- Conduct a benthic survey comprising of grab sampling, Drop Down Camera (DDC), beam trawling and scrape sampling providing data to inform the EIA.

1.4. Document Overview

This document details the setup, progress, and initial field observations of the Teesport benthic survey by OEL that took place between 26th April and 30th April 2026. Further detail is also provided on site information and sampling strategy.

1.5. Site Information

1.5.1. Site Location

The Teesport survey area encompasses a nearshore and estuarine area within the River Tees Estuary on the northeast coast on England, adjacent to Middlesborough. The Tees estuary experiences moderate to strong tidal currents with flows typically directed along the estuarine channel and influenced by North Sea tidal regimes. Water depths across the site generally range from approximately 5 m to 20 m below Chart Datum (bCD) deepening within maintained navigation channels.

1.5.2. Designated Sites

Teesmouth and Cleveland Coast (SPA)

The survey area is situated within the Teesmouth and Cleveland Coast Special Protection Area (SPA). The SPA is an approximately 12,000 ha coastal and estuarine site designated in 1995 to protect internationally important populations of breeding and non-breeding waterbirds. The area comprises of diverse habitats including intertidal mudflats, sandflats, saltmarsh, freshwater lagoons, sand dunes, and grazing marsh. These habitats provide essential feeding, roosting and breeding grounds for significant assemblages of birds, the site is recognised as an important component of the UK's network of protected areas for migratory bird species (Natural England, 2020).

2. Survey Design

2.1. Sampling Design and Rationale

The key objective of the Teesport benthic survey was to collect seabed imagery, grab samples, beam trawls and scrape samples data to inform the EIA.

A survey design was prepared by ARUP and presented in Figure 1 and Table 1. In total, this survey comprised of 15 grab stations, 8 DDC transects and 6 beam trawls. Scrape samples were to be collected from 5 pile structures, chosen in the field by accessibility of each two jetties at low, mid and high tide within the survey area.

Table 1 List of stations sampled as part of the Teesport benthic survey.

Survey Station ID	Sample Type	WGS84 / UTM Zone 30N				WGS84 (DD)			
		Start Eastings	Start Northings	End Eastings	End Northings	Start Latitude	Start Longitude	End Latitude	End Longitude
DG_01	Day Grab Station	618425.598	6052624.917			54.607178	-1.166456		
DG_02	Day Grab Station	618496.237	6052655.830			54.607439	-1.165350		
DG_03	Day Grab Station	618581.833	6052698.268			54.607800	-1.164008		
DG_04	Day Grab Station	618504.738	6052790.884			54.608650	-1.165164		
DG_05	Day Grab Station	618431.671	6052392.212			54.605086	-1.166456		
DG_06	Day Grab Station	618518.840	6052353.977			54.604722	-1.165122		
DG_07	Day Grab Station	618438.350	6052480.213			54.605875	-1.166317		
DG_08	Day Grab Station	618519.260	6052489.129			54.605936	-1.165061		
DG_09	Day Grab Station	618621.695	6052485.001			54.605875	-1.163478		
DG_10	Day Grab Station	618489.781	6052573.092			54.606697	-1.165483		
DG_11	Day Grab Station	618570.604	6052599.015			54.606911	-1.164222		
DG_12	Day Grab Station	618373.530	6052315.549			54.604411	-1.167386		
DG_13	Day Grab Station	618591.287	6052776.136			54.608497	-1.163831		
DG_14	Day Grab Station	618386.966	6052523.094			54.606272	-1.167094		
DG_15	Day Grab Station	618501.696	6052728.645			54.608092	-1.165236		
TR_1	Camera Transect	618319.814	6052048.888	618357.224	6052095.423	54.601900	-1.166700	54.602300	-1.166117
TR_2	Camera Transect	617913.748	6051542.514	617964.798	6051608.048	54.597450	-1.173200	54.598017	-1.172383
TR_3	Camera Transect	618959.739	6052843.222	619006.721	6052911.282	54.608883	-1.156483	54.609483	-1.155733
TR_4	Camera Transect	619109.951	6053243.169	619121.723	6053336.100	54.612433	-1.154000	54.613267	-1.153767
TR_5	Camera Transect	618597.125	6052812.837	618542.785	6052765.735	54.608700	-1.162100	54.608283	-1.162967
TR_6	Camera Transect	618477.139	6052617.368	618473.990	6052698.152	54.607000	-1.164050	54.607683	-1.164067
TR_7	Camera Transect	618474.145	6052484.817	618520.814	6052539.445	54.605783	-1.164150	54.60625	-1.163400
TR_8	Camera Transect	618608.337	6052550.341	618608.979	6052470.122	54.606333	-1.162033	54.605617	-1.162067

Survey Station ID	Sample Type	WGS84 / UTM Zone 30N				WGS84 (DD)			
		Start Eastings	Start Northings	End Eastings	End Northings	Start Latitude	Start Longitude	End Latitude	End Longitude
BT_1	Beam Trawl	618477.771	6052001.637	618515.363	6052047.150	54.601567	-1.165900	54.601967	-1.165300
BT_2	Beam Trawl	618018.171	6051531.326	618069.306	6051595.778	54.597450	-1.173200	54.598017	-1.172383
BT_3	Beam Trawl	618987.856	6052842.491	619034.539	6052910.513	54.609000	-1.157667	54.609600	-1.156917
BT_4	Beam Trawl	619162.650	6053199.659	619174.278	6053290.809	54.612167	-1.154817	54.612983	-1.154600
BT_5	Beam Trawl	618702.454	6052801.618	618647.678	6052753.761	54.608700	-1.162100	54.608283	-1.162967
BT_6	Beam Trawl	618544.092	6052513.589	618540.928	6052595.111	54.606150	-1.164667	54.606883	-1.164683
BT_7	Beam Trawl	618532.644	6052333.271	618579.676	6052388.383	54.604533	-1.164917	54.605017	-1.164167
BT_8	Beam Trawl	618664.310	6052654.000	618665.295	6052574.314	54.607383	-1.162750	54.606667	-1.162767

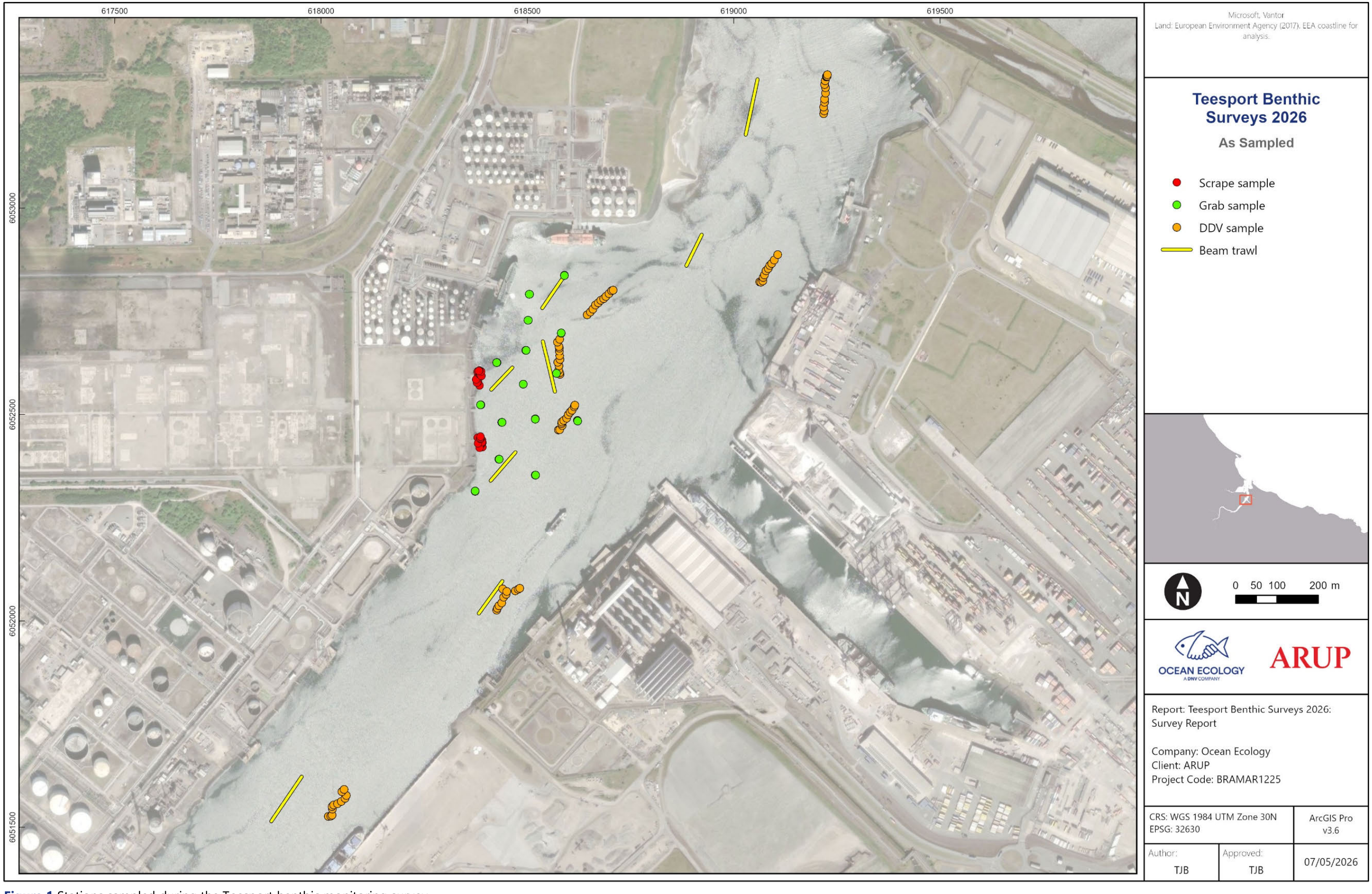


Figure 1 Stations sampled during the Teesport benthic monitoring survey.

3. Survey Methods

3.1. Survey Vessel

DDC, grab and beam trawl sampling was conducted from the 26.7 m MCA Category 1 coded DP0 survey vessel *MJM* Enterprise (Table 2 and Plate 1). The vessel was mobilised at Hartlepool Fish Quay and operated on a 12-hour operational basis.

Table 2 Vessel details for the *MJM Enterprise*.

Vessel Name	*MJM Enterprise*
Call Sign	MPAL7
MMSI	232054596
Length	26.70 m
Beam	8.10 m
Draught	3.00 m



Plate 1 MCA Cat 1 coded survey vessel, *MJM Enterprise*.

To complete the scrape sampling scrape sampling scope, the Red Lion Marine Rigid Raider and support vessel Cerberus (Plate 2) was mobilised within the Tees.



Plate 2 Red Lion Marine Rigid Raider (left) and Cerberus (right).

3.2. Geodetic Parameters

3.2.1. Horizontal Datum

All data was referenced to WGS84 and projected in Universal Transverse Mercator (UTM) zone 30N. Details of the specific datums that were adopted are shown in Table 3.

Table 3 Details of the horizontal and vertical datums that were used.

Horizontal Datum	
Geodetic Datum	World Geodetic System 1984 (WGS84)
Projection Method	Universal Transverse Mercator (UTM)
Zone	30 North (EPSG:32630)
Ellipsoid	
Reference Ellipsoid	WGS84
Semi-Major Axis (a)	6,378,137.000 m
Semi-Minor Axis (b)	6,356,752.3142 m
Inverse Flattening (1/f)	298.257 223 563
Transverse Mercator Projection	
Central Meridian (CM)	-3° (3° West)
Latitude of Origin	0°
False Easting	500,000m
False Northing	0m
Scale Factor at Central Meridian	0.9996

3.2.2. Unit Format Conversion

The following units were used throughout this project and are expressed using the conventions outlined in Table 4.

Table 4 Project unit format and convention details.

Unit Formats and Conventions	
Geographical Coordinates	Latitude: N DD.dddddd˚to 6 decimal places. Longitude: E/W DD.dddddd˚to 6 decimal places.
Grid Coordinates	Meters in the following format: Easting: EEE EEE.eee m to 3 decimal places. Northing: NNN NNN.nnn m to 3 decimal places.
Linear distances	Meters to 1 decimal places.
Offset measurement sign conventions	Meters in the following format: 'Y' is positive forward. 'X' is positive to starboard. 'Z' values are positives upwards from the waterline.
Time	UTC unless otherwise stated.

3.3. Survey Navigation

Onboard the *MJM Enterprise*, survey navigation was set up by SAND geophysics (contracted for geotechnical works) and MJM. OEL adopted and managed the same system while onboard which comprised Navipac with fixed offsets for deployment positions (crane and A-Frame). No subsurface navigation was required.

Navigation for scrape sampling was managed using a handheld GPS and notes of which piles were sampled were taken when the GPS could not reach any satellites due to obstructions caused by overhead structures.

3.4. Survey Equipment and Sampling

3.4.1. Drop Down Camera (DDC)

Seabed imagery (simultaneous video and stills) was acquired at each DDC transect using OEL's SubC Rayfin PLE camera system. The system was mounted in a camera frame with Light Emitting Diode (LED) strip lamps and a 10 cm point laser scaling array projected into the field of view. The camera is height and angle adjustable to provide a variety of options for view, lighting, and focal length to maximise data quality with respect to prevailing conditions (e.g., high turbidity). A digital overlay will be provided on all video footage detailed at a minimum GPS position and transect ID.

A Clear Liquid Optical Chamber (CLOC) (otherwise known as a 'freshwater lens') filled with fresh water in a planar view (Plate 3) was used to improve the chances of acquiring imagery of suitable quality, in what was expected to be a highly turbid environment.

All DDC transects were sampled in consideration of the Joint Nature Conservation Committee (JNCC) epibiota remote monitoring operational guidelines (Hitchin et al., 2015).

The camera system was deployed from the hydraulic 'A' frame on the aft deck of the *MJM Enterprise*. When deployed to the seabed, the camera was kept as close to the seabed as possible to gain a clear image with the footage viewed in real-time by the onboard OEL Ecologist via the umbilical. At each DDC transect, the camera was deployed to the seabed over the target start / end transect location and slowly 'flown' just above the seabed along the transect to obtain both continuous video footage and still images. The camera was flown above the seabed during camera transects at a consistent speed of 0.3 kts or less. Over a 100 m transect, this resulted in the collection of approximately 11 minutes of video footage.

All footage underwent a preliminary review in situ by the OEL's onboard ecologists. Videos were recorded in a digital format. Detailed notes were taken of visible sediment conditions and seabed features, obvious fauna, and habitat-related features whilst in the field, prior to detailed analysis in the laboratory. Whenever a photograph was taken a positional fix was recorded in Navipac.

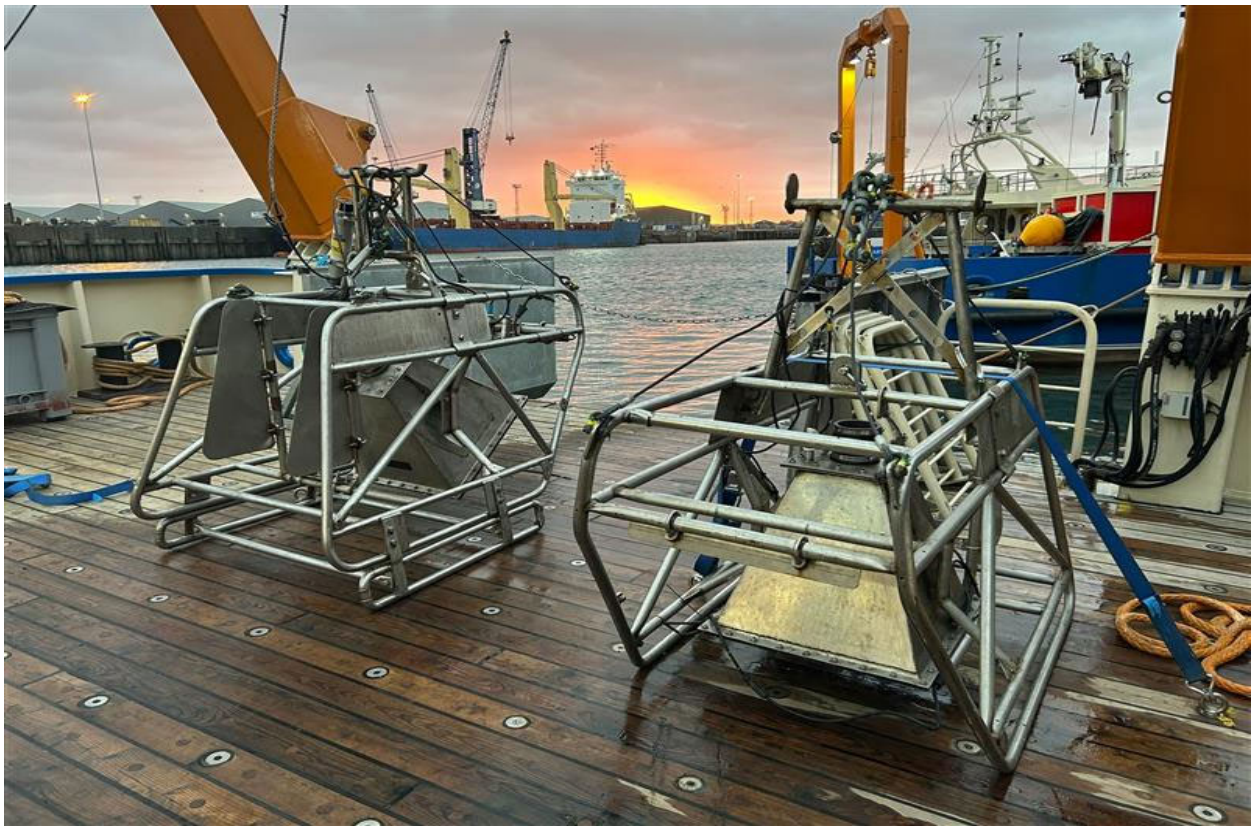


Plate 3 SubC Rayfin camera system set up with the freshwater housing angled forward at 45 degrees (left) and a camera frame set up with the freshwater housing set up in a planar view (right).

3.4.2. Grab sampling

A 0.1 m^2 stainless steel Day grab was used for all grab sampling operations (Plate 4) and deployed from the port side crane. At all stations, two replicate 0.1 m^2 samples of approximately 10 L were collected from two deployments of the grab sampler. One sample was retained for macrobenthic analysis, and the second for Particle Size Distribution (PSD) and chemical analyses.

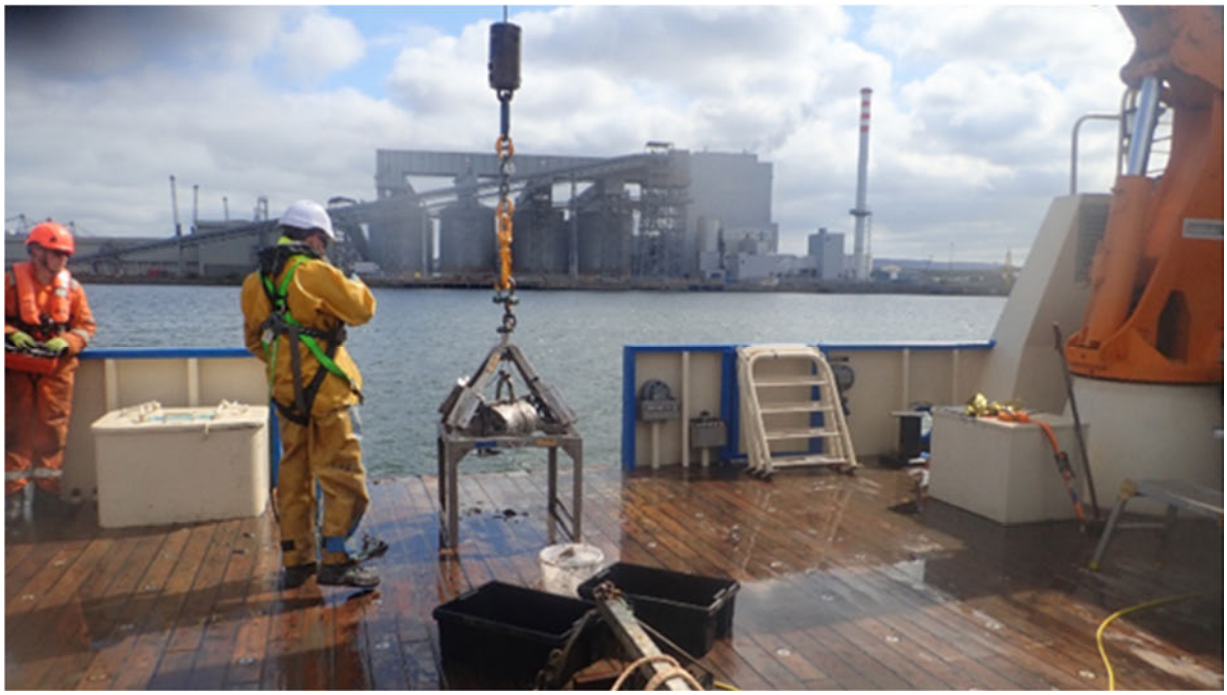


Plate 4 Day grab onboard *MJM Enterprise* using port side crane for deployment and recovery.

The macrobenthic sample was elutriated through a 1 mm sieve, fixed with 4-10% buffered formalin solution and retained for subsequent macrobenthic analysis in the laboratory.

To ensure consistency in sampling, grab samples were screened by the lead ecologist and considered unacceptable if:

- Sample replicates were less than 5 L, i.e., the sample represents less than approx. a half of the 10 L capacity of the grab used.
- The jaws failed to close completely or were jammed open by an obstruction, allowing fines to pass through (washout or partial washout).
- The sample was taken at an unacceptable distance from the target location (beyond 50 m).
- There was obvious contamination of the sample from survey equipment, paint chips etc.

A complete field log of grab attempts was recorded in the field and is available as a fundamental deliverable within the wider data package.

3.4.3. Sediment Sample Processing (Macrobenthic, PSD and chemical)

Processing of the first grab sample was undertaken in line with the following methodology, at all sampling stations:

- Initial visual assessment of sample size and acceptability made.
- Photograph of the sample with station details and scale bar was taken.
- Sample emptied onto 1.0 mm sieve net laid over 4.0 mm sieve table and washed through using gentle rinsing with seawater hose.
- Photograph of the sieved sample with station details and scale bar was taken.
- Remaining sample was backwashed into a suitable sized sample container with 10% formalin solution added to fix the sample prior to laboratory analysis.
- Sample containers were clearly labelled internally and externally with project code, sample ID and type.

From the second replicate sample collected using the day grab:

- Initial visual assessment of sample size and acceptability made.
- Photograph of the sample with station details and scale bar was taken.
- A minimum of 200 ml and maximum of 500 ml of the sample removed as PSD sub-sample and transferred to a labelled and sealed plastic container and frozen at -20°C in an onboard freezer.
- Sub-samples of sediment decanted into appropriate sample containers for sediment physio-chemical analyses, and frozen immediately at -20 °C in an onboard freezer.

Detailed field notes and digital photographs were taken of each station and included station number, fix number, number of attempts, water depth. Visual descriptions of sediment type were made (using the Folk classification categories) at the time of sampling, together with estimates of sample volume. Any notable or obvious fauna present was also recorded in the field notes.

3.4.4. Scientific Beam Trawl

Beam trawl tows were undertaken in consideration of the guidelines set out by Ware et al. (2011) and Curtis & Coggan (2007). Tows were undertaken at a speed of 1.0 - 1.5 knots for approximately 100 m deployed from the stern A-Frame. The direction of each tow was dependent on tide and wind conditions, where tow direction aligned against the prevailing direction of the tide. Tow start times and positions were recorded at the point when the trawl made contact with the seabed and end times and positions when hauling of the trawl commences.

OEL's 2 m scientific beam trawl with a 5 mm mesh cod end insert was used. The beam trawl had the following dimensions:

- Headline height: 55 cm
- Shoe length: 77 cm
- Width: 15 cm

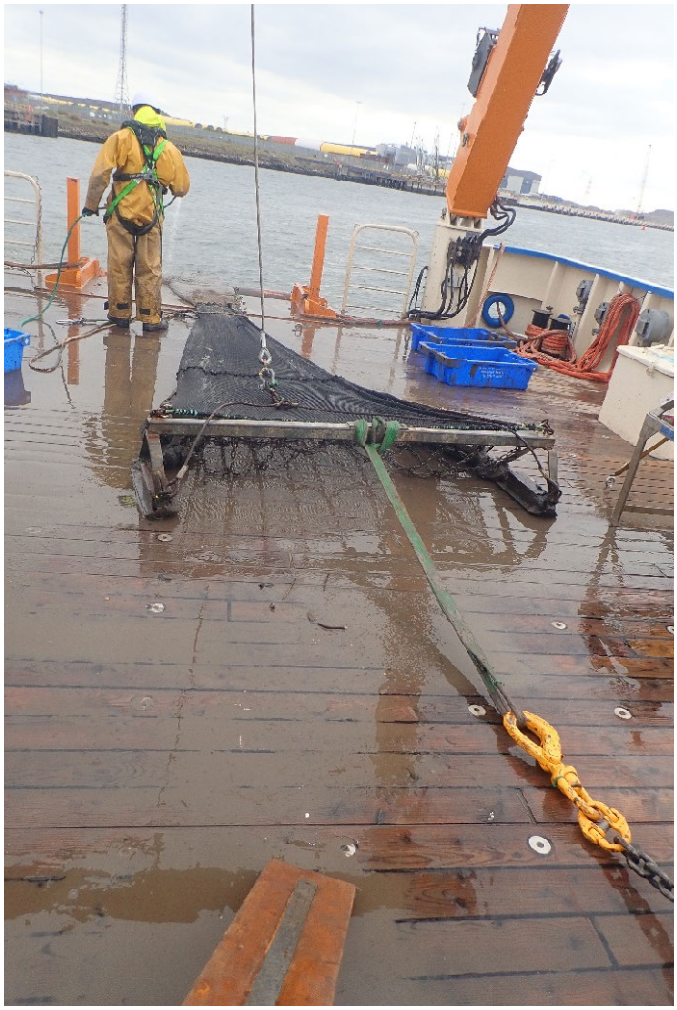


Plate 5 Beam trawl (OEL) onboard *MJM Enterprise*.

3.4.5. Beam Trawl Processing

Trawl samples were processed in line with the guidelines set out by Ware et al. (2011) and Curtis & Coggan (2007) as follows:

- A photograph of the entire catch, prior to sorting, with station details was taken. A reference photograph of each new species caught for the survey was also taken.
- All fish and epibenthic fauna were sorted for identification and enumeration (presence / absence for colonial / encrusting species) in the field.
- Total length (from snout tip to the longest extension of the caudal fin tip) measurements (to the nearest mm) was be taken for all individuals Wing-width (to the nearest mm) was also to be recorded for rays. Epibenthic invertebrate species will be identified to the lowest taxonomic resolution possible and commercial shellfish will be measured using the methods set out in EC Regulation 850/983: carapace length for lobsters (*Homarus gammarus*) and carapace width for edible and velvet crabs (*Cancer pagurus* and *Necora puber* respectively), mantle length for all cephalopods, shell height for all whelk (*Buccinum undatum*) and shell length for all King (*Pecten maximus*) and Queen scallops (*Aequipecten opercularis*). Scallops were measured to the scientific standard of height of the shell measured perpendicular from the hinge. Measurements were recorded and all individuals were returned to the sea, other than those required for subsequent laboratory identification.
- All taxa were weighed, and wet weight bulk total weight provided by summing all individual weights per trawl.
- Where identification requires clarification, individuals were to be transferred to a labelled sample container and fixed in 4-5 % buffered formaldehyde solution and identified on return to OEL's NE Atlantic Marine Biological Quality Control (NMBAQC) scheme participating laboratory.
- The entire sample was then returned to the water once all individuals have been identified, enumerated, and measured (where required). No fish were retained following processing other than those required for subsequent laboratory identification.

3.4.6. Scrape Sampling

To understand the species composition of the surficial environment, a scrape survey, to collect epifauna and epifloral specimens from the existing jetties of the proposed Lighthouse Green Fuels development site was required.

Scrape sampling was conducted onboard the Rigid Raider using a handheld paint scraper and 50 cm x 50 cm quadrat. A total of 30 scrape samples (15 from each jetty) were taken from various vertical components (piles) of the two structures evenly distributed across tide heights.

Samples were taken at high tide (±1 hour), mid-tide (±1 hour) and low tide (±1 hour), with even numbers of samples from each tide height (i.e., 5 samples from each jetty at each tidal height).

The vessel pulled alongside the sampling locations chosen in the field to provide a representative distribution across the piles. Scrape samples were collected by hand within an area of 50 cm x 50 cm. A quadrat was used to outline the area for scraping, a photograph was taken, and a scraping tool used to collect all colonising fauna. Samples were retained in a suitably sized sample container and diluted 10% formalin solution added to fix the sample prior to laboratory analysis. Sample containers were clearly labelled internally and externally with sample ID and project name.

Distance from the top of the structure (main infrastructure, not railings) was also measured and recorded in field sampling logs.

4. Results

4.1. Survey Progress

The *MJM Enterprise* was mobilised on 26th April 2026 and demobilised on 30th April 2026 at Hartlepool Fish Quay. During this period the vessel was operational for three days. The *Rigid Raider* and *Cerberus* were mobilised on 27th April in Teesport, operational for one day, and demobilised after the scrape sampling scope was completed.

A summary of the sampling undertaken is detailed in Table 5.

Table 5 Sampling summary.

Date	Activity	Number of sample stations completed			
		Camera	Grab	Beam Trawl	Scrape
26.04.2026	Personnel arrived to the *MJM Enterprise,* and equipment mobilisation was completed by 20:00 UTC	0	0	0	0
27.04.2026	*MJM Enterprise* crew change, the vessel departed for the survey site arriving at 11:30, operations began undertaking Drop Down Camera transects before transit back to Hartlepool Fish Quay. Personnel also mobilised the *Cerberus* for scrape sampling low water stations were sampled at 06:15, mid-tide stations at 09:17 and high tide stations 12:15 before returning to port for demobilisation.	7	0	0	30
28.04.2026	*MJM Enterprise* arrived on site at 06:00, operations commenced undertaking grab sampling until 13:30. Operations then switched to beam trawls before heading back to Hartlepool Fish Quay at 17:00.	0	15	2	0
29.04.2026	Vessel arrived on site at 06:00 and began operations at 06:30. Trawling operations were completed by 15:00. The repeat camera stations were completed by 16:15 before the vessel began the transit to Hartlepool Fish quay for demobilisation.	0	0	6	0
30.04.2026	OEL personnel departed the vessel and began travel back to OEL head office following equipment demobilisation.	0	0	0	0
	Total	**7**	**15**	**8**	**30**

4.2. Weather and Technical Downtime

Throughout the duration of the project there was no downtime because of weather. There was a 30-minute technical delay on 27th April as a result of the camera umbilical being damaged in which the time was used to switch to the spare umbilical.

4.3. Seabed Imagery Results

Eleven minutes video of the seabed and a minimum of one still per minute were collected for all seven transects, all collected on the 27th of April. One transect (CS_004 (2)) was repeated as a result of vessel traffic impacting completion of the transect. A second transect (CS_008 (2)) was repeated due to plumage affecting clear imagery of seabed. Examples of imagery collected are presented in Plate 6.

4.4. Grab Sampling Results

All grab samples (n = 15) included macrofaunal (MAC), particle size distribution (PSD) and chemical analysis (CHEM) subsamples and were collected on 28th April. All stations were sampled successfully on the first attempt at recovering an acceptable sample size. Mud was the dominant sediment type encountered throughout the survey area, based on preliminary in-field assessments. Examples of sediment types found during the survey are presented in **Plate 7**.

4.5. Beam Trawl Results

All beam trawling samples (n = 8) were successfully collected between 28th and 29th April. Fauna present within the sediment was identified to the lowest taxonomic form possible in the field. Any unidentifiable samples (typically annelids) were collected and stored appropriately (diluted formalin) for identification in the laboratory. Common species identified in the trawls included Dab (*Limanda limanda*), Common Goby (*Pomatoschistus microps*) and Plaice (*Pleuronectes platessa*). Invertebrate taxa were also collected in the trawl which included the Common Shore crab (*Carcinus maenas*), Brown shrimp (Crangonidae) and Bobtail squid (Sepiola). Species of interest included blue mussels (*Mytilus edulis*) and Banded wedge shell (*Donax vittatus*). Examples of identification processes in the field are presented in Plate 8.

4.6. Scrape Sampling Results

All scrape samples (n = 30) were successfully collected across five piles at each of the two jetties across three tidal states, low, mid and high (±1 hour), on 27th April. The same pile was sampled at the three tide states, excluding the third forward pile at jetty number 1, which became inaccessible at high tide. Instead, the second middle pile was sampled. Initial field interpretation by survey personnel noted the dominant species to be *Semibalanus balanoides*, and *Mytilus edulis* at low water. Note that species identifications will be ratified by detailed macrobenthic analysis. Biomass and biodiversity were lower higher up the piles (Plate 9).

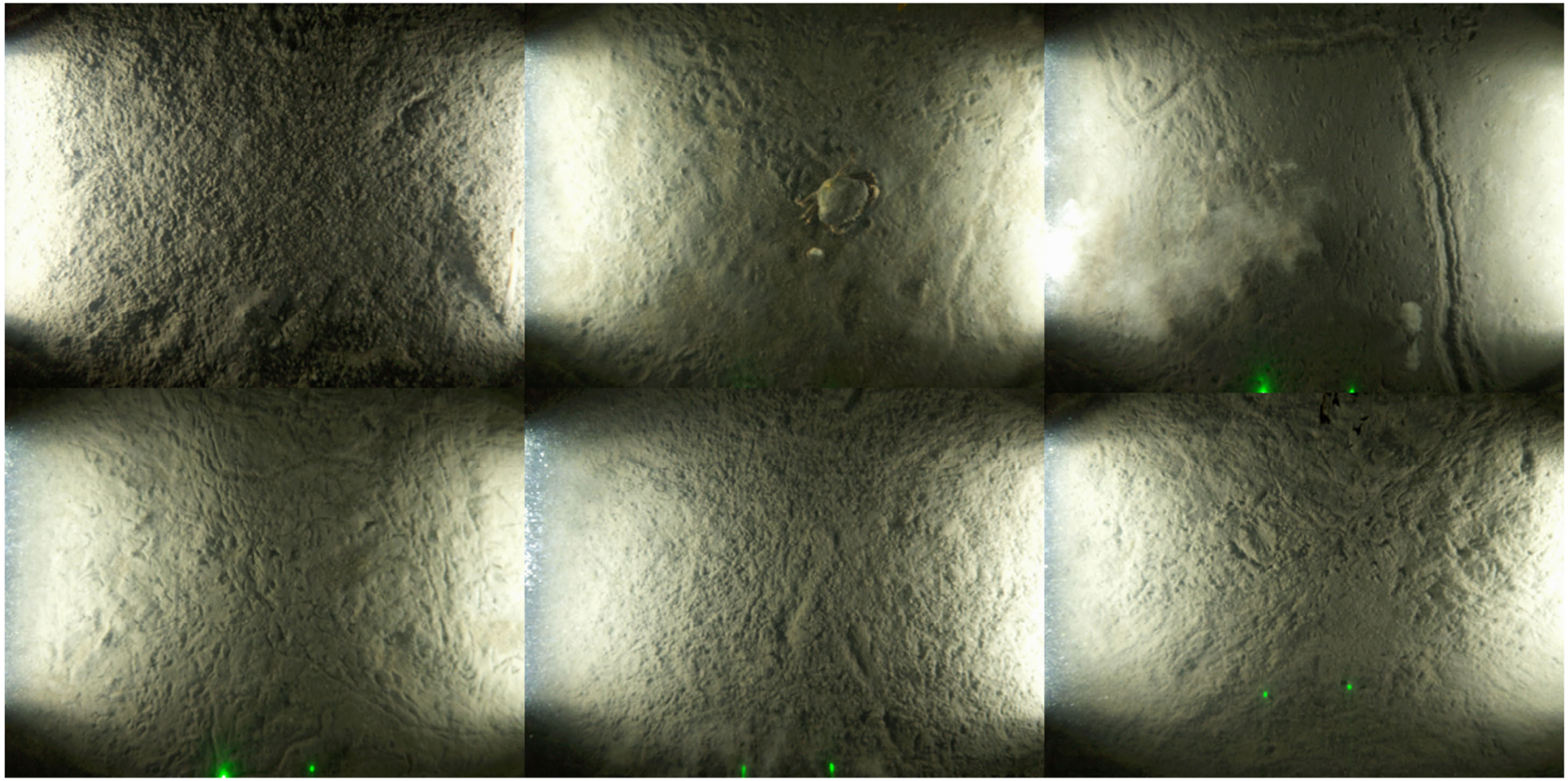


Plate 6 Seabed imagery stills from top left to right and bottom left to right (CS_002; CS_003; CS_004 (2); CS_005; CS_007; CS_008).



Plate 7 Sediment grab summary from top left to right and bottom left to right. Unreleased DG_04 PSD/CHEM; released DG_13; sieved DG_10; unreleased DG_11 MAC; released DG_05; sieved DG_12.



Plate 8 Trawling samples examples. Top left to right includes sieved BT_03(A); BT_05; BT_08. Bottom left to right specific species picked out BT_03; BT_03(A); BT_02.



Plate 9 Scrape sample quadrat and bucket images for Pile number 3 middle row Jetty 1 at low (left) mid (middle) and high (right) tidal states.

5. References

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4 Marine Mammal Observation Results

INCA 2026-40

Marine Mammal Observation Surveys

‘Lighthouse Green Fuels’ Project

River Tees

Seal Sands Road, Stockton-on-Tees

August 2026

Industry Nature Conservation Association

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July 2025

Introduction

1.1 Project Background

INCA was commissioned by Alfanar in June 2026 to undertake a series of Marine Mammal Observation (MMO) Surveys at the Proposed Development site of the new Lighthouse Green Fuels Sustainable Aviation Fuel (SAF) Project located on Seal Sands Road.

Surveys were to be conducted from the existing INEOS jetties prior to their demolition and the scheduled construction of a new quay. The purpose of the surveys and interpretation of results is to understand the extent of which the adjacent estuary is used by the area's marine mammal population.

1.2 Desktop Study

The Tees River Estuary, namely Greatham Creek and the Tees Barrage, are known to support significant numbers of both the Grey Seal (*Halichoerus grypus***)** and the Common Seal (*Phoca vitulina)*. Seal Sands also supports a local breeding population of the Common Seal, which is now recognised as being of national importance and a feature contributing to the designation of the Teesmouth and Cleveland Coast as a Site of Significant Scientific Interest (SSSI).

The site itself and the River Tees up to the Tees Barrage is within this SSSI. Seal Sands is located approximately 3.6km North-east from the proposed development site, whereas Tees Barrage is located approximately 11.4km to the South-west. Grey Seals are known to forage at distances upwards of 100km from their haul out sites, with Common Seals travelling within 40-50 km (SCOS, 2020 and Berwick Bank Wind Farm, 2023).

Common Seals are seen using Seal Sands most often during mid to late summer (mid-June onwards), which coincides with their typical pupping season which occurs from June to August. Numbers of Grey Seals are also typically higher from late summer (mid-August onwards) compared to the beginning of the season, although Grey Seals will not begin pupping until October. Additionally, Seal Sands is the closest known location to the River Tees where seal pups are present.

The Tees Barrage is of particular importance as a feeding site for the Grey and Common Seal populations. Migratory fish species use the barrage as a corridor when moving up the river which provides foraging opportunities for the seals in the area. Monitoring of the number of seals present within the Barrage has been conducted by the Canals and Rivers Trust annually since 2008. Seals are recorded between March through to November, with the highest counts of individuals being recorded from July to October, which coincides with the time of year that salmon are moving up the River Tees. There are also anecdotal records from the Canal and Rivers Trust of seal presence here throughout the winter months.

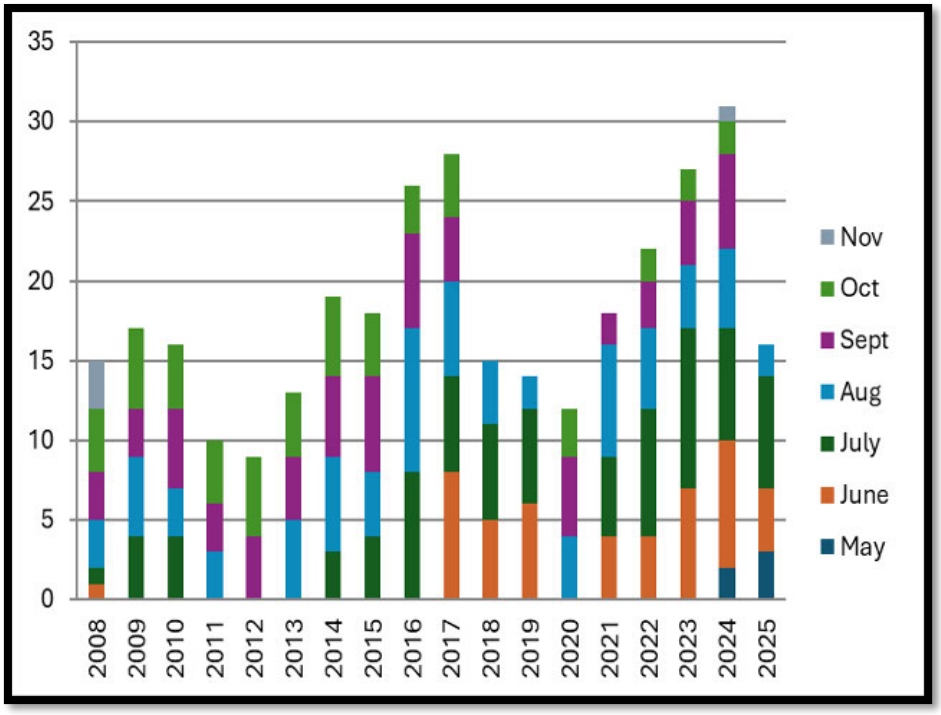


Figure 1: Maximum Grey Seals seen on the Tees Barrage from 2008-2025 (@ Canals and Rivers Trust)

Relevant Wildlife Legislation

2.1 Conservation of Habitats and Species Regulations 2017

All species of cetacean (dolphins, porpoises and whales) are classified as Schedule 2 European Protected Species (ESP) under this directive and therefore receive extra protection. The regulations deem it an offence to deliberately or recklessly kill, injure, capture or disturb an ESP as well as damage or destroy resting and breeding sites used by the ESP

2.2 Wildlife and Countryside Act 1981

Under the Wildlife and Countryside Act 1981, it is deemed as an offence to intentionally injure, harm or kill a seal or cetacean, whether it be in captivity or wild. Protections for the aforementioned species extends to 12 nautical miles (nm) offshore.

Interfering with areas used for protection and shelter by seal populations as well as disturbing seals inhabiting these areas is also prohibited. The term ‘disturbance’ in this case includes factors such as noise (boat engines or voices), sight (people or shadows approaching a seal) or physical proximity within approximately 50m of a hauled-out seal.

Intentionally disturbing or harassing any species of cetacean is also considered an offence under this Act.

2.3 Conservation of Offshore Marine Habitats and Species Regulations 2017

The scope of this Act applies to what is known as the ‘Offshore Area’ which extends from 12nm from the landward baselines of the UK territorial sea and protects all seal and cetacean species found in the UK. It is an offence to; kill, injure, take, possess or keep a seal or cetacean. Their resting and breeding sites are also protected from damage or disturbance, and the animals themselves are also protected against unlawful disturbance unless unavoidable in certain offshore zones.

2.4 Protection of Seals Act 1970

This Act originally prohibited the unnecessary killing or capture of a seal as well use of ‘unlawful’ killing of seals via methods such as poisoning or the use of certain projectiles of firearms. Its amendment alongside the Fisheries Act (2020) now prohibits the reckless or intentional killing, disturbance, and harm of seals and now heavily restricts the circumstances in which killing a seal would be considered permissible in England.

Field Survey

3.1 Survey Method

Morgan Robson-Young and Sarah Barry conducted six surveys, both Ecologists at INCA. Sarah has over 20 years of Marine Mammal Survey experience using multiple methodologies worldwide. Morgan has at least 5 years of ecological survey experience. Each survey lasted for four hours, with constant observation of the survey area being conducted throughout the survey period.



Figure 2: The scope of the survey area outlined by the red lined boundary and the vantage points used (@ GoogleEarth)

Scans of the highlighted area were made from two separate stationary vantage points (Figure 2). The surveyor remained at the Northern vantage point for the first two hours of each survey before relocating to the second Southern point for the remaining two hours to ensure proper visual coverage of the river was achieved. Binoculars with a 10x42 magnification power were used for each survey.

The distance from the jetties, species and behaviour of each seal observed were recorded alongside the tidal phase, weather conditions, and visibility during the survey.

Table 1: Field Survey details

Date	Tide	Weather and observation period
29/06/2026	LT @ 0923h GMT, 1.4m	Overcast, Cloud 5/8 oktas, 20 °C, Wind Force 5 08:15 – 12:15h
01/07/2026	LT @ 1038 GMT, 1.2m	Sunny, Cloud 7/8 oktas, 16°C, Wind Force 2 111:30 – 15:30h
09/07/2026	HT @ 1003 GMT, 4.7m	Sunny, Cloud 0/8 oktas, 26 °C, Wind Force 3 12:30-16:30h
10/07/2026	HT @ 1113h GMT, 4.7m	Sunny, Cloud 0/8 oktas, 27°C, Wind Force 1 09:00 – 13:00h
14/07/2026	HT @ 1531h GMT, 5.3m	Overcast, Cloud 7/8, 18°C, Wind Force 6 12:30 – 16:30h
16/07/2026	LT @ 1113h GMT, 0.4m	Overcast, Cloud 7/8 oktas, 18 °C, Wind Force 1 08:00-12:00h

4.2 Survey Constraints

Weather conditions and visibility were good and therefore did not impact the survey results.

There were frequent passes of container ships, pilot boats, and other vessels directly opposite to the jetties and within the area of the river being surveyed. Industrial and commercial shipping disturbance is therefore a factor to consider in this area.

On occasion seals farther away from the jetties could not be identified to a species-specific level and are instead referred to as *Seal sp*. in Table 2.

Additionally, it should be considered that a seal recorded in a similar location multiple times or in frequent succession is likely to be the same individual.

Survey Result

The number of seals recorded across the survey period were as follows:

Table 2: Seals observed from the vantage points.

Tidal Phase	Date	Number of Individuals Seen		
		Grey Seal	Common Seal	Seal sp.
Low	29/06/2026	0	4	0
Low	01/07/2026	3	1	1
High	09/07/2026	1	0	1
High	10/07/2026	1	0	3
High	14/07/2026	3	0	2
Low	16/07/2026	4	0	1
	Total	11	5	8

A total of 23 individual seals were recorded throughout the survey period across 43 separate observations. Of the 43 observations, the seals were recorded 'bottling' a total of 36 times, resulting in this being the most observed behaviour. 'Bottling' refers to an instance of a seal raising its nose or its head above the surface of the water to breathe for a short period of time to rest. Seals were recorded travelling or commuting within the boundary on six occasions and a single feeding event was observed on the 16th of July when a Grey Seal was seen eating a salmonid. There were no sightings of any cetaceans on any of the surveys.

Seals were seen from Vantage Point 1 on 20 occasions, with the average distance of an observation being approximately 441 metres away from the jetty. There were 23 observationss from Vantage Point 2, with an average distance of approximately 420 metres away.

Regarding other fauna present on the surveys, there were several occasions of Common Terns (*Sterna hirundo*) and Sandwich Terns (*Thalasseus sandvicensis*) actively foraging and catching fish within the survey boundary ranging from approximately 200m to 600m from the vantage points Numbers of Cormorants (*Phalacrocorax carbo)*, Herring Gulls (*Larus argentatus*) as well as small groups of Oystercatchers (*Haematopus ostralegus)* were seen regularly resting on structures adjacent to the vantage points as well as foraging and feeding on the banks next to the jetties, with the closest observation being a single Cormorant resting on Vantage Point 2 before being flushed by the surveyor. A Peregrine Falcon (*Falco peregrinus*) flew over the jetties on the 9th of July, and one Whimbrel *(Numenius phaeopus)* was observed to fly in from the North of the site and come to rest on the bank next to Vantage Point 1 on the 14th of July.

Discussion

5.1 Interpretation of Results

Following the completion of the survey period it can be reasonably argued that the estuary adjacent to the jetties is of a moderate importance to the local Grey and Common seal populations. The area is used regularly by seals, likely travelling to and from haul out sites located at Greatham Creek or Tees Barrage and the bay between the South Gare and North Gare, as well as out to sea.

Although only one instance of active foraging by a seal was observed on the surveys, it is evident that the area is able to provide hunting and feeding opportunities. It is likely that seals spending time under the surface of the water would also be spending time feeding on smaller fish or crustaceans without being visible to the surveyor. Some individual seals spent a significant amount of time within the river, adjacent to the vantage points, ranging from approximatley 30 minutes to upwards of one hour.On the 10th of July, one seal was observed to stay within 300 meters of Vantage Point 1 for approximately one hour and ten minutes with multiple instances of bottling behaviour. One female Grey Seal spent at least 45 minutes diving and resurfacing in the same area directly in front of Vantage Point 2 on the 16th of July. These longer stretches of time spent within the estuary are likely to be indicative of active foraging periods taking place underwater.

The behaviour of bottling is undertaken when seals are at rest, often between feeding. As 84% of sightings were of bottling seals, and a seal was observed feeding, this indicates that seals are spending the majority of their time within the survey area at rest, or feeding.

Seals rarely came close in to either of the vantage points. There were twelve occasions of seals present within 250 metres of either jetty. However, 73% of the individual seals recorded were within 500m of the vantage points, which is the minimum mitigation zone around a piling site prior to any piling (JNCC, 2010). A 500m mitigation zone, would extend across to the opposite side of the River Tees.

The state of the tidal phase during the surveys was not observed to have any significant effect on the number of seal observations or overall seal activity. The maximum number of sightings was ten which was recorded on two occasions ; the 10th of July which was a high tide and the 16th of July which was a low tide.

On the 10th of July there was frequent movement of container ships and other vessels within the boundary and directly opposite the proposed development site from 12:00h onwards. The last seal observed within the area was at 11:49h. The subsequent rise in noise levels as well as disturbance to the water following the vessels arrival into port is likley to have proved a factor in the lack of seal observations for the rest of this survey period.

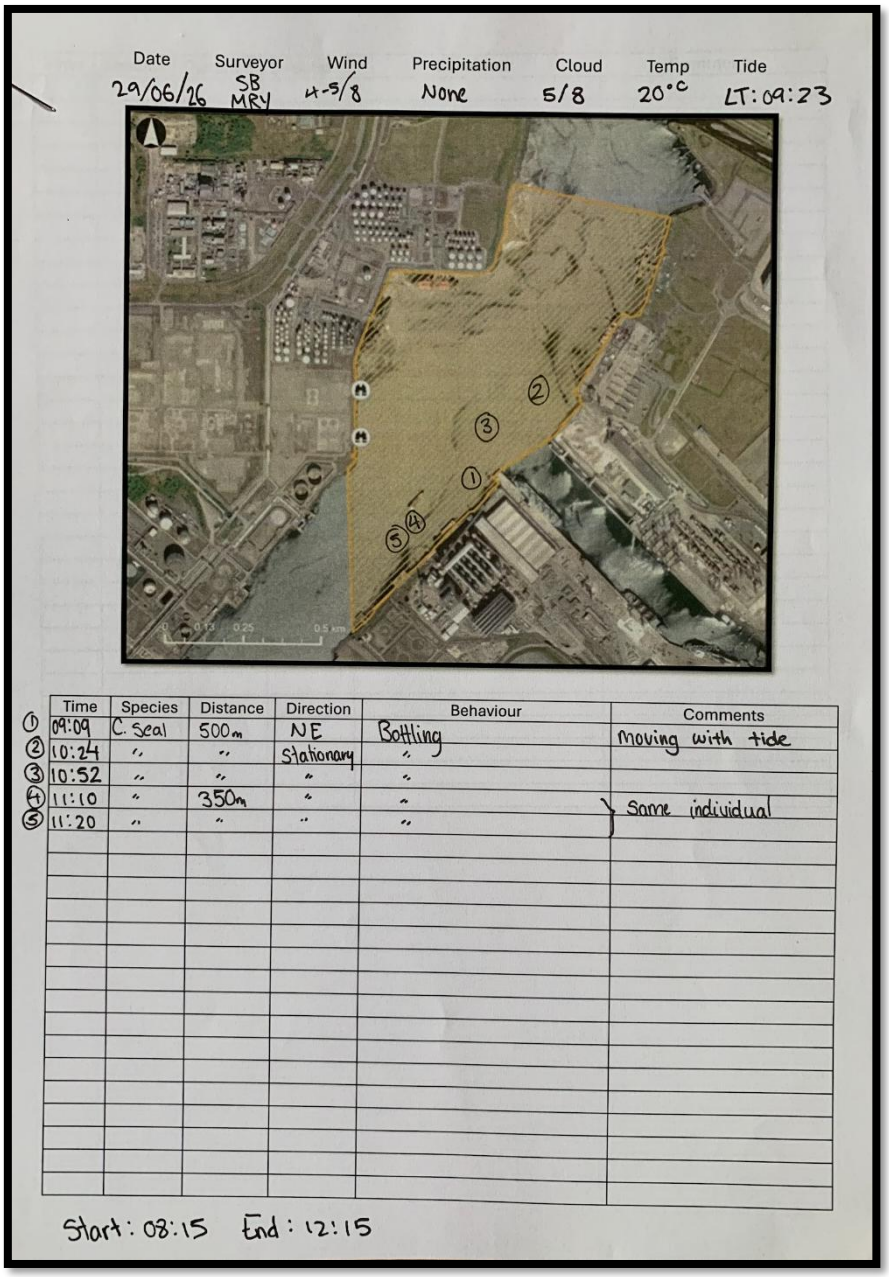
Considering the lack of seal sightings following the movement of the large vessels, it can be assumed that these disruptions from the surrounding industry and its practices are a major factor contributing to seal disturbance within the boundary, likely impacting their ability to hunt as well as acting as a general stressor overall. Therefore, it can be reasonably assumed that the destruction of the existing jetties and the proposed development of the site is likely to cause a level of disturbance to seals frequenting the estuary.

As surveys were undertaken over a two week period, it is not possible to establish any seasonality in seal presense within the survey area, however, from surveys undertaken at Seal Sands and the Tees Barrage, records show that seals are present between March through to November with occasional sightings during the winter months.

5.3 Acknowledgements

Thank you to Jon Pickering from Alfanar for assistance with arranging site access and for acting as a supervisor on the surveys.

Appendix

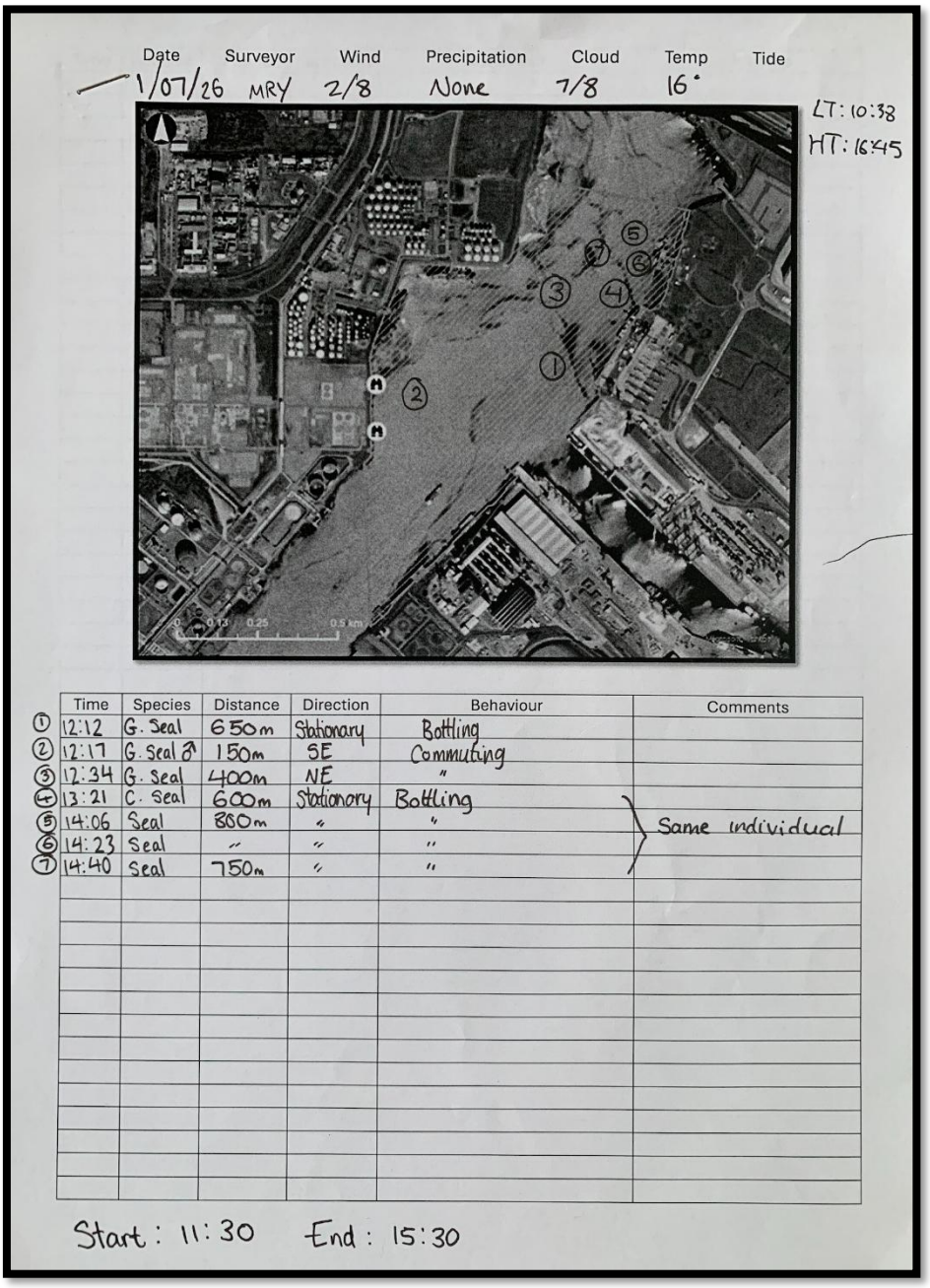


Date	Surveyor	Wind	Precipitation	Cloud	Temp	Tide
29/06/26	SB MRY	4-5/8	None	5/8	20°C	LT: 09:23

	Time	Species	Distance	Direction	Behaviour	Comments
①	09:09	C. Seal	500m	NE	Bottling	moving with tide
②	10:24	"	"	Stationary	"	
③	10:52	"	"	"	"	
④	11:10	"	350m	"	"	} same individual
⑤	11:20	"	"	"	"	

Start: 08:15 End: 12:15

Figure 3: Original survey map and recording sheet from the 29th of June 2026.



Date	Surveyor	Wind	Precipitation	Cloud	Temp	Tide
1/07/26	MRY	2/8	None	7/8	16°	LT: 10:38 HT: 16:45

	Time	Species	Distance	Direction	Behaviour	Comments
①	12:12	G. Seal	650m	Stationary	Battling	
②	12:17	G. Seal ♂	150m	SE	Commuting	
③	12:34	G. Seal	400m	NE	"	
④	13:21	C. Seal	600m	Stationary	Battling	
⑤	14:06	Seal	800m	"	"	Same individual
⑥	14:23	Seal	"	"	"	
⑦	14:40	Seal	750m	"	"	

Start: 11:30 End: 15:30

Figure 4: Original survey map and recording sheet from the 1st of July 2026.

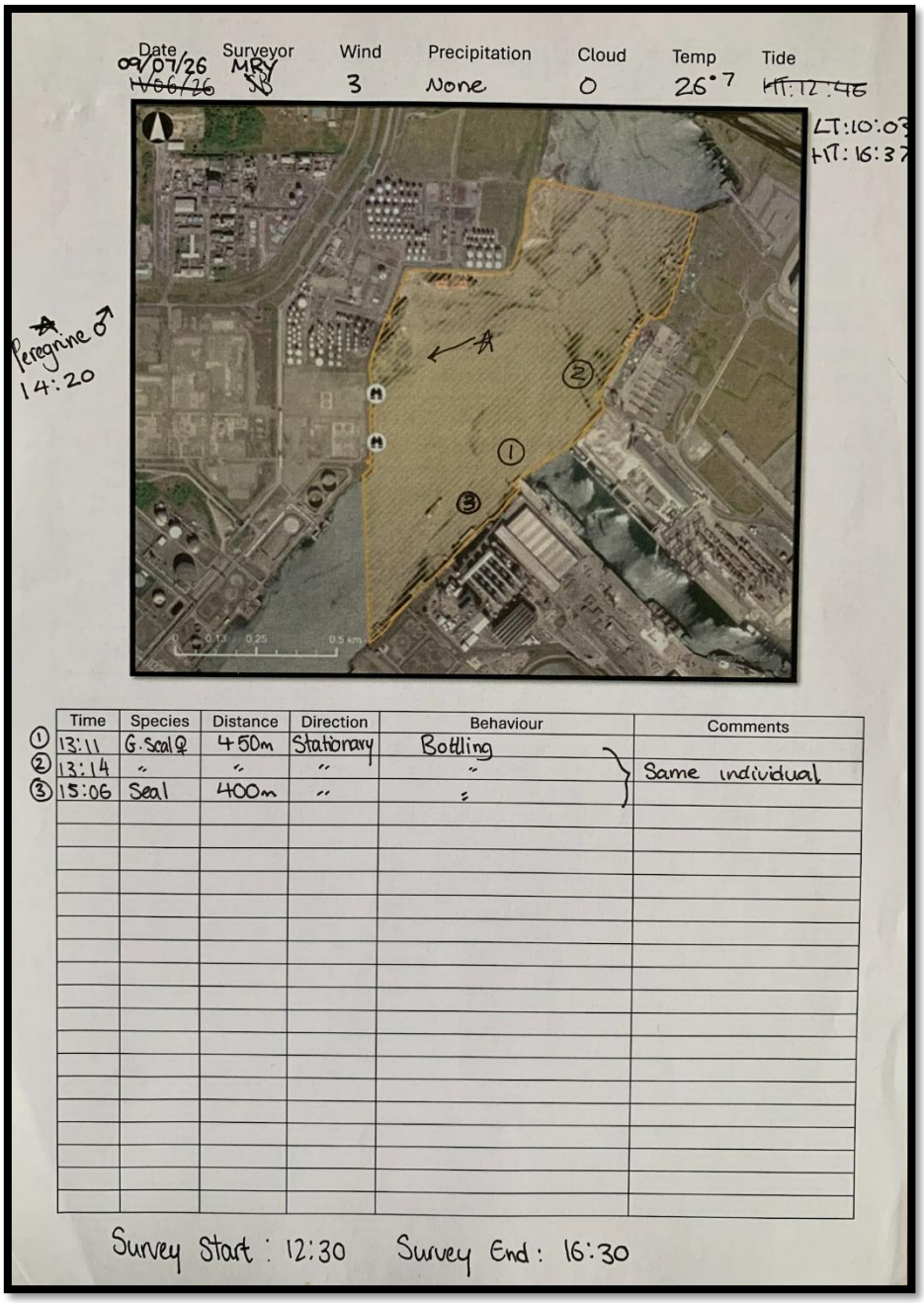
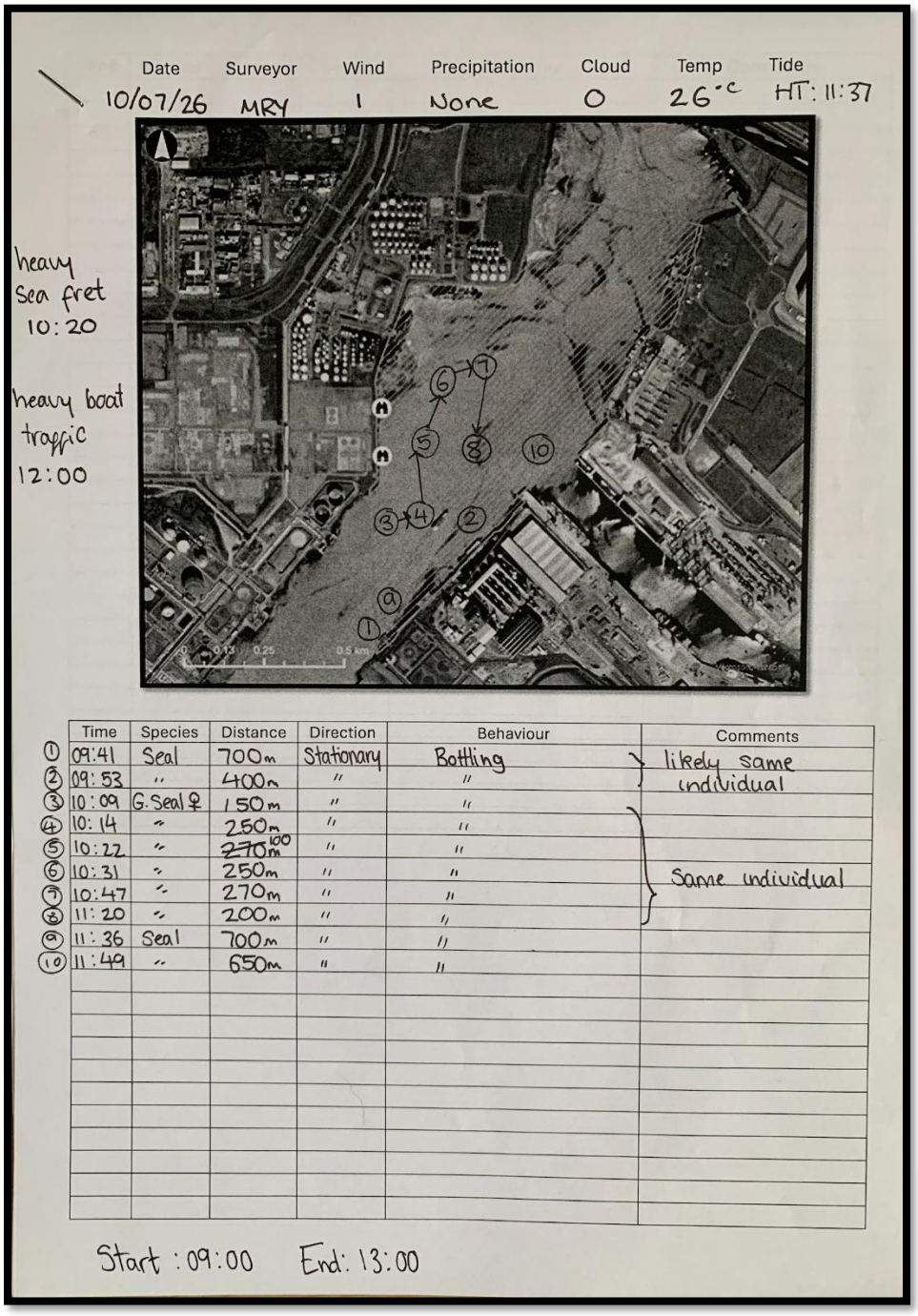


Figure 5: Original survey map and recording sheet from the 9th of July 2026.



Date: 10/07/26 | Surveyor: MRY | Wind: 1 | Precipitation: None | Cloud: 0 | Temp: 26°C | Tide: HT: 11:37

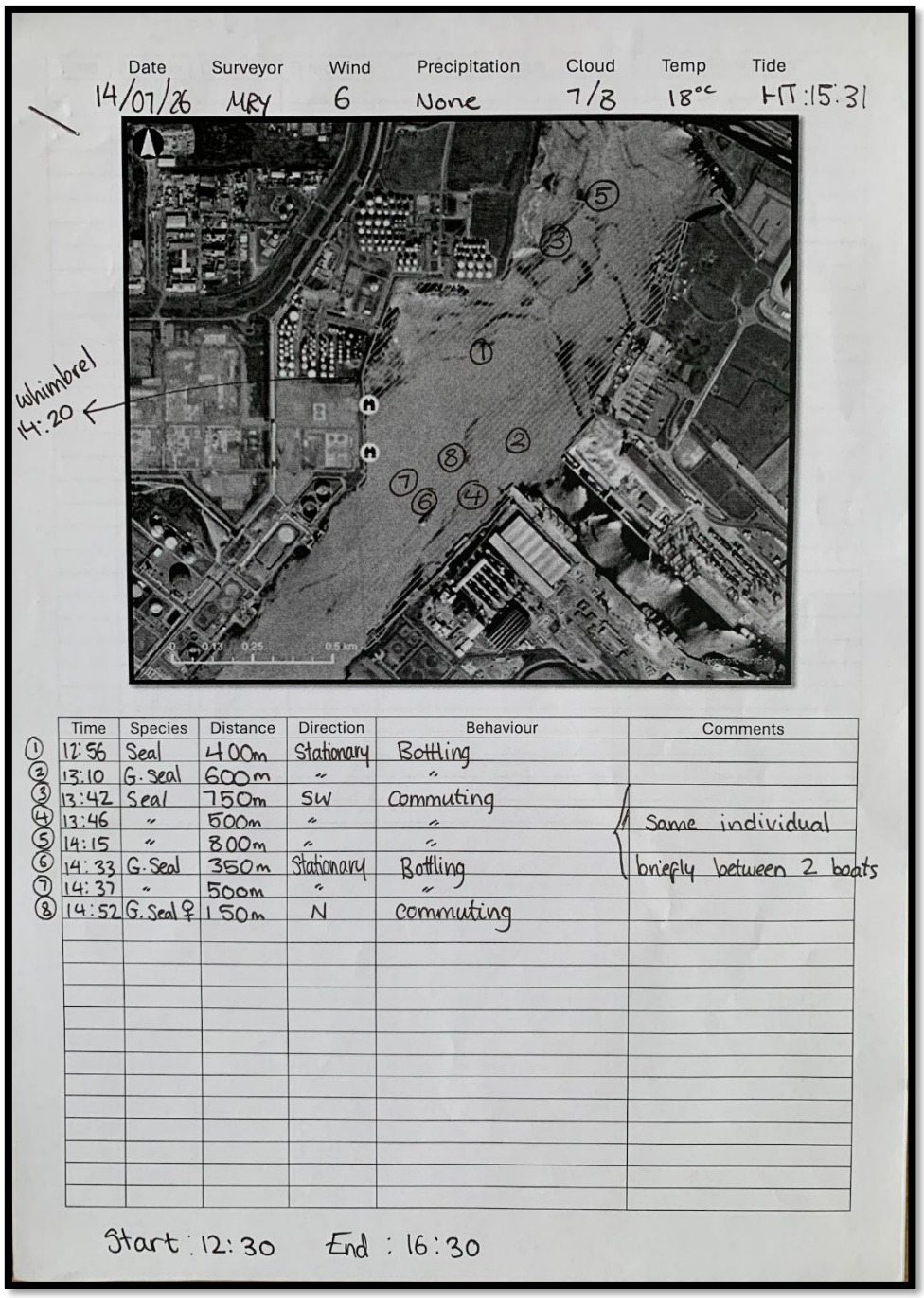
heavy sea fret 10:20

heavy boat traffic 12:00

	Time	Species	Distance	Direction	Behaviour	Comments
①	09:41	Seal	700m	Stationary	Bottling	likely same individual
②	09:53	"	400m	"	"	
③	10:09	G. Seal ♀	150m	"	"	
④	10:14	"	250m	"	"	
⑤	10:22	"	~~270m~~ 100	"	"	
⑥	10:31	"	250m	"	"	Same individual
⑦	10:47	"	270m	"	"	
⑧	11:20	"	200m	"	"	
⑨	11:36	Seal	700m	"	"	
⑩	11:49	"	650m	"	"	

Start: 09:00 End: 13:00

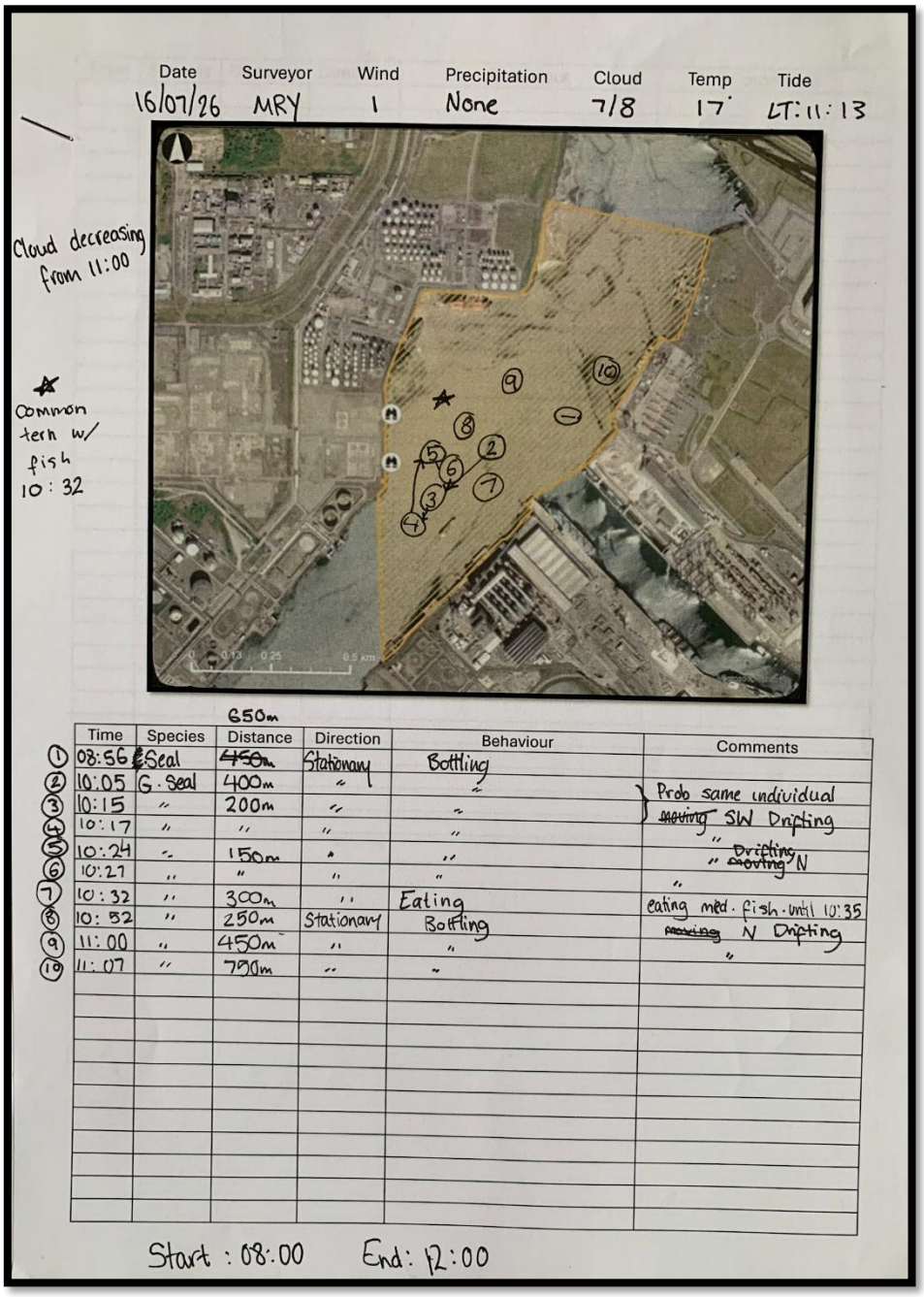
Figure 6: Original survey map and recording sheet from the 10th of July 2026.



	Time	Species	Distance	Direction	Behaviour	Comments
①	12:56	Seal	400m	Stationary	Bottling	
②	13:10	G. Seal	600m	"	"	
③	13:42	Seal	750m	SW	Commuting	
④	13:46	"	500m	"	"	Same individual
⑤	14:15	"	800m	"	"	
⑥	14:33	G. Seal	350m	Stationary	Bottling	briefly between 2 boats
⑦	14:37	"	500m	"	"	
⑧	14:52	G. Seal ?	150m	N	Commuting	

Start: 12:30 End: 16:30

Figure 7: Original survey map and recording sheet from the 14th of July 2026.



Date: 16/07/26 | Surveyor: MRY | Wind: 1 | Precipitation: None | Cloud: 7/8 | Temp: 17° | Tide: LT: 11:13

Cloud decreasing from 11:00

★ Common tern w/ fish 10:32

650m

	Time	Species	Distance	Direction	Behaviour	Comments
1	08:56	Seal	~~450m~~	Stationary	Bottling	
2	10:05	G. Seal	400m	"	"	Prob same individual
3	10:15	"	200m	"	"	~~moving~~ SW Drifting
4	10:17	"	"	"	"	"
5	10:24	"	150m	"	"	" ~~Drifting~~ ~~moving~~ N
6	10:27	"	"	"	"	"
7	10:32	"	300m	"	Eating	eating med. fish. until 10:35
8	10:32	"	250m	Stationary	Bottling	~~moving~~ N Drifting
9	11:00	"	450m	"	"	"
10	11:07	"	700m	"	"	

Start: 08:00 End: 12:00

Figure 8: Original survey map and recording sheet from the 16th of July 2026.

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