

Appendix 11.5

Marine Mammals

Marine Mammals

Marine Mammal Observer records carried out during site investigation works

MARINE MAMMAL RECORDING FORM - LOCATION AND EFFORT DATA (COASTAL WORKS*)

PROJECT No: 17-0167



Location: ARKLOW BAY

Operated by: Causeway Geotech Limited

Platform type/name: "OCM80" Jack-Up Barge and OCM Baby Blue

Contracting Body: Byrne Looby ARUP Joint Venture

Please record the following information every day even if no marine mammals are seen.

Date	Observer name	Time you started looking for marine mammals	Time you stopped looking for marine mammals	Length of time of target operations while you were looking for marine mammals (mins)	Wind force and direction (use Beaufort scale)	Sea state (WMO Sea State Code)	Swell Choose from: 0 = no Swell 1 = <1 m 2 = 1-2 m 3 = 2+ m	Visibility Choose from: 1 = < 1 km 2 = 1-5 km 3 = > 5 km	Were marine mammals present in the time before the target operations began and how long before?	If marine mammals were present, what action was taken? (e.g. delay, none)
22/08/17	S. Graydon	13:00	19:00	360 mins	3 SW	1	0	1	No	-
23/08/17	S. Graydon	07:00	17:00	600 mins	2 S	1	0	2	No	-
24/08/17	S. Graydon	07:00	17:30	630 mins	3 SW	1	0	3	No	-
25/08/17	S. Graydon	07:00	19:00	720 mins	3 SSW	1	0	3	No	-
29/08/17	S. Graydon	11:30	19:00	450 mins	2 S	1	0	3	No	-
30/08/17	S. Graydon	07:00	19:00	720 mins	3 SW	1	0	2	No	-
31/08/17	S. Graydon	07:00	18:45	705 mins	2 SE	1	0	3	No	-
01/09/17	S. Graydon	12:30	17:00	270 mins	3 S	1	0	3	No	-
04/09/17	S. Graydon	08:00	19:00	540 mins	2 E	1	0	1	No	-
05/09/17	S. Graydon	07:00	13:00	360 mins	3 SE	1	0	2	No	-
07/09/17	S. Graydon	12:30	19:00	390 mins	3 W	3	2	2	No	-
08/09/17	S. Graydon	07:00	19:00	720 mins	4 NW	1	2	3	No	-
19/09/17	S. Graydon	07:00	19:00	720 mins	3 SSW	1	1	3	No	-
20/09/17	S. Graydon	07:00	9:30	150 mins	3 WSW	2	2	2	No	-
20/09/17	S. Graydon	18:30	19:30	60 mins	3 SW	2	2	2	No	-
21/09/17	S. Graydon	07:00	19:00	720 mins	3 - 4 W	2	1	3	No	-

26/09/17	S. Graydon	07:00	19:00	720 mins	3 - 5 SE	1	1	2	No	-
28/09/17	S. Graydon	07:00	13:00	360 mins	2 - 3 S	3	1	3	No	-
29/09/17	S. Graydon	09:30	10:30	60 mins	5 - 6 NW	3	1	2	No	-
30/09/17	S. Graydon	07:00	19:00	720 mins	3 - 4 SW	2	1	3	No	-
08/10/17	S. Graydon	10:00	19:00	540 mins	1 - 2 W	1	1	3	No	-
09/10/17	S. Graydon	07:00	19:00	720 mins	2 - 3 WSW	1	1	3	No	-
10/10/17	S. Graydon	07:00	17:00	600 mins	3 - 5 SW	2	2	3	No	-
26/10/17	S. Graydon	07:00	19:00	720 mins	3 - 4 W	2	1	1	No	-
27/10/17	S. Graydon	07:00	19:00	720 mins	2 - 4 NE	1	1	3	No	-
28/10/17	S. Graydon	07:00	15:00	480 mins	3 - 5 S	2	2	1	No	-
02/11/17	L. Newland	07:00	17:00	600 mins	1 - 2 W	1	0	3	No	-
03/11/17	L. Newland	07:00	17:00	600 mins	1 - 2 SW	1	0	3	No	-
06/11/17	L. Newland	08:00	20:00	720 mins	2 - 3 SE	1	0	3	No	-
07/11/17	L. Newland	07:00	14:00	420 mins	1 - 2 NW	1	0	3	No	-

* Coastal works are any operations outside of acoustic seafloor surveys where mitigation for potential impacts of marine noise are required for marine mammals e.g. dredging, pile-driving etc.

MARINE MAMMAL RECORDING FORM - LOCATION AND EFFORT DATA (COASTAL WORKS*)

PROJECT No: 17-0167

Location: ARKLOW BAY

Operated by: Causeway Geotech Limited

Platform type/name: "OCM80" Jack-Up Barge

Contracting Body: Byrne Looby ARUP Joint Venture



ID	Location	Platform name/type	Contracting body	Date	Observer name	Start time	Stop time	Watch duration	Operational Time	Wind force and direction	Sea state	Swell	Visibility	Observer difficulties	Mammals observed	Observation time	Actions taken
1	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	22/08/17	S. Graydon	13:00	19:00	30 mins (pre-start). Constant thereafter.	360 mins	3 SW	1	0	1	No	No	-	No actions required as works in progress.
2	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	23/08/17	S. Graydon	07:00	17:00	30 mins (pre-start). Constant thereafter.	600 mins	2 S	1	0	2	No	No	-	No actions required as works in progress.
3	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	24/08/17	S. Graydon	07:00	17:30	30 mins (pre-start). Constant thereafter.	630 mins	3 SW	1	0	3	No	No	-	No actions required as works in progress.
4	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	25/08/17	S. Graydon	07:30	19:00	30 mins (pre-start). Constant thereafter.	690 mins	3 SSW	1	0	3	No	No	-	No actions required as works in progress.
5	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	29/08/17	S. Graydon	11:30	19:00	30 mins (pre-start). Constant thereafter.	450 mins	2 S	1	0	3	No	No	-	No actions required as works in progress.
6	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	30/08/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3 SW	1	0	2	No	No	-	No actions required as works in progress.
7	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	31/08/17	S. Graydon	07:00	18:45	30 mins (pre-start). Constant thereafter.	705 mins	2 SE	1	0	3	No	No	-	No actions required as works in progress.
8	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	01/09/17	S. Graydon	12:30	17:00	30 mins (pre-start). Constant thereafter.	270 mins	3 S	1	0	3	No	No	-	No actions required as works in progress.
9	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	04/09/17	S. Graydon	08:00	19:00	30 mins (pre-start). Constant thereafter.	660 mins	2 E	1	0	1	No	No	-	No actions required as works in progress.
10	River Avoca	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	05/09/17	S. Graydon	07:00	13:00	30 mins (pre-start). Constant thereafter.	360 mins	3 SE	1	0	2	No	No	-	No actions required as works in progress.
11	Arklow Bay (BH04)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	07/09/17	S. Graydon	12:30	19:00	30 mins (pre-start). Constant thereafter.	390 mins	3 W	3	2	2	No	No	-	No actions required as works in progress.
12	Arklow Bay (BH04)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	08/09/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	4 NW	1	2	3	No	No	-	No actions required as works in progress.
13	Arklow Bay (BH05)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	19/09/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3 SSW	1	1	3	No	No	-	No actions required as works in progress.
14	Arklow Bay (BH05)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	20/09/17	S. Graydon	07:00	09:30	30 mins (pre-start). Constant thereafter.	150 mins	3 SW	2	2	2	No	No	-	No actions required as works in progress.
15	Arklow Bay (BH05)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	20/09/17	S. Graydon	18:30	19:30	30 mins (pre-start). Constant thereafter.	60 mins	3 WSW	2	2	2	No	No	-	No actions required as works in progress.
16	Arklow Bay (BH05)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	21/09/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3-4 W	2	1	3	No	No	-	No actions required as works in progress.
17	Arklow Bay (BH06)	720 B24mins	OCM Ltd./Causeway Geotech Ltd.	26/09/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3-5 SE	1	1	2	No	No	-	No actions required as works in progress.
18	Arklow Bay (BH06)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	28/09/17	S. Graydon	07:00	13:00	30 mins (pre-start). Constant thereafter.	360 mins	2-3 S	3	1	3	No	No	-	No actions required as works in progress.

19	Arklow Bay (BH06)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	29/09/17	S. Graydon	09:30	10:30	30 mins (pre-start). Constant thereafter.	60 mins	5 - 6 NW	3	1	2	No	No	-	No actions required as works in progress.
20	Arklow Bay (BH06)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	30/09/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3 - 4 SW	2	1	3	No	No	-	No actions required as works in progress.
21	Arklow Bay (BH08)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	08/10/17	S. Graydon	10:00	19:00	30 mins (pre-start). Constant thereafter.	540 mins	1 - 2 W	1	1	3	No	No	-	No actions required as works in progress.
22	Arklow Bay (BH08 / BH07)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	09/10/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	2 - 3 WSW	1	1	3	No	No	-	No actions required as works in progress.
23	Arklow Bay (BH07)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	10/10/17	S. Graydon	07:00	17:00	30 mins (pre-start). Constant thereafter.	600 mins	3 - 5 SW	2	2	3	No	No	-	No actions required as works in progress.
24	Arklow Bay (BH10)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	26/10/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	3 - 4 W	2	1	1	No	No	-	No actions required as works in progress.
25	Arklow Bay (BH10 / BH09)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	27/10/17	S. Graydon	07:00	19:00	30 mins (pre-start). Constant thereafter.	720 mins	2 - 4 NE	1	1	3	No	No	-	No actions required as works in progress.
26	Arklow Bay (BH09)	OCM80 JUB	OCM Ltd./Causeway Geotech Ltd.	28/10/17	S. Graydon	07:00	15:00	30 mins (pre-start). Constant thereafter.	480 mins	3 - 5 S	2	2	1	No	No	-	No actions required as works in progress.
27	Arklow Bay (BH11)	OCM Baby Blue	OCM Ltd./Causeway Geotech Ltd.	02/11/17	L. Newland	07:00	17:00	30 mins (pre-start). Constant thereafter.	600 mins	1 - 2 W	1	0	3	No	No	-	No actions required as works in progress.
28	Arklow Bay (BH17)	OCM Baby Blue	OCM Ltd./Causeway Geotech Ltd.	03/11/17	L. Newland	07:00	17:00	30 mins (pre-start). Constant thereafter.	600 mins	1 - 2 SW	1	0	3	No	No	-	No actions required as works in progress.
29	Arklow Bay (BH16 / BH18)	OCM Baby Blue	OCM Ltd./Causeway Geotech Ltd.	06/11/17	L. Newland	08:00	20:00	30 mins (pre-start). Constant thereafter.	720 mins	2 - 3 SE	1	0	3	No	No	-	No actions required as works in progress.
30	Arklow Bay (BH19)	OCM Baby Blue	OCM Ltd./Causeway Geotech Ltd.	07/11/17	L. Newland	07:00	14:00	30 mins (pre-start). Constant thereafter.	420 mins	1 - 2 NW	1	0	3	No	No	-	No actions required as works in progress.

*Coastal works are any operations outside of acoustic seafloor surveys where mitigation for potential impacts of marine noise are required for marine mammals e.g. dredging, pile-driving etc.

Please Read the Explanatory Worksheet "READ THIS"

Transcription of marine mammal noise exposure criteria

Appendix 11.8.5.2 – Transcription of marine mammal noise exposure criteria given by Southall *et al.*²³. Table B includes received levels (RL) from multiple pulse and non-pulse sound events reported to elicit significant behavioural responses* in previous studies. [* w.r.t. Irish-occurring species]

A, Criteria for Permanent Injury - estimated values for PTS-onset.

Cetaceans			Pinnipeds	Pinnipeds
<i>Low frequency</i>	<i>Mid-frequency</i>	<i>High frequency</i>	<i>in Water</i>	<i>in Air</i>
7 Hz-22 kHz	150 Hz-160 kHz	200 Hz-180 kHz	75 Hz-75 kHz	75 Hz-30 kHz
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoises	All species	All species
<u>Single Pulse:</u> 230 dB SPL 198 dB SEL	<u>Single Pulse:</u> 230 dB SPL 198 dB SEL	<u>Single Pulse:</u> 230 dB SPL 198 dB SEL	<u>Single Pulse:</u> 218 dB SPL 186 dB SEL	<u>Single Pulse:</u> 149 dB SPL 144 dB SEL
<u>Multiple Pulse:</u> 230 dB SPL 198 dB SEL	<u>Multiple Pulse:</u> 230 dB SPL 198 dB SEL	<u>Multiple Pulse:</u> 230 dB SPL 198 dB SEL	<u>Multiple Pulse:</u> 218 dB SPL 186 dB SEL	<u>Multiple Pulse:</u> 149 dB SPL 144 dB SEL
<u>Non-pulses:</u> 230 dB SPL 215 dB SEL	<u>Non-pulses:</u> 230 dB SPL 215 dB SEL	<u>Non-pulses:</u> 230 dB SPL 215 dB SEL	<u>Non-pulses:</u> 218 dB SPL 203 dB SEL	<u>Non-pulses:</u> 149 dB SPL 144.5 dB SEL

B. Criteria and values for TTS-onset (single pulses only) and Disturbance/Behavioural Response (multiple pulses and non-pulses).

Cetaceans			Pinnipeds	Pinnipeds
<i>Low frequency</i>	<i>Mid-frequency</i>	<i>High frequency</i>	<i>in Water</i>	<i>in Air</i>
7 Hz-22 kHz	150 Hz-160 kHz	200 Hz-180 kHz	75 Hz-75 kHz	75 Hz-30 kHz
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoises	All species	All species
<u>Single Pulse:</u> 224 dB SPL 183 dB SEL	<u>Single Pulse:</u> 224 dB SPL 183 dB SEL	<u>Single Pulse:</u> 224 dB SPL 183 dB SEL	<u>Single Pulse:</u> 212 dB SPL 171 dB SEL	<u>Single Pulse:</u> 109 dB SPL 100 dB SEL
<u>Multiple Pulse:</u> 120-180 dB RL Not applicable	<u>Multiple Pulse:</u> 120-180 dB RL Not applicable	<u>Multiple Pulse:</u> Data unavailable Not applicable	<u>Multiple Pulse:</u> 150-200 dB RL Not applicable	<u>Multiple Pulse:</u> Data unavailable Not applicable
<u>Non-pulses:</u> 120-160 dB RL Not applicable	<u>Non-pulses:</u> 90-200 dB RL Not applicable	<u>Non-pulses:</u> 90-170 dB RL Not applicable	<u>Non-pulses:</u> 100+ dB RL Not applicable	<u>Non-pulses:</u> 110-120 dB RL Not applicable

²³ Units of measurement:
 Sound Pressure Level, SPL (in water): measured in dB re: 1 µPa (peak) (flat)
 Sound Exposure Level, SEL (in water): measured in dB re: 1 µPa²-s
 Sound Pressure Level, SPL (*in air*): measured in dB re: 20 µPa (peak) (flat)
 Sound Exposure Level, SEL (*in air*): measured in dB re: (20 µPa)²-s

Reproduced from Department of Arts, Heritage and the Gaeltacht (January 2014); Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters