

REPORT

Boston Alternative Energy Facility

Outline Marine Mammal Mitigation Protocol

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Table of Contents

Glossary of Acronyms		iii
1	Purpose of This Report	1
1.2	Agreement on the Final MMMP	1
2	Summary of Potential Impacts to Marine Mammals	3
3	Marine Mammal Mitigation Measures	7
3.1	Piling	7
3.2	Mitigation Protocol for Piling	7
3.3	Vessels	10
4	Mitigation Protocols	20
5	References	28

Table of Tables

Table 2-1 Summary of underwater noise assessments (PTS) and vessel collision risk for harbour seal	5
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Mitigation Protocols

Box 1 Mitigation Protocol for Piling	21
Box 2 Best Practice Measures for Vessels	22
Box 3 Reporting of Marine Mammal Strandings	24
Box 4 Marine Mammal Collision Reporting Form	25
Box 5 Stranded or Deceased Marine Mammal Reporting Form	26

Glossary of Acronyms

Acronym	Definition
BDMLR	British Divers Marine Life Rescue
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
CSIP	Cetacean Strandings Investigation Programme
dB re 1 μPa	Decibel level in water (decibels per 1 micro pascal)
DCO	Development Consent Order
DML	Deemed Marine Licence
IMO	International Maritime Organisation
IWC	International Whaling Commission
JNCC	Joint Nature and Conservation Committee
km	Kilometre
km²	Square Kilometres
MMO	Marine Management Organisation
MMOb	Marine Mammal Observer
MMMP	Marine Mammal Mitigation Protocol
MU	Management Unit
NMP	Navigation Management Plan
PAM	Passive Acoustic Monitoring
PTS	Permanent Threshold Shift
SCOS	Special Committee on Seals
SE	South East
SEL	Sound Exposure Level
SEL_{cum}	Sound Exposure Level (cumulative)
SEL_{ss}	Sound Exposure Level (single strike)
SNH	Scottish Natural Heritage (now NatureScot)
SPL_{peak}	Sound Pressure Level (peak)

1 Purpose of This Report

- 1.1.1 This Outline Marine Mammal Mitigation Protocol (MMMP) is for the Boston Alternative Energy Facility (the Facility). This report is provided on behalf of Alternative Use Boston Projects Limited (the Applicant), to support the application for a Development Consent Order (DCO) (the DCO application) for the Facility that has been made to the Planning Inspectorate under Section 37 of the Planning Act 2008 (the Act).
- 1.1.2 The purpose of this Outline MMMP is to define the measures to be put in place to mitigate the potential impacts of any physical injury or permanent auditory injury / change in hearing sensitivity (Permanent Threshold Shift (PTS)) to marine mammals associated with the construction and operation of the proposed Facility.
- 1.1.3 This Outline MMMP is secured by Condition 17 of the draft Deemed Marine Licence (DML) contained within Schedule 9 to the draft DCO (document reference 2.1(3) which requires a final MMMP to be approved by the Marine Management Organisation (MMO) following consultation with the statutory nature conservation body and Lincolnshire Wildlife Trust. The final MMMP submitted for approval must be in accordance with this Outline MMMP. The piling method statement (approved under Condition 13 of the DML) and the navigation management plan (approved under Condition 14 of the DML) are both required to contain measures for managing potential risks to marine mammals in accordance with the approved MMMP.
- 1.1.4 This Outline MMMP sets out the protocol of how the proposed Facility would mitigate impacts assessed in Environmental Statement Chapter 17 Marine and Coastal Ecology (document reference 6.2.17, APP-055), to reduce the likelihood of any potential physical or permanent auditory injury to marine mammals as a result of underwater noise during underwater piling operations and the presence of vessels during construction and operation.

1.2 Agreement on the Final MMMP

- 1.2.1 The final MMMP will be submitted for approval in accordance with Schedule 9, Condition 17 of the DML;

17.—(1) The undertaker must submit a marine mammal mitigation protocol to the MMO for approval in accordance with the procedure in Part 4, following consultation with the relevant statutory nature conservation body and Lincolnshire Wildlife Trust, at least 13 weeks prior to the commencement of any of licenced activity.

(2) The marine mammal mitigation protocol submitted for approval under sub-paragraph (1) must be in accordance with the outline marine mammal mitigation protocol.

(3) The undertaker must not commence the licenced activities until the MMO has approved in writing the submitted marine management mitigation protocol.

(4) Unless otherwise agreed by the MMO, the marine mammal mitigation protocol must be implemented as approved by the MMO.

1.2.2 When finalising the MMMP, once the final piling design and methodologies are known, the Applicant will ensure the following information is provided on the pile design:

- Types of pile;
- Number of each type of pile;
- Pile diameters;
- Piling methodologies;
- Hammer energy required for installation for each pile type (for any impact piling);
- Piling durations (for each pile, and in total for all piles and pile types); and Piling programme.

1.2.3 The final MMMP will be based on the mitigation measures as set out within this Outline MMMP. As set out in the Updated Piling Noise Assessment (document reference 9.16, REP1-029) there is unlikely to be any simultaneous piling as each pile location would have its own specific requirements, that would require previous piles to be installed in order for the next to be installed. The wharf piling duration (4 months) is predicated on almost continuous piling during the allowable construction hours without any simultaneous piling occurring.

1.2.4 If required, following final pile design, site specific underwater noise modelling would be undertaken to determine the maximum impact range for PTS. The modelled impact range for PTS will be used to determine the range over which monitoring by the Marine Mammal Observers (MMObs) from suitable vantage points will need to be conducted, to reduce the risk of PTS in marine mammals that could be present in the area during piling operations. The underwater noise modelling would be undertaken for conditions at both high and low tides to determine potential requirements for mitigation measures during both these periods.

- 1.2.5 The final MMMP will be approved by the MMO in consultation with Natural England and Lincolnshire Wildlife Trust.

2 Summary of Potential Impacts to Marine Mammals

- 2.1.1 High exposure levels from underwater noise sources (such as impact piling) can cause permanent auditory injury or hearing impairment, through permanent loss of hearing sensitivity (PTS).
- 2.1.2 Piling at the Facility will be for both sheet piles and tubular piles, and will use impact piling. Sheet piles would take up to five minutes each to install, while tubular piles would take up to 15 minutes.
- 2.1.3 A number of piling rigs would be on site at any one time, allowing for the next piles to be placed in readiness for piling, while the previous are installed. It is possible that there would be continuous piling, as there would sufficient rigs on site to allow for changeover times to occur while other piles are installed. However, it is unlikely that there would be any simultaneous piling as each pile location would have its own specific requirements, that would require previous piles to be installed in order for the next to be installed. A maximum of 96 sheet piles and a maximum of 48 tubular piles could therefore be installed in any one day (over a maximum of 12 hours working time,-) ~~and a maximum of 48 tubular piles.~~
- 2.1.4 PTS can occur instantaneously from acute exposure (Sound Exposure Level (SEL)) to high noise levels, such as single strike (SEL_{ss}) of the maximum hammer energy during piling. PTS can also occur as a result of prolonged exposure to increased noise levels, such as during the duration of pile installation (SEL_{cum}).
- 2.1.5 Due to the water levels at the Facility during low water (or within three hours of low water), noise levels are not expected to propagate at distance from the sound source. There is not expected to be any significant levels of noise for piling undertaken during low water, however, all piling is expected to be subject to the procedures as provided within this Outline MMMP on a precautionary basis. This will be confirmed in the final MMMP following final pile design, and site specific underwater noise modelling (if required).
- 2.1.6 **Table 2-1** summarises the assessments relevant to the Outline MMMP for underwater noise impacts to harbour seal due to piling, dredging, and vessels, during construction and operation, and the potential for an increase in collision risk with vessels, during construction and operation. Further information on these

assessments is within Chapter 17 Marine and Coastal Ecology¹, Appendix 17.1 Habitats Regulations Assessment², and the Marine Mammal Addendum (document reference 9.14).

¹ 6.2.17 Environmental Statement - Chapter 17 - Marine and Coastal Ecology [APP-055]. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010095/EN010095-000440-6.2.17.%20Chapter%2017%20Marine%20and%20Coastal%20Ecology.pdf>

² 6.4.18 Environmental Statement - Appendix 17.1 - Habitats Regulations Assessment [APP-111]. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010095/EN010095-000490-6.4.18.%20Appendix%2017.1%20Habitats%20Regulations%20Assessment.pdf>

Table 2-1 Summary of underwater noise assessments (PTS) and vessel collision risk for ~~marine mammals~~ (harbour seal **only**)

Potential impact	Criteria and threshold	Impact range (and area)	Maximum number of individuals (% of reference population)	Magnitude	Sensitivity	Impact significance	Mitigation
Construction related impacts only							
PTS from single strike piling	218 dB re 1 μ Pa SPL _{peak} unweighted impulsive criteria (Southall <i>et al.</i> , 2019)	0m (0km ²)	0 harbour seal	No potential for impact.	High	No impact.	Mitigation for piling at high water following Joint Nature Conservation Committee (JNCC) Protocol (JNCC, 2010), as outlined in Section 3.1 and Box 1
PTS from cumulative piling	185 dB re 1 μ Pa ² s SEL _{cum} weighted impulsive criteria (Southall <i>et al.</i> , 2019)	90m (<0.01km ²)	0.008 harbour seal (based on the harbour seal density of 0.80/km ² at the Application Site) ^{3,4} . 0.0002% of the South East (SE) England Management Unit (MU) population ⁵ . 0.0003% of the most recent count of adult seals in The Wash ^{5,6} .	Permanent effect with negligible magnitude (less than 0.001% of the reference population anticipated to be exposed to effect).	High	Minor adverse	
PTS from dredging activities (cumulative)	201 dB re 1 μ Pa ² s SEL _{cum} weighted non-impulsive criteria	<10m (0.0003km ²)*	0.0002 harbour seal (based on the harbour seal density of 0.80/km ² at the Application Site). 0.000005% of the SE England MU population.	Permanent effect with negligible magnitude (less than 0.001% of the reference population)	High	Minor adverse	No mitigation required as highly unlikely that marine mammal would be in very close vicinity

³ Russell *et al.*, 2017

⁴ Application Site = the development area around the Facility

⁵ Special Committee on Seals (SCOS), 2020

⁶ ~~SCOS, 2020~~

Potential impact	Criteria and threshold	Impact range (and area)	Maximum number of individuals (% of reference population)	Magnitude	Sensitivity	Impact significance	Mitigation
	(Southall <i>et al.</i> , 2019)		0.000008% of the most recent count of adult seals in The Wash.	anticipated to be exposed to effect).			(<10m) for 24 hours or more.
Construction and operation related impacts							
Increased risk of collision for marine mammals (impact zone includes the Wash as a transit area) during both construction and operation [5% at increased risk]	-	10.46km ²	1.7 harbour seal harbour porpoise (based on the harbour seal density of 3.189/km ² over whole project area). 0.05% of the SE England MU population. 0.07% of the most recent count of adult seals in The Wash.	Permanent effect with medium magnitude (between 0.01% and 0.1% of the reference population anticipated to be exposed to effect).	Low	Minor adverse	Mitigation for vessels as outlined in Section 3.3 and Box 2

3 Marine Mammal Mitigation Measures

3.1 Piling

3.1.1 As a precautionary approach, mitigation will be undertaken for all piling works, to ensure that any potential impact to marine mammals (and fish species) are reduced as far as is possible. These measures are secured as part of the piling method statement required by condition 13 of the DML (Schedule 9 to the draft DCO (document reference 2.1(3)), which requires the piling method statement to include measures for managing potential risks to marine mammals in accordance with the approved MMMP.

3.1.2 Piling would be undertaken between June and September only, to reduce the potential for impact to ecological receptors such as overwintering birds.

3.1.3 This mitigation would include:

- Pre-piling watch for marine mammals, following the standard JNCC ‘Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise’ (JNCC Protocol)⁷ (JNCC, 2010) for minimising the risk of injury to marine mammals from piling noise; and
- Soft-start and ramp-up procedures, for piling activities, where possible taking into account final pile design (and durations).

3.2 Mitigation Protocol for Piling

3.2.1 A flowchart of the mitigation for piling is included in **Box 1**. See ~~paragraph 2.1.5 Section 1~~ for more information.

Pre-Piling Watch

3.2.2 For any piling activity, a pre-piling watch will be undertaken for a period of at least 30 minutes prior to piling. This will be undertaken by fully qualified and experienced Marine Mammal Observer (MMOb) during hours of daylight and good visibility (as defined within the JNCC MMOb recording forms⁸ as more than 1km in all directions [noting the restrictions set out in ~~paragraph 3.2.4~~ 3.1.6]).

3.2.3 Due to the piling programme restrictions of being undertaken in daylight hours

⁷Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise, 2010 <https://data.jncc.gov.uk/data/31662b6a-19ed-4918-9fab-8fbcff752046/JNCC-CNCB-Piling-protocol-August2010-Web.pdf>

⁸ Marine Mammal Recording Form <https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/Deckforms-rev04.doc>

only⁹, the use of Passive Acoustic Monitoring (PAM) is not currently considered in this Outline MMMP. PAM is not an optimum method of detecting seal species (as they tend to vocalise less underwater than cetacean species).

- 3.2.4 The pre-piling watch should monitor a 500m radius around the piling location (referred to as the mitigation-monitoring zone). Note that due to the location of the Facility, it may not be possible to see the entire mitigation-monitoring zone from all piling locations (due to the bend in the river to the north, however, the minimum viewable distance would be at least 150m at all times, and the full 500m monitoring zone would be used wherever possible to do so. Although it is important to note that the maximum potential PTS range of 90m would be visible at all times and for all piling locations.
- 3.2.5 If marine mammals are detected within the monitoring zone, the commencement of piling would be delayed until the marine mammal is outside of the monitoring zone for 20 minutes, and the full 30 minute pre-piling watch has been completed.

Soft-Start and Ramp-Up Protocol

- 3.2.6 The soft-start and ramp-up procedure for piling, where is it technically possible taking into account final pile design (e.g. durations), will be conducted prior to any piling. Each piling event will commence with a hammer energy at as low as is reasonably practical, followed by a gradual ramp-up to full hammer energy. Note that, due to the very short expected piling times of five minutes or 15 minutes per pile (dependent on pile type), the full soft-start procedure as stated within the JNCC Piling Protocol (JNCC, 2010) may not be possible. However, the piling, where possible, would commence with hammer energies as low as is reasonably practical, with a ramp-up to full hammer energy for as long a period as is possible.
- 3.2.7 This procedure is only required where there has been no piling for the preceding 10 minutes (i.e. if piling continues at a new location within 10 minutes of a pile being installed, as is expected, then this soft-start and ramp-up protocol would not be required).
- 3.2.8 If a marine mammal enters the monitoring zone during the soft-start and ramp-up procedure, then, if possible, the piling energy will not increase until the marine mammal exits the monitoring zone.

Full Piling Sequence

- 3.2.9 Due to the specific piling requirements of this project, with a piling period of five minutes for each sheet pile, and 15 minutes for each tubular pile, 'full piling' refers

⁹ Of between 7am and 7pm, or 8am and 8pm, during the summer months only (of June to September)

to a sequence of piling, at different piling locations, with no break in overall piling (i.e. a piling sequence would include multiple sheet piles, and the next pile sequence would commence only when there is a break of more than 10 minutes in piling).

3.2.10 When piling at full power, there is no requirement to cease piling or reduce the power if a marine mammal is detected in the monitoring zone.

Breaks in Piling

3.2.11 In the event that piling activity is stopped for less than 10 minutes, then a check of the surrounding area should be undertaken by the MMOB for any marine mammal presence within the monitoring zone before piling can recommence. If a marine mammal is present within the monitoring zone, the full mitigation procedure should be undertaken prior to piling recommencing.

~~3.2.113.2.12~~ 3.2.12 In the event that piling activity is stopped for more than 10 minutes, the piling coordinator would ensure that the pre-piling watch, soft-start and ramp-up procedure (if possible) is conducted prior to piling re-commencing.

~~3.2.123.2.13~~ 3.2.13 If a watch has been undertaken in the 30 minute period prior to the piling sequence re-commencing, then there would be no requirement for the full pre-piling monitoring to be undertaken, as the 30 minute watch has already been completed.

Reporting

~~3.2.133.2.14~~ 3.2.14 Reporting would be undertaken following the JNCC Statutory protocols^{40,8,11}, and in accordance with Condition 24 of the DML which requires reporting of impact sound to the Marine Noise Registry:

(1) Only when impact driven or part-driven pile foundations or detonation of explosives are proposed to be used as part of the foundation installation the undertaker must provide the following information to the Marine Noise Registry:

(a) prior to the commencement of the licenced activities, information on the expected location, start and end dates of impact pile driving/detonation of explosives to satisfy the Marine Noise Registry's Forward Look requirements; and

⁴⁰ Marine mammal recording forms - <https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/Marine-mammal-recordingforms-rev04.xls>

¹¹ Marine mammal deck forms - <https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/Deckforms-rev04.doc>

(b) within 12 weeks of completion of impact pile driving/detonation of explosives, information on the exact locations and specific dates of impact pile driving/detonation of explosives to satisfy the Marine Noise Registry's Close Out requirements.

(2) The undertaker must notify the MMO of the successful submission of Forward Look or Close Out data pursuant to paragraph (1) above within 7 days of the submission.

3.3 Vessels

3.3.1 As stated in Table 1, mitigation and monitoring measures are proposed to reduce the potential for impact to harbour seals due to an increase in commercial vessel numbers associated with the operation of the Facility.

3.3.13.2 Mitigation measures and monitoring -will be applied to reduce the potential impacts due to the increased number of vessels in the area (i.e. the potential for an increase in collision risk and disturbance from vessels). These are ~~referred to as best practice measures, and are~~ summarised below:

- ~~• Safety, weather and tidal~~ Subject to the pilotage requirements for navigational safety and efficiency (vessel management), and the application of the principle of 'safe speed' (application of COLREGS), vessel speeds of 'as low a speed as reasonably practicable' are to be encouraged within The Haven and The Wash.
 - ~~○ Noting that since the potential for fatal collisions with marine mammals is significantly reduced at vessel speeds of less than 10 knots, BAEF vessel speeds should be aimed to be below that speed, as directed by the onboard Pilot~~
- ~~• Safety permitting, vessels will maintain the same course (if possible) and speed to give, if required, any seal(s) time to avoid the vessel.~~
- ~~• Monitoring Option 1: Observers on board each vessel, monitoring for marine mammals as the vessel makes it way though The Wash and up The Haven. Observers on board each vessel, monitoring for marine mammals as the vessel makes its way through The Wash and up The Haven.~~
- ~~•~~
- ~~• Safety, weather and tidal conditions permitting, vessel speed limits of 6 knots for all vessels travelling within The Haven and The Wash, will reduce the potential for fatal collisions with marine mammals, including harbour seal.~~
- ~~• Safety permitting, vessels will maintain the same course (if possible) and speed to give, if required, any seal time to avoid the vessel. Monitoring~~

~~Option 2: Adaptive monitoring programme Observers on board each vessel, monitoring to record for marine mammal presence and behaviour s-in response to vessels within The Haven and The Wash.as the vessel makes its way through The Wash and up The Haven.~~

•

~~3.3.2 The observers on the vessels can be non-dedicated, and therefore can be a member of the vessels crew, provided that they do not undertake other duties while they are required for marine mammal observations. They should still be qualified as an MMOB, with a JNCC accredited training course.~~

3.3.3 The best practice measures for vessels travelling through and into The Wash and The Haven are shown in **Box 2**.

3.3.4 These measures will ~~form part~~inform of the Navigation Management Plan (NMP) secured by Requirement 14 of the draft DCO.

Development of the Best Practice Measures for Vessels

~~3.3.5 Following consultation with the Port of Boston, additional information has been received on the vessel current (and planned) speed limits within The Haven. While there is currently a general advisory speed limit of 6 knots along The Haven (to mitigate erosion from wash), it is not subject to enforcement by any party.~~

~~3.3.6 Currently, cargo vessels travel through The Haven at up to approximately 12 knots, but slowing as they move further up The Haven to between 4 and 6 knots near the Port itself. The current speed limit is 'safe speed at all times', in accordance with the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS).~~

~~3.3.7 An enforced speed limit is inconsistent with current safe practice and It would restrict the number of vessels able to transit to the Port each tide (i.e. it would increase the transit time, reducing the number of vessels able to transit each tide, and significantly increase the number of vessels within the anchorage area).~~

~~3.3.8 In order to ensure that the presence of vessels within the anchorage area is as low as possible (which is within The Wash and North Norfolk Coast SAC), and poses a greater risk to harbour seals), the previously provided speed limit has been removed from these mitigation previously set out in this document.~~

~~3.3.9 se et out in this document~~As explained above, vessel movements (and speeds) will be under the management of the Port at all times (on-board pilot), to ensure river navigational safety at all times.

Best Practice Measures for Vessels during Construction and Operation

~~3.3.53.3.10~~ The best practice measures follow the relevant principles as outlined in:

- The Sea Watch Foundation Pinniped Code of Conduct (Sea Watch Foundation, 2021);
- Cornwall Marine and Coastal Code Guidelines (Cornwall Marine and Coastal Code Group, 2017);
- Scottish Marine Wildlife Watching Code Parts 1 and 2 (Scottish Natural Heritage (SNH) (now NatureScot), 2017a; SNH, 2017b);
- The Wash & North Norfolk Coast Wild Recreation Guide (The Norfolk Coast Partnership, 2021); and
- North Norfolk District Council Personal Watercraft Code of Conduct (North Norfolk District Council, 2017).

Observers

~~3.3.6~~ As outlined above, all vessels used by the Facility, during both the construction and operational phases, best practice is to have a non-dedicated MMOb on board, to keep watch for any harbour seal (or other marine mammal presence), within both The Haven and The Wash. A non-dedicated MMOb relates to a fully trained MMOb (by an JNCC accredited course), who may undertake other vessel duties while not required on watch (i.e. this can be a member of the vessel's crew). The MMOb duties would be the priority whenever it was required.

~~3.3.7~~ The MMOb would be positioned to ensure the best and uninterrupted view, if required for some vessels, the option for more than one MMOb will be considered. The MMOb should be equipped with binoculars, and in the case of any sighting, evaluate its location and heading against the location and heading of the vessel. Measures should be taken, if required, to avoid a collision with the individual.

~~3.3.8~~ The purpose of having a MMOb on board each vessel will be to watch ahead of the vessel, to ensure that no harbour seal (or other marine mammal) is at risk of collision with the vessel. If a harbour seal (or any other marine mammal) is sighted and considered to be at risk, the protocol is to maintain vessel speed and course (if possible) to allow the seal to move out of the way.

~~3.3.9~~ In addition, for vessels preparing to leave the anchorage area, the MMOb would be required to undertake a check of the area surrounding the vessel, to ensure there are no seals within close proximity to the vessel, particularly the propellers, prior to the vessel starting the engine for transit through the Haven.

~~3.3.10 Additional measures that could be taken, only in the case that it is observed that the individual is not vacating the area and is at risk of collision, include slowing down of the vessel. However, this should only be undertaken where the harbour seal (marine mammal) is at risk and not moving, and it is possible and safe to undertake these additional measures.~~

Vessel Speed and Direction

~~3.3.11 COLREGS Convention on the International Regulations for Preventing Collisions at Sea, (COLREGS) Subject to safety considerations, and directions from the Port of Boston Pilot and / or the vessel Master, vessels travelling to and from the Facility are, will be required to follow the current **speed limit** of 6 knots or less when within The Wash or The Haven. The Port of Boston relies on the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS) safe speed, and in the case of large shipping, safe speed is set by the onboard pilot and is based on the prevailing circumstances, conditions and proximity of other vessels. The vessels associated with the Facility would therefore conform to current practice in The Haven, with a speed limit of 6 knots (unless this is not possible due to safety considerations, as advised by the statutory harbour authority or their representative on a vessel (i.e. the Pilot)).~~

~~3.3.12~~ 3.3.11 A reduction in vessel speed is one of the key measures that can be put in place in order to reduce the risk of collision to marine mammal species.

~~3.3.13~~ 3.3.12 There is a higher risk of collision to fatally injure marine mammals from vessels travelling at higher speeds, due to the increased level of impact (Wang *et al.*, 2007). This relationship between vessels speeds and lethality of collision is species dependant, as it is strongly related to body size.

~~3.3.13~~ 3.3.13 The Port of Boston relies on the COLREGS (1972) safe speed; in the case of large shipping safe speed is set by the onboard pilot and is based on the prevailing circumstances, conditions and proximity of other vessels. Subject pilotage requirements for navigational safety and efficiency (vessel management), and the application of 'safe speed', vessel speeds of 'as low a speed as reasonably practicable' are to be encouraged within The Haven and The Wash, and will be taking into consideration that the potential for fatal collision with marine mammals is significantly reduced at vessel speeds of less than 10 knots.

3.3.14 As well as reducing the potential for lethal injury, a reduction in vessel speeds also reduces the number of collision events (Vanderlaan and Taggart, 2007; Conn and Silber, 2013), as individuals are more likely to have the ability and time to move out of the way with vessels travelling at lower speeds (Hazel *et al.*, 2007;

Gende *et al.*, 2011). Seals are very agile, giving them a good opportunity to move out of the way, and therefore reducing the potential for collision with vessels.

3.3.15 Where there is a presence of vessels, the reduction in vessel speed is a preferred method for reducing collision risk, as stated by the International Whaling Commission (International Whaling Commission (IWC), 2014) and the International Maritime Organisation (IMO, 2016). It is also the only method that has been recommended for smaller marine mammal species. ~~A study into the impact of ice-breaking vessels on phocid seals found that the predicted probability of collision was significantly increased with increasing vessel speed; at a speed of 4 knots or less, the potential for collision was very low, with the potential for collision increasing significantly from 6 knots or higher (Wilson *et al.*, 2017).~~

~~3.3.16 While the mitigation originally put forward to reduce the potential for collision risk was to reduce vessel speeds to 4 knots, further information has been received which means that this restriction would not be possible to undertake safely for all vessels at all times. This is due to the need for larger vessels to navigate at a speed of up to 6 knots in order to have sufficient engine power to navigate safely through The Wash and The Haven.~~

~~3.3.17 While it is not possible for some vessels to travel at a speed of as low as 4 knots (due to vessel manoeuvrability and safety concerns, as noted above), there is no indication that a further reduction to 4 knots would result in further reduction to that risk, as the evidence suggests that at any speed of below 6 knots, the potential for collision is significantly decreased.~~

~~3.3.18~~ 3.3.16 Notwithstanding the need to ensure vessel safety, and the safety of other vessels, at all times the Best Practice measures relating to **speed** are:

- Vessels will maintain a steady speed, and direction, at all times, to allow any marine mammal to predict where the vessel may be headed, and to move out of the way. Vessels should use the defined anchorage area and shipping channel at all times.
- Within 300m of a marine mammal at sea, vessel should maintain speed and direction to ensure the individual can predict the vessel movements, and move out of the area if needed (**Box 2**).
- Vessels should not approach within 600m of known seal haul-out sites¹².
- Extra care should be taken during the harbour seal pupping season of June to July (inclusive), and moult period of August.

¹² As most recently reported in the 2018 harbour seal haul-out site report: <https://wnnmp.co.uk/wp-content/uploads/sites/29/reports/2019/05/SMRU-The-Wash-Breeding-Season-Seal-Survey-Report-2018.pdf>

- If a marine mammal chooses to approach the vessel (for example, to bow-ride) maintain the vessel's speed and direction.

3.3.193.3.17 **General measures** that would be taken in order to reduce the risk of disturbance to marine mammals include:

- Keeping a well-maintained engine and propellor to minimise underwater noise.
- Turning off 'noisy' equipment when close to marine mammals (e.g. engines, propellers (within the anchorage area), and echo sounders) if possible.

Monitoring of Vessel Interactions

3.3.18 There are two options for monitoring the interactions between harbour seals and vessel transits:

1. Observers on-board all Facility vessels for a specified period, or
2. Observers at set land-based locations for defined monitoring periods. The below sections provide more detail on the potential options for monitoring, and outline the methodologies that may be used under each of the options.

3.3.19 In the post-consent phase of the Project, the preferred monitoring option would be defined and a full monitoring programme provided within the final MMMP. This will be designed in consultation with the MMO, Natural England and The Wildlife Trust.

Monitoring Option 1: Marine Mammal Observers

3.3.20 This potential monitoring option uses non-dedicated MMObs on-board all Facility vessels transiting through The Wash and The Haven over a set period.

3.3.21 This monitoring option would be adaptive, to allow for the programme to change with results of initial observations.

3.3.22 This monitoring plan would be fully developed post-consent, with both the MMO and Natural England, in order to define objectives, monitoring methods and spatial areas included, and programme. However, an example of what this monitoring option may include is provided below.

3.3.23 As outlined above, all vessels used by the Facility, during both the construction and operational phases, best practice is to have a non-dedicated MMOb on board, to keep watch for any harbour seal (or other marine mammal presence), within

both The Haven and The Wash. A non-dedicated MMOB relates to a fully trained MMOB (by an JNCC accredited course), who may undertake other vessel duties while not required on watch (i.e. this can be a member of the vessel's crew). The MMOB duties would be the priority whenever it was required.

3.3.24 The MMOB would be positioned to ensure the best and uninterrupted view, if required for some vessels, the option for more than one MMOB will be considered. The MMOB should be equipped with binoculars, and in the case of any sighting, evaluate its location and heading against the location and heading of the vessel. Measures should be taken, if required, to avoid a collision with the individual.

3.3.25 The purpose of having a MMOB on board each vessel will be to watch ahead of the vessel, to ensure that no harbour seal (or other marine mammal) is at risk of collision with the vessel. If a harbour seal (or any other marine mammal) is sighted and considered to be at risk, the protocol is to maintain vessel speed and course (if possible) to allow the seal to move out of the way.

3.3.26 In addition, for vessels preparing to leave the anchorage area, the MMOB would be required to undertake a check of the area surrounding the vessel, to ensure there are no seals within close proximity to the vessel, particularly the propellers, prior to the vessel starting the engine for transit through The Haven.

3.3.27 Additional measures that could be taken, only in the case that it is observed that the individual is not vacating the area and is at risk of collision, include slowing down of the vessel. However, this should only be undertaken where the harbour seal (marine mammal) is at risk and not moving, and it is possible and safe to undertake these additional measures.

3.3.28 This monitoring option would be in place for all Facility vessels within a defined period (e.g. the first year of construction and ~~two years of operation~~), to monitor the potential for collision events to occur with marine mammals. The monitoring would only be undertaken when the vessel is within the Project areas (i.e. the anchorage area, vessel transit corridor through The Haven, and around the Facility itself).

3.3.29 If a significant level of collision events¹³ are detected during the ~~first two years of operation~~ these periods, then the monitoring programme may be extended. If there are no collisions detected within the first year, or the harbour seal population stabilises following the current decline, then the monitoring programme may be completed. This would be decided in consultation with both the MMO and Natural

¹³ A 'significant level of collision' would be defined and agreed with the MMO and Natural England, during the post-consent phase of the Project, as the MMMP is finalised

England, and be based on the data recorded to date.

Monitoring Option 2: Adaptive Monitoring Programme

3.3.30 This monitoring option utilises land-based (and potential vessel-based) observers, at a set location, to monitor all vessel and seal interactions in a set period, through operation of the Facility.

3.3.31 An adaptive monitoring programme may be developed to monitor and record harbour seal and cargo vessel interactions within The Haven and The Wash. This would be developed in order to validate assessments presented in the application documents and through the DCO examination application stage of the impact of increased vessel usage on the harbour seal population. In order to understand any impacts the increased vessel presence has on the population, it would be necessary to undertake monitoring for a period prior to the Facility becoming operational.

3.3.32 portFacilityThe monitoring programme would be adaptive, to allow for the programme to change with results of initial observations.

3.3.33 Monitoring would take place in both prior to operation (for example, for a year prior to operation), and during the first period of operation (for example, for the first two years of operation). The monitoring would take place over set timeframes (e.g. for one or two days a month, throughout the monitoring programme).

3.3.34 If there are changes detected in the presence and behaviour of harbour seal during the first two years of operation, then the monitoring programme may be extended. If there are no changes detected in the presence and behaviour of harbour seal within the first year, in comparison to the pre-operation phase, or the harbour seal population stabilises following the current decline within The Wash, then the monitoring programme may be completed. This would be decided in consultation with both the MMO and Natural England, and be based on the data recorded to date.

3.3.35 Monitoring could be undertaken by trained observers, or with the use of camera and auto-detection systems, or by another method not yet available.

3.3.36 Monitoring could take the form of a number of trained marine mammal observers along the banks of The Haven, and using a vessel within the anchorage area within The Wash, to monitor all presence of marine mammals (principally harbour seal) in the vicinity of the vessel, and any movements and behaviours observed in response to any cargo (or other large) vessel presence or transit. There could be three observer stations along The Haven; one near the Port of Boston, one

between the Facility and the mouth of The Haven, and one at the outer part of The Haven, where it meets The Wash. In addition, there could be one on a vessel within the anchorage area.

3.3.37 Monitoring could also be undertaken with the use of high-definition, underwater, and infrared cameras being set-up at each of the above mentioned stations. This would greatly reduce the personnel requirements of the monitoring programme. Cameras with auto-detection of marine mammals could be used to reduce the amount of data to be recorded and transmitted. Observers would then be able to review any footage with marine mammals, greatly reducing time requirements to gather the data.

3.3.38 Potential methods of this adaptive monitoring, if required, would be reviewed when the programme is finalised, and in consultation with both the MMO and Natural England.

3.3.39 A monitoring programme such as this has the benefit, when compared to having observers on-board each vessel, of providing data and information on harbour seal behaviour around large vessels. There remains fairly limited information on these potential responses, and this monitoring programme would validate the assessments of potential impacts made in the application documents and through the DCO examination.

3.3.203.3.40 Reporting of Stranding's and Collisions

3.3.213.3.41 Any stranding and / or collision event **through the chosen monitoring programme** should be reported:

- Any live strandings and / or non-fatal collisions (where the location of the individual is known) should be reported to British Divers Marine Life Rescue (BDMLR) (contact details are in **Box 3**).
- Any deceased strandings and / or fatal collisions should be reported to the Cetacean Strandings Investigation Programme (CSIP) (contact details are in **Box 3**).

3.3.223.3.42 For any stranded or injured seal, MMOb should determine whether the individual is exhibiting normal behaviour, or whether it requires assistance. A seal may require assistance for one of the following reasons:

- Abandonment of juvenile seals
 - Juvenile grey seals have a white coat, and are born in November and December
 - Harbour seals are born in June and July

- Monitor the seal periodically for as long as possible (for a period of at least 30 minutes, but preferably up to two hours) to determine whether there is a parent seal nearby
- Malnutrition
 - Signs of malnutrition include visible ribs, hips and neck. Sometimes the skin can be baggy and wrinkled in places
- Unwell – signs of ill health include
 - Coughing, sneezing or noisy, rapid breathing
 - Thick mucus coming from the nose, wounds or swellings
 - Favouring one flipper when moving
 - Cloudy eyes, or mucus around the eyes, or one eye kept closed
 - Seal showing little response to any disturbance (unless asleep)
- Entanglement in rope or gear

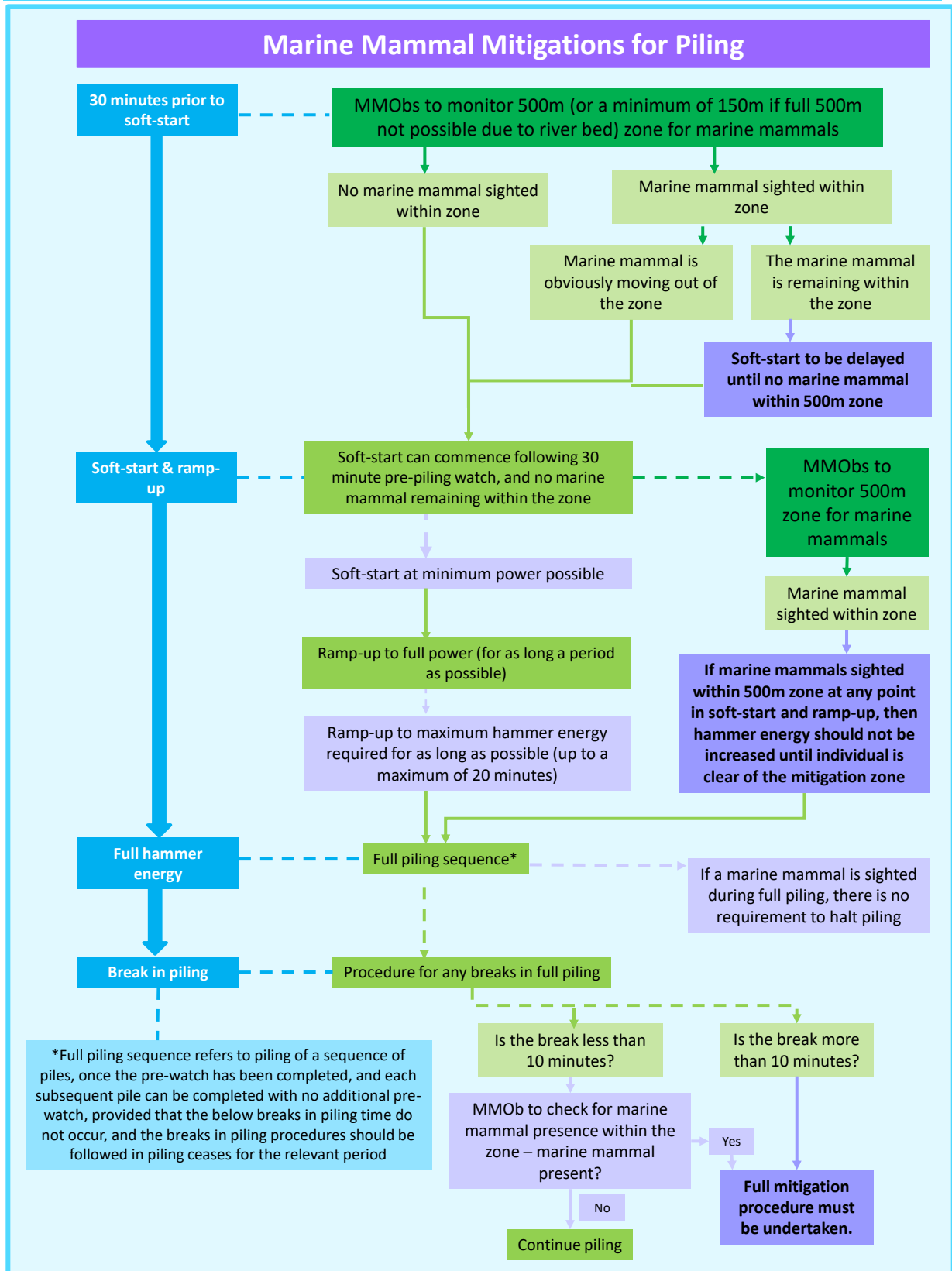
~~3.3.23~~3.3.43 Any other marine mammal (dolphin, porpoise, or whale) that has stranded will require immediate assistance – do not attempt to help, call BDMLR for specialist assistance, following the instructions in **Box 3**.

~~3.3.24~~3.3.44 Photographs, and a record of any collision incidents, should be kept by the vessel crew for reporting to the relevant bodies. **Box 4** provides a collision event form that should be used in the case that any collision occurs, and **Box 5** provides a stranding form.

4 Mitigation Protocols

- 4.1.1 The mitigation protocol for piling is shown in **Box 1**.
- 4.1.2 The best practice measures for vessels travelling through and into The Wash and The Haven are shown in **Box 2**.
- 4.1.3 Details for the reporting of stranded or deceased marine mammals are in **Box 3**.
- 4.1.4 Reporting forms for any collision and / or stranding are in **Box 4** and **Box 5**.

Box 1 Mitigation Protocol for Piling



Box 2 Best Practice Measures for Vessels

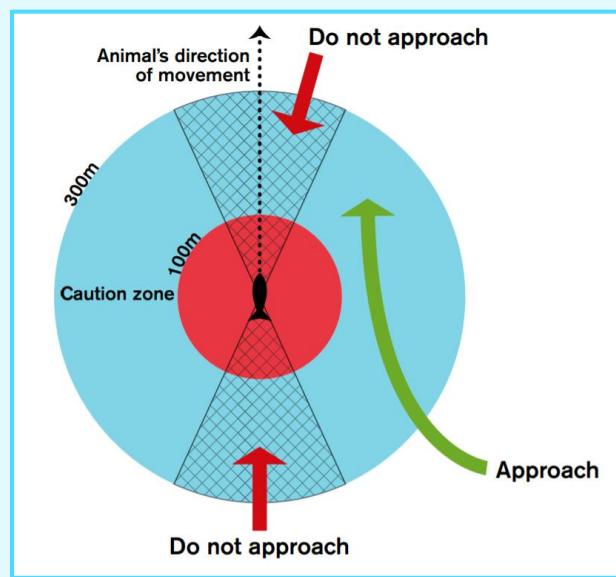
Mitigation Measures for Vessels during Construction and Operation – Page 1

Vessels in Transit through The Wash and The Haven

Vessels to transit at as low a speed as possible at all times within The Haven and The Wash.

~~• Abide by vessel speed limits at all times (in line with vessel safety considerations as advised by the Port of Boston and their Pilots)~~

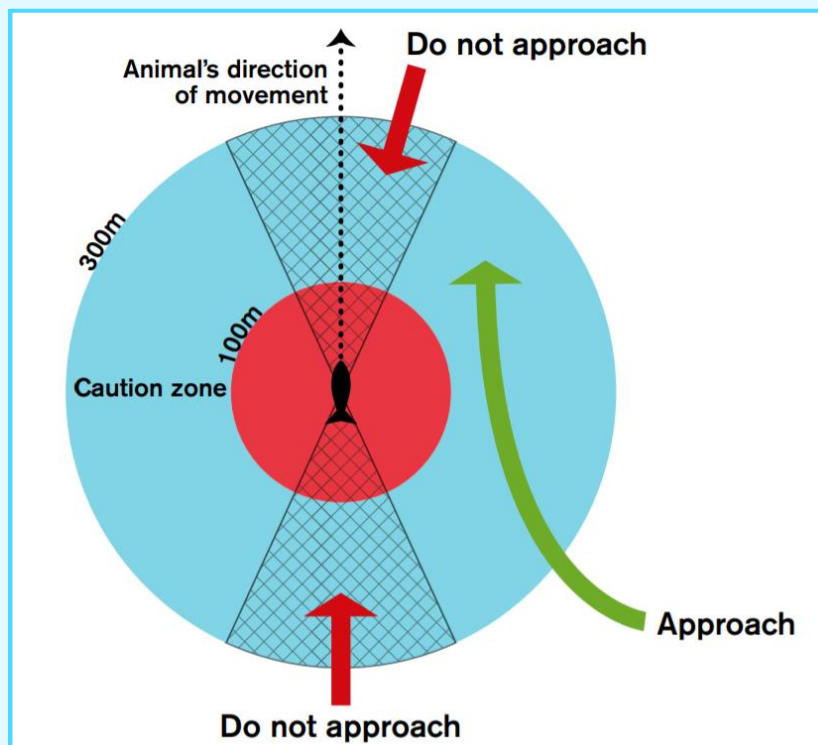
- Vessels to **use defined anchorage area and shipping channel at all times**
- Mitigation measures to be followed are below (wherever possible considering vessel manoeuvrability and any health and safety concerns)
 - Avoid being within 600m of a haul-out site
 - Vessels to maintain steady speed and direction
 - Extra care to be taken during harbour seal pupping season of June to August (inclusive)
 - If individual/s approach the vessel, maintain speed and direction
 - Avoid heading directly towards any marine mammal/s – follow guidelines in figure below



Mitigation Measures for Vessels during Construction and Operation – Page 2

Vessels in Transit through The Wash and The Haven

- ~~Abide by vessel speed limits at all times (in line with vessel safety considerations as advised by the Port of Boston and their Pilots)~~ Vessels to travel at 6 knots or less when within The Wash or The Haven ~~en, and~~
- Vessels to use defined anchorage area and shipping channel at all times
- Mitigation measures to be followed are below (wherever possible considering vessel manoeuvrability and any health and safety concerns)
 - Avoid being within 600m of a haul-out site
 - Vessels to maintain steady speed and direction
 - Extra care to be taken during harbour seal pupping season of June to August (inclusive)
 - If individual/s approach the vessel, maintain speed and direction
 - Avoid heading directly towards any marine mammal/s – follow guidelines in figure below



Box 3 Reporting of Marine Mammal Strandings

Reporting of Marine Mammal Strandings

Any live strandings and / or non-fatal collisions (where the location of the individual is known) should be reported to BDMLR

BDMLR Rescue Hotline	01825 765546 Monday-Friday (9am-5pm) 07787 433412 Out of office hours and Bank Holidays
RSPCA Hotline	0300 1234 999 24 hours

- **For seals**, follow this advice:
 1. Collect an accurate description of the seal
 2. Estimate the length of the animal and look for any distinguishing features
 3. Look for any signs of injury
 4. Provide information regarding location
 5. Avoid disturbance of the seal, do not scare it into the sea
 6. Do not touch the seal

- **For cetaceans** (dolphins, porpoises, whales), follow this advice:
 1. Avoid disturbance, excessive noise and too many observers
 2. Do not touch the cetacean and remain at a safe distance
 3. Estimate the length of the animal and look for any distinguishing features
 4. Look for any signs of injury
 5. If visible from a distance or via visual aids, count the number of breaths (opening of the blowhole) that occur over a minute
 6. Provide information regarding location
 7. Provide an accurate description of the animal, including its breathing rate, and whether it is in the surf, on rocks or sand, in the shade or in the full glare of the sun
 8. Provide information on weather conditions and sea state

Any deceased strandings and / or fatal collisions should be reported to the CSIP

CSIP Hotline	0800 652 0333
Further information	http://www.bdmlr.org.uk/uploads/documents/CSIP_leaflet.pdf

Box 4 Marine Mammal Collision Reporting Form

Marine Mammal Collision Reporting Form

If a vessel is involved in a collision with a marine mammal, details of the incident should be captured using the following form.

Contact Details for reporting - to be reported within 24 hours of incident

This form shall also be sent to the person in charge of the works, or the environmental liaison officer, as well as the regulator;

- Marine Management Organisation (MMO) – England
 - marine.consents@marinemanagement.org

Form to be completed

Details of the incident (to be filled in by Vessel Master)

Vessel		Date & Time	
Approx. Location			
Vessel Activity			
Species Involved (if known) e.g. harbour porpoise; seal			
No. animals e.g. 1; small group; large group			
Outcome of the collision	<input type="checkbox"/> Near miss	<input type="checkbox"/> Minor injury	<input type="checkbox"/> Major injury
	<input type="checkbox"/> Presumed dead	<input type="checkbox"/> Known dead	<input type="checkbox"/> Other
Photographic Evidence (if applicable)	<input type="checkbox"/> Yes (provided with form)		<input type="checkbox"/> Unable to capture following the incident
Description of incident, and any further information:			
Mitigating actions taken:			

Box 5 Stranded or Deceased Marine Mammal Reporting Form

Stranded or Deceased Animal Reporting Form – Page 1

If a stranded or deceased marine mammal is found, details of the individual should be captured using the following form.

Contact details for reporting - to be reported within 24 hours of incident

This form shall also be sent to the person in charge of the works, or the environmental liaison officer, and kept on file for any later information requested from a regulator

Any live strandings should be reported to BDMLR to get help for the individual

BDMLR Rescue Hotline	01825 765546 Monday-Friday (9am-5pm) 07787 433412 Out of office hours and Bank Holidays
RSPCA Hotline	0300 1234 999 24 hours

Note that any deceased strandings and / or fatal collisions should be reported to CSIP

CSIP Hotline	0800 652 0333
Further information	http://www.bdmlr.org.uk/uploads/documents/CSIP_leaflet.pdf

Marine mammal stranding form can be found on next page.

Stranded or Deceased Animal Reporting Form – Page 2

Form to be completed

Details of the incident (to be filled in by Vessel Master)

Date		Time	
Reported by		Employer	
Location of deceased or stranded animal			
Weather conditions			
Animal	<input type="checkbox"/> Seal	<input type="checkbox"/> Cetacean	No animals:
Status	<input type="checkbox"/> Alive	<input type="checkbox"/> Dead (look for evidence of breathing, response to noise etc.)	
If alive, please give details of behaviour, body condition & trauma.			
<input type="checkbox"/> Active	<input type="checkbox"/> Still / quiet	<input type="checkbox"/> Coughing	<input type="checkbox"/> Sneezing
<input type="checkbox"/> Thin	<input type="checkbox"/> Plump	<input type="checkbox"/> Cloudy eyes	<input type="checkbox"/> Squinting
<input type="checkbox"/> Clear eyes	<input type="checkbox"/> Trauma	<input type="checkbox"/> Blood	<input type="checkbox"/> Entangled
<input type="checkbox"/> Other			
Further information:			
If dead, status of carcass	<input type="checkbox"/> Fresh	<input type="checkbox"/> Decomposing	
Photographic information provided	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Parties contacted (e.g. CSIP)			

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