



Esker Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

Addendum 1

Document Control Sheet

Document Name:	Esker Bog Decommissioning and Rehabilitation Plan 2021 – Addendum 1					
Document File Path:						
Document Status:	Final					

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices

Rev.	1.0	Author(s):	Checked By:	Approved By:
		CC	MMC	MMC
		28/05/2021	28/05/2021	28/05/2021

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1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen bog group (Ref. P0503-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

This report – *Esker Bog Decommissioning and Rehabilitation Plan 2021 – Addendum 1* – should be read in conjunction with – *Esker Bog Decommissioning and Rehabilitation Plan 2021*.

This report - *Esker Bog Decommissioning and Rehabilitation Plan 2021 – Addendum 1* - outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Esker Bog, and reproduces the specific water quality related mitigation measures that are listed in the Natura Impact Assessment of the Esker Bog Decommissioning and Rehabilitation Plan 2021¹.

This include, where relevant, both bespoke measures designed to mitigate the potentially adverse effects identified in the Appropriate Assessment reporting but also any Best Practice measures which also mitigate the potential for adverse effects on European Sites.

All such measures are to be implemented as part of an Environmental Management Plan (hereafter EMP) to be overseen by PCAS staff.

Additionally it is acknowledged that IPC license conditions (Conditions 2.2, 2.4, 2.5, 3.2, 4.1, 4.2, 4.4, 4.5, 4.6, 6.0, 9.0, 11.0, 12.0, 13.0, schedule 1, 3, & 4 of the Allen IPC Licence) will be implemented as part of an EMP.

2. APPROPRIATE ASSESSMENT REPORTING FINDINGS

Appropriate Assessment Stage One Screening of all European sites identified within a 15km radius of the proposed rehabilitation works evaluated that the potential for significant effects on the Qualifying Interests of one European Site could not be excluded; i.e. River Barrow and River Nore SAC. In particular, the potential for indirect effects to downstream aquatic QI habitats and species via a deterioration in water quality and ex-situ disturbance and mortality to otter, a volant QI species of this SAC.

Thus, the respective elements were brought forward for further critical examination in the Natura Impact Statement Report to inform the Appropriate Assessment process.

Following examination and analysis, there was the potential for:

- Impacts through the release of silt laden surface water to downstream water dependent and nutrient sensitive habitats and species of Qualifying Interest of the River Barrow and River Nore SAC.
- Disturbance and / or displacement of the ex-situ otter populations associated with the River Barrow and River Nore SAC.

¹ Delichon Ecology (2021) Cutaway Bog Decommissioning and Rehabilitation Plan Natura Impact Statement Esker Bog, Co. Offaly

To restrict the above impact pathways, the key protective measure relates to the retention of silt laden water and potentially deleterious materials associated with the decommissioning and rehabilitation works to the project footprint. A key consideration in this regard will be drain blocking as described in Section 3.4.1.5 of the NIS. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Esker Bog and the River Barrow and River Nore SAC. . Other key mitigation measures include the standard best practice environmental control measures, bespoke mitigation measures to avoid berm failure, the utilisation of existing surface water management infrastructure and the provision of further bespoke surface water management, mitigation measures and rehabilitation measures. Finally, It is proposed to develop these measures across 318.31ha of the Esker Bog site

Once constructed and fully operational, the rehabilitation features will act as a source of surface water retention and attenuation on site, further mitigating the risk of run-off from the bog rehabilitation site to the receiving environment. The development of the proposed decommissioning and rehabilitation measures, coupled with best practice design measures and bespoke mitigation measures will ensure that potential impact magnitude will be low and not significant and will not provide baseline impacts upon which synergistic effects from downstream projects and plans may result. In addition to the above design principles and their inherent attenuation capacities, it is considered that the receiving hydrological catchment and its associated watercourses (Esker_020 and Figile_040) afford substantial dilution rates. It is not anticipated that the proposed rehabilitation measures will give rise to any perceptible impacts on water quality either alone or in-combination. Furthermore, the discharge from the bogs will be managed through silt traps (Section 3.4.1.5 of the NIS) which will substantially reduce the quantity of peat silt export from the bog. During low flow conditions when dilution potential will be lowest the silt traps will be most effective, in contrast during large events when silt traps are least effective very substantial dilution will be achievable within the Esker_020 and Figile_040 watercourses.

There are no significant effects identified which would adversely affect the Qualifying Interests or conservation objectives of the various SAC's under consideration with regard to the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The implementation of the PCAS scheme at Esker Bog will not give rise to adverse effects on the integrity of any of the identified European sites evaluated in the NIS.

3. APPROPRIATE ASSESSMENT MITIGATION

The following sub-sections re-produce from the NIS the range of water-quality related mitigation measures that will be implemented during the PCAS and form part of the PCAS design.

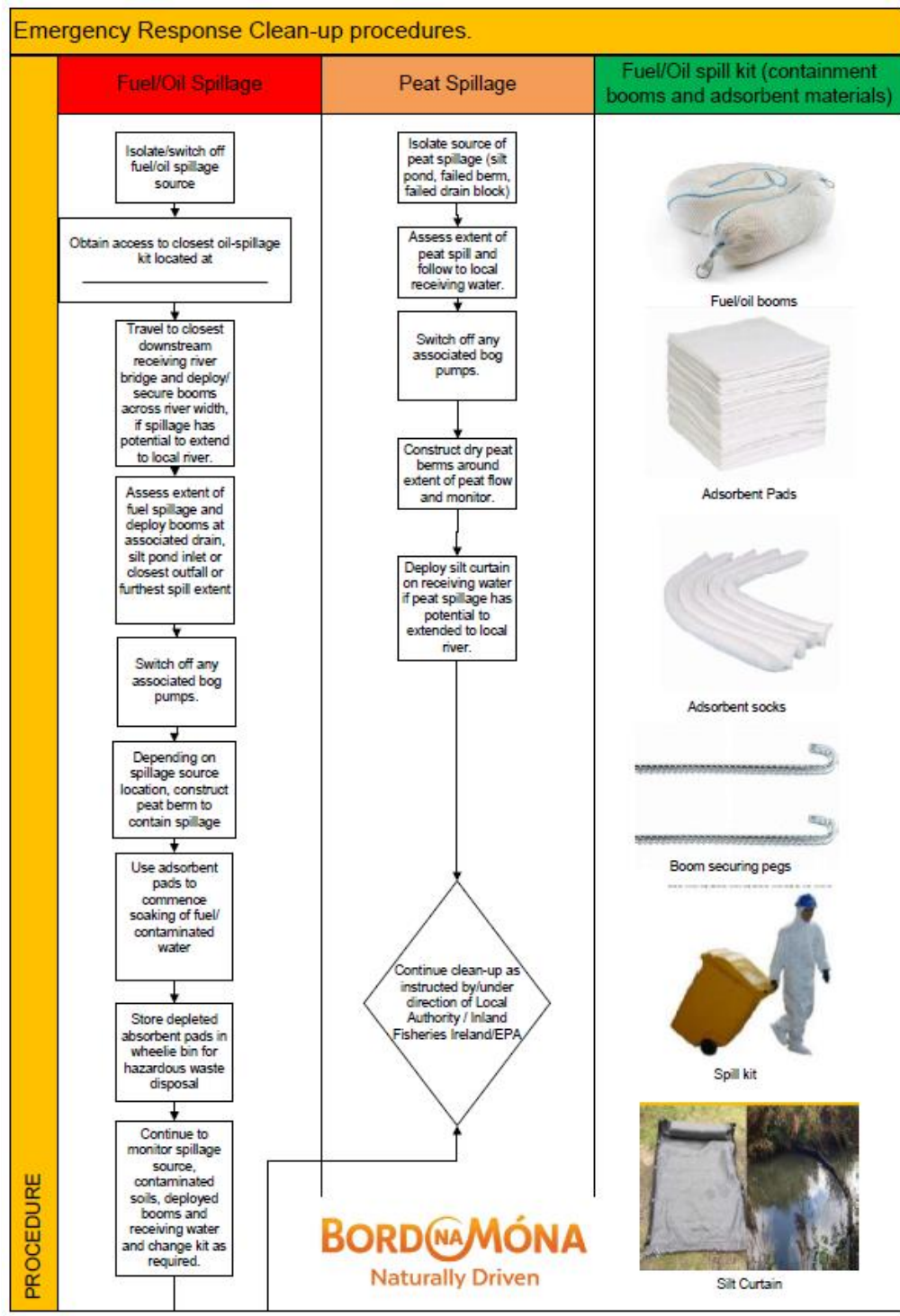
3.1 Description of the Measure

3.1.2 Best Practice Environmental Control Measures to be applied to Decommissioning and Rehabilitation Works

The following Best Practice Environmental Control measures are to be applied as standard to ensure compliance with IPC license Conditions:

- Bog restoration/rehabilitation works will be restricted to within the footprint of the proposed rehabilitation works area.
- The proposed rehabilitation works will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- A standard operating procedure overseen by the Project Ecologist will be in place for all PCAS activities to avoid any significant effects on breeding birds. This will include ground nesting birds and will apply to silt pond cleaning, and cutaway activities. Restriction zones will be in place to avoid effects on any identified ground nesting birds/waterfowl as appropriate.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed works will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, works will be halted.
- Works will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- All waste will be sorted by the works crews, managed within the site in designated waste disposal facilities, and removed to a licenced waste facility, in line with BnM Standard operating practice.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowers. Only dedicated trained and competent personnel will carry out refuelling operations.

- All fuels required for machinery and equipment will be stored in a designated location, away from main traffic activity, at the nearest BnM Compound. All fuel will be stored in bunded, locked storage containers. Diesel or petrol fuel and mechanical oils will also be used by site vehicles.
- Mobile storage such as fuel bowsters will be bunded to 110% capacity to prevent spills. Tanks for bowsters and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation works will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site works will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.
- All waste water will be removed by a licenced waste contractor to a licenced waste water treatment facility.
- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
 1. The land is waterlogged;
 2. The land is flooded, or it is likely to flood;
 3. The land is frozen, or covered with snow;
 4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
 5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on <https://www.epa.ie/about/fag/name,57156.en.html>, will be adhered with at all times with regard to fertiliser application.
- The below image / flow chart (**Figure 17 reproduced from the NIS**) provides Bord na Móna's proposed clean up procedures for fuel/oil and peat.

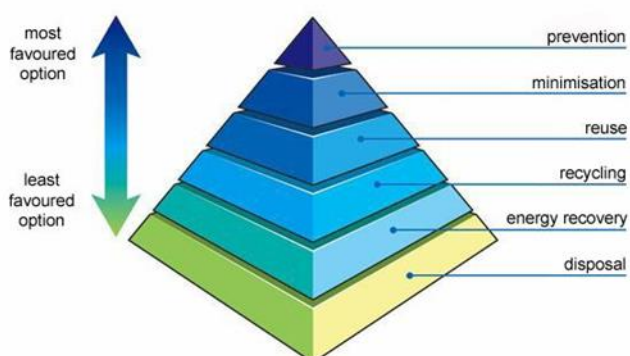


• Figure 17: BnM Emergency Response Clean Up Procedures

3.1.2 Best Practice Measures around the treatment of Waste

Condition 7 of the IPC licence for Peat Extraction at Esker Bog requires waste items to be disposed of or recovered as follows:

- Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.
- Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.
- A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:
 - The names of the agent and transporter of the waste.
 - The name of the persons responsible for the ultimate disposal/recovery of the waste.
 - The ultimate destination of the waste.
 - Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
 - The tonnages and EWC Code for the waste materials listed in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
 - Details of any rejected consignments.
- A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.
- As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, as agreed by the EPA, with waste records maintained as required for inspection by authorized persons of the EPA at all times.
- Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can be reused or recycled ahead of disposal.



- The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

These best practice measures have been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.1.3 Best Practice & Biosecurity

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) has been identified. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under Bord na Moña ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- All plant and equipment employed on the proposed works (e.g. diggers, tracked machines, footwear etc.) must be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species such as (but not limited to) Japanese knotweed (*Fallopia japonica*) and Himalayan Balsam (*Impatiens glandulifera*). A sign off sheet must be maintained by the contractor to confirm cleaning;
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly inspecting and washing vehicles prior to entering the works area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague will be adhered with throughout all rehabilitation works and activities.

- All water quality monitoring equipment which has been used in water will be treated with a disinfectant or a strong saline solution and then thoroughly dried (ideally over 24 hours) BEFORE being used in water again.

- Check, Clean, Dry protocol will be adhered with before and after visiting a river or lake for monitoring, in line with Best Practice² or for activities such as Sphagnum inoculation.
- Virkon Aquatic will be available as required.

These best practice measures have been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.1.4 Silt Ponds

Silt Ponds – 9 no. Silt ponds with a total volume of 33,359.03 m³ and area of 2.01ha are in place at Esker Bog and connected to the existing drainage network.

These silt ponds, already stipulated and in use as mitigation measures in respect of Peat Extraction under IPC license, will continue to function as the primary intervention in terms of sediment release to receiving waterbodies. It should be noted, that the silt pond network at Esker Bog will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures (including terminal dams), which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Esker Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

Regular cleaning and reporting on same already forms part of annual (AER) reporting submitted to EPA. All Silt Ponds at Esker Bog are currently compliant with EPA requirements. **Table 13** of the NIS, reproduced below, and **Figure 18, of the NIS**, reproduced overleaf summarise and illustrate the onsite Silt Pond locations, the latter also illustrates the current flow regime within the main drainage network (into which any other drains also feed). Continued maintenance and reporting on same will be reported on annually until IPC license Surrender.

Table 13 of the NIS Silt Ponds in use at Esker Bog

Bog Name	IPC License Reference	Pond No.	Volume (m ³)
Esker	503_01	1_38	1643.26
Esker	503_01	2_39	1858.15
Esker	503_01	3_40	2873.73
Esker	503_01	3_4142	5451.25
Esker	503_01	3_47	2847.23
Esker	503_01	4_43	4397.08
Esker	503_01	6_45	4978.81
Esker	503_01	7_45	6752.19
Esker	503_01	New Pond	2557.33
		Total	33,359.03

² <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

The above capacity is considered sufficient for the purposes of decommissioning and rehabilitation.

The attenuation of silt and particulate matter generated as a result of the proposed works is a key mitigation measure for the proposed rehabilitation and decommissioning works. The main source of potential impact to influence significant adverse effects to the downstream areas of the River Barrow and River Nore SAC relate to particulate matter run-off from the site, during the rehabilitation works. A key consideration in this regard will be drain blocking as described in **Section 3.1.5** below. This methodology relies on the placement of terminal dams at the extremity of the drain; i.e. that closest to watercourse within the receiving environment. The securing of strategic peat dams will allow the hydraulic separation between the proposed rehabilitation works and the receiving and downstream aquatic environment, and in so doing isolating these works from sensitive ecological and environmental receptors within the project zone of influence and in the case of Esker Bog the River Barrow and River Nore SAC.

Further detail is provided in this section on the proposed rehabilitation measures at Esker Bog, particularly the provision of measures Deep Peat 3 (DPT3), Deep Peat 4 (DPT4) and Deep Peat 5 (DPT5).

It is proposed to develop these measures across 318.31ha of the Esker Bog site (See **Figure 12**, **Figure 13** and the accompanying Bog Rehabilitation Plan in **Appendix B of the NIS**). The development of these measures will involve the construction of berms and field re-profiling, blocking outfalls, managing overflows and drainage channels for excess water and *Sphagnum* inoculation.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

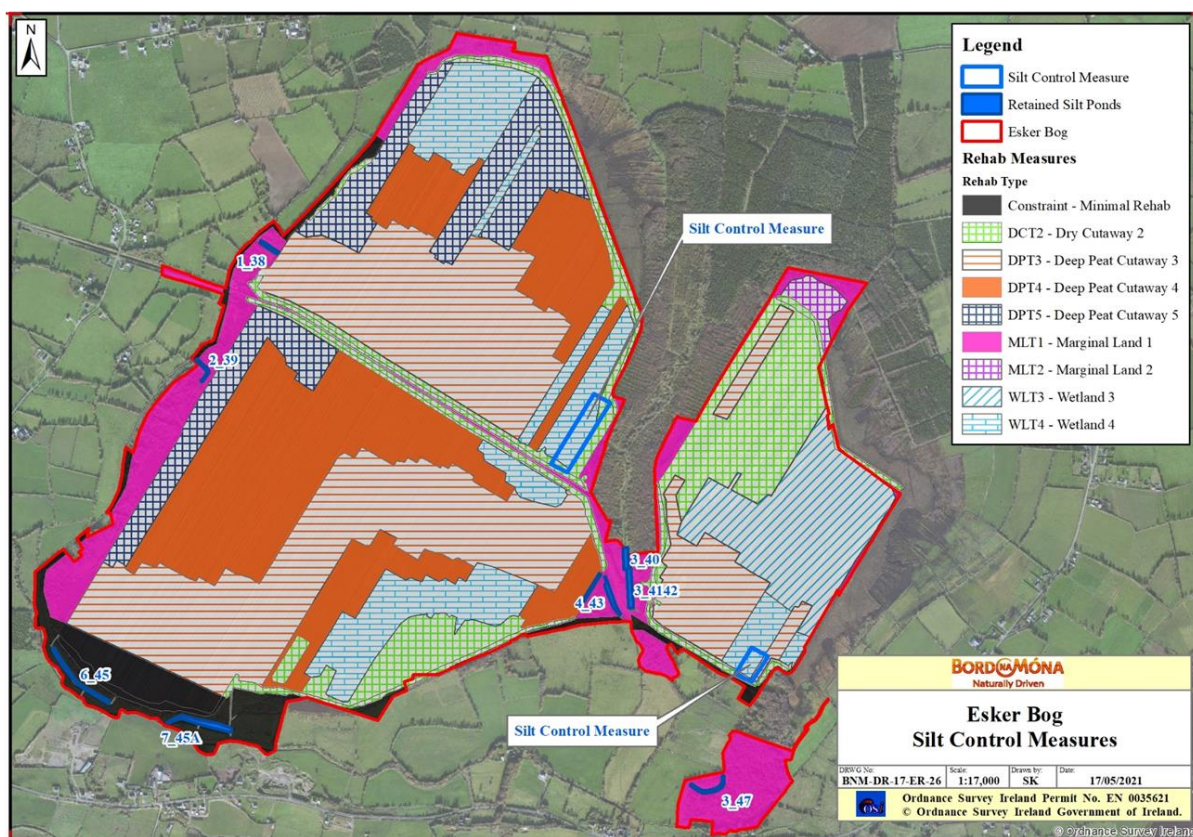


Figure 18 of the NIS Esker Bog Silt Control Measures

3.1.5 Measures to avoid runoff when carrying out drain blocking

The principal mitigation for proposed rehabilitation works at Eskeer Bog will involve securing the works area from the receiving environment when rehabilitation works are ongoing. This will include the creation of terminal dams at the margins of the rehabilitation works. These dams will secure the works area from the receiving environment, in particular downstream watercourses. These terminal dams are an integral part of the rehabilitation design works and comprise mitigation by design.

- All Silt ponds will be cleaned prior to the commencement of upstream drain blocking.
- When blocking drains, terminal dams i.e. the dams at the extremity of the drain and closest to any hydrologically connected watercourses, will be blocked first with AT MINIMUM 2 IN SERIES STANDARD DAMS, to prevent sediment release from subsequent dam insertion. This will form a hydraulic barrier between subsequent drain works and other rehabilitation works at the bog and the receiving and surrounding environment.
- The functionality and efficacy of these terminal dams will be monitored by the Project Ecologist/Environmental Supervisor and audited by the project engineering team. If the structural competency of the terminal dams become compromised, additional mitigation will be secured on site, such as silt fencing or additional check dams.
- Dams will be inspected during periods of dry weather to ensure no ‘cracking’ of peat has occurred which might allow for discharge.
- Discharge from all rehabilitated areas will be directed into silt ponds.
- Outfalls and overflow pipes from e.g. bunded cells will be directed into silt ponds.
- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.
- The above will be overseen by a suitably qualified Environmental Supervisor with support from members of the BnM Ecology Team.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.1.6 Measures for cleaning Silt Ponds

Cleaning of silt ponds integrated into or adjoining EPA Blue line features, will follow the below best practice measures.

- Cleaning of silt ponds will align with best practice measures, including BnM Standard Operating Procedures (SOPs) for works within and near watercourses, works with hydrocarbons, biosecurity measures when working at and different watercourses and waterbodies.
- Prior to cleaning of silt ponds on streams/rivers in any particular year, Inland Fisheries Ireland will be notified in advance.
- Cleaning of silt ponds will be completed under licence (following consultation with IFI) and in accordance with strict biosecurity measures. Cognisance of capture of non-target aquatic species (Crayfish, lamprey, small fish etc.) within the dredged material and the secure rescue and translocation of these species downstream of the pond cleaning works in line with IFI guidance. Silt ponds will be cleaned from the inlet point to the outlet point allowing fish and aquatic life to migrate downstream as the works progress. The silt pond cleaning works and species translocation efforts will be overseen by a suitably qualified

Ecologist/Ecological Clerk of Works/Environmental Supervisor and ongoing monitoring undertaken by the project ecologist.

- Prior to the commencement of the works, the excavator shall be inspected for invasive species. Should any be observed they should be removed and disposed off site to a licenced waste facility. The machine bucket and arm shall be treated with 1% Virkon Aquatic.
- Excavated silt material will be placed at least 20m away from the blue line feature and will be deposited into corralled berms and thereafter secured into the nearby ground with the back of the machine excavator bucket, to ensure particulate matter is not mobilised during or following rainfall events.
- Retain vegetation on un-worked banks and avoid unnecessary scraping of silt pond margins and banks.
- The above will be overseen by a suitably qualified Ecologist/Ecological Clerk of Works.

It should be noted, that the silt pond network at Esker Bog will not be the sole mitigation measure to attenuate silt laden waters emanating from the site during the project construction and operational phases. The design of the PCAS scheme requires the creation of internal drain blocking measures, which will in itself reduce the possibility of surface run-off to the receiving environment during the rehabilitation works. However, the functionality of a silt pond feature is based on its capacity to assimilate and attenuate ongoing surface water flows. Silt ponds need to be cleaned and emptied regularly to ensure they have sufficient capacity to operate efficiently.

Once rehabilitation works are completed and the bog has been rehabilitated, the bog will act as a natural repository for surface water, regulating and slowing the movement of surface water from Esker Bog to the receiving environment. It is considered that the silt pond network will provide further attenuation and regulation to those measures associated with the PCAS measures during the project construction phase and the rewetted peatland habitat during the project's operational phase.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.1.7 Rehabilitation Design at Esker Bog

Further detail is provided in this section on the proposed rehabilitation measures at Esker Bog, particularly the provision of measures Deep Peat 3 (DPT3), Deep Peat 4 (DPT4) and Deep Peat 5 (DPT5).

It is proposed to develop these measures across 316.50ha of the Esker Bog site (See **Figure 12**, **Figure 13** and the accompanying Bog Rehabilitation Plan in **Appendix B of the NIS**). The development of these measures will involve the construction of berms and field re-profiling, blocking outfalls, managing overflows and drainage channels for excess water and *Sphagnum* inoculation.

Once constructed and fully operational, these rehabilitation features will act in the same way as a series individual silt ponds. The functioning of these features will act as an source of surface water retention and attenuation on site, further mitigating the risk of silt release from this area to the receiving environment. The location of the silt control measures and silt ponds for Esker Bog are presented in **Figure 18 of the NIS**, reproduced above.

In addition to the above design principles and their inherent attenuation capacities, it is considered that the Esker_020 watercourse and downstream Figile_040 afford substantial dilution rates. The contributing catchment

area where Esker discharges into the Esker_020 waterbody is c. 55km² and is estimated to have a QMED of 9.64m³/s. This is 26.7km upstream of the River Barrow and River Nore SAC.

Given the substantial dilution rates achievable within the Esker and Figile watercourses, it is not anticipated that the proposed rehabilitation measures will give rise to any perceptible impacts on water quality either alone or in-combination. Furthermore, the discharge from the bogs will be managed through silt traps (**Section 3.1.5**) which will substantially reduce the quantity of peat silt export from the bog. During low flow conditions when dilution potential will be lowest the silt traps will be most effective, in contrast during large events when silt traps are least effective very substantial dilution will be achievable within the Esker and Figile watercourses

3.1.8 Mitigation when undertaking flood avoidance measures and retention of hydraulic barriers

The following mitigation and best practice measures will be undertaken at the Esker Bog site. Although drain blocking and consequent and hydrological rewetting of the Esker Bog site will occur, it is not intended to rewet or hydrologically alter adjoining lands or those areas surrounding the Esker Bog site. To this end, the following mitigation measures will be implemented:

- Maintenance of peripheral drains and where required, provision of additional drains, to create hydraulic barriers between the site and the receiving environment. This will mean that lands and local drainage patterns associated with the margins of the BnM site will be maintained;
- Maintenance of specified internal drains to avoid flooding where required to maintain existing drainage of adjacent lands. In some instances this may include re-grading or widening of specific existing drains which currently act as preferential flow paths through the bog.
- Monitoring of adjacent lands will also be specified.

This mitigation measure has been included first and foremost to avoid flooding of adjacent lands where hydraulic gradients may exist, but secondarily mitigates negative quality effects on watercourses in the receiving environment (from addition nutrient run-off along flooding pathways), and hence downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

Key drainage features at Esker Bog are presented in **Figure 19 of the NIS**, reproduced below.

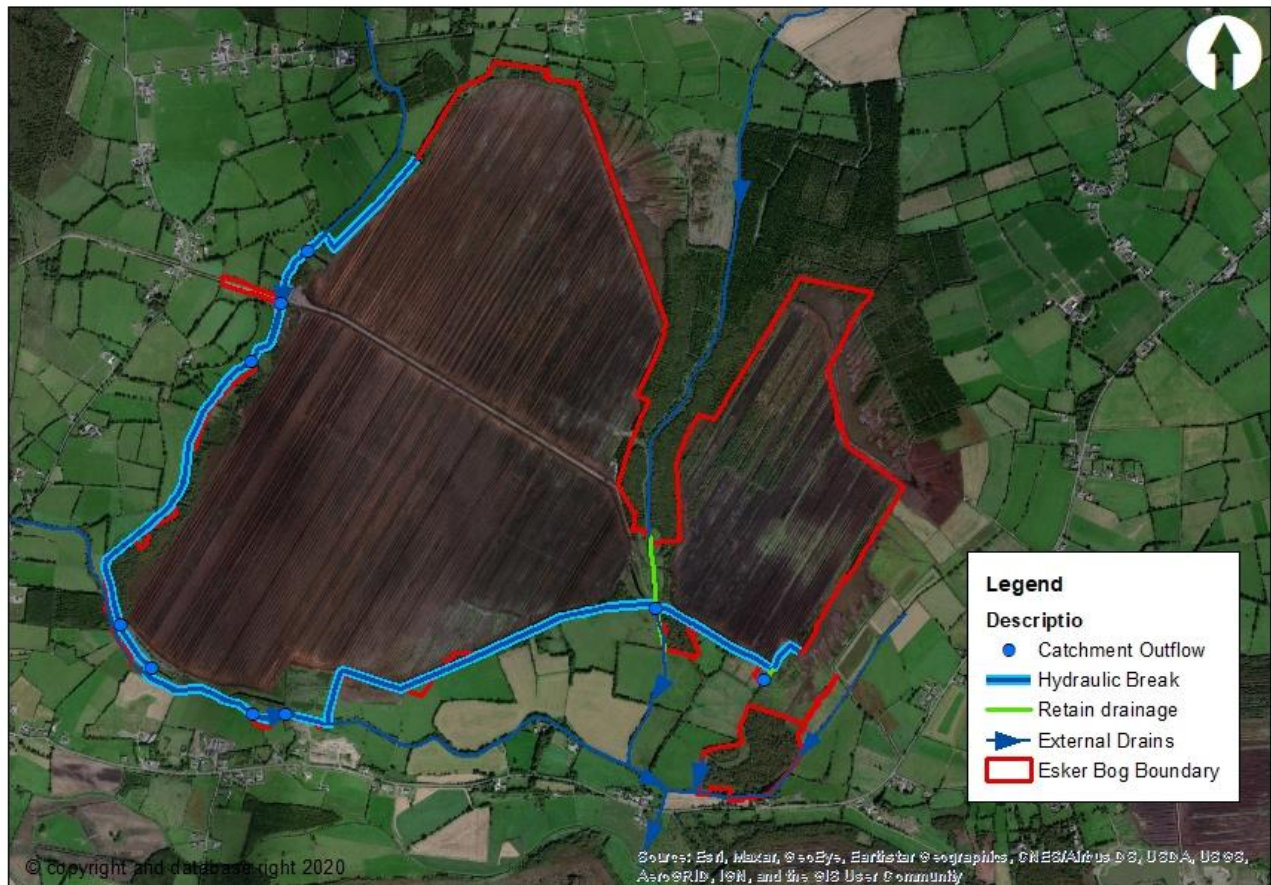


Figure 19 of the NIS: Key drainage features for Esker Bog

3.1.9 Mitigation during upgrade of boundary or peripheral drains outside of the proposed rehabilitation footprint

Boundary drains may require upgrading to retain their functionality as hydraulic breaks between the site and adjoining lands. These works will be completed during periods of low flow and will follow the below sequencing:

- Prior to commencement of channel works, at least 2 no. check dams will be placed at the downstream end of the drainage channel to control the flow of suspended sediment downstream to receiving watercourses.
- The most downstream check dam will comprise locally sourced turves and double bagged sand bags to initially secure and check downstream flow within the channel. At least 10m upstream of this check dam, a peat dams will be created and keyed into the adjoining drainage channel banks following the methodologies presented in **Section 2.6.1.3 of the NIS**.
- The build-up of silt material upstream of the constructed check dams will be monitored during upgrade works and the silt material will be removed from the drainage channel during works as it builds up. The material will be removed from the channel, spread and levelled into the adjacent field, a minimum of 10m from the nearest drain.

- The constructed check dams will be inspected during periods of dry weather to ensure no ‘cracking’ of peat has occurred which might allow for discharge.
- Upon completion of the upgrade works, all silt will be removed from the drainage channel immediately upstream of the 2 standard drain blocks prior their removal. The 2 standard drain blocks will only be removed once all upgrade works are completed and once all water within the channel is suitably settled with no evidence of suspended solids within the water column.
- Where a new drain is required, it will be formed and established prior to connecting the drainage channel to wider drainage network. Only once it has formed and become established, with the bed and banks stabilised will it be connected to the wider drainage network. This approach will minimise to a negligible level the potential for suspend solids to be generated in waters within the new drainage channel and conveyed downstream to receiving watercourses and European Sites.
- An Emergency Response Plan will be available in the event of any inadvertent release of a large volume of sediment.

The set up of these features will be overseen by a suitably qualified Ecologist/Ecological Clerk of Works and ongoing monitoring undertaken by the project ecologist.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.1.10 Mitigation to prevent Berm Failure

The below mitigation measures will be put in place when constructing and working with berm features as part of the bog rewetting and rehabilitation process. The berm design adopts an empirical design approach. It is proposed to apply proven sizes, proportions, materials, and assemblies from existing successful rehabilitation measures and flood defence berm features carried out in the past by Bord na Moña. This represents mitigation for the proposed rehabilitation works through design; i.e. integrating key design principles into the rehabilitation efforts to restrict potential berm failure and consequent run-off to the receiving environment. Further details on berm design and mitigation incorporated into berm design is provided in **Appendix E of the NIS- Engineering and Rehabilitation Design Specification**.

- The selection of an appropriate drain block spacing.
- Drain blocks are formed at a minimum of 300mm higher than the adjacent ground level and are relatively wide to create a relatively strong structure out of peat that will mitigate water flow eroding the drain block construction.
- The provision of a key in the drain ensures a tight seal is maintained and a strong structure is developed to mitigate the formation of preferential flow paths around the edges of the drain block.
- Operators assigned to this work element are familiar with the technique and process and provide effective robust drain blocks. The operators are experienced and capable of adapting to the particular conditions encountered within the bog.
- Qualified, experienced Engineers overseeing the works during the installation phase ensure that quality procedures of the various elements are implemented and effectively meet the standards for quality service and performance.

Mitigation through maintenance and avoidance:

- Ongoing monitoring of completed peat drain blocks in the weeks after formation will ensure they have consolidated.
- The risk associated with peat drain block failure from an environmental and rehabilitation measures impact is generally categorised as low as a peat drain block failure will result in an impact that is localised and silt control measures are provided upstream of all discharge points. There is an allowance for a reactive approach to remediation measures where required.
- A post rehabilitation Lidar and imagery survey will take place which will capture any areas where failures occurred resulting in remediation measures in a particular area if required. The Lidar survey will be implemented when the rehabilitation measures have been in place for a reasonable period of time allowing areas of weakness or potential concern to become apparent.
- In the event of a peat drain block failure, the adjacent peat drain blocks will generally have sufficient capacity to accommodate any additional hydrostatic pressures generated ensuring the negative impact
- If, after heavy rainfall, significant water flows in the drains cause localised drain block failure, the regular and frequent placing of drain blocks along the drain further downstream will mitigate the impact to the immediate area.

As peat drain blocks are designed to retain water on the cutover resulting in a reduction in discharge into the boundary drains, preventing any negative impacts on adjacent agricultural land.

Further to the above, Figure 17 of the NIS, reproduced above from the NIS presents an Emergency Response procedures to address peat spillage in the unlikely event of berm failure- further information is provided as Appendix 1.

This mitigation measure has been included for the protection of watercourses in the receiving environment, downstream connected European Sites (River Barrow and River Nore SAC) and their nutrient sensitive and water dependent habitats and species of Qualifying Interest.

3.2 Effectiveness of these Measures

The Mitigation Measures (Project Design Measures, Management Plans, Environmental Emergency Response Measures and Best Practice Measures), listed above, have been developed by the hydrological/drainage and ecological expert members of the Decommissioning and Rehabilitation project team in Bord na Móna and use best practice water quality protection techniques which are tried and tested regularly across the country. Furthermore, a suitably qualified Environmental Supervisor will be employed during the construction stage to monitor the effectiveness of these measures on a daily basis. The Environmental Supervisor will be supported and assisted by members of the BnM Ecology Team as required. An Environmental Management Plan (EMP) has also been prepared for the proposed works (See **Appendix F of the NIS**).

The watercourse crossing, drainage and water quality measures have been developed using relevant legislation, guidance and literature including:

3.2.1 Guidance

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters;
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes; and,
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.
- Brew, T. & Gillagan, N. (2019). Environmental Guidance: Drainage Maintenance and Construction
- EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems

Pollution Prevention Guidance Notes (PPGs) & Guidance for Pollution Prevention (GPP)³

- PPG 1: Understanding your environmental responsibilities - good environmental practices
- GPP 2: Above ground oil storage tanks
- PPG 3: Use and design of oil separators in surface water drainage systems
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer
- GPP 5: Works and maintenance in or near water
- PPG 6: Working at construction and demolition sites
- PPG 7: Safe storage - The safe operation of refuelling facilities
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 19: Vehicles: Service and Repair
- GPP 21: Pollution incident response planning
- GPP 22: Dealing with spills
- GPP 26 Safe storage - drums and intermediate bulk containers
- PPG 27: Installation, decommissioning and removal of underground storage tanks

Construction Industry Research and Information Association (CIRIA)⁴

- CIRIA Report C502 Environmental Good Practice on Site;
- CIRIA Report C532 Control of Water Pollution from Construction Sites: Guidance for consultants and contractors;
- CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
- CIRIA Handbook C650 Environmental good practice on site;
- CIRIA Handbook C651 Environmental good practice on site checklist;
- CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,
- CIRIA Report C697 – The SuDS Manual.

³<https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

⁴ Available from <https://www.ciria.org/>

Invasive Species Guidance

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013)⁵;
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010)⁶;
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010)⁷;
- Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010⁸).

3.3 Implementation of Mitigation Measures

The Mitigation Measures (Project Design measures, Management Plans, Environmental Emergency Procedures and Best Practice Measures) will be implemented by the Project Manager/PSCS and BnM Project Staff during the Decommissioning and Rehabilitation stage. Implementation of the Mitigation Measures, will be implemented under an Environmental Management Plan for Esker Bog Decommissioning and Rehabilitation.

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

Implementation of the mitigation measures for the Decommissioning and Rehabilitation activities will be the responsibility of Bord na Móna Operations and supervision of the works will be carried out by this Bord na Móna Department incorporating Area leaders, Operations Managers and Project Supervisor Construction Stage (PSCS).

In addition, implementation of the mitigation measures will be monitored and inspected by Bord na Móna Environmental, Ecology and Engineering Departments, who are independent of Bord Na Móna Operations. Project Ecologists, Engineers and Environmental Compliance Officers will be appointed for each bog and they will ensure that measures are carried out in accordance with an Site-Specific Environmental Management Plan which sets out the required mitigation measures for each bog and defines the pertinent individual roles. The Ecologist, Environmental Compliance Officer, Engineer, H&S Manager, Site Supervisor and PSCS will have a 'stop works' authority.

3.4 Degree of confidence in the likely success of the mitigation measure

All protection measures have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. As such there is a very high degree of confidence in their likely success.

⁵ <http://cfins.scrs.co.uk/wp-content/uploads/2014/06/2013-code-of-practice.pdf>

⁶ <https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>

⁷ <https://www.midsussex.gov.uk/media/1725/managing-invasive-non-native-plants.pdf>

⁸ <https://www.fisheriesireland.ie/Biosecurity/biosecurity-protocol-for-field-survey-work.html>

3.5 Monitoring of the Implementation and Effectiveness of the Mitigation Measures

A degree of Monitoring is required under Condition 10.1 of the IPC license under which Peat Extraction and now Decommissioning and Rehabilitation is to take place. This environmental monitoring carried out during the aftercare and maintenance period of Decommissioning and Rehabilitation, has to ensure no Environmental Pollution has been caused, and is subject to an Independent Closure Audit (ICA) followed by an EPA Exit Audit (EA) in order to facilitate IPC License surrender.

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence and is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements, if required, for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial drone survey to take an up-to-date aerial photo, when rehabilitation is completed. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if required.
- A **water quality monitoring programme** at the bog will be established. The main objective of this water quality monitoring programme will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring of key environmental variables will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity. Water quality samples will be collected from the main drainage system from the bog at a designated point, before water leaves the site. Water quality samples will be collected at monthly intervals. Where required, additional composite samplers may be place, with an intensive additional monitoring regime required as part of IPC license surrender
- If, after three years, key criteria for successful rehabilitation are being achieved and critical success factors are being met, then the water quality monitoring programme will be reviewed, with consideration of potential ongoing research on site. The water quality data, the drone surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after three years, key criteria for successful rehabilitation have **not** been achieved and critical success factors have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment process and planning procedures.

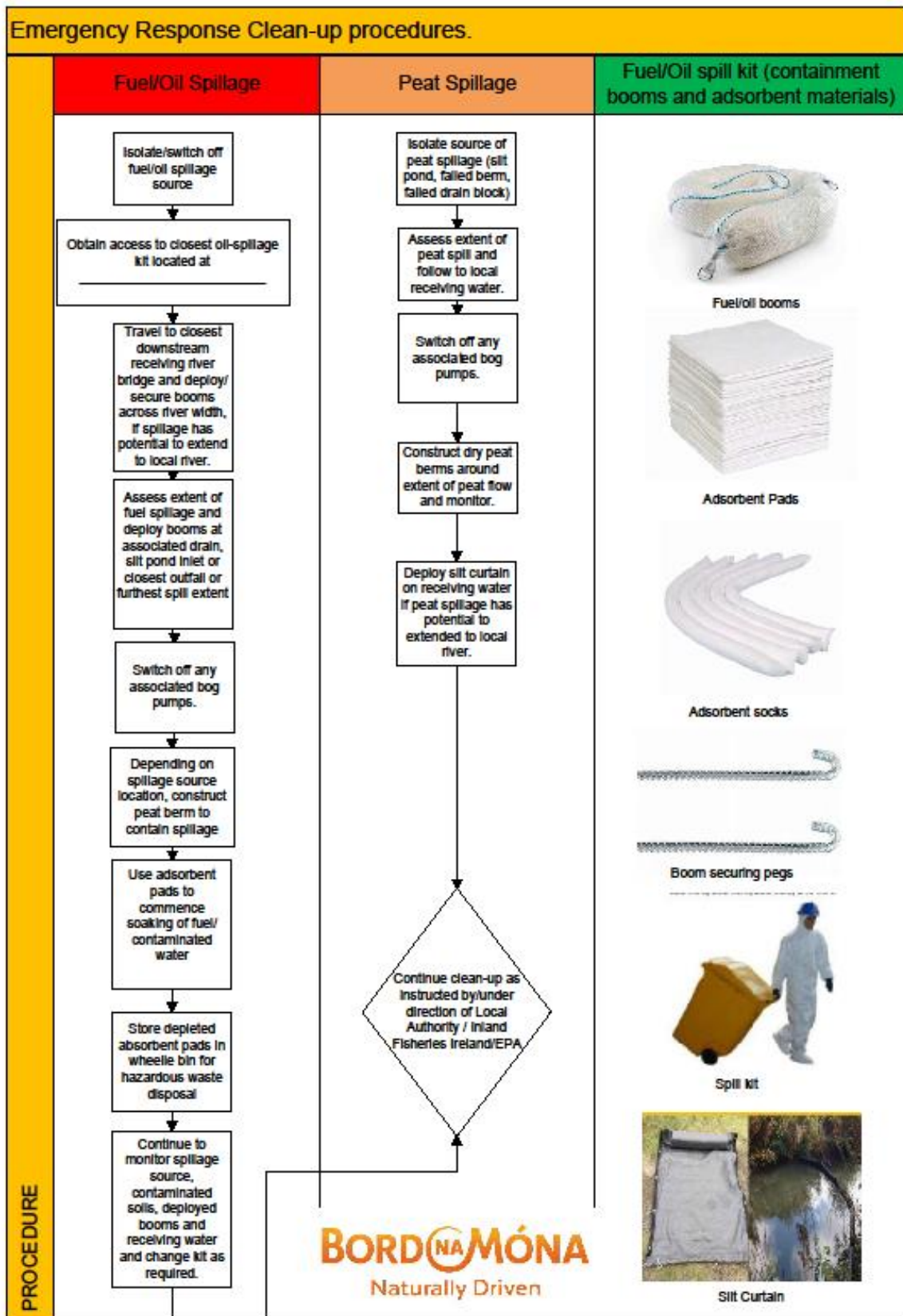
3.6 How any mitigation failure will be addressed

The Mitigation measures prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and Best Practice. The Mitigation Measures are considered to be robust and proven measures which will avoid adverse effects to European Sites.

On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless contingency measures will be in place for unforeseen events such as oil/fuel spillages, water pollution or any inadvertent release of sediment. This will ensure any unforeseen potentially adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Ecologist, Environmental Compliance Officer, Engineer, H & S Manager, Site Supervisor and PSCS will have a 'stop-works' authority to temporarily stop works over part of the site to avoid an infringement of the Environmental Commitments or an unforeseen environmental event. Works will not be allowed to re-commence until the issue is resolved.

Appendix 1



EP 5.0 General Emergency Response (IPC Licence Condition 13)

Condition 13 Emergency Response

13.1 The licensee shall, within six months of date of grant of this licence, ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment.

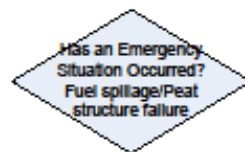
(xii) Effective spill/leak management of mobile fuelling units.

Refer to:
ERP Fuel/Oil spill clean-up
ERP Peat spill clean-up



9.1.1 No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.

9.1.13 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.



Yes

Notify Compliance Department



Assess Scale of Incident

Inform Emergency Services

Direct clean-up crew

In absence of Compliance Officer – Operations Manager shall assume this role

Compliance Officer records details of Incident as required on Aider

Reportable Environmental Incident?

Yes

Report to EPA via EDEN and Phone Call (056 7796700)

Out of Hours Emergency?

Yes

Contact Designated On-Call Person (056 7796700)

Complete EPA Incident Notification Form on Eden <https://www.edenireland.ie/>

The licensee shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:

4.1.1 Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.

4.1.2 Any emission which does not comply with the requirements of this licence.

4.1.3 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.

The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.

4.2 The licensee shall make a record of any incident as set out in Condition 4.1 above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.

4.3 A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

4.4 In the case of any incident as set out in Condition 4.1 above which relates to discharges to water, the licensee shall notify the appropriate Regional Fisheries Board, as soon as practicable after such an incident.

4.5 In the event of any incident, as set out in Condition 4.1.3 having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident.

4.6 In the case of any incident, as set out in Condition 4.1.3, which has the potential to impact the conservation objectives of the Special Areas of Conservation and Natural Heritage Areas identified in Attachment 10.1 of the IPC application having taken place, the licensee shall notify Dúchas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.