

SECTION 2

DESCRIPTION OF THE SITE AND PROPOSED DEVELOPMENT

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2.1 PROJECT DESCRIPTION

2.1.1 INTRODUCTION

Bord na Móna Environmental Limited were commissioned by Bord na Móna Energy Ltd (previously named “Bord na Móna Peat Energy Division”) to complete an Environmental Impact Assessment. This EIS shall accompany a planning application with Offaly County Council for a change in the waste types accepted at the Ash Repository Facility at Cloncreen, Clonbullogue, Co. Offaly. Currently the ash repository facility accepts ash from the burning of peat.

Bord na Móna Energy Ltd hold a waste licence (49-1) (refer to Attachment 1) with the Environmental Protection Agency (EPA) and are currently in the process of reviewing their Waste Licence to allow for the continuation of ash disposal activities (include ash from the co-fuelling of peat with biomass and /or MBM) at its existing ash repository facility at Cloncreen.

The purpose of the planning application is to allow for the acceptance of ash from the EPL co-fuelling power plant for peat with biomass and/or treated MBM.

BAT technologies (Best Available Technology) will be used in all situations for site management and for the minimisation of environmental contamination.

2.1.2 BORD NA MÓNA ENERGY LTD.

The applicant, Bord na Móna Energy, is a subsidiary division within Bord na Móna. Bord na Móna is a statutory corporation established in 1946. The Turf Development Act of that year charged the organisation with responsibility for developing and managing those areas of Ireland’s peatlands and other lands vested in it, and as a consequence, to produce and market peat and peat products. As a result, 88,000 hectares of bogland have been acquired and developed.

The 25 hectare area for the ash repository site is located within Cloncreen bog, an approximate 800 hectares peatland area all of which is owned by and registered to Bord na Móna. The title to the proposed location of the ash disposal site is registered at Entry No. 494 on Folio 8610 Kings County (Offaly).

The original planning permission (Ref No. 98-482) relating to the existing ash disposal development was obtained from Offaly County Council in 1998. A waste licence application was submitted with the EPA in conjunction with the planning application and the waste licence was issued in April 2000.

2.2 EXISTING ASH REPOSITORY DEVELOPMENT

2.2.1 INTRODUCTION

Bord na Móna Energy Ltd have an Ash Repository facility at Clonbullogue which has been operating since December 2000.

The landfill was constructed in 1998-1999 and was issued with a waste licence in April 2000. The facility receives fly ash and bottom ash arising from peat combustion from the fluidized bed plant operated by Edenderry Power Limited in the vicinity of the landfill. This ash is delivered to the site by means of a rail link where it is deposited directly into the landfill.

Bord na Móna Peat Energy was issued with a Waste Licence for their facility at Cloncreen, Clonbullogue, County Offaly on 20th April 2000 as per The Waste Management Act of 1996. To obtain the Waste Licence Bord na Móna Peat Energy engaged the services of Bord na Móna Environmental Ltd. who undertook the relatively onerous task of assessing the potential impacts that the proposed development could have on the receiving environment, an Environmental Impact Statement was also prepared as part of the waste licence application.

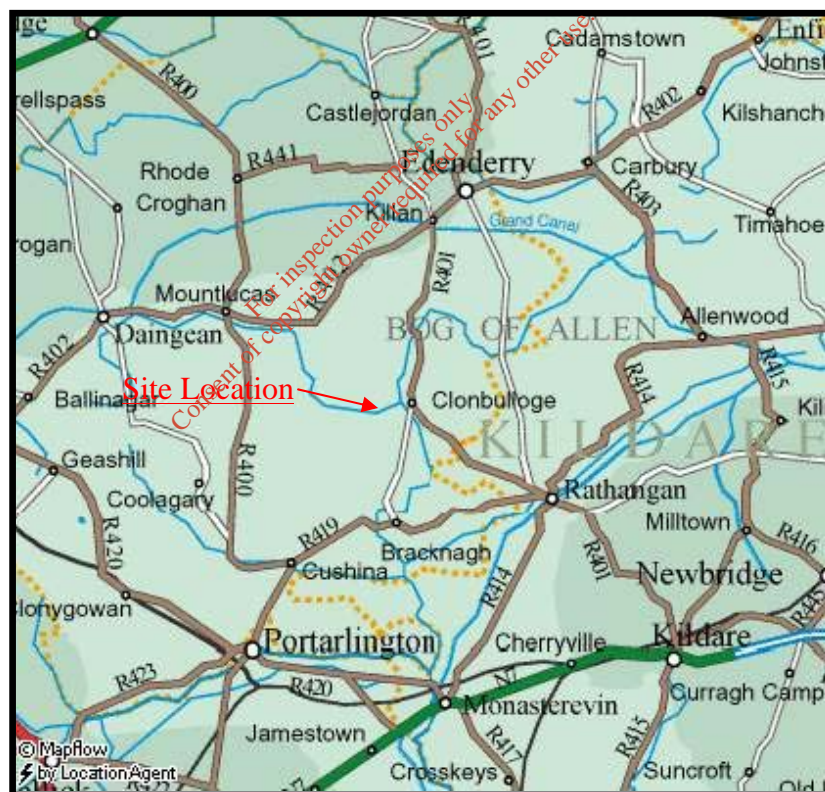
Currently ash disposal activities are occurring at cell II of the facility with the construction of the lined cell occurring at cell III. Cell I has been filled and restored. These cells were constructed as per the specifications for non-hazardous waste landfills (refer to figure 2.2/2 page 27) in compliance with condition 4.9.1 and 4.10.1 of the waste licences (49-1, as attached in attachment 01).

2.2.2 SITE LOCATION

The Cloncreen ash repository is located approximately 8 km South West of the town of Edenderry and 2 km North West of Clonbullogue village. The facility is setback approximately 1 km from the Clonbullogue to Daingean road (Third Class Road which links with the Edenderry to Tullamore Regional Road - R402) (see Figure 1.3/1 below, and Drawing No 2401057-1a Site Location Map).

The landfill site is located on Cloncreen bog, a cut-away peatland area within the Bog of Allen. The Northern, Western and Eastern sides of the landfill site are bounded by raised and/or cut-away peatlands (approximately 800 hectares) while the Southern side is bounded by a tree line which is subsequently bounded by pastoral land.

Figure 2.2/1 Regional Location of Ash Repository Site



2.2.3 GENERAL SITE DESCRIPTION

Topographically, the Bog of Allen area consists of raised peatlands in which peat has built up to considerable depths. As such Cloncreen bog is characteristic of

many of the raised bogs of the Central Lowlands which have been extensively harvested by mechanised cutting.

Drainage ditches excavated in the surrounding peatlands by Bord na Móna are orientated in a East - West axis and essentially divert any seepage or drainage water from the peatlands. Drainage from the site is along a West - East drainage ditch which discharges ultimately to the Figile River. The geology of the Cloncreen site is dominated by the Upper Palaeozoic, Lower Carboniferous Allenwood formation (Edenderry Limestone).

In the Western margins of the Central Lowlands cultivated lands, pastures and bogs intermingle with farm sizes typically decreasing as the soil fertility decreases. The land uses of the immediate area are a mixture of peat extraction for fuel use on the raised peatlands and agricultural use on the pastoral land. Ash disposal activities will occur on a 25 hectares area.

Ash deposition has taken place in Cell I and the capping of the cell has taken place. Current ash deposition is occurring in cell II and construction of cell III is almost complete.

2.2.4 EXISTING SITE INFRASTRUCTURE

The general layout of the Ash Repository Site is detailed in Drawing 2401057-2 Site Infrastructure/Site Layout.

(1) Site Security Arrangements

Due to the remoteness of the site, unauthorised access is deemed unlikely outside of operational hours. Access to the facility is restricted by means of a lockable gate which is located on the south-east corner of the site.

The security of the site consists of a drainage channel and ditch along the southern boundary of the site, and fence and ditch along the eastern boundary of the site. The northern and western boundary of the site is flanked by existing peat borrowing areas.

The Site Manager who will be on-site at all reasonable times during operating hours of the facility, will be responsible for on-site security.

(2) Access to the Site

Access to the site consists of a rail link and road entrance.

Locomotive access (fuel, waste and materials) to the site will be via a railway line and individual rail links which will run through the centre of the cell. The rail lines are constructed from hardcore and laid on a peat base. The railway embankment has a side slope of 1:1.

The main site entrance is located at the south-west of the site. The access to the site entrance is via a lane-way from the third class Clonbullogue to Tullamore road. From the site entrance, a site roadway travels up along the southern boundary as far as the tea-room and parking facilities. The site road and car parking area is constructed with hardcore material cover.

(3) Surface Water Drainage System

Surface water drainage ditches oriented in a west-east direction divert drainage water from the surrounding peatlands via two existing silt ponds (SWR-1 & SWR-2) into the small stream which flows adjacent to the southern boundary of the facility (refer to Section 3.4 Hydrology).

Leachate generated on-site is collected in the existing interceptor lagoon in the south-east corner of the site through a collection pipework system along the base of the site into a sump. The leachate in the sump is then pumped into the interceptor lagoon. Innocuous surface water run-off from the capped cell is directed into a drainage channel at the toe of the capped cell which directs water into the small stream which flows adjacent to the southern boundary of the facility generated via the existing silt pond (SWR-2).

(4) Services

The facility is serviced by a site office, and canteen facilities. These buildings are serviced by electricity connection.

(5) Site Accommodation

Site accommodation consists of 3 no. temporary structures (canteen, lock-up store & site office) held within the south-western section of the site. These

buildings are utilised for the storage of material and for canteen facilities for site workers. There is no fuel or any other flammable materials held on-site.

The main administration office is located within the Bord na Móna Energy works adjoining the Edenderry Power Station. (2 km north east of the site)

(6) Fire Control System

Hoses for fire-fighting purposes are located on-site. Fire protection is provided by water drawn from the interceptor lagoon via a tractor mounted pump (recirculation of water sourced from the surface water run-off/leachate collected in the interceptor lagoon).

2.2.5 SITE OPERATIONAL DETAILS

(1) Working Hours

The ash repository is operational for associated ash disposal activities from Monday to Saturday during the following hours:

	Monday - Friday	Weekend
Current	8 am - 6 pm	8 am - 4 pm Saturday
Proposed	8 am - 8 pm	8 am - 6 pm Saturday 8 am - 4 pm on Sundays

As part of the planning application and waste licence review it is proposed to extend the hours of operation from 8 am to 8 pm Monday to Friday, 8 am to 6 pm on Saturdays and when necessary 8 am to 4 pm on Sundays. Due to the nature of the proposed ash, the volumes of ash handled at the facility will increase and as such additional working hours will be required to permit the placement and compaction of the ash accepted at the facility.

It should be noted that activities occurring on-site during the weekend will be via rail transportation and work will only take place on a Sunday, in emergency situations only (i.e: in the event that the ash is not completely placed on Saturday).

(2) Employment & Management Structure

The managerial staff structure for the ash repository facility is outlined in Table 2.2/1 below.

Title	Duties & Responsibilities	Experience/Qualifications
General Manager (Mr. Paul Riordan BE)	Overall responsibility for the ongoing management of the site and maintenance of the waste licence. Delegation of authority and responsibility to ensure the effective management of the facility.	General Manager of Eastern Region since 2002. Previously held other senior management positions
Transport/ Quality Manager (Mr Justin McCarthy BE)	Responsibility for the transportation of ash to the facility as directed by the General Manager. The transport manager will be based at the Power Station for the majority of the time.	Quality Manager, Derrygreenagh Works for over 16 years with responsibility for transport of peat and peat quality.
Site Manager/ Environmental Co-Ordinator (Joe Ryan)	Responsibility for the day to day implementation of routine compliance monitoring, maintenance of all environmental records and the environmental file and preparation of environmental reports as directed by General Manager.	Environmental Co-ordinator Derrygreenagh for 5 year. Previous experience in survey in Bord na Mona for 2 years. Holder of FETAC national skills cert in Waste Management & National Diploma in Civil Engineering

Additional Support: Mr. Donal Wynne B.E: Head of Civil Engineering & Environmental Control based at Bord na Mona Energy's offices in Leabeg, Tullamore, Co. Offaly.

The transportation manager will be responsible for:

- Implementation of rail operations i.e. transport of ash in specifically designed wagons via rail from power station to ash repository
- Implementation of waste acceptance procedures and the tipping of ash at the appropriate ash disposal cell

Waste acceptance procedures involve the registration of incoming ash loads which includes the logging of the waste load content (type, quantity) and time and location of deposition.

- Role in Environmental Emergency Response Team
- Role in the achievement of environmental targets and objectives.

The site manager/environmental co-ordinator (trained in landfill operational procedures) is responsible for:

- Tipping of ash at the appropriate ash disposal cell
- Levelling and compaction of deposited ash
- Spreading of capping material over the active ash disposal area when the cell reaches capacity
- operation of the on-site water spray/sprinkler system for dampening of the deposited ash.
- On-site security
- Member of environmental emergency response team

(3) Equipment Details

The ash repository has 2 vehicles on-site for daily operational activities.

- Front End Loader
This is used for the placement, levelling and compaction of deposited waste loads on a daily basis.
- Tractor/water dowers
This is used for the dowsing of the deposited waste loads for dust abatement measures.
- Pump
This is used to pump leachate to and from the leachate lagoon.

(4) Preparatory Works

a. Construction Schedule and Sequence

The proposed method for landfilling of the ash is that of excavated cell/trench. The ash disposal site shall be divided into a series of rectangular cells (8 in total) (Drawing No.2401057-2 Site Layout Plan) excavated in the subsoil which will be delineated by pre-constructed cell walls (natural peat/clay perimeter and rail embankments) (Drawing No. 2401057-5 Cell Cross Sections). The proposal is to remove the residual peat layer prior to commencing ash disposal activities and use the indigenous rigid clay subsurface as a barrier to prevent the infiltration of leachate into the subsurface soils. Currently there are three cells operational at the facility, cell I (restored), Cell II (currently active) and Cell III (under construction).

The leachate collection system directs any leachate generated into a sump and the leachate is then pumped into the existing interceptor lagoon in the south-east corner of the site.

The indigenous subsoil excavated from the site (combination of peat and clay material) is used for the final cover. This material is stored adjacent to active cell disposal areas. Ash is deposited to final levels (8 m above cell base level) into cells which will be filled successively in phases. A cycle of progressive filling across the site will occur, with one phase being restored while a second is filled and a third prepared for filling. Excavation, filling and restoration of individual cells will take place progressively as outlined overleaf. Currently, an active cell has a life-time of 1 year ash disposal activities.

b. Method Statement for the Construction Work

All construction works which will take place on-site will take place under the supervision of Bord na Móna and adhere to standard building/construction regulations.

c. Safety Statement for Construction Work

All preparatory works which will take place on-site will take place under the supervision of Bord na Móna and adhere to standard health and safety precautions and regulations.

d. *Calculations for Material Requirements*

Peat

Total Peat Volume Required = Quantity of peat required for construction of external/internal perimeter embankments + Quantity of peat required for construction of railway embankments + Quantity of peat required for capping material

$$= 355,800 \text{ m}^3 + 49,632 \text{ m}^3 + 46,900 \text{ m}^3 = 452,332 \text{ m}^3$$

Clay

The base of the cell at 67.3 formation level is in excess of 1 m in depth, therefore, no additional clay requirement to ensure 1 m thickness of clay at base of cell.

Total Clay Volume Required = Quantity of clay required for capping material

$$= 187,600 \text{ m}^3$$

Note: Capping layer is based on 20:80 mix of peat:clay

e. *Importation of construction Materials*

$$\text{Total clay material present on-site} = 351,750 \text{ m}^3$$

$$\text{Total peat material unharvested within the site} = 234,500 \text{ m}^3$$

(Note: Calculations of peat and clay material present on-site are approximations based on borehole lithology and cross sections)

Given that the total quantity of peat required for the construction of external/internal perimeter and railway embankments and that used within the capping layer (452,332 m³) exceeds that of which is presently unharvested within the site (234,500 m³), peat will have to be sourced and excavated from the adjacent peatland. However, it is proposed to mix the excess clay (164,150 m³) with peat to form the external/internal perimeter and railway embankments. Therefore, a net volume of 53,682 m³ peat is required.

f. Formation Levels for the Site

The ash disposal site will be divided into a series of rectangular cells excavated in the subsoil (refer to drawing No. 2401057-2 Site Layout Plan). The proposal is to remove the residual peat layer prior to commencing ash disposal activities i.e. soil stripping to boulder clay. A formation level of 67.30 m O.D is taken throughout.

g. Basal Gradients for all Cells

Basal leachate drainage blankets which compose of a collection pipework system across the base of the site will direct any leachate generated to an interceptor lagoon. The base of each cell will slope towards the leachate drain at a rate of 2% (Drawing No. 2401057-5 Cell Cross Sections).

(5) Waste Acceptance Procedure

A copy of the waste acceptance procedure and ash handling procedure is attached in Attachment 4.

The ash is delivered to the facility via rail link. The ash is transported in 12 no. especially designed wagons (see plate 2.2/1). These are made up of 11 no. wagons for the fly ash fraction and 1 no. wagon for bottom ash. Each wagon has a capacity of 3.6 – 4.4 m³.

Currently the fly ash fraction generated from peat combustion within the boiler equates to a daily production of 119 tonnes while the bottom ash equates to a daily production of 15 tonnes. The ash is moistened prior to it leaving the power plant (see plate 2.2/2), and is covered by a hydraulically controlled lid to prevent dust nuisance during transportation.



Plate 2.2/1: Unloading of Ash



Plate 2.2/2: Moistened Ash

Incoming ash is unloaded from the especially designed wagon using the front end loader. Each wagon holds two containers each are individual unloaded and placed in the active cell on either side of the rail line by the front loader. Once

all of the wagons have been unloaded, the ash is levelled and using the bucket of the front end loader. As the cell reaches capacity, the cell will be filled from the south embankment across the cell.

Fly ash is typically dampened with water (40:1 w/w Fly Ash:H₂O ratio) at the power station as dust control. Further in-situ dampening of ash is afforded by an on-site water dower which is carried out through the day, when necessary. This mitigates against any dust problems and also aids in the compaction of the deposited ash. The ash will be deposited to final levels (8 m above cell base level) into cells which will be filled successively in phases. Therefore, a cycle of progressive filling across the site will occur, with one phase being restored while a second is filled and a third prepared for filling. Currently cell II is being filled while cell I has been capped and cell III is being constructed.

Meteorological records are taken daily at the Bord na Mona Offices at Derrygreenagh. In the event that wind speeds are recorded greater than 39 km/hr, ash acceptance will cease, until such time that the wind die down.

Since the commencement of ash disposal at the ash repository site in December 2000 the generation of leachate from the facility has been minimal. Water added to the ash at the power station and at the facility appears to react with the ash resulting in the evaporation of the water/leachate and the formation of a “concreted ash”.

Dampening of Ash

Ash obtained from the fluidised bed boiler of the proposed peat fired power station is dry. When loading to the especially designed wagons at the power station, fly ash is dampened with water (40:1 w/w Fly Ash:H₂O ratio) to attain a minimum 2.5% w/w ash moisture content. Further in-situ dampening of deposited ash at the ash facility is carried out by an on-site water dower system.

A pump is used to draw water from the interceptor lagoon for fire protection and for the dower system used for in situ dampening of the deposited ash.

2.2.6 Quantity & Type of Waste Accepted

(1) Existing Ash Quantities & Type

Currently the ash repository site accepts furnace bottom ash and fly ash waste products produced from peat combustion within the fluidised bed boiler of the

120 Megawatt peat fired power station at Ballykillen, Edenderry, County Offaly. Fly ash is typically dampened with water (40:1 w/w Fly Ash:H₂O ratio) at source for dust control resulting in the addition of 950 tonnes of water to this ash fraction. This water addition will subsequently result in the generation of a total of approximately 39,000 tonnes per annum of moistened fly ash and 4,000 tonnes per annum of moistened bottom ash material for disposal at the ash repository.

Bottom Ash & Fly Ash Composition - Mineralogy: Furnace bottom ash is a solid, coarse grained, granular ash while fly ash is lighter and fine grained and accounts for ca. 90% of the ash produced from peat combustion. Compositional analysis of the fly ash from the peat fired boiler of a power station (see appendix 05) indicates the presence of a large quantity of inerts which are calcium, magnesium, iron, silica and sulphur based (Calcite - CaCO₃, Hydrated Lime - Ca(OH)₂, Quartz - SiO₂, Brucite - Mg(OH)₂ and Magnesium Carbonate MgCO₃, are typically the main phases present) and trace amounts of heavy metals (Zn, Cu, Pb, B, Ni, V, Mo, Cr, As, Sr). (Refer to Attachment 5: Ash Composition)

Since the commencement of activities on the site the quantities of waste accepted at the facility are detailed in Table 2.2/3 overleaf.

Year	Bottom Ash	Top Ash	Total
2000 (8-31 December)	356 tonnes	1,561 tonnes	1,917 tonnes
2001	6,471 tonnes	20,578 tonnes	27,049 tonnes
2002	4,920 tonnes	22,333 tonnes	27,253 tonnes
2003	4,500 tonnes	24,092 tonnes	28,592 tonnes
2004	5,310 tonnes	29,251 tonnes	34,561 tonnes
2005 (up to 01/10/05)	4,199 tonnes	19,290 tonnes	23,489 tonnes

(2) Proposed Ash Quantities & Type

The proposed ash will be generated from the co-fuelling of biomass and treated Meat and Bone Meal (MBM). The extent of the use of MBM in the fuel mix will be up to a maximum of 10% per annum of calorific value on average, with the expected quantity being approximately 60,000 tonnes annually.

While the substitution of the peat with biomass will result in a reduction in the volumes of ash generated (due to lower ash content in wood), the MBM will result in an increase in ash volumes. The ash from MBM will ca. 20-30% greater than that of peat. As a result of this the volumes of ash proposed to be accepted at the facility will increase from an existing licensed annual tonnage of 50,000 to 70,000 tonnes per annum.

To determine the nature of the ash from the co-fuelling of peat and MBM or biomass and MBM, analysis was carried out from the ash produced from the laboratory combustion of a sample of the fuel. A copy of the results are given in Attachment 5. The pH (12.6 pH units) and Sulphate (23,270 µg/g) are indicative of the current ash generated from the process. The elevated results obtained are as a result of dosing with limestone to abate SO_x emissions in the flue gas. The elevated Chloride results (3,763 µg/g) and Sodium (139.77 mg/g) would be what would expected due to the presence of the MBM in the fuel. None of the metals detected were at such a level to be considered as presenting a risk to the environment when deposited in a landfill. Of note, was that no Semi-Volatile Organics, Polychlorinated Bi-Phenyls or Polyaromatic Hydrocarbons were recorded above the limit of detection, demonstrating the absence of these possible dioxin precursors.

The fly ash from burning peat and untreated wood material is classified according to the EWC/HWL as 10 01 03 – fly ash from peat and untreated wood. This is a non-hazardous waste classification. The fly ash from burning peat and or peat/biomass and MBM is classified according to the EWC/HWL as 10 01 17 – fly ash from co-incineration other than those mentioned in 10 01 16. This is a non-hazardous EWC/HWL code.

2.2.7 LINING SYSTEM

A lining system is used to protect the surrounding environment (soil, groundwater, & surround water) from the ingress of leachate generated in the landfill. The type of lining system applied to any landfill should be compatible with the expected leachate for the design life of the facility.

(1) Existing Lining System

The existing two lined cells at the ash repository facility are in compliance with the lining requirements of non-hazardous waste facilities, as shown in Figure 2.2/2 and 2.2/3 overleaf.

Under the conditions of the waste licence, Bord na Mona Energy Ltd requested a change of lining system at the facility based on the findings of the ash deposition conditions and on-going environmental monitoring. The EPA agreed for the lining system for inert waste facilities (refer to attachment 6), as shown below:

Figure 2.2/2: Existing/Proposed Lining System For Non-Hazardous Ash

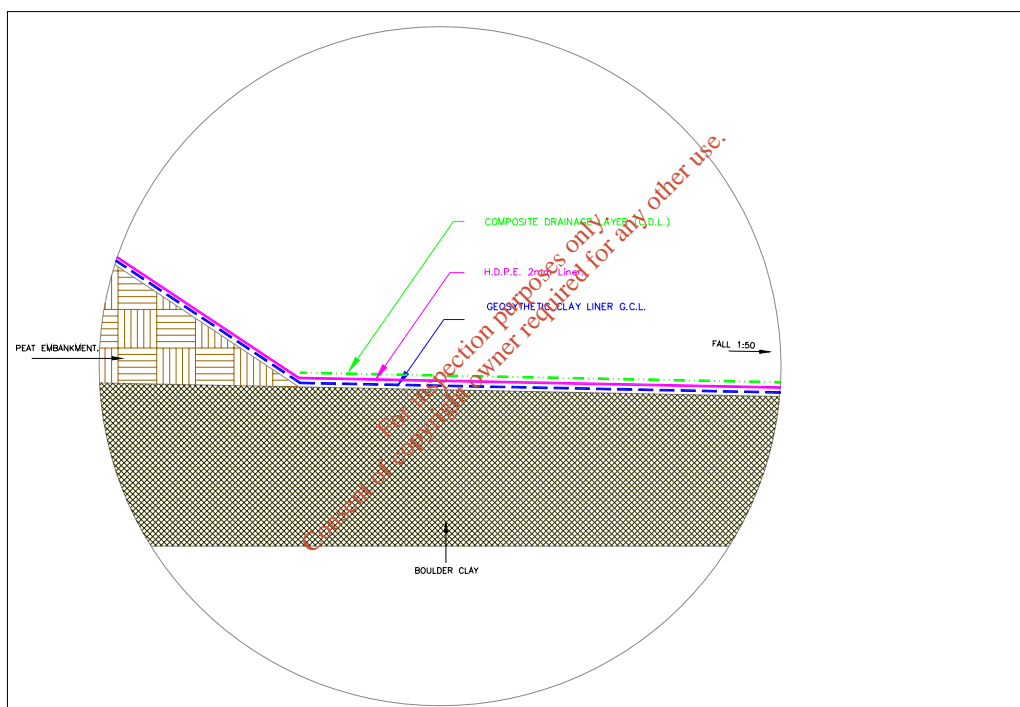
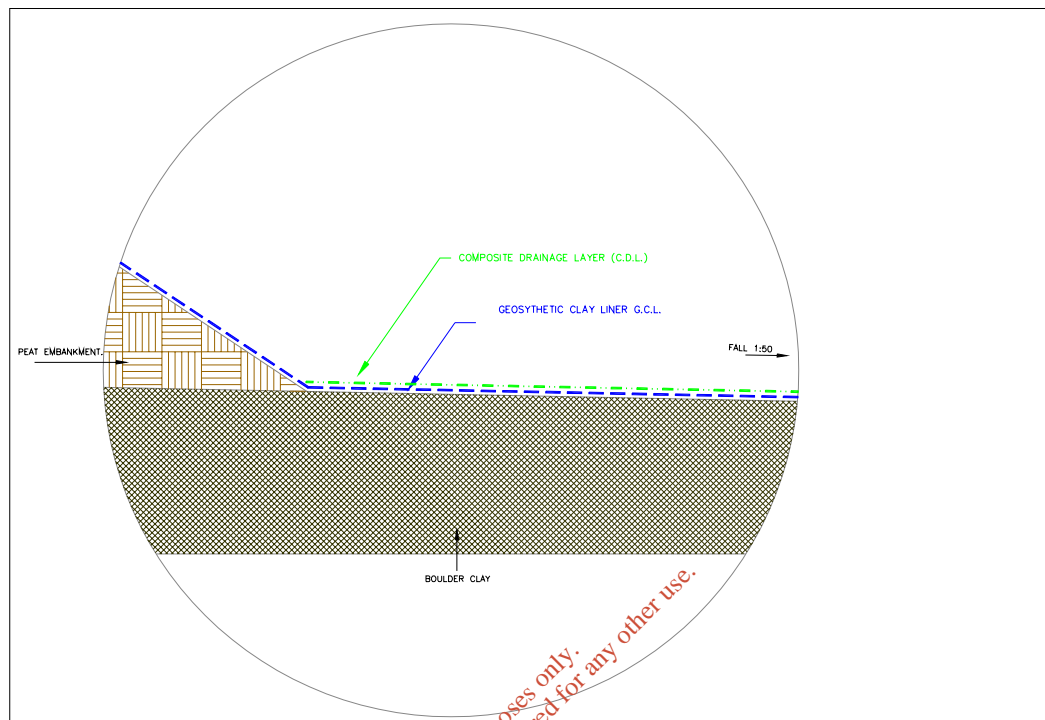


Figure 2.2/3: Proposed Lining System For Ash Generated from Peat/Peat & Biomass



(2) Proposed Lining System

The composition of the ash is classified as non-hazardous and as such it is proposed to construct the cells in compliance with that for non-hazardous biodegradable waste landfill as detailed in Figure 2.2/2.

2.2.8 LEACHATE MANAGEMENT DETAILS

(1) Existing Leachate Management System

Since the commencement of ash disposal of the ash repository site in December 2000 the generation of leachate from the facility has been minimal. Water added to the ash at the power station and at the facility appears to react with the ash resulting in the evaporation of the water/leachate and the formation of a “concreted ash”. Any leachate generated at the site is currently re-circulated into the landfill as dampening agent, thus only two discharges from the interceptor lagoon have occurred to-date. The first occurred in December 2000, prior to any

ash begin disposed off at the facility and the second occurred in February 2002, after a prolong rainfall event. In February 2002, due to the high rainfall, a high dilution factor occurred within the stream itself on account of the high flows.

It is thought that the following processes occur when the dampening water is added to the fly-ash in the lined facility:

- Water utilised for dampening purposes chemically interacts with the fly-ash creating a leachate with a high pH and conductivity due to the lime added. No other chemical elevations have been noted.
- A hydrolysis reaction (e.g. hydrolysis of CaO flecks and the dissolution of Ca(OH)₂) between the ash and the applied water resulting in the consumption of certain amounts of water. This results in the ash becoming “concreted” and quite dense. The ‘concreted’ fly ash has a very low hydraulic conductivity or permeability coefficient.

An exothermic reaction occurs between the lime (added to the Ash) and the water. This process is also referred to as ‘slaking’, $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$ with heat given off as part of the reaction. This heat, particularly in the upper section of the deposited ash, is thought to lead to the evaporation of water/leachate. Any leachate generated at the site is currently re-circulated into the landfill as dampening agent. There has been only two discharges from the interceptor lagoon since the commencement of activities on the site in December 2000.

(2) Proposed Leachate Management

It is proposed to continue to manage the leachate in the same manner that is presently occurring on site and in compliance with condition 4.10 of the waste licence (49-1)

(3) Leachate Monitoring

On-going monitoring of the leachate is undertaken at the facility as part of the conditions of the waste license (49-1) at location LC1A (capped cell sump), LC2A (active cell sump) and L1 (lagoon). Results of the leachate analysis for 2004 and 2005 are given in Table 2.2/4 overleaf.

Table 2.2/4: Leachate Monitoring Analysis at Clonreen Ash Repository Site.

Location id	Parameter	Feb 04	May 04	August 04	Nov 04	March 05	May 05	July 05
LC 1A (Sump)	pH (pH units)	12.94	12.96	12.5	12.93	13.03	12.83	12.53
	Conductivity (µS/cm)	19550	18450	14070	12060	19970	19190	13880
	Ammonia (mg/l)	10	11	0.05	5	11	11	8.5
	COD (mg/l)	712	1098	69	605	964	178	338
	Total S.S. (mg/l)	37	5	<5	224	113	27	25
	Total Oxidised Nitrogen	0.39	0.06	<0.2	0.07	0.22	0.08	0.41
LC 2A (Sump)	PH (pH units)	12.76	12.71	11.89	12.86	12.75	12.6	12.39
	Conductivity (µS/cm)	14960	9390	6850	15730	16610	14050	13710
	Ammonia (mg/l)	8.2	7.2	10	4.57	3.06	2.39	13
	COD (mg/l)	503	545	<10	602	1314	209	454
	Total S.S. (mg/l)	12	25	14	123	83	88	48
	Total Oxidised Nitrogen	0.48	0.26	<0.2	0.07	0.28	0.08	0.14
L1 (Lagoon)	PH (pH units)	12.27	10.52	8.75	12.37	12.05	10.9	10.32
	Conductivity (µS/cm)	5900	4240	1407	4390	7970	6420	6840
	Ammonia (mg/l)	0.95	0.37	6.8	1.57	0.63	0.45	0.02
	COD (mg/l)	116	155	468	290	452	53	118
	Total S.S. (mg/l)	11	26	63	79	74	51	5
	Total Oxidised Nitrogen	0.34	0.1	<0.2	0.07	0.23	0.08	0.08

The results show that the leachate sample taken from the sump have high pH and conductivity levels. Eco-toxicological tests undertaken on the leachate showed high toxic units for the species vibrio fischeri only. It was concluded that this response was on account of the high pH levels of the leachate only. To confirm this additional eco-toxicological tests were undertaken on the leachate sample which had been pH corrected. Results obtained on the pH corrected leachate sample recorded toxic units of <2.2 for both the 5 min-EC₅₀ and 15 min-EC₅₀ confirming the pH is causing the eco-toxicologically response. The general quality of the leachate have varied with Ammonia levels ranging from 0.05 to 11 mg/l, COD from 69 to 1314 mg/l. Total oxidised nitrogen levels and suspended solids (TSS) have been generally low ranging from <0.2 – 0.41 mg/l and 5 to 123 mg/l respectively.

The leachate management system will allow any leachate generated, if any, to flow into the leachate drainage channels which directs leachate into the sumps where it is pumped to the Interceptor Lagoon. Water within the interceptor lagoon will be re-circulated as dampening water for dust suppression purposes.

2.2.9 CAPPING SYSTEM

On completion of filling of each cell, the cell will be immediately restored. The restoration will consist of a capping layer and the completed capping restoration will have a depth of approximately 1.0 m (20:80 mix of peat:clay). This capping layer will slope in accordance with the landfill restoration landscape plan.



Plate 2.2/3: Existing Capped Cell I

All construction works which will take place on-site will take place under the supervision of Bord na Móna and adhere to standard building/construction regulations, health and safety precautions and regulations and recommended landfill design procedures.

2.2.10 AFTERCARE MANAGEMENT SYSTEM

Ash will be deposited to final levels (8 m above cell base level) into cells which will be filled successively in phases. A cycle of progressive filling across the site will occur, with one phase being restored while a second is filled and a third prepared for filling.

Capping and seeding of cells will occur when the cell reaches final levels in order to stabilise the surface. The site which will be finished in a concave mound design at a slope of approximately 20%, will be contoured (final contours will be approximately to pre-cutaway state - Drawings No. 2401057-4 Details of capping contours) and revegetated in order to blend with the natural landscape of the area. Currently cell I has been temporary capped and is vegetated with indigenous species (refer to section 3.6).

It is envisaged that the facility will be revegetated with a mixture of coniferous and deciduous trees post decommissioning. This tree planting exercise will occur in a phased basis as cell sections of the waste mass are filled and capped.

The purpose of the Aftercare Management Plan is to ensure that the presence of the former ash disposal site does not have any adverse impact on the environment of the surrounding area. Part of this plan will be the environmental monitoring of the site after its closure and restoration have been completed. Monitoring parameters will be inline with schedule F of the Waste Licence (Reg. No. 49-1). The programme will be reviewed at regular periods on the basis of the on-going monitoring conclusions.

On closure of the facility leachate generation is predicted to be minimal. Capping and seeding of cells will typically occur when the cell reaches final levels in order to stabilise the surface. Vegetation cover permits water to be lost by transpiration and hence contributes to the reduction of rain infiltration. Therefore, the significance of rainfall in the generation of leachate at the site is reduced. However, in order to eliminate any adverse effects of possible contaminant inputs to the surface water drainage network, it is proposed to initiate an on-site leachate diversion and containment programme. A leachate collection system will direct any leachate generated to the existing interceptor lagoon. Following review results of analysis of any leachate which has collected within the lagoon the liquid contents will be either:

- discharged directly to the West - East drainage ditch (if leachate deemed environmentally benign) or
- treated appropriately on-site (if leachate deemed contaminated).

In any event ongoing environmental monitoring will dictate the nature, extent and duration of additional aftercare required.

The main issues to be addressed regarding aftercare (outside of the monitoring parameters) have been identified as:

- Land Settlement
- Slope Stability

Topographical studies will be carried out periodically to assess the quality, profile and stability of the restored cell surface i.e. establish the degree (if any) of settlement and ensure slope stability and integrity is maintained.