11 AIR EMISSIONS

11.1 Introduction

This section is prepared to determine the existing air quality characteristics of the Srahmore Peat Deposition Site and surrounds, and to assess the potential impact of continued use of the site resulting from the import and deposition of up to 75,000m^3 of peat to the site.

11.2 Study Methodology

This study aims to identify and assess the sources and potential impact of atmospheric releases from the transfer and deposition of peat.

Emissions associated with the peat deposition phase include dust generation from vehicle movements and wind blowing over open ground or dusty materials. Potential emissions may also include fine particles of a size that can be inhaled into the lungs (PM_{10}) if not effectively controlled. Emissions associated with combustion of fuel in the transport of the material to Srahmore are also assessed.

Dust deposition is often highly localised with most dust particles falling to ground within several hundred metres from the dust source. Dust generation itself is highly dependant on climatic conditions, the type of material and nature of dust generating activities. Any predictive assessment of dust generated during deposition activities can be prone to a significant level of uncertainty. It is consequently often considered more appropriate to ensure an effective management strategy is in place to minimise dust releases rather than attempt to quantify them directly. An effective dust management strategy will be introduced to control dust emissions and prevent its generation. The strategy is based on dust suppression or containment. Given the inherent moisture content of the peat, dust generation however is not expected to be significant.

The emission components from vehicles with the greatest potential to impact on health are oxides of nitrogen (NOx) and specifically nitrogen dioxide (NO2).

Up to twenty five vehicle units will be used in the internal transfer and deposition of peat, together with the road haulage vehicles. These units will all generate similar emissions.

The remainder of this section is set out as outlined below:

- emission characteristics associated with the importation and deposition of peat from the onshore pipeline development to the Srahmore site;
- the legislative context that defines air quality standards and limits;
- description of the background air quality;

- identification of potential interactions with other sources;
- a summary of mitigation measures that will minimise releases to air;
- impact assessment;
- potential microclimate considerations;
- air quality monitoring;
- conclusions and summary; and,
- any residual impacts

11.3 Emissions Characteristics of the Proposed Development

Emissions to atmosphere potentially arise as a result of the transfer of peat from the onshore pipeline development to the existing peat deposition site at Srahmore

Peat will be excavated from sections of the onshore pipeline development. Aspects specific to the onshore pipeline are addressed in Chapter 8 of the onshore pipeline development (Volume 1 & 2 of the EIS). Up to 75,000m^3 of peat will be hauled along the road network.

Dust may be generated during the placement of peat at the deposition site. If uncontrolled, elevated dust deposition can occur beyond the site boundary and lead to complaints arising from soiling of property. Haulage and onsite vehicles and equipment will also generate exhaust fumes.

In accordance with the current EPA Waste Licence for the site (WL199-1) dust monitoring was carried out on-site during 2005 and 2007.

The importation of construction materials has the potential to produce dust emissions and road traffic emissions.

Peat will be transferred to the peat deposition site in trucks using the route identified in the traffic impact assessment (see Section 16 of this EIS). Road traffic emissions will consist mainly of carbon dioxide (CO_2), carbon monoxide (CO), nitrogen oxides (NOx), particulates (PM) and hydrocarbons (HC). Vehicle fuels have low concentrations of sulphur. Sulphur dioxide emissions from vehicles are typically only significant in highly trafficked, urban areas.

In common with other vehicles, those operating within the site will emit carbon monoxide, nitrogen oxides, particulates and hydrocarbons. At maximum activity, twenty five machines or vehicles are expected to operate at the peat deposition site. These units will comprise of:

- 12 No. Tractors
- 2 No. Loading shovels
- 10 No. Excavators
- 1 No. Dozer

Once peat is deposited at the site, dust emissions have the potential to arise from dust entrainment as wind blows across the site. The moisture levels of peat layers following deposition will however mean such emissions will be very low and degradation of the peat is not expected to occur.

11.4 Legislative Context - Air Quality Standards and Limits

Air quality standards have been developed and incorporated into Irish statute to protect human health and the environment. International agreements have also been drawn up to identify performance standards and limit the generation of air quality pollutants at a regional, national and global level. Relevant legislation and agreements have been discussed below:

11.4.1 Air Quality Standards and Guidelines

The European Commission (EC) has formally adopted the Air Quality Framework Directive (96/62/EC). The first daughter directive, 99/30/EC (adopted April 1999), set specific limits for four air pollutants: nitrogen dioxide, sulphur dioxide, PM10 and lead. There are no sources of lead associated with the development and lead is not described further. In December 2001, the EC adopted the second daughter directive, 2000/69/EC, relating to limit values for benzene and carbon monoxide (CO) in ambient air.

These directives have been transposed into Irish legislation by the Air Quality Standards Regulations, 2002 (SI No. 271 of 2002). The original Air Quality Directives have been replaced by one over-riding European Directive (2008/50/EC) in May 2008, but the specified limits for the protection of human health remain unchanged from those specified in SI No. 271 of 2002. These limit values are presented in Table 11.1.

Table 11.1: Relevant Air Quality Standards and Guidelines

Pollutant	Averaging Period	Standard ($\mu g/m^3$)	Percentile	Maximum Exceedences per year	Status
NO_2	1 hour 1 hour Annual Annual (vegetation)	200 200 40 30	99.8th 98th	18 175	In Force In Force In Force In Force
SO_2	1 hour 24 hours Annual (ecosystems)	350 125 20	99.7th 98.9th	24 3	In Force In Force In Force
PM_{10} Stage 1	24 hours Annual	50 40	-	35	In Force In Force
PM_{10} Stage 2	24 hours Annual	50 20	-	7	In Force In Force
CO	8 hours	10,000	-	-	In Force
Benzene	Annual	5	-	-	In Force

Various international initiatives, Protocols and Directives exist to limit and reduce emissions at a national level including ensuring, for example, vehicles meet emission standards.

11.4.2 Dust Deposition

Whether dust deposition becomes a problem is a subjective issue and depends on a variety of factors including the sensitivity of nearby locations, the repetitive nature of any deposit occurring and the nature of the particulate itself. The colour of particulate can be influential in determining sensitivity with for example coal dust causing dust problems at lower deposition rates in comparison to dust derived from soils.

Due to this subjectivity there are no statutory limits on dust deposition and the focus is on the prevention of nuisance and minimising air borne dust emissions where practicable.

A number of rule of thumb measures exist to identify whether the potential for deposition can cause dust problems. These are based on two different types of measure, namely mass deposition rate and effective area coverage. Ongoing dust monitoring has been carried out at the site by Bord na Móna to monitor deposition rates. The method of assessment has determined a mass deposition rate and therefore dust guidelines described in this section have focussed on this measure.

Mass deposition rates determine the quantity of material deposited per unit area over a given reference period. Two commonly applied guidelines include a UK based rule of thumb of 200 mg/m^2/day (expressed over a 30 day average) and the German (TA Luft) guideline of 350 mg/m^2/day. Below these thresholds dust problems are considered less likely.

11.5 Background Air Quality Data

11.5.1 Air Quality

The EU Air Framework Directive requires Member State to categorise geographic areas, in terms of Zones and Agglomerations for Air Quality. Mayo has been classified as falling within Zone D – Rural Ireland.

The existing Air Quality in the area has been assessed in Chapter 8 of the onshore pipeline development (Volume 1 & 2 of this EIS).

11.5.2 Dust Deposition

Affects of dust emissions are generally related to nuisance, however within the dust a certain fraction can have health impacts. Health effects are typically associated with fine particulate matter, generally below 10µm (i.e. PM10)

The owner of the site, Bord na Móna, has carried out dust monitoring using dust deposition gauges (Bergerhoff gauges) for comparison with the TA Luft threshold of 350mg/m^2/day (in line with the statutory limits in the Waste Licence of 350mg/m^2/day) in 2005, 2007 and 2010.

In 2005, as required by Condition 8.8.1 of the existing Waste Licence (WL199-1), locations for dust monitoring around the site were agreed with the EPA, and Bergerhoff Dust gauges were installed. No dust monitoring was undertaken in 2006, 2008 or 2009 as there were no activities on site. The results are summarised below in Table 11.2 and shown on Figure 11.1.

Table 11.2: Measured Dust Deposition Rates

	April 05	May 05	June 05	July 05	Aug 05	Sept 05	Oct 05	April 07	May 07	June 07	July 07	Aug 07	Sept 07
DM-01 mg/m²/day	45	24	20	17	4	13	13	11	18	32	90	8	89
DM-02 mg/m²/day	422	153	243	7	13	30	15	15	33	83	53	9	7
DM-03 mg/m²/day	21	894	1181	12	16	13	13	174	347	2256*	67	29	43
DM-04 mg/m²/day	38	-	259	4	6	9	3	13	59	42	37	13	26
DM-05 mg/m²/day	84	29	24	12	6	16	18	-	109	63	31	5	10

* This was not reported as it was found to be contaminated.
Note: Monitoring and reports prepared by Bord na Móna.

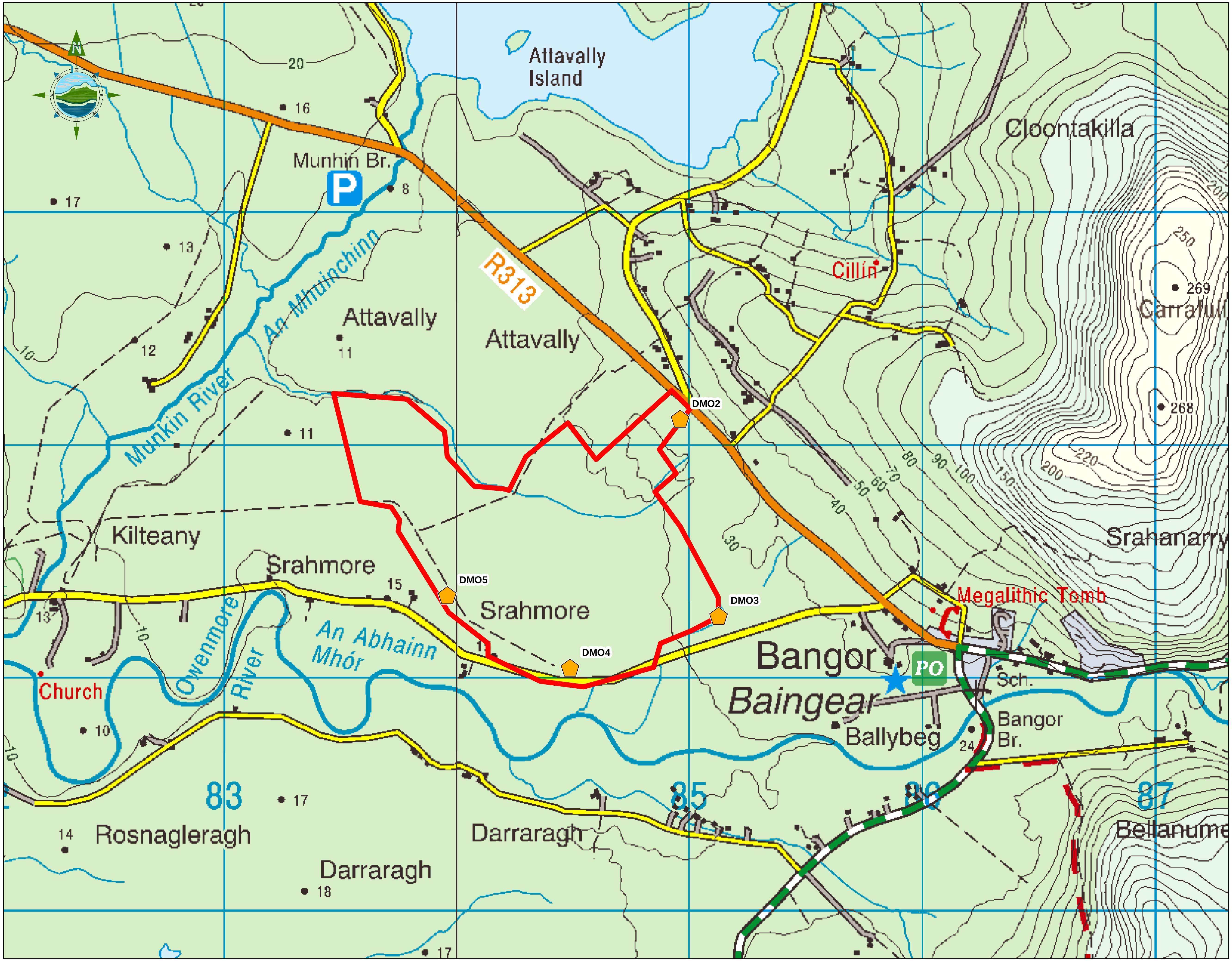
During peat deposition activities, which commenced on the 18th April 2005, the dust gauges were monitored every 28 – 32 days. During this period 35 samples were taken from the 5 dust sensitive locations, with 3 of the samples exceeding the Emission Limit Value (350mg/m³/day). These exceedance's were reported to the Environmental Protection Agency and corrective actions were put in place. These corrective actions are included in Appendix 11.1, Book 3.

Due to the fact that there was no peat deposition or activity during 2006, dust monitoring was suspended, in agreement with the EPA. Dust monitoring recommenced prior to resumption of peat deposition in April 2007. There were no non-compliances in 2007. Dust monitoring was then suspended in 2008 and 2009 in agreement with the EPA.

More recently, between February–March 2010 further dust monitoring using dust deposition gauges (Bergerhoff gauges) for comparison with the TA Luft threshold of 350mg/m^2/day was undertaken at the site. The dust monitoring locations are shown in Figure 11.1 overleaf. The results of this dust monitoring exercise are described in Table 11.3.

Table 11.3: Dust Monitoring Locations

Monitoring Location as per Figure 11.1	February 23rd to March 24th 2010
DM-02 (mg/m²/day)	10.3d
DM-03 (mg/m²/day)	3.45
DM-04 (mg/m²/day)	5.17
DM-05 (mg/m²/day)	2.87



Legend

- Site Boundary
- Dust Monitoring Location

0 62.5 125 250 375 500

Metres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	14.05.10	ISSUED FOR RE-SUBMISSION	A.G	S.F.
Issue	Date	Description	By	Chkd.

Applicant: Shell E&P Ireland Limited
Corrib House, 52 Leeson Street Lower,
Dublin 2, REpublic of Ireland

Operator: BORD NA MÓNA

Project: CORRIB ONSHORE PIPELINE DEVELOPMENT

Aspect: SRAHMORE PEAT DEPOSITION SITE

Title: DUST MONITORING LOCATIONS 2010

Scale @ A3: 1:15,000

Prepared by: A.Gruschka
Checked: S.Finlay
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Project Director: S.Finlay

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11.6 Interactions with Other Sources in the Region

Other emission sources in the vicinity of the peat deposition site include road traffic. Contributions from existing road traffic will have been recorded in the air quality monitoring described in Chapter 8 of the onshore pipeline development (Volume 1 & 2 of the EIS.

In relation to dust emissions, such emissions are generally a highly localised issue, with deposition occurring close to its source. Therefore, significant interactions with other dust generating activities are not likely to be significant.

Fine dust with the potential to affect health (PM_{10}) can be generated from both vehicle emissions and dust generating activities.

Dust suppression techniques will minimise releases of PM_{10} and releases from vehicles are assessed later in this section. Background levels of PM_{10} where both of these sources are already present show very low levels in comparison to air quality standards.

11.7 Potential Impact of the Proposed Development

The following section assesses the potential impact of the transport and deposition of peat at the Srahmore Peat Deposition site.

The potential impacts are associated with the following:

- Generation of dust emissions during transport;
- Generation of dust emissions during deposition and stabilisation; and
- Generation of vehicle emissions during transport and deposition.

While the transport of peat to the Srahmore site has the potential to generate dust emissions, operational measures are incorporated into the overall traffic management proposal and is already best industry practice for material transport. Owing to the wet nature of the material (i.e. high moisture content), the potential for such emissions is very low.

The unloading and deposition of the peat at the Srahmore site also represents a potential for dust emission. However, owing to the wet nature of the material (i.e. high moisture content), the potential for such emissions is very low. However, notwithstanding the low dust generation potential, operational measures are proposed to further reduce this risk.

Following deposition and during the stabilisation period, there is again the potential for dust generation. However, the mass deposition of the peat will generally impede full drainage of the peat mass and the material will consequently retain a high moisture content. This will significantly reduce the potential for desiccation of the material and thus reduce the potential for dust generation.

Emissions from vehicles have potential to impact on the local air quality. A quantitative air quality model has been prepared for the onshore pipeline development (Ref Chapter 8 of Volume 1 & 2 of the relevant EIS), which indicates that emissions from vehicles will result in varying levels of impacts along the haul routes during peak construction traffic activity. However, the level of impact is significantly lower that the relevant air quality limits for the protection of human health.

Emissions from the activity of vehicles associated with the internal transport and deposition within the Srahmore site has the potential to impact on air quality. However, owing to the low level of vehicle activity (i.e. 25 No. vehicles) and the large site and separation distance, the level of impact is considered to be negligible.

11.8 Do Nothing Scenario

In this scenario, the site would remain unchanged. No air emissions would be generated.

11.9 Summary of Mitigation Measures

Traffic emissions will continue to be minimised through appropriate vehicle maintenance and route selection to and from the peat deposition site. Route selection is described in Section 16 of this Volume of the EIS.

Dust impact will be mitigated by the continued application of best practice dust suppression and containment techniques including the prevention of dust accumulation and ensuring dusty materials are either moist or sheeted. Dust control measures which will continue to be employed will include where necessary:

- The surface of roads around the site will be sprayed with water during dry periods;
- Haul roads have been surfaced and road sweepers employed to ensure spillages of materials are collected and a build up of mud or dusty material does not occur;
- Speed restrictions onsite apply, particularly where travelling on unpaved areas;
- Vehicles will preferentially have upward-directed exhausts to reduce disturbance;
- Where mud can be transferred to vehicles, a wheel wash system has been provided to prevent the subsequent transfer of mud onto local roads;
- Any vehicle carrying fine materials will remain sheeted for as long as possible to prevent dust blow and spillages; and
- Existing trees and shrubs provide filtering of wind-borne dust and reduce near-ground wind speeds (and subsequent dust entrainment).

The continued monitoring of dust deposition at the site will assess the effectiveness of the mitigation measures introduced (as prescribed by the regulatory body).

11.10 Predicted Impacts of the Peat Deposition site

11.10.1 During Peat Deposition

To assist in the prevention of congestion, a Traffic Management Plan has been put in place to manage the movements of heavy commercial vehicles (HCV) during peat removal from the onshore pipeline development and transfer to the peat deposition site. Traffic management and route selection is described further in Section 16 herein.

Dust generation during peat deposition is unlikely to cause a significant impact given the wet nature of the site and the material being deposited. As identified above, should very dry conditions occur; standard techniques of dust suppression will be used. Minimising dust generation will reduce the potential for dust deposition problems from occurring at sensitive locations and additionally reduce to a minimum the generation of fine particulate with the potential to affect health (PM_{10}).

The greatest potential for air quality impact will occur from the HCV movements taking peat along the haul route between the onshore pipeline development and the peat deposition site. This is due to the proximity of the vehicles in relation to sensitive locations along the haul route. This impact is assessed in Chapter 8 of the onshore pipeline development (Volume 1 & 2 of the EIS). In contrast, emissions from on-site vehicles and machinery at the peat deposition site will be spatially separated and located a significantly greater distance away from nearby sensitive locations. Emission releases from vehicles will not have a significant impact on local air quality.

The deposition of up to 75,000m^3 of peat at Srahmore (even with on-site activity) from the onshore pipeline would produce lower emissions than the exportation of this peat to the next nearest permitted facility. No significant air quality impacts are predicted to arise from the peat deposition site.

11.10.2 Upon Completion of Peat Deposition

Few, if any vehicle movements will occur on the Srahmore Peat Deposition site once the peat has been deposited. Potential vehicle derived air quality impacts will therefore not arise.

Dust generation will primarily be limited to dust entrainment by wind once the peat has been deposited. Generation rates will be expected to be lower than during the deposit phase. Any dust deposition is also likely to be lower than currently measured for existing operations at the site.

11.11 Micro-climate considerations

The site and surrounding area within 1km is relatively flat and open and good dispersion conditions are expected. The wind direction is expected to be prevailing south-westerly however localised land-sea effects of wind direction can be expected. Such effects are likely to lead to higher localised winds than would otherwise be the case, again aiding dispersion.

A hill ridge lies to the east of the haul road and includes the peaks of Glenturk Beg, Slieve Fyagh and Carrafull. Steep gradients do not typically occur however within 1km of the haul road site, other than a rise up to 134m above ordnance data near Gleann Chuillin Íochtarach (Glencullin Lower) and again good dispersion conditions would be expected. The hill ridge does not form a basin where land rises steeply on all sides. Such basins can lead to poor dispersion characteristics under certain weather conditions (known as inversions). The hill ridge may cause localised influence in wind direction and wind speeds but such effects will not decrease the level of dispersion expected.

11.12 Air Quality Monitoring

No monitoring of air quality associated with traffic emissions is proposed. The screening assessment described previously predicted that air quality would be well within air quality limits at sensitive locations in close proximity to the haul route.

Existing dust deposition monitoring will be continued at the site during the period of peat positioning to ensure proposed mitigation measures are effective (as prescribed by the regulatory body).

11.13 Residual Impacts

As a result of this study, atmospheric emissions resulting from the peat deposition site are not deemed likely to have a significant impact on the local environment either through emissions from vehicles or from dust generation. Minimising the number of internal site roads used in the operation will significantly reduce the residual impact.