AIR EMISSION IMPACTS

The information / air emission impact assessment presented herein is based on that presented in Chapter 8 (Air Quality) of the EIAR which accompanies this waste licence application. Details of the baseline air environment and a description of the methodologies employed for the purposes of this impact assessment are presented in the EIAR .

Particulate matter arising from waste recovery activities at the application site has the potential to affect existing sensitive receptors in the area due to a potential increase in airborne dust deposition. The significance of impacts arising from site emissions is dependent upon the magnitude of the emissions, the prevailing meteorological conditions for the location and the proximity of sensitive locations to the emission sources. Each of the activities associated with this application have been assessed for potential air quality impacts including:

- emission from separation of soil and stone, soils placement and storage (including trackout);
- PM_{10} contribution from operational activities;
- traffic exhaust emissions.

Trackout – Dust Assessment

In the course of the backfilling and soil waste recovery activities at Usk, the incoming / outgoing HGV traffic will follow established haul routes within the application site, much of which are paved around the site entrance / egress and the shared infrastructure area (where the site office, welfare facilities, staff canteen, weighbridge, wheelwash etc. will be located).

Given that HGVs travel over a relatively limited length of unpaved haul road in the centre of the application site and over paved roads around its access / egress point, the trackout dust risk category is considered to be 'negligible'.

While the overall risk category has been assessed as 'negligible', if the activities were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in dust nuisance immediately around the application area. However, these are not considered to be significant given the limited duration of potentially adverse meteorological conditions.

Soil Importation and Handling – Dust Assessment

An overview of the sources and processes associated with the soil recovery activities, and their respective potential for dust deposition, is presented below in Table 1.

Table 1
Sources of Particulate Emissions

Activity	Source	Emission Potential	Comments
Material transfer on site	Onsite vehicle, Dry loose material.	High when dry material being handled during strong windy weather. High - on un paved road surfaces	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Material storage	Dry loose material in stockpiles	High when dry material being stored during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Transfer off site and traffic off site	HDV/Road vehicles	Low - on paved road surfaces	Dependant on the amount of loose material on road surface available for re-suspension and track out.

Table 2 overleaf identifies receptors within the 500m study area around the application site. There are 10 receptors rated as being of medium sensitivity within 500m of the site boundary. Using the tiered assessment methodology (refer to the accompanying EIAR), receptors located within 500m were progressed to a Tier 2 assessment as they were considered to have greater potential risk of exposure to dust impact.

Each receptor identified in Table 2 and shown in Figure 7-1-3-3A is assessed against the frequency of exposure and the distance between the potential dust source to the receptor (i.e. the pathway). The frequency of exposure of each receptor is based upon the frequency of winds capable of carrying dust particles blowing in the direction, from the source to the receptor, on days when rainfall does not inhibit dust from becoming airborne.

The potential for the generation of airborne dust will increase with wind speed, with winds greater than 3 m/s capable of carrying airborne dust. For the purposes of this impact assessment, wind patterns at the application site were assumed to be similar to those at the Baldonnel Aerodrome Meteorological Station approximately 30km to the north-east.

Published data (in the form of a wind rose) identifies the frequency of winds at wind speeds of greater than 2 m/s, with the individual frequencies for each 10 degree compass sector used within the assessment. Wind speeds over 2 m/s were used for the purposes of this impact assessment, as this is how the data on percentage occurrence of wind frequency and wind speed is calculated and presented for Baldonnel Aerodrome by Met Eireann. For this reason therefore, the impact assessment presented herein is conservative.

A summary of the risk assessment of dust impacts from sources within the proposed development is presented in Table 2 below. All receptors are residential properties surrounding the application site and are considered to be of moderate sensitivity to airborne dust impact.

Table 2
Dust Risk Assessment (Without Mitigation Measures)

Receptor Reference	Distance from Operations (m)	Relevant Wind Direction (°)	Potential Exposure Duration [a]	Relative Wind / Distance Rank	Risk Evaluation
R6	483 NW	140-180	2.548	1 / 2	Insignificant
R7	485 NW	130-170	1.96	1 / 2	Insignificant
R10	275 NW	140-180	2.548	1 / 4	Insignificant
R11	131 N	140-200	7.105	3 / 5	Slight Adverse
R12	67 N	140-200	7.105	3 / 8	Moderate Adverse
R14	203 NW	110-160	2.303	1 / 4	Insignificant
R15	200 NW	90-130	2.695	1 / 4	Insignificant
R16	20 N	130-300	31.36	6 / 8	Moderate Adverse
R17	366 NE	220-260	17.101	6 / 3	Slight Adverse
R18	383 NE	230-270	12.838	5 / 3	Slight Adverse

[a] Based on the frequency of moderate to high winds (≥2 m/s) which would cause dust emissions to travel in the *direction of the receptor. Adjusted for natural suppression due to 183 days with rainfall over 0.2mm (Factor = 0.5)*

This assessment does not take into account proposed mitigation measures that include provision of perimeter landscape proposals, dust suppression measures etc., refer to Mitigation Measures section

Refer to Figure 7-1-3-3A for Receptor Locations / EIAR Chapter 8 for Dust Risk Assessment Methodology

From Table 2 above, it is observed that the risk of impact from dust emissions associated with the waste recovery facility at Usk (without any mitigation measures in place) generally varies from insignificant to moderate adverse at assessed receptors within 500m of the dust generating activities.

Ecological Receptors

The application site at Usk is not subject to any statutory nature conservation designation. The nearest protected site is located to the north of the application site boundary. Based on the nature, size and scale of the planned activity at Usk, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 sites is up to a maximum radius of 2km from the application site, unless, there are any potential source-pathway-receptor links between it and any Natura 2000 site(s) beyond this distance.

At a distance greater than 2km and in the absence of any potential source-pathway-receptor link, it is considered that no Natura 2000 sites would be affected by any direct loss of habitat or impacted upon by the effects of dust deposition or traffic emissions.

Studies have indicated that fugitive dust is typically deposited within 100m to 200m of the source, the greatest proportion of which, comprising larger particles (greater than 30 microns) is deposited within 100m. Where large amounts of dust are deposited on vegetation over a long time-scale (a full growing season for example) there may be some adverse effects upon plants restricting photosynthesis, respiration, and transpiration.

Baseline dust deposition monitoring at the site indicates that the levels of dust at the application site are currently low and well below the level of 1000 mg/m^2/day, where it is considered that dust could be likely to have a significant effect on sensitive ecosystems. Dust emissions limits for former

extractive activities and likely future backfilling and restoration activities are also significantly lower that this potential impact level.

Based on the above, it is concluded that the planned development will have an insignificant dust deposition impact on ecological receptors and it is considered that all site can be screened out from any further dust impact assessment.

Human Receptors

Using a screening assessment tool, the Air Quality Assessment (outlined in Appendix 8.A of the accompanying EIAR) indicates that there is generally an insignificant to moderate adverse risk that dust may cause an impact at sensitive receptors within 500m of the source of the dust generated activities.

Note that this assessment *does not take into account implementation of mitigation measures* within the proposed development that include provision of perimeter screening berms, dust suppression measures etc. (outlined in section on mitigation below). This assessment is considered to be conservative on the basis of the moderate wind speeds included in the risk evaluation.

Soil Importation and Handling - PM_{10} Assessment

In terms of PM_{10}, the maximum annual mean measured baseline background concentration recorded at Kilkitt monitoring station was 9µg/m³ in 2015. An upper range increase of 5µg/m³ (identified in technical literature for the potential contribution from quarrying related activity) towards annual mean background concentrations of coarse fraction particulates (2.5 – 10µm diameters) in the immediate vicinity of the application site is considered to be insignificant and would result in cumulative emissions well below the annual objective of 40µg/m³ for human health air quality limit.

Therefore, the potential impacts in relation to increase in ambient PM_{10} concentrations beyond the development site boundary can be classified as 'negligible', given the limited duration of potential adverse meteorological conditions.

Traffic Emissions – Air Quality Assessment

For the purposes of assessment, the projected traffic movements associated with the development is predicted to be up to 58 two-way HDV movements per day, or up to 6 two-way HDV movements per hour; with no significant changes to either road alignment or speed.

Residential Receptors

As none of the roads in the surrounding local road network meet any of the traffic / alignment criteria set out in DMRB Advice Note HA 207/07 (published by Highways England), the potential impact of the soil / stone waste recovery activity and HGV traffic movements can be considered to be 'negligible' in terms of local air quality and no further air quality assessment is necessary.

On this basis, the impact of the proposed soil recovery facility from the change of HDVs traffic can be screened out and combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the transportation of materials are not considered to have potential to contribute to local air pollution.

Ecological Receptors

The main pollutants from traffic emissions which are of concern for ecology are nitrogen oxides (NOx), together with the acidification and eutrophication associated with acid and nitrogen deposition on sensitive ecosystems that can occur when these substances are deposited to land at high rates.

Although environmental standards for the protection of vegetation and ecosystems include sulphur dioxide (SO_2), this parameter from traffic emissions is negligible and is not of concern near roads[1].

High rates of nitrogen deposition upon sensitive ecosystems can increase the eutrophication of soils and water and have a detrimental effect on species-rich plant communities and semi-natural habitats that are often associated with a low nutrient status. Eutrophication can decrease species diversity and the dominant plant species can change to those better placed to respond to increased nitrogen levels.

Transport Infrastructure Ireland guidance[2] indicates that detailed consideration need only to be given to emissions to air where there is a significant change to traffic flows (>5%) and a designated site lies within 200m of the road centre line.

The potential zone of influence from air traffic emissions will be up to a distance of 200m either side of the L6094 / L6096 Local Road(s) and the R448 Regional Road which will be used by vehicles for access to and from the waste recovery facility. Parts of the Dunlavin Marshes pNHA lie immediately adjacent Local Road L6094 and close to 200m of the centreline of the local road network (at their closest point).

Measurement of background NOx concentration for the air quality assessment indicate a concentration of 4.4 µg/m^3 at the application site. This baseline figure is well below the 30 µg/m^3 per annum for NO_x for the protection of ecosystems as defined under the National Air Quality Standards (NAQS)[3]. This baseline figure would indicate that nitrogen deposition rates within the localised area are well below the critical load range for 'poor fens' of 10-15 kg N/ha/year as defined by the UK Air Pollution Information System (APIS) database[4]

Based on an annual waste intake of 300,000 tonnes per annum, the annual average daily traffic (AADT) generated by the soil waste recovery facility will average 114 heavy duty vehicles (HDV) movements in and out of the application site per day. In generating this level of traffic, it is predicted that the proposed development is unlikely to significantly increase localised NOx concentrations and/or nitrogen deposition rates to the level where the NAQS for the protection of ecosystems and critical loads for 'poor fens' will be exceeded. It is considered therefore that any changes in air quality from traffic emissions is not likely to have any measurable effects on any habitats and vegetation within the Dunlavin Marshes pNHA, or on the integrity of this designated site.

Cumulative / Synergistic Impacts

In essence, cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

There are no potentially significant sources of known future air emissions located in close proximity to the application site and therefore no potential for significant cumulative impacts has been identified.

[1] Highways Agency (2005). *Guidance for the Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs (Supplement to DMRB 11.3.1)*. Interim Advice Note 61.05. Highways Agency.

[2] National Roads Authority (2006). *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*. National Road Authority.

[3] Air Quality Standards Regulations 2011 (SI 180 of 2011).

[4] www.apis.ac.uk

Mitigation Measures

A range of mitigation measures are recommended for the proposed backfilling and soil waste recovery activities at Usk. Specific mitigation measures are listed in Table 3 below.

Table 3
Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavator / HDV	High – dry or fine particulate matter during strong windy weather	Minimise drop heights when handling waste materials. Avoid working in adverse / windy conditions.	High
	Low – wet particulate matter during conditions of low wind speed	Minimise drop heights when handling waste materials, protection from wind where possible.	High
Onsite Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise distances of onsite haul routes.	High
		Use of water sprays / tractor & bowser to moisten surfaces during dry weather.	High
		Restrict vehicle speeds through signage / staff training.	High
		Location of haul routes away from sensitive receptors.	High
Road Vehicles (transfer offsite)	Low / Moderate on paved road surfaces	All HGVs exiting the facility to be routed through the existing wheelwash facility.	High
		Use of road sweeper to reduce the amount of available material for re-suspension.	Moderate / High
		Consider paving additional length of access road leading to the recovery facility (if required to achieve emission limits).	High
Stockpiles	High when dry or fine material being stored or handled during strong windy weather	Limit mechanical disturbance.	High
		Consider installation of sprinkler system along haul roads and/or around perimeter of the waste recovery facility (if required to achieve emission limits).	
Slight Adverse Risk Receptors	High – during dry and strong windy weather	Retention of existing perimeter berm.	High
		Retention of planting of perimeter berm.	High
		Minimise working in adverse weather conditions	High

Residual Impact Assessment

With the range of mitigation measures to be implemented and design measures to be incorporated into the working scheme, it is considered that the risk of dust impact at receptors from the proposed development at the application site reduces further.

After an assessment of potential adverse effects produced by the development it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors (screened out) which cumulatively would not impact the surrounding area. Overall the effects of the proposed development on air quality have been considered to be negligible to acceptable.

A summary of the residual dust risk impact assessment is provided in Table 4 below.

Table 4
Residual Dust Risk Assessment (With Mitigation Measures)

Receptor Reference	Risk Evaluation
R6	Insignificant
R7	Insignificant
R10	Insignificant
R11	Acceptable
R12	Acceptable
R14	Insignificant
R15	Insignificant
R16	Acceptable
R17	Acceptable
R18	Acceptable

On the basis of the assessment presented above, it is concluded that the proposed development, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme, will not have any adverse dust deposition impact on any assessed receptors.

NOISE EMISSION IMPACTS

The information / air emission impact assessment presented herein is based on that presented in Chapter 10 (Noise and Vibration) of the EIAR which accompanies this waste licence application. Details of the baseline noise environment and a description of the methodologies employed for the purposes of this impact assessment are presented in the EIAR .

To determine the noise impact arising from soil / stone intake and recovery at the waste recovery facility, SLR Consulting Ireland carried out a noise prediction assessment, whereby resultant noise levels were calculated at the noise sensitive receptors (residences) within 500m of the site shown on Figure 7-1-3-3B.

Operational L_{Ar}, 1hr noise predictions at each receptor location are based on the prediction protocol for fixed plant contained within ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation'. The noise assessment methodology used was based on BS5228: Part 1 (2009)+ A1:2014 "*Code of Practice for Noise and Vibration Control on Construction and Open Sites*''

The following noise sources have been considered in the noise assessment for the recovery facility operations :

- Dozer;
- Hydraulic Excavator;
- HGV truck.

For the purposes of this noise emissions impact assessment, it is assumed that all of the noise sources are active and arise continuously and simultaneously during assessment hours. A reduction of -20 dB(A) has been assumed for partial noise screening as the attenuation path difference arising (between the noise source and receptors) is generally greater than 1.5 m in height (as a result of existing perimeter / face screening).

For the purposes of this assessment, it is assumed that all of the noise sources are active for 50% of the time at the application site. The soil deposition activity by the HGV will not occur at the site boundary, the excavator and dozer will not be working simultaneously and the compaction of soil close to the site boundary will be carried out intermittently. On this basis, it is considered that the noise impact assessment presented herein is conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in Appendix 10-B of the accompanying EIAR.

The operational L_{Ar}, 1hr noise predictions at each receptor location are presented in Table 5 below. The table also shows the comparison between the predicted operational L_{Ar}, 1hr noise level and the noise limit at each receptor during each time-period.

Table 5
Operational Noise Levels : Soil Recovery Facility

Baseline Location	Receptor	Period	Noise Limit $L_{Aeq,\ 1HR}$ dB(A)	Operational* $L_{Aeq\ ,\ 1HR}$ dB(A)	Difference
BN1	R7	Daytime	55.0	30	-25
BN1	R10	Daytime	55.0	35	-20
BN1	R11	Daytime	55.0	42	-13
BN1	R12	Daytime	55.0	48	-7
BN1	R14	Daytime	55.0	37	-18

Baseline Location	Receptor	Period	Noise Limit $L_{Aeq, 1HR}$ dB(A)	Operational* $L_{Aeq, 1HR}$ dB(A)	Difference
BN1	R15	Daytime	55.0	38	-17
BN2	R16	Daytime	55.0	50	-5
BN2	R16	Daytime	55.0	33	-22
BN2	R24	Daytime	55.0	32	-23
BN3	R25	Daytime	55.0	26	-29
BN3	R26	Daytime	55.0	26	-29
BN3	R27	Daytime	55.0	29	-26
BN3	R42	Daytime	55.0	29	-26
n/a	pNHA	Daytime	55.0	30	-25

**Operational Noise Level = Predicted Noise Level without a 5 dB penalty*

As can be seen from the above Table, the EPA NG4 daytime noise criterion limits arising specifically from recovery operations at the proposed facility at Usk are comfortably satisfied at all nearby noise sensitive locations.

To identify the potential impact of continuous soil recovery activity at the existing facility, predicted specific $L_{Aeq, 1hr}$ dB(A) noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels at each of the noise sensitive locations for each time-period. The cumulative assessment is presented in Table 6 below.

Table 6
Cumulative Operational Noise Levels : Soil Recovery Activity

Location	Receptors	Period	Existing Baseline $L_{Aeq,T}$ dB(A)	Operational $L_{AR, 1HR}$ dB(A)*	Cumulative $L_{Aeq, T}$ dB(A)	Difference
BN1	R7	Daytime	60.1	30	60.1	0
BN1	R10	Daytime	60.1	35	60.1	0
BN1	R11	Daytime	60.1	42	60.1	0
BN1	R12	Daytime	60.1	48	60.1	0
BN1	R14	Daytime	60.1	37	60.1	0
BN1	R15	Daytime	60.1	38	60.1	0
BN2	R16	Daytime	66.1	50	66.1	0
BN2	R16	Daytime	66.1	33	66.1	0
BN2	R24	Daytime	66.1	32	66.1	0
BN3	R25	Daytime	57.0	26	57.0	0
BN3	R26	Daytime	57.0	26	57.0	0
BN3	R27	Daytime	57.0	29	57.0	0
BN4	R42	Daytime	57.2	29	57.2	0

**Operational Noise Level = Predicted Noise Level without the 5 dB penalty*

With reference to the *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative noise impact from the proposed operations at the proposed soil recovery facility at all receptors is determined to be NEGLIGIBLE.

In view of the above findings, it is considered that mitigation measures to reduce the noise impacts of plant associated with the planned activities at the proposed soil recovery facility are not strictly necessary.

Traffic Noise

For the purposes of assessment, the projected traffic movements associated with the development based on a 48-week year, 5 days per week, and 20 tonne loads, will result in up to 58 two-way HDV movements per day, or up to 6 two-way HDV movements per hour; with no significant changes to either road alignment or speed.

Given that the change in HDV / HGV flows to and from the application site will be below the threshold limits indicated by DMRB guidance as requiring assessment, it is considered that no significant traffic related noise impact will arise, no detailed noise impact assessment is required and no mitigation measures are strictly required to reduce noise impacts.

Noise Impact on Ecological Sites

Ecological receptors of key concern are those areas designated under EU Habitats Directive (92/43/EEC) and EU Birds Directive (2009/147/EC). The application site at Usk is not subject to any statutory nature conservation designation and there are no designated European (Natura 2000) sites within 2km of it. The nearest protected nature site, Dunlavin Marshes pNHA (designated under the Wildlife Act 1976, as amended) is located approximately 200m north of application site.

At a distance greater than 2km, and in the absence of any potential source-pathway-receptor link, it is considered that no Natura 2000 site would be impacted upon by the effects of noise arising at the proposed facility.

The operational $L_{Ar,\ 1hr}$ noise prediction for the nearest ecological receptor, at Dunlavin Marshes pNHA is presented in Table 7 below, together with the predicted operational L_{Ar1hr} noise level (in isolation from other sources) and the prescribed noise limit for protection of wildlife.

Table 7
Operational Noise Levels at Ecological Receptors : Soil Recovery Activity

Location	Receptors	Period	Noise Limit $L_{Aeq,\ 1HR}$ dB(A)	Operational* $L_{Aeq,\ 1HR}$ dB(A)	Difference
Dunlavin Marshes	pNHA	Daytime	55.0	30	-25

**Operational Noise Level = Predicted Noise Level without the 5 dB penalty*

As can be seen from the above figures that the noise criterion limit for protection of wildlife arising specifically from proposed soil recovery activity at Usk is comfortably satisfied at the nearest ecological noise sensitive location.

Noise Exposure and Potential Health Effects

To determine the potential health effects noise impact arising from the planned recovery facility, SLR Consulting Ireland carried out a calculation of L_{den} for operational noise, whereby the resultant noise levels were calculated at nearby noise sensitive receptors (residences) shown on Figure 7-1-3-3B.

The operational L_{den} noise predictions at each receptor location are based on predicted operational noise level at the application site boundary (as indicated in Figure 7-1-3-3B) rather than from the noise source. On this basis, it is considered that the potential health effects presented herein is conservative.

The operational L_{den} noise prediction for receptor location is presented in Table 8 below. The table also shows the comparison between the predicted operational L_{den} noise level and the prescribed noise threshold for reported health effects.

Table 8
Health Effects Noise Levels Screening Summary : Soil Recovery Activity

Receptors	Period	Reported Health Effects Threshold L_{DEN} dB	Operational L_{DEN} dB	Difference
R7	Daytime only	50	30	-20
R10	Daytime only	50	35	-15
R11	Daytime only	50	42	-8
R12	Daytime only	50	48	-2
R14	Daytime only	50	37	-13
R15	Daytime only	50	38	-12
R16	Daytime only	50	50	0
R16	Daytime only	50	33	-17
R24	Daytime only	50	32	-18
R25	Daytime only	50	26	-24
R26	Daytime only	50	26	-24
R27	Daytime only	50	29	-21
R42	Daytime only	50	29	-21

It can be seen from the above assessment that the operational noise arising specifically from proposed activity at Usk, is comfortably below the Reported Health Effects Threshold at all nearby noise sensitive locations.

'Do Nothing' Scenario

At present the noise environment within the study area is dominated by road traffic noise emanating from the local road network. Locally, natural sounds such as farmyard animals or barking dogs, agriculture activities are also audible. Over time, it is anticipated that the volume of road traffic in the area will gradually increase as population and economic activity increases overt time and that this, in turn, is likely to lead to a gradual, likely audible increase in ambient and background noise levels

At present the noise environment within the study area is dominated by road traffic noise emanating from the R448. Locally, natural sounds such as farmyard animals or barking dogs, agriculture activities are also audible. Over time, it is anticipated that the volume of road traffic, in the area will increase as economic activity increases and that this in turn is likely to lead to a gradual, likely audible increase in ambient and background noise levels.

Cumulative Impacts

There are no cumulative noise impacts arising from the proposed soil recovery facility. Given the proximity of site to road infrastructure, ambient noise levels from road traffic are considerably elevated and will tend to dominate other noise sources, including those associated with proposed soil recovery activities at Usk. Noise levels arising from proposed soil recovery activities will not have the potential to increase the existing ambient noise levels in the vicinity of the site.

Mitigation Measures

Where necessary, the three established strategies for impact mitigation are avoidance, reduction and remedy. Where it is not possible or practical to mitigate all impacts, then the residual impacts must be clearly described in accordance with the system for impact description set out in the EPA Guidelines. The adoption of Best Practicable Means is generally considered to be the most effective means of controlling noise emissions.

Notwithstanding the findings of the impact assessment presented above, which determined that the proposed soil recovery activities at Usk will have negligible noise impact, and in line with standard practice at other sites the following best practice measures will be implemented wherever practicable at the proposed development at Usk to minimise the potential noise impact of on-site soil recovery activities:

Screening

- existing screening berms and screen planting around the application site / recovery facility will be retained to act as acoustic barriers. Berms should be inspected on a regular basis and maintained as necessary.

Plant

- all mobile plant used at the development should have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments thereof;
- all plant items should be properly maintained and operated according the manufacturers' recommendations, in such a manner as to avoid causing excessive noise (i.e. all moving parts are kept well lubricated, all cutting edges are kept sharpened, the integrity of silencers and acoustic hoods are maintained);
- all plant should be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers should be replaced immediately.

Traffic

- any deliveries should be programmed to arrive during daytime hours only;
- care should be taken when unloading vehicles to reduce or minimise potential disturbance to local residents;
- access / internal haul roads should be kept clean and maintained in a good state of repair, i.e. any potholes are filled and large bumps removed, to avoid unwanted rattle and "body-slap" from heavy goods vehicles;
- delivery vehicles waiting within the facility should be prohibited from leaving their engines running and there should be no unnecessary revving of engines.
- Experience from other waste recovery facilities has shown that by implementing these measures, typical noise levels from construction works and/or recovery operations can bring about a reduction of up to 5dB(A) in ambient noise levels.

Experience from other waste recovery facilities has shown that by implementing these measures, typical noise levels from construction works and/or recovery operations can bring about a reduction of up to 5dB(A) in ambient noise levels.

Residual Impact Assessment

The worst-case scenario noise assessment has shown that in accordance with the scale in the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA) the cumulative long-term noise impact from plant associated with the development at all receptors is NEGLIGIBLE.

Table 9 below summarises the noise impact arising assuming implementation of mitigation measures for operational plant noise at each of the noise sensitive receptors considered.

Table 9
Operational Noise Summary Table

Receptors	Increase In $L_{AEQ, 1HR}$ dB(A) Noise Level From Operations	Increase In $L_{AEQ, 1HR}$ dB(A) Noise Level From Recovery Facility	Impact	Mitigation
R7	0	0	Negligible	Not Required
R10	0	0	Negligible	
R11	0	0	Negligible	
R12	0	0	Negligible	
R14	0	0	Negligible	
R15	0	0	Negligible	
R16	0	0	Negligible	
R16	0	0	Negligible	
R24	0	0	Negligible	
R25	0	0	Negligible	
R26	0	0	Negligible	
R27	0	0	Negligible	
R42	0	0	Negligible	

GROUND / GROUNDWATER EMISSIONS IMPACTS

Ground Impacts

This waste licence application provides for the importation of inert material for backfilling / recovery purposes at an existing worked out sand and gravel pit at Usk, Co. Kildare from which all soil cover has previously been removed to facilitate extraction activities.

In the context of the proposed development, the construction stage is taken to comprise advance site preparation works. These works involve installation of site infrastructure, removing existing scrub and vegetation around the pit, removing any remaining waste from prior development, connecting site services, upgrading internal access roads, establishing environmental control and monitoring infrastructure and backfilling existing shallow ponds using sand and overburden soils stockpiled on site.

During the operational stage, inert soil and stone / broken rock will be imported to the application site for uses in backfilling / soil recovery activities. On completion, the final landform will be topsoiled, seeded and restored to agricultural use.

During both the construction and operational phase, there is potential for accidental spills or leaks of fuel, hydrocarbons or other hazardous substances being used or stored at the facility to adversely impact land quality. During the operational phase, there is also a potential risk that contaminated materials could be imported to the facility, thereby adversely impacting existing soils / subsoils at the application site.

The potential for uncontrolled emissions to ground, through spillages / leakages and inadvertent importation of contaminated soils, will be minimised by implementing a series of mitigation measures (outlined in the section addressing groundwater impacts below). An Environmental Management System (EMS) will also be developed and implanted at the facility, which will include, amongst other features, detailed systems and procedures providing for the implementation of the proposed mitigation measures, waste acceptance procedures and appropriate handling, storage, control and monitoring of all potentially hazardous substances.

Wastewater from the proposed site office and staff welfare facilities will initially be discharged to a Tricell Novo wastewater treatment system (or similar) and treated effluent will be discharged thereafter to ground via a sand polishing filter.

With the proposed mitigation measures in place, it is considered that the magnitude of any potential impacts on land quality over both the construction and operational phases will be small and overall, the residual impact is assessed as imperceptible.

Ultimately, following completion of the backfilling works, the final restoration of the lands and their return to agricultural grassland, the long-term impact will be moderately positive at a local scale.

Groundwater Impacts

Construction Stage

In the context of the planned backfilling and restoration of the application site with imported inert soil waste materials, the construction stage is taken to comprise the site establishment and preparation works outlined previously.

The construction stage provides for the backfilling of a number of existing groundwater ponds at the application site except for the pond to be retained in the south-eastern corner of the site for ecological habitat and surface water drainage. Ponds are to be backfilled using natural sand and gravel materials stockpiled on-site, and if necessary, any in-situ sand and gravel which remains unexcavated at the site.

As there is no discharge from the application site to surface watercourses, there are no impacts on surface water quality or quantity during this stage. There is no dewatering associated with the site establishment phase and there will therefore be no impact on groundwater flow or quantities during this phase.

The accidental leaking of fuels and other petroleum-based products (lubricating oils, greases etc.) from plant and machinery, or the storage of such materials also has the potential to impact on groundwater quality during this phase. Backfilling of the groundwater ponds with in-situ sand and gravel has the potential to impact on groundwater quality in terms of suspended solids and/or hydrocarbons from plant and machinery.

The bedrock aquifer beneath the site is classified as a poorly productive aquifer and the local residences are on a mains water supply and do not therefore rely on groundwater boreholes for supply.

It is likely that the water channel immediately beyond the eastern site boundary of the application site is fed by groundwater flowing beneath the application site. Therefore any potential direct impacts to groundwater underlying the site could also potentially indirect impact the River Greese.

Having regard to these classification and sensitivity of the underlying aquifer and the likely magnitude of any impacts which might arise, the potential impact potential impact to groundwater quality without mitigation at the site establishment stage is assessed as slight.

Operational Stage Impacts – Extraction and Processing

During the operational stage, inert material will be imported to the site and will be placed / recovered across the proposed backfill / restoration areas. As there are no surface water courses on or in the immediate vicinity of the application site, and there is no discharge from the site to surface watercourses; there will be no direct impacts on surface water quality (or on surface water flow / quantity) during this stage.

The floor of the former pit lies above the groundwater table except at a small number of localised ponds in the sand and gravel (which will be backfilled using site-won materials at the outset. The proposed backfilling and restoration works will take place above groundwater level also and there will therefore be no requirement for dewatering to facilitate the works.

The proposed backfilling and restoration of the site will be undertaken using inert soil and stone only. However, in the event of the unintentional importation of non-inert material, there is the potential to impact the groundwater quality of the underlying poor bedrock aquifer and local well supplies. The importation of soil and stone could also impact groundwater quality at the site in terms of increased suspended solids. The significance of this potential impact to groundwater quality without mitigation is assessed as 'moderate' over this stage.

Accidental spills or leaks of fuels and other petroleum-based products (lubricating oils, greases etc.) from plant and machinery, or the storage of such materials also has the potential to adversely impact groundwater quality. The significance of this potential impact to groundwater quality without mitigation is assessed as 'slight' over this stage.

Infilling of the site with low permeability inert fill material has the potential to create a low permeability zone. This could alter the groundwater flow pattern around the site, leading to higher groundwater levels upstream of the site and lower levels downstream of the site, and/or reduced recharge to the underlying aquifer. The significance of this potential impact to groundwater quality without mitigation is assessed as 'slight' over this stage.

The restoration of the site with inert soil and stone material will increase the thickness of unsaturated material in place above the groundwater table. This measure will afford additional protection to groundwater from potential pollutants thus reducing the groundwater vulnerability across the application site. This is considered to be a potential positive impact for groundwater quality which will be permanent.

As previously noted, it is likely that the water channel immediately beyond the eastern site boundary of the application site is fed by groundwater flowing beneath the application site. Therefore any potential direct impacts to groundwater underlying the site could also potentially indirect impact the River Greese.

Post Operational Stage Impacts – Restoration

On completion of final restoration works, the application site will be restored to agricultural grassland. All plant, equipment and infrastructure will be removed, together with any fuels and oils which could be potential harmful to the receiving environment.

There will be no direct impacts on surface water following the restoration of the site. There will be a decrease in groundwater recharge across the areas backfilled and following restoration as the infilled material will likely be of lower permeability and vegetation across the backfilled area will increase evapotranspiration rates compared to the existing situation where the pit is characterised by exposed sands and gravels with no soil or vegetation cover.

Summary of Potential Impacts and Unmitigated Risk

A summary of the unmitigated risk, magnitude and significance of potential impacts during site preparation and backfilling / recovery stages are presented in Table 10 and Table 11 below. These indicate that if no mitigation measures are applied there is potential for the proposed activity to have a negative impact on groundwater quality.

Table 10
Unmitigated Risk and Magnitude of Potential Impacts (Construction Stage)

Potential Impact	Spatial Impact, Duration, Direct/Indirect and Quality	Importance of Attribute	Magnitude of Impact	Significance of Impact	Mitigation Required?
Groundwater Quality					
Accidental spillages of fuel from plant and machinery or by refuelling	Local, Short Term, Direct and Negative	Low	Moderate Adverse	Slight	Yes

Table 11
Unmitigated Risk and Magnitude of Potential Impacts (Operational Stage)

Potential Impact	Spatial Impact, Duration, Direct/Indirect and Quality	Importance of Attribute	Magnitude of Impact	Significance of Impact	Mitigation Required?
Groundwater Quality and Quantity					
Accidental spillages of fuel and release of fuels during refuelling.	Local, Short Term, Direct and Negative	Low	Moderate Adverse	Slight	Yes
Accidental importation of non-inert material to site	Local, Medium to Long term, Direct, Negative	Low	Large Adverse	Moderate	Yes
Creation of a low permeability zone from low permeability soils for filling and reduction in groundwater recharge	Local, Long Term, Direct, Negative	Low	Moderate Adverse	Slight	Yes
Increasing groundwater protection by increasing unsaturated thickness	Local, Long Term, Direct and Positive	Low	-	-	No

Mitigation Measures

Proposed mitigation measures required to reduce the potential impacts associated with the construction stage and operational stage to acceptable levels, presenting a low risk to the receiving environment, are identified below. These measures are designed to either reduce the likelihood of an event occurring, or reduce the magnitude of the consequences if the event does occur.

Construction Stage – Site Preparation

During the construction stage potential impacts have been identified on groundwater quality from accidental leak of fuels and leaks during refuelling. The following mitigation measures will be implemented at the site during this site preparation stage:

- surface water run-off will be managed during the site preparation works and will either be allowed to infiltrate to the ground or will be directed to the ponds in the south eastern part of the site where the water will infiltrate to the ground and underlying gravels;
- no refuelling or plant / machinery maintenance and repairs will take place in the proposed restoration area to prevent accidental spillages reaching the ground or being washed off by surface water run-off;
- routine maintenance / repairs of plant and machinery will take place under cover in the existing shed or on the hardstand refuelling area beside it. More extensive / non-routine maintenance of plant and machinery will take place at off-site locations;

- all mobile plant and machinery refuelling will take place at the existing hard stand refuelling area at the site, located beside the shed;
- all plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids;
- a spill kit and drip trays will be kept on site and will be deployed if there is an accidental leak from any plant or machinery;
- plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it should be deployed;
- a traffic management system will be put in place to reduce the potential accidents between vehicles, thereby reducing the risk of a collision which could result in a fuel spill; and
- a site speed limit will be enforced to further reduce the likelihood and significance of collisions and hence the possibility of a fuel leak from such a collision.

Operational Stage – Waste Recovery

During the operational stage potential impacts have been identified on groundwater quality from the accidental leak of fuels and leaks during refuelling, the accidental importation of non-inert material to site and the creation of a low permeability zone at the site from low permeability soil materials imported to the site.

The measures previously identified for implementation during the construction / site preparation stage will continue to be implemented over the course of the operational (backfilling / recovery) stage, together with the additional measures outlined below:

- surface water run-off over backfilled ground (if any) will be directed to the ponds in the south eastern part of the site where sediment will settle and water will infiltrate to the ground and underlying gravels;
- no refuelling or plant / machinery maintenance and repairs will take place in the proposed restoration area to prevent accidental spillages reaching the ground or being washed off by surface water run-off;
- there will be no fuel storage within the restoration area; fuel storage will continue at the bunded storage facility at the existing shed;
- all petroleum-based products (lubricating oils, waste oils, etc.) will be stored on drip trays under cover, principally in a designated storage container to be located at the northern end of the site infrastructure area, thereby preventing pollution risk due to accidental leakages;
- imported soil and stone will only be accepted from pre-approved development sites which will have been pre-screened, where the land use history of the site is known and no potentially contaminating activities have occurred in the past and soil samples have been pre-tested to confirm materials are inert;
- site screening will involve a site investigation and soil quality testing to confirm that the material at the site is inert and comply with site acceptance criteria;
- no peat, contaminated soils or non-hazardous waste will be accepted at the proposed recovery facility. The proposed development will include the separation of any construction and demolition waste (principally concrete, metal, timber, PVC pipes and plastic) inadvertently imported to site prior to removal off-site to authorised waste disposal or recovery facilities;
- to ensure that contaminated material is not accidently imported, representative samples will be regularly taken by the Applicant from incoming consignments and subject to confirmatory

(compliance) testing focused on key contaminant indicators. These data shall be used to confirm that the accepted soils are inert and comply with acceptance criteria;

- any imported waste which is accepted at the facility but subsequently suspected to be non-compliant with the waste acceptance criteria for the facility will be re-loaded onto HGV trucks and transferred to the existing covered shed (with concrete floor slab) which will act as a waste inspection and quarantine facility for closer examination and/or testing. No incident rainfall will come into contact with consignments of suspected contaminated waste stored at the covered shed;
- should any subsequent inspection or testing of suspect soil waste at the inspection and quarantine facility identify any non-inert material which cannot be accepted or reused in the restoration of this site, it will be removed off site by permitted waste collectors to authorised waste disposal or recovery facilities;
- provision will also be made for temporary storage of any separated non-inert construction and demolition waste (including metal, timber, plastic etc.) in skips prior to removal off site to a licenced recovery facility; and
- storm surface water runoff from across the site will be directed to the ponds located in the south eastern corner of the site, which are to be retained, where the storm water will infiltrate naturally to the underlying gravels. This measure will ensure the recharge of the underlying gravels despite the importation of low permeability soil materials to the site.

Taken together, these mitigation measures reduce the potential magnitude of any impacts on groundwater in the locally important sand and gravel aquifer and/or at private water supply wells from

- spillage of fuels and lubricants during site construction from '*medium*' to '*low*';
- transport of suspended solids arising from soil and subsoil stripping during site construction from '*medium*' to '*low*';
- spillage of fuels and lubricants during backfilling / recovery activities from '*medium*' to '*low*'; and
- the importation of non-inert material during backfilling / recovery activities from '*medium*' to '*low*'.

Post Operational Stage - Restoration

Once the importation and recovery of material completed at the site it will be restored to agricultural grassland. There will be no potentially polluting activities at the site and therefore no long-term mitigation measures will be required in respect of surface water / groundwater. During the final restoration works, when soils are being placed and seeded to facilitate the site return to agricultural use, the mitigation measures outlined above in relation to plant and machinery, the storage of fuels and refuelling will apply.

Residual Impact Assessment

Taken together, the mitigation measures outlined above will reduce the potential magnitude of all of the identified potential impacts on the groundwater beneath the site to 'small adverse'. This in turn means that the assessed significance of mitigated impacts:

- for any spillage of fuels and lubricants during the site preparation stage will be reduced from '*slight*' to '*imperceptible*';
- for any spillage of fuels and lubricants during the site operation stage will be reduced from '*slight*' to '*imperceptible*';

- for the accidental importation of non-inert material to the site for restoration will be reduced from '*moderate*' to '*imperceptible*'; and
- for the reduction in groundwater recharge from creation of low permeability zone will be reduced from *slight*' to '*imperceptible*'.

The increase in the thickness of inert soil and stone cover above the groundwater table following completion of backfilling / recovery operations will afford additional protection to it. This is considered to be a *slight beneficial impact* for groundwater quality.

NOTES

1. Extract from Ordnance Survey Discovery Series Mapping 55

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LEGEND

PLANNING APPLICATION AREA (c. 26.6 Hectares)

D2 DUST MONITORING LOCATIONS

R RESIDENTIAL PROPERTY

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All Dimensions and Levels are to be checked on site.

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DUNLAVIN LAND RESTORATION LTD.

WASTE LICENCE APPLICATION

LANDS AT USK TOWNLAND, KILCULLEN, CO. KILDARE

LOCAL RECEPTORS - DUST

FIGURE 7-1-3-3A

Scale: 1:10,000 @ A3

Date: SEPTEMBER 2020

501.00507.00001.FIG_7-1-3-3A.Local Receptors – Dust.dwg

NOTES

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LEGEND

PLANNING APPLICATION AREA (c. 26.6 Hectares)

N2 NOISE MONITORING LOCATIONS

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LOCAL RECEPTORS - NOISE

FIGURE 7-1-3-3B

Scale: 1:10,000 @ A3

Date: SEPTEMBER 2020

501.00501.00001.FIG_7-1-3-3B.Local Receptors - Noise.dwg