



CLIENT: Ørsted

PROJECT: Ballinrea Solar Farm, 110 kV Grid Connection. Proposed new alignment of 110 kV underground cable grid route

Construction Noise Impact Assessment

Prepared by: AONA Environmental Consulting Ltd.

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1.0 INTRODUCTION

AONA Environmental Consulting Ltd. was commissioned by Ballinrea Solar Farm Ltd. to undertake a Construction Noise Impact Assessment in support of the proposed Section 146B application to An Coimisiún Pleanála. The proposed works will involve moving a c. 370m section of the grid route along the public road into consented private lands, offsetting from the original route by c. 10m. This is required to avoid Irish Water mains. It is estimated that it will take approximately 15 days to lay the c. 370m of cable, including the installation of the joint bay.

The development of a 110 kV substation, grid connection and associated infrastructure to connect the permitted Ballinrea Solar Farm (PI. Ref. 17/6784, ABP Ref. PL04.303013) to the existing electricity grid at Raffeen 220 kV Substation has previously been granted permission by An Bord Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 182A of the Planning and Development Act 2000 as amended (Case Number ABP – 317706). As a result of the presence of an existing Irish Water watermain in the Shannonpark Road (L2473) it is proposed to realign a section of circa. 370m of the 110kV underground grid connection route between the Shannonpark roundabout and the Shannonpark Road (Drawing no. 300101179-DR-802 and 300101179-DR-803 attached). The underground cable will exit the public road and travel through consented third party lands to the north of the public road for approximately 370m before joining the M28 crossing in the east (as per the permitted development).

The Noise Impact Assessment and evaluation of the noise impact involved the following:

- Worst-case noise level predictions of the main likely noisy components of the construction phase of the proposed development at the nearest noise sensitive receivers.
- An assessment of the predicted construction noise impact on the nearest residential receivers against relevant noise guidelines and a review of the potential for noise nuisance and complaint.
- Appropriate construction noise limits have been outlined.

A CEMP has been submitted to Cork County Council and written agreement received in compliance with Condition 4 of the SID permission; "Prior to commencement of development, a detailed Construction Environmental Management Plan (CEMP) for the construction phase shall be submitted to and agreed in writing with the planning authority, generally in accordance with the CEMP report submitted with the application". As required, the CEMP includes a detailed plan for the construction phase incorporating inter alia noise management measures. There will be no change to the measures set out in the CEMP and agreed with Cork County Council as a result of the proposed alteration to the permitted scheme.

2.0 PROPOSED DEVELOPMENT

The redline boundary along a c. 370m section of the grid route along the public road will be moved off the public road into private lands, offsetting from the original route by c. 10m to avoid Irish Water mains. Figures 1 – 3 indicate the extent and location of the proposed works. Figure 1 below presents a summary of Drawing No.s 300101179-DR-801 – Site Location Map, 300101179-DR-802 – Site Layout Plan Sheet 1 of 2 and 300101179-DR-803 – Site Layout Plan Sheet 1 of 3.

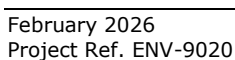
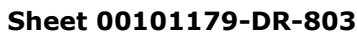
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Figure 2: Site Location Plan – See approximate area marked in yellow relative to the location of the on-going M28 road construction works.

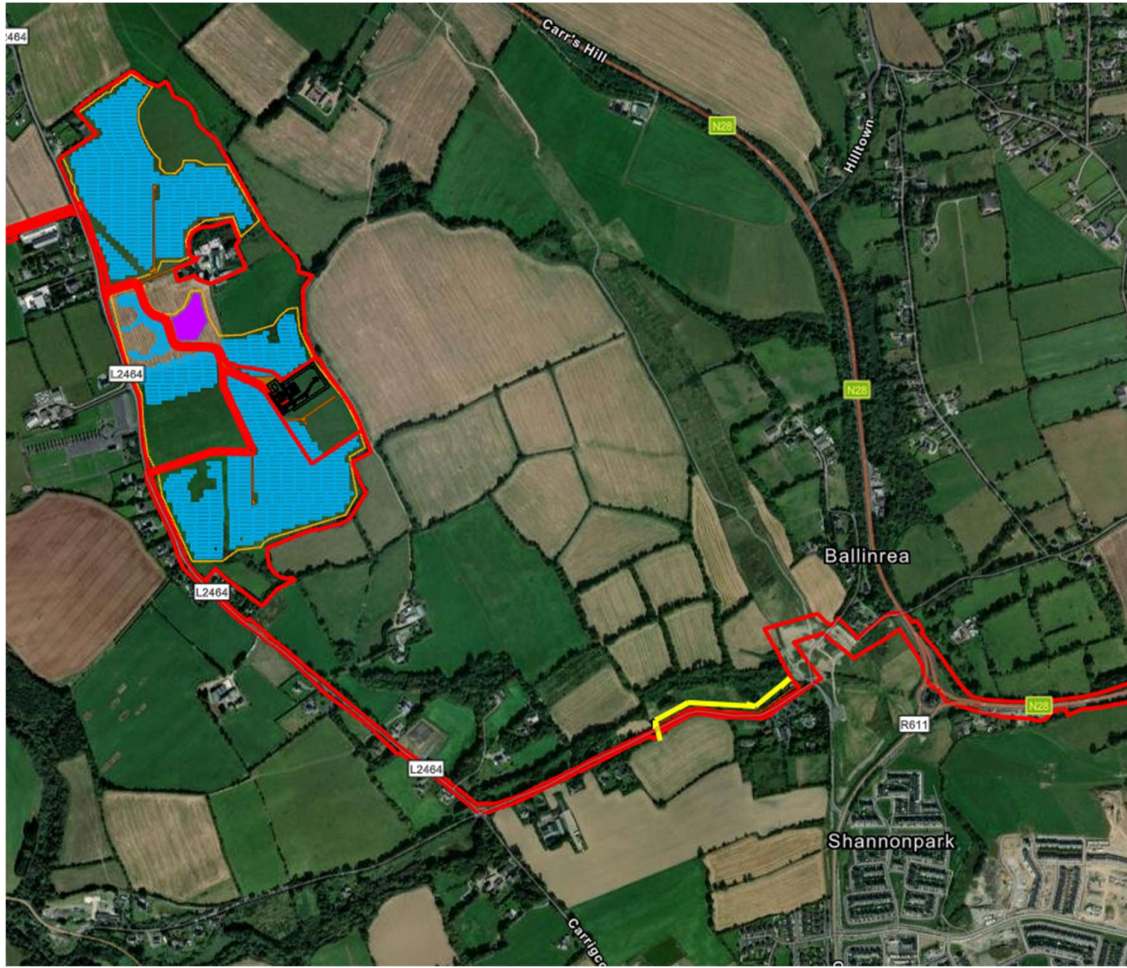


Figure 3: Overall Site Location Map – See approximate area marked in Red, Permitted grid connection route shown in green.



3.0 METHODOLOGY

3.1 Assessing Significance of Construction Noise Impacts

There are no national construction noise limit guidelines in the Republic of Ireland. Instead, there are indicative levels of acceptability for construction noise, such as contained in the Transport Infrastructure Ireland (TII) "Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes" (March 2014) as outlined in Table 1.

Table 1: Maximum permissible noise levels at the façade of dwellings during construction

Days & Times	L _{Aeq} (1hr) dB	L _{AMax} dB
Monday to Friday - 07.00 to 19.00	70	80*
Monday to Friday - 19.00 to 22.00	60*	65*
Saturday - 08.00 to 16.30	65	75
Sundays and Bank Holidays - 08.00 to 16.30	60*	65*

* Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority. (Ref. TII Guidelines)

Annex E of BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*, provides guidance on assessing the potential significance of noise effects from construction activities. In relation to construction noise limits, BS 5228-1:2009+A1: 2014 *Noise and Vibration Control on Construction and Open Sites Part 1: Noise* details the 'ABC method', which recommends a construction noise limit based on the existing ambient noise level. General and short-term construction noise impacts that are deemed typical of any construction site noise sources, including activities such as ground preparation, site clearance, foundation earthworks, construction of new road alignment, etc. are assessed in accordance with the 'ABC method' defined in BS 5228.

By determining the ambient noise level in proximity to the proposed construction works through a baseline noise survey, the ambient noise level is rounded to the nearest 5 dB to determine the appropriate category (A, B or C) and subsequent construction noise threshold value. A potentially significant effect is indicated if the construction noise level exceeds the appropriate category threshold value. If the existing ambient level exceeds the threshold category values, then a potential significant impact is indicated if the total noise level, including both the ambient noise and the various contributions of construction noise, is greater than the ambient noise level by more than 5 dB. Table 2, reproduced from BS5228, demonstrates the criteria for selection of a noise limit for a specific receiver location.

Table 2: Construction noise threshold levels based on the BS 5228 'ABC' method

Assessment Category and Threshold value period (L _{Aeq})	Threshold value, in decibels (dB)		
	Category A (A)	Category B (B)	Category C (C)
Night time (23.00 to 07.00)	45	50	55
Evening and weekends ^(D)	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00)	65	70	75

Notes:

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

3.2 Noise Prediction Methodology

3.2.1 Construction Noise Prediction

In terms of daytime noise impacts during the construction phase, the worst-case construction noise levels at specific locations in proximity to the expected main areas of construction activity have been predicted assuming specific operating 'on' times for typical equipment associated with such a construction project.

BS 5228-1:2009+A1:2014 sets out methods of predicting construction noise levels. Methods are presented for stationary and quasi-stationary activities and for mobile plant using a regular well-defined route (e.g. site haul roads). The predictions account for source-receiver distance, reflections and screening or ground attenuation and a percentage on-time.

The closest noise sensitive receivers to the expected main areas of construction activity have been selected to assess if there will be an exceedance of typical daytime construction noise limits at the noise sensitive receivers in the area.

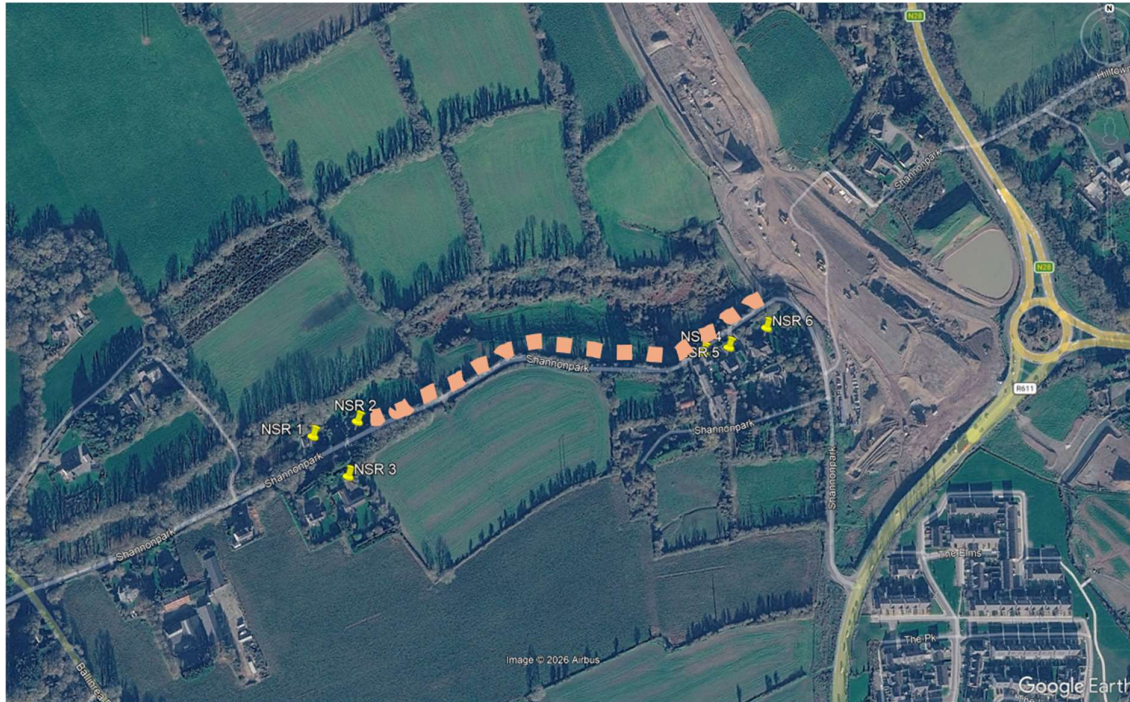
3.2.2 Sensitive Receptor Locations

The sensitive receiver locations in proximity to the proposed c. 370m section of the grid route have been identified, as shown in Table 3 below. All noise sensitive receivers in close proximity to the proposed c. 370m section of the grid route were identified and assessed for construction phase noise impacts. Note that these receptors were not identified during the parent permission NIA, because the parent NIA dealt with the receptors in closest proximity to the substation site, which is located within the permitted Ballinrea solar farm site. The main construction and operational impacts will occur near to the substation site.

Table 3: Sensitive Receptor Locations assessed (See Figure 4)

Ref.	Location	Coordinates	
		X (m)	Y (m)
NSR 1	Along L2473	172198	64370
NSR 2	Along L2473	172243	64384
NSR 3	Along L2473	172235	64329
NSR 4	Along L2473	172600	64454
NSR 5	Along L2473	172627	64459
NSR 6	Chestnut Lodge, Along L2473	172667	64480

Figure 4: Noise Sensitive Receivers, NSR 1 – 6, and the relative locations of the proposed cable route and the M28 road scheme developments and



4.0 CONSTRUCTION NOISE LIMIT

A continuous baseline noise monitoring survey was undertaken in proximity to the proposed Ballinrea Solar Farm 110kV Substation in proximity to the nearest adjacent residential properties from 23rd – 26th August 2022. The noise monitoring location was selected to ensure an accurate background noise level for the area was recorded during daytime and night-time, which is influenced by passing traffic on the Ballinrea Road and agricultural activity.

The noise monitoring location was selected to determine a worst-case background noise level for the nearest residential properties in proximity to the proposed Ballinrea Solar Farm 110kV Substation. The noise monitoring location was selected so as to record a representative background noise level in proximity to the nearest residential properties to the proposed Ballinrea Solar Farm 110kV Substation.

The continuous baseline noise monitoring survey was undertaken in proximity to the proposed Ballinrea Solar Farm 110kV Substation because this is the main area at which construction noise and operational noise impact may occur over an extended period. A background noise survey was not undertaken along the proposed cable route because construction works in such areas will be of a very short duration, i.e. less than 1 week, and there will be no operational noise impact along the cable route.

Figure 1: Noise monitoring location (NML) and the noise sensitive receiver locations (NSR) in proximity to the proposed Ballinrea Solar Farm 110kV Substation, Co. Cork.

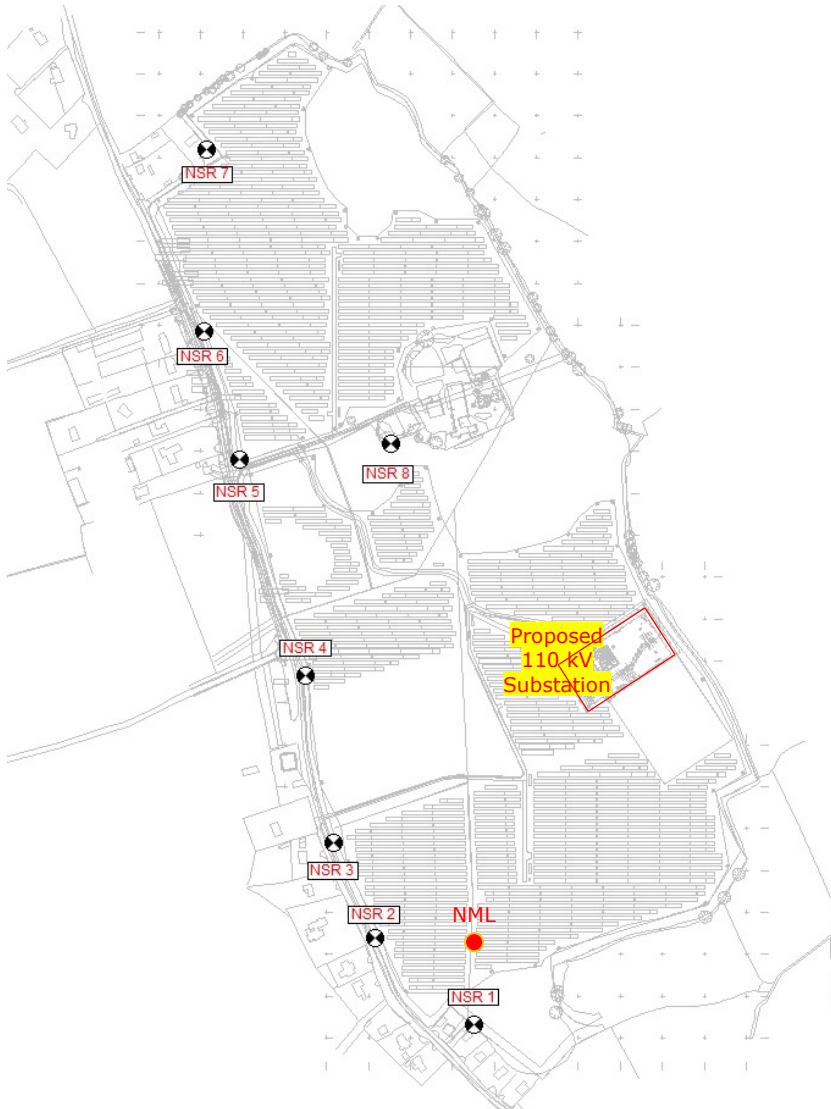


Table 4: Summary of noise monitoring survey results in proximity to the proposed Ballinrea Solar Farm 110kV Substation.

Time Period		L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
Daytime 16 Hour (0700 – 2300)	Average	45.1	54.9	48.2	37.8
	Minimum	29.9	42.8	30.9	23.5
	Median	45.2	53.9	48.2	38.2
Daytime 12 Hour (0700 – 1900)	Average	46.2	55.9	49.0	39.6
	Minimum	40.8	47.9	44.5	31.2
	Median	45.9	54.7	48.9	39.5
Evening (1900 – 2300)	Average	42.6	52.5	46.3	33.8
	Minimum	29.9	42.8	30.9	23.5
	Median	43.0	52.3	46.6	33.9
Night-time (2300 – 0700)	Average	34.8	46.7	37.6	28.3
	Minimum	23.2	29.3	23.7	22.6
	Median	35.2	48.5	37.8	26.9

Based on the daytime noise levels recorded of approximately 45 dB L_{Aeq, 12 Hour}, this equates to a Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00) **construction noise limit of 65 dB L_{Aeq, 12 Hour} at the nearest residential receiver locations.**

5.0 CONSTRUCTION NOISE IMPACT ASSESSMENT

5.1 Construction Noise Impact Prediction

The construction noise impact as a result of the construction phase of the c. 370m section of the grid route off the public road in private lands, offsetting from the original route by c. 10m to avoid Irish Water mains, will have the potential to be perceptible at nearby residential properties but this will be a temporary noise impact. Construction activities will not take place during night-time hours.

Construction noise can be assessed in terms of the equivalent continuous sound level and/or in terms of the maximum level. The level of sound in the neighbourhood that arises from a construction site depends on a number of factors and the estimation procedures need to take into account the following significant factors;

- the sound power outputs of processes and plant;
- the periods of operation of processes and plant;
- the distances from sources to receiver;
- the presence of screening by barriers;
- the reflection of sound;
- ground attenuation;
- meteorological conditions (particularly wind speed and direction), and
- atmospheric absorption.

Ørsted has provided a list of equipment and materials that will be required for the amended grid cable route through third party lands (Folio CK77185F) and installation of one joint bay (Joint Bay 06). The construction methodology set out in Section 4 and 5 of the Outline Construction Methodology, Ballinrea Solar Park, 110kV Grid Connection (Date: December 2025, Report Ref:

05887-R04-02) remains largely unchanged, however the joint bay will be pre-cast. Only 1 joint bay will be put in place in the amended grid route.

- Crane
- 360° tracked excavator (13 ton normally)
- tractor and trailer materials:
- cable drum trailer
- Precast Chamber Units / Relevant construction materials for chambers
- Link Box
- Sand for pipe bedding
- Blinding Concrete where necessary
- Clause 804 Material
- 160mm diameter HDPE ducting;
- 125mm diameter HDPE ducting;
- Marker tapes

The equipment and materials required for the amendment do not vary from those required for the permitted SID cable route works as assessed under the parent permission.

With regard to the Outline Construction Methodology prepared by TLI which accompanies this application, Table 5 summarises the grid connection works, however only part of Item 6 and part of Item 7 are relevant to this application as the other sections are previously permitted.

Table 5: Summary of Ballinrea Solar Farm 110 kV Grid Connection to Raffeen 220 kV Substation Design Route

Section 6 UGC within consented third party land from Joint Bay 05 to Joint Bay 06	From here the grid connection turns and travels west within the consented third party land of Folio no. CK77185F . The grid connection travels west within this folio for approx. 184 m until Joint Bay 06 location is reached.
Section 7 UGC within consented third party land and public road from Joint Bay 06 to Joint Bay 07	The grid connection continues west from Joint Bay 06 location within consented third party land of Folio no. CK77185F for approx. 185 m where it then merges onto the L2473 local road (Shannonpark Road).

The following construction practices have the potential to produce temporary noise impacts:

- Site Clearance & Excavation - Dozers, tracked excavators & dump trucks, etc.;
- Infilling / Levelling - Excavators, wheeled loaders & rollers, etc.;
- The proposed development will generate HGV movements throughout the duration of the construction period. Peak construction traffic volumes will be approximately 5 two-way truck movements/hour associated with excavation or concrete operations. The primary construction traffic access will be from L2473 Road.

Typical noise levels from construction works likely to take place during construction phase of proposed cable realignment are outlined in Table 6.

Table 6: Typical Noise Levels from Construction Sources likely to be required during the construction phase of the proposed cable realignment (Source: BS 5228)

Ref No.	Equipment	A-weighted sound pressure level, L_{Aeq} , dB @ 10m
Table C.2 Sound level data on site preparation		
Clearing Site & Ground excavation/earthworks		
3	Tracked excavator (102 kW, 22T)	78
14	Tracked excavator (226 kW, 40T)	79
Loading lorries		
27	Wheeled loader (493 kW)	80
Distribution of material		
30	Dump truck (tipping fill) (306 kW, 29T)	79
31	Dump truck (empty) (306 kW, 29T)	87
Rolling and compaction		
37	Roller (rolling fill) ж	79 ж
Table C.4 Sound level data on general site activities		
Distribution of materials		
1	Articulated dump truck ж	81 ж
Mixing & Pumping concrete		
20	Concrete mixer truck	80
Trenching		
63	Tracked excavator	77
Pumping water		
88	Water pump (diesel) (10 kW, 100Kg)	68
Table C.5 Sound level data on road construction works		
Breaking road surface & concrete		
1	Backhoe mounted hydraulic breaker	88

ж Drive-by maximum sound pressure level in L_{Amax} (overall level)

(Ref: BS 5228 Noise on Construction and Open sites)

The proposed construction works over the length of the cable route will occur for approximately 15 days. Based on c.370m of construction works, this equates to approximately 75m trenching per day. By its nature, such construction works are transient in terms of locations of precise trenching and construction activities on site from hour to hour. Therefore, the predicted worst-case $L_{Aeq,1 \text{ hour}}$ noise levels at a distance of 20m, 45m and 70m from the noise sensitive receiver locations have been outlined to present a worst-case hourly noise level that has the potential to occur at various stages throughout the construction period during any given day.

The predicted worst-case construction noise levels are presented in Table 7 below.

It is also worthy of note that the cable realignment works in the private lands will be slightly further offset by c. 10m from the previous grid route along the public road. Therefore, this will result in a slightly lower construction noise level at the residential properties to the south of the L2473 road.

Table 7: Predicted worst-case cumulative 1-Hour Noise Level at a distance of 20m, 45m and 70m from the noise sensitive receiver locations to construction activities throughout the construction period during any given day.

Noise Source - BS 5228 Ref - dB L_{Aeq} @ 10m dB	Distance (m) to source	Cumulative Worst-case 1-Hour Noise Level dB $L_{Aeq,1 \text{ hour}}$
Tracked excavator (Trenching) - C.4.63 - 77 dB	20m	73 dB $L_{Aeq,1 \text{ hour}}$
Dump truck (tipping fill) (306 kW, 29T) - C.2.30 - 79 dB	45m	70 dB $L_{Aeq,1 \text{ hour}}$
Articulated dump truck* - C.4.1 - 81 dB	70m	69 dB $L_{Aeq,1 \text{ hour}}$

5.2 Construction Noise Impact Significance

In accordance with the BS 5228-1:2009+A1: 2014 Noise and Vibration Control on Construction and Open Sites Part 1: Noise 'ABC method', the ambient noise levels (rounded to the nearest 5 dB) in the area of the proposed construction works are approximately 45 dB $L_{Aeq,T}$ during daytime. As a result, the noise sensitive receivers fall into Category A of the 'ABC' assessment methodology, i.e. construction noise limit is 65 dB $L_{Aeq, 12 \text{ Hour}}$.

It is important to note that construction noise impacts will occur during daytime hours only and will be short-term at each area of construction along the proposed cable route.

Not all construction noise sources will operate at once and construction noise levels are likely to vary significantly throughout the typical working day. Therefore, the daytime construction noise limit of 65 dB $L_{Aeq, 12 \text{ Hour}}$ should be achieved at the nearest residential properties. The construction noise impacts will be short-term and will not be a significant impact.

A pragmatic approach needs to be taken when assessing the significance of noise effects of any construction project. The significance of the construction noise from the project has been determined by considering the change in the ambient noise level with the construction noise on-going.

BS5228 states that noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact.

Based on the estimated duration of works of c. 15 days, there will be a short-term noise impact at the nearest sensitive receivers due to the proposed construction works.

In some of the works areas, the predicted worst-case 1-hour construction noise levels may be in excess of the recommended maximum noise level of 65 dB $L_{Aeq, 12 \text{ Hour}}$ / 80 dB L_{Amax} at 1m from the façade of the nearest residential properties as outlined by the TII Guidelines (March 2014).

Appropriate construction mitigation measures, as outlined below, will be implemented as part of the Construction Environmental Management Plan (CEMP).

The movement of construction vehicles to the proposed works area will be via the existing road network.

Construction noise impacts for the cable route were assessed during the parent permission and deemed acceptable. No significant change in construction noise impacts are anticipated due to the proposed amendment subject of the 146b application subject to the implementation of appropriate mitigation measures. The previous Noise Impact Assessment outlined that the construction of the proposed underground cable route from the Ballinrea Solar farm to the proposed 110kV cable bay at the existing Raffeen 220 KV substation will be a linear construction process with short-term and temporary noise impact at individual residential properties as the underground cable laying progresses.

6.0 MITIGATION MEASURES

6.1 Construction Noise Mitigation Measures

Appropriate mitigation measures have been identified to ensure the Construction Phase target noise limits are not exceeded. There is no change from the mitigation measures proposed for original assessment carried out in 2023 for the permitted development.

The contractor will be required to implement the control measures recommended in BS 5228 and apply the appropriate measures where applicable. Other measures will include:

- Working hours during site construction operations will be restricted to daytime hours from 07:30 hours to 18:00 hours (Monday to Friday) and, as may be required, from 08:00 hours to 13:00 hours (Saturdays). Evening and night-time work is not expected to take place.
- An on-site speed limit will be enforced for all traffic. Drivers of vehicles will be advised of the speed limits through the erection of signs *i.e.* a typically recommended on site speed limit is 10 km/hr.
- Where practicable, the use of quiet working methods and the most suitable plant will be selected for each activity having due regard to the need for noise control.
- Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228. To this end operators will use “*noise reduced*” plant and/or will modify their construction methods so that noisy plant is unnecessary.
- By positioning potentially noisy plant as far as possible from noise sensitive receivers the transmission of sound can be minimised. Earth mounds and/or stockpiles of material or perimeter fencing on site can be used as a physical barrier between the source and the receiver.
- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately in order to minimise noise breakout from the site while still maintaining their effectiveness.
- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use.
- Compressors will be of the “noise reduced” variety and fitted with properly lined and sealed acoustic covers.
- In all cases engine and/or machinery covers will be closed whenever the machines or engines are in use.
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable, all mechanical static plant will be enclosed by acoustic sheds or screens.
- Employees working on the site will be informed about the requirement to minimise noise and will undergo training on the following aspects:
 - The proper use and maintenance of tools and equipment.
 - The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receivers.
 - Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment.
 - The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
- Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary wooden hoarding / acoustic screening to be installed to a height of no less than 2.5m around areas of construction where loud noise levels occur.

- Responsible Person –The Contractor will appoint a responsible and trained person who will be present on site and who will be willing to answer and act upon complaints and queries from the local public.
- Night-time Working - If there are items of plant (e.g. dewatering pumps and similar) in use during night-time hours they will be chosen, sited and enclosed such that levels at the nearest properties do not exceed the measured background noise levels.

7.0 CUMULATIVE CONSTRUCTION NOISE WITH THE M28 ROAD SCHEME

The prediction and assessment of cumulative construction noise levels from the proposed c. 370m cable route and the M28 road scheme development requires precise details and timings of specific works.

Figure 4 presents the relative locations of the proposed cable route and the M28 road scheme development. It is evident that at the eastern end of the proposed c. 370m cable route, the construction works will be in close proximity to the M28 road scheme development.

The duration of the construction works of the proposed c. 370m cable route in close proximity to the M28 road scheme development will only be for a maximum of 4 days, as the c.370m cable route project will only take 15 days in total, including installation of the joint bay. Therefore, there will be no significant cumulative construction noise impact with the construction noise from the M28 road scheme development.

8.0 CONCLUSIONS

As outlined above, BS5228 states that noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact.

The assessment of worst-case construction noise impacts from the proposed development has indicated that construction noise limit criteria may occasionally be exceeded at the nearest residential properties during daytime, when works are in very close proximity to a residential property. However, noise from construction works will fluctuate throughout the course of a typical working day as well as over the course of the construction works being undertaken in any one location.

The construction noise impacts will be short-term and will not be significant as the works will last for a period of just 15 days. Therefore, no continuous construction activities will occur over a 1 month period in the area. The nature of the proposed works and its duration will mean that noise sensitive receivers will not be exposed to continuous construction noise impact during the construction period.

Therefore, while the daytime construction noise limit of 65 dB $L_{Aeq, 12 \text{ Hour}}$ may occasionally be exceeded at the nearest residential properties, the cable route construction works will be of a duration of well less than one month in any one location and will not result in a significant impact.

Appropriate construction mitigation measures have been outlined and once implemented, the residual impacts from the construction period will not be significant.

On the basis of the above findings, review of the results of the original NIA for the permitted development and the predicted relative noise impact on residential properties in proximity to the proposed cable realignment, the construction noise impact assessment has indicated that no existing properties will require additional noise mitigation measures to be included in the proposed cable realignment project.

Appendix A

Construction Noise Predictions

Table A1: Predicted worst-case construction noise levels in proximity to construction works, i.e. at 20m from construction works.

PLANT TYPE / NOISE SOURCE	BS 5228 Ref	$L_{Aeq, AT}$ 10m, dB	DISTANCE (m)	ADJUSTMENTS (dB)			RESULTANT $L_{Aeq, dB}$	FRACTION ON TIME	CORRECTIONS		ACTIVITY $L_{Aeq, 1 HR}$
				DISTANCE	SCREENING	REFLECTION			To $L_{Aeq, 1 HR}$		
Noise sources			Average distance to receptor, m	$K_s = (25 \log_{10}(R/10)) - 2$	0, 5, 10, calculate	0, 3	L_{WA} adjustments	(Activity duration working period) /	$t_c = T_t \times F$	$(t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
Tracked excavator (Trenching)	C.4.63	77	20	5.5	0	0	71.5	0.75	0.75	10531404.0	
Dump truck (tipping fill) (306 kW, 29T)	C.2.30	79	20	5.5	0	0	73.0	0.1	0.1	1985820.6	
Articulated dump truck*	C.4.1	81	20	5.5	0	0	75.5	0.1	0.1	3527158.8	
* Drive-by maximum sound pressure level in L_{Amax}										$SIGMA (t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
										16044383.4	72

Table A2: Predicted worst-case construction noise levels in proximity to construction works, i.e. at 45m from construction works.

PLANT TYPE / NOISE SOURCE	BS 5228 Ref	$L_{Aeq, AT}$ 10m, dB	DISTANCE (m)	ADJUSTMENTS (dB)			RESULTANT $L_{Aeq, dB}$	FRACTION ON TIME	CORRECTIONS		ACTIVITY $L_{Aeq, 1 HR}$
				DISTANCE	SCREENING	REFLECTION			To $L_{Aeq, 1 HR}$		
Noise sources			Average distance to receptor, m	$K_s = (25 \log_{10}(R/10)) - 2$	0, 5, 10, calculate	0, 3	L_{WA} adjustments	(Activity duration working period) /	$t_c = T_t \times F$	$(t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
Tracked excavator (Trenching)	C.4.63	77	45	14.3	0	0	62.7	0.75	0.75	1386851.6	
Dump truck (tipping fill) (306 kW, 29T)	C.2.30	79	45	14.3	0	0	79.0	0.1	0.1	7943282.3	
Articulated dump truck*	C.4.1	81	45	14.3	0	0	66.7	0.1	0.1	464481.8	
* Drive-by maximum sound pressure level in L_{Amax}										$SIGMA (t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
										9794615.7	70

Table A3: Predicted worst-case construction noise levels in proximity to construction works, i.e. at 70m from construction works.

PLANT TYPE / NOISE SOURCE	BS 5228 Ref	$L_{Aeq, AT}$ 10m, dB	DISTANCE (m)	ADJUSTMENTS (dB)			RESULTANT $L_{Aeq, dB}$	FRACTION ON TIME	CORRECTIONS		ACTIVITY $L_{Aeq, 1 HR}$
				DISTANCE	SCREENING	REFLECTION			$T_o L_{Aeq, 1 HR}$		
Noise sources			Average distance to receptor, m	$K_s = (25 \log_{10}(R/10)) - 2$	0, 5, 10, calculate	0, 3	L_{WA} - adjustments	(Activity duration / working period)	$t_c = T_t \times F$	$(t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
Tracked excavator (Trenching)	C.4.63	77	70	19.1	0	0	57.9	0.75	0.75	459532.4	
Dump truck (tipping fill) (306 kW, 29T)	C.2.30	79	70	19.1	0	0	79.0	0.1	0.1	7943282.3	
Articulated dump truck*	C.4.1	81	70	19.1	0	0	61.9	0.1	0.1	153905.8	
* Drive-by maximum sound pressure level in L_{Amax}										$SIGMA (t_c)(10^{0.1L_i})$	$L_{Aeq, 1hr} = 10 \log_{10}[1/1S(t_c)(10^{0.1L_i})]$
										8556720.5	69

NOTE

- 0 dB(A) attenuation – predictions assume no perimeter screening between receptor and source to provide additional attenuation of noise
- Calculation Method - PREDICTION OF NOISE FROM QUASI STATIONARY PLANT [ACTIVITY LAEQ METHOD, BS5228]