

9 NOISE AND VIBRATION

9.1 Introduction and Methodology

Potential noise impacts are assessed in this chapter. Following a preliminary scoping exercise, it was concluded that the proposed development will not give rise to any noise impacts following commissioning, as operational phase emissions will be representative of a typical residential estate, similar to those seen across the surrounding area. The commissioned development will similarly not give rise to any vibration impacts.

With respect to the construction phase, blasting and piling will not be required, with a potential requirement for only small amounts of rock breaking. It is expected that vibration impacts will not arise due to the topography of the site which means that blasting is not required. On this basis, construction phase vibration impacts, operational phase vibration impacts, and operational phase noise impacts will not arise. Potential noise impacts thus relate solely to those associated with the construction phase. This chapter identifies and describes those potential impacts and assesses the significance of the effects.

Typical ambient noise levels across the local area have been measured, and these used to identify appropriate construction phase noise criteria. Proposed construction plant are also identified, and expected noise output data used to predict likely noise levels at surrounding receptors. Predicted levels are assessed in the context of identified criteria, and mitigation measures, where required, are identified.

The following documents were consulted during the preparation of this chapter:

- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017, DRAFT).
- *Advice Notes for preparing Environmental Impact Statements September 2015* (EPA, 2015, DRAFT).
- *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (EPA, 2016).
- *British Standard BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise* (2014).

A baseline noise survey was undertaken in accordance with *International Standard ISO 1996-2:2007 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels* (2007).

9.2 Statement of Authority

This assessment and chapter was completed by Damian Brosnan of Damian Brosnan Acoustics who has over 20 years experience in scoping and carrying out noise impact assessments. His qualifications are as follows:

- BSc (Honours) 1993 (University College Cork).
- Diploma in Acoustics & Noise Control 2009 (Institute of Acoustics).
- MSc (Distinction) in Applied Acoustics 2015 (University of Derby).
- Member of Institute of Acoustics (MIOA) & secretary of Irish branch.
- Member of trade association of Irish acoustic consultants (ACASITI).
- Member of Engineers Ireland (MIEI).

- 1996-2001: Noise Officer with Cork County Council.
- 2001-2014: Partner with DixonBrosnan Environmental Consultants, specialising in EIA.
- 2015--: Principal at Damian Brosnan Acoustics.

9.3 Guidance & criteria

There are no national mandatory noise limits relating to the construction phases of projects. Irish noise guidance documents relate to operational phase emissions, and are in almost all cases sector-specific. No documents have been issued with respect to the residential construction sector.

The chief noise guidance document applied in Ireland and the UK in construction phase noise assessments is *British Standard BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise* (2014). Annex E sets out several methods to draw up suitable noise criteria applicable to the construction phase of a project. The most appropriate method here is considered to be the 'ABC method', which provides for the selection of criteria based on existing ambient noise data. On the basis of noise data recorded in the vicinity of the study site, as described in Section 9.3.3 below, a daytime $L_{Aeq\ 1\ h}$ criterion of 65 dB is identified, and is thus applied in this assessment. The $L_{Aeq\ 1\ h}$ describes the total noise emissions from all construction sources occurring during any 1 h period, and averaged over that hour.

British Standard BS 5228:2009+A1:2014 states that the 65 dB criterion is applicable to the periods Monday-Friday 0700-1900 h and Saturday 0700-1300 h. For the purposes of this assessment, the criterion is extended to include Saturday afternoons, to facilitate possible local onsite activities required to complete the project. As construction operations will not be undertaken during evening or night-time hours, or on Sundays, other criteria are not applicable, and this assessment therefore focuses on the 65 dB criterion.

The 65 dB criterion is considered applicable to surrounding receptors, in their immediate curtilage. In this regard, the Environmental Protection Agency document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016) defines a noise sensitive locations as:

'Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.'

It is noted that the 65 dB criterion is typically applied by local authorities when specifying construction phase noise limits in conditions attached to planning permission. As construction projects tend to be relatively short, and as construction works areas are usually localised and mobile, the 65 dB limit is usually not subject to any additional criteria such as tone and impulse restrictions.

9.4 Baseline

9.4.1 Location & land use

The proposed development site consists of an 8.7 ha plot in the townlands of Moneyduff and Oranhill, on the southern fringes of Oranmore. The site does not directly adjoin the public road network, being surrounded by a mix of developed and undeveloped landbanks. The nearest public road is national route N67 which runs within 180 m of the site's eastern boundary. Maree Road runs 270 m to the west of the site. From Maree Road, the main drive ('Orancourt Road') serving Orancourt residential estate runs southeast to skirt the western tip of the proposed development site.

The site is irregular in shape (Figure 9.1). The main block runs on a northwest-southeast axis. At the southern end of this block, a triangular plot extends westwards to meet Orancourt Road. The northern boundary of the triangle, and the western boundary of the main block, adjoin an undeveloped landbank currently grazed by horses. Beyond this landbank lies Maree Road. The southern boundary of the triangle is contiguous with the southern boundary of the main plot, and these adjoin an undeveloped landbank previously subject to some clearance works. Permission was previously granted by ABP (ref. PL61.246315) for 61 residential units here. To the immediate south of this landbank, Orancourt residential estate includes a mixture of two storey dwellings and three storey apartment complexes.



Figure 9.1 Proposed development site outlined red.



At its northern end, the main block meets two residential developments: Beech Park and Coill Clocha. The eastern boundary of the main block adjoins agricultural land which currently benefits from planning permission (GCC ref. 15/1334) for a large scale mixed residential and commercial development including a hotel and leisure centre. The permission also provides for completion of the north-south Oranmore distributor road which will run along the entire eastern boundary of the applicant's site.

Beech Park and Coill Clocha constitute the only locations where the proposed development site directly borders any receptors. All other site boundaries adjoin undeveloped lands, apart from the western tip of the triangular plot which meets Orancourt Road.

The proposed development site gently rises eastwards. The site is currently unused. There is evidence of rough grazing by horses and previous ground clearance. Outside the site boundaries, land use is predominantly urban in character, being dominated by residential estates linked by an extensive network of roadways.

9.4.2 Receptors

The proposed development site directly adjoins Beech Park and Coill Clocha residential estates. Approximately 15 dwellings here back onto the northern end of the site, and the dwellings thus lie within 10 m of the boundary. Other dwellings across both estates lie further north, extending away from the site.

There are no receptors in proximity to the site's eastern boundary. Scattered dwellings on the far side of the N67 lie over 300 m from the site.

The relatively extensive expanse of Orancourt residential estate is such that it lies to the south and west of the site. At two locations, the site boundary approaches to within 50 m of Orancourt receptors. At the western tip of the site, where it meets Orancourt Road, approximately 25 dwellings are located within 100 m of the site boundary. At the site's southeast corner, approximately 10 dwellings lie within 100 m, in addition to a three storey apartment complex. These receptors are separated from the site by the plot subject to permission PL61.246315 for 61 dwellings. Other dwellings at Orancourt extend south and west away from the site. Of note here is a three storey apartment complex at the eastern end of Orancourt, which is located on elevated ground, and thus partially overlooks the proposed development site. The complex lies 130 m from the boundary.

The extensive local urban development is such that the number of individual receptors are too extensive to list. The most practical approach is to apply sensitive receptor status to all dwellings at Beech Park, Coill Clocha and Orancourt. No other receptors lie in the immediate vicinity. Dwellings along Maree Road lie over 300 m from the site. A small cul de sac off Maree Road, west of Beech Park, approaches to within 180 m of the site.

Apart from the receptors identified above, no other receptors of significance are located in the vicinity of the site. No particularly vulnerable receptors such as nursing homes are located in proximity. In addition, no particularly noise-sensitive species have been identified in the ecological report.

9.4.3 Ambient noise survey

The soundscape in the vicinity of receptors surrounding the proposed development site was characterized through an ambient noise survey undertaken Thursday 31st May 2018. As proposed construction activities will be undertaken during daytime only, the survey was confined to daytime hours.

Monitoring was carried out at three stations described in Table 9.1, and shown in Figure 9.2 and Photographs 9.1-9.3. Survey details, equipment specifications and weather conditions are listed in Appendix 9.1.

Table 9.1 Noise stations

Station	ITM NGR	Description	Reason
N1	538339 723473	Undeveloped ground outside SE corner of site, N of 3 storey apartment complex, 32 m from nearest apartment. Unattended measurement.	To represent dwellings at apartment complexes to S and SE of site.
N2	538229 723867	Outside N boundary of site, at Coill Clocha residential estate, 4 m from boundary wall, 20 m from nearest dwelling. Attended measurement.	To represent dwellings to N of site at Coil Cloch and Beech Park. Boundary wall near measurement position representative of layout at nearby dwellings.
N3	538017 723486	W tip of site, 20 m from Orancourt Road, 65 m from nearest dwellings. Attended measurement.	To represent dwellings to W of site at Orancourt.

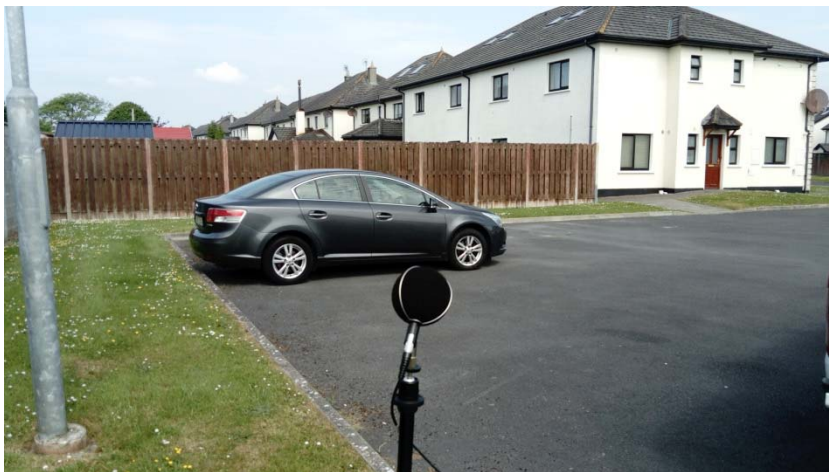


Figure 9.2 Noise stations

NO



Photograph 9.1 N1, looking S towards three storey apartment complex



Photograph 9.2 N2, looking NW towards nearest dwellings at Coill Clocha



Photograph 9.3 N3, looking NW towards nearest dwellings at Orancourt

Recorded $L_{Aeq\ 15\ s}$ profiles are shown in Figures 9.3-9.5. Noise data are presented in Table 9.2. The soundscape at N1 was dominated by intermittent local traffic on nearby Orancourt roadways. Distant traffic was continuously clearly audible on the N67. Other audible sources were birds song/calls and aircraft. The soundscape at N2 was similar, with sporadic traffic audible on the nearest estate roadways, and occasional voices and children calling in gardens. The soundscape at N3 was louder due to greater traffic activity on Orancourt Road.

Recorded data were applied in the determination of the 65 dB $L_{Aeq\ 1\ h}$ criterion as set out in *British Standard BS 5228:2009+A1:2014*.

Table 9.2 Noise data

Station	Time	$L_{Aeq\ 15\ min\ dB}$	$L_{AF10\ 15\ min\ dB}$	$L_{AF90\ 15\ min\ dB}$
N1	1045-1100	41	45	38
	1100-1115	41	44	37
	1115-1130	41	43	37
	1130-1145	44	44	38
	1145-1200	42	45	36
	1200-1215	40	43	35
	1215-1230	39	41	34
	1230-1245	41	44	33
	1245-1300	40	43	36
	1300-1315	41	44	36
	1315-1330	39	41	33
	1330-1345	38	41	33
	1345-1400	38	41	33
	1400-1415	38	40	33
	1415-1430	39	40	33
	1430-1445	39	42	32
	1445-1500	40	43	33
	1500-1515	36	39	30
	1515-1530	38	41	30
	1530-1545	37	38	32
1545-1600	38	40	34	
N2	1124-1139	41	43	37
	1139-1154	40	43	37
	1154-1209	44	41	35
	1209-1224	44	44	38
	1224-1239	39	41	36
	1239-1254	40	42	36
	1254-1309	42	44	38
	1309-1324	41	44	37
N3	1345-1400	45	49	36
	1400-1415	46	50	36
	1415-1430	47	52	36
	1430-1445	46	50	36
	1445-1500	45	50	35
	1500-1515	47	51	33
	1515-1530	47	51	33
	1530-1545	45	49	34

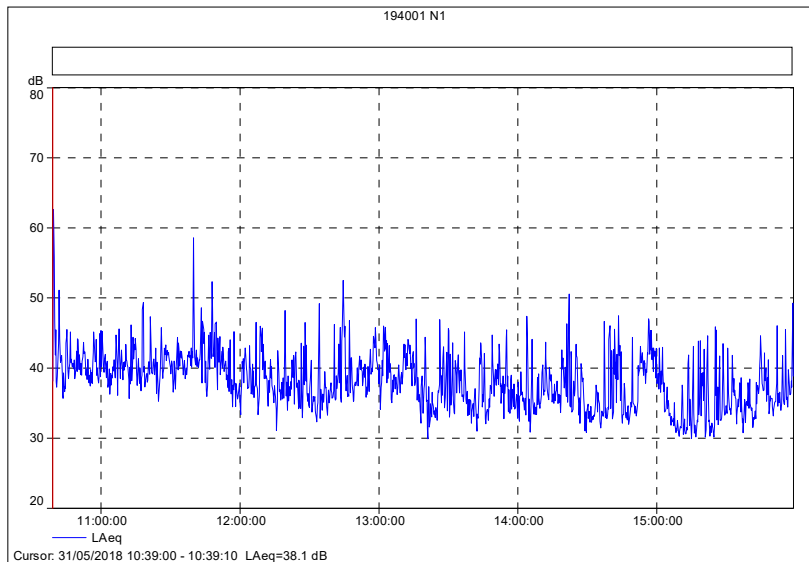


Figure 9.3 LAeq 1 s profile at N1

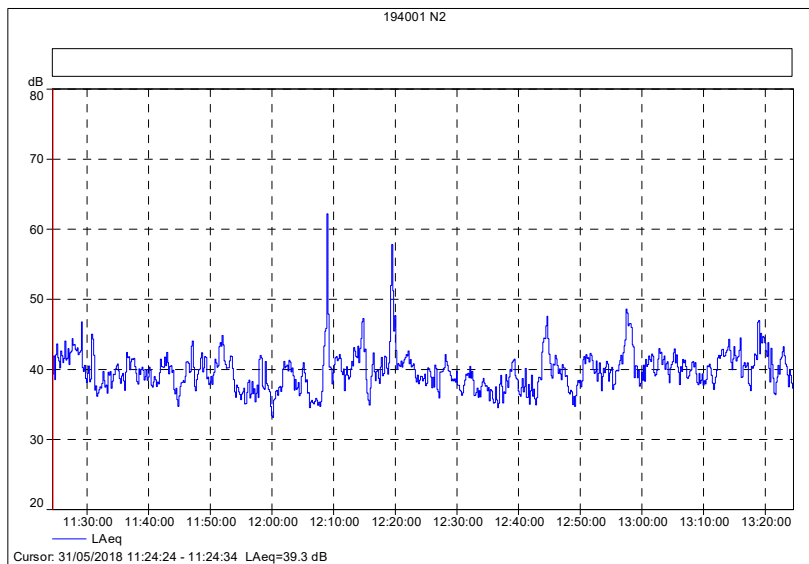


Figure 9.4 LAeq 1 s profile at N2

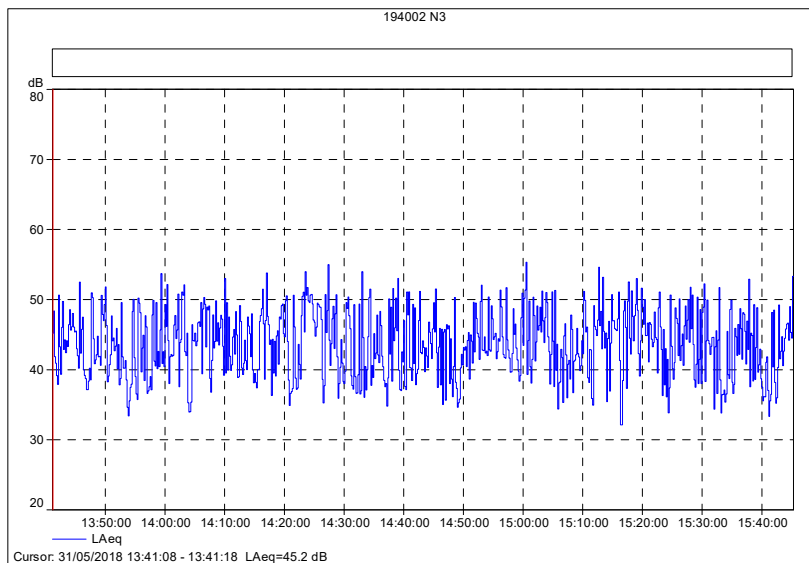


Figure 9.5 LAeq 1 s profile at N3

9.4.4 Future receiving environment

EPA EIAR guidance recommends that a noise impact assessment should include a description of the likely evolution of the future receiving acoustic environment in the absence of the proposed development. The local noise environment is urban in character, with the chief noise sources being local traffic on residential estate roadways, and distant national road traffic. A considerable change in traffic volume is required before ambient noise levels alter significantly. As road traffic levels are unlikely to radically change into the future, local noise levels are expected to remain reasonably similar to present levels, although the contribution due to local roadway traffic is expected to reduce slightly due to a likely increase in the proportion of electric vehicles.

Planning permission has been granted previously for residential estates on landbanks to the east and south of the site. If constructed, these are likely to lead to the introduction of greater local traffic activity, and an increase in residential estate noise sources such as lawnmowers, dog barking and children vocalisations. It is likely that development pressures will result in a large site on the western side of the applicant's site being developed, as a residential estate or otherwise.

With respect to the development site itself, it is expected that, should the proposed development not proceed (the 'do nothing' scenario), no noise emissions are expected to arise other than those from land management practices, depending on how the site is used into the future. Given the site's location, being surrounded by residential development, it is likely that the site will be earmarked for development at a later date, should the current proposal not proceed.

9.5 Likely and significant effects

9.5.1 Development summary

It is proposed to construct residential housing across the site, of various styles and sizes. In total, 212 dwelling units are proposed. It is also proposed to construct a crèche with associated carparking. The development will be served by an extensive network of onsite roadways, including a proposed connecting roadway to the north-south Oranmore distributor road which is proposed outside the site's eastern boundary. The development will require extensive landscaping works. The outer site boundary will consist of existing stone walls and block walls. The proposed layout is shown in Figure 9.6. Full details are given in Chapter 3 of this EIAR.

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling
- Installation of temporary site compound
- Provision of hardcore on onsite roadways
- Excavation of dwelling foundations
- Excavation of ground services trenches
- Installation of services
- Pouring & floating of concrete floor slabs
- Block work and roof work
- Building finishing (windows, doors, etc.)
- Laying of asphalt
- Site landscaping

During the construction phase, the chief source of noise emissions will be plant used onsite. While sporadic emissions may arise from other sources such as voices and hammering, plant emissions may continue for extended periods of time and may therefore potentially cause nuisance. Consequently, the assessment of noise impacts associated with construction phase emissions relates chiefly to plant sources.

Construction plant required onsite at various stages of the project are listed in Table 9.3. The table includes details of typical sound pressure levels, taken from *British Standard BS 5228:2009+A1:2014*. More than one item of several plant listed are likely to be onsite simultaneously e.g. excavators.

Table 9.3 Expected construction plant

Plant	L _{Aeq T} at 10 m dB
Asphalt paving machine with tipper truck	75
Consaw (various activities)	79-84
Delivery truck (18-26 t) (drive by)	83
Discharging concrete mixer truck	75
Dumper (3-7 t) (drive by)	76
Roller (drive by)	73
Small cement mixer	61
Telescopic handler	71
Tracked excavator (16-30 t)	68-78
Truck (tipping)	79
Truck (manoeuvring, various sizes)	70-80
Wheeled backhoe loader (9 t)	62-67

In addition to the above plant, rock breaking may be required locally onsite, depending on ground conditions. Such activity, where required, is expected to be short term and local only.

9.5.3 Predicted levels

Noise emissions arising during the construction phase of the proposed development will vary considerably due to several reasons:

1. The site is relatively large. Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.

2. The large construction area will result in differing propagation conditions with respect to receptors at different locations.
3. The construction phase is expected to last several years. During this time, plant associated with different activities will relocate around the site as required.
4. Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
5. As noted previously, more than one plant item may be required. For instance, two telescopic loaders may operate in close proximity to each other for a limited period. Simultaneously there may be several other loaders at different locations throughout the site.
6. Each machine item may operate under different loading conditions or be in varying states of repair.
7. Construction works may be concentrated for certain periods, followed by periods of seeming inactivity. Localised works may require several hours of intense activity.
8. During later stages of the construction phase, emissions from some operations will be screened by previously completed buildings.
9. As buildings near completion, activity will gradually relocate indoors.
10. With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. In such circumstances, it is preferable to assess specific operations or areas rather than attempting to apply a blanket figure across the entire site for the duration of the construction phase.

With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries. The shortest separation distances from works areas to surrounding receptors will be as follows:

- 20 m to the rear of dwellings at Beech Park and Coill Clocha. Dwellings at the latter benefit from a solid block work wall 2 m in height along the boundary.
- Dwellings along Orancourt Road to the south of the site. The works area will approach within 60 m of a number of receptors here.
- Dwellings off Orancourt Road outside the western tip of the site, some of which will lie within 80 m of the works area.

Separation distances to all other receptors across the local area will be greater, and thus the dwellings listed above represent the most vulnerable to construction phase noise emissions. Noise levels in the rear gardens of these properties are likely to be affected by construction phase emissions as follows:

Throughout most of the construction phase, activities will be undertaken remotely. Noise emissions arising from activities undertaken across the site will attenuate significantly before reaching receptors, and will become inaudible, or audible at a low level, in the context of the local soundscape. Screening will be provided in due course following construction of the nearest dwellings.

Over a shorter period, expected to last approximately six months, noise emissions will arise in closer proximity to the respective receptors while the nearest dwellings are under construction. Experience with other construction operations indicates that noise emissions will not be intrusive over most of this period, and will be significantly lower than the identified 65 dB $L_{Aeq, 1h}$ criterion. However, from time to time, noise levels may rise near the site boundary as plant operate locally. Activities here may include excavators undertaking boundary landscaping works, and roadways undergoing paving.

Table 9.4 presents the results of predictive modelling of the loudest construction phase activities at the nearest receptors identified above, undertaken in accordance with *British Standard BS 5228:2009+A1:2014*. Receiver positions considered appropriate to the construction phase are set at 4 m from the dwelling façade facing the construction zone. Given the absence of ground and atmospheric attenuation factors in *British Standard BS 5228:2009+A1:2014*, predicted levels are likely to overestimate actual levels by several decibels. Model input parameters are as follows:

- Soft ground assumed.
- No screening available, apart from Coill Clocha.
- Levels not rated for character.
- A-weighted values assessed, as specific plant items not selected at this stage.
- Plant output data taken from Table 9.3. Where various levels quoted, highest value is applied.
- Plant on-times: consaw (10 %), delivery truck (10 %), discharging mixer truck (20 %), excavator (80 %), dumper (20 %).
- Activity undertaken at nearest point of each activity zone to each receptor.

Table 9.4 Predicted construction phase levels at nearest receptors
*depending on plant size

Receptor	Activity	Received L _{Aeq} 1 h
Dwellings at Beech Park	Consaw at 40 m	61 dB
	Delivery truck at 40 m	60 dB
	Discharging mixer truck at 30 m	58 dB
	Tracked excavator at 20 m	62-72 dB *
	Dumper at 20 m	64 dB
Dwellings at Cois Clocha	Consaw at 40 m	57 dB
	Delivery truck at 40 m	56 dB
	Discharging mixer truck at 30 m	54 dB
	Tracked excavator at 20 m	56-66 dB *
	Dumper at 20 m	58 dB
Nearest dwellings along Orancourt Road to S	Consaw at 80 m	54 dB
	Delivery truck at 80 m	53 dB
	Discharging mixer truck at 70 m	49 dB
	Tracked excavator at 60 m	50-60 dB *
	Dumper at 60 m	52 dB
Nearest dwellings off Orancourt Road to W	Consaw at 80 m	53 dB
	Delivery truck at 80 m	52 dB
	Discharging mixer truck at 70 m	49 dB
	Tracked excavator at 60 m	50-60 dB *
	Dumper at 60 m	52 dB

9.5.4 Assessment of Effects

Table 9.4 indicates that noise levels at the nearest receptors attributable to construction operations will not exceed the 65 dB L_{Aeq} 1 h criterion, apart from a single exception: operation of a large (30 t or greater) tracked excavator in the vicinity of the site boundary adjoining Coill Clocha and Beech Park will marginally exceed the criterion. The criterion will not be exceeded where a smaller excavator is used (less than 15 t approximately, depending on plant power output). This restriction therefore forms part of the mitigation requirements. Noise emissions associated with all other plant will be less than the criterion.

All other receptors are located at greater distances from the proposed development site, and noise levels here are not expected to exceed 65 dB at any time during the construction phase, regardless of work locations onsite, and indeed are unlikely to exceed 55 dB throughout most of the construction phase. Any potential noise effects will therefore be temporary and not significant.

British Standard BS 5228:2009+A1:2014 data suggest that construction phase emissions will not be tonal. Apart from hammering, emissions are also unlikely to be impulsive. Hammering will be sporadic, typically occurring during roofing, and scaffolding erection and dismantling. These activities will be brief effects, localized and not significant. While rock breaking emissions are also impulsive in character, rock breaking is not expected to be required on a large scale at the site. If rock breaking is undertaken, it is expected to be brief and local only, most likely required for several hours at most at any position.

9.5.5 Construction traffic

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival

and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules. Numbers are unlikely to exceed 80 at any time, due to project phasing.

All personnel and deliveries will access the proposed development site from the N67, via a proposed construction roadway from an existing roundabout. This roadway will not pass any existing dwellings. Dwellings previously permitted in proximity to this roadway have not yet been constructed.

Given that construction phase traffic will not pass any existing dwellings, and will be inconsequential in the context of N67 traffic, potential construction phase traffic noise impacts will be temporary, localised and imperceptible.

9.5.6 Cumulative impacts

Potential cumulative impacts consist chiefly of potential for combined construction activities at (a) the applicant's site, (b) the previously permitted residential estate and hotel development on the site to the immediate east, and (c) the previously permitted residential estate on the site to the immediate south. Other developments and activities discussed in Section 2.5.2 of this EIAR are also considered for this cumulative impact assessment. It is possible that multiple or all sites may undergo development simultaneously.

Potential cumulative impacts will in general be temporary, localised and imperceptible, as construction operations at one site are likely to be relatively distant from operations at an adjacent site. However, there is potential for combined impacts to arise as follows:

1. Simultaneous construction at the northern end of the applicant's site, and the northern end of the site to the immediate east, resulting in impacts on Coill Clocha.
2. Simultaneous construction at the southern end of the applicant's site, and at the site to the south, resulting in impacts on dwellings to the south at Orancourt.
3. Simultaneous construction at the western end of the applicant's site, and the western end of the site to the south, resulting in impacts on dwellings to the west at Orancourt.

A review of predicted data indicates that combined noise levels will remain below the 65 dB $L_{Aeq, 1h}$ criterion throughout, apart from a single exception: In scenario 1 above, operation of a tracked excavator and/or dumper simultaneously at both sites in the vicinity of existing Coill Clocha dwellings is likely to generate combined levels which exceed the criterion. It is therefore recommended that periods of potential simultaneous excavator and/or dumper activity at both sites be notified in advance to the occupants of the nearest dwellings in Coill Clocha. It is reiterated here that the 65 dB criterion is not mandatory, but is merely a guidance value and in reality any potential effect is likely to be temporary, localized and not significant.

9.5.7 Population & human health

Many noise standards and noise guidance documents published by various authorities over the last three decades have been informed by criteria recommended by the World Health Organisation (WHO). Their first noise guidance document issued in 1980 concluded that a daytime $L_{Aeq, T}$ limit around 55 dB may be considered a suitable environmental health goal for external noise levels in residential areas, and

that levels below 55 dB are ‘desirable to prevent any significant community annoyance’.

However, the WHO recommendation relates to longer term events, averaged over a 16 h day. The WHO does not make any recommendation regarding short term events such as construction projects. Social studies suggest that listeners are more tolerant of short term construction events, particularly when such activities are likely to result in an overall improvement to the local environment. In this regard, the 65 dB criterion recommended by *British Standard BS 5228:2009+A1:2014* is considered to provide a sufficient degree of protection to human health.

Construction phase noise emissions will comply with this criterion at all receptors, subject to certain mitigation measures. On this basis, it is considered that there will be no adverse noise impact on the local population or on human health.

9.6 Mitigation

Noise emissions arising from construction phase operations at the proposed development site will not exceed the identified 65 dB $L_{Aeq, 1h}$ criterion at receptors, with a single exception: use of tracked excavators over approximately 15 t in size in immediate proximity to the boundaries adjoining Beech Park and Coill Clocha is likely to give rise to levels which marginally exceed the criterion. This will be avoided through use of excavators which do not exceed 15 t approximately, depending on plant power output and condition.

No other specific mitigation measures are warranted. Several general measures are proposed as follows:

- Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 08:00-14:00 h.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms.

With respect to potential cumulative impacts arising at Coill Clocha if construction activities are simultaneously undertaken at the nearest point of the applicant’s site and the adjacent site to the east, it is recommended that the occupants of the nearest dwellings at Coill Clocha be notified in advance of periods of possible simultaneous activities.

9.7 Residual impacts

Construction phase impacts will be satisfactory, subject to two specific mitigation requirements relating to activities in the vicinity of the boundary with Beech Park and Coill Clocha.

No noise impacts are expected from the commissioned development.

9.8 Significance of Effects

Based on the assessment above there will be no significant effects.