

3.1.2.2 CONSIDERATION OF CHANGE IN NOISE ENVIRONMENT

In assessing the scale of an adverse noise impact, consideration is given to the change in noise environment brought about by a development. There are two aspects to be considered. The first is the increase in total noise level (L_{Aeq}) due to the development, which is termed the “sound emergence”. The second is the degree to which the industrial noise exceeds the pre-existing background noise. In this context the background noise, which is quantified by the L_{A90} parameter, is the steady underlying component of the ambient noise.

BS 4142 provides guidelines on potential noise impacts by consideration of the level of the industrial noise relative to the background noise. An exceedence of 10 dB indicates clear audibility, with potential for complaints, and the impact needs to be carefully assessed. An increase of 5 dB is considered to be a marginal situation. When the industrial noise is equal to or less than the background noise, it is unlikely to be noticeable, and there is a low probability of complaint.

The mean daytime background noise level at measurement locations N1 to N3 in the vicinity of the proposed WWTP site were in the range 39 to 41 dB(A) L_{A90} , due to distant traffic noise. At the nearest house to the east, at position N4, the daytime background noise level was 48 dB(A) L_{A90} .

The mean nighttime background noise level at measurement locations N1 to N3 in the vicinity of the proposed WWTP site was in the range 30 to 31 dB(A) L_{A90} . During the quietest periods of the night from 02.00 to 05.00, background noise levels ranged between 24 and 30 dB(A) L_{A90} . At the nearest house to the east of the site at N4, the lowest background noise level detected was 35 dB(A) L_{A90} .

Noise Impact Descriptors

Neither EPA guidelines, nor BS 4142 provide criteria for assigning noise impact descriptors such as “negligible, slight, moderate, significant”. However the principles of BS 4142 can be used in conjunction with the EPA guideline noise limits to arrive at a set of descriptors.

In the case where noise from a development is 10 dB higher than the existing background noise, and if the EPA guideline limit is also approached or exceeded, the adverse noise impact can be described as “significant”.

If the noise from a development exceeds the background noise by 5 dB, the adverse impact can be described as: “slight” if the noise level is less than the EPA limit; “moderate” if the noise level is close to the EPA limit; and “significant” if the EPA limit is exceeded by more than 2 dB.

For “negligible” or “slight” impact, the additional noise from the development should be less than, or broadly comparable with the existing background noise. In these cases, if the absolute noise level is close to the EPA limit, the impact can be described as “slight”. If the absolute noise level is significantly less (10 dB less) than the EPA

limit, the impact can be described as “negligible”. When the noise from the development is significantly lower than the background noise (for example 10 dB lower), it is unlikely to be audible, and the noise impact can be described as negligible.

3.1.2.3 CONSIDERATION OF INDOOR NOISE LEVELS AT NIGHTTIME

It should be noted that BS 4142 was devised for mixed residential and industrial areas, already subject to a detectable level of industrial noise. It does not specifically address noise impacts in quiet rural areas where the background noise is less than 30 dB(A), as occurs on occasion in this area at nighttime.

In these cases of very low background noise, any new noise sources will always be in excess of the background noise level at certain times, especially at nighttime. In these cases, the level of the new noise source relative to the background noise is not the determining factor. Rather, the level of noise transmitted inside a house needs to be considered.

Acceptable indoor noise criteria are specified in British Standard 8233 “ Sound insulation and noise reduction for buildings – Code of practice” (1999). BS 8233 specifies 30 to 40 dB(A) L_{Aeq} as representing a “good” to “reasonable” indoor noise environment for living rooms, and 30 to 35 dB(A) L_{Aeq} for bedrooms. In addition, noise maxima inside bedrooms should not normally exceed 45 dB(A) L_{AFmax} at nighttime. This is to ensure acceptable resting/sleeping conditions. These guidelines are also consistent with recommendations of the World Health Organisation. However from experience measuring indoor noise levels in Irish residences in rural areas, it is found that indoor noise levels at nighttime are generally below 30 dB(A), and would more typically be in the range 20 to 25 dB(A).

An external noise source of level 35 dB(A) would be attenuated by approximately 15 dB when transmitted into a house, through a partially opened window, or through an open ventilation grille. The resulting indoor noise level would therefore be approximately 20 dB(A). This would be at the lower range of typical indoor background noise levels, and provided the sound contains no tonal or impulsive components is unlikely to be noticeable. An indoor noise level of 20 dB(A) would be very comfortably within BS 8233 and WHO guideline levels. Noise impact at this level would be negligible.

3.1.3 PROPOSED BOUNDARY NOISE DESIGN CRITERIA

Criterion for Continuous Plant and Process Noise Emissions

Taking account of the EPA guideline limits, and the existing low background noise levels, and also the requirement that the WWTP noise should not be noticeable indoors at nighttime, it is considered that a design criterion of 35 dB(A) at nighttime at the nearest noise sensitive location is appropriate for this development. This

would constitute a “negligible” noise impact, based on the noise impact criteria discussed in section 3.1.2 above. The nearest noise sensitive location is the land zoned residential, approximately 130m to the east of the proposed site boundary. There is currently no development on these lands. The nearest existing house is approximately 260m to the east.

The noise design criterion is best specified at a reference distance from the proposed boundary, rather than at the precise WWTP boundary. Specification at a position beyond the site boundary would take proper account of any noise screening which may be incorporated at the WWTP plant boundary, which would also have a benefit at the nearest noise sensitive receptor locations. A reasonable reference position would be at 20m from the boundary to the north, south, and east. The western boundary is not especially noise sensitive, due to the proximity of the ESB compound. It is therefore not necessary to apply a noise design criterion for the western boundary.

An ISO 9613 noise propagation model was developed for the proposed site. This was used to calculate the design criterion at the plant boundary, which would ensure that the resulting noise level at the zoned residential lands 130m to the east was less than 35 dB(A), which is the criterion for negligible noise impact in this rural area. The calculated design noise criterion is a noise level of 45 dB(A) at 20m from the plant boundaries. Based on experience measuring noise levels at existing wastewater treatment plants, this is considered to be technically achievable using current equipment technology, and through incorporation of boundary noise screening where required.

Criterion for Daytime Work Activity Noise Emissions

It should be noted that the above engineering design noise criterion applies to items of equipment and processes at the WWTP which operate on a 24-hour basis. The criterion was devised to ensure that there would be negligible noise impact at nighttime, which is the most sensitive period with respect to noise impact.

During normal operation of the WWTP there will also be daytime work activities, and movement of vehicles during daytime within the site, which would not be subject to the same criterion. The existing underlying background noise in the vicinity of the site was determined to be at least 10 dB higher than at nighttime. Consequently, a daytime design noise criterion 10dB higher than the nighttime criterion, i.e. 55 dB(A) at 20 m for the site boundary, would be considered appropriate to ensure negligible daytime noise impact at the nearest noise sensitive receptors. For a daytime noise criterion of 55 dB(A) at 20m from the boundary, the resulting noise level at the nearest noise sensitive location, approximately 130m to the east is calculated to be 45 dB(A).

3.2 CONSTRUCTION NOISE IMPACT

3.2.1 CONSTRUCTION OF WASTE WATER TREATMENT PLANT

The assessment in this report is based on general information available at the planning stage of the project. The analysis presented is considered indicative of the scale of potential noise impacts during the construction phase, based on noise emission data for construction equipment from BS 5228, and experience at similar sites. However this does not constitute a definitive estimate of construction noise levels. The detailed noise analysis can only be carried out when precise details of works are formulated in terms of equipment, processes, and exact timings of works. This detailed analysis will be the responsibility of contacting companies undertaking the work, in accordance with the applicable standards.

During construction of the treatment plant itself, the highest noise levels will be generated during the site clearance and excavation phase of the works. During the actual construction of the plant facilities and equipment installation, noise emissions will be considerably lower.

For site clearance activities, involving heavy earth moving and excavation equipment, the calculated construction noise level at the nearest house to the east is 51 dB(A) L_{Aeq} (based on an assumed sound power emission of 120 dB L_{WA} from plant and equipment operating on the site). This calculated noise level is very comfortably below the NRA construction noise criterion of 70 dB(A). It would be just noticeable above the existing ambient noise outdoors, but would not be intrusive. There would be no noticeable noise impact indoors. The resulting noise impact at the houses is negligible.

The construction noise level in the sports field to the northeast is expected to be in the range 50 to 55 dB(A), and will have negligible impact on outdoor activities in this area.

A noise map representing construction noise levels during the early construction phase of the WWTP is shown in Figure 4.

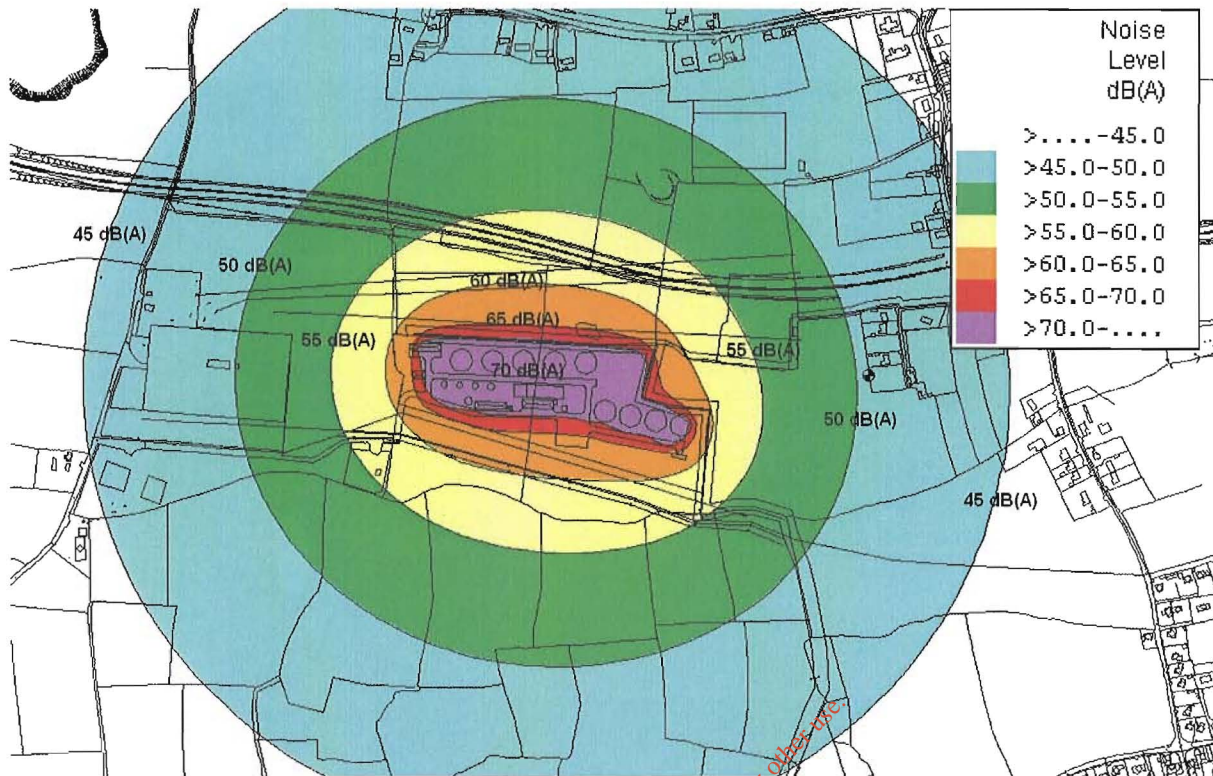


Figure 4. Calculated construction noise levels, during the early site excavation and preparation phase when noise emissions are expected to be highest. The calculation are based on a total site sound power emission of 120 dB(A) L_{WA} , which is a reasonable allowance for a project of this scale

3.2.2 CONSTRUCTION WORKS AT PUMPING STATIONS

The construction works at the major pumping stations will be of a significantly reduced scale compared with the construction of the WWTP. The highest noise emissions will be produced during the site preparation and excavation phase. Based on a site equipment sound power emissions of 115 dB(A) L_{WA} , the resulting construction noise levels at the nearest houses are calculated to be approximately 70 dB(A) at the nearest houses at the Monkstown and West Beach sites, where it is considered that the standard guideline noise limit of 70 dB(A) can be complied with, subject to appropriate mitigation. There will be a slight adverse noise impact at these houses. At the Raffeen and Carrigaloe sites, the calculated noise levels are 58 and 57 dB(A) respectively, which are comfortably within the standard 70 dB(A) criterion, and noise impact will be negligible.

Construction noise levels at the minor pumping stations will be of a lower level and shorter duration than for the major pumping stations, and the adverse noise impact will be negligible to slight.

Location of Proposed Pumping Station	Calculated Construction Phase Noise Level at Nearest House to Pumping Station dB(A)
Rafeen	58
Monkstown	70
Carrigaloe	57
West Beach Cobh	69

Table 12. Calculated highest construction noise levels, during the early site preparation and excavation phases for the proposed major pumping stations (BS 5228 calculation based on site sound power emissions of 115 dB(A) L_{WA} , with allowance for noise screening by standard timber site hoardings).

3.2.3 EXCAVATION WORKS FOR SEWER LINES

The proposed sewer network will involve laying of sewer lines through populated areas of Cobh, Monkstown, Ringaskiddy, and Carrigaline, and in the vicinity of houses along rural sections of the network. The noise level at houses along the proposed sewer routes will vary depending on the proximity of the works, and the set-back distance of the houses from the line of the sewer. The expected construction noise levels at the houses along the routes of the sewer pipelines were calculated in accordance with BS 5228. The calculations are based on typical equipment noise emissions data (for excavator/breaker and truck) and allow for distance attenuation, and marginal screening at the house boundaries.

The highest expected noise level at any given house along the sewer route will be generated when excavations are in progress immediately adjacent to the house in question. The noise level at the house will depend on the distance of the house from the excavation works. Table 13 shows the calculated noise levels for houses at various distances from the line of the sewer line excavation works.

For houses set back 10 metres from the sewer line, the noise levels may exceed the 70 dB(A) construction noise criterion for the short period while works are in progress immediately adjacent to the house.

As works progress along the route, the noise level at any given house will vary depending on the location of the works along the road. The expected variation in noise level is shown in Figure 5. This shows that in general noise levels will be less than 65 dB(A). However, noise levels may exceed 70 dB(A) while works are in progress in the 20m stretch immediately in front of the houses. As works progress away from the house, the noise level falls off rapidly. Beyond 50 metres, the noise level would be less than 60 dB(A), and beyond 100 metres the noise levels would be less than 54 dB(A).

This construction noise will be audible above the existing ambient noise, but would

not be considered intrusive in the context of the limited duration of the works.

Set-back distance of house from line of sewer excavations, metres	10	20	30	40	50
Noise level dB(A) $L_{Aeq,1hr}$	73	67	63	61	59

Table 13. Calculated noise levels at a house, due to excavation works at roadside adjacent to the house

(based on data from BS 5228, with an assumed sound power emission of 110 dB(A) from an excavation works, with average on-time of 50%, and assumed nominal screening allowance of 6 dB for boundary walls.)

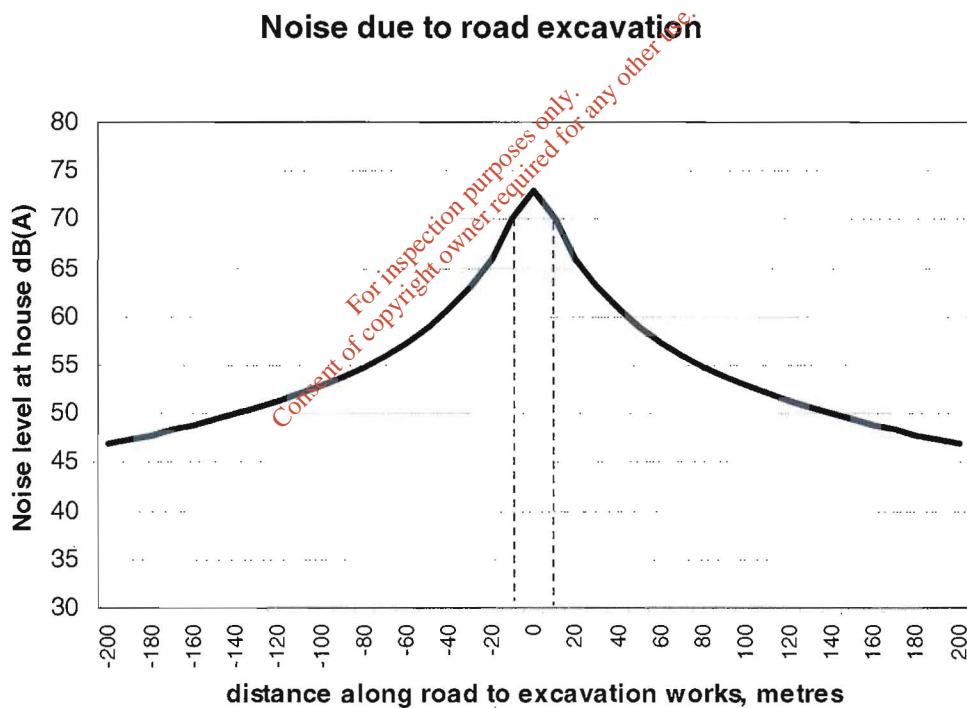


Figure 5. Variation of noise level at a given house, depending on distance of excavation works along the road from the house entrance. In the situation depicted, the house is 10m from the road. The 70dB(A) NRA criterion may be exceeded while works are in progress on the 20m stretch immediately in front of the house.

Channel Crossing at Carrigaloe

At this planning stage, final details are not available on the works on the channel crossing at Carrigaloe. The possible options include open cut and tunnelling. In either case, it can be assumed that there will be shore-based works, which will generate noise. In the case of the open cut option there would also be noise emitted from the works on floating platforms in the channel. An additional consideration is the question of tidal restrictions, which may require works to be carried out outside the normal daytime construction periods on occasions. Noise emissions from these works will be subject to the construction noise limits set out in section 3.1.1.

3.2.4 VIBRATION

In carrying out this assessment, it is assumed that there will be no blasting carried out.

Taking account of the nature of the likely excavation works for the sewerage pipes, such as excavation and rock breaking, it is expected that the resulting vibration levels at nearby properties will be comfortably within the vibration limits for protection against cosmetic damage (set out in Table 10), and in terms of nuisance, are likely to be imperceptible.

3.2.5 CONSTRUCTION TRAFFIC

At this planning stage, precise details are not available on construction traffic volumes. Additional traffic noise can however be expected on haul routes to the treatment plant site, and along the sewer pipeline routes.

Based on a nominal assumption of 10 vehicles per hour travelling to/from the work sites, the additional traffic noise generated at a house at 10m from the road is expected to be approximately 55 dB(A). This is a relatively low level of traffic noise, and would have only a slight impact.

3.3 OPERATIONAL PHASE NOISE IMPACT

3.3.1 NOISE PROPAGATION MODEL

A computer noise propagation model was developed for the proposed waste water treatment plant. The model is based on the calculation procedures of ISO 9613. For noise modelling purposes the overall continuous plant and process noise emissions from the new plant are assumed to be limited at source and/or screened, such that the resulting noise level at a reference distance of 20m from the plant boundary is at the proposed design noise criterion of 45 dB(A). For additional work activities and vehicles operating within the site during daytime, the overall noise emissions are assumed to be limited to the daytime noise criterion of 55 dB(A) at 20m from the boundary.

3.3.2 NOISE EMISSIONS FROM WWTP

The calculated operational noise levels, and noise impact assessment for the daytime and nighttime periods, are presented in Table 14. The calculated noise levels for the operational WWTP are illustrated as a noise map in Figures 6 and 7 for nighttime and daytime operation respectively.

Daytime Noise Impact

For daytime operation of the WWTP, including daytime work activities and vehicle movements within the site, the projected additional noise levels due to the WWTP are in the range 34 dB(A) to 45 dB(A) at the noise sensitive locations considered. These additional noise levels are all comfortably below the EPA daytime noise limit of 55 dB(A).

At the nearest lands zoned residential to the east of the site, the ambient noise level is calculated to increase by 2 dB. This increase is not likely to be perceptible. The daytime activity noise and vehicle movement noise within the site is calculated to exceed the background noise by 4 dB. The noise may therefore be just audible, but is unlikely to be clearly distinguishable from the existing distant traffic noise. The component of continuous noise from the plant and processes at the WWTP (excluding vehicles and daytime works activities) would be in the range 27 to 35dB(A) and would be inaudible. The noise impact at this location is considered to be negligible.

At the other noise sensitive locations, the additional noise from the WWTP, including daytime work activities and vehicle movements within the site, would not result in any change in the existing total ambient noise at the nearest noise sensitive locations, and would be lower than the existing background noise levels. There would be no adverse noise impact at these locations.

At the existing houses to the east, north, south and west, the calculated additional WWTP noise will be 8 to 14 dB lower than the existing steady background noise level, and will be inaudible.

In the sports field to the north east of the site, the daytime noise level is expected to be in the range 40 to 45 dB(A), and will have no noise impact on the amenity of this area.

Nighttime Noise Impact

For nighttime operations, noise emissions from the WWTP are the same as modelled for daytime conditions, and the calculated noise levels at the noise sensitive locations are in the range 24 to 35 dB(A).

These additional noise levels are all in comfortable compliance with the EPA nighttime noise limit of 45 dB(A).

The additional noise at the noise sensitive locations would result in an increase of at most 1 dB in nighttime noise level at the nearest noise sensitive location, which is the land zoned residential 140m to the east. At this location, the WWTP noise would exceed the existing steady background noise by 5 dB, and consequently the noise would be audible at a low level outdoors. Allowing for an attenuation of approximately 15 dB through a partially opened window, the resulting indoor noise level would be 20 dB(A). This is comfortably within the BS 8233 guidelines, and represents an extremely low noise level which is unlikely to be noticeable indoors. The adverse noise impact at this location is considered to be negligible.

At the existing houses to the east, north, south and west, the projected WWTP noise is very low, and in the range 24 to 30 dB(A). The WWTP noise would be between 6 and 11 dB lower than the existing background noise, and would not be audible outdoors or indoors. There would be no adverse noise impact at these houses.

House Locations	Projected WWTP Plant Noise Level L _{Aeq} dB(A)	Existing Noise L _{Aeq} dB(A)	Projected Total Future Noise L _{Aeq} dB(A)	Projected Change, dB (Sound emergence)	Within EPA Limits (55/45 dB(A) day/night)	Comparison with mean background noise L _{A90} ¹	Likely Audibility	Overall Adverse Noise Impact
Daytime								
Lands to east (zoned residential)	45	47	49	+2	yes	+ 4 dB	Daytime activities possibly audible at low level outdoors, inaudible indoors	Negligible
Houses to east	40	55	55	0	yes	-8 dB	Inaudible outdoors and indoors	None
Houses to north	39	62	62	0	yes	-14 dB		
Houses to south	34	55	55	0	yes	-8 dB		
Houses to west	37	54	54	0	yes	-9 dB		
Nighttime								
Lands to east (zoned residential)	35	38	40	+2	yes	+5 dB	Audible at low level outdoors, not noticeable indoors	Negligible
Houses to east	30	50	50	0	yes	-10 dB	Inaudible outdoors and indoors	None
Houses to north	29	49	49	0	yes	-6 dB		
Houses to south	24	48	48	0	yes	-7 dB		
Houses to west	27	46	46	0	yes	-11 dB		

Table 14. Predicted noise levels from proposed WWTP, and noise impact assessment

¹ difference between projected WWTP noise, and the background noise at the assessment location, as given in Table 3

3.3.3 GROUND VIBRATION DUE TO WWTP

From visits to other waste water treatment plants (including Limerick, Ennis, Kilkenny, Athy, Greystones), it has been found that there is no perceptible ground vibration beyond the site boundaries associated with the operating equipment. At the proposed WWTP site, the nearest sensitive location is 140m to the east. There is unlikely to be any significant potential for audible ground-borne vibration over this distance.

3.3.4 NOISE AND VIBRATION EMISSIONS FROM PUMPING STATIONS

As the pumps and equipment in the major pumping stations will be enclosed within buildings, or located below ground level at the minor pumping stations, the noise sources will be effectively enclosed. In principle any desired degree of sound attenuation can be achieved.

Nighttime background noise levels at the sites of the proposed pumping stations ranged from 32 to 47 dB(A) L_{A90} . A reasonable criterion would be to ensure a noise level of less than 35 dB(A) at the nearest houses, as was proposed for the noise sensitive locations near the WWTP site itself. For noise sensitive locations closest to the pumping stations at Monkstown and West Beach Cobh, this would correspond to a design noise criterion of 45 dB(A) at 5m from the pumping stations.

Given the proximity of nearby residences to the pumping station at Monkstown and West Beach Cobh, it is prudent to consider the potential for generation of ground-borne vibration, in the audio frequency range, which could potentially give rise to a low pitched audible sound inside the nearby residences.

Such ground-borne hums could be generated by motors, pumps and any other equipment which is in mechanical contact with the ground near a building. Audible ground-borne vibration is readily prevented through incorporation of suitable vibration isolators in the equipment mountings.

Measurements at the existing Church Street pumping station in Carrigaline found that ground vibration levels at 1m from the wall of the pumping station were extremely low, and there was negligible potential for transmission of audible ground-borne vibration to nearby residences. The measured vibration level is presented in Figure 8.

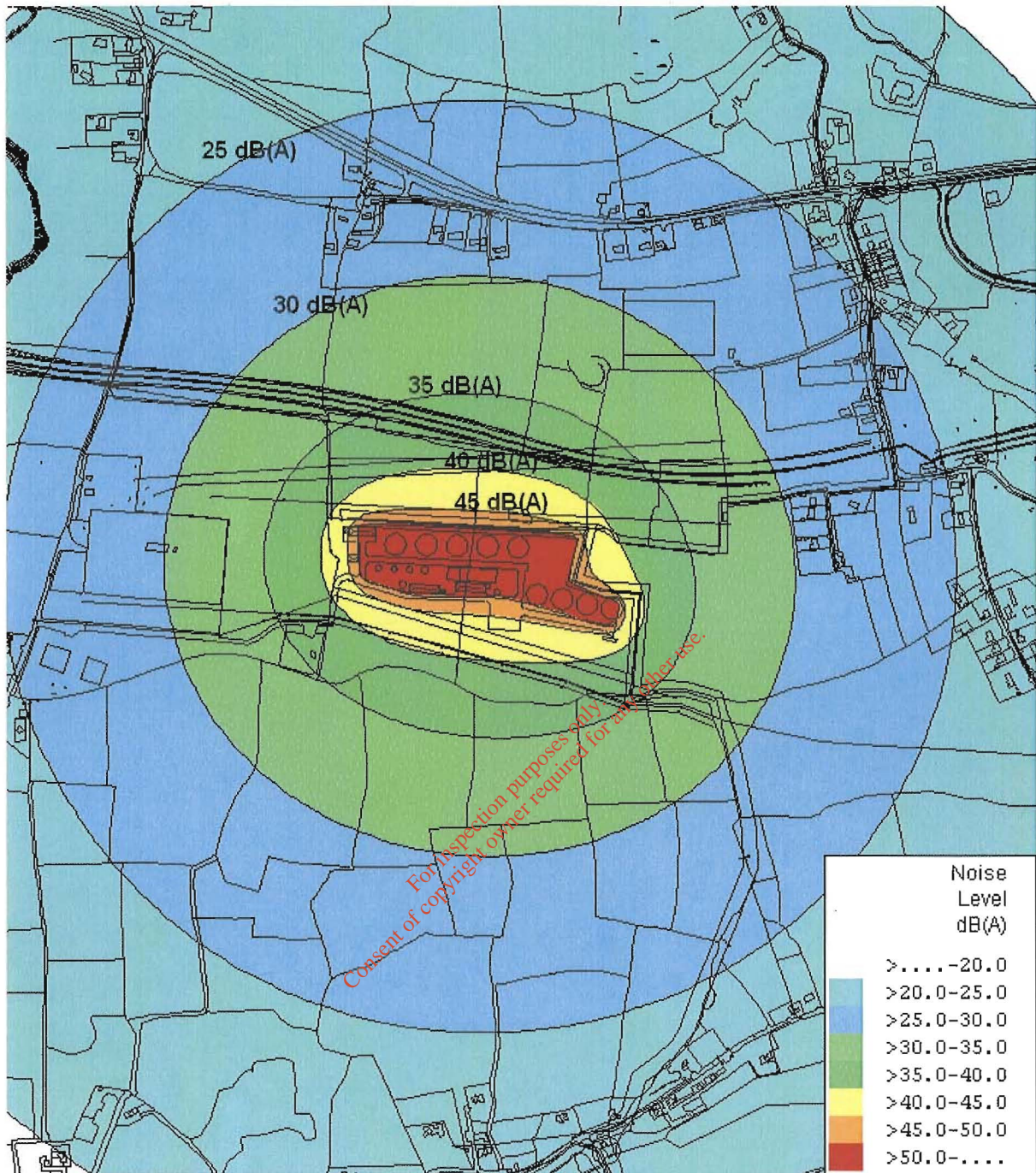


Figure 6. Calculated nighttime noise levels due to the operating WWTP. This noise map was generated using an ISO 9613 noise propagation model, based on a nighttime design noise criterion of 45 dB(A) at 20m from the WWTP boundary. This noise map represents the continuous plant and process noise emissions from the operating WWTP.

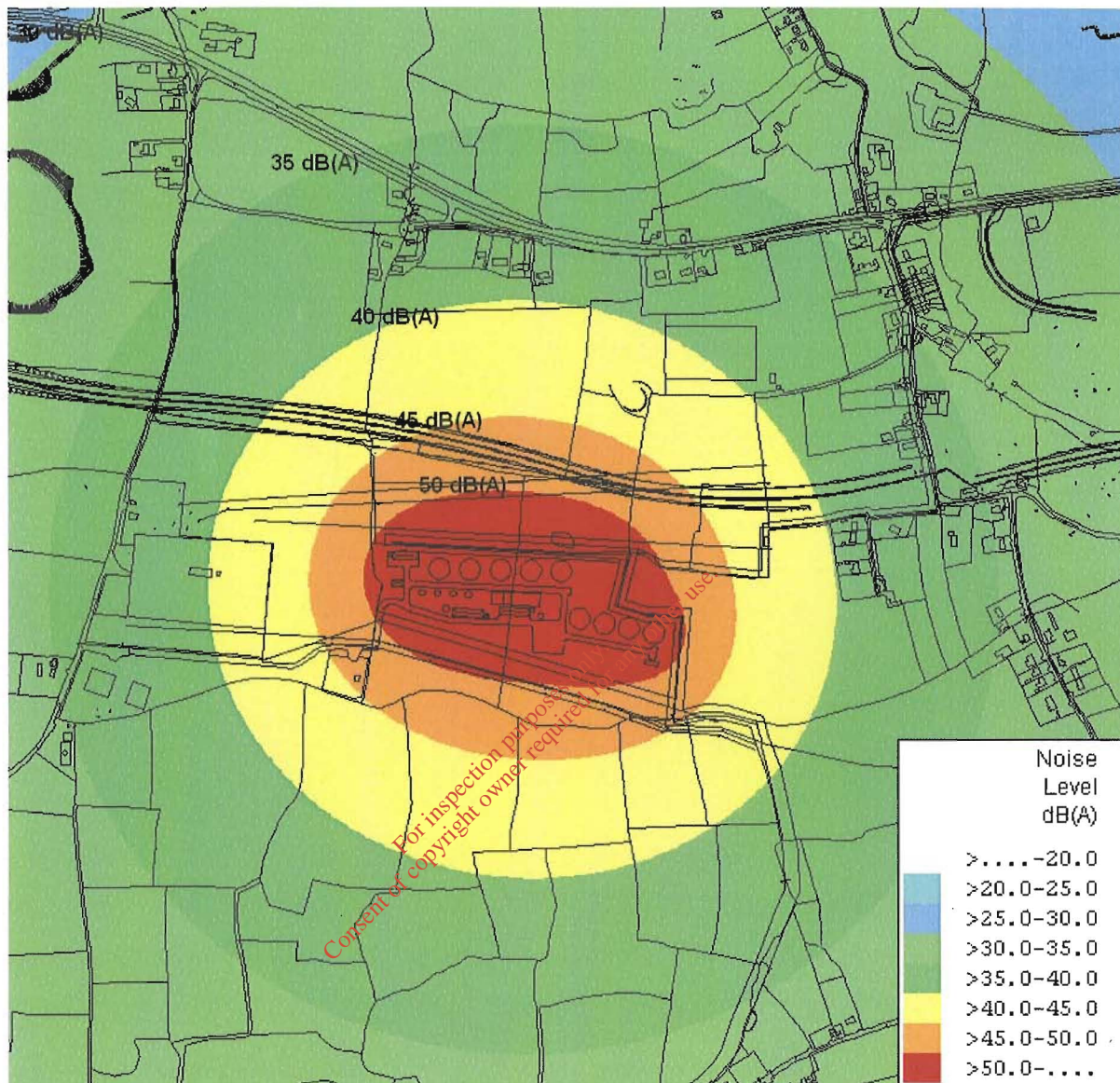


Figure 7. Calculated noise levels due to operating WWTP, during daytime. This noise map was generated using an ISO 9613 noise propagation model, based on a design noise criterion of 55 dB(A) at 20m from the WWTP boundary during daytime. This noise map represents the continuous plant and process noise emissions from the operating WWTP, and includes daytime work activities and traffic on site.

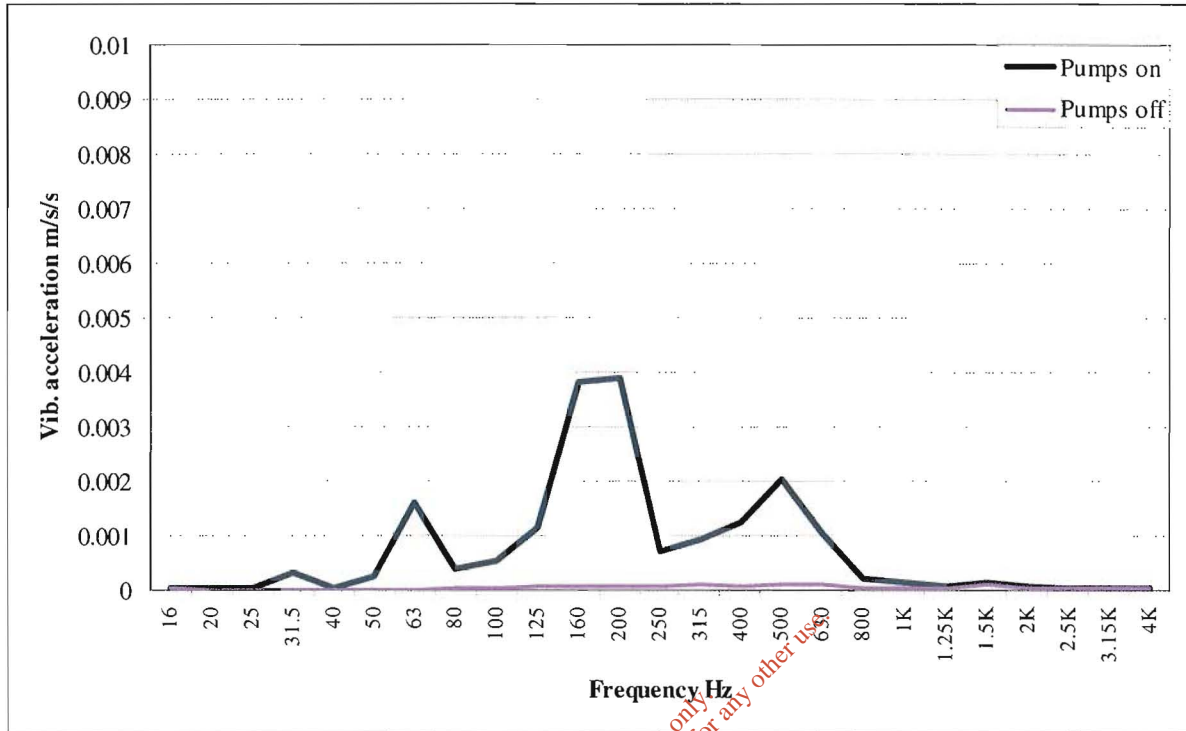


Figure 8. Measured ground vibration level at 1m from existing Church Street pumping station in Carrigaline, which demonstrate very low ground vibration levels, with no potential for transmission of audible sound beyond the immediate vicinity of the station

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3.3.5 IMPACT OF OPERATIONAL PHASE TRAFFIC

Detailed operational traffic forecasts were not available at time of preparation of this report. However the estimates of likely site traffic are relatively low, at approximately 10 heavy vehicle movements per day along Cogan's Road to the site, and light staff traffic, which will have negligible impact.

The calculated traffic noise level due to the heavy vehicle movements is 40 dB(A) L_{Aeq} at a distance of 20m from the road. The existing measured traffic noise level was 54 dB(A) L_{Aeq} . The additional traffic noise would not add detectibly to the average traffic noise level.

The noise generated by vehicles moving within the site is calculated to result in a noise level of less than 50 dB(A) at 20m from the site boundary, and will be comfortably within the proposed daytime noise criterion of 55 dB(A) at 20m from the site boundary.

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4 MITIGATION

4.1 NOISE MITIGATION DURING CONSTRUCTION PHASE

During the construction phase of the actual WWTP, the potential noise impact during daytime is slight, and no special mitigation measures are likely to be required.

During construction of the pumping stations and during excavation works for the sewer lines, there is potential for exceedence of the standard construction noise criterion of 70 dB(A) on occasions. In accordance with best practice, the noise issues at the sites should be managed in accordance with the recommendations in BS 5228, which should be incorporated into the construction environmental management plan.

- General guidelines for limiting the disturbance which may be applicable for these works are outlined below:
- Limit noisy construction works to 07.00 to 19.00 weekdays with Saturday working from 08.00 – 13.00 hours (relatively quiet construction activities could be carried out outside these hours, subject to strict controls).
- Essential nighttime works, should be subject to a noise limit of 45 dB(A), and carefully assessed and controlled to minimise impact
- Utilise solid timber site hoardings where required to screen sensitive properties.
- Use modern, silenced and well-maintained equipment conforming to applicable EU directives.
- Shut down equipment when not in use, where practicable.
- Site semi-static equipment such as generators, mixers, and compressors as far away as possible from sensitive locations and ensure that the orientation is the optimum for low noise.
- Ensure that all workers are given training with respect to minimising noise and disturbance.
- Noise exposure aspects within the worksites will be managed in accordance with the requirements of Safety, Health and Welfare at Work (General Application) Regulations 2007, SI 299 of 2007.

4.2 NOISE MITIGATION FOR OPERATIONAL PHASE

The assessment of noise impact during the operational phase of the development was based on a nighttime design noise criterion of 45 dB(A) at 20m from the northern, eastern and southern boundaries of the WWTP, and a design criterion of 45 dB(A) at 5m from the pumping stations.

In addition, for the WWTP site, a daytime design noise criterion of less than 55 dB(A) at 20m from the boundary is proposed to ensure negligible noise impact due to daytime work activities and vehicles operating within the site. These design noise criteria represent the specific noise emissions from continuous plant and processes, excluding residual noise from other sources such as traffic.

The achievement of these noise criteria will depend on the appropriate noise specifications and noise controls being incorporated into the detailed acoustic design of the plant. The principal mitigation measures required for the development therefore concern selection of equipment, sound containment, acoustic attenuators, and noise screening, in order to achieve the required design noise criteria.

Any mechanical equipment (such as motors) at the pumping stations, which is considered capable of transmitting significant ground borne vibration in the audio frequency range, should be adequately vibration isolated to ensure that they do not give rise to audible sound at the nearest houses.

Achieving the design criteria will be the responsibility of the developer's design team. The predicted noise levels, as outlined in this report are considered to be readily technically achievable using standard technology and noise control methods. The contractor will be required to demonstrate in advance of construction, using an appropriate methodology, that the design noise criteria will be achieved.

The design noise criteria referred to above, are for engineering design purposes only, and should not be confused with any noise conditions which may be set by the relevant authorities, which would typically be 55 dB(A) during daytime, and 45 dB(A) during nighttime at noise sensitive locations (as opposed to boundaries).

5 RESIDUAL NOISE IMPACT

The WWTP development with associated pumping stations is expected to have a negligible residual noise impact at the nearest houses during daytime and nighttime operations. Noise will be comfortably within the EPA limits at all houses.

6 NON TECHNICAL SUMMARY

The environmental noise impact of the proposed Cork Lower Harbour Drainage Scheme and Waste Water Treatment Plant has been assessed both during the construction phase, and during the operational phase.

The existing daytime noise environment in the vicinity of the proposed WWTP site was found to be relatively quiet, with a mean ambient noise level in the range 44 to 47 dB(A) L_{Aeq} , and with steady underlying background noise levels of 39 to 41 dB(A) L_{A90} . The noise environment is determined by distant traffic noise, agricultural machinery, with a contribution from aircraft noise.

At nighttime the mean ambient noise level was in the range 36 to 43 dB(A) L_{Aeq} with a steady underlying background noise component of 30 to 39 dB(A) L_{A90} .

The future realignment of the N28 will alter the noise environment at the site of the WWTP. The calculated future ambient noise level at the northern boundary is 52 dB(A) during daytime, and 39 dB(A) at nighttime. The realignment of the road is not expected to alter the steady underlying component of background noise at the WWTP site, as this is due to distant noise sources.

At the sites of the proposed major pumping stations at Rafeen, Monkstown, West Beach Cobh, and Carrigaloe, the noise environment was determined mainly by local traffic.

During the construction phase of the proposed WWTP the resulting noise levels at the nearest existing houses to the east and north is 51 dB(A). This is a very low noise level, and is comfortably within the standard construction noise criterion of 70 dB(A). The noise impact will be negligible.

During construction of the major pumping stations at Rafeen, Monkstown, West Beach Cobh, and Carrigaloe, the construction noise levels are expected to range from 57 to 70 dB(A) at the nearest houses. The highest noise levels will be experienced at the houses closest to the Monkstown and West Beach sites. Subject to appropriate mitigation, it is expected that the NRA 70 dB(A) criterion will be achievable at these locations, and that the resulting adverse impact will be slight.

The proposed scheme will involve extensive excavation works for laying new sewer lines. When these works are in progress adjacent to houses along the routes, noise may exceed the 70 dB(A) National Roads Authority construction noise criterion for short periods. In general however, construction noise levels at houses along the sewer routes will be typically less than 65 dB(A), with minimal impact.

When the treatment plant is operational, and provided it is designed to the specified noise criteria, noise emissions are calculated to result in a nighttime noise level of 30 dB(A) L_{Aeq} , and a daytime noise level of 40 dB(A) L_{Aeq} at the nearest existing houses to the east, with no adverse noise impact. At the lands zoned residential, 140m to the east of the site, the expected noise level is 35 dB(A) at nighttime, and 45 dB(A) during daytime. The resulting noise impact is considered to be negligible.

Airborne noise emission from the pumping stations will be negligible. However, where a pumping station is located close to a residence, there is a small risk of structure borne vibration being transmitted into the residence, and being audible indoors. This can be avoided through incorporation of suitable vibration isolation as appropriate.

Summary of Main Mitigation Measures for This Project

- The Waste Water Treatment Plant should be designed such that the operational noise level due to the continuously operating WWTP plant and processes at a distance of 20m from the plant boundaries is less than 45 dB(A) L_{Aeq} .

This criterion excludes daytime work activities and daytime vehicle movements within the site. The appropriate criterion for these daytime work activities and vehicle movements is a noise level of less than 55 dB(A) at a distance of 20m from the boundaries

- The pumping stations should be designed such that the operational noise level at a distance of 5m from the stations is less than 45 dB(A) L_{Aeq}
- Any equipment at the pumping stations capable of transmitting audible ground borne vibration to nearby houses should be adequately vibration isolated
- A daytime construction noise limit of 70 dB(A) is considered appropriate for this project. Construction noise aspects should be managed in accordance with BS 5228 “Noise and vibration control on construction and open sites”.

References

ISO 1996 “Description and Measurement of Environmental Noise”

ISO 9613 “Attenuation of sound during propagation outdoors”

BS 5228 “Noise and Vibration Control on Construction and Open Sites”.

BS 4142, “Rating Industrial Noise Affecting Mixed Residential and Industrial Areas”.

U.K. Design Manual for Roads and Bridges / Calculation of Road Traffic Noise

BS 8233 “Sound insulation and noise reduction for buildings – A code of practice”.

National Road Authority “Guidelines for Treatment of Noise and Vibration in National roads Schemes”

World Health Organisation: “Guidelines for Community Noise”

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APPENDIX A - TERMINOLOGY

dB(A) a logarithmic noise scale (decibel). The "A" indicates that a frequency weighting has been applied to take account of the variation in the sensitivity of the human ear as a function of frequency.

L_{Aeq} the average noise level during the measurement period, which includes all noise events. The L_{Aeq} value has been found to correlate well with human tolerance of noise, and is the value normally used in setting and monitoring industrial noise limits.

L_{A90} the noise level exceeded for 90% of the time. It is generally taken as being representative of the steady background noise at a location. It tends to exclude short events such as cars passing, dogs barking, aircraft flyovers etc.

L_{A50} the noise level exceeded for 50% of the time.

L_{A10} the noise level exceeded for 10% of the time. It is a measure of the higher noise levels present in the ambient noise. The L_{A10} parameter is generally used to describe traffic noise.

L_{WA} the total sound power emitted by a source (in dB re 1 piconWatt)

Free-field

Noise measurements made away from reflecting surfaces (apart from the ground) are termed free-field measurements. Measurements at the façade of a building are typically 3 dB higher, due to reflection from the façade. All data in this report are free-field

Total Noise Level

The total noise level due to all noise sources (also called ambient noise).

Specific Noise Level

A component of the ambient noise that can be attributed to a specific source, e.g. industrial source

Residual Noise Level

The component of the total noise that exists in the absence of the specific noise

Sound Emergence

The increase in the total noise due to the addition of a specific noise source

Background Noise

The steady underlying component of the measured noise (normally measured using the L_{A90} parameter)