

REPORT 24225

Environmental Noise Impact Assessment

Newport Sewerage Scheme

October 2004

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**ANV Technology Report 24225
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Newport Sewerage Scheme**

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Newport Sewerage Scheme

Summary

The environmental noise impact of the proposed sewerage scheme has been assessed both during the construction phase, and during the operational phase.

The existing daytime noise environment in the Newport area where the new sewer lines will run is relatively quiet, with a mean ambient noise level of 47 dB(A) L_{Aeq} . Noise levels at houses along the main road through the town are 63 dB(A) L_{Aeq} .

The site of the proposed treatment plant is in a quiet area, with ambient daytime noise levels of 39 dB(A) L_{Aeq} , and background noise levels at nighttime of 31 dB(A) L_{A90} .

During the construction phase, the highest noise levels will be generated during excavations for the new sewer lines. When works are in progress adjacent to houses, noise may exceed the 70 dB(A) National Roads Authority construction noise criterion for short periods. In general however, construction noise levels at houses will be typically less than 65 dB(A), with minimal impact. As a mitigation measure, it is recommended that the noise aspects of the works be managed and controlled in accordance with BS 5228 "Noise control on open and working sites". While this standard will ensure protection of all noise sensitive locations, particular care should be exercised for works adjacent to especially sensitive locations such as the Newport Resource Centre, and local schools.

The construction of the treatment plant is expected to generate noise levels of less than 55 dB(A) L_{Aeq} at the nearest properties, and will have negligible impact.

When the treatment plant is operational, noise emissions are calculated to result in a noise level of 33 dB(A) L_{Aeq} at the nearest houses to the southeast. 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.

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Environmental Noise Impact Assessment

Newport Sewerage Scheme

1 INTRODUCTION

The noise and vibration impact of the Newport Sewerage Scheme was assessed. The proposed scheme will involve installation of a network of sewerage lines in Newport, and construction of a waste water treatment plant at Caulicaun.

The impact during both construction and operation was considered. In terms of noise impact, the main impact would be during the construction phase when there will be excavation works along the routes of the proposed sewer, and construction of the treatment plant itself.

During the operational phase, the potential noise impacts will in general be limited to the vicinity of the treatment plant, due to noise emissions from associated equipment.

There are minor potential impacts in terms of noise from pumping stations, which are also considered in the report.

1.1 NOISE SENSITIVE LOCATIONS

The site of the waste water treatment plant is Caulicaun, where a tributary joins the Newport River. The site is rural, with few dwellings visible from the site. It is situated on a hillside, on the opposite side of the town, and therefore is screened from the town. The access road is via a quiet residential area.

The nearest noise-sensitive locations to the site are the houses at Caulicaun, near the entrance to the access road, which are approximately 200m to the southeast of the site boundary (location 2 in Figure 1).

There are three houses visible from the site, two distant to the north, and one to the northwest across the tributary, some 300m distant.

Two pumping stations form part of the scheme. The proposed pumping station nearest the treatment facility is situated on a bend at the western end of Quay Road, by the Newport River estuary. There

are no houses in the immediate vicinity.

The second pumping station is to be located adjacent to the Newport River. There is a new apartment block and an established farmhouse style dwelling nearby (location 3 in Figure 1).

Underground pipes are to be laid along most of the main roads of the town and the installation of these will therefore affect many houses in different areas, for limited periods during the construction phase.

All of the houses along the proposed sewer routes are therefore considered as being noise sensitive locations during the construction phase.

There is a care home for the disabled located near the option C and D sewer lines. This is the Newport Resource Centre, operated by The Western Care Association. This incorporates a day centre and an accommodation unit. It would be considered an especially sensitive location during the construction phase (location 5 in Figure 1).

The Holy Family National School, which is adjacent to the option E sewer line, is also a particularly noise sensitive location.

1.2 METHODOLOGY

Standards and guidelines used in the assessment are as follows:

- ISO 1996 "Description and Measurement of Environmental Noise".
- ISO 9313 noise propagation model "Attenuation of sound during propagation outdoors"
- BS 5228 "Noise Control on Construction and Open Sites".
- EPA "Guidance note on noise" 2003
- BS 4142 "Rating noise affecting mixed residential and industrial areas"
- Guidelines for Treatment of Noise and Vibration in National Roads Schemes, published draft, NRA, 2003 (for construction noise limits).

A daytime and nighttime baseline noise survey was undertaken at the water treatment plant site, and one of the pumping station sites to

establish the existing noise environment. This serves as a baseline against which the operational noise emissions during daytime and nighttime from the treatment plant and pumping stations can be assessed.

Measurements of daytime noise levels were carried out at representative locations along the proposed sewer lines, to serve as a baseline for assessment of construction noise impact.

The surveys were undertaken in accordance with ISO 1996.

Construction noise was calculated with reference to typical construction noise data in BS 5228 "Noise Control on Construction and Open Sites", and assessed according to Irish National Roads Authority criteria.

There is no data available at time of writing this report on the noise emissions from the waste water treatment plant equipment. The potential noise emissions from the treatment plant were therefore modelled based on measurements made at other existing plants.

The potential noise impact during the operational phase was assessed with reference to the Environmental Protection Agency guideline noise limits, and the assessment procedures of BS 4142, "Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". The potential audibility of sound at nighttime was also considered.

All noise levels presented in the report are time-averaged L_{Aeq} parameters, unless otherwise indicated.

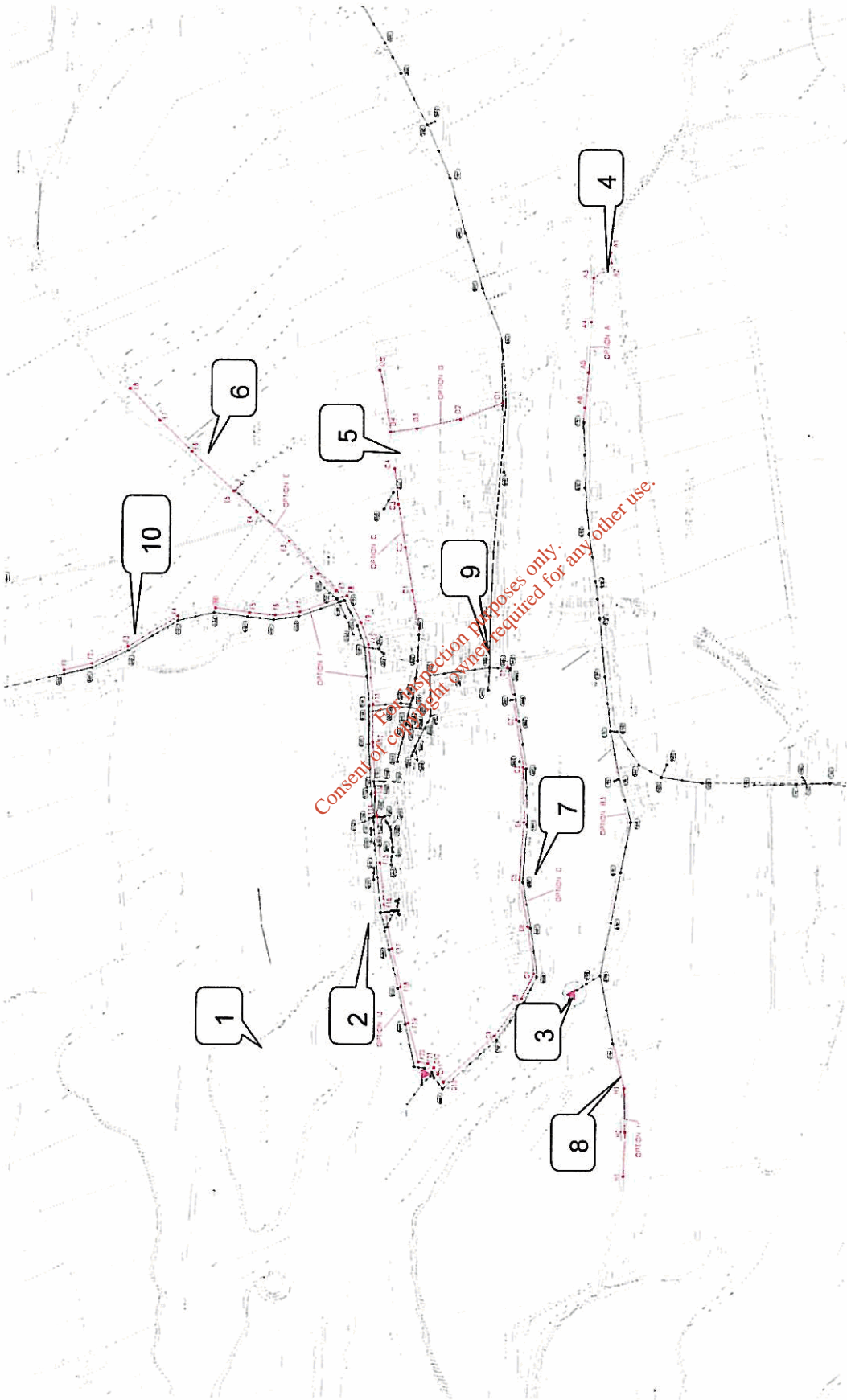


Figure 1. Noise survey measurement locations

2 EXISTING NOISE ENVIRONMENT

A baseline noise survey was carried out on the 2nd / 3rd September 2004 to determine the existing daytime and nighttime noise environment.

2.1 MEASUREMENT DETAILS

Assessment and Measurement Locations

Due to the geographical scope of this project, measurements were made at ten locations, as indicated in Figure 1, and described as follows:

1. Within the site of the proposed waste water treatment plant. Measurements here are representative of the existing ambient noise level within the plant site, and also of the noise environment at houses in the locality.
2. At 20m from the proposed entrance to the waste water treatment plant. Measurements here are representative of the existing ambient noise level at houses along this road.
3. At 10m from the south bank of the Newport River beside the apartment block, at the proposed site of the Option B3 pumping station. Noise levels here are representative of the existing ambient noise level at this site.
4. At 10m from the road at Knockaveely Glebe: the end point of the proposed Option A sewer route. Noise levels here represent the existing ambient noise exposure of houses along this road.
5. At 10m from the road at point C4 along the proposed Option C sewer route. Noise levels here represent the existing ambient noise exposure of the Newport Resource Centre, defined as a noise sensitive location.
6. At 10m from R317: at the entrance to Burrishole GAA Ground. Noise levels here represent the existing ambient noise exposure of houses along this road (Option E sewer route).
7. On Quay Road 100m from N59: along Option G sewer route. Noise levels here represent the existing ambient noise

exposure of houses along route G.

8. At 10m from lane leading to Milcum House: along Option H sewer route. Noise levels recorded here are representative of the houses and apartments along this road, in one of the quietest locations in the overall study area.
9. At 15m from N59 in the town centre: traffic moving slowly (less than 20mph) through the town.
10. At 15m from N59 outside town: in 40mph zone, traffic flowing freely. Noise levels here represent the existing ambient noise exposure of houses along this road (Option F sewer route).

Measurement periods were of 15 minutes duration, apart from some locations where short orientation "spot" measurements of duration 5 minutes were made. Extended measurements were undertaken at Location 1 to establish the variability of noise levels throughout the day.

Weather

Daytime 2nd September: light/medium gusts, dry, bright

Nighttime 2nd September: light/medium breeze, dry, overcast

Daytime 3rd September: calm, frequent light showers, overcast

Instrumentation

Instrumentation used was Norsonic 116 Type 1 sound level meter. The calibration of the instrument was checked before and during the survey with a Norsonic 1251 calibrator.

Laboratory calibrations: Norsonic 116 serial no. 27354, laboratory calibration 29/01/2004 by Campbell Associates U.K. Cert no. 1187.

Nor 1251 serial no. 27064, laboratory calibration by Campbell Associates, U.K. 29/01/2004, to UKAS requirements. Cert. no. 1187

Personnel

The survey was undertaken by Ross Whyatt B.Sc. of ANV Technology Ltd.

2.2 NOISE SURVEY RESULTS

The measured noise levels are presented in Table 1.

Location	Noise Level dB(A)			Comment
	L _{Aeq}	L _{A90}	L _{A10}	
Daytime				
1	40	34	42	12:35 - wind in trees, birdsong
	43	34	44	12:45 - wind in trees, birdsong
	39	30	42	13:00 - wind in trees, birdsong
	33	28	36	13:15 - wind in trees, birdsong
	39	32	42	13:30 - wind in trees, birdsong
	42	36	45	13:45 - wind in trees, birdsong
	41	35	44	14:00 - wind in trees, birdsong
	42	37	45	14:15 - wind in trees, birdsong
	42	40	44	14:30 - wind in trees, birdsong
	35	26	34	17:45 - birdsong, dogs, water craft on estuary
	30	26	32	18:00
	35	29	38	18:15
	38	33	41	18:30
	38	32	41	18:45
38	32	41	19:00	
41	32	44	19:15 - jet-ski on estuary	
Mean	39	32	41	
2	46	29	45	16:50 – traffic, dogs, children, birdsong
3	39	33	42	11:45 (spot) - quiet location; birdsong, traffic across river
4	51	33	46	12:00 (spot) - rural location; constant traffic to west, birdsong
5	43	38	45	12:15 - traffic, coolers. Quiet location.
6	65	43	67	10:55 (spot) – traffic, construction at 200m
7	45	37	46	15:05 – traffic
	44	36	45	15:15 – traffic
Mean	45	37	46	
8	38	33	41	11:25 (spot) - very quiet; rain, birdsong, distant traffic, craft in harbour

Table 1: Measured Noise Levels 2nd / 3rd September 2004 (cont.)

Location	Noise Level dB(A)			Comment
	L _{Aeq}	L _{A90}	L _{A10}	
9	63	51	66	15:35 – traffic
10 02/09/04)	59	41	63	16:00 - traffic, birdsong, construction
10 (03/09/04)	67	44	65	10:35 - traffic (road wet), distant construction
	58	44	63	12:45 - traffic, construction, schoolchildren
Mean	63	44	64	
Nighttime				
1	44	37	47	03:30 - medium/strong wind, gusting
	44	37	47	03:45
	43	31	46	04:00 - occasional rain
	37	28	40	04:15
	40	33	44	04:30
	42	33	46	04:45
	36	28	39	05:00
	31	25	35	05:15
	37	26	40	05:30
	37	29	41	05:45
	42	34	45	06:00
	40	31	44	06:15
	36	30	38	06:30
	36	29	39	06:45
	37	30	40	07:00
	38	32	41	07:15
	36	31	39	07:30
36	30	39	07:45	
41	30	44	08:00	
Mean	39	31	42	
2	45	38	47	02:30 - wind in trees
	41	33	44	02:50 - wind in trees
Mean	43	36	46	

Table 1: Measured Noise Levels 2nd / 3rd September 2004

2.3 DESCRIPTION OF EXISTING NOISE ENVIRONMENT

Daytime

The daytime ambient noise in the town of Newport is primarily due to traffic on the N59 which runs through the town. Mean ambient traffic noise levels at houses along this road were 63 dB(A) L_{Aeq} .

Otherwise the town is relatively quiet, with houses distant from the main road exposed to low traffic noise levels.

The proposed site of the treatment plant is in a quiet rural location, with a daytime ambient noise level of 39 dB(A) L_{Aeq} . The ambient noise at the houses at the entrance of the proposed site entrance was also relatively low at 46 dB(A) L_{Aeq} .

For houses outside the town centre, and adjacent to the proposed pipelines, the mean ambient noise level was 47 dB(A) (range: 38 to 65 dB(A)).

Nighttime

At nighttime the ambient noise at the site of the proposed treatment plant was the same as during daytime at 39 dB(A) L_{Aeq} . The ambient noise near the houses at the entrance of the proposed site entrance was 43 dB(A) L_{Aeq} .

The steady underlying background noise level at the site was 31 dB(A) L_{A90} , and was due to wind noise. The steady background noise at the nearest houses was also low, at 36 dB(A) L_{A90} , and was again due to wind noise.

On calm nights, the background noise in this quiet rural area would be expected to be lower than 25 dB(A) L_{A90} .

3 NOISE IMPACTS OF THE DEVELOPMENT

3.1 ASSESSMENT CRITERIA

3.3.1 CONSTRUCTION NOISE CRITERIA

Criteria for daytime construction noise are generally set at a level higher than for other permanent intrusive noise sources, because it is recognised that it is a short-term activity. For prolonged exposures above 70dB(A), the level of noise intrusion into houses may however prove unacceptable.

A level of 70 dB(A) is the construction noise limit proposed in the recent National Roads Authority guidelines for road construction projects, during normal daytime working hours, as shown in Table 2. (Guidelines for Treatment of Noise and Vibration in National Roads Schemes, published draft, NRA, 2003).

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
Vibration Limits: For protection of buildings 8 mm/s (vibration frequency <10Hz) 12.5mm/s (vibration frequency 10 to 50Hz) 20 mm/s (vibration frequency >50 Hz) Continuous piling: 2.5mm/s (tolerable level)		

L_{Aeq(1hr)} is the one hour average noise level.

L_{Amax} is the measured maximum noise level.

Table 2 Maximum permissible construction noise levels at the façade of dwellings (NRA published draft guidelines 2003). For typical construction works, compliance with the average noise level of 70 dB(A) would also imply compliance with the maximum limit of 80 dB(A). The exception would be noise of a significant impact nature such as piling, or rockbreaking.

3.3.2 OPERATIONAL PHASE NOISE CRITERIA

For a wastewater treatment plant which operates continuously, the noise emissions are expected to be essentially constant during the daytime and nighttime periods.

To ensure negligible noise impact the plant would have to meet the more onerous assessment criteria which are applied at nighttime.

For nighttime noise emissions, it is relevant to consider the EPA (Environmental Protection Agency) guidelines, which set a nighttime limit of 45dB(A), at noise sensitive locations. The EPA guidelines should however be viewed as maximum tolerable levels rather than levels of negligible impact. Where existing background noise levels are low, a lower noise criterion would be required, as described below.

In an area such as this where the background nighttime noise level is low, the potential for a noise impact is assessed relative to the existing background noise levels. A procedure for this is set out in BS 4142, "Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". According to BS 4142, there is a likelihood of noise complaints when additional noise (L_{Aeq}) from a development significantly exceeds the existing background noise level (L_{A90}). When the additional noise is equal to or lower than the background noise, complaints are considered unlikely.

For very low background noise areas such as this, a BS 4142 analysis may sometimes indicate a potential impact, when in fact the noise would be essentially inaudible at nighttime. To deal with these situations, the potential audibility of the noise inside the nearest dwellings is also analyzed.

3.2 CONSTRUCTION NOISE IMPACT

The project will involve significant excavation works throughout the town in conjunction with installation of the sewer lines. The greatest noise impact is expected in conjunction with these works. The construction of the treatment plant is likely to have a lower noise impact, due to the greater distance to the nearest houses.

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.

3.3.3 EXCAVATION WORKS FOR SEWER LINES

The noise level at houses along the sewer routes will vary depending on the proximity of the works, and the distance of the house from the road.

The highest expected noise level 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 road. Table 3 shows the calculated noise levels for houses at various distances from the road.

For houses within 10 metres of the road, 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 2. 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 house. 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.

Distance of house from road	5	10	20	30	40
Noise level dB(A) L _{Aeq,1hr}	79	73	67	63	61

Table 3. 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.)

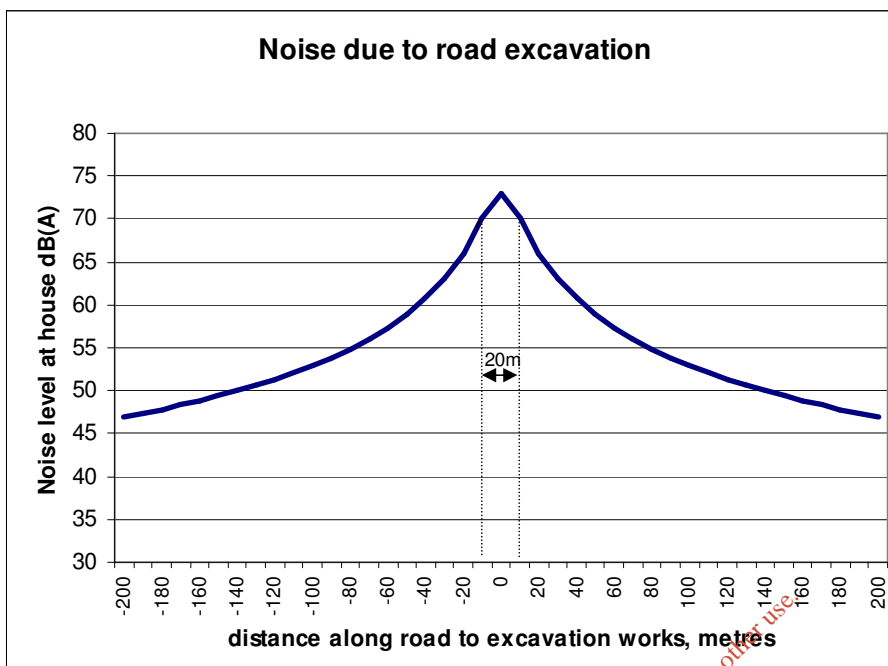


Figure 2. Variation of noise level at a house, depending on distance of excavation works along the road from the house entrance. In the situation depicted, the house is 10m from the road. The 70dB(A) NRA criterion may be exceeded while works are in progress on the 20m stretch immediately in front of the house.

3.3.4 CONSTRUCTION OF WASTE WATER TREATMENT PLANT

During construction of the treatment plant itself, the highest noise levels will be generated during the site clearance and excavation. 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 noise level at the nearest house is less than 55 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 audible above the existing ambient noise outdoors, but would not be intrusive. There would be no noise impact indoors.

3.3.5 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 rockbreaking, it is expected that the resulting vibration levels at nearby properties will be comfortably within the vibration limits for protection against structural damage (set out in Table 2), and in terms of nuisance, are likely to be imperceptible.

3.3.6 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.

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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 noise emissions from the new plant are assumed to be the same as for similar modern plants at Greystones County Wicklow, and Ballybofey, Co. Donegal. However this is likely to be an overestimate for the Newport plant, which caters for a smaller population. Details of the noise model are given in appendix B.

3.4 NOISE EMISSIONS FROM WWTP

The predicted noise levels due to the waste water treatment plant are shown in Figure 3. It is expected that noise emissions will be relatively constant during day and night, and the noise map consequently represents both day and nighttime emissions.

At the nearest house to the southeast, the calculated nighttime noise level is 33 dB(A). At the nearest house to the northwest, the calculated nighttime noise level is 31 dB(A).

Compliance with EPA guidelines

The calculated noise level at the nearest houses is comfortably below the EPA nighttime noise limit of 45 dB(A).

BS 4142 Analysis

The calculated noise level for the WWTP of 33 dB(A) at the nearest house is slightly lower than the mean background noise level of 36 dB(A) L_{A90} , which was measured at the nearest houses at nighttime. According to BS 4142, there is no indication of potential noise complaints.

However, the background noise levels were measured on a night when there was a moderate breeze, and the background noise was due to wind noise in the trees. On calm nights, the background noise would be significantly lower, perhaps less than 25 dB(A). Under these conditions the noise from the plant would exceed the background noise. The BS 4142 methodology does not have provision for consideration of such very low background noise situations.

To assess this type of situation, the potential audibility of the sound is considered. On a calm night, a sound level of 33 dB(A) would be just perceptible outdoors, however it is unlikely to be immediately noticeable. The critical consideration at nighttime, is intrusion of the noise indoors. Allowing for the typical reduction of 15 dB through a partially opened window, the resulting noise level indoors would be slightly less than 20 dB(A), and is likely to be inaudible indoors.

There is therefore expected to be no impact in terms of audible noise levels indoors at nighttime.

3.5 GROUND VIBRATION DUE TO WWTP

From visits to other waste water treatment plants (Limerick, Ennis), it has been found that there is no perceptible ground vibration beyond the site boundaries associated with the operating equipment. At Newport, the nearest house is in excess of 250m from the WWTP equipment. There is unlikely to be any significant potential for audible ground-borne vibration over this distance.

3.6 NOISE EMISSIONS FROM PUMPING STATION

Based on noise surveys carried out at pumping stations (in Mullingar and Ennis), it is concluded that noise emissions are negligible, and are not detectable at a distance of 20m.

However, given the proximity of nearby residences to the pumping station at assessment location no. 3 (new apartments beside Newport River), it is prudent to consider the potential for generation of ground-borne vibration, in the audio frequency range, which could 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.

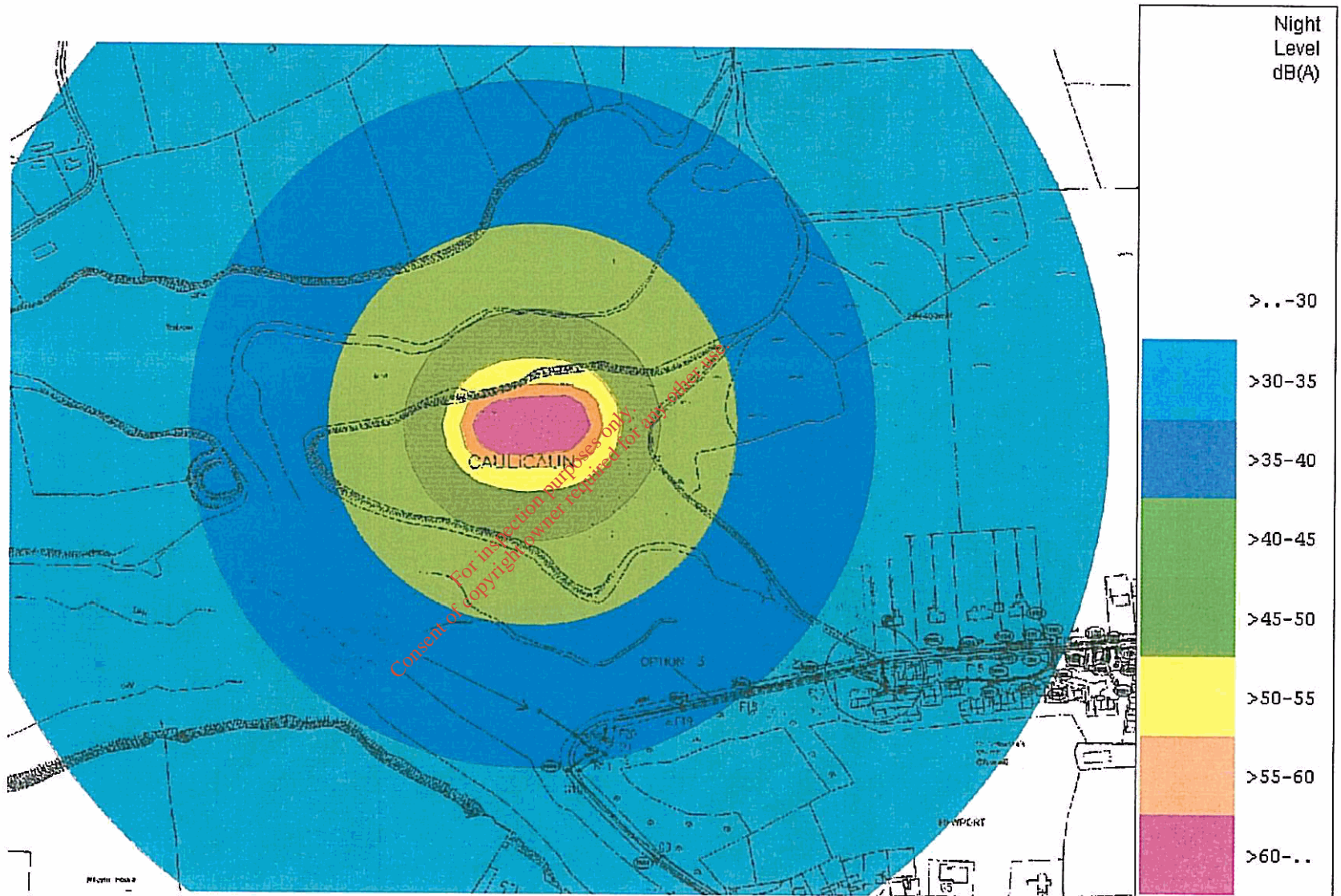


Figure 3. Calculated noise levels due to proposed waste water treatment plant, L_{Aeq} , day and nighttime

4 MITIGATION MEASURES

4.1 MITIGATION OF CONSTRUCTION NOISE

In order to limit disturbance from construction noise, it is recommended that construction noise be assessed and managed in accordance with BS5228 "Noise Control on Construction and Open Sites". An appropriate limit for a typical construction project is 70 dB(A) during daytime hours.

General guidelines for limiting the disturbance which may be applicable to this development are outlined below:

- Limit noisy construction works to 08.00 to 18.00 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, to meet the limits in Table 2)
- Ensure rock-breaking and other noisy activities are adequately screened from the adjacent sensitive locations
- Use modern, silenced and well-maintained equipment conforming to EU directives (Outdoor Noise Directive 2000/14/EC)
- 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 workers are given appropriate training with respect to minimising noise and disturbance in the context of the BS 5228 assessment for the works.
- For works near particularly sensitive locations, such as the Newport Resource Centre, and local schools, liaise with the management to agree a work schedule which will result in least disruption.

4.2 NOISE MITIGATION OF COMPLETED DEVELOPMENT

Specification of Equipment Noise Emissions

The noise generated by the WWTP is expected to be approximately 33 dB(A) at nighttime at the nearest house, at which level there will be

negligible impact.

This level of noise can be assured through incorporation of an appropriate specification in the equipment supply contracts for the plant. As the expected noise emissions from the plant are low, there may be difficulty measuring it in practice. It is therefore preferable to set a noise design specification at a location closer to the plant. An appropriate position would be on the access road, at a reference distance of 100m from the main items of plant equipment.

The noise level at this position should be less than 42 dB(A). This would correspond to a noise level of 33 dB(A) at the nearest house, allowing for distance attenuation, and ground attenuation.

It should be noted that the criterion of 33 dB(A) at the nearest houses is for design purposes, to ensure negligible impact, and is not proposed as a formal monitoring limit, as in practice such low levels would be difficult to detect during routine surveys.

4.3 VIBRATION ISOLATION

Any mechanical equipment (such as motors) at the pumping stations or treatment plant, 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.

5 RESIDUAL IMPACT

By implementing the mitigation measures outlined, the residual noise impact is expected to be negligible.

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 used in BS 4142 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_{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 emission from a noise source (acoustic watts, expressed as a decibel level)

APPENDIX B – NOISE MODEL

B1. Noise Model

Standard: ISO 9613 (Woelfel IMMI 5.2 program)

Sources:

Measurements at a WWTP in Ballyofey determined that the total sound power emission was approximately 95 dB(A) L_{WA} . Measurements at a plant in Greystones found the overall sound power emission to be 98 dB(A) L_{WA} .

The assessment for the Newport site is based on an assumed overall sound power emissions of 98 dB(A) L_{WA} .

Noise source: 98 dB(A) L_{WA} , area source

Ground: absorbing

Screening: none assumed (there will be some screening provided by buildings, and intervening terrain)

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