IRWIN CARR
CONSULTING

NOISE IMPACT ASSESSMENT
Circle K, Ninth Lock

Rp001N 2022071 (Circle K, Ninth Lock)
21 April 2022

PROJECT:	CIRCLE K, NINTH LOCK
PREPARED FOR:	MCARDLE DOYLE 2ND FLOOR EXCHANGE BUILDING THE LONG WALK DUNDALK A91 XV5H
ATTENTION:	JAMES FEGAN
REPORT NO.:	RP001N 2022071

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1.0 INTRODUCTION

Irwin Carr Ltd have been commissioned to undertake a noise impact assessment for a proposed car wash, car wash plant room and associated structures at Circle K Service Station, Ninth Lock Road, Dublin 22.

It is the purpose of this report to address the issues which may arise from the development and ensure noise requirements are met.

2.0 DEVELOPMENT DESCRIPTION

The site is located adjacent to the existing Circle K Service Station on Ninth Lock Road, Dublin 22 and the proposal is for the installation of a mechanical brush wash, car wash plant room and all associated structures, drainage and site development works.

The site is dominated by road traffic noise from Ninth Lock Road and surrounding arterial routes in the locality.

It is understood that the proposed development will only operate during daytime hours between 07:00 – 23:00hrs, with no night-time operations.

The site location is presented in Appendix A.

3.0 ASSESSMENT CRITERIA

There are two types of assessment criteria in relation to the predicted noise levels from this type of site. BS 4142:2014 is an assessment methodology that can be described as using noise change criteria, where the predicted noise levels are compared to the existing background noise levels.

Another method of assessment compares the predicted noise levels to absolute noise levels such as the World Health Organisation Guidelines, which outline absolute noise levels.

3.1 BS4142:2014

BS 4142:2014, *Methods for rating and assessing industrial and commercial sound*, describes methods for assessing whether noise levels are likely to give rise to an adverse impact by comparison of the background noise level with the noise emissions from the facility under assessment.

The Standard introduces the concept of a Rating Level (L_{Ar}) to account for the fact that certain characteristics of the noise source can increase the likelihood of an adverse impact. These characteristics include noise sources of an irregular nature or that contain distinguishable, discrete tonal noise.

Where applicable, a correction is added to the measured or predicted Specific Noise Level (L_{Aeq}) to determine the Rating Level. Note that all noise levels are assessed at an amenity area of the property under consideration.

BS 4142:2014 requires that the measured Rating Level (L_{Ar}) is compared to the Background Level (L_{A90}), measured in the absence of the noise under assessment, to determine the likelihood of an adverse impact. The greater this difference, the greater the likelihood of an adverse impact as follows:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.2 World Health Organisation (WHO)

Example noise limits can be found in World Health Organisation (WHO) publication *Guidelines for Community Noise*, 1999 which states the following:

> *"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise."*

and

> *"For a good night's sleep, the equivalent sound level should not exceed 30dB(A) for continuous background noise, and individual noise events exceeding 45dB(A) should be avoided."*

4.0 ENVIRONMENTAL NOISE SURVEY

Noise levels were measured at the boundary of the Circle K site on Ninth Lock Road between 11 and 21 April 2022. The survey was set up using the following equipment:

- Larsen Davis 831 Sound Level Meter
- Larsen Davis Acoustic Calibrator

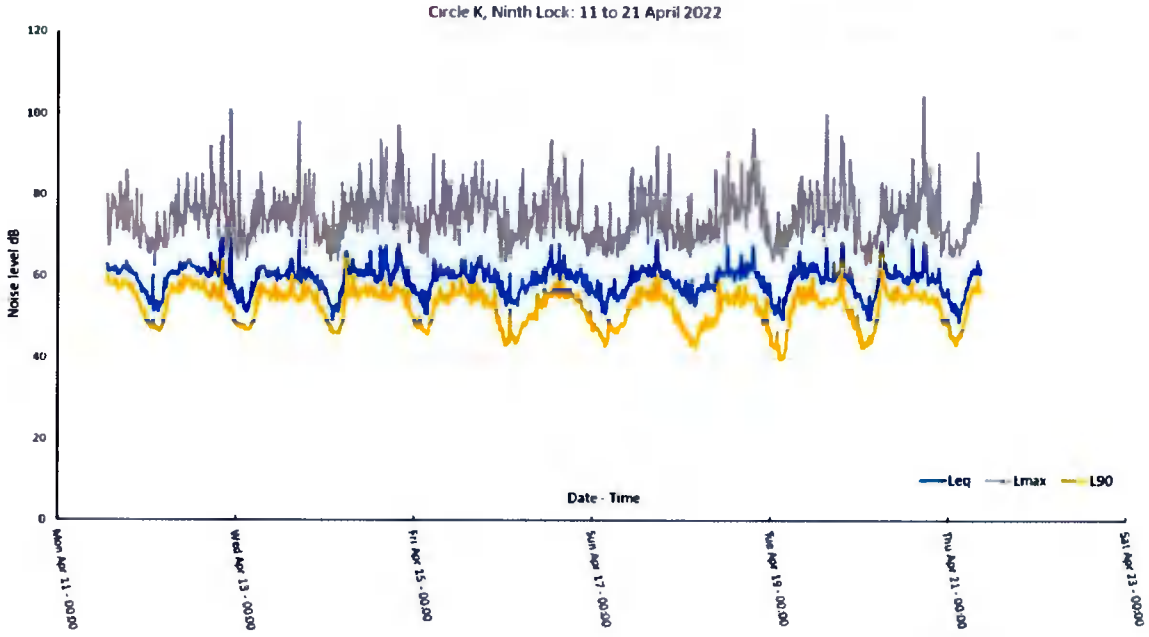
Table 1: Noise Monitoring Location

	Location (Irish Grid)
Noise Monitoring Location	306775, 232181

The acoustic parameters measured included L_{Aeq}, L_{A90} and L_{AFMax}. Instrumentation was check calibrated before and after the survey period, with no deviation.

Figure 1 presents the results of the noise measurements over the 11-day survey period.

Figure 1: Acoustic survey time history

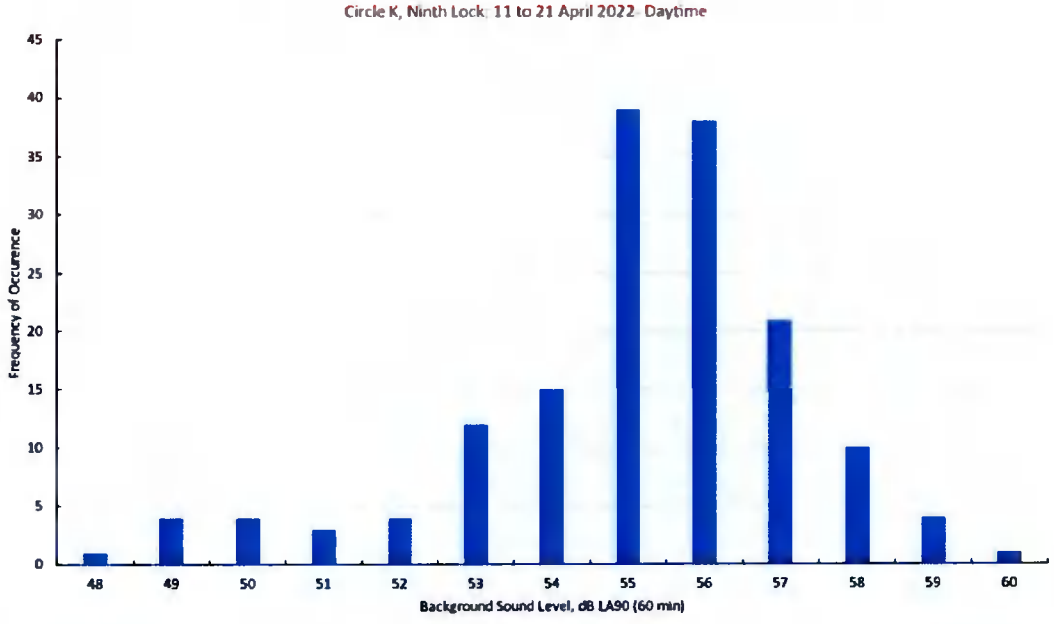


4.1 Background Sound Level

Background sound pressure levels were determined for the purposes of the BS4142 assessment. The standard uses a typical background level ($L_{A90,T}$) in the absence of the specific sound under consideration.

The daytime results are presented in Figure 2. Daytime background noise levels are from 07:00 to 23:00 every day.

Figure 2: Histogram showing frequency distribution of daytime background sound levels



Based on analysis of the data presented in Figure 2, the average noise level of 55.1dB L_{A90}, the median level of 55.4dB L_{A90} and the modal level of 55dB L_{A90} and guidance from BS 4142:2014, 55dB L_{A90} has been chosen as the appropriate and representative background noise levels for the daytime period.

There will be no operation of the car wash during the night-time period, and as a result analysis of the measurement period has not been undertaken.

5.0 NOISE PREDICTIONS

5.1 *SoundPLAN* Noise Modelling

For the purposes of this assessment, computer modelling has been undertaken to accurately predict noise emissions at the nearest residential properties due to the proposed development.

The model was implemented in *SoundPLAN* version 8.2, which is produced by Braunstein & Berndt GmbH. The *SoundPLAN* implementation of ISO9613 has been tested in-house by *SoundPLAN* developers to ensure calculated results are within 0.2dB of the standard.

The model is integrated, allowing noise from all sources, with prediction methodologies to be undertaken simultaneously. The noise model takes into consideration the following parameters:

- Topographical effects
- Atmospheric absorption
- Ground absorption
- Screening effects
- Reflections
- Focusing effects
- Metrological conditions

The model predicts the propagation of noise in each octave-band for source-receiver pair and produces a noise level contour map. The noise level contours are colour coded for ease of interpretation.

5.2 Source Noise Levels

The emissions included in the SoundPLAN model are based on on-site measurements at existing facilities undertaken by Irwin Carr as well as a database of similar sites.

The Table below details the source noise levels relied upon for the purposes of the assessment.

Table 2: Noise Model Sound Power Level

		Octave Band Mid- Frequency							
Description	(A)	63	125	250	500	1k	2k	4k	Hz
Automated Carwash, Lw	(93)	94	88	89	86	87	87	85	dB

It was confirmed in information submitted as part of the planning application that the carwash is expected to carry out an average of 20 washes per day and is enclosed along both sides with 2.2m high cladding.

In the interests of conservatism it was assumed that the carwash was on for 30 minutes in every hour, however it is expected that the normal operation of the site will be less than this.

5.3 Receptors

Seven receptors were identified representing the nearest residential properties in the vicinity of the proposed development site. The location of these receptors is detailed in Table 3 and shown in Appendix A.

Table 3: Noise Sensitive Receptors

Location	Co-ordinates
R1 – 1 Ninth Lock Road	306831, 232187
R2 – 4 Canal Way	306804, 232235
R3 – 2 Cappaghmore	306740, 232243

All receptors were considered in the external amenity area at a height of 1.5m.

5.4 Predicted Noise Levels

The predicted noise levels (L_{Aeq} to the nearest dB) at each receptor location for each scenario are shown in Table 4.

Table 4: Predicted Noise Levels

Location	Predicted Specific Daytime Noise Level (dB) $L_{Aeq, 1hr}$
R1	49.0
R2	44.5
R3	36.8

6.0 NOISE ASSESSMENT

6.1 BS 4142:2014 Noise Assessment

The predicted operations of the site have been assessed in accordance with BS 4142:2014.

- The highest predicted level is taken from Table 4 above
- The acoustic feature correction was assessed this takes account of:
  - Tonality – The noise sources associated are not inherently tonal;
  - Impulsivity – The noise sources associated are not inherently impulsive;
  - Other sound characteristics – There will not be a readily distinctive feature to the noise on the proposed site;
  - Intermittency – The car wash may be considered intermittent, and a +3dB feature correction has been applied.

Noise from the proposed development will not add to the existing noise environment.

Table 5: BS4142 assessment

Description	Daytime (typical)
Predicted source L_{Aeq} noise level	49.0 dB
Acoustic feature correction	+3 dB
Rating Level, L_{Ar}	52 dB
Background level (measured L_{A90})	55 dB
Difference	Rating Level = Background –3dB

BS4142 requires that the background noise level is subtracted from the Rating Level to identify the presence or otherwise of an adverse impact. The greater this difference, the greater the likelihood of an adverse impact as follows:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

6.1.1 DAYTIME

The 'Typical' Rating Level is **3 dB lower** than the daytime 'typical' background level at the nearest residential properties; this is an indication of the specific sound source having a low impact.

Furthermore, the maximum predicted absolute sound pressure level predicted at the closest receptor (49dB) is a minimum of 6dB below the WHO recommended higher external daytime noise level of 55dB L_{Aeq}.

7.0 CONCLUSION

A noise impact assessment has been carried out for a proposed car wash, car wash plant room and associated structures at Circle K Service Station, Ninth Lock, Clondalkin, Dublin.

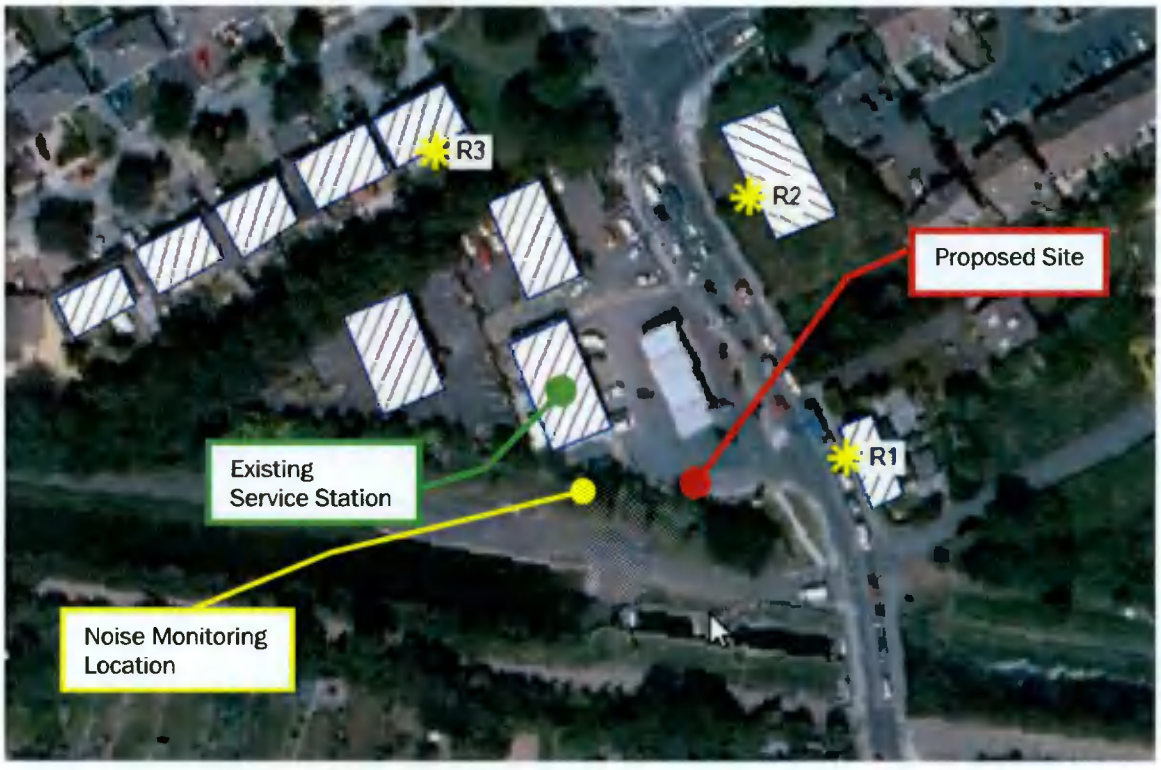
For this assessment, background noise levels were measured on the boundary the site between 11 – 21 April 2022. The background noise level measured at this location was deemed representative of the background noise levels in the vicinity of the site.

The predicted noise levels at each of the nearest sensitive receptors were assessed against BS 4142:2014 limits and WHO recommended noise levels.

It was found that operational noise from the proposed development is likely to have a low impact during the daytime period.

For the reasons outlined within this report, Irwin Carr Consulting is of the opinion that noise generated by the proposed development should not adversely impact neighbouring properties and therefore should not be considered a negative determining factor when assessing this application.

APPENDIX A SITE LOCATION AND NOISE MONITORING LOCATION



***Note- The above diagram is not to scale and is for illustrative purposes only*

APPENDIX B SOUNDPLAN NOISE MAP CONTOURS