

Pollution Control Consultancy and Design

ABN 71 776 800 318

Air, Noise and Water Pollution
Assessment and Engineering Control



Level 7, 91 Phillip Street - Parramatta
Sydney - New South Wales 2150 - Australia

ALEX JOCHELSON

MEMech MIEAust CPEng (Reg)

Telephone: **(02) 9893 1848**

Facsimile: **(02) 9891 1771**

E -mail: **principal@pccd.com.au**

Web site: **www.pccd.com.au**

REPORT No EN-CS-060209AJ

Southern Sydney Freight Line

(bi-directional, non-electrified, dedicated freight line from Macarthur to Sefton)

**Assessment of noise from
drilling rig Soilmeco SR-30
on Arencos's construction sites.**

February 2009



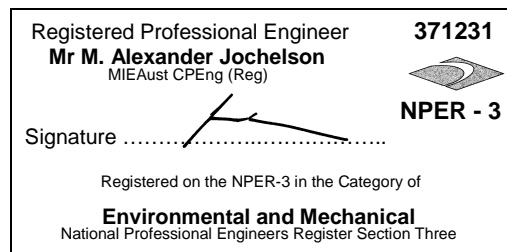
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Appendix 1: Photograph of drilling rig Soilmeco SR-30.

Appendix 2: Results of calculations of contribution.



GLOSSARY

Background Noise:

the level of noise ($L_{A90, T}$) measured in the absence of noise under consideration.

Sound Frequency:

a number of fluctuations in the air pressure, which are detected by the human ear, per second, [Hz].

Sound Pressure:

fluctuations in the air pressure that are detected by the human ear, [Pa].

Sound Pressure Level (L_p):

a sound pressure measured on a decibel scale, [dB] : $L_p = 10 \log_{10} (p/p_o)^2$,

where:

p - is the sound pressure; and

p_o - is the reference sound pressure of 20 μ Pa.

A-weighted sound pressure level (L_A):

in A-weighted decibels [dB(A)], the sound pressure level, which is corrected to correlate with the human subjective response to different frequencies at low ranges of sound pressure levels (about 40 dB).

A-weighted Ten-Percentile Sound Pressure Level ($L_{A10, T}$):

the A-weighted sound pressure level that is exceeded for ten percent of the measurement time T , [dB(A)].

(the $L_{A10, T}$ is sometimes called: *the average maximum sound pressure level*).

A-weighted Ninety-Percentile Sound Pressure Level ($L_{A90, T}$):

the A-weighted sound pressure level that is exceeded for ninety percent of the measurement time T , [dB(A)].

(the $L_{A90, T}$ is sometimes called: *the average minimum sound pressure level*).

Equivalent Sound Pressure Level ($L_{eq, T}$):

the sound pressure level of a steady sound that has the same energy during the measurement time T as a sound under consideration whose level varies with time, (dB).



EXECUTIVE SUMMARY

This report presents results of measurements of the A-weighted, ten-percentile sound pressure level (L_{A10}) emanating from a drilling rig Soilmeco SR-30 (Appendix 1) on Arenco's construction sites for Southern Sydney Freight Line (SSFL).

The measurements were carried out at the residential boundary in 5 Wellington Road, Birrong, on 6 February 2009.

The results of the measurements show that the L_{A10} emanating from the drilling rig Soilmeco SR-30 was between:

72 dB(A) and 75 dB(A) during an initial drilling; and

79 dB(A) and 80 dB(A) during the remaining, normal drilling;

at the boundary of 5 Wellington Road, Birrong, where the *Background Noise* level is about 48 dB(A), as determined in our Report No EN-CS-160808AJ of 28 October 2008.

Such an L_{A10} exceeds the limit from the EPA guideline for noise from construction sites [1], even if the residential premises in 5 Wellington Road will be exposed to this L_{A10} for less than four weeks.



1. NOISE CONTROL LIMITS

At present, the level of noise (A-weighted, ten-percentile, fifteen-minute sound pressure level - $L_{A10, 15min}$) from construction sites in New South Wales is limited by Environmental Noise Control Manual - Chapter 171: Construction Site Noise [1].

According to [1], the $L_{A10, 15min}$ emanating from construction sites should not exceed the *Background Noise* level by more than:

- 20 dB(A) for construction periods of four weeks or under;
- 10 dB(A) for construction periods greater than four weeks and not exceeding 26 weeks; and
- 5 dB(A) for construction periods exceeding 26 weeks.

This means that the limits on the $L_{A10, 15min}$ emanating from Arenco's construction sites vary because along the approximately seven-kilometre long span of construction sites, duration of construction works varies from less than 4 weeks (e.g. works between bridges) to more than 26 weeks (e.g. works at Sefton Dive).

Should New South Wales Construction Noise Guideline [2] become a formal guideline prior to completion of Arenco's construction works, the A-weighted, equivalent, fifteen-minute sound pressure level ($L_{Aeq, 15min}$) from the works that exceeds the *Background Noise* level plus 10 dB(A) will prompt implementation of "all feasible and reasonable" measures to reduce this $L_{Aeq, 15min}$.

In August 2008, Pollution Control Consultancy and Design (PCCD) carried out measurements of the *Background Noise* level along the entire span of Arenco's construction sites for Southern Sydney Freight Line (SSFL). Results of the measurements are presented in Report No EN-CS-160808AJ of 28 October 2008.

The results show that the *Background Noise* level in the vicinity of 5 Wellington Road, Birrong, during the hours of Arenco's construction activities is 48 dB(A).

2. LOCATION AND TIME OF NOISE MEASUREMENTS

The measurements of the A-weighted, ten-percentile sound pressure level (L_{A10}) emanating from the drilling rig Soilmecco SR-30 were carried out at the boundary of 5 Wellington Road, Birrong, on Thursday, 6 February 2009, between 9.59 am and 10.08 am, while the measurements of the L_{A10} in the vicinity of 5 Wellington Road, in the absence of noise from Arenco's construction site, were carried out from 7.25 am and till 10.35 am.

3. INSTRUMENTATION AND CALIBRATION

The measurements presented in this report were carried out with a NATA-calibrated, class 1, Brüel & Kjær (B&K) Modular, Precision, Real-Time Sound and Vibration Analyzer type 2260 Investigator, serial number: 2305249, with a ½" Prepolarized, Condenser, Free-Field Microphone type 4189, serial number: 2294388, with Enhanced Sound Analysis BZ7206 Version 2.2 software.

The instrument was calibrated acoustically with a NATA-calibrated, B&K Sound Level Calibrator type 4231, serial number: 1821262, before and after the measurements, when the calibration drifts were lesser than 1 dB and thus, according to [4], the results from the instrument are valid.



4. RESULTS OF NOISE MEASUREMENTS

The results of the measurements carried out at the residential boundary in 5 Wellington Road, Birrong, on Friday, 6 February 2009, show that the A-weighted, ten-percentile sound pressure level (L_{A10}) measured during the:

- initial drilling (the first five to six minutes) was 76 dB(A);
- remaining, normal drilling was 80 dB(A).

In the absence of noise from Arenco's construction site, the L_{A10} measured at boundaries of residential premises in 1, 3 and 5 Wellington Road, Birrong, before and just after the drilling, ranged between 69 dB(A) and 72 dB(A).

Thus, as in Appendix 2, the L_{A10} emanating from the drilling was between:

- 72 dB(A) and 75 dB(A) during the initial drilling; and
 - 79 dB(A) and 80 dB(A) during the normal drilling,
- i.e. 24 dB(A) to 32 dB(A) above the *Background Noise* level.

Such an L_{A10} is well above the limits from the EPA guideline for noise from construction sites [1].

5. RECOMMENDATIONS

Due to the size of the drilling rig Soilmeco SR-30, it is not practical to provide any effective screening of the equipment from the residential boundary. Instead, we may carry out an investigation to identify the most powerful sub-sources of noise and find measures to attenuate the excessive noise, e.g. by lagging and/or enclosing parts of the equipment.

In meantime, Pollution Control Consultancy and Design (PCCD) recommends that Arenco will liaise with residents of Wellington Road, Birrong, that will be exposed to noise from Soilmeco SR-30, to carry out the drilling:

- after the most residents leave their homes for;
 - before the most residents come back to their homes from;
- the school, shopping and work.



BIBLIOGRAPHY

- [1] State Pollution Control Commission of New South Wales (SPCC), now Environment Protection Authority of New South Wales (EPA) incorporated in New South Wales Department of Environment and Climate Change (DECC) - Environmental Noise Control Manual - Chapter 171: Construction Site Noise - June 1985.
- [2] New South Wales Department of Environment and Climate Change (DECC) - New South Wales Construction Noise Guideline - Draft for consultation - August 2008.
- [3] Environment Protection Authority of New South Wales (EPA) incorporated in New South Wales Department of Environment and Climate Change (DECC) - New South Wales Industrial Noise Policy - January 2000.
- [4] Australian Standard: Acoustics - Description and measurement of environmental noise - Parts 1-3 (AS 1055.1-3 - 1997).





Pollution Control Consultancy and Design

is a member of The Association of Consulting Engineers, Australia (ACEA)
and Association of Australian Acoustical Consultants (AAAC),

and its principal consultant is a Corporate Member of
The Institution of Engineers, Australia (MIEAust)
and Australian Acoustical Society (M.A.A.S.).

Pollution Control Consultancy and Design (PCCD) is an independent, accredited, acoustical and environmental engineering practice that was established and is managed by **Alex Jochelson**.

Alex has a Master's Degree in Mechanical Engineering (MEMech) and he is a Corporate Member, Chartered Professional Engineer of The Institution of Engineers, Australia, registered on National Professional Engineers Register under No 371231, in the categories of Environmental and Mechanical Engineering [MIEAust CPEng (Reg)].

Alex's well balanced, extensive, multi-disciplinary experience in environmental engineering includes:-

- (1) four-year industrial experience (environment protection specialist at ferro-chromium smelting plant);
- (2) four-year research and design experience (research engineer at university);
- (3) nine-year operational, industrial pollution control experience at the Environment Protection Authority of New South Wales - EPA (engineer); and
- (4) the current, since January 1995, engineering consulting experience as the principal consultant of Pollution Control Consultancy and Design (PCCD).

Services provided by Pollution Control Consultancy and Design

Pollution Control Consultancy and Design (PCCD) provides a comprehensive range of services covering all major aspects of the environment protection: air, noise and water pollution control. These services include:-

- a) air, noise and water pollution measurement, assessment and engineering control;
- b) environmental reviews and audits;
- c) environmental management programs (EMPs);
- d) pollution reduction programmes (PRPs);
- e) environment protection policy and strategy;
- f) submissions to and negotiations with the Environment Protection Authority, Department of Planning, Department of Mineral Resources, Sydney Water, Liquor Administration Board and Local Councils;
- g) "environment impact statements" and "statements on environmental effects" for development consents;
- h) applications for pollution control approvals and licences;
- i) compliance audits for environment protection approvals and licences, and development consents;
- j) interpretation of technical requirements of environment protection legislation;
- k) expert witness services for Land and Environment Court and local courts;
- l) proposals of environmentally acceptable and safe operational conditions and procedures;
- m) development of operational manuals for pollution control systems;
- n) process and functional design of air, noise and water pollution control systems;
- o) selection of optimal pollution control technology, equipment and systems;
- p) supervision of construction, commissioning, operation and maintenance of pollution control systems; and
- q) troubleshooting existing air, noise and water pollution control systems.



Photograph of drilling rig Soilmeco SR-30.

	Ambient L_{A10}	69	72
	L_{A10} measured	L_{A10} contribution	L_{A10} contribution
Initial drilling	76	75	72
Normal drilling	80	80	79

Results of calculations of contribution.



NOTES