Vipac Engineers and Scientists Limited
215 Portrush Road, Maylands, SA 5069, Australia

t. +61 8 8334 0900 | **f.** +61 8 8362 0793 | **e.** adelaide@vipac.com.au
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Vipac Engineers & Scientists

Adelaide Brighton Cement Ltd

Birkenhead Plant

ESP Fan Assessment Report

50B-18-0036-TRP-8950764-1

5 August 2019

Report Title: ESP Fan Assessment Report **Job Title: Birkenhead Plant**	
DOCUMENT NO: 50B-18-0036-TRP-8950764-1 **PREPARED FOR:** Adelaide Brighton Cement Ltd 62 Elder Road Port Adelaide, South Australia, 5015, Australia **CONTACT:** Tim Radimissis **Tel:** (08) 8300 0533 **Fax:** 61 8 83000431	**REPORT CODE:** TRP **PREPARED BY:** Vipac Engineers and Scientists Limited 215 Portrush Road, Maylands, SA 5069, Australia **Tel:** +61 8 8334 0900 **Fax**: +61 8 8362 0793
PREPARED BY: Author: Saksham Garg ACOUSTIC ENGINEER	Date: 5 Aug 2019
REVIEWED BY: Reviewer: Peter Moncrieff Team Leader	Date: 5 Aug 2019
AUTHORISED BY: Peter Moncrieff Team Leader	Date:5 Aug 2019

REVISION HISTORY

Revision No.	Date Issued	Reason/Comments
0	5/08/2019	Initial Issue
1		
2		

DISTRIBUTION

Copy No._____	**Location**	
1	Project	
2	Client (PDF Format)	Uncontrolled Copy
3		

KEYWORDS:

NOTE: This is a controlled document within the document control system. If revised, it must be marked SUPERSEDED and returned to the Vipac QA Representative. This document contains commercial, conceptual and engineering information that is proprietary to Vipac Engineers & Scientists Ltd. We specifically state that inclusion of this information does not grant the Client any license to use the information without Vipac's written permission. We further require that the information not be divulged to a third party without our written consent

TABLE OF CONTENTS

1 INTRODUCTION 4
2 REFERENCES 4
3 SCOPE OF WORKS 4
4 EQUIPMENT & METHODOLOGY 5
5 ASSESSMENT RESULTS 5
5.1 ESP Fan 5
5.2 4A Air-Slide Fan 6
5.3 Noise Sensitive Receiver (NSR) 6
6 CONCLUSION 7

1 INTRODUCTION

Vipac Engineers & Scientists (Vipac) were engaged by Adelaide Brighton Cement Limited (ABC) to undertake an acoustic survey within the ABC Birkenhead plant during typical operations. The survey was conducted on 19 July 2019, between 08:15AM – 09:00AM to measure the noise emissions from ESP fan outlet (post noise abatement works) and Level 9 4A Air-slide fan (post noise abatement works).

This report provides details of the results of the attended noise measurement survey, the methodology followed and provides a comparison of the results against the previous surveys.

2 REFERENCES

[1] Vipac's Acoustic Report 50B-18-0036-TRP-6755126-2, *"Noise Model Update and Abatement Options"*, dated 27 February 2019.

[2] Vipac's Acoustic Report 50B-18-0036-TRP-805631-2, *"ABC Birkenhead – 2018 Noise Model Update"*, dated 10 August 2018.

[3] Site details provided by Adelaide Brighton Cement in their correspondence of 19 July 2019.

3 SCOPE OF WORKS

Based on the information provided by ABC [3] and Vipac's previous noise assessment reports [1] [2], we note that noise abatement works were conducted to reduce emissions from the ESP (outlet) and Level 9 4A air-slide fans. As such, to reduce noise emissions, a noise barrier was constructed to enclose the 4A air-slide fan and the ESP fan outlet was enclosed with profiled metal sheet and insulation. Figure 1 and Figure 2 below indicate the fans before and after noise abatement works.

Before noise abatement works

After noise abatement works

Figure 1: ESP Fan post and pre-noise abatement works

Following the noise abatement works, Vipac conducted on-site measurements to compare the noise emissions from each fan against the measurements conducted prior to abatement works. In addition to on-site emission measurements, Vipac predicted the noise levels incident at 36 Alfred Street Birkenhead (noise sensitive receiver).

Figure 2: 4A Air-Slide Fan - Post noise abatement works

4 EQUIPMENT & METHODOLOGY

The noise survey was conducted on 19 July 2019 and where possible, noise measurements were conducted at the same position as during previous surveys, i.e., surveys before noise abatement works [1] [2]. All measurements were conducted using the sound level meter nominated in Table 1. The sound level meter was calibrated immediately prior to and following the series of measurements using the calibrator nominated below with no drift in sensitivity observed.

Table 1: Acoustical Equipment Summary

Description	Make/model	Serial Number	Due for calibration
Sound level meter	Brüel & Kjær Type 2250	3002841	29/02/2020
Pistonphone acoustic calibrator	Larson Davis CA250	2815	12/02/2020

5 ASSESSMENT RESULTS

5.1 ESP FAN

The results of our on-site measurements for ESP fan compared against the previous survey results (before noise abatement works) are presented in Table 2 below. Please note that the octave band result comparison is presented in Appendix A.

Table 2: ESP Fan Measurement Results

ESP Fan		Measurement Distance (meters)	Measured Sound Pressure Levels, dB(A)
Pre-Noise Abatement Works	2017	3	88
	2018	3	87
Post Noise Abatement Works	2019	3	85 (refer note below)

Note:

Please note that the measurements were contaminated due to the surrounding noise sources (extraneous noise sources such as loading/unloading activities nearby and other fans). However, considering the noise levels in 2017 and 2018, we note that the noise emissions from the fan have *marginally reduced* post acoustic treatment works.

5.2 4A AIR-SLIDE FAN

The results for 4A air-slide fan are presented in Table 3 below. Please note that in addition to measurements at 0.5m away from the fan, an additional measurement was conducted at 0.5m away from the new acoustic barrier.

Table 3: 4A Air-Slide Fan Measurement Results

4A Air-Slide Fan		Measurement Distance (meters)	Measured Sound Pressure Levels, dB(A)
Pre-Noise Abatement Works	2018	1m from the fan	89
Post Noise Abatement Works	2019	0.5m from the fan	93 (refer note below)
	2019	0.5m away from barrier (approx. 1m from fan)	81(refer note below)

Note:

The noise measurements at 0.5m measured in 2019 were higher than the levels measured in 2018, due to reverberant conditions created with barrier in place. However, we note that the barrier provides *considerable noise emission reduction* (~8dB) at 1m from the fan (0.5m beyond barrier) compared to 2018 noise levels.

5.3 NOISE SENSITIVE RECEIVER (NSR)

We predicted the noise impact to the noise sensitive receiver at 36 Alfred Street, Peterhead SA 5016 (as advised by ABC [3]), due to the operation of ESP and 4A Air-Slide fans (post and pre-noise abatement works). The results of our assessment are presented in Table 4 below:

Table 4: Emission predictions at 36 Alfred Street

Fan	Conditions	Predicted Noise Levels, dB(A)	Notes
ESP Fan	Pre-Noise Abatement Works (2017)	51	Refer Note 1
	Pre-Noise Abatement Works (2018)	50	
	Post Noise Abatement Works (2019)	48	
4a Air-Slide Fan	Pre Noise Abatement Works (2018)	41	Refer Note 2
	Post Noise Abatement Works (2019)	32	

Notes:

1. The predictions at 36 Alfred Street (NSR) indicate that the incident noise levels are marginally lower post noise abatement works. However, Vipac notes that due to extraneous noise sources present during the survey, the actual incident noise levels at the NSR due to ESP fan operation would be lower than the predicted levels presented above.
2. The predictions indicate significant reduction in incident noise levels at the NSR due to the 4A air-slide fan operation.

6 CONCLUSION

A noise survey of selected plant on-site at Adelaide Brighton Cement's Birkenhead cement plant was undertaken. The purpose of the survey was to obtain updated noise measurement data for ESP and 4A air-slide fan after the recent noise abatement works conducted by ABC. The noise measurement survey was conducted on Friday, 19 July 2019 between 08:15AM and 09:00AM.

The results of the survey were compared with the corresponding results from the most recent previous survey. In general, noise emissions were observed to have reduced in comparison with the previous survey, indicating that upgrade and refurbishment actions have been effective in reducing noise emissions from the relevant plant and equipment.

Appendix A: ESP Fan Survey Results

Description	Year	Distance (m)	LAeq	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25 k	1.6k	2k	2.5k	3.15 k	4k	5k	6.3k	8k	10k
ESP Fan Outlet (2017-2018)	2017	3	88	87	89	87	86	85	85	88	86	84	93	90	85	81	81	81	80	80	77	77	75	72	70	68	64	63	62	59	57
	2018	3	87	88	91	87	86	84	87	85	83	85	86	85	84	82	83	80	79	78	78	76	74	72	69	67	64	60	58	55	49
ESP Fan outlet (2019)	2019	3	85	91	88	84	84	83	82	82	80	79	83	82	79	79	80	78	77	77	76	75	73	71	68	65	61	58	58	52	49