

38.3849.R50:ZJM

5th June, 2008

Shoalhaven Starches Pty. Ltd.
P O Box 123
NOWRA NSW 2541

Attention: Mr. G. Murphy

Dear Sirs,

ACOUSTIC AUDIT OF SITE OPERATIONS
SHOALHAVEN STARCHES, BOMADERRY

As part of the assessment process for the proposed Ethanol upgrade at Shoalhaven Starches (Nowra), the Director General's requirements has specified an audit of the existing plant should be undertaken. This report addresses that audit in terms of acoustic compliance with noise conditions issued by the NSW EPA (now DECC).

Prior to the implementation of a major acoustic upgrade of the site assessment of the operations was conducted on individual plant items that were exposed to the outside area and the surface area of existing buildings that in themselves contain plant items.

The majority of the newer buildings erected on the site are of solid concrete construction with a few discharge openings either on the side of the building or the roof. The old sections of the mill are generally metal clad buildings with some ventilation openings or discharges for plant items.



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To determine noise emitted from the site it is necessary to identify the noise sources that exist on the site, and then determine the sound power level of each source from which that data is imported to the Environmental Noise Model (ENM) program to assess noise emission Shoalhaven Starches with respect to the design criteria.

In the month of March, 2008, a series of measurements were conducted on the site to determine the relevant sound power level of the major plant items. Due to the size and configuration of the buildings the spatial averaging of the relevant building façade was obtained by the use a crane lifting a cage in which the operator directed the cage to be placed against the various plant items/facades to conduct measurements.

Appendix A identifies the location of Shoalhaven Starches plant and the reference noise locations that have been used by the EPA and the site for a number of years in relation to prediction of new plant and monitoring existing operations.

Appendix B identifies the current major noise emission sources with Appendix C providing the corresponding sound power levels attributed to those sources as a result of our audit.

During the course of our audit it was established that two items that were nominated as part of the PRP7 project had not been completed and therefore need an allocation for noise emission contribution as part of the overall audit. In effect the noise design goal for the PRP7 was set at 10 dB(A) below the EPA criteria and for the purpose of simplification, the outstanding PRP7 components (being number 5 starch dryer and a weighbridge) had a noise contribution at residential reference locations set at least 20 dB(A) below the EPA criteria.



Appendix D provides a ranking of the noise emission from the various sources as determined by ENM for neutral weather conditions. To be consistent with the PRP7 acoustic assessment, whilst the matter of temperature inversion and adverse weather conditions do not constitute 30% of nighttime operations, the table in Appendix E identifies the resultant contribution (as determined by ENM) for the reference receiver locations and the various weather conditions, where Table 1 below compares the calculated contribution from existing site operations, plus the outstanding PRP7 items to then compare the summation of all of that with respect the EPA/DECC noise criteria.

Table 1: Sound Pressure Level Contribution Neutral Conditions

Receiver	Calculated Contribution dB(A)	Outstanding PRP7 Contribution dB(A)	Total Contribution dB(A)	EPA/DECC Noise Criteria dB(A)
1.Terara	33	0	33	38
4.Riverview Rd	35	4	35	38
5.Meroo St	39	10	39	42
6.Meroo & Birriley St	41	9	41	42

On the basis of the measurements and the allocation of the PRP7 design goal for the dryer, the calculated contribution reveal Shoalhaven Starches to comply with EPA noise limits, which has also being confirmed by noise monitoring carried out during the sound power measurements and on a six monthly basis as directed by the EPA.

In relation to the proposed ethanol plant upgrade from a noise perspective we propose the allocation of a noise design target of 15 dB(A) below the EPA noise limits which as shown in Table 2 below will still maintain compliance with the designated criteria under neutral weather conditions as being the basis used for previous assessments.



**Table 2: Sound Pressure Level Contribution for Ethanol Upgrade
Neutral Conditions**

Receiver	Existing Contribution dB(A)*	Ethanol Upgrade Contribution dB(A)	Total Contribution dB(A)	EPA/DECC Noise Criteria dB(A)
1.Terara	33	23	33	38
4.Riverview Rd	35	23	35	38
5.Meroo St	39	27	39	42
6.Meroo & Birriley St	41	27	41	42

*includes outstanding PRP7

Yours faithfully,

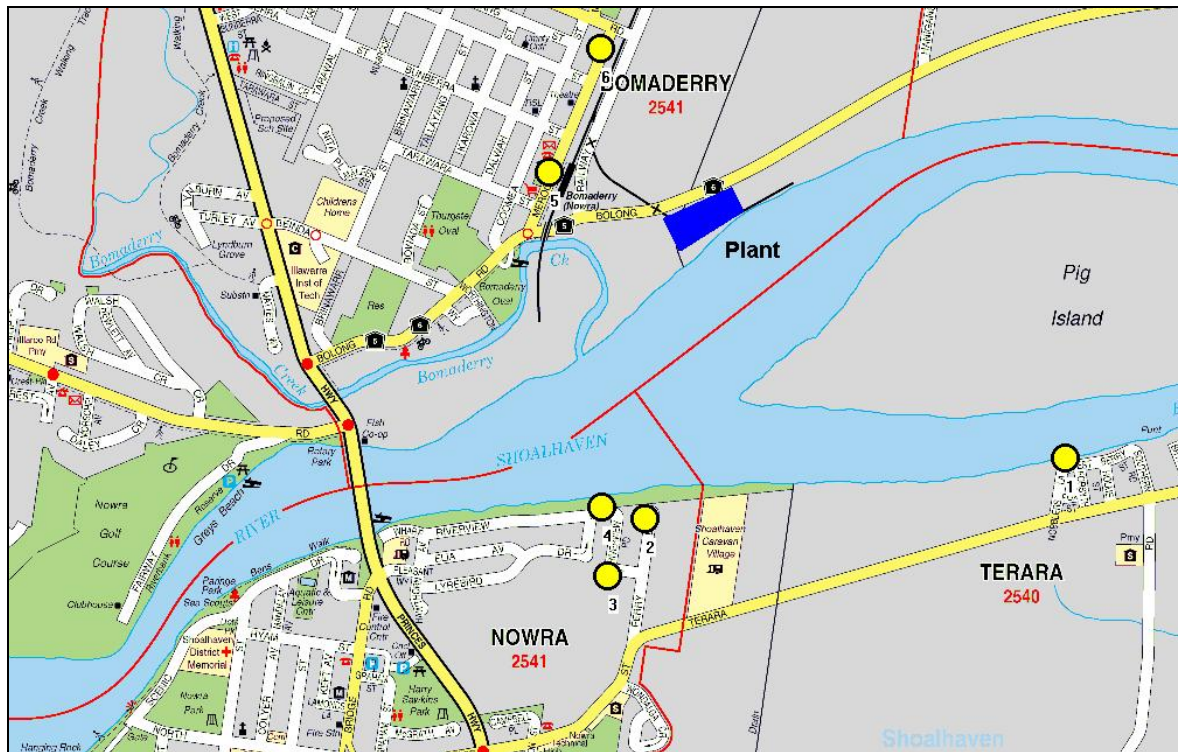
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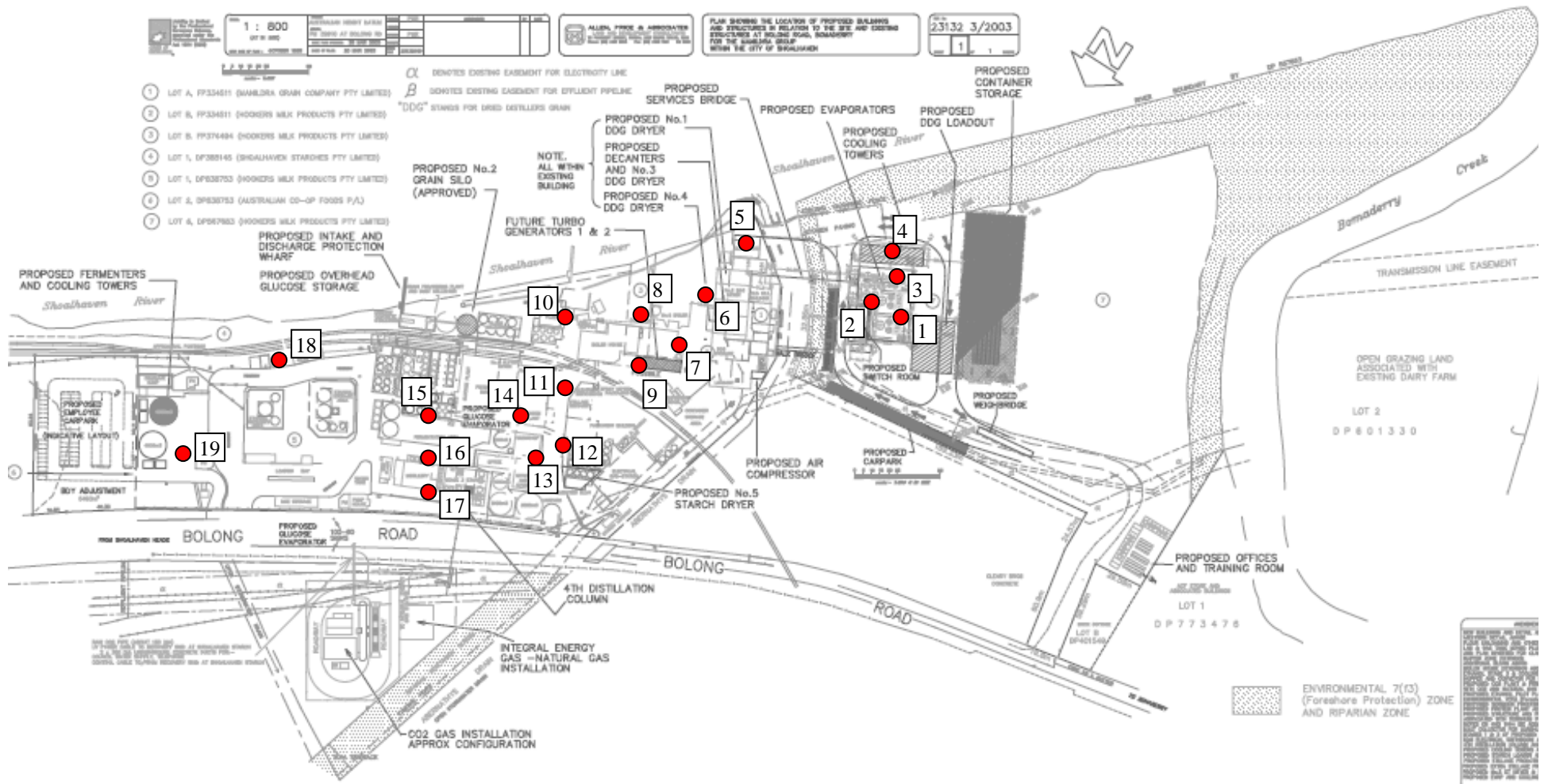
APPENDIX A: Site and Assessment Locations



APPENDIX B: Major Noise Sources

Source ID	Source Description
1	Evaporator (Building facade)
2	Evaporator (external plant – south)
3	Evaporator (external plant – north)
4	Evaporator Cooling Towers
5	DDG Dryer Cooling Tower
6	DDG Dryer (Building facade)
7	Boiler House (Building facade – west)
8	Boiler House (Building facade – south)
9	Boiler House (Building facade – north)
10	Slurry Plant & Boiler House (Building facade – east)
11	Stillage Recovery
12	No. 3 Starch Dryer
13	Starch Plant
14	Gluten Dryers
15	Fermentation plants and Glucose evaporator
16	Distillation columns (south)
17	Distillation columns (north)
18	Glucose Storage
19	Fermenter Cooling Towers





APPENDIX C: Sound Power Levels

Source ID	dB(A)	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
1	80	85	90	82	79	77	75	71	69	66
2	87	90	94	89	86	84	81	79	77	74
3	90	93	93	90	88	87	83	81	80	76
4	91	97	98	96	91	86	84	81	80	76
5	94	101	103	98	95	91	88	85	81	74
6	95	99	100	97	96	91	89	86	82	75
7	92	97	95	93	91	88	86	84	81	75
8	96	100	98	97	95	92	89	86	84	77
9	93	95	95	92	92	89	86	84	82	76
10	105	98	96	99	98	98	101	98	94	89
11	106	108	109	105	104	105	101	96	90	89
12	98	99	101	98	96	94	91	90	87	84
13	97	98	100	97	95	94	91	88	85	81
14	111	120	112	109	109	110	105	99	93	87
15	100	98	97	95	97	96	93	93	92	85
16	98	97	96	92	94	92	90	90	90	84
17	98	95	94	90	90	88	88	91	93	87
18	98	93	95	94	92	92	91	90	88	86
19	100	102	102	99	96	94	95	92	89	86



APPENDIX D: Sound Pressure Level Contributions (Rankings – Neutral Conditions)

Receiver ID	Assessment Locations
1	1 - Terara
2	4 – Riverview Road
3	5 – Meroo Street
4	6 – Meroo & Birriley Streets

Note: Neutral Conditions – Temperature of 10°C and 50% relative humidity

Receiver	Source ID	dB(A)	Octave Band Centre Frequency (Hz)									
			31.5	63	125	250	500	1k	2k	4k	8k	
1	14	29	45	34	27	32	30	21	5	-32	-135	
	11	26	40	40	35	30	23	20	10	-26	-124	
	10	22	30	27	29	24	16	17	12	-20	-120	
	15	20	24	22	14	24	19	14	4	-23	-129	
	16	17	23	19	12	20	16	11	0	-28	-132	
	6	17	30	31	27	22	9	8	0	-35	-140	
	5	16	32	34	27	19	7	8	0	-35	-139	
	8	16	32	29	27	21	0	8	0	-32	-136	
	18	16	25	27	24	19	11	10	6	-27	-118	
	19	14	28	27	17	17	12	9	-5	-37	-133	
	17	13	23	23	17	9	13	8	2	-24	-129	
	4	13	28	29	25	16	3	4	-7	-38	-143	
	3	8	19	17	7	10	8	2	-9	-38	-147	
	2	4	4	15	16	5	8	3	-4	-14	-44	-149
	9	2	2	20	18	8	6	1	-7	-22	-54	-162
	13	1	1	20	18	7	5	-1	-10	-26	-58	-163
	7	0	0	22	18	10	-1	-1	-10	-24	-58	-164
	12	0	0	20	17	4	6	-3	-12	-24	-54	-158
	1	1	-19	3	3	-16	-15	-24	-30	-44	-78	-185
	Total	33	47	43	38	36	32	25	16	-16	-115	



Receiver	Source ID	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
4	11	32	40	42	38	34	26	28	13	-13	-84
	10	30	30	29	33	29	21	28	17	-8	-80
	5	22	34	37	32	24	17	16	6	-18	-88
	8	21	32	32	31	25	6	17	6	-16	-88
	15	20	26	21	16	22	20	13	4	-20	-103
	18	19	23	27	26	21	12	17	5	-20	-99
	4	19	31	33	30	19	17	13	3	-16	-76
	3	18	27	26	16	22	17	12	4	-15	-78
	19	16	30	29	24	14	15	12	-1	-31	-119
	16	16	25	21	12	19	15	10	2	-21	-105
	14	16	48	33	22	16	14	6	-9	-38	-117
	2	15	23	28	17	18	15	9	1	-21	-83
	17	12	22	15	15	14	11	8	2	-20	-105
	7	10	27	23	15	13	10	3	-8	-34	-108
	6	10	28	27	19	11	9	1	-12	-39	-114
	9	10	24	23	14	13	9	1	-10	-35	-113
	13	9	26	25	17	8	10	1	-14	-42	-122
	1	9	19	25	17	12	1	4	-8	-27	-88
	12	6	24	23	15	4	5	-5	-17	-41	-115
	Total	35	49	45	41	37	30	32	20	-4	-72

Receiver	Source ID	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
5	15	33	32	23	31	32	33	29	21	12	-31
	13	31	35	37	33	28	28	28	21	7	-29
	19	30	36	37	35	29	25	28	20	2	-44
	16	30	31	23	28	29	29	26	18	11	-30
	17	29	36	34	27	21	26	24	23	13	-27
	11	28	42	41	28	31	29	20	9	-11	-50
	3	26	34	32	23	28	25	20	14	3	-32
	14	25	57	40	26	27	22	16	5	-12	-52
	2	24	30	33	22	26	23	19	13	1	-32
	10	24	32	28	25	23	22	21	11	-9	-53
	7	22	33	30	24	19	21	17	10	-5	-45
	6	18	34	34	26	19	17	11	0	-19	-61
	5	17	36	36	26	15	16	7	-3	-21	-65
	12	14	32	30	22	16	13	6	-2	-18	-51
	8	14	35	30	23	18	6	8	-2	-20	-63
	9	14	30	27	15	19	13	5	-4	-20	-60
	18	13	25	22	16	16	13	7	-3	-21	-66
	4	6	25	16	20	9	2	-4	-15	-22	-58
	1	-2	17	20	8	-6	-4	-12	-20	-32	-66
	Total	39	57	47	40	39	38	35	29	18	-22



Receiver	Source ID	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
6	11	38	47	48	43	41	39	26	24	2	-42
	15	31	37	36	32	29	31	26	22	7	-42
	12	30	38	40	37	34	30	18	19	1	-43
	19	30	37	38	36	29	24	28	20	1	-46
	13	28	33	35	31	26	25	25	18	1	-41
	16	28	37	35	30	26	27	24	19	6	-42
	17	27	35	33	28	20	25	22	20	10	-34
	14	26	51	33	34	29	25	16	5	-13	-65
	18	24	26	28	27	22	15	23	15	-1	-49
	6	21	32	33	27	18	21	15	7	-11	-65
	3	21	29	28	18	24	19	15	7	-9	-61
	10	20	30	26	24	14	20	16	5	-17	-70
	2	19	28	32	24	13	20	13	7	-11	-60
	5	18	34	35	26	17	18	9	-1	-23	-80
	7	13	30	25	14	19	11	6	-3	-25	-77
	8	10	31	27	20	13	2	4	-8	-29	-83
	9	9	26	23	13	13	7	0	-10	-29	-80
	4	2	22	15	14	6	-3	-9	-18	-35	-86
	1	-7	13	15	4	-7	-12	-17	-28	-45	-95
	Total	41	53	50	46	43	41	34	29	14	-31



APPENDIX E: Sound Pressure Level Contributions (Non-neutral Weather Conditions)

Scenario	Description
2.	Temperature 10°C and 50% relative humidity with a one metre per second wind from 270°
3.	Temperature and humidity as above with a one metre per second from 270° with a slight inversion of 1° per 100 metres temperature inversion.
4.	Temperature and humidity as above with a 5 metres per second wind from 270°.
5.	Temperature and humidity as above with a 1 metre per second wind from the north west.
6.	Temperature and humidity as above a 1 metre per second wind from the north west with a slight temperature inversion of 1° per 100 metres.
7.	Temperature and humidity as above with a 5 metres per second wind form the north west.
8.	Temperature and humidity as above with a 5 metres per second wind for the north east.

Note: Scenario 1 is neutral conditions as describe in Appendix D



Scenario	Receiver ID	dB(A)	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
2	1	34	48	44	39	36	34	27	17	-16	-115
	4	34	47	44	40	36	30	31	19	-5	-73
	5	38	56	45	38	37	37	33	26	15	-24
	6	40	53	49	44	42	40	33	28	12	-33
3	1	35	49	45	39	36	35	28	18	-15	-114
	4	35	49	45	41	37	30	32	20	-4	-72
	5	38	57	46	39	38	37	34	27	16	-23
	6	41	53	50	45	43	41	34	29	13	-32
4	1	40	54	48	41	37	41	35	20	-15	-113
	4	32	45	42	37	34	28	29	15	-9	-76
	5	33	52	41	32	33	34	28	18	7	-31
	6	38	50	46	40	39	39	29	22	6	-39
5	1	34	48	44	39	36	34	28	17	-15	-114
	4	36	50	46	41	37	31	33	20	-4	-72
	5	38	56	45	38	37	37	33	26	16	-24
	6	40	52	48	44	41	40	32	27	11	-34
6	1	35	49	45	39	36	35	29	18	-15	-114
	4	36	51	46	42	37	32	34	20	-4	-72
	5	38	57	46	39	38	37	34	27	17	-23
	6	40	53	49	44	42	40	33	28	12	-33
7	1	42	55	49	42	37	43	36	21	-15	-113
	4	39	53	48	43	37	35	36	22	-3	-72
	5	34	52	41	32	33	34	28	19	8	-31
	6	36	48	43	36	36	37	27	18	1	-44
8	1	31	46	41	36	34	31	24	14	-18	-117
	4	44	56	51	45	38	42	42	25	-3	-71
	5	44	60	50	44	40	43	40	30	18	-22
	6	40	52	49	44	41	40	34	28	13	-32

