

APPENDIX 6

Cumulative Noise Assessment

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NOISE IMPACT ASSESSMENT OF A PROPOSED ETHANOL PLANT IN THE KWINANA INDUSTRIAL AREA

FOR

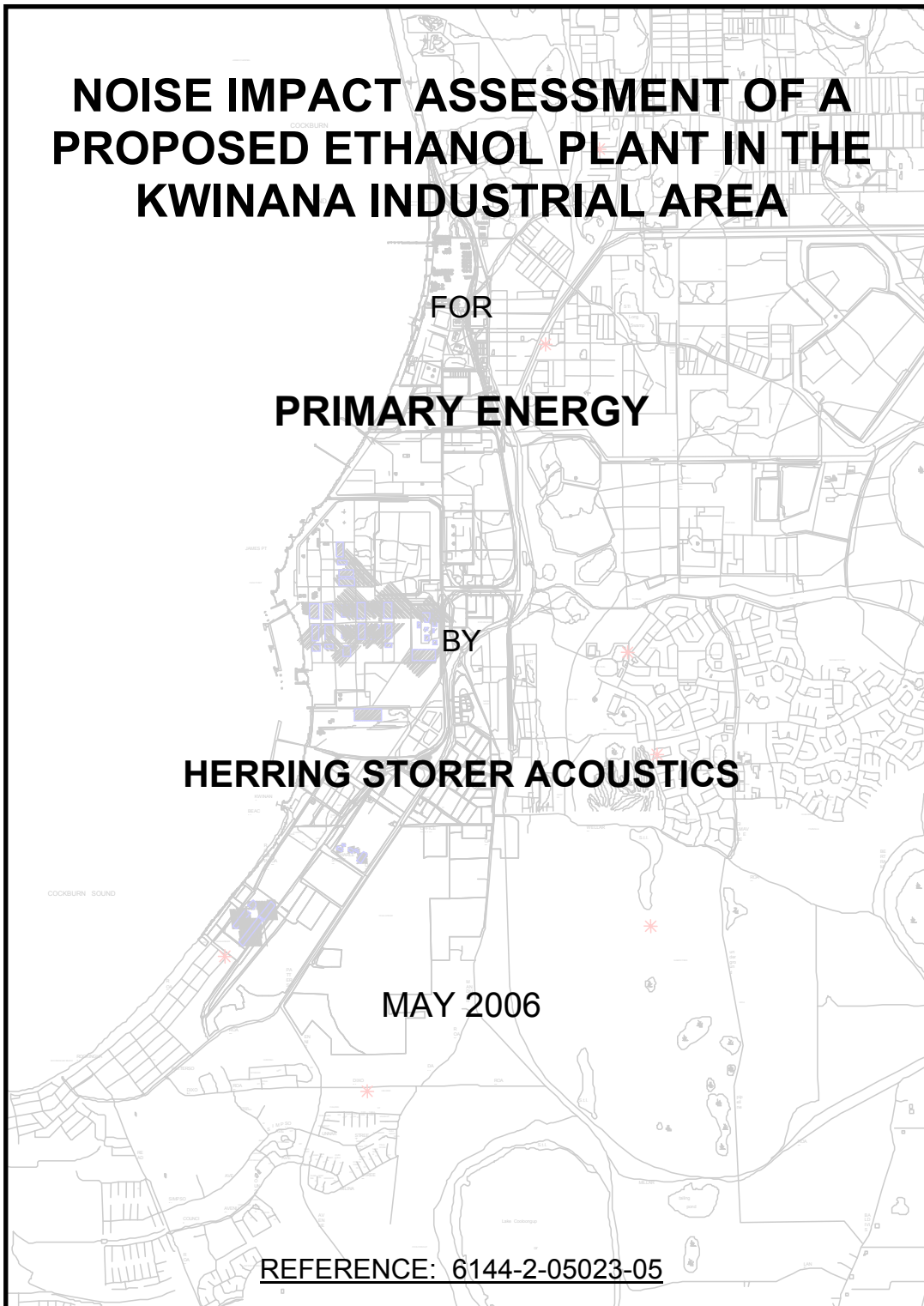
PRIMARY ENERGY

BY

HERRING STORER ACOUSTICS

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CONTENTS

- 1.0 INTRODUCTION
- 2.0 SUMMARY
- 3.0 CRITERIA
- 4.0 METHODOLOGY
- 5.0 RESULTS
- 6.0 DISCUSSION & ASSESSMENT

APPENDIX

- A Locality Map
- B Predicted Noise Levels from Ethanol Plant
- C Predicted Noise Levels from All Industries and Ethanol Plant
- D Industry Ranking for Worst-Case Ethanol Plant Noise Levels

1.0 INTRODUCTION

In April 2006, Heggies Australia Pty Ltd developed an environmental noise model of a proposed Ethanol Plant, to be located in the Kwinana Industrial Area (KIA) - refer Appendix A. Heggies reported the results of the modelling in "*Kwinana Ethanol Plant Noise Assessment – Report 30-1540 Kwinana 20060522, Heggies Australia Pty Ltd 2006*".

As the Ethanol Plant is located in the KIA, it is necessary to assess the cumulative noise impact of introducing another industry in the area. This process involves incorporating the model information in the Kwinana Industries Council (KIC) Cumulative Noise Model where each significant industry is represented.

The impact of the proposed Ethanol Plant is assessed in two ways:

1. Compliance with the *Environmental Protection (Noise) Regulations 1997*; and
2. The total noise level changes at selected receiver locations due to the additional sound power level of the Ethanol Plant.

2.0 SUMMARY

The noise levels associated with the proposed Ethanol Plant were incorporated into the computer modelling programme Environmental Noise Model (ENM) and combined with the Kwinana Industry Council's Cumulative Noise Model of the Kwinana Industrial Area.

Modelling of the noise propagation indicates that:

noise levels from the Ethanol Plant will comply with the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* at all times at all locations.

Noise levels from the Ethanol Plant result in no significant change in the existing, predicted, noise levels at residential locations.

3.0 CRITERIA

In terms of the cumulative noise from all industries, individual industries should not significantly contribute to an exceedance of the assigned level (Regulation 7(i)(a)). An individual industry noise immission is considered to be significantly contributing if the noise level exceeds a value that is within 5 dB of the assigned level.

In determining the applicable assigned level, the calculation of the influencing factor (IF) is affected by the zoning of land within a 450 metre radius of the receiver point and the presence of roads (transport factor). For the KIA, any location falling within or bordering the boundary of Area B of the Kwinana Policy Area within the meaning of the *Environmental Protection ((Kwinana Atmospheric Wastes) Policy Approval Order 1992)* must consider that land as Type B (commercial) in calculating the IF.

The most critical, night time, assigned L_{A10} level for each of the receiver locations of this study are shown below in Table 3.1, with the locations of these receivers shown in Figure 3.1 below.

TABLE 3.1 – ASSIGNED NIGHT PERIOD NOISE LEVELS L_{A10}

Location	Assigned Night Level, dB L_{A10}
Hope Valley	43
Wattleup	45
Medina	35
Calista	35
Leda	35
Hillman	35
North Rockingham	35

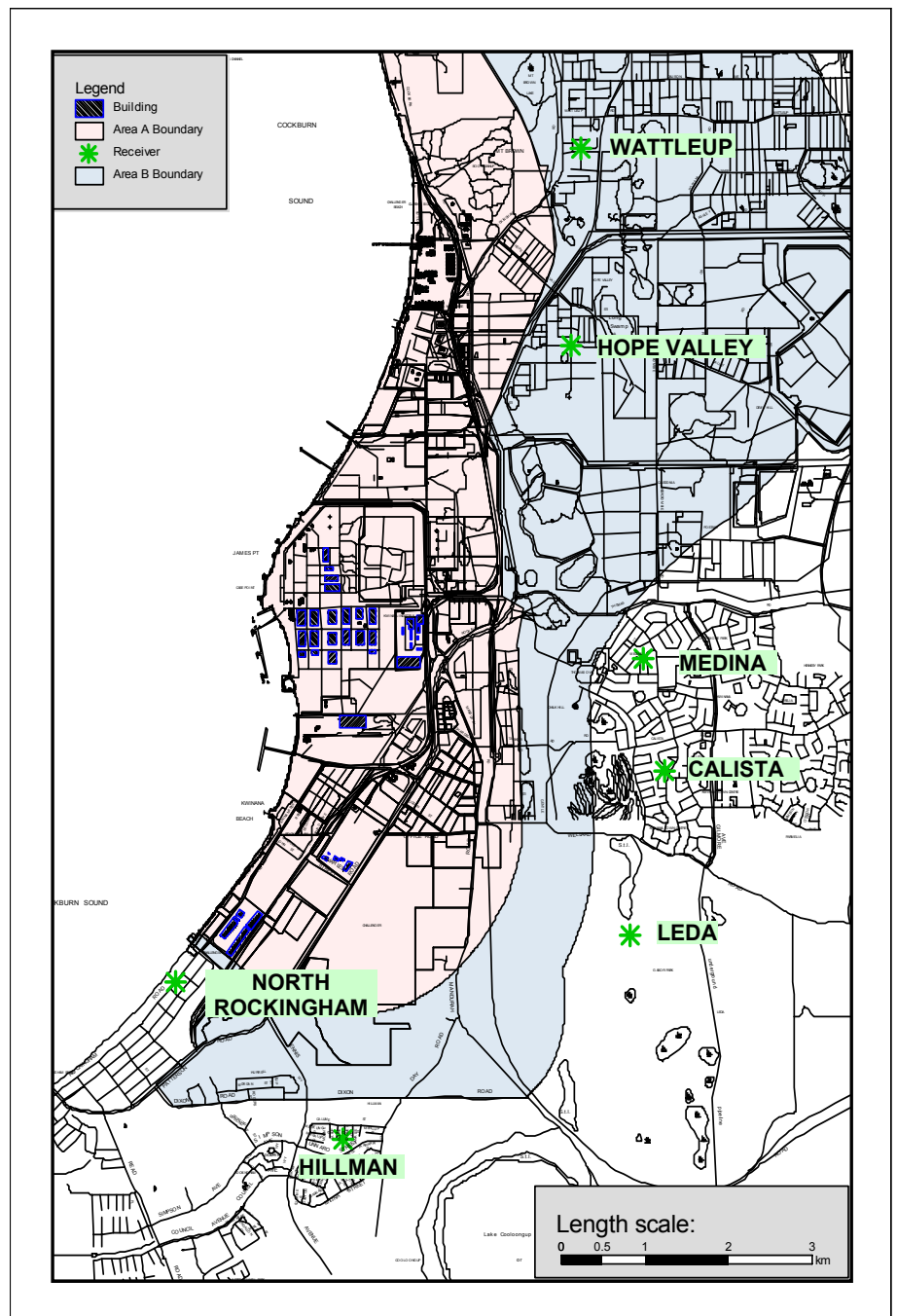


FIGURE 3.1 – RECEIVER LOCALITY MAP

4.0 METHODOLOGY

The methodology of the KIC model is not discussed in detail in this report, but essentially involved each industry providing the KIC with a refined sound power level list representing their industries. In some instances, the site buildings were also incorporated as they were providing shielding of noise to the environs. These were incorporated into the computer modelling software *Environmental Noise Model* (ENM) along with the topography of the study area.

The same process was undertaken for the Ethanol Plant, in that Heggies Australia Pty Ltd provided a sound power level database and associated map files to be incorporated into the Cumulative Noise Model of the KIA. The difference in this case is that the plant does not exist and therefore the sound power levels are estimations from similar plant and manufacturer's data, whereas other industries in the area determined their sound power levels based on actual noise measurements.

As with all industries in the KIC model, the sound power level input data is refined from a usually very detailed computer model into a smaller number of noise sources, so that the data is manageable. These smaller number of sources are derived by each industry's own acoustic consultant and considered to provide a reasonable representation of the noise emissions from each industry. Because of this refining, some detail is removed such that it is possible the results in the KIC model, do not exactly align with results of a noise model produced by each industry. Thus in this case, the noise levels shown from the Ethanol Plant may not exactly align with those in the Heggies report.

The sound power levels for the Ethanol Plant are shown below in Table 4.1.

TABLE 4.1 – SOUND POWER LEVELS OF ETHANOL PLANT

Item	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Gas Blowers (6) Table C1	104	109	96	94	86	80	75	69	96
Air Coolers (1-6) Table C2	117	122	108	106	99	93	87	82	109
Air Coolers (7-12) Table C2	117	122	108	106	99	93	87	82	109
Digester Agitator (24) Table D1	94	92	86	87	90	84	79	73	92
Digester Pumps (24) + Feed Pumps Table D1	97	95	89	90	92	86	82	75	95
Ammonai Pumps & Loadout Table D3	94	92	88	92	91	87	85	84	95
Sulphuric Acid Pumps & Loadout Table E1	91	89	83	84	87	81	76	70	89
Hammer Mill 1 (enclosed) Table E2	88	87	81	87	86	86	82	74	92
Hammer Mill 2 (enclosed) Table E2	88	87	81	87	86	86	82	74	92
Fermenter + Beer Well Agitators Table E4, E9	91	89	83	84	87	81	76	70	89
Cooling Tower 1 Table E5	102	107	93	91	84	78	73	67	94
Cooling Tower 2 Table E5	102	107	93	91	84	78	73	67	94
Ethanol Day Tank Farm & Pumps Table E8	100	96	87	92	91	87	83	78	95
Phosphate Eleveators (4) Table F1	90	89	89	98	91	88	79	69	97
Phosphate Feed Conveyor (external)	81	81	81	81	81	81	81	81	88
B-double entry & Exit - weighbridge	96	94	89	89	89	86	82	77	93
Truck passby NE corner	93	91	86	86	86	83	79	74	90

Item	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Truck drive-off ethanol loading	93	91	86	86	86	83	79	74	90
Truck passby - utility building	93	91	86	86	86	83	79	74	90
Truck passby SE corner	93	91	86	86	86	83	79	74	90
Truck drive-off grain dump	93	91	86	86	86	83	79	74	90
Truck drive-off ammonia loading	93	91	86	86	86	83	79	74	90
Truck passby - entry to fert building	93	91	86	86	86	83	79	74	90
Truck passby - fert building	93	91	86	86	86	83	79	74	90
Truck passby - exit from fert building	93	91	86	86	86	83	79	74	90
Generator Building (roof)	98	102	94	92	91	85	75	66	95
Generator Building (south wall)	77	69	56	51	47	36	25	20	57
Fertiliser Building (north opening)	82	80	80	87	80	77	72	71	87
Dryer Building (roof)	100	91	83	83	71	64	53	45	83
Centrifuge Building (south wall)	100	98	77	69	56	45	33	29	83
Centrifuge Building (roof)	100	99	78	70	56	45	34	29	83
Utility Building (roof)	105	94	80	76	68	60	50	46	83
DD&E Building (roof)	97	87	71	70	62	53	44	40	75
DD&E Building (south wall)	97	87	71	70	62	53	44	40	75
Fermentation Building (roof)	99	89	72	71	64	55	45	42	77
Ethanol Process Building (roof)	109	98	82	81	74	65	55	51	87
Ethanol Process Building (south wall)	99	89	73	72	64	55	46	42	77
Ethanol Process Building (west wall)	102	92	76	75	67	58	49	45	80

Noise propagation calculations were undertaken for various wind speeds (1 to 3m/s) and each of the eight wind directions. Temperature was fixed at 15°C, humidity at 50% and both neutral and positive (2°C/100m) temperature gradients considered.

The noise levels from the existing industries in the KIA were taken from the draft report *Cumulative Noise Model of the Kwinana Industrial Area for Kwinana Industries Council, 2006 Update*; May 2006, 5702-2-05023, which is yet to be endorsed by the KIC members, however is considered to best reflect the current noise levels.

5.0 RESULTS

The predicted noise levels at each of the receiver locations, for each of the weather conditions considered, are provided in Appendix B, being for the Ethanol Plant only. Appendix C shows the results for existing industries and the Ethanol Plant combined.

A summary of the results is shown in Tables 5.1 and 5.2 below.

Table 5.1 shows the change in noise level at each receiver location as a result of the introduction of the Ethanol Plant, under the weather conditions that result in maximum noise levels from the Ethanol Plant.

Table 5.2 shows the change in noise level due to the introduction of the Ethanol Plant under the worst-case propagation conditions for existing industries.

TABLE 5.1 – WORST-CASE PREDICTED NOISE LEVELS FROM ETHANOL PLANT, dB(A)

Location	Wind Condition	Worst-Case Noise Level from Ethanol Plant	Corresponding Noise Level From All Existing Industries	Combined	Change
Hope Valley	3m/s Southwesterly, 2°C/100m	17.7	46.2	46.2	0
Wattleup	3m/s Southerly, 2°C/100m	15.4	41.7	41.7	0
Medina	3m/s Southwesterly, 2°C/100m	23.5	40.1	40.2	+0.1
Calista	3m/s Westerly, 2°C/100m	21.9	38.5	38.6	+0.1
Leda	3m/s Westerly, 2°C/100m	21.8	37.2	37.3	+0.1
Hillman	3m/s Northerly, 2°C/100m	22.5	36.4	36.6	+0.2
North Rockingham	3m/s Northeasterly, 2°C/100m	25.1	40.7	40.8	+0.1

TABLE 5.2 – WORST-CASE PREDICTED NOISE LEVELS FROM ALL INDUSTRIES, dB(A)

Location	Wind Condition	Corresponding Noise Level from Ethanol Plant	Worst-Case Noise Level From All Existing Industries	Combined	Change
Hope Valley	3m/s Westerly, 2°C/100m	16.8	47.3	47.3	0
Wattleup	3m/s Southwesterly, 2°C/100m	15.4	43.2	43.2	0
Medina	3m/s Westerly, 2°C/100m	23.3	42.0	42.1	+0.1
Calista	3m/s Westerly, 2°C/100m	21.9	38.5	38.6	+0.1
Leda	3m/s Northwesterly, 2°C/100m	21.0	37.6	37.7	+0.1
Hillman	3m/s Northerly, 2°C/100m	22.5	36.4	36.6	+0.2
North Rockingham	3m/s Northeasterly, 2°C/100m	25.1	40.7	40.8	+0.1

In terms of the Ethanol Plant, the highest predicted noise level is to North Rockingham. A noise source ranking of worst-case wind conditions to this location is contained in Appendix D.

6.0 DISCUSSION & ASSESSMENT

Table 6.1 compares the worst-case predicted noise levels from the Ethanol Plant at the receiver locations to the assigned night noise levels of the *Environmental Protection (Noise) Regulations 1997*.

TABLE 6.1 – COMPARISON OF ETHANOL PLANT WORST-CASE NOISE LEVELS WITH ASSIGNED NIGHT LEVELS, dB(A)

Location	Wind Condition	Worst-Case Noise Level from Ethanol Plant	Assigned Night Level	Exceedance
Hope Valley	3m/s Southwesterly, 2°C/100m	17.7	43	-
Wattleup	3m/s Southerly, 2°C/100m	15.4	45	-
Medina	3m/s Southwesterly, 2°C/100m	23.5	35	-
Calista	3m/s Westerly, 2°C/100m	21.9	35	-
Leda	3m/s Westerly, 2°C/100m	21.8	35	-
Hillman	3m/s Northerly, 2°C/100m	22.5	35	-
North Rockingham	3m/s Northeasterly, 2°C/100m	25.1	35	-

It is evident from the above that noise levels from the Ethanol Plant comply with the most stringent assigned night noise levels of the *Environmental Protection (Noise) Regulations 1997*. Furthermore, the predicted noise levels are at least 5 dB less than the assigned night levels and therefore the Ethanol Plant does not significantly contribute to overall industry noise levels at any residence.

In terms of cumulative noise impacts under worst-case conditions, the introduction of the Ethanol Plant results in a noise level increase of up to 0.2 dB, which is considered insignificant.

The highest predicted increase in noise level is 0.8 dB in Hillman under 3m/s westerly winds, however at this time the total noise level is only 27.3 dB(A).

Based on the above analysis, it is concluded that the proposed Ethanol Plant can comply with the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* and not significantly increase the ambient noise levels due to existing industry.

Yours faithfully,
For HERRING STORER ACOUSTICS

Terry George

Checked Lynton Storer

29 May 2006

APPENDIX A

Locality Map

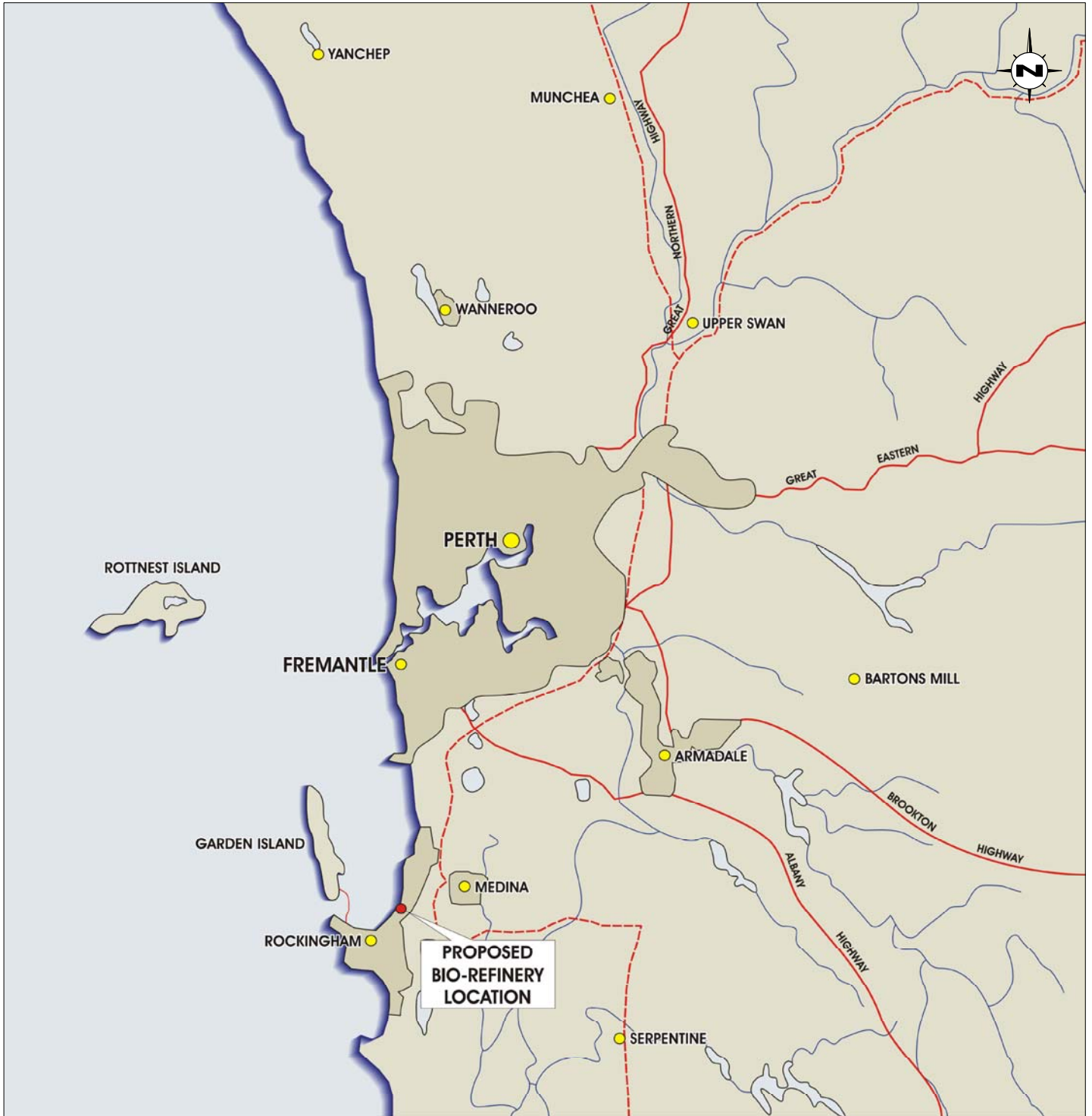


FIGURE 1
Proposed Bio-Refinery Locality Plan

APPENDIX B

Predicted Noise Levels from Ethanol Plant

Table B1 - Cumulative Noise Levels for Hope Valley

43 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	9.4								
1m/s	No		7.8	7.6	8.3	10.8	15.1	15.7	11.4	8.7
2m/s	No		6.5	6.2	7.6	11.5	16.3	16.4	15.8	8.3
3m/s	No		5.3	4.9	6.9	14.4	16.8	17.0	16.2	7.9
Calm	Yes	15.9								
1m/s	Yes		10.7	10.3	12.3	16.2	16.5	16.5	16.3	14.9
2m/s	Yes		8.1	7.8	10.2	16.3	16.9	17.0	16.5	12.0
3m/s	Yes		6.9	6.4	8.5	16.4	17.5	17.7	16.8	11.0

Table B2 - Cumulative Noise Levels for Wattleup

45 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	5.5								
1m/s	No		3.9	3.9	4.7	8.1	11.4	11.4	8.2	4.7
2m/s	No		2.5	2.5	4.1	9.8	14.1	14.1	10.2	4.1
3m/s	No		1.2	1.2	3.5	12.7	14.6	14.7	13.0	3.6
Calm	Yes	12.6								
1m/s	Yes		7.1	7.0	9.3	13.9	14.2	14.2	13.9	9.6
2m/s	Yes		4.1	4.1	7.9	14.1	14.8	14.8	14.1	8.1
3m/s	Yes		2.8	2.8	5.1	14.3	15.4	15.4	14.4	5.4

Table B3 - Cumulative Noise Levels for Medina

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	14.1								
1m/s	No		13.1	12.3	12.4	13.4	15.5	16.8	16.6	15.0
2m/s	No		12.3	12.0	11.1	12.9	16.7	19.4	18.9	15.8
3m/s	No		11.6	9.4	9.7	12.5	18.0	21.8	21.3	16.5
Calm	Yes	17.1								
1m/s	Yes		16.0	14.5	14.7	16.4	18.4	19.7	19.6	17.9
2m/s	Yes		14.5	12.6	12.8	15.7	19.7	22.1	21.8	18.7
3m/s	Yes		13.3	11.1	11.4	14.7	20.9	23.5	23.3	19.5

Table B4 - Cumulative Noise Levels for Calista

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	14.1								
1m/s	No		13.6	12.6	12.4	13.0	14.5	15.7	16.0	15.2
2m/s	No		13.2	9.1	10.9	12.2	15.0	17.7	18.3	16.3
3m/s	No		12.9	10.0	9.4	11.4	15.4	19.4	20.1	17.7
Calm	Yes	16.4								
1m/s	Yes		15.9	14.7	14.4	15.2	16.9	18.2	18.5	17.7
2m/s	Yes		15.4	13.0	12.6	14.1	17.4	19.8	20.3	18.7
3m/s	Yes		15.0	11.7	11.0	13.1	17.8	21.3	21.9	19.8

Table B5 - Cumulative Noise Levels for Leda

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	13.4								
1m/s	No		13.9	11.2	10.6	10.8	12.5	14.8	16.4	15.7
2m/s	No		14.4	10.4	9.2	9.6	11.5	16.7	18.1	17.6
3m/s	No		15.0	9.7	7.9	8.5	11.0	17.5	19.7	19.2
Calm	Yes	16.7								
1m/s	Yes		16.9	14.8	13.7	14.0	16.2	17.5	18.4	18.1
2m/s	Yes		17.3	13.5	10.8	11.1	15.4	18.5	19.9	19.5
3m/s	Yes		17.7	11.3	9.4	9.9	14.7	19.6	21.8	21.0

Table B6- Cumulative Noise Levels for Hillman

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	14.8								
1m/s	No		20.1	19.7	14.5	13.6	13.5	14.0	19.4	19.9
2m/s	No		20.8	20.2	14.3	12.5	12.1	13.3	19.6	20.6
3m/s	No		21.5	20.5	14.0	11.5	10.9	12.5	19.7	21.2
Calm	Yes	20.2								
1m/s	Yes		20.9	20.6	20.0	19.5	19.4	19.7	20.3	20.8
2m/s	Yes		21.7	21.0	19.8	14.0	13.6	14.8	20.5	21.4
3m/s	Yes		22.5	21.4	19.7	12.9	12.3	14.0	20.6	22.1

Table B7 - Cumulative Noise Levels for North Rockingham

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	14.6								
1m/s	No		16.6	17.2	16.6	14.5	13.4	12.9	13.4	14.6
2m/s	No		18.1	19.1	17.9	14.4	12.4	11.6	12.4	14.6
3m/s	No		19.4	21.3	19.3	14.5	11.4	10.3	11.5	14.6
Calm	Yes	17.3								
1m/s	Yes		18.8	19.4	18.8	17.3	15.5	14.8	15.9	17.4
2m/s	Yes		20.2	21.5	20.1	17.3	13.9	13.1	14.0	17.4
3m/s	Yes		21.9	25.1	21.9	17.2	12.9	11.8	13.0	17.4

APPENDIX C

Predicted Noise Levels from
All Existing Industries and Ethanol Plant

Table C1 - Cumulative Noise Levels for Hope Valley

43 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	37.7								
1m/s	No		38.7	36.1	35.4	36.5	38.7	40.7	41.7	41.1
2m/s	No		40.4	35.4	34.2	36.0	39.8	42.4	44.0	42.9
3m/s	No		41.2	34.9	33.1	35.7	40.6	43.8	45.5	44.6
Calm	Yes	42.7								
1m/s	Yes		42.4	40.6	39.4	40.4	42.2	43.7	44.5	44.2
2m/s	Yes		42.9	38.9	35.9	39.1	42.2	45.0	45.9	45.4
3m/s	Yes		43.7	38.2	34.5	38.5	42.6	46.2	47.3	46.6

Table C2 - Cumulative Noise Levels for Wattleup

45 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	32.5								
1m/s	No		30.5	30.0	30.4	32.8	36.3	38.0	36.9	32.9
2m/s	No		29.3	27.8	29.2	33.0	38.7	40.2	39.5	33.4
3m/s	No		27.5	25.7	27.4	33.4	40.2	41.5	40.6	34.0
Calm	Yes	38.6								
1m/s	Yes		34.8	33.4	34.8	38.1	39.9	40.4	40.0	39.0
2m/s	Yes		31.7	30.2	31.4	37.8	40.8	41.7	41.1	39.1
3m/s	Yes		30.2	28.1	29.9	37.4	41.7	43.2	42.3	39.2

Table C3 - Cumulative Noise Levels for Medina

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	31.3								
1m/s	No		33.3	28.9	27.9	28.1	30.6	34.8	36.9	36.4
2m/s	No		35.5	29.1	27.0	27.3	32.0	36.8	39.1	38.9
3m/s	No		36.9	28.9	26.2	26.6	32.4	37.8	40.4	40.1
Calm	Yes	37.7								
1m/s	Yes		38.5	35.7	32.9	34.1	36.4	38.6	39.4	39.3
2m/s	Yes		38.8	33.7	28.5	30.0	35.6	39.5	40.7	40.5
3m/s	Yes		39.3	32.0	27.2	28.4	35.2	40.2	42.1	41.7

Table C4 - Cumulative Noise Levels for Calista

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	27.6								
1m/s	No		29.5	26.7	25.9	26.0	27.2	29.7	31.8	31.8
2m/s	No		31.3	26.7	25.0	25.1	27.3	32.3	34.5	33.6
3m/s	No		32.3	26.3	24.1	24.3	27.6	33.8	36.5	36.0
Calm	Yes	32.5								
1m/s	Yes		33.1	31.4	29.0	29.2	31.7	34.0	34.9	34.6
2m/s	Yes		33.8	29.8	26.4	26.6	31.1	35.1	36.9	36.7
3m/s	Yes		34.7	29.2	25.3	25.5	31.2	36.2	38.6	38.5

Table C5 - Cumulative Noise Levels for Leda

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	23.8								
1m/s	No		30.4	24.4	21.8	21.7	22.3	26.6	31.6	32.4
2m/s	No		32.8	25.8	21.0	20.7	21.7	30.3	34.6	35.0
3m/s	No		33.8	27.0	20.2	19.7	21.3	31.9	35.8	36.2
Calm	Yes	33.7								
1m/s	Yes		34.6	32.5	28.3	25.6	29.9	34.0	35.1	35.3
2m/s	Yes		35.3	32.1	23.7	21.9	27.7	34.1	36.2	36.4
3m/s	Yes		36.0	32.0	22.0	20.9	26.6	34.4	37.3	37.7

Table C6- Cumulative Noise Levels for Hillman

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	25.8								
1m/s	No		29.6	28.9	25.5	24.0	23.7	24.1	27.0	29.0
2m/s	No		32.3	30.5	25.4	23.1	22.5	23.4	27.1	30.8
3m/s	No		35.0	32.4	25.5	22.2	21.4	22.7	27.3	32.8
Calm	Yes	29.8								
1m/s	Yes		32.6	31.8	29.7	28.1	27.2	28.1	29.9	31.9
2m/s	Yes		35.2	34.2	29.6	24.6	23.8	25.4	30.0	34.3
3m/s	Yes		36.6	35.3	29.5	23.5	22.7	24.4	30.1	35.5

Table C7 - Cumulative Noise Levels for North Rockingham

35 dB(A) Night

Wind Speed	Thermal Inversion	Wind Direction								
		Calm	N	NE	E	SE	S	SW	W	NW
Calm	No	30.5								
1m/s	No		33.7	34.1	32.9	29.5	28.7	28.3	28.6	31.7
2m/s	No		35.1	36.4	35.0	29.6	28.0	27.3	27.8	32.6
3m/s	No		36.7	39.0	37.0	29.8	27.4	26.3	27.1	33.4
Calm	Yes	34.4								
1m/s	Yes		36.1	36.7	36.2	34.0	31.9	31.3	33.1	34.6
2m/s	Yes		37.5	39.3	37.9	33.9	29.2	28.5	31.3	34.7
3m/s	Yes		39.4	40.8	39.4	33.6	28.5	27.5	29.9	34.9

APPENDIX D

Worst-Case Noise Source Ranking for Ethanol Plant

TABLE D1 – WORST-CASE INDUSTRY RANKING TO NORTH ROCKINGHAM

Industry	SPL
BHP Billiton - Nickel West	34.8
Cooperative Bulk Handling (CBH) Ltd	33.9
BP Refinery (Kwinana) Pty Ltd	32.1
Doral Specialty Chemicals Pty Ltd	31.3
CSBP Ltd	29.4
Tiwest	28.4
Kwinana Cogeneration Plant	25.6
Prime Energy	25.1
Australian Fused Materials (AFM) Ltd	24.6
Fremantle Ports - Kwinana Bulk Jetty	23.4
Hismelt Corporation Pty Ltd	21.6
KMK Cogeneration Facility	20.5
Alcoa World Alumina Australia	20.1
Wesfarmers LPG Pty Ltd	19.2
BOC Ltd	16.6
Cockburn Cement Ltd	16.3
Air Liquide W.A. Pty Ltd	15.0
Fremantle Ports - Kwinana Bulk Terminal	14.7
Epic Energy	14.6
Western Power Kwinana P.S.	13.5
Tyco Water	13.3
Ciba Specialty Chemicals Pty Ltd	10.8
Western Power Cockburn P.S.	10.4
Total	40.8