

**SCMF EXPANSION
CSBP KWINANA
ACOUSTIC ASSESSMENT**

FOR

CSBP KWINANA

MAY 2019

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CONTENTS

1.0	INTRODUCTION	3
2.0	ENVIRONMENTAL NOISE CRITERIA	3
3.0	METHODOLOGY	5
4.0	PREDICTED NOISE LEVELS	5
5.0	ASSESSMENT OF ENVIRONMENTAL NOISE COMPLIANCE	6
7.0	CONCLUSION	6

APPENDIX

A	Expansion Noise Source Sound Power Data
B	Noise Emission Plots

1.0 INTRODUCTION

CSBP Kwinana (Kwinana) commissioned Herring Storer Acoustics to carry out an acoustic assessment of a proposed expansion of the Sodium Cyanide Manufacturing Facility (SCMF) in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

The proposed expansion involves a relatively small increase in equipment on site. The proposal includes the addition of two cooling tower cells (duplicate of existing cells), a number of pumps, the addition of a packaged Oxygen Plant, duplication of some equipment in the Solids Plant and addition of fresh air intake booster fans for SCP1 and SCP2. The booster fans have been specified with suitable acoustic attenuators to control noise emissions.

The most significant receptor location is the nearby Coogee Chemicals premises, on the far side of the rail reserve, which is within the Area A zone of the Kwinana Industrial Area, with associated 'assigned level' of L_{A10} of 75 dB(A). Noise emissions to far-field residential receptor areas are unlikely to be significant in comparison to the existing noise emissions for the site.

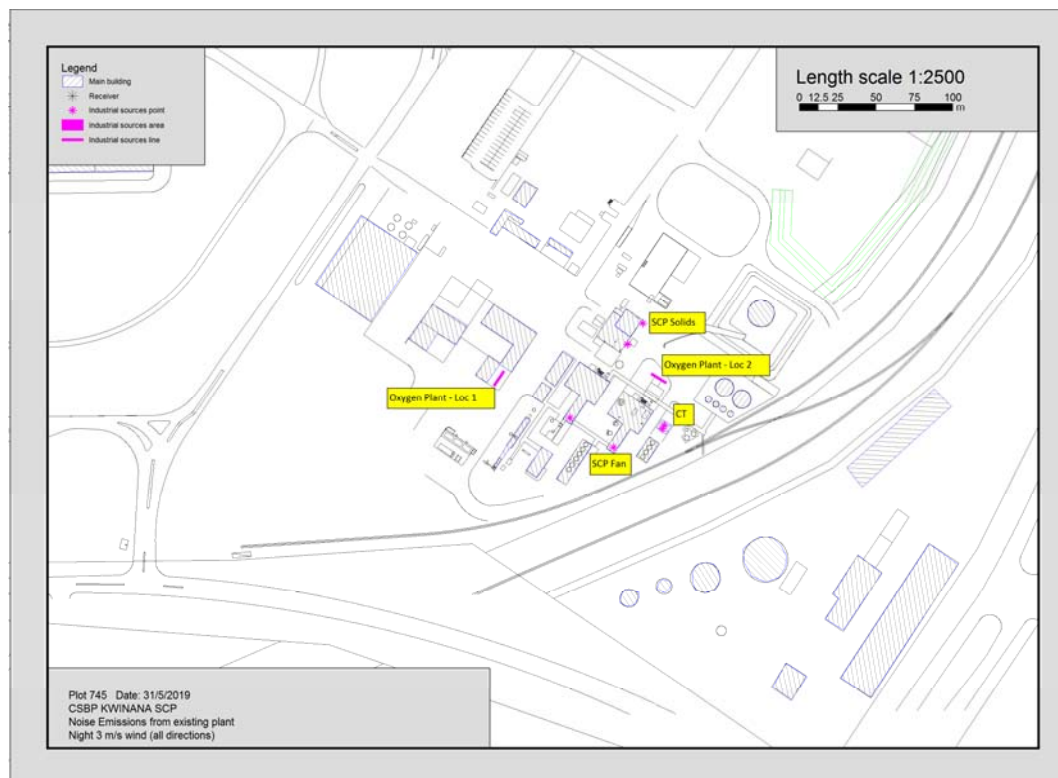


Figure 1 – SCMF Layout showing expansion major noise source locations

2.0 ENVIRONMENTAL NOISE CRITERIA

The criteria used is in accordance with the *Environmental Protection (Noise) Regulations 1997 (as amended)*. These regulations stipulate maximum allowable external noise levels determined by the calculation of an influencing factor. The influencing factor is calculated for the usage of land within the two circles, having radii of 100m and 450m from the premises of concern. For commercial and industrial premises the allowable assigned noise levels are fixed, as listed in Table 3.1.

TABLE 3.1 –ASSIGNED OUTDOOR NOISE LEVELS

Type of premises receiving noise	Time of day	Assigned level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area (i.e within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises other than those in the Kwinana Industrial Area	All hours	65	80	90
Industrial and utility premises in the Kwinana Industrial Area	All hours	75	85	90

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
 The L_{A1} noise level is the noise that is exceeded for 1% of the time.
 The L_{Amax} noise level is the maximum noise level recorded.
 IF = Influencing Factor

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined below as per Regulation 9.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 3.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS WHEN MUSIC IS NOT PRESENT

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

The premises nearest the site being assessed are industrial properties within the Kwinana Industrial Area, with ‘assigned levels’ of 75 L_{A10}, 85 L_{A1} and 90 L_{Amax}. At locations where noise levels from an industrial premises exceeds 65 dB(A), it is common for the noise emission to contain ‘tonal’ noise characteristic. Previous assessments have shown that noise emissions received at the neighbouring premises are ‘tonal’ under the regulations. As the tonal noise emission requires adjustment by +5 dB(A) before assessment with the ‘assigned level’ under the regulations, the sound level for compliance at the boundary of adjacent industrial premises is an L_{A10} of 70 dB(A).

Within the Medina/Kwinana residential area there are receptors located away from industrial and commercial areas, and away from major roads that have an influencing factor of zero. The night time ‘assigned level’ for these is 35 dB(A). As the previously measured background noise from the Kwinana Industrial Area is greater than 35 dB(A), each individual premises is required to emit no more than 30 dB(A) to these residential receptors at night, in accordance with regulation 7 and the ‘significantly contributing’ requirements, part (2).

3.0 METHODOLOGY

Noise levels were predicted using the acoustic software SoundPlan using the Concawe algorithm for nominated direction wind conditions in accordance with the Western Australian Environmental Protection Authority “Draft Guideline on Environmental Noise for Prescribed Premises”, May 2016.

The climatic conditions used for ‘worst case’ modelling are slightly different for night and day, although in practise the predicted emissions are similar for both sets of conditions. The night scenarios were modelled with 15 degree temperature with winds at 3 m/s (Pasquill Stability class F), this being the most stringent criteria for far-field residential receptors and the condition that results in the highest predicted noise emission. The sound power levels used in the acoustic modelling are tabulated in the Appendix A.

It is noted that ‘worst case’ wind conditions refer to conditions where there is a temperature inversion in conjunction with light winds in the direction from noise source to receiver, resulting in effective sound propagation receiver locations. The night scenarios are modelled with temperature inversion conditions.

The noise emissions from the proposed scenarios were predicted for a nominal ‘worst case’ scenario based on data provided or sourced from previously measured equipment. Two locations for the Oxygen Plant have been modelled, Location 1 and Location 2.

4.0 PREDICTED NOISE LEVELS

Noise emissions from existing plant were measured on the 27th February 2019 with the plant operating at capacity. The highest measured noise level at the nearby Coogee Chemicals boundary was an L_{A10} sound level of 67 dB(A). The acoustic model predicts noise emissions close to those measured.

The proposed expansion noise sources were added to the model, with the following predicted noise levels at the most significant (location of highest predicted noise level) section of the Coogee Chemicals boundary.

TABLE 4.1 – PREDICTED COOGEE CHEMICALS BOUNDARY NOISE LEVELS

Description	Coogee Chemicals L_{A10}	Medina Residential L_{A10}	Compliance Status
Night-time ‘assigned level’, L_{A10}	75	35	
Existing Plant	67 (72)	27 (32)	Complies
Expansion & Existing Plant – Oxygen Plant Location 1	68 (73)	27 (32)	Complies
Expansion & Existing Plant – Oxygen Plant Location 2	68 (73)	29 (34)	Complies

Note: () denotes adjusted level inclusive of adjustment of +5 dB(A) for tonal characteristic.

Noise contour plots of the area around the SCMF are shown in Appendix B. Plots 742 (existing), 743 (Expansion with Oxygen Plant at Location 1) and 744 (Expansion with Oxygen Plant at Location 2) are provided.

5.0 ASSESSMENT OF ENVIRONMENTAL NOISE COMPLIANCE

The existing measured noise levels at the key boundary sections of CSBP Kwinana are less than the Kwinana Industrial Area 'assigned levels' after adjustment for tonal characteristic.

The proposed expansion is predicted to increase the noise emission at the Coogee Chemicals boundary by 0.8 dB(A) for the proposal with Oxygen Plant at location 1 or 1.1 dB(A) for the oxygen plant at location 2. The predicted increase at Medina under 'worst case' inversion wind conditions is 0.6 dB(A) for Oxygen Plant at location 1 or 1.9 dB(A) at location 2.

The resultant noise emissions are compliant with the respective receptor 'assigned levels' after adjustment for tonal characteristic at Coogee Chemicals and 'significantly contributing' at Medina residential area.

This assessment shows that the proposed SCMF expansion with the oxygen plant at either Location 1 or Location 2 will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

7.0 CONCLUSION

CSBP Kwinana (Kwinana) commissioned Herring Storer Acoustics to carry out an acoustic assessment of a proposed expansion of the Sodium Cyanide Manufacturing Facility (SCMF) in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

The proposed expansion involves a relatively small increase in equipment on site. The proposal includes the addition of two cooling tower cells (duplicate of existing cells), a number of pumps, the addition of a packaged Oxygen Plant, duplication of some equipment in the Solids Plant and addition of fresh air intake booster fans for SCP1 and SCP2. The booster fans have been specified with suitable acoustic attenuators to control noise emissions.

The most significant receptor location is the nearby Coogee Chemicals premises, on the far side of the rail reserve, which is within the Area A zone of the Kwinana Industrial Area, with associated 'assigned level' of L_{A10} of 75 dB(A).

The noise emissions from the proposed scenarios were predicted for a nominal 'worst case' scenario based on data provided or sourced from previously measured equipment. Two locations for the Oxygen Plant have been modelled, Location 1 and Location 2.

The proposed expansion is predicted to increase the noise emission at the Coogee Chemicals boundary by 0.8 dB(A) for the proposal with Oxygen Plant at location 1 or 1.1 dB(A) for the oxygen plant at location 2. The predicted increase at Medina under 'worst case' inversion wind conditions is 0.6 dB(A) for Oxygen Plant at location 1 or 1.9 dB(A) at location 2.

The resultant noise emissions are compliant with the respective receptor 'assigned levels' after adjustment for tonal characteristic at Coogee Chemicals and 'significantly contributing' at Medina residential area.

This assessment shows that the proposed SCMF expansion with the oxygen plant at either Location 1 or Location 2 will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

APPENDIX A

SCMF EXPANSION - SOUND POWER LEVELS

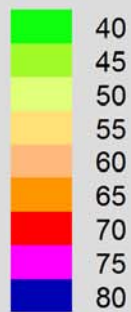
SCMF Expansion - Sound Power Levels

Description	L _{WA}	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k
CT No.2-1 Fan Discharge (High speed)	89.4	102	99	102	100	95	94	95	94	92	88	87	87	84	83	82	78	76	74	71	69	67	62	61	58	53	52
CT No.2-4 Fan Discharge (High speed)	89.4	102	99	102	100	95	94	95	94	92	88	87	87	84	83	82	78	76	74	71	69	67	62	61	58	53	52
Oxygen Plant	107.0	93	94	96	94	93	98	92	88	93	86	91	89	88	90	89	86	85	86	84	82	82	82	81	77	75	74
SCP 1 Blower Fan Attenuated	94.7					108			103			98			94			79			75			74			80
SCP 2 Blower Fan Attenuated	94.7					108			103			98			94			79			75			74			80
SCP No.2 CT Upgrade (east)	98.3	84	85	85	86	87	83	81	82	83	80	76	72	77	75	72	73	72	77	75	72	71	69	67	68	64	61
SCP No.2 CT Upgrade (west)	98.3	85	86	86	87	88	84	82	83	84	81	77	73	78	76	73	74	73	78	76	73	72	70	68	69	65	62
Solids Scrubber - Centrifuge 2	95.7	82	82	82	82	82	82	86	86	86	87	87	87	86	86	86	85	85	85	86	86	86	78	78	78	78	78

APPENDIX B

NOISE EMISSION PLOTS

Noise level
dB(A)
in dB(A)

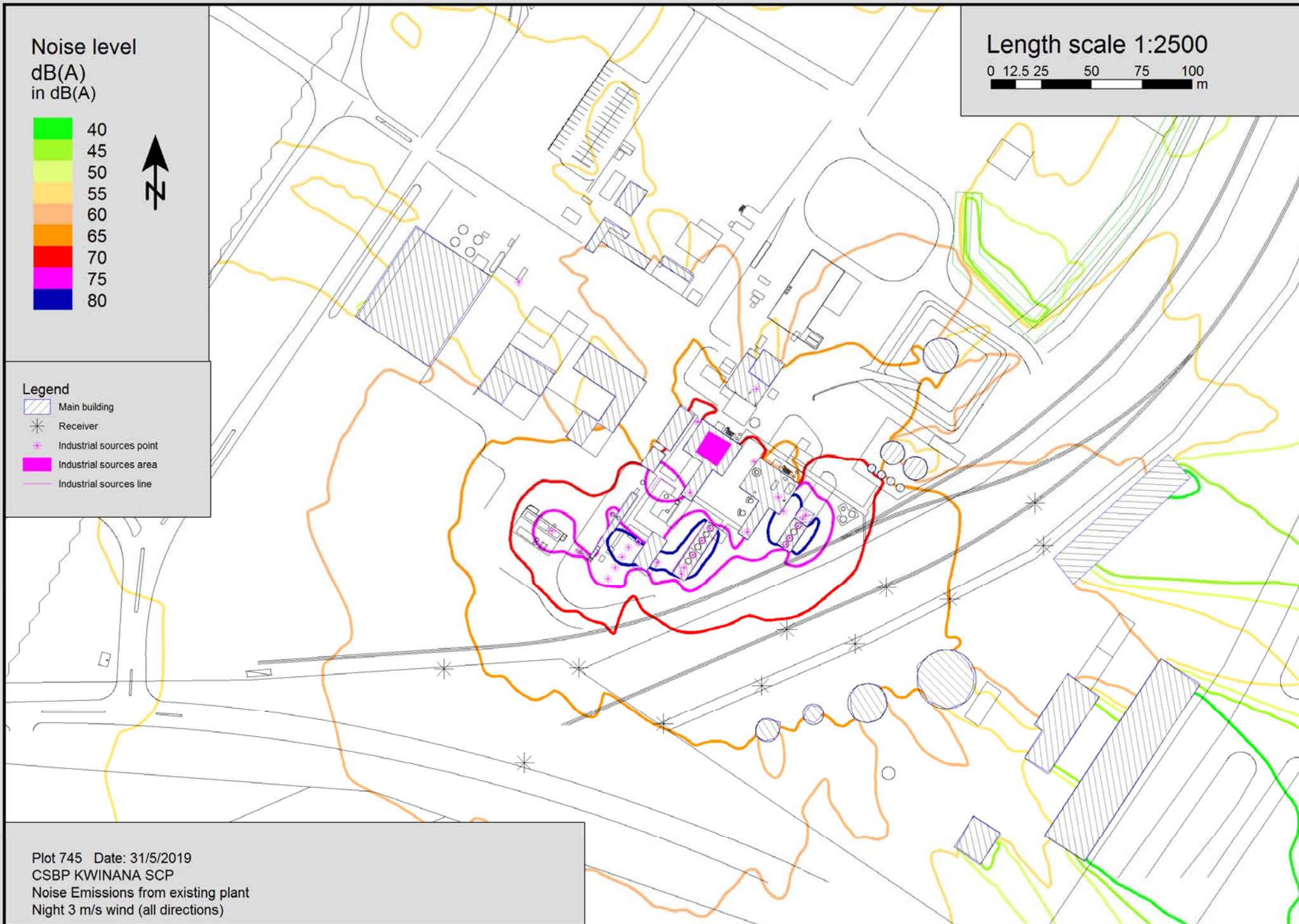


Length scale 1:2500



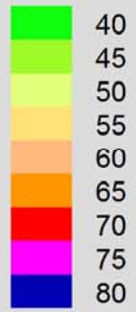
Legend

- Main building
- Receiver
- Industrial sources point
- Industrial sources area
- Industrial sources line



Plot 745 Date: 31/5/2019
CSBP KWINANA SCP
Noise Emissions from existing plant
Night 3 m/s wind (all directions)

Noise level
dB(A)
in dB(A)



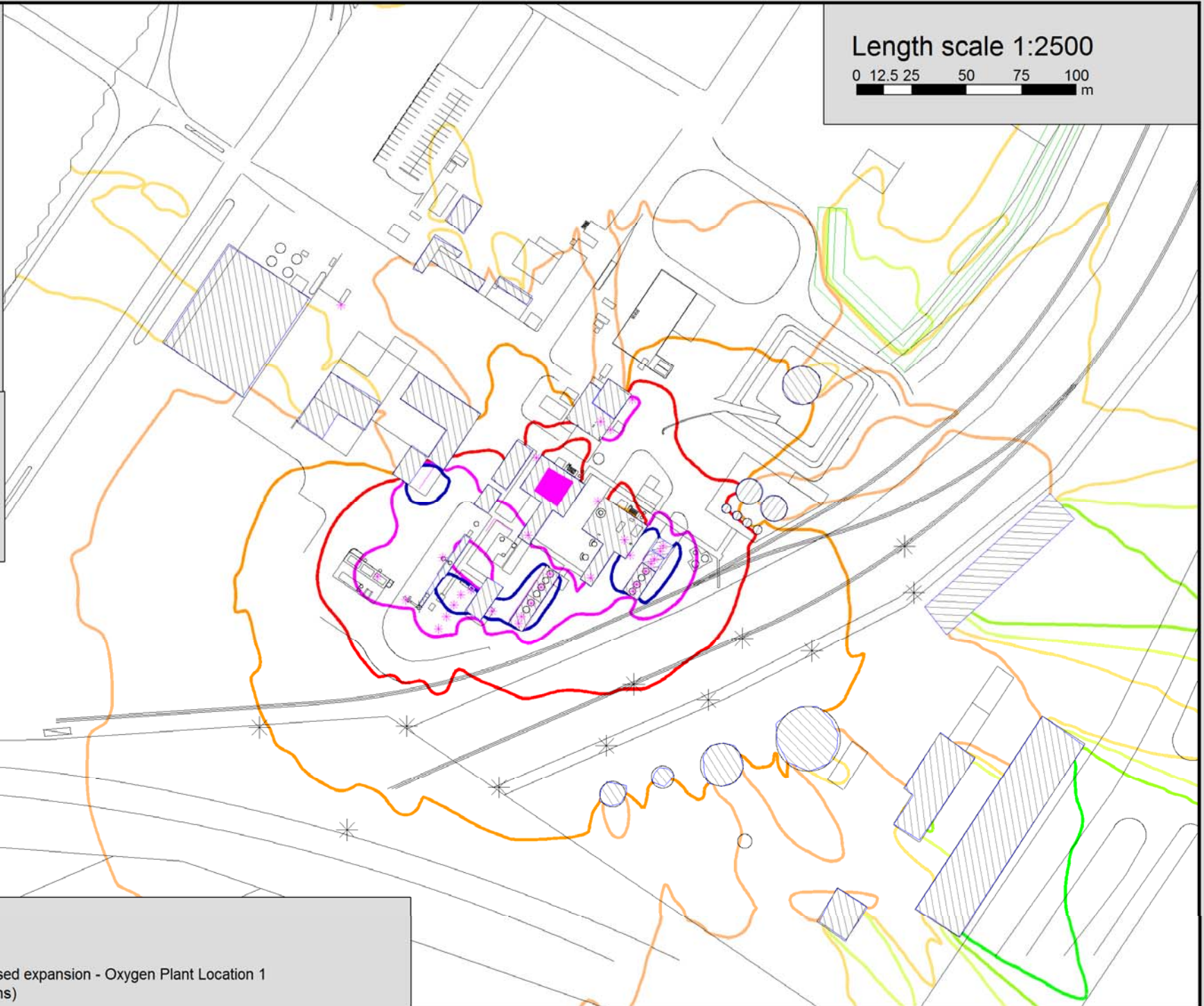
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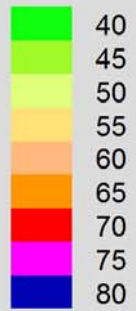
Legend

- Main building
- Receiver
- Industrial sources point
- Industrial sources area
- Industrial sources line

Plot 746 Date: 31/5/2019
CSBP KWINANA SCP
Noise Emissions from proposed expansion - Oxygen Plant Location 1
Night 3 m/s wind (all directions)



Noise level
dB(A)
in dB(A)

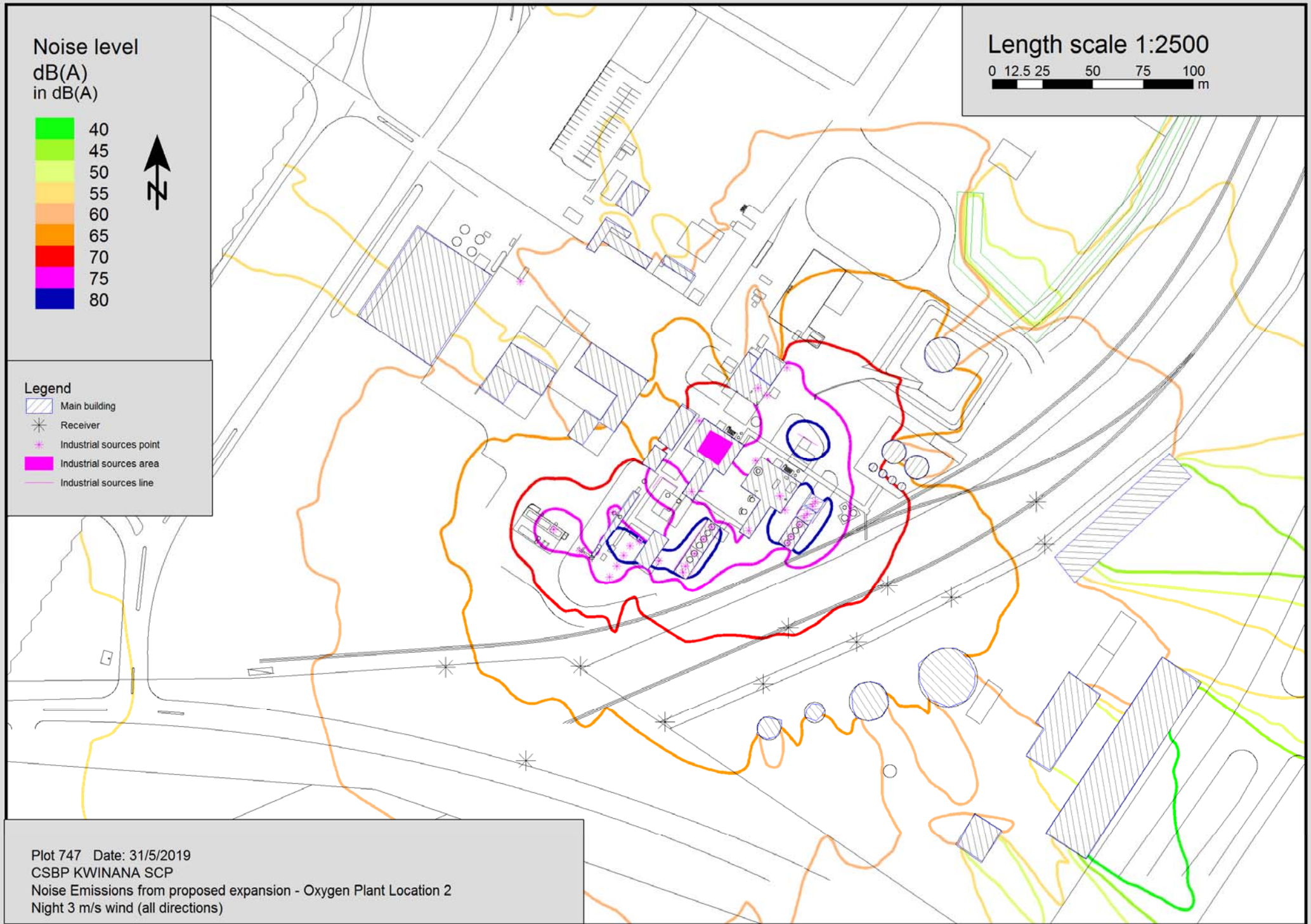


Length scale 1:2500



Legend

- Main building (hatched rectangle)
- Receiver (asterisk)
- Industrial sources point (pink star)
- Industrial sources area (magenta square)
- Industrial sources line (pink line)



Plot 747 Date: 31/5/2019
CSBP KWINANA SCP
Noise Emissions from proposed expansion - Oxygen Plant Location 2
Night 3 m/s wind (all directions)