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Re: Oakdale West Estate (OWE) Modification 7 – Noise Assessment  
RWDI Ref. 2102730A

Dear Stephanie

## Introduction

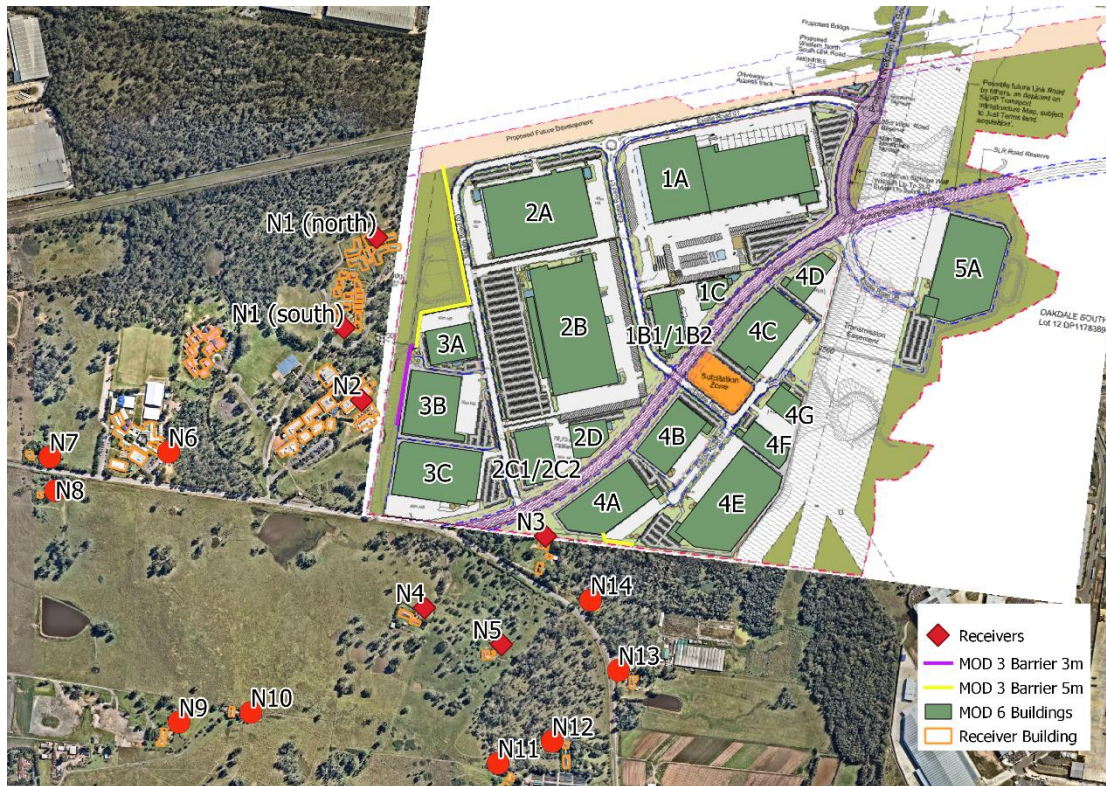
RWDI Australia Pty Ltd (RWDI) was commissioned by Goodman to review the Modifications of the Oakdale West Estate (OWE) Plans – SSD 7348 Modification 7 (MOD 7). The purpose of the review is to determine the noise impact from MOD 7 on surrounding receivers and provide any noise control recommendations, if required. The existing OWE noise model developed during MOD 6 has been adapted to reflect the proposed changes, based on updated civil design, operational changes and updated building layouts.

MOD 7 involves minor changes to the Concept Plan Approval and Stage 1 Development Approval, principally relating to Precincts 3 and 4 as follows:

- Building layouts across Precinct 3 and 4, namely Lot 3B, 3C, and 4E.
- Civil design amended to accommodate changes to Precinct 3 and Precinct 4;
- the removal of an Estate Road in Precinct 4
- inclusion of additional retaining walls in Precinct 3 & 4
- The proposal also includes a modification to Stage 1 of SSD 7348 to construct a 2.4 m high boundary fence between Lot 1A and Lots 1B & 1C in Precinct 1.
- Operation of a forklift at Lot 4E during the night period (10.00pm to 7.00am).

Comparison of the OWE MOD 6 and OWE MOD 7 Concept Plans are presented in **Figure 1** and **Figure 2**, respectively. The site maps also include the locations of nearby surrounding receivers.

**Figure 1: Site Location Plan – MOD 6**



**Figure 2: Site Location Plan – MOD 7**







## Approved Noise Limit

Conditions B18 and B19 of SSD 7348 include operational noise limits for the site as follows:

### NOISE LIMITS

B18. The Applicant shall ensure the Development does not exceed the noise limits in **Table 3** at the receiver locations N1, N2, N3, N4 and N5 shown on the plan in **Appendix 5**.

**Table 3: Noise Limits dB(A)**

Location	Day	Evening	Night	L <sub>AMax</sub>
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	
N1 Emmaus Village Residential	44	43	41	52
N3 Kemps Creek – nearest residential property	39	39	37	52
N4 & N5 Kemps Creek – other residences	39	39	37	52
All other non-associated residences	40 <sup>2</sup>	35 <sup>2</sup>	35 <sup>2</sup>	52
N2 Emmaus Catholic College (school)	When in use: 45 L <sub>eq</sub> (1h)			

#### Notes:

- Noise generated by the development is to be measured in accordance with the relevant procedures and modifications, including certain meteorological conditions, of the Noise Policy for Industry (EPA, 2017). Refer to the plan in Appendix 2 for the location of residential sensitive receivers.
- or background + 5 dB, whichever is higher.

B19. The noise limits in **Table 3** do not apply to receiver N3, N4 and N5 if the Applicant has a Noise Agreement with the relevant landowner to exceed the noise limits, and the Applicant has provided written evidence to the Planning Secretary that an agreement is in place.

It is understood that a Noise Agreement between the applicant and receiver N3, N4 and N5 has been made. As such, the criteria in Condition B18 of the Development Consent SSD 7348 are not applicable at receivers N3, N4 and N5. Since the assessment of MOD 6, nine additional noise sensitive receivers have been taken into consideration to ensure noise compliance is achieved at all surrounding receiver locations.

Receiver N6 is Mamre Anglican College which will have the same noise criteria as N2 – Emmaus Catholic College (school).

To develop criteria for residential receivers N7 to N14, data was obtained from the unattended noise monitoring systems located on site. The location of these monitors is shown in Figure 3.

**Figure 3: Noise Monitoring Locations**



The 'South' location is representative of residential receivers N7 to N14. The 'Village' location is representative of residential location N1 (presented for information only).

We have re-analysed this data between 1 May 2021 and 29 June 2021 for these two locations to determine the Rating Background Levels (RBLs) in accordance with the NPfI. This process avoids any potential influence from daytime construction noise on site. The resulting background levels are shown in **Table 1**. These are consistent with our expectations given the site conditions.

**Table 1: Calculated RBLs**

Location	RBL (dBA)		
	Day	Evening	Night
South	42	37	37
Village	39	38	37

As per Condition B18, all other 'non-associated residences' can be evaluated using background plus 5 criteria. The criteria determined in Table 2 have been adopted for receivers N7 to N14.

**Table 2: Intrusiveness Criteria (Background plus 5)**

Location	Criteria (dBA)		
	Day	Evening	Night
Receivers N7 to N14 (South)	47	42	42

## Noise Modelling

Operational noise emissions from the site have been predicted with a model prepared using the SoundPLAN V8.0 noise modelling software, implementing the CONCAWE prediction method. The model incorporates the OWE MOD 7 Masterplan design, including the updated civil design and buildings shown in **Figure 2**.

There have been some changes to modelling assumptions to more accurately reflect this current operational plan. This includes traffic forecasts provided by tenants. These assumptions are presented in the following tables.

Note that traffic assumptions were previously conservative. Information provided for this assessment provides a more accurate assessment of traffic noise. Table 3 below presents the sound power level assumptions used for this assessment.

**Table 3: Sound Power Reference Levels**

Noise Source	Noise Characteristic	Sound Power Level SWL, dBA
<b>Forklift operational on hardstand<sup>3</sup></b>	Quasi-steady	93 L <sub>Aeq</sub>
<b>Light Vehicles<sup>6</sup> on site, up to speed of 40km/h</b>	Quasi-steady	90 L <sub>Aeq</sub>
<b>Heavy Vehicle<sup>1</sup> @25 km/h</b>	Quasi-steady	106 L <sub>Aeq</sub>
<b>Heavy Vehicle<sup>1</sup>, unloaded @ 10 km/h</b>	Quasi-steady	106 L <sub>Aeq</sub>
<b>Heavy Vehicle<sup>1</sup>, loaded @ 10 km/h</b>	Quasi-steady	107 L <sub>Aeq</sub>
<b>Heavy Vehicle<sup>1</sup>, reversing<sup>4</sup> @ 5 km/h</b>	Quasi-steady	111 L <sub>Aeq</sub>
<b>Truck Idling<sup>5</sup></b>	Quasi-steady	95 L <sub>Aeq</sub>
<b>Truck Engine Starting</b>	Instantaneous	100 L <sub>Amax</sub>
<b>Truck Airbrake Release<sup>2</sup></b>	Instantaneous	113 L <sub>Amax</sub>

Note 1: Heavy vehicle defined as any cargo vehicle with three or more axles with gross vehicle weight > 12,000 kg.

Note 2: Consistent with measurements taken at Woolworths Customer Fulfillment Centre Brookvale, 16 March 2021.

Note 3: Consistent with assessment of Woolworths Moorebank Distribution Centre, 16 October 2020.

Note 4: Assume that reversing operation will not take more than 30 seconds for each vehicle.

Note 5: Consistent with measurements taken at Woolworths Distribution Centre Minchinbury, 1 April 2021.

Note 6: Considered conservative when compared to previous assessment of Woolworths Moorebank Distribution Centre.

**Table 4: Peak Hourly Assumed Traffic Volumes**

Precinct	Lot	Day (7am -6pm)		Evening (6pm-10pm)		Night (10pm -7am)	
		LV	HV	LV	HV	LV	HV
<b>1</b>	<b>1A</b>	377	54	377	54	216	54
	<b>1B1</b>	7	5	7	5	2	1
	<b>1B2</b>	7	5	7	5	2	1
	<b>1C<sup>1</sup></b>	14	-	14	-	4	-
<b>2</b>	<b>2A</b>	65	21	65	21	19	6
	<b>2B<sup>3</sup></b>	805	22	842	24	515	28
	<b>2C-1<sup>2</sup></b>	17	-	5	-	5	-
	<b>2C-2<sup>2</sup></b>	16	-	4	-	5	-
	<b>2D</b>	33	11	33	11	10	3
<b>3</b>	<b>3A</b>	13	3	-	-	-	-
	<b>3B1</b>	13	3	-	-	-	-
	<b>3B2</b>	13	3	-	-	-	-
	<b>3C</b>	13	3	-	-	-	-
<b>4</b>	<b>4A</b>	28	9	28	9	8	3
	<b>4B</b>	22	7	22	7	7	2
	<b>4C</b>	27	9	27	9	8	3
	<b>4D</b>	10	3	10	3	3	1
	<b>4E<sup>3</sup></b>	84	28	33	6	117	34
	<b>4F</b>	6	2	6	2	2	1
	<b>4G</b>	6	2	6	2	2	1
<b>5</b>	<b>5A</b>	43	14	43	14	13	4

Note 1: 1C HV movements captured in 1B

Note 2: 2C HV movements captured in 2D

Note 3: Updated with hourly breakdown provided by tenant

Light vehicle and heavy vehicle traffic movements have been modelled as line sources with varying speed. Heavy vehicles are expected to enter the estate at 50km/h, reduce speed to 25km/h on estate roads, and reduce speed again to 10km/h when manoeuvring on site. For instances where heavy vehicles will be side loaded, these will park up within the bays allocated with engine off whilst loading/unloading. For rear loaded semi-trailers, these will reverse into the recessed docks where indicated. Sound power levels have been applied as per, accounting for reversing alarms.

**Table 5: Mechanical Services / Fixed Plant Noise Sources throughout OWE**

Precinct	Lot	Day (7am -6pm)	Evening (6pm-10pm)	Night (10pm -7am)
<b>Precinct 1</b>	1A	See Footnote	See Footnote	See Footnote
	1B1	No Operation	No Operation	No Operation
	1B2	No Operation	No Operation	No Operation
	1C	No Operation	No Operation	No Operation
<b>Precinct 2</b>	2A	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative
	2B	Refer Table 4-2 of Oakdale West Estate (OWE) Noise & Vibration Assessment Report (Report No.:19940 Version F)		
	2C-1	No Operation	No Operation	No Operation
	2C-2	No Operation	No Operation	No Operation
	2D	No Operation	No Operation	No Operation
<b>Precinct 3</b>	3A	No Operation	No Operation	No Operation
	3B	No Operation	No Operation	No Operation
	3C	No Operation	No Operation	No Operation
<b>Precinct 4</b>	4A	No Operation	No Operation	No Operation
	4B	No Operation	No Operation	No Operation
	4C	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative
	4D	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative
	4E	No Operation	No Operation	No Operation
	4F	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative
	4G	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative
<b>Precinct 5</b>	5A	SWL 90 dBA Cumulative	SWL 90 dBA Cumulative	SWL 85 dBA Cumulative

Note: Some of these assumptions have changed from previous assessments to be consistent with the current operational plan. Details of the Lot 1A mechanical services plant are set out in Table 4 of the MOD 2 noise assessment prepared by SLR (SLR Ref: 610.15617-L04-v1.5.doc). Assumptions for night-time plant operation has been based off estates in the surrounding area and current operational plan, as advised by Goodman.

**Table 6: Number of Operational Forklifts Assumed for each Lot**

Precinct	Lot	Day (7am -6pm)	Evening (6pm-10pm)	Night (10pm -7am)
<b>Precinct 1</b>	1A	4	4	4
	1B1	2	No Operation	No Operation
	1B2	1	No Operation	No Operation
	1C	1	No Operation	No Operation
<b>Precinct 2</b>	2A	2	No Operation	2
	2B	7	7	7
	2C-1	1	No Operation	No Operation
	2C-2	1	No Operation	No Operation
	2D	1	No Operation	No Operation
<b>Precinct 3</b>	3A	1	No Operation	No Operation
	3B	1	No Operation	No Operation
	3C	1	No Operation	No Operation
<b>Precinct 4</b>	4A	1	No Operation	No Operation
	4B	1	No Operation	No Operation
	4C	1	No Operation	1
	4D	1	No Operation	1
	4E	1	No Operation	1
	4F	1	No Operation	1
	4G	1	No Operation	1
<b>Precinct 5</b>	5A	1	No Operation	No Operation

## Noise Impact Results

### *Intrusive Noise Impact Results*

Updated modelling taking into account the changes associated with MOD 7 indicates that predicted noise levels would increase by 3dB at Emmaus Collect (N2) during the daytime period. This is due to the exposure of truck noise from Lot 3B2 and lot 3C. It should be noted, the predicted noise level at N2 would remain in compliance with the sites approved noise levels at under all operational conditions.

Predicted noise levels at N13 and N14 have increased by 1 to 7dB across all scenarios. This is due to the exposure of truck noise from Lot 4E. However, noise levels at both of these receivers remain compliant.



**Table 7** presents the comparison in the MOD 6 and MOD 7 noise impact results.

**Table 7: Predicted  $L_{Aeq,15min}$  Operational Noise Levels – All Precincts, Peak Season**

Receiver	Period (weather)	$L_{Aeq,15min}$ Approved Noise Limits	$L_{Aeq,15min}$ Noise Level (dBA)	
			Mod 6	Mod 7
<b>N1 – Emmaus Village (Residential)</b>	Day	44	39	36
	Eve	43	38	36
	Night	41	36	37
	Night <sup>(Adverse)</sup>	41	39	41
<b>N2 – Emmaus College (School)</b>	Day	45	39	43
	Eve	n/a	39	32
	Night	n/a	34	34
	Night <sup>(Adverse)</sup>	n/a	37	38
<b>N6 – Mamre Anglican College</b>	Day	45	32	28
	Eve	n/a	32	27
	Night	n/a	30	28
	Night <sup>(Adverse)</sup>	n/a	35	34
<b>N7 – 21-42 Bakers Ln, Kemps Creek</b>	Day	47	30	29
	Eve	42	30	28
	Night	42	28	31
	Night <sup>(Adverse)</sup>	42	34	36
<b>N8 – 706-752 Mamre Rd, Kemps Creek</b>	Day	47	31	28
	Eve	42	30	27
	Night	42	28	29
	Night <sup>(Adverse)</sup>	42	34	34
<b>N9 – 754-770 Mamre Rd, Kemps Creek</b>	Day	47	18	<20
	Eve	42	18	<20
	Night	42	16	<20
	Night <sup>(Adverse)</sup>	42	21	22
<b>N10 – 784-786 Mamre Rd, Kemps Creek</b>	Day	47	31	27
	Eve	42	30	27
	Night	42	28	28
	Night <sup>(Adverse)</sup>	42	33	33
	Day	47	35	34
	Eve	42	34	34

Receiver	Period (weather)	L <sub>Aeq,15min</sub> Approved Noise Limits	L <sub>Aeq,15min</sub> Noise Level (dBA)	
			Mod 6	Mod 7
<b>N11 – 99-111 Aldington Rd, Kemps Creek</b>	Night	42	32	33
	Night <sup>(Adverse)</sup>	42	37	39
<b>N12 – 53 Aldington Rd, Kemps Creek</b>	Day	47	34	33
	Eve	42	33	33
	Night	42	31	33
	Night <sup>(Adverse)</sup>	42	37	39
<b>N13 – 54-72 Aldington Rd, Kemps Creek</b>	Day	47	33	32
	Eve	42	33	32
	Night	42	31	33
	Night <sup>(Adverse)</sup>	42	36	38
<b>N14 – 74-88 Aldington Rd, Kemps Creek</b>	Day	47	32	35
	Eve	42	32	35
	Night	42	27	34
	Night <sup>(Adverse)</sup>	42	33	39

- Note 1: The approved noise limit for N2 is L<sub>Aeq</sub> 35 dBA which applies internally and is only applicable when the school is in use. For the purpose of this assessment a conservative inside to outside correction of +10 dBA has been applied to the internal limit for N2 to allow for comparison with the external noise predictions. An inside to outside correction of +10 dBA is typical of a building with partially open windows.
- Note 2: Consistent with the MOD2 assessment, noise-enhancing weather conditions during the daytime and evening periods have not been included in the assessment as these are not considered prevailing conditions for the site.
- Note 3: This assessment has applied a revised sound power level of 90 dBA to represent a light vehicle movement. MOD2 applied a sound power level of 96 dBA, which is considered overly conservative.
- Note 4: The predictions have assumed that the Lot 2B mechanical services plant can be attenuated by 10 dB by inclusion of silencers/attenuators and/or barrier solutions. This would need to be addressed with the mechanical services engineers during detailed design. Note this assessment has assumed that all mech services plant would operate concurrently, at all times - this assumption would also be reviewed at detailed design.

We do not believe that a modifying factor correction is warranted at this stage. We would normally apply an intermittent modifying factor to L<sub>Aeq,15min</sub> noise levels where all noise being assessed suddenly increases or reduces where the difference between the total L<sub>Aeq,15min</sub> (including all other non-industrial sources) at the receiver with the source present and not present results in a difference in L<sub>Aeq</sub> of 5dB or more during a 15 minute period. It should be noted that given the number of sources at OWE, total noise emissions will not suddenly change.

Even if they did and based on the logging performed at the southern location, night time L<sub>Aeq,15min</sub> are typically 40dBA and do not drop below 37dBA. Given the loudest level we are predicting is 41dBA (a difference of no more than 4dB), we would still not apply an intermittent correction.

We have consulted with the Noise Policy Section of the EPA and, their interpretation is similar to ours and they do not consider that an intermittent modifying factor is warranted in this instance. They will be confirming this advice in writing. This will be submitted with this assessment as soon as it's received.

## Sleep Disturbance Assessment

**Table 8** shows the  $L_{A1,1min}$  maximum operational noise predictions for MOD 6 and MOD 7 in comparison with the approved noise limits. Note that for the sources assessed, the difference between the  $L_{A1,1min}$  and  $L_{Amax}$  descriptors is negligible.

**Table 8: Predicted Maximum Operational Noise Levels – Staged Development**

Receiver	Period	$L_{A1,1min}$ Noise Level (dBA)		
		(Approved Limit)	MOD 6	MOD 7
<b>N1 – Emmaus Village Residential</b>	Night	52	44	44
	Night <sup>Adverse</sup>	52	50	50
<b>N2 – Emmaus College (School)</b>	Night	n/a	n/a	n/a
	Night <sup>Adverse</sup>	n/a	n/a	n/a
<b>N6 – Mamre Anglican College</b>	Night	n/a	n/a	n/a
	Night <sup>Adverse</sup>	n/a	n/a	n/a
<b>N7 – 21-42 Bakers Ln, Kemps Creek</b>	Night	52	37	37
	Night <sup>Adverse</sup>	52	41	41
<b>N8 – 706-752 Mamre Rd, Kemps Creek</b>	Night	52	35	35
	Night <sup>Adverse</sup>	52	42	42
<b>N9 – 754-770 Mamre Rd, Kemps Creek</b>	Night	52	20	20
	Night <sup>Adverse</sup>	n/a	27	27
<b>N10 – 784-786 Mamre Rd, Kemps Creek</b>	Night	52	35	35
	Night <sup>Adverse</sup>	52	41	41
<b>N11 – 99-111 Aldington Rd, Kemps Creek</b>	Night	n/a	n/a	n/a
	Night <sup>Adverse</sup>	n/a	n/a	n/a
<b>N12 – 53 Aldington Rd, Kemps Creek</b>	Night	n/a	n/a	n/a
	Night <sup>Adverse</sup>	n/a	n/a	n/a
<b>N13 – 54-72 Aldington Rd, Kemps Creek</b>	Night	n/a	n/a	n/a
	Night <sup>Adverse</sup>	n/a	n/a	n/a
<b>N14 – 74-88 Aldington Rd, Kemps Creek</b>	Night	52	49	49
	Night <sup>Adverse</sup>	52	51	52



Updated modelling taking account of the changes associated with MOD 7 (and Stage 3 DA & Council DA) indicates that noise levels would remain in compliance with the sites approved noise levels at these receivers under all operational and meteorological conditions.

#### *Construction Noise*

Construction works are to maintain the Noise Mitigation Plan outlined in Section 6.5 and 6.7 of the Wilkinson Murray Operational Noise Assessment report (reference number: 19440, Version F) and the indicative construction noise and vibration mitigation measures recommended in Section 5 of SLR report 610.15617-R2.

#### *Discussion*

Noise impact assessment in relation to intrusive, sleep disturbance, cumulative and construction noise have been considered in this review. As indicated in the result sections, there is a slight increase in noise level at N1 during the night time period. However, compliance is still achieved.

The predicted noise levels at receivers N2 and N14 have changed slightly due to the updates made. Notably, receivers immediately south of Building 4E have seen predicted noise levels increase during the evening and night time periods. The noise impact at all receivers are compliant with the relevant conditions of consent.

Therefore, the proposed changes have been determined by noise modelling to be relatively minor from an acoustical perspective and no additional noise control is required.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours truly

A handwritten signature in black ink, appearing to read 'Ben Lawrence'.

**Ben Lawrence**  
Technical Director  
RWDI