21 January 2022

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Aurizon Operations Limited
Ground Floor, 121 Woodstock Street
Mayfield NSW 2304

Attention: Harry Egan

Dear Harry

Condition F4A - Turning Angle Noise and Vibration Compliance Assessment Hexham Train Support Facility

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) was engaged by Aurizon Operations Limited (Aurizon) to conduct an operational noise and vibration compliance assessment for the turning angle (the Project) located at the Hexham Train Support Facility (TSF), NSW.

Aurizon was issued SSI 6090 MP07_0171 MOD 1 (the Approval) for the Project on 8 October 2019. Condition F4A of the Approval requires that a noise and vibration assessment be conducted to assess compliance with the limits contained in condition C1 and C2 of the Approval and confirm the predictions contained in section B1 of the Approval.

2 Noise and Vibration Criteria

Condition F4a of the Approval is as follows:

> *F4A. The Proponent shall undertake a noise and vibration compliance assessment, consistent with the requirement of condition F4 to include the Turning Angle Works within 12 months of the commencement of operation of the Turning Angle Works.*

Condition F4 of the Approval is provided in **Table 1** together with the relevant section of this report where the requirements have been addressed.

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Table 1 Condition F4 of the Approval

Condition Requirements	Relevant NIA Section
The Proponent shall undertake a noise and vibration compliance assessment to confirm the predictions of the noise assessment included at B1 and the limits referred to in condition C2. The noise and vibration compliance assessment shall be developed in consultation with the EPA and be undertaken within 12 months of the commencement of operation of the SSI, or as otherwise agreed by the Planning Secretary. The assessment shall include, but not necessarily be limited to:	Section 3
(a) noise and vibration monitoring and compliance assessment, to assess compliance with conditions C1 and C2 of this approval	Section 3
(b) methodology for assessment, including the assessment of worst-case scenarios	Section 3
(c) details of any complaints received relating to operational noise and vibration impacts	No Complaints have been received relating to noise and/or vibration from the Project.
(d) any required recalibration of the noise and vibration model	Section 3
(e) consideration of the cumulative noise and vibration impacts associated with the Project and the proposed ARTC Hexham Relief Roads project	Section 3
(f) consideration of noise impacts to the Hexham Swamp Reserve with reference to the passive recreation criteria under the INP	Section 3
(g) an assessment of the performance and effectiveness of the applied noise and vibration mitigation measures	Section 3
(h) identification, if required, of further noise and vibration mitigation measures to meet the requirements of C1 and C2 of this approval	Section 3

The vibration limits contained in the Approval are:

> *C1 The SSI shall be designed and operated with the objective of not exceeding the vibration goals for human exposure for existing sensitive receivers, as presented in Assessing Vibration: a Technical Guideline (DECC, 2006).*

The relevant vibration goals for human exposure at relevant existing sensitive receivers are reproduced from *Assessing Vibration: a Technical Guideline (DECC, 2006)* and are presented in **Table 2**.

Table 2 Preferred and maximum weighted rms values for continuous and impulsive vibration acceleration (m/s^2) 1–80 Hz

Location	Assessment Period	Preferred Values		Maximum Values	
		z-axis	x-and y-axis	z-axis	x-and y-axis
Continuous vibration					
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Workshops	Day or night-time	0.04	0.029	0.080	0.058

1. Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am

The relevant noise limits are contained in Condition C2 Table 1 and are reproduced in **Table 3**.

Table 3 Operational Noise Limits (dB(A))

Receiver	Daytime **LAeq(15minute)**	**Evening** LAeq(15minute)	**Night** LAeq(15minute)	**Night** LA1(1minute)
R1 Hain Property	46	46	45	56
R2 Lynch Property	60	50	45	62
R3 New England Highway	60	50	45	62
R4 Old Maitland Road (North)	45	45	44	54
R5 Old Maitland Road	45	45	44	54
R6 Old Maitland Road (South)	45	45	44	54
R7 Maitland Road	60	50	45	62
R8 Church Old Maitland Road	40 (internal – when in use)			N/A
R9 Tarro Primary School	35 (internal – when in use)			N/A
Hexham Swamp Nature Reserve	50 (when in use)			N/A

Notes:

- For the purposes of this condition, daytime is defined as the period from 7am to 6pm, Monday to Saturdays and 8am to 6pm on Sundays and public holidays. Evening is defined as the period from 6pm to 10pm and night time is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and public holidays.
- The noise emission limits apply under all meteorological conditions except during wind speeds greater than 3m/s at 10m height; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m height; or stability category G temperature inversion conditions as described in the NSW Industrial Noise Policy.
- For the purpose of noise measurement required for this condition, the LAeq(15minute) noise level must be measured approximately on the property boundary, where any residence is situated 30m or from the property boundary closest to the premises; within 30m of a residence, but not closer than 3m, where any residence is located more than 30m from the boundary closest to the premises; and within 50m of the boundary of a National Park or Nature Reserve
- For the purpose of noise measurement required for this condition, the LA1(1minute) noise level must be measured within 1m of a residence.
- Noise measurement equipment must be located at the most affected point at a location.

3 Noise and Vibration Assessment

3.1 Methodology

The methodology for the noise and vibration compliance assessment was prepared in consultation with the NSW Environment Protection Authority (**Appendix A**).

Due to the infrequent use and limited number of movements on the turning angle (i.e typically one movement per day) noise monitoring was conducted during the night-time period during a rail movement. This is considered a 'worst-case' operating scenario for assessing noise levels from the turning angle.

3.2 Noise Assessment

Operator attended noise monitoring was conducted during the night-time period on Wednesday 28 April 2021 to capture the noise emissions of one rail movement on the Project. Measurements were conducted at locations representing the nearest affected noise sensitive residential receiver and the Hexham Swamp Nature Reserve (HSNR). The Locations of the noise measurements are presented in **Table 4**.

Table 4 Measurement Locations

Receiver	UTM Coordinates Zone 56H	
	X	Y
R7	377505	6365312
HSNR	376397	6365886

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of AS IEC 61672.1 – 2004 Electroacoustics—Sound level meters - Specifications and carried calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ±1.0 dBA.

The attended noise measurements were performed using Bruel & Kjaer 2250L and 2270 sound level meters (serial numbers 3005904 and 2679354 respectively). Results from the operator attended noise surveys are provided in **Table 5**.

Table 5 Operator Attended Noise Surveys

Location	Date/Start Time/ Weather	L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
R7	28/4/2021 22:24 18°C 1.9 m/s W	88	83	76	56	72	**Turning Angle:** Inaudible **Estimated $L_{Aeq(15minute)}$ <46 dBA** **Estimated $L_{A1(1minute)}$ <46 dBA** *Other noise sources* Road traffic 51-88
HSNR	28/4/2021 22:26 18°C 1.9 m/s W	70	52	51	47	49	**Turning Angle:** Briefly Audible Train shunting 42-50 **Estimated $L_{Aeq(15minute)}$ 35 dBA** *Other noise sources* Road traffic 42-52 Insects 38-46 Train horn 70

Project noise emissions were not discernible at R7 monitoring location over the existing ambient noise levels during the noise monitoring period. Where this is the case, noise levels from the source are typically at least 10 dB below the measured L_{A90} noise level. Therefore, subtracting 10 dB from the measured L_{A90} noise level at these locations gives an indication of the maximum $L_{Aeq(15minute)}$ and $L_{A1(1minute)}$ contribution of less than 46 dBA at R7 and is considered compliant with C2 operational noise limits. Given that R7 is the nearest receiver to the Project compliance with C2 operational noise limits is expected at all residential receivers.

$L_{Aeq(15minute)}$ noise level of 35 dBA was measured at the HSNR. This is compliant with the C2 operational noise limit of 50 dBA $L_{Aeq(15minute)}$ noise level (when in use) for the HSNR. It is also noted that given that only one train movement is likely to occur in any given day compliance would also be met with regard to the recommended acceptable amenity noise criteria for a passive recreation area of 50 dBA $L_{Aeq(period)}$ when in use.

Attended noise measurements indicate the addition of the Project would not lead to any significant increase in cumulative noise impacts from the Aurizon Train Servicing Facility and the approved Hexham Relief Roads.

Given that compliance at the noise monitoring locations was achieved current operational noise mitigation measures are adequate and no additional validation or recalibration of the noise model or further mitigation measures are warranted.

3.3 Vibration Assessment

The distances to the nearest relevant receiver type from the closest extent of the Project are presented in **Table 6**.

Table 6 Distances to relevant receivers

Receiver type	Approximate distance (m)
Workshop	250
Residential	620

Due to the large distance between the Project and relevant receivers, vibration levels generated by Project operations are expected to be negligible and significantly below the threshold for human perception. As such vibration from the Project is considered to be compliant with condition C1 and no further mitigation measures are warranted.

4 Conclusion

SLR completed a noise and vibration assessment of the Project. The Project was found to be compliant with the relevant noise and vibration limits contained in the approval and no additional validation or recalibration of the noise model or further noise and vibration mitigation measures are warranted.

Yours sincerely

Checked/
Authorised by: KM

MARTIN DAVENPORT

Principal Consultant - Noise and Vibration

APPENDIX A

EPA CONSULTATION

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Martin Davenport

From: Peter Jamieson <Peter.Jamieson@epa.nsw.gov.au>
Sent: Wednesday, 13 January 2021 9:45 AM
To: Egan, Harry
Subject: [EXTERNAL SENDER] RE: Aurizon Hexham TSF Noise and Vibration Assessment

Dear Mr Egan

Sorry for the delay in replying.

I note that Auizon has not had a licence with the EPA for this site for over five years. The EPA is also not the appropriate regulatory authority for this site.

Therefore we are not across any current specifics or issues for this site, however we advise that any noise and vibration compliance assessment should be undertaken in compliance with the EPA's current policy on this issue, being the "Noise Policy for Industry".

Regards

Peter Jamieson
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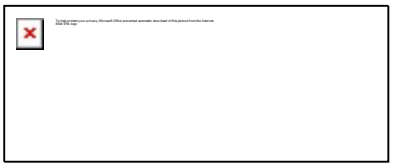

From: Egan, Harry <Harry.Egan@aurizon.com.au>
Sent: Monday, 11 January 2021 2:56 PM
To: EPA RSD Hunter Region Mailbox <hunter.region@epa.nsw.gov.au>
Subject: FW: Aurizon Hexham TSF Noise and Vibration Assessment
Importance: High

EPA Hunter Team,

Just following up on the below email sent in November.

Harry Egan
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Safety is our core value

From: Egan, Harry
Sent: Monday, 23 November 2020 9:17 AM
To: EPA RSD Hunter Region Mailbox <hunter.region@epa.nsw.gov.au>
Subject: Aurizon Hexham TSF Noise and Vibration Assessment
Importance: High

Sir/Madame,

Aurizon Operations Pty. Ltd. (Aurizon) was issued SSI 6090 MP07_0171 MOD 1 (the Approval) on the 8 October 2019. The Approval permits the construction and operation of a turning angle at the Hexham Train Support Facility (the Site). Construction of the turning angle was completed in July 2020.

Condition F4a of the Approval requires that Aurizon undertake a noise and vibration compliance assessment, in compliance with Condition F4, to confirm the predictions of the noise assessment referenced in Condition B1 and limits referred in condition C2 of the Approval.

Condition F4 also requires that the scope of the noise and vibration compliance assessment shall be developed in consultation with the EPA and be undertaken within 12 months of the commencement of operation of the SSI.

Could the EPA please advise on any requirements they wish Aurizon to consider when undertaking this noise and vibration assessment? The proposed scope of works/methodology is detailed in the 'Methodology' section of the attached.

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Safety is our core value
