WHITE NOISE ACOUSTICS

4 June 2021

303, 74 Pitt Street
Sydney, NSW 2000

Attention: Jane Lloyd
Jattca Property Solutions

Weigall Sports Complex, Sydney Grammar School (SSD-10421) – Request for additional information – Acoustics

This letter details the review and response to the items included in the request for additional information from the NSW Department of Planning Industry & Environment in their letter dated 19th May 2021.

This response includes the relevant information regarding *Noise impact and pick-up/drop-off facility* included in Item 6 of the DPIE letter and the acoustic assessment of the site including the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment* with reference 20054_220420_Noise Impact Assessment_BW_R5 dated 12/9/2021.

The letter from the EPA includes request for additional information regarding acoustics which are discussed below:

1. *Item 6 a)i)- Building 1 pick-up and drop-off area –*

   Details of the proposed pick-up and drop-off for the Building 1 area is included in the PTC *SSD10421-Proposed Weigall Sports Complex, Sydney Grammar School-Request for Additional information* which includes the traffic details of the expected movements on the proposed drop-off/pick-up area.

   The drop-off area will be open from 6am on weekdays and 6.30am Weekends. Prior to these times the gates will be locked shut. For evening periods the gates will be locked shut after 7pm on weekends.

ABN: 35 632 449 122

The management of traffic and pick-up/drop-off will be undertaken in accordance with the traffic plan and the recommendations of the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment*.

2. *Item 6 a)ii) – Noise Management levels of the Interim Construction Noise Guideline.*

   The EPA's *Interim Construction Noise Guideline (ICNG)* includes the recommended methodology for the assessment of noise resulting from construction activities.

   Section 9 of the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment* details the assessment of expected construction noise impacts during the delivery of the project.

   The Construction noise impact included in the report has been undertaken in accordance with the recommendations of the EPA's *ICNG* including the relevant noise management levels of background + 5 dB(A) during extended working hours periods and Background + 10 dB(A) during normal working hours.

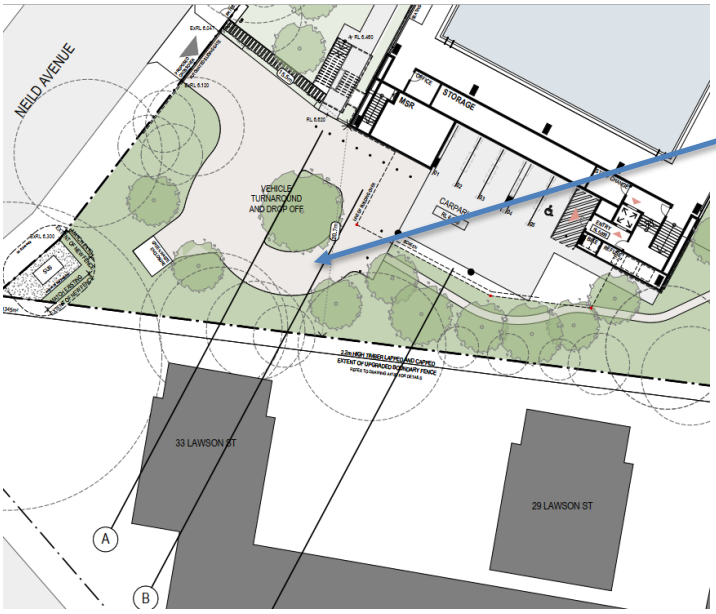
   Construction noise hours for the site include 7am to 6pm Monday to Friday, with noisy works from 8am to 5pm and Saturdays 8am to 1pm.

   The requirements of construction noise management levels are included in Section 9.2.1 of the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment* including Table 16, and construction noise will be managed in accordance with the requirements of the EPA's *ICNG.*

3. *Item 6 b) – Provide more information regarding the impact of car parking and pick-up/drop-off on neighbouring properties.*
   i) Confirm predicted maximum noise levels, any exceedances, the effect of proposed mitigation measures.

   Based on the proposed use of the pick-up/drop-off area an assessment of potential for maximum noise level events has been undertaken. The assessment includes the potential for a maximum noise level events resulting from use of the drop-off/pick-up areas during night-time hours of 6am to 7am (night-time defined by the EPA as 7am to 10pm) to neighbouring residential receivers to the south of the site.

The assessment of maximum noise levels occurring from the proposed development has included noise generated as a result of cars using the vehicle turn around and drop off area located to the south of Building 1, as detailed in the figure below.



Proposed vehicle turn around and drop off area

The assessment of maximum noise levels includes intermittent noise levels from operations such as vehicle movements and drop offs on the site during night-time periods. Based on the proposed operation of the site the relevant period of assessment for the drop-off area is 6am to 7am on week days and 6.30am to 7am on Saturdays.

The most recent NSW guidance in relation to maximum noise levels is contained in the NSW EPA's online *Application notes – NSW industrial noise policy*. For the purposes of this assessment a night-time sleep disturbance 'screening criterion' noise goal of RBL +15 dB(A) is applied.

The term 'screening criterion' indicates a noise level that is intended as a guide to identify the likelihood of sleep disturbance. While it is not a firm criterion to be met, where the criterion is met sleep disturbance is not likely. When the screening criterion is not met, a more detailed analysis is required.

With regard to reaction to potential sleep awakening events, the EPA's *NSW Road Noise Policy (RNP)* gives the following guidance:

'From *the research on sleep disturbance to date it can be concluded that:*

- *maximum internal noise levels below 50–55 dBA are unlikely to awaken people from sleep*
- *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

The EPA's *Noise Policy for Industry* (NPfI) and the *NSW Road Noise Policy (RNP)* includes suitable criteria for the assessment of potential sleep awakening events, which have been used as the basis of this report.

The NPfI includes the following commentary regarding possible sleep awakening events:

2.5 Maximum noise level event assessment

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.
Where the subject development/premises night-time noise levels at a residential location exceed:

- $L_{Aeq,15min}$ *40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- L_{AFmax} *52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

A detailed maximum noise level event assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy.

The RNP includes the following comments regarding sleep disturbance:

From the research on sleep disturbance to date it can be concluded that:

- *maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

Based on the details of the relevant standards detailed above a summary of the sleep disturbance noise level criteria is detailed in the following table.

Table 1 – Sleep Disturbance Criteria

Type of Receiver	Location	Policy	Description	Background Noise level at 6am	Resulting Maximum Noise Level
Residential Receiver	External Noise levels[1]	Noise Policy for Industry	The potential for sleep disturbance from maximum noise level events	47 dB(A) L $L_{90,15min}$	$L_{Aeq,15min}$ 52 dB(A) External
					L_{AFmax} 62 dB(A) Externally
	Within the residential dwelling[2]	Road Noise Policy	1 or 2 events unlikely to awaken people from sleep	-	65-70 dB(A) Lmax Internally
			Maximum internal noise unlikely to awaken people from sleep	-	50-55 dB(A) Lmax Internally
Note 1: Emergence Maximum Noise Level Event *Note 2: Potential Sleep Awakening events*					

Based on the details included within the NPfI and the RNP a stage 1 assessment of emergence maximum noise levels should be conducted and in the event that a noise level of 62 dB(A) L_{max} does not occur externally then compliance with the emergence maximum noise level event is achieved.

If these noise levels are exceeded then the stage 2 of the assessment, including the potential for sleep awakening events as a result of the use of the vehicle turning and drop-off area (internally within the residential receiver) should be undertaken. If the stage 2 assessment results in noise levels of less than 50-55 dB(A) L_{max} internally then noise levels are *unlikely to awaken people from sleep* and compliance with the requirements of the NPfI and the RNP regarding sleep disturbance would be achieved.

An assessment of the maximum noise levels, including the stage 1 screening test, has been undertaken for the external noise levels from the proposed vehicle turning and drop-off area, including the period of 6am to 7am (as defined as night-time period), and are included in the sample calculation below.

Table 2 – Maximum Noise level events Stage 1 Screening Criteria to Residential Receiver (externally)

	Descriptor	
Noise Source	Car Door Closing	Car engine starting
Noise Source level	89 dB(A) Lmax	90 dB(A) Lmax
Distance Correction to neighbours window (12m)	-29.6 dB	-29.6 dB
Resulting External Noise Level	59 dB(A) Lmax	60 dB(A) Lmax
Screening Noise Level –	62 dB(A) L_{AFmax}	62 dB(A) L_{AFmax}

Based on the predicted noise levels above, compliance with the maximum noise level '*screening test*' from cars starting and closing of doors will be achieved. In addition to the stage 1 test the stage 2 assessment of possible *sleep awakenings* has also been undertaken.

The Stage 2 assessment of possible sleep awakenings has included the potential for maximum internal noise within residential receivers within proximity to the proposed development including noise sources resulting from the use of the vehicle turnaround and drop-off area.

Table 3 – Potential for Sleep Awakenings Noise Calculation to Residential Receiver (internally)

	Descriptor	
Noise Source	Car Door Closing	Car engine starting
Noise Source level	89 dB(A) Lmax	90 dB(A) Lmax
Distance Correction (12m)	-29.6	-29.6
Correction for external to internal correction for open window and room characteristic	-10 dB	-10 dB
Resulting Noise Level within bedroom	49 dB(A) Lmax	50 dB(A) Lmax
unlikely to awaken people from sleep Noise Level	50-55 dB(A) L_{max} – repetitive events 65-70 L_{max} – 1-2 events	50-55 dB(A) L_{max} – repetitive events 65-70 L_{max} – 1-2 events

Based on the results of the assessment detailed above the resulting maximum noise levels from the use of the proposed vehicle turning area and drop-off will comply with the relevant criteria for sleep disturbance events based on continuously occurring events. In the event that are limited number of maximum noise events generated on the turning bay and drop off area then the potential for sleep awakening is increasingly unlikely.

Furthermore, as detailed in table 2 above, the stage 1 maximum noise levels assessment details noise levels which are compliant with maximum noise level screening tests. Based on the results of noise logging undertaken at the representative location to the residence to the south, the background noise levels increase between 6am to 7am (including weekday and Saturday mornings).
Based on the results of logging background levels of up to 3-4 dB(A) can be expected. As a result, further compliance with the maximum noise level emergence test will result during the time period closer to 7am.

In addition to the assessment above the following mitigations are recommended:

1. Signs Should be installed at the entry to the site reminding users that noise should be minimised when using the drop-off area.

4. *Item 3 ii) - For Building 1, pick-up/drop-off area, clarify the benefit of the proposed noise wall.*

   The proposed noise wall to the south of the proposed pick-up/drop-off area to Building 1 is intended to include a line of sight barrier from vehicle engine and door closing noise to the of the residential building to the south of the site including the external open areas of the property.

   As the proposed screening includes a line of sight barrier from the use of the turning bay and drop-off areas to the external areas of the dwellings to the south there will be an effective noise mitigation.

   The proposed screen has been recommended such that best practice, possible and practical mitigation of noise to the residential receiver (including the external areas) is provided to the residence to the south of the site.

5. *Item 6 c) – Confirm the RBL and Noise Management Level for the Sydney Grammar School Edgecliff (education sensitive receiver).*

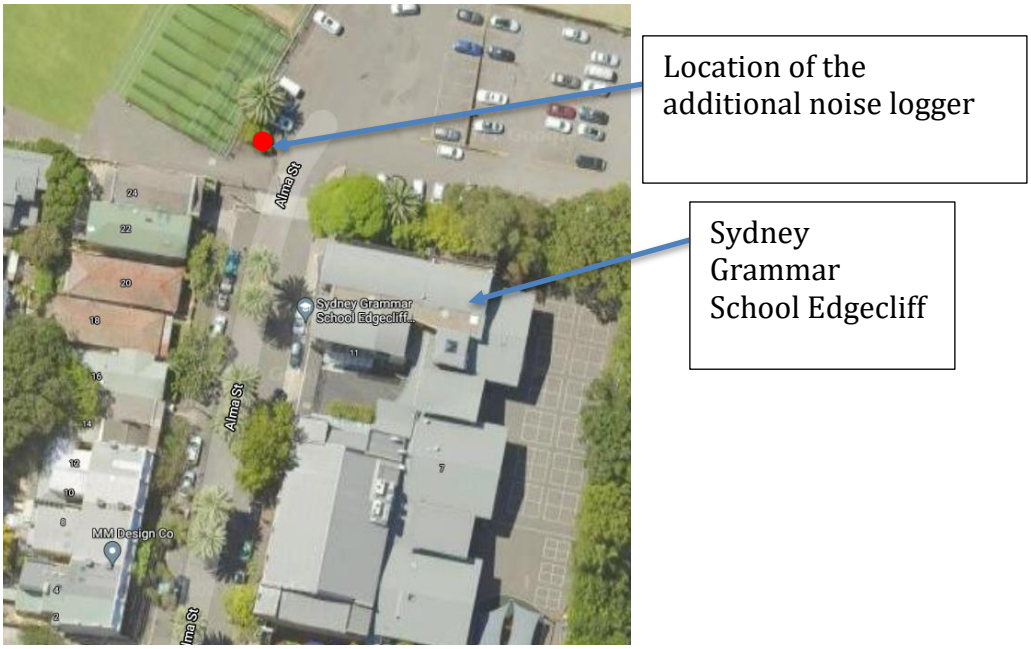
   As part of the provision of this additional information noise logging has been undertaken a at representative location of the Sydney Grammar School Edgecliff, located to the east of Alma Street.

   The additional noise logging included long term unattended noise logging between the 25th of May and the 1st June 2021. Periods of inclement weather have not been included in the assessment as required by the EPA.

   Noise logging was undertaken using a Rion NL-42EX type noise monitor with the following serial numbers and calibrations:

   1. Noise Logger – Instrument Serial number 00998079 and calibration number C20550.

   The noise logger was located at a representative location to the Sydney Grammar School Edgecliff and included a position to the north of Alma Street as detailed in Figure 1 below. The noise logger was positioned such that it did not include façade corrections.



   The noise logging survey was conducted in accordance with the requirements of the Australian Standard *AS1055.1:1997: Acoustics—Description and measurement of environmental noise.*

   The location of noise logging was selected to obtain suitable noise levels for the assessment of background noise levels ($L_{90\,(t)}$) as well as the existing ambient ($Leq_{(t)}$) levels.

The results of the additional noise logging are included in Appendix A of this report.

The results of the acoustic survey are detailed in the table below which includes comparison with the previously undertaken noise logging included in the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment*.

Table 4 – Results of the Noise Logging at the Site

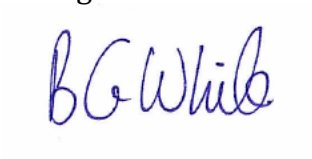
Measurement Location	**Time of Measurement**	**Maximum Repeatable $L_{Aeq, 15min}$ dB(A)**	**Representable Background noise Level (RBL) $L_{A90, 15min}$ dB(A)**
Additional Noise Logger location, Sydney Grammar School Edgecliff	Day	57	49
	Evening	51	45
	Night	49	40
Previously undertaken, Southern noise logger location	Day	54	47
	Evening	50	42
	Night	44	39
Previously undertaken, Northern sports field noise logger location	Day	53	47
	Evening	49	42
	Night	42	37

Based on the results of the additional monitoring the following is discussed:

a. The results of the additional noise survey undertaken at the Sydney Grammar School Edgecliff included noise levels which are greater than the previously obtained noise survey undertaken as part of the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment*.
b. Based on the previously conducted assessment, including the previously obtained noise levels, the resulting noise emissions criteria included in the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment* include levels which remain accurate.
c. Based on the results of the additional noise logging at the site the relevant project *Noise Trigger Levels* and construction *Noise Management Levels* remain accurate as detailed in the *Sydney Grammar School, Weigall Sports Complex – Noise Impact Assessment*.
d. The projects relevant construction *Noise Management* level for the sensitive educational receiver, including the Sydney Grammar School Edgecliff, includes a level of 45 dB(A) internally when the facility is in use, this is *Noise Management* level which will be used for the assessment of construction noise impacts on the school. It is expected that management of construction noise impacts on the Sydney Grammar School Edgecliff will be required. Management will be required to including communication with the school such that scheduling of noisy works out side of the most acoustically sensitive periods of the school receiver can be possible.

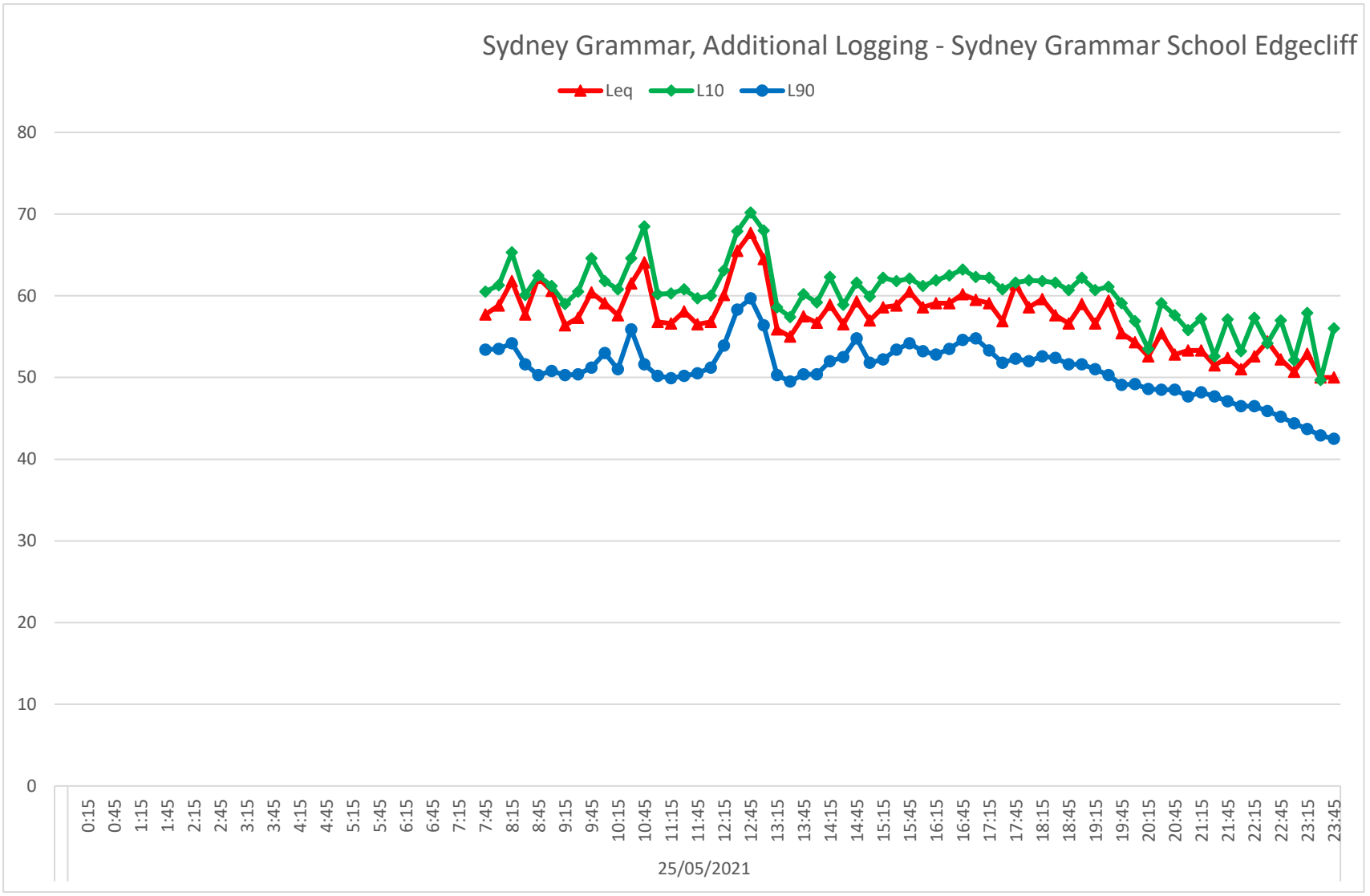
If you have any additional questions, please contact the author below.

Regards



Ben White
Director
White Noise Acoustics

1 Appendix A – Results of Noise Logging at Sydney Grammar School Edgecliff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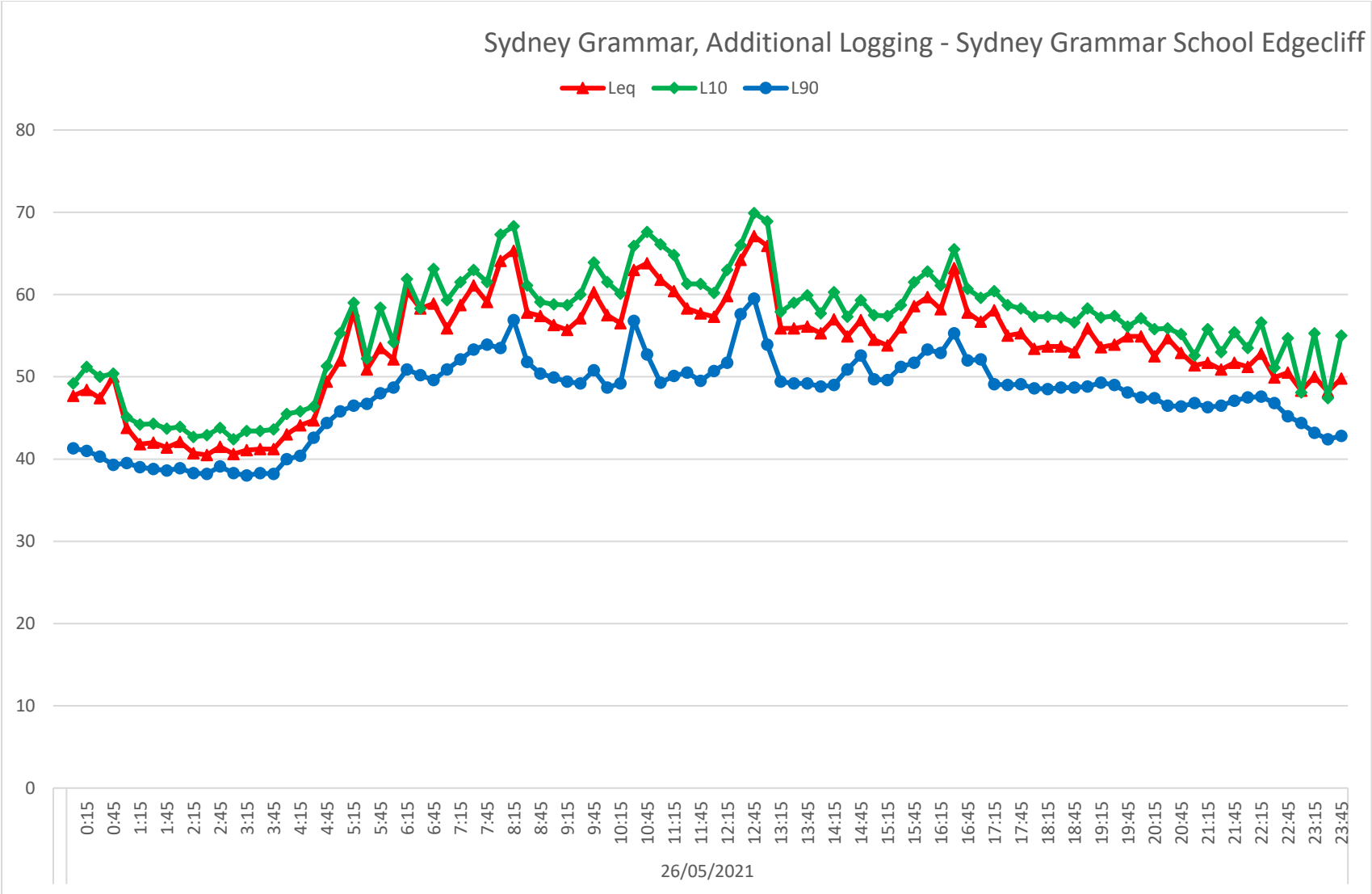
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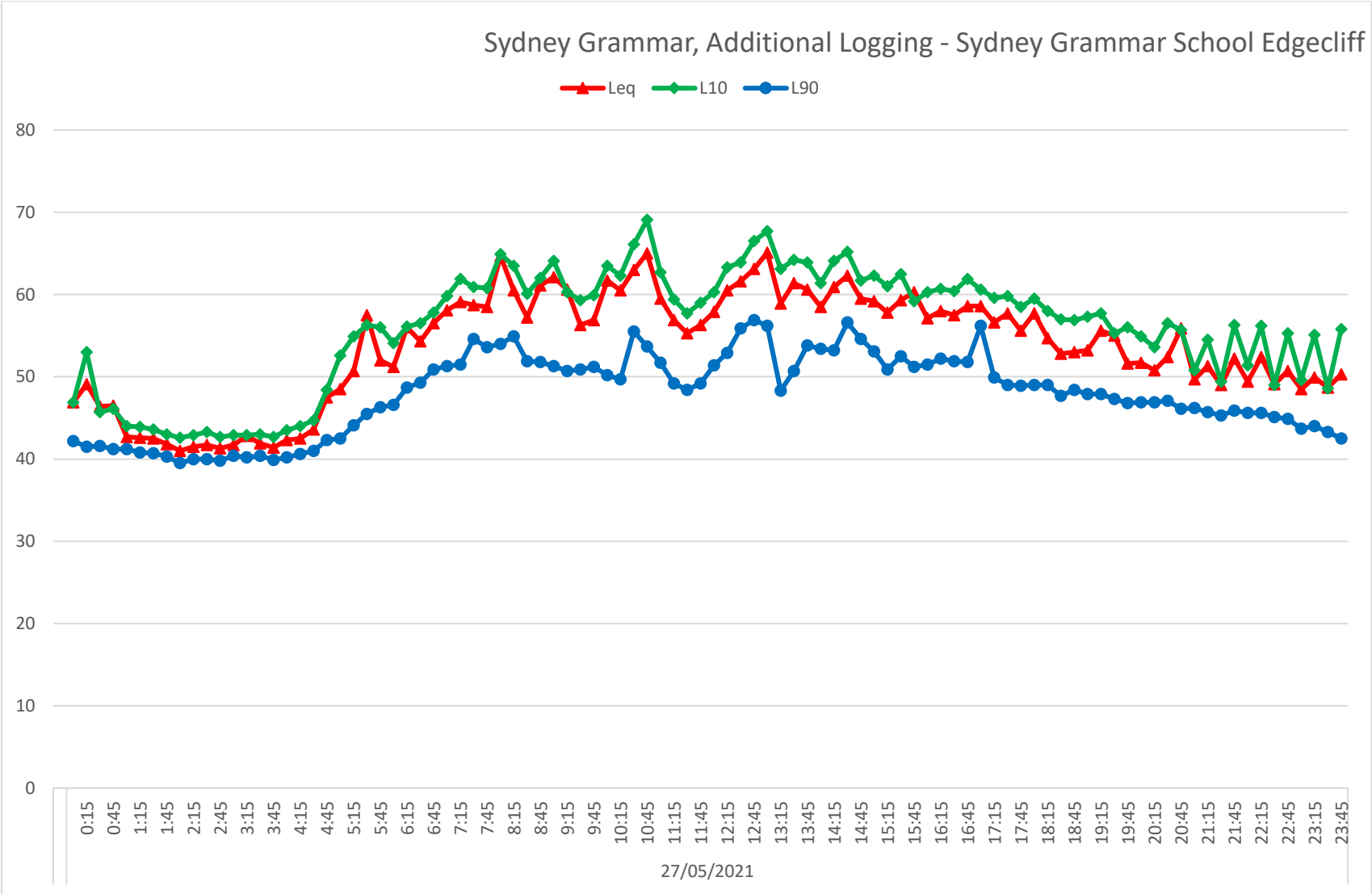
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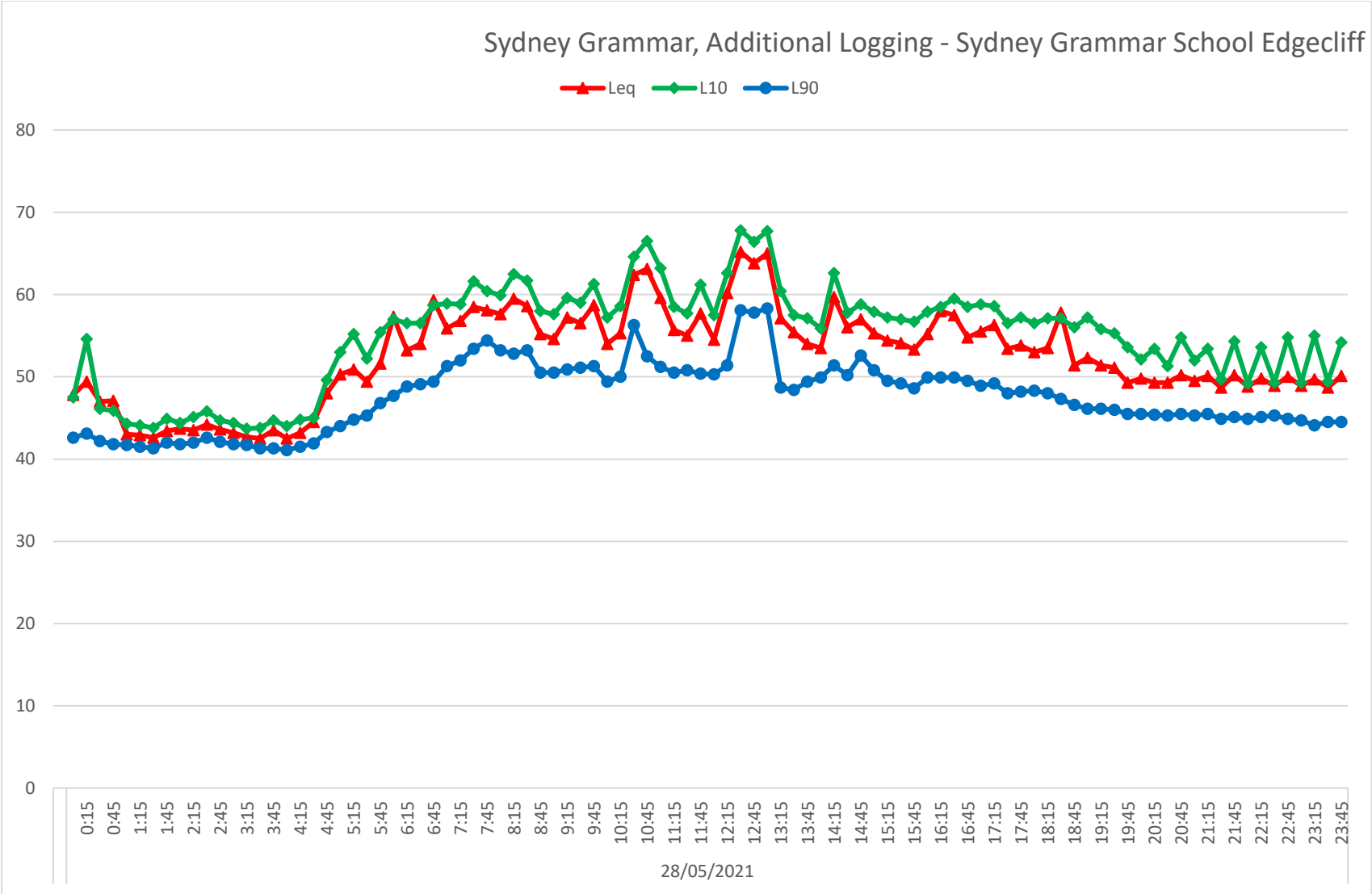
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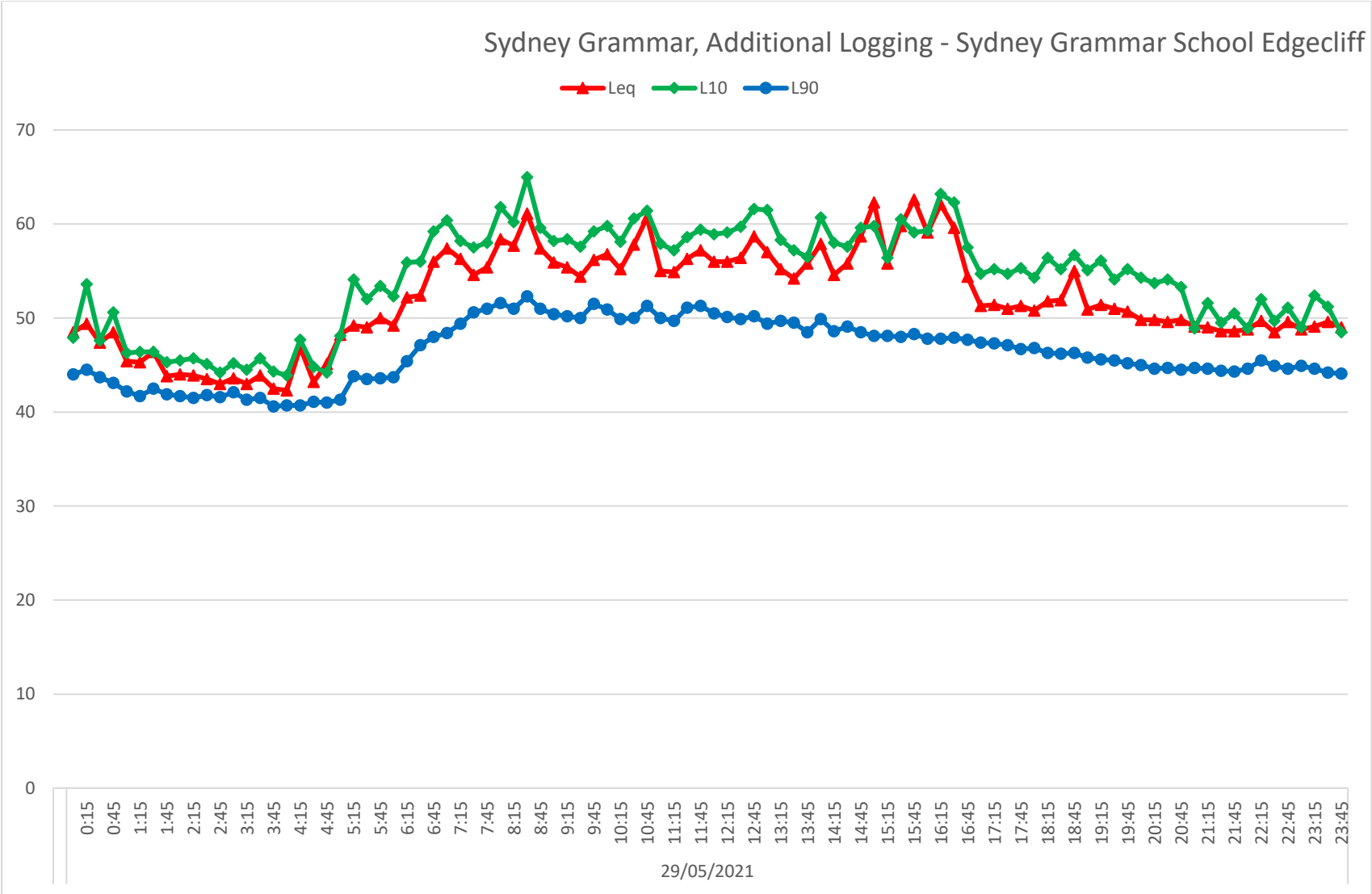
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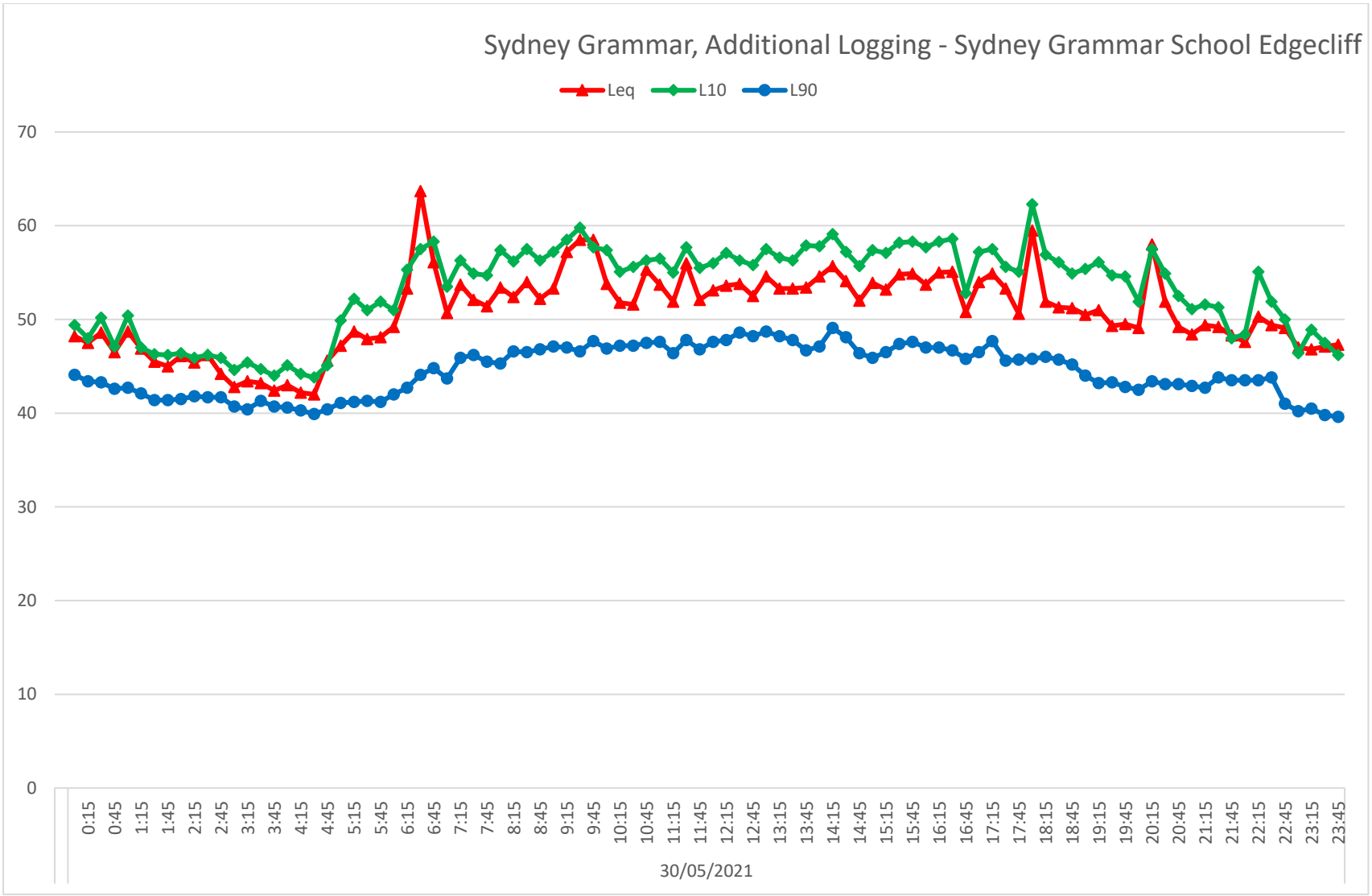
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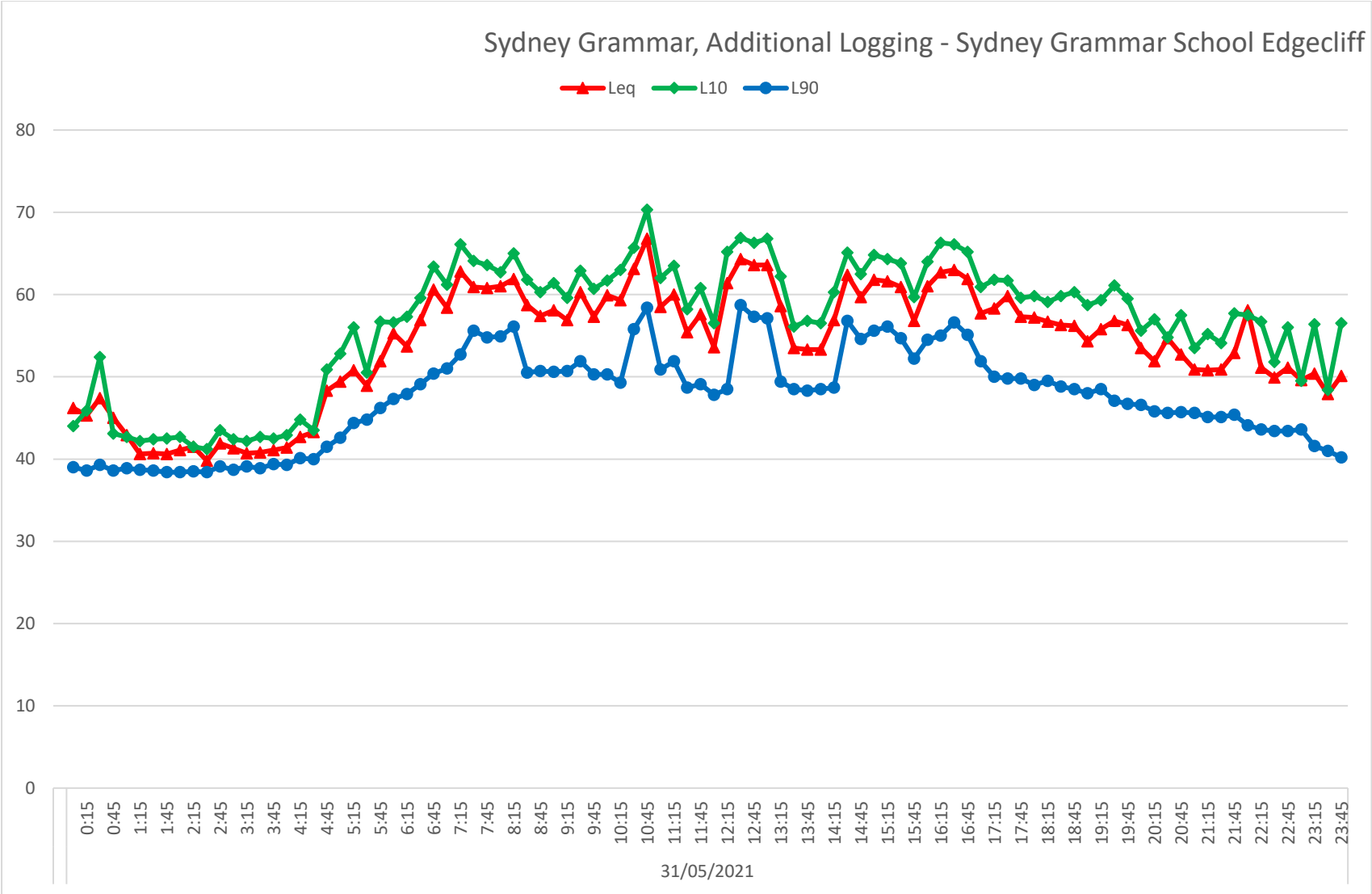
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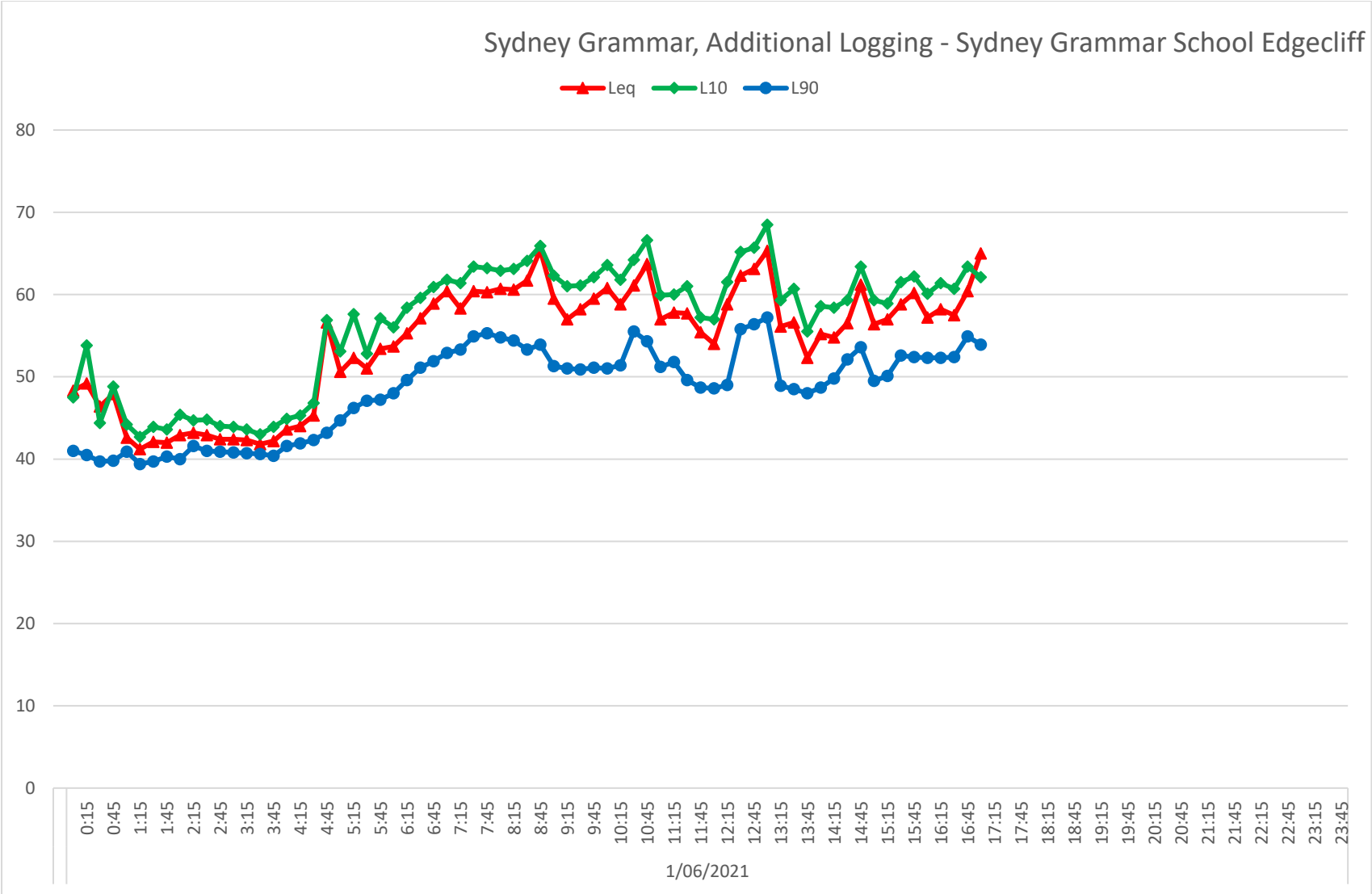
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