Adelaide Beach Management Review

Implementation Project – Dredge Trial

Noise Measurement Report

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1 INTRODUCTION

Noise monitoring has been undertaken during the Sand Dredging Trial at Adelaide metropolitan beaches (the **Project**) in accordance with recommendations from the Project's Noise Management Plan.

The Department for Environment and Water (**DEW**) has been trialling dredging in late 2024, as a potential methodology to assist with managing Adelaide's beaches.

Dredging activity between 3-21 October was comprised of a cutter suction dredge operating in Sand Borrow Area 1 (**SBA1**) which is nearshore at North Haven. The dredged material was transported via two Split Hopper Barges (**SHB**s) to a nearshore deposition location at West Beach.

From 30 October to 30 November 2024, the cutter suction dredge operated in Sand Borrow Area 3 (**SBA3**) in the approved West Beach boat harbour sand trap. Sand was pumped north via a 1.2 kilometre pipeline for nearshore deposition south of the West Beach Surf Life Saving Club.

The observed location of the dredging operations and the SHB transport route are shown in Figure 1.

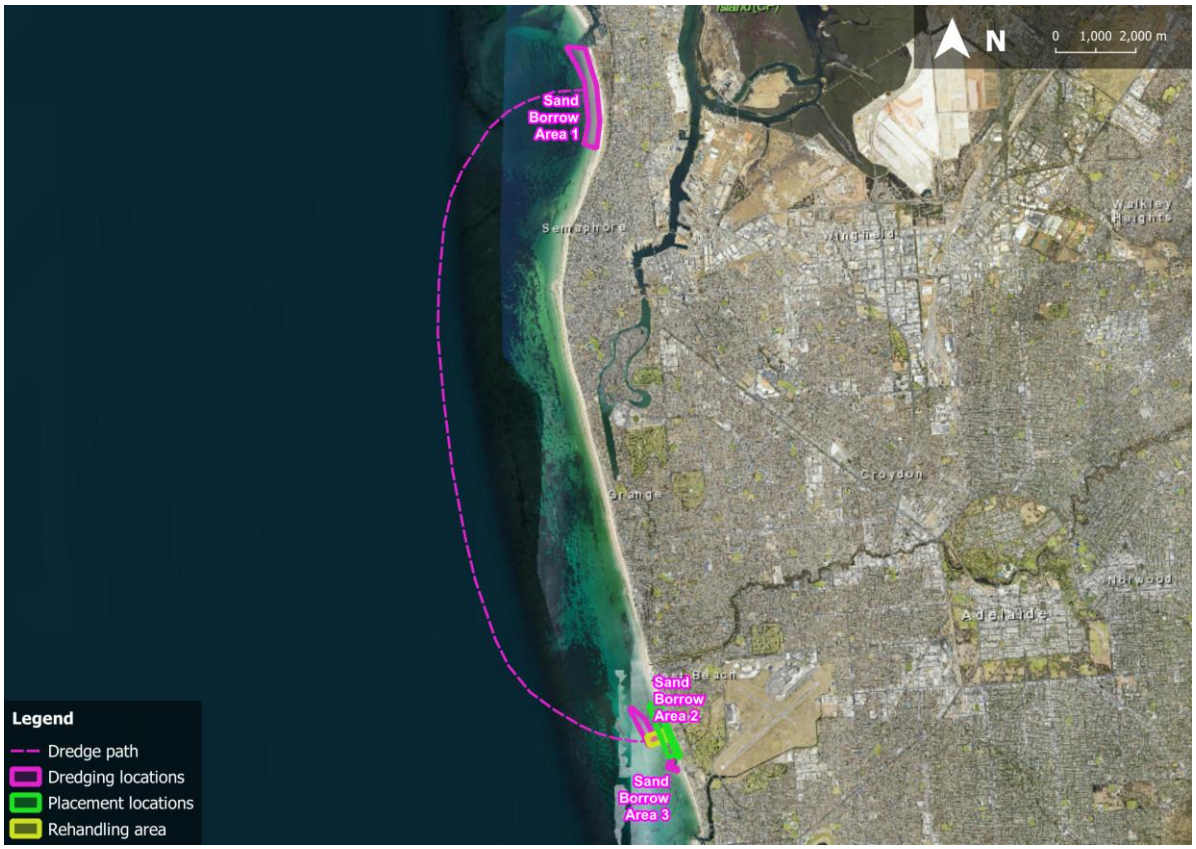

Figure 1: Dredging locations, transport route, rehandling area and deposition/placement locations

2 CRITERIA

The Noise Management Plan provides recommendations for noise monitoring to be conducted during the Project works. These are:

"Routine attended noise monitoring will be undertaken over the course of the Project, at locations representative of receivers closest to the work areas at West Beach and North Haven.

The proposed noise monitoring program includes the following (subject to suitable weather conditions):

- *Attended noise measurements on the first day of dredging*
- *Attended noise measurements on the first use of the night-works excavator*
- *Attended noise measurements one week after commencement of dredging, once activity levels have normalised*
- *Attended noise measurements two weeks after commencement of dredging*
- *Attended noise measurements four weeks after commencement of dredging*
- *Attended noise measurements may also be conducted in response to a noise compliant (if a compliant is received), where monitoring is deemed to be an appropriate response to quantify the level of noise at the complainant location."*

Noise criteria for the Project are also provided in the Noise Management Plan. For offshore activities, assessment criteria at the facade of a noise sensitive receiver are as follows:

- during day hours (7:00 am to 10:00 pm) no greater than $L_{eq,16h}$ 50 dB(A)
- during night hours (10:00 pm to 7:00 am) no greater than $L_{eq,8h}$ 45 dB(A) or L_{max} 60 dB(A)

Noise sensitive receivers for the Project are determined from the definition provided by the Planning and Design Code, this includes existing residential dwellings, land zones primarily for residential purposes, childcare facilities, educational facilities, hospitals, supported accommodation (e.g. aged care facilities) and short-term accommodation such as hotels and caravan parks.

3 NOISE MEASUREMENTS AND OBSERVATIONS

3.1 Equipment

Noise measurements were taken with Rion NL42 and NL52 Sound Level Meters, fitted with 200mm diameter windshields to minimise the influence of wind-induced noise on the microphones.

3.2 Attended measurements

A series of attended noise measurements were taken during the dredging trial at positions representative of the closest sensitive receiver locations to dredging activity. Measurements were taken at the commencement of dredging to confirm initial compliance with noise criteria and were repeated over the duration of the trial to observe if noise emissions remained consistent across changing conditions.

3.2.1 8 October 2024 – Initial daytime operation

West beach

Sand deposition using a Split Hopper Barge (**SHB**) was observed at West Beach at approximately 3:15pm on 8 October 2024. Weather conditions were observed as clear with a moderate westerly breeze. The SHB was observed being towed by tugboats from the dredging location at North Haven, into a near-shore deposition location just north of the West Beach Surf Life Saving Club. The cycle of vessel movement and sand deposition at West Beach, where the vessel was audible (within approximately 500m of the shoreline) took around 15 minutes. The vessel path for the *Sea Pelican* tugboat and SHB (provided by MarineTraffic.com) is shown in Figure 2.

Figure 2: Sea Pelican tugboat vessel path (from Marine Traffic) - 8 October

Noise measurements were taken at a location representative of receivers on the corner of Cottesloe Street and Seaview Road, which was observed on site to be the closest receivers to the observed vessel movement. A photo of the SHB deposition location observed from the measurement position is provided in Figure 3.

Figure 3: Tugboat and SHB nearshore at West Beach – 8 October

During the measurements, the noise environment was observed to be controlled by traffic and other vehicle activity on Seaview Road, with some lesser contribution from people gathered along the foreshore. Noise from the vessel movement was observed primarily as a low-frequency hum from the tugboats manoeuvring the SHB which was audible over the ambient sounds.

It is understood that sand deposition could occur at a rate of up to one vessel movement every four to six hours. Based on the observed activity, sand deposition rate and the measured noise levels, the L_{eq16hr} noise level from sand deposition at West Beach was calculated as 42 dB(A), which was compliant with the $L_{eq,16hr}$ 50 dB(A) noise criterion.

North Haven Sand Borrow Area 1:

Measurements of dredging were attempted at North Haven, nearby SBA1 at the location shown in the photograph below. At the time of the measurements, dredging activity had ceased, as the available SHB had been filled to capacity.

The noise environment was controlled by natural sounds, primarily steady tidal noise from the beach, with some contribution from people in the vicinity. Some faint noise was observed and attributed to the vessels, however this did not influence the measured level, and as such a noise level from the vessels could not be determined.

Figure 4: Split Hopper Barge (left) and Dredge (Right) nearshore at North Haven – 8 October

3.2.2 15 October 2024 –Night operation

West Beach

Sand deposition using a SHB was observed at West Beach at approximately 10:45pm on 15 October. Weather conditions were observed as a clear night with a moderate N-NE breeze.

The SHB was observed being towed by tugboats from the dredging location at North Haven, into a near-shore deposition location just north of the West Beach Surf Life Saving Club.

The vessel paths for the *Sea Pelican* tugboat with the SHBs for the night of 15 October (from Marine Traffic.com) are shown Figure 5.

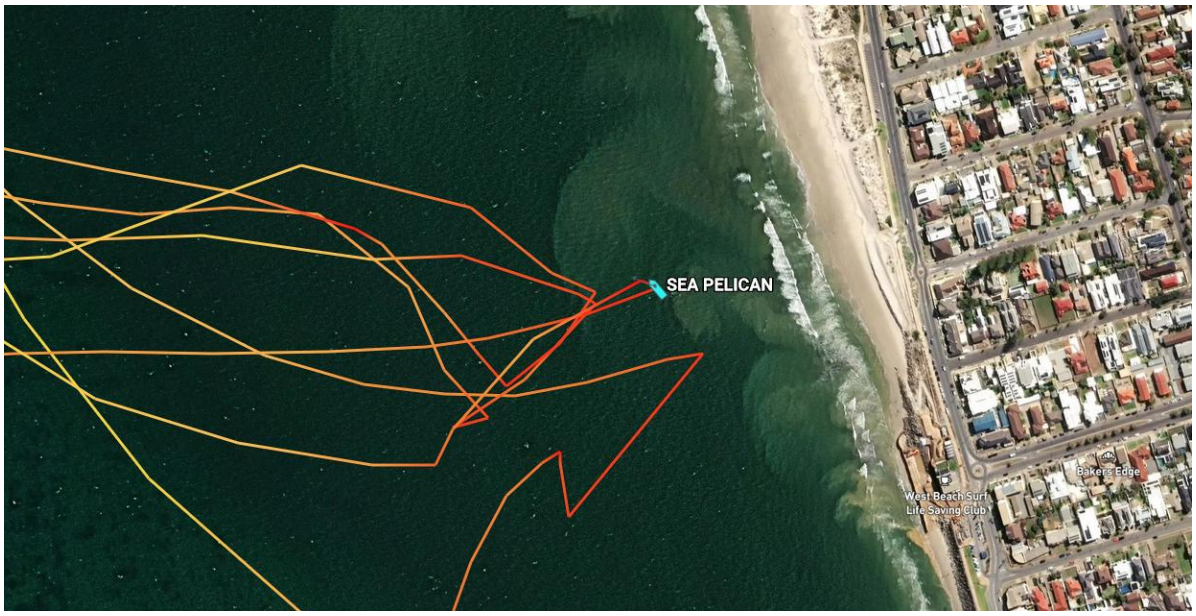

Figure 5: Sea Pelican tugboat vessel paths overnight (from Marine Traffic) - 15 October

Noise measurements were taken at a location representative of receivers on Seaview Road just north of Rockingham Street, which was deemed representative of noise at the closest receivers to the observed vessel movement. A photo of the SHB position observed from the measurement position is provided below.

Figure 6: Tugboat and SHB nearshore at West Beach – 15 October

During the measurements, the noise environment was observed to be controlled by traffic on Seaview Road, with some lesser contribution from wind in nearby foliage, aircraft passing overhead and occasional pedestrians along the foreshore shared use path. Noise from the vessel movement was observed primarily as a low-frequency hum from the tugboats manoeuvring the SHB which was audible over the ambient sounds for around 10 minutes in total.

Based on the observed activity, sand deposition rate and the measured noise levels, the relevant L_{eq8hr} noise level from sand deposition at West Beach was calculated as 33 dB(A), which is compliant with the night time period $L_{eq,8hr}$ noise criterion of 45 dB(A). The L_{max} noise level from sand deposition was estimated as 48 dB(A), which is compliant with the L_{max} criterion of 60 dB(A) and was noted as lower than maximum noise levels observed from extraneous noise sources at the measurement location.

North Haven Sand Borrow Area 1:

The North Haven dredging location was attended at approximately 9:15-9:30pm on 15 October, however at the time of attendance there was no significant noise from the dredge or barge, suggesting that dredging had ceased. The noise environment was controlled primarily by steady tidal noise from the beach, and with some noise from the Outer Harbor port to the North. Sonus was advised that dredging may not recommence until day time hours and so a night measurement could not be taken at North Haven on this occasion.

3.2.3 16 October – Mid dredge campaign - Day measurement

West Beach

Sand placement using a Split Hopper Barge (**SHB**) was observed at West Beach at approximately 3:30pm on 16 October. Weather conditions were observed as a partly cloudy sky with a moderate-strong sea breeze.

The SHB was observed being towed by tugboats from the dredging location at North Haven, into a near-shore deposition location just north of the West Beach Surf Life Saving Club.

During the measurements the noise environment was observed to be controlled by other recreational vessel traffic on coastal waters and vehicle traffic on Seaview Road. As per previous measurements, noise from the barge/tug movement was observed primarily as a low-frequency hum from the tugboats manoeuvring the SHB which was audible over the ambient sounds for around 10 minutes in total.

Figure 7: Tugboat and SHB (left of photo) travelling nearshore toward West Beach – 16 October

Based on the observed activity, rate of sand deposition and the measured noise levels, the relevant L_{eq8hr} noise level from sand deposition at West Beach was calculated as 34 dB(A), which is compliant with the day time noise criterion.

North Haven

A measurement of dredge operation at North Haven was taken at approximately 4:40pm. Noise from the dredge was estimated to be less than 50 dB(A) as the measured noise level included some ambient sound which could not be excluded.

Figure 8: Dredge operating at North Haven – 16 October

3.2.4 1 November 2024 – Dredging at West Beach Sand trap – Day measurement

Measurements of dredging activity at West Beach were taken shortly after commencement of dredge operation in this position.

West Beach

Dredging using a small cutter suction dredge was observed at West Beach sand trap at approximately 1:00 pm on 1 November. Weather conditions were observed as clear with a moderate SE breeze.

A photo of the dredge position (taken from shore, dredge circled in green, partially obscured by the breakwater) is provided in Figure 9.

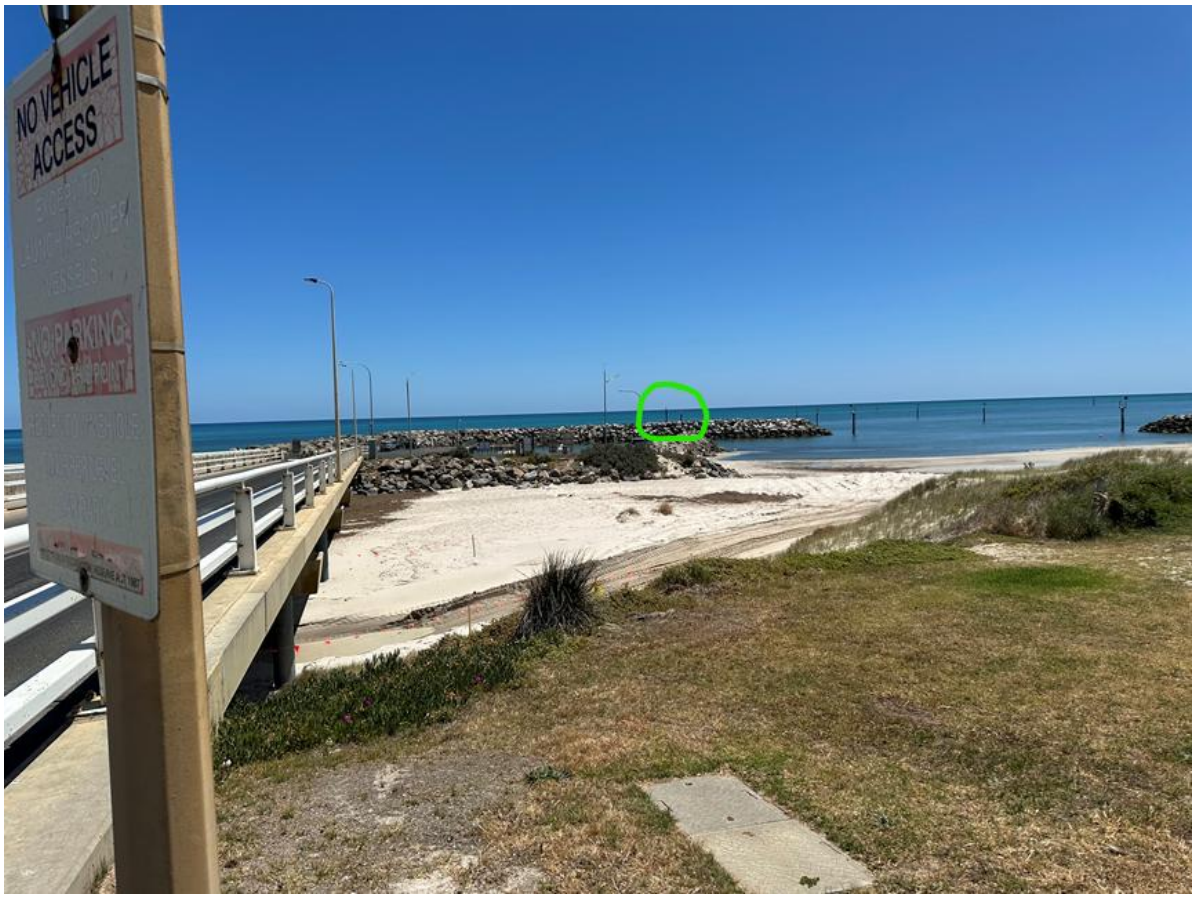

Figure 9: Dredge position (partially obscured) at West Beach sand trap - 1 November 2024

Noise measurements were taken at a location on the West Beach breakwater, at a distance of approximately 40 metres to the dredging activity. Operation of the dredge and a smaller support vessel was observed.

At this location the noise from the dredge and support vessel was subjectively similar in noise to other recreational vessels using the West Beach boat ramp. Noise from the dredging activity was not audible on the shoreline, as other sand carting activity on the beach was the dominant noise source. Based upon the relative distance from the dredge to the nearest sensitive receivers, if the dredging activity was to operate continuously over daytime hours, the highest noise level expected at sensitive receivers would be $L_{eq,16hr}$ 42 dB(A), which complies with the noise criteria.

3.3 Unattended noise monitoring

Unattended noise monitors were placed at positions representative of receivers at West Beach and North Haven respectively to measure noise from dredging activities continuously between 11-17 October 2024.

West Beach

The location of the unattended noise monitor at West Beach is shown in Figure 10, and a photo of the equipment on site is provided in Figure 11.

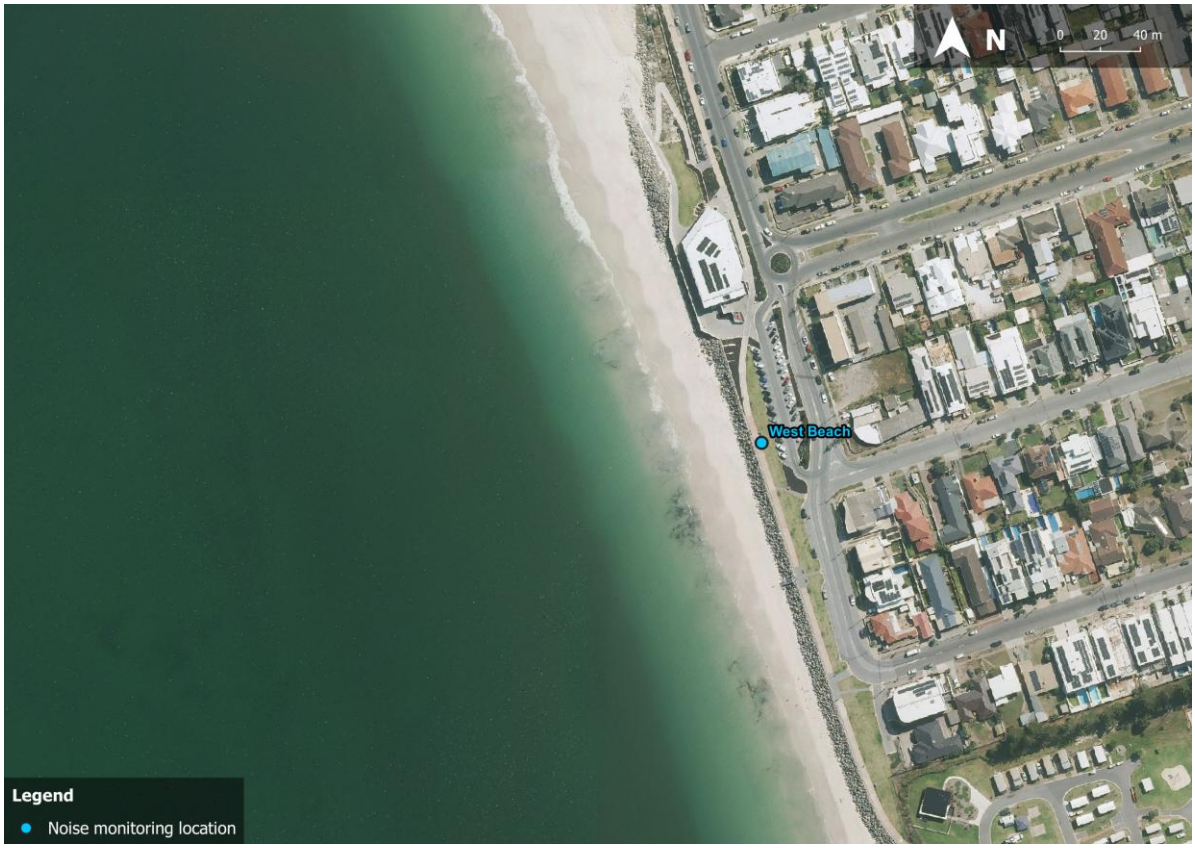

Figure 10: West Beach unattended noise monitoring location

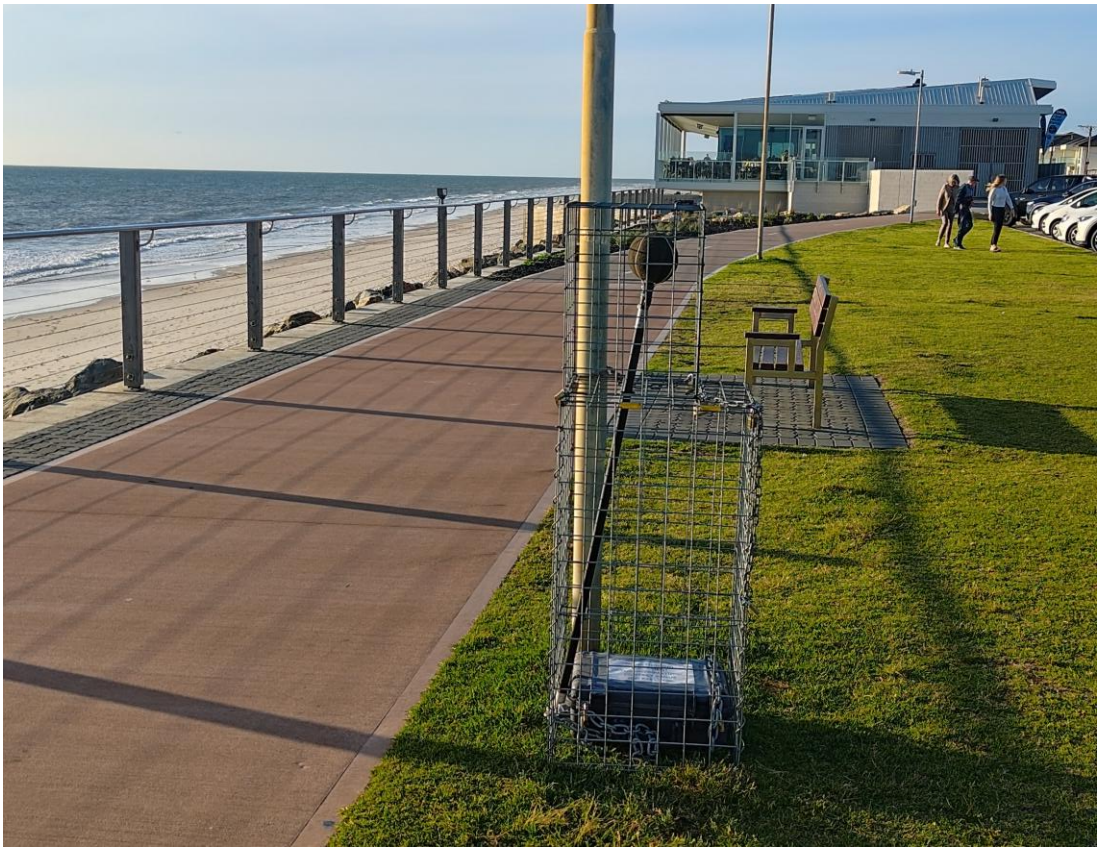

Figure 11: Unattended noise monitoring equipment installed at West Beach

Measured noise levels at West Beach have been overlaid on provided sand placement times on the graph in Figure 12.

Based on previous site observations at West Beach, a maximum sand placement noise duration of three 15-minute periods is highlighted, centred on the reported placement time noted in the Sea Pelican Barge Record document provided by DEW.

Little correlation was found between fluctuations in the 15-minute L_{max}/L_{eq}/L_{90} noise descriptors and the times when the SHB was present for sand placement. Note that comparison has not been made between these measured levels and noise criteria, as it was not possible to remove the influence of extraneous noise from the measured noise levels.

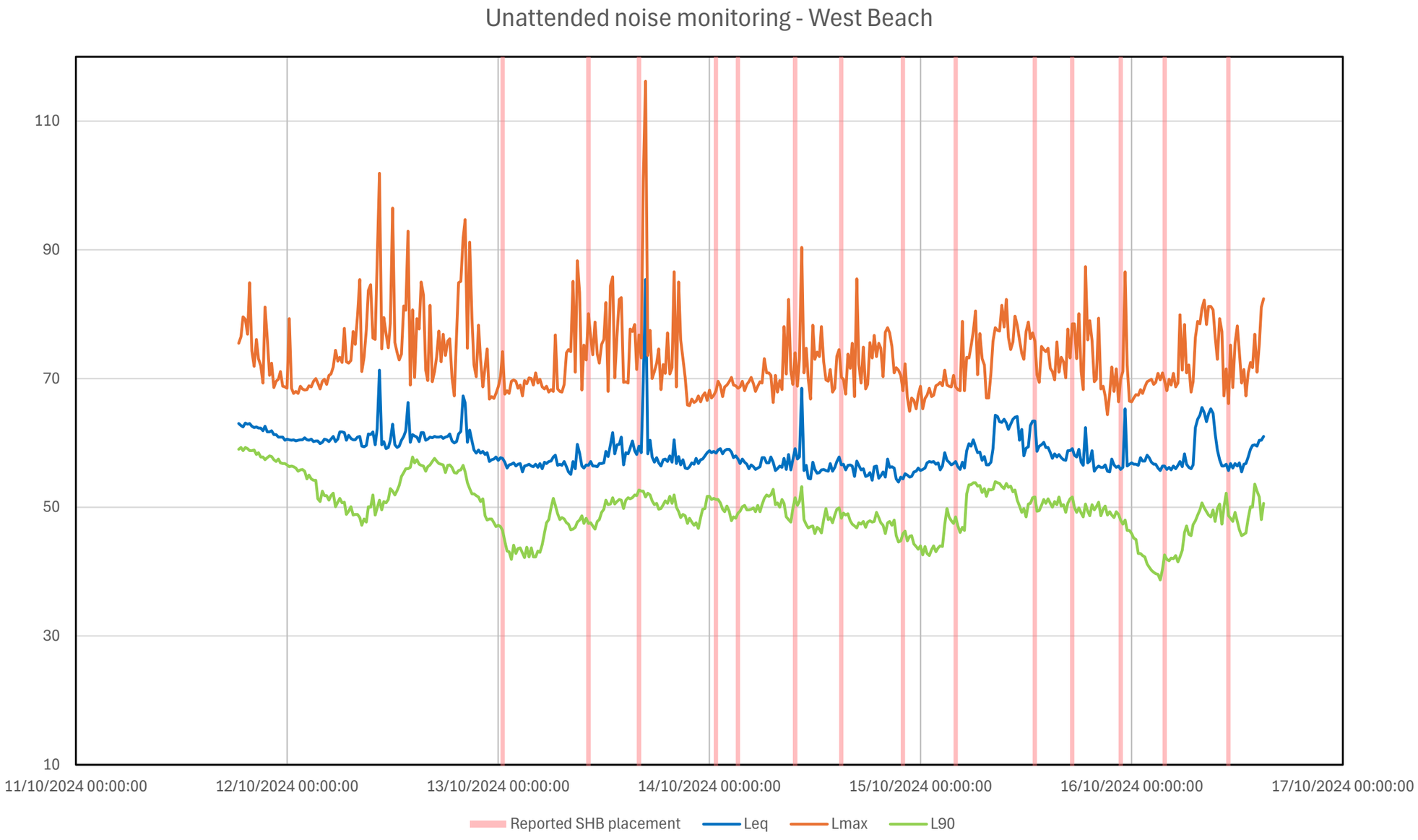

Figure 12: West Beach noise monitoring results overlaid with sand placement

North Haven

The location of the unattended noise monitor at North Haven is shown in Figure 13, and a photo of the equipment on site is provided in Figure 14

Figure 13: North Haven unattended noise monitoring location

Figure 14: Unattended noise monitoring equipment installed at North Haven

Measured noise levels at North Haven are provided in the graph in Figure 15.

This location showed greater variation in measured noise levels, potentially due to the location being more exposed to weather and further from steady traffic flow and beachfront activity which was present at the West Beach location.

Measured noise levels at North Haven were typically controlled by natural sound in the environment at this location, as well as some contribution from activity at the cul-de-sac carpark where the equipment was located, the North Haven Marina and at the Outer Harbor shipping terminal. If dredge operation had been a consistently controlling noise source at the monitoring location, it would be expected that recorded noise levels would have held a steady level for the duration of active dredging, and that the Leq (blue) and L90 (green) would have tracked closely together over this time.

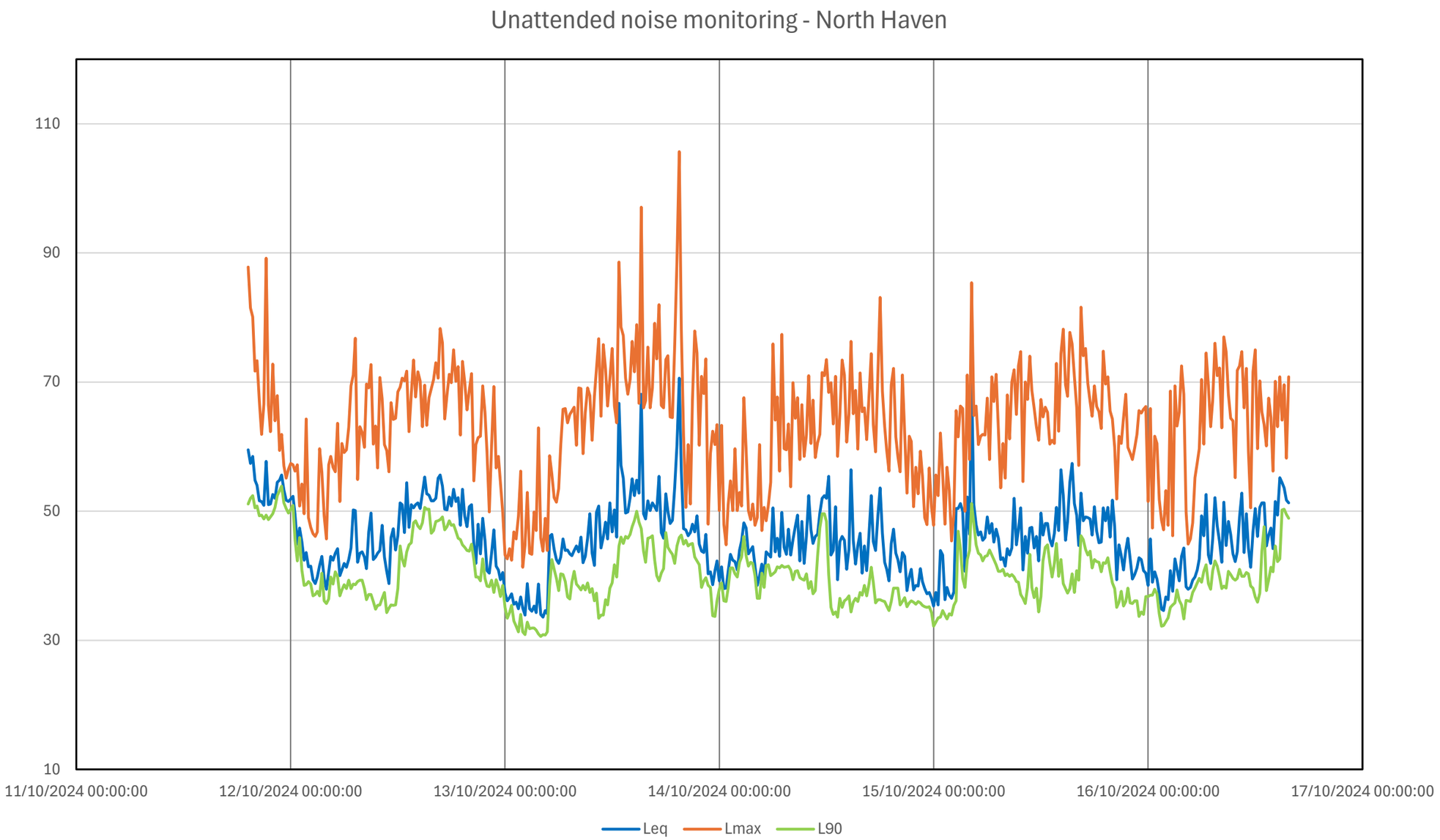

Figure 15: North Haven noise monitoring results

4 CONCLUSION

Noise monitoring was undertaken as part of the Adelaide Beach Management Review beach dredging trial.

Attended noise measurements were taken at locations representative of the closest noise-sensitive receivers to near-shore noise-generating activity associated with the Project. Attended measurements showed compliance with the relevant noise criteria was achieved on all attended measurement occasions.

Unattended noise monitoring was also undertaken between 11-17 October 2024 at locations at West Beach and North Haven which were likely to be most affected by noise from Dredging. Noise at both locations was observed to be controlled by natural sounds or extraneous noise sources rather than dredging activity. Dredging activity at both locations was not shown to have significantly affected measured noise levels over the unattended noise monitoring period.