

30 September 2010

WM Project Number: 05135-CP
Our Ref: AHL300910 GJ Itr
Email: GColquhoun@australand.com.au

Mr Glenn Colquhoun
Australand Holdings Limited
PO Box A148
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Dear Glenn

**Re: Shell Cove - Boatharbour Precinct
- Response to the Assessment of Air Quality and Noise**

Wilkinson Murray Report 05135-CP of January 2010 provides an assessment of air quality and noise impacts of the proposed Shell Cove Boatharbour Precinct Concept Plan Application.

We have recently received response to our report, including comments from the Department of Planning (DoP), the Department of Environment, Climate Change and Water (DECCW) and Heggies Pty Ltd on behalf of the operator of the nearby Bass Point Quarry.

The issues raised in the responses include:

- mitigation of traffic noise generated by the development;
- noise from quarry operations as it affects the development, including meteorological factors influencing noise propagation; and
- noise and vibration from blasting at the quarry as it affects the development.

This letter report provides responses to each of the issues raised.

In addition to the letters listed from DoP, DECCW, and Heggies, we will also reference the Heggies Report *"Proposed Quarry Expansion, Bass Point NSW, Construction, Operation and Transportation Noise and Blasting Impact Assessment"* dated 21 May 2010. We will refer to this as the Heggies *Bass Point Quarry Report* to distinguish it from the Heggies letter concerning Wilkinson Murray's report.

1. TRAFFIC NOISE

1.1 Findings of the Assessment Report

Our assessment for the Concept Plan Application included prediction of noise to the residential development from traffic generated by the development itself. It was predicted that traffic noise would exceed the guideline criteria at residences facing Harbour Boulevard. Recommendations were made for building siting and construction against traffic noise.

1.2 Department of Planning Comments

The DoP discussed in their response that acoustic walls are strongly discouraged. They state that layouts should be designed so that high fences do not front the streets as this gives the impression of a gated community. The issue was raised in response to acoustic walls being shown in the section of Harbour Boulevard north of Cove Boulevard on the western side of the road, which is outside of the study boundary.

The DoP states that this is a greenfield site and traffic volumes are predicted to be low. However, the site is of sufficient size that self-generated traffic volumes could lead to noise levels exceeding relevant noise criteria if there were no consideration of mitigation.

In response, Section 3.5 of our report discussed options for noise mitigation. A range of effective mitigation is available to be incorporated into the development. Low height noise barriers facing the road were one of the options proposed that may be suitable in some circumstances. These would shield gardens and the ground floor of residences.

Table 3-4 of our report identified examples of mitigations that could be incorporated. The designers are certainly aware of the disbenefits of traffic noise barriers, and would certainly avoid using them where possible, but they remain an option for feasible noise mitigation. Noise barriers are therefore not the preferred option. Further detail of noise mitigation will be provided at project application stage.

1.3 Heggies Comments

The Heggies letter notes that the criteria, traffic flow, assumptions and recommendations in our report appear reasonable. It discusses traffic volumes that vary to some extent from those shown in our own report, particularly with respect to the percentage of heavy vehicles on Shellharbour Road. These volumes and percentage heavy vehicles were determined for the *Bass Point Quarry Report*.

In response, we do not consider that the variation in traffic as shown in the Heggies letter is sufficient to alter the conclusions of the assessment report. The variations in heavy vehicle percentages relate to Shellharbour road. While there is some commercial component to the proposal for Shell Cove Boat Harbour Precinct, it is estimated that the traffic would be predominantly residential.

1.4 DECCW Comments

The DECCW concurred, in principle, with the assessment approach and outcomes of our report. They recommend that a more detailed study be undertaken in order to ensure appropriate acoustic amenity from traffic noise is provided to all residences in the final plan. They comment that the internal traffic noise goal should be expressed at $L_{Aeq,1hr}$ rather than L_{Aeq} as shown in our report.

In response, Wilkinson Murray agrees with this amendment to the internal noise criterion. We note that while the descriptor quoted was L_{Aeq} , the noise modelling that informed it was based on $L_{Aeq,1hr}$, hence there are no consequences to this amendment.

2. ASSESSMENT OF IMPACTS FROM BASS POINT QUARRY (EXCLUDING BLASTING)

2.1 Findings of the Assessment Report

A noise model was used to predict noise from the quarry to the proposed residences. The predicted noise levels complied with the criteria at all locations.

It should be noted that since issue of the assessment report in January 2010, Bass Point Quarry has proposed an extension to their operations adjacent to the Boat Harbour Precinct. That expansion has potential impacts on noise and vibration within the development. The expansion does not include significant increase to the “footprint” of the quarry, and hence for considering noise impacts there may not be a major change from current operations. Modelling of the quarry operations was undertaken by Heggies who predict higher noise emissions than those presented in our report, as noted below.

2.2 Department of Planning Comments

Noise Impacts

With regard to noise impacts, the DoP simply recommends that a response be provided to comments from Heggies and the DECCW, as discussed below.

Air Quality

The DoP recommend that an assessment of air quality impacts from Bass Point Quarry on the development be conducted. Such an assessment is listed in the DGRs for the proposed expansion of the quarry (DoP website, Project 08_0143). This would be done by the quarry as part of their application.

2.3 Heggies Comments

Noise Criteria

Heggies note in Section 5.3 of their letter that there was an inconsistency in setting amenity criteria for the proposal in our report.

In response, we accept that there was an inconsistency and the correct amenity criterion that should have been applied in all circumstances throughout the report was that of “urban”, as advised by Council. We also agree with Heggies that the intrusiveness criteria as presented in Section 5.3 of our report are the controlling criteria in this case, independent of whether “urban” or “suburban” amenity criteria are used. Hence amending the criteria to “urban” has no consequences for the noise assessment,

Noise Modelling

Heggies note that the equipment noise levels assumed for our noise model are lower than the levels measured by them for their assessment of the proposed quarry expansion, and present alternative modelling results showing predicted noise levels within the development.

In response, while the Heggies *Bass Point Quarry Report* does not state the sound power levels used, we note that the levels used in our assessment are at the low end of the range typical of quarry equipment. We note also that the modelling conducted by Wilkinson Murray was based on a

rudimentary understanding the quarry operations and quarry topography. As Heggies have had access to measurement of the actual noise sources to be used in the noise model, and presumably have been supplied with accurate internal topography to the quarry, we accept that the results of their noise modelling would be more reliable than ours.

Table 5-4 of the Heggies letter shows predicted noise levels from the proposed expanded quarry, and shows only one minor exceedance (1dB) of the criteria proposed by Wilkinson Murray. If the expanded quarry proposal were to proceed, it is probable that reasonable and feasible noise mitigation could be designed by the quarry operator to remove this exceedance.

Heggies note that there is 5dBA difference between predicted noise levels at Locations 1 and 7 in our report. They considered this difference to be large considering the small distance between the receivers.

In response, the difference is due to the location of Receiver 7 which is on a steep slope. The noise level at this location is quite sensitive to the exact location of assessment, and placement of noise sources, given that the slope shields the location from the noise sources.

2.4 DECCW Comments

Noise Criteria

The DECCW in paragraph 1b state that they do not concur with the noise criteria proposed by Wilkinson Murray for residential land use within 200m of the ocean as the effect of the ocean on the background noise would vary over time. They recommend a criterion of $L_{Aeq,15min}$ 40dBA to be applied to all residential locations near the ocean.

In response, Wilkinson Murray does not agree with the approach as sound of the ocean is normally considered as a usual part of the background noise for residences near the ocean. If the background is measured over a sufficiently long period, then the Rating Background Level (RBL) will take into account the quiet periods that occur at times near the ocean.

Meteorology

Adverse meteorological conditions can influence the propagation of noise. An assessment according to the method set out in the *NSW Industrial Noise Policy (INP)* considers propagation under adverse conditions if these are a "feature" of the area. In particular, night-time temperature inversions are considered a "feature" of the area if they occur more than 30% of the time during winter nights.

The DECCW response to our report discusses the findings of the environmental assessment of the Tallawarra Stage B Power Station. In that assessment, an analysis was made of data from the Warrawong automatic weather station. It was concluded that Class F temperature inversions were a significant feature of the general area. The DECCW therefore consider that the assessment of noise emission from the Bass Point Quarry should include the effects of temperature inversions on night-time noise propagation.

In response, both Wilkinson Murray and Heggies conclude, based on analysis of available meteorological data, that there are no adverse meteorological conditions that require consideration in assessing noise propagation from the quarry. Wilkinson Murray based this on analysis of data from Port Kembla for the year 2008. Heggies, as noted in the *Bass Point Quarry Report*, reached the same conclusion based on an analysis of data from Kiama for the period January 2004 to September 2009. Both weather stations are a similar distance from the site, though Port Kembla is to the north and Kiama to the south of Shell Cove.

With regard to the “Warrawong” station, the Bureau of Meteorology website does not list this weather station. It is probably no more than a few kilometres from the Port Kembla weather station used by Wilkinson Murray, if not the same station under a different name. Different conclusions from closely spaced weather stations over different periods emphasise the complexity of deriving appropriate meteorological parameters for the noise assessment. The ocean, the mountains and the lake all influence local meteorology. The DECCW was contacted to obtain the data on which their conclusion was based, but they responded that the data were not available from them and that they relied on the conclusion of the Tallawarra assessment.

In the absence of data specific to this site, it is impossible to conclude with certainty that meteorological conditions would be a significant feature of the area. We can, however, assess whether it would make significant difference to noise propagation from the quarry.

The influence of temperature inversions at this site was investigated using the noise model prepared for our report. It showed that during times of temperature inversion the noise from the quarry would be increased by approximately 3dBA at the surrounding residential receivers. Accepting the results of the Heggies noise model, this would mean there would be exceedances up to 4dBA at the most-affected point within the development during times of temperature inversion. Noise management measures at the quarry could reduce or eliminate this exceedances.

3. NOISE AND VIBRATION FROM BLASTING AT BASS POINT QUARRY

3.1 Findings of the Assessment Report

Noise and vibration from blasting was not included in the assessment report, but is discussed by Heggies, both in their response to our report and their assessment of the proposed Bass Point Quarry expansion.

3.2 Heggies Comments

Criteria

Heggies propose criteria for assessment of blast overpressure and vibration that are consistent with DECCW guidelines, and are accepted by Wilkinson Murray. As is generally the case, in practice the overpressure criteria are more limiting than the vibration criteria. The relevant overpressure criterion is a value of 115 dBLin, which should be exceeded by no more than 5% of blasts. This is consistent with the operational controls imposed on the quarry via the quarry's current Environment Protection Licence (EPL 2193).

Calculated Overpressure and Vibration Levels

Prediction of overpressure is based on an equation which includes two parameters specific to the site. Heggies have established such a "site law" by measurement at this site. This gives similar predictions to a "typical" site law developed by Wilkinson Murray for predictions at a general site. Hence we accept the validity of Heggies' site law.

The Heggies report gives predictions for blasts with a Maximum Instantaneous Charge (MIC) of 72 kg. In the absence of other information we assume this is the highest MIC proposed for blasting at the quarry.

For a series of blasts apparently using the same design, there will in general be a large spread of noise and vibration levels at any receiving point. For this reason, it is typical to predict two values - a 5% exceedance prediction and a "best fit" prediction representing a typical measured overpressure level for the given distance and MIC.

Heggies in their report discuss only the 5% exceedance levels, and state that at the distance of the proposed residences from the quarry (330m), 5% exceedance overpressure levels would exceed the criterion of 115 dBLin.

In response, we confirm that using the given site law this is the case. However, using the Heggies 5% exceedance site law we predict that a blast of MIC 72kg would exceed 115 dBLin at distances to over 1km. Hence the predicted blasting overpressure exceeds the relevant criterion at existing residences, and mitigation measures should therefore be applied, consistent with the quarry's operating Environment Protection Licence.

On the other hand, using Wilkinson Murray's "best fit" site law, the predicted overpressure from a 72kg MIC blast is within 115 dBLin at 330m. This indicates that overpressure levels can meet the relevant criterion at the nearest proposed residence given "typical" blast practice and conditions.

Given the measured 5% exceedance site law, controls on blasting practice at the quarry are clearly required to meet the criterion of 115 dBLin, on a 5% exceedance basis, at existing residences. These

controls should be designed to ensure that conditions giving rise to occasional very loud blasts do not occur. They would normally include:

- strict control of stemming for blast holes;
- ensuring adequate timing sequences for all blasts; and
- restriction of blasting under adverse weather conditions.

With such controls, the values given by the "best fit" site law should be attainable for all but 5% of blasts, and can therefore be used for assessment.

We conclude that the siting of the residences is compatible with continued blasting at the quarry, however strict controls on blasting practice would be required. Controls would be required even in the absence of the proposed development, in accordance with the quarry's operating Environment Protection Licence, to ensure that criteria are met at existing residences.

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

Yours faithfully

WILKINSON MURRAY

A handwritten signature in black ink, appearing to read 'Geo Jenner', written in a cursive style.

George Jenner

Associate