Environmental Noise Report

Lot 74 (423) Rudds Gully Road
Narngulu
2017
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Scope

The scope of this document is restricted to lot 74 (423) Rudds Gully Road Narngulu, in relation the application for approval to change the existing business carried out the site from Water Blasting to Mini Concrete. This approval would need to be provided by the City of Greater Geraldton (CoGG) to Midwest Hydroclean. The areas used by Midwest Hydroclean for the concrete batch plant will be to the rear of lot 74. A noise bund has been put in place to minimise impact on sensitive land-uses to the south east of the site (sensitive receptors) (Figure 1).

The site is zoned as “General Industry” in accordance with the City of Greater Geraldton town planning scheme, LPS No 1, with the sensitive receptors located in both general industry and rural zoned areas (figure 2).
Noise Assessment

This Noise assessment has been carried out in accordance with the Western Australian Government Department of Water and Environment Regulation (DWER); Environmental (Noise) Regulations 1997, which are provided under the Environmental Protection Act 1986. This assessment describes current noise conditions at the site and measured simulations of the concrete batching process at the site on October 20th and 21st 2017. All reasonable effort has been made to provide an accurate simulation of the concrete batching plant, as without the relevant approvals the plant cannot be constructed and actual noise levels cannot be measured.

Noise measurement

All noise measurements taken for this assessment have been collected using a calibrated Bruel and Kajer type 1 sound level meter, model number 2250 (SN2715363), with acoustic calibrator type 4231, both have current calibration certificates (appendix 2).

The sound readings were collected by a Department of Mines and Industry Regulation Safety approved Noise officer (Certificate – 08017) at the site in accordance with the Environmental (Noise) Regulations 1997, Part 3 and where relevant the Australian Standard 1055 (1997) Acoustics – Description and measurement of environmental noise, parts 1, 2 and 3.

Noise measurements were taken at a height of 1.2 meters using a tripod and all measurements were collected at least 3 meters from the nearest noise reflective surface, a windscreen was used to reduce wind interference (Figure 3). The noise meters microphone was directed at the process being carried out or simulated as part of the assessment.

Readings of $L_{A20}$, $L_{A1}$ and $L_{Anax}$ were collected over a time period of at least 1 minute for each process using slow meter response time setting and are comparable to table 1 of the Environmental (Noise) Regulations 1997. Field performance checks were carried out at the start and finish of each block of noise testing and complied with Schedule 4, 3(1 a, b & c). Field calibrations were all found to be within the accepted range of variation during the assessment.
Meteorological conditions
During the survey the weather conditions at the site were varied;

- On the 20th October wind was from the East South East at around 26km/hr to East at 30km/hr, with a temperature at around 36 degrees C.
- 21st October wind was North-North East at around 24km/hr with a temperature of between 30 and 36 degrees C.

The general wind direction at the site is from the south either South West or South East, this weather during the survey was a worst case scenario with the wind directing the sound from the site towards the sensitive receptors.

Current Environmental Noise Background

Rudds gully road runs directly along the southern boundary of lot 74, and is between the proposed concrete batching plant site and sensitive noise receptor 2 (figure 1), this road provides a significant contribution to the current noise at the site. During September 2017 a study was carried out by Midwest Hydroclean to determine the average volume, and type of traffic on Rudds Gully road between 8:30am and 6pm; the average time between tucks (both light trucks and road trains) was 3 minutes with the general flow of light vehicles constant through the assessment period (average of 256 vehicles per day).

During background noise assessment at the site it was noted that Rudds Gully road has a significant impact on noise at the site. The noise reading shown in Figure 4 was taken at the site on 20th October; the peaks on the graph represent the vehicles passing the site. It was difficult to collect a reasonable background from this site due to the regular traffic. The final peak at the end of the record was a truck passing the site.
A background noise reading carried out on the 21st October (Figure 5) indicated a much lower background noise level due to fewer cars using the road at the time of the survey. The scale on the graph has reduced but car noise measured is directly comparable between the two assessments, cars passing the site peaked the noise reading at around 70dB.

The background noise readings collected over the two days of testing have been collated in Table 1, with the final line of the table indicating the noise levels prescribed in the Environmental (Noise) Regulations 1997 Part 2, Division 1, allowable noise emissions, general provisions Table 1, for noise sensitive premises. Sensitive receptors 2 and 3 are classed as Noise sensitive premises: highly sensitive area.

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TABLE 1 TYPICAL BACKGROUND NOISE LEVELS AT THE SITE

<table>
<thead>
<tr>
<th>Background Noise Readings(dB)*</th>
<th>LA1</th>
<th>LA10</th>
<th>LAmx</th>
<th>Impacting factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/10/2017</td>
<td>71</td>
<td>56</td>
<td>81</td>
<td>8 cars and 1 truck passed the site (Figure 4)</td>
</tr>
<tr>
<td>21/10/2017</td>
<td>69</td>
<td>51</td>
<td>71</td>
<td>2 cars passed the site (Figure 5)</td>
</tr>
</tbody>
</table>

*all readings have been rounded to the nearest whole number.

Another significant source of noise at this site is the Geraldton Airport which is approximately 2Km from the site and planes taking off from the airport impact on noise at the site. The survey did not capture the noise from the jet taking off although this noise is very loud and the windows in the office at the site rattle as the plane fly’s overhead.

Considerable works have been completed at this site to reduce noise impact on sensitive receptors from the current business of high pressure water blasting. An earthen noise reducing wall was installed at the site a number of years ago and this wall reduces the levels of noise the sensitive receptors receive from the site business activities. All proposed concrete works will be carried out so the sound reducing wall can reduce the impact noise may have on the sensitive receptors.

Noise Associated with the Concrete Batching Process

The process required to make concrete based on the following actions to be carried out;

1. Raw materials are delivered to the site by truck ~ once per week.
   **Concrete mixing process**
2. Water is added to the small concrete truck.
3. Cement is added to the concrete truck from storage silo through a pipe, aggregate is added from storage bunkers using a skid steer loader via a hopper and conveyer, into the concrete truck.
4. Concrete truck (holding 2m³ of concrete) agitates load of concrete for ~5 minutes after loading.
5. Concrete truck leaves the site stopping at the site office for a short period (~5mins) on the way to the customer.
6. The load will be further mixed in the concrete truck on the way to the customer.

Simulating the concrete making process

This noise assessment has been carried out to measure the potential impact concrete production at the site will have on the sensitive receptors close to the site (shown on Figure 1). The processes...
described when making the cement were listed above, with the highest potential impacting noise activities being 3, 4 and 5.

In order to assess the noise associated with these activities a simulation of each activity was carried out and the noise produced was measured at different locations both close to the noise source (inside the sound bund) and close to the sensitive receptors.

**Loading the concrete truck**
The concrete trucks are available at the site and were used in the assessment, the conveyer system is not set up so to simulate tipping aggregate into the cement truck an empty skip bin was positioned at the planned location of the conveyer hopper and filled with aggregate material using a skid steer loader (bobcat). The noise produced during this simulation was expected to be very similar to the noise produced as the aggregate and sand is loaded into the conveyer for mixing.

Part 3 and 4 sand and cement being loaded into the concrete truck was measured inside the noise bund, on the nearest sensitive receptors boundaries, and off the site in between SR1 and SR.

The following table indicates the noise measured during the simulation of loading the aggregate and agitating the Concrete truck inside the noise bund. Each noise reading has a graph showing the reading in the figures following;

**TABLE 2 SIMULATED NOISE LEVELS AT THE SITE – LOADING AND AGITATION OF THE LOAD**

<table>
<thead>
<tr>
<th>Simulated process readings(dB)*</th>
<th>Location of noise measurement</th>
<th>( L_{A1} )</th>
<th>( L_{A10} )</th>
<th>( L_{Am} )</th>
<th>Impacting factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAS004 bobcat loading truck with aggregate (Figure 6)</td>
<td>Taken close to SR3 on South West boundary</td>
<td>55</td>
<td>52</td>
<td>55</td>
<td>Cars removed from reading</td>
</tr>
<tr>
<td>MEAS010 , bobcat loading truck with aggregate (Figure 7)</td>
<td>Taken inside the noise bund as a <strong>worst case scenario</strong></td>
<td>79</td>
<td>78</td>
<td>79</td>
<td>at noise source, no-controls</td>
</tr>
<tr>
<td>MEAS011, bobcat loading truck with aggregate</td>
<td>Just outside the noise bund close to the boundary with SR1</td>
<td>55</td>
<td>53</td>
<td>55</td>
<td>Noise bund demonstrated controls</td>
</tr>
<tr>
<td>MEAS012 , bobcat loading truck with aggregate</td>
<td>Taken close to SR3 on South West boundary</td>
<td>53</td>
<td>51</td>
<td>54</td>
<td>Cars removed from readings</td>
</tr>
<tr>
<td>MEAS013 , bobcat loading truck with aggregate</td>
<td>Between SR1 and SR2 close to Rudds Gully rd</td>
<td>54</td>
<td>49</td>
<td>54</td>
<td>Cars removed from the readings</td>
</tr>
</tbody>
</table>
**Environmental (Noise) Regulations 1997**

<table>
<thead>
<tr>
<th>Table 1: Noise Sensitive Receptors</th>
<th>SR1 = noise sensitive premises</th>
<th>75</th>
<th>60</th>
<th>80</th>
<th>SR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowable noise levels</td>
<td>SR2 &amp; SR3 = noise sensitive + highly sensitive area</td>
<td>63</td>
<td>53</td>
<td>73</td>
<td>SR2 &amp; SR3 with influencing factor added</td>
</tr>
</tbody>
</table>

*All noise readings have been rounded to the nearest whole number

Noise levels shown on Figure 6 where no traffic was passing the site indicated that loading the aggregate has noise levels around 45dB (between 4:58:30 and 4:49:05, 5:01 and 5:02) where the agitation of the concrete was started this increased the levels measured slightly to around 50dB (at around 5:03:45).

**FIGURE 6 SIMULATION OF LOADING AGGREGATE - FROM BOUNDARY CLOSE TO SR 1**

The noise associated with the loading process was taken inside the noise bund 20 meters from the loading process towards SR1 for Figure 7. This would provide a worst case scenario at the noise source. The two processes are shown clearly on the figure, the initial loading process from the start to 8:49, then the concrete truck started mixing its load.
Directly outside the noise bund but close to SR1 boundary the reading displayed on Figure 8 shows that the noise is significantly lower due to the noise bund being in place. Where the initial bucket of aggregate peaked the noise reading at around 80dB inside the noise bund (Figure 7) it was reduced to around 55dB by the noise bund (Figure 8).

Noise readings taken further away from the task in Figure 9 indicate generally lower noise levels, lower than 50dB during loading and slightly above 50dB during agitation. This reading was impacted by road traffic which has impacted LA1 and LA10 and pushed them up.
When the noise level was assessed between SR1 and SR3 there was further reduction in noise levels with the loading period at around 45dB and with the agitation around 48dB. Cars passing on Rudds Gully rd have impacted on the LA1, LA10 and LA max, distinct peaks on the graph indicate passing traffic.

The concrete truck leaving the site

The following table compares part 5 of the process where the Concrete truck is loaded and leaves the site after remaining stationary at the site office for 5 minutes. These noise readings were taken close to all sensitive receptors to provide the most accurate assessment of their potential exposure.

**Table 3 simulated noise levels at the site – agitation of the load at the site office**

<table>
<thead>
<tr>
<th>Simulated readings(dB)*</th>
<th>process details</th>
<th>Location of noise measurement</th>
<th>L_{A1}</th>
<th>L_{A10}</th>
<th>L_{Amax}</th>
<th>Impacting factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAS005, loaded concrete truck agitating its load at the site office</td>
<td>Taken close to SR3 on SW boundary</td>
<td>69</td>
<td>53</td>
<td>70</td>
<td>Cars on the road impacts the readings</td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Noise Assessment - Lot 74 (423) Rudds Gully rd. November 2017

**Table:**

<table>
<thead>
<tr>
<th>MEAS015</th>
<th>Loaded Concrete Truck agitating its load at the site office</th>
<th>Between SR1 and SR2 close to Rudds Gully rd</th>
<th>69</th>
<th>50</th>
<th>74</th>
<th>Cars on the road impacts the readings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Environmental (Noise) Regulations 1997</em> table 1.</td>
<td><em>Noise Sensitive receptors</em> allow noise levels</td>
<td>75</td>
<td>60</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

This noise reading (Figure 11) was impacted by Rudds Gully rd noise traffic, but indicates noise levels associated with this process is very low.

**Figure 11 - Simulation of truck leaving the site - on Rudds Gully rd near SR1**

**Figure 12 - Simulation of truck leaving the site - on Rudds Gully rd between SR1 and SR2**
Discussion

The local government has zoned lot 74 (423) Rudds Gully rd as “General industry” under the LPS 1 and the nearest sensitive receptor is zoned as “Rural”. Under the *Environmental (Noise) Regulations 1997, the property is also defined as a “rural premises” (page 3, Part 1, r.3). In accordance with Schedule 1, Part 3 sensitive receptors 2 and 3 (Figure 1) are classed as “Noise sensitive premises: highly sensitive area”. The assessment carried out was designed to compare the measured noise levels simulated by the concrete making process to the guideline levels provided by the noise regulations.

Comparison against the regulatory guideline has been made very difficult due to the proximity of the Rudds Gully road to this site and the sensitive receptors. It can be seen from many of the graphs that the main noise source in this location is the traffic on the local road.

Background noise levels at this site were measured on the two days of testing with readings provided in Table 1. Where measured background noise levels were compared to the allowable level of noise provided by the noise regulations it was found that due to the road traffic background noise (LAmx) exceeded the allowable level in one measurement.

The most significant noise associate with making concrete was when loading and agitating the load in the truck was carried out as shown in Table 2. Only one noise readings taken close to the sensitive receptors (SR1, SR2 and SR3) was found to be above the regulatory maximum provided, with this being attributed to traffic on Rudds Gully rd not the concrete batching process. The highest readings were taken inside the noise bund adjacent to the process, these were elevated which was expected to be the case. Measurements taken near the sensitive receptors found that a significant reduction of noise occurs due to the noise bund in place at the site.

When the concrete truck was idled at the office and agitating this noise was barely distinguishable from other background noise levels, and well below the regulatory guidance as shown on Table 3.

This noise assessment also assessed tonality, modulation and impulsiveness in accordance with the definitions provided in the *Environmental (Noise) Regulations 1997,9(1), these noise characteristics were not found to be present at the time of the survey during the simulated processes carried out at the site. The traffic noise along Rudds Gully road also impacted on the ability measure the changes in tonality and modulation accurately.

Summary

This assessment clearly indicates that the process relating to the production of concrete at this site is not going to have a significant impact on the three immediate sensitive receptors close to the site. Traffic noise can have a far greater impact than on the sensitive receptors than the concrete making process.
Noise measured directly next to the simulated concrete making process inside the noise bund at the noise source indicated it was above the accepted limits, but once the readings were taken outside the noise reducing bund and close to the sensitive receptors it was found to be well below the mandated regulatory limits.

References
