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Substrate Plant Mulgrave

Operational Noise Management Plan

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1 INTRODUCTION

Acoustic Consulting Engineers Pty Ltd was engaged by Elf Farm Supplies to review and update the Operational Noise Management Plan (ONMP) for the existing and upgraded (Approval 08_0255) mushroom substrate plant at Mulgrave.

This report addresses procedures for the management of noise issues associated with the operation of the Mulgrave substrate plant. The facility would be expanded in three (3) stages over ten (10) years.

2 REQUIREMENTS

2.1 Ministers Conditions of Approval

Conditions of Approval were issued by Department of Planning and Infrastructure (11 January 2012) for the development under Application No. 08_0255. Condition 22 of Schedule 3 requires the preparation of a Noise Management Plan for the Substrate Plant. Specifically:

Noise Management Plan

22. *The Proponent shall prepare and implement a Noise Management Plan for the Substrate Plant site in consultation with the OEH to the satisfaction of the Director-General. The Plan must be submitted to the Director-General for approval prior to commencement of operations, and include a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this approval.*

With reference to Approval MP 08_0255 MOD 1 dated 14 March 2016 (Condition 26), the Department of Planning replaced the noise assessment objectives set out in Condition 19 of Schedule 3 (taking into consideration of the predicted noise levels presented in Atkins Acoustics' Report No. 45.6932.L2:CFCD7 dated 17 February 2015). In terms of specific operational noise limits, Condition 19 states:

Operational Noise Criteria

19. *The Proponent shall ensure that the operational noise generated by the Substrate Plant site does not exceed the criteria in Table 2.*

Table 2 Operational Noise impact assessment criteria, dB(A)

Receiver Location	Day/Evening $L_{Aeq,15min}$	Night $L_{Aeq,15min}$
R1 – 46 Mulgrave Road, Mulgrave	43	43
R2 – Mulgrave Industrial Area	42	42
R3 – 2 Railway Road, Mulgrave	42	37
R4 – 126 Mulgrave Road, Mulgrave	44	41
R5 – Chisholm Place, South Windsor	44	42

Note: Noise generated by the Project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

It is noted that Reference Receiver Location R2 was an isolated residence in an Industrial area. This dwelling has been demolished and the site has been advertised for sale for industrial uses.

2.2 Relevant Guidelines

The Substrate Plant, Mulgrave *ONMP* was prepared with consideration of:

- OEH, Industrial Noise Policy (2000)
- Department of Planning and Infrastructure, Approval 08_0255

3 PROPOSAL

The expansion of the substrate site is accommodated within the south-east, south-west and north-west portions of the site (*Figure 1*). The substrate production at Mulgrave is currently limited by its development consent to a maximum of 1,000 tonnes/week of Phase 1 substrate, regardless of whether this is the final product or further processed to produce Phase 2 or 3 products. Due to efficiencies and refinement of processing operations, increased production utilising the current plant is possible. In addition, with the advent of Phase 2 and 3 processing, demand for substrate by mushroom growers has increased and production levels at Mulgrave have operated maximum levels for the last 3 to 4 years. The expansion of the existing substrate plant is a prerequisite for the development of the mushroom farm at Londonderry (Approval 08_0255).

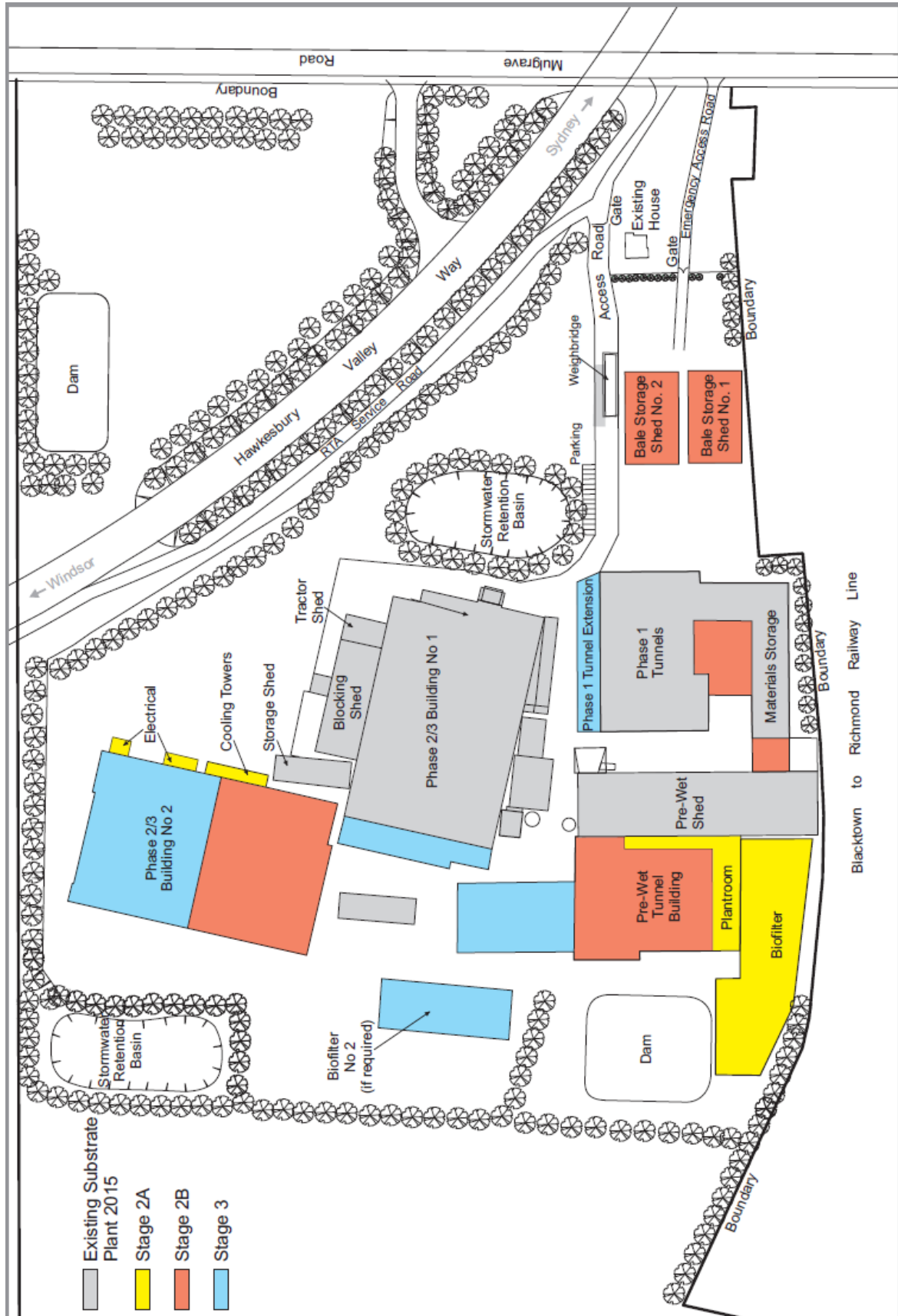
An increased production capacity of 1,600 tonnes/week can be accommodated utilising the existing substrate production plant and would not require any additional plant and equipment with the exception on an additional shed for the storage of straw.

To facilitate increased production up to 3,200 tonnes/week it is proposed to expand the facility in three (3) stages over ten (10) years. The main components of the expansion are presented below:

Stage	Description	Plant Capacity (tonnes/week*)
1	Additional straw bale storage shed. Fill final small area on western side	1,600
2	Pre-wet shed extension with new conveyor, new bio scrubber with chimney, extra bale wetting area, extra bale storage shed, relocate weighbridge, new Phase 2/3 building with 9 tunnels and overhead supply conveyor	2,400
3	Extra Phase 1 tunnels and 13 Phase 2/3 tunnels	3,200

- Tonnes of Phase 1 substrate (1,000t Phase 1 reduces to 600t Phase 3)

Figure 1 Site Layout - Substrate Plant Expansion



In terms of vehicle trips associated with the development, the following numbers were projected for the staged tonnage increases:

1,000 tonne/week	16 trucks/day
	29 cars/day
1,600 tonne/week	24 trucks/day
	32 cars/day
3,200 tonne/week	50 trucks/day
	36 cars/day

In terms of vehicle movements the numbers presented have been doubled for modelling traffic noise by Atkins Acoustics. The hourly generations identified in the Atkins Acoustics' report for the final design level of 3,200 tonne/week are:

Day (7.00am to 10.00pm)	70 trucks (5/hr)
	50 cars (3/hr)
Night (10.00pm to 7.00am)	30 trucks (3/hr)
	22 cars (2/hr)

The plant and equipment used at the facility is consistent with existing plant and includes front end loaders, mobile blender and tunnel loading machines. Fixed plant and equipment include exhaust and supply air fans, bio-scrubber, conveyors, chillers, compressors and pumps.

Hours of operation for the facility are twenty-four (24) hours, seven (7) days a week consistent with current use of the site and in accordance with Project Approval 08_0255 (Condition 20).

4 OPERATIONAL NOISE

4.1 Noise Receivers

Figure 2 and Table 1 show the nearest potentially affected residential dwellings located to the north (46 Mulgrave Road – feedlot and associated residence), south-east (commercial market garden - 124 Mulgrave Road and isolated residential dwellings - 2 Railway Road) and west (Chisholm Place, South Windsor) of the development, identified in the Atkins Acoustics' report.

The residential dwelling at Reference Receiver Location R2 has been demolished and the site has been advertised for sale for industrial uses. Accordingly the recommended amenity noise level for Industrial premises of 70dB(A) L_{Aeq} would apply in accordance with NSW EPA Noise Policy for Industry (2017).

Table 1 Assessment Locations

Reference	Description	Location
R1*	46 Mulgrave Road, Mulgrave	North
R2	Mulgrave Industrial Area	East
R3	2 Railway Road, Mulgrave	South-east
R4*	126 Mulgrave Road, Mulgrave	
R5*	Chisholm Place, South Windsor	West

* Noise monitoring locations

Figure 2 Reference Assessment Locations



4.2 Noise Assessment Objective

Based on previous work undertaken by Atkins Acoustics, the *Department of Planning and Infrastructure* imposed specific noise limits at reference receivers (*Condition 19 (Table 2)*) as follows:

Table 2 Operational Noise impact assessment criteria dB(A)

Receiver / Location	Day/Evening $L_{Aeq,15min}$	Night $L_{Aeq,15min}$
R1 – 46 Mulgrave Road, Mulgrave	43	43
R2 – Mulgrave Industrial Area	42	42
R3 – 2 Railway Road, Mulgrave	42	37
R4 – 126 Mulgrave Road, Mulgrave	44	41
R5 – Chisholm Place, South Windsor	44	42

Notes: Noise generated by the Project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

It is noted that the dwelling at Reference Receiver Location R2 in an industrial area has been demolished and the site has been advertised for sale for industrial uses. Accordingly, the recommended amenity noise level for Industrial premises of 70dB(A) L_{Aeq} would apply in accordance with NSW EPA Noise Policy for Industry (2017).

4.3 Operational Noise Sources

Operational noise from the Mulgrave Substrate Facility includes both mobile (FELs, trucks) and fixed mechanical plant (compressors, condensers, fans). Table 3 provides plant/equipment sound power levels and spectra, representing Stage 3 (final design level of 3,200t/week), extracted from Atkins Acoustics' 'Operational Noise Management Plan. Substrate Plant. Mulgrave' Report No. 42.6411.ONMP_Mul:CFCD5 Rev01 dated April 2012 and additional modelling prepared by Atkins Acoustics in 2015.

Table 3 Plant/Equipment Sound Power Levels and Spectra

Plant Description	Sound Power Level								
	dB(A)	63	125	250	500	1k	2k	4k	8k
Super Chill Condensers EWK-D680 (x6) [^]	83	79	81	81	78	75	73	76	72
Compressor Room (external door) x2	80	79	75	77	76	76	70	69	63
Conveyor Drive – New Phase 3 (E-W)	80	72	74	72	77	76	72	63	55
Conveyor Belt – New Phase 3 (E-W)	70*	75	75	70	70	63	59	52	43
Conveyor Drive – New Phase 3 (N-S)	80	72	74	72	77	76	72	63	55
Conveyor Belt – New Phase 3 (N-S)	70*	75	75	70	70	63	59	52	43
Conveyor Drive – Pre Wet	80	72	74	72	77	76	72	63	55
Conveyor Belt – Pre Wet	70*	75	75	70	70	63	59	52	43
FEL – Volvo L90E	102	115	104	100	98	99	92	92	87
FEL – Volvo L150E	105	120	104	103	102	99	97	95	91
FEL – Komatsu WA320	104	114	102	100	102	99	96	93	86
Pre-Wet Shed (average in shed)	85	84	85	84	83	79	77	74	71
Truck (moving)	101	98	102	101	97	94	94	91	80
Loading Activities (Phase 2/3 average in loading hall)	86	81	84	85	85	81	78	73	65
Loading Activities (Phase 2/3 external facade)	63	66	68	63	61	60	49	43	37
Evapco MTT-116-4Q20 New Phase 2/3 cooling towers	99	111	107	102	97	88	84	81	78
FEL – Hyundai HL 757-9	98	111	100	92	87	97	86	72	66
FEL – Leibherr 550	98	110	99	92	90	97	87	74	67

* sound power level per metre of conveyor

[^] three (3) cooling towers operating simultaneously at any one time

Fixed mechanical plant including condensers and compressors presented in *Table 3* are based on audit measurements of the existing plant servicing the current Phase 2/3 building. Existing compressor room and condensers are located on the eastern façade of the existing Phase 2/3 building, conducted by Atkins Acoustics. The compressors and condensers servicing the new Phase 2/3 building on the north-west corner of the site are proposed to be located along the eastern façade of the new building. A selection of roof and tunnel fans for the new Phase 1 tunnels, odour control fans including ammonia scrubbers, and new pre-wet bale breaking line were also incorporated into the noise model.

It is also noted that Elf Farm Supplies has since replaced the Volvo and Komatsu front end loaders with Hyundai HL 757-9 and Liebherr 500 front end loaders which are 6-7dB(A) quieter.

4.4 Assessment

The modelling (Atkins Acoustics' Report No. 40.6411.R1:CFCD4 Rev03 *Tables 12-14*) and additional modelling by Atkins Acoustics in 2015 for rotation of the new Phase 2/3 building, amended cooling tower selections, bale breaking line and new odour control system showed that with the incorporation of noise and management controls, predicted noise levels satisfied the project operational noise goals and operational noise criteria specified in *Condition 19* under calm and adverse weather conditions identified in accordance with procedures of the *INP*.

The Atkins Acoustics' reports modelled operational noise with the following scenario for day/evening/night:

- 2 x trucks - 4 movements (base on Lw101dB(A) adjusted for total 3min duration on access road and 3min duration for entry/exit paths to building)
 - 1 x Existing Phase 2/3 Building (exit & entry points)
 - 2 x Access Road
- 3 x FEL (Komatsu WA320, Volvo L90E and Volvo L150E)
 - 1 x Bale Storage Area - Komatsu WA320
 - 1 x Materials Storage Area - Volvo L90E
 - 1 x Pre Wet (between Pre Wet and Conveyor Building) - Volvo L150E
- Bale Breaking Line in Pre Wet Shed
- Loading in both Phase 2/3 Buildings (new Phase 2/3 substrate is transferred by internal conveyor to loading hall in existing Phase 2/3 building)
- Fixed mechanical plant – Cooling towers, pumps, compressors, tunnel supply and exhaust fans and odour control system

5 ROLES AND RESPONSIBILITIES

This section of the *ONMP* provides an outline of the roles and responsibilities of the personnel involved in the operation of the site, including contractors to ensure that noise impacts are managed to comply with the relevant assessment goals and do not adversely impact the identified sensitive receivers. The personnel, roles and responsibilities are summarised below:

<i>General Manager</i>	<p>review and authorise the <i>ONMP</i> in conjunction with <i>Managing Director</i>;</p> <p>designate environmental responsibilities to the project <i>Operations Manager</i>;</p> <p>ensure that the specified production limits for Phase 1 substrate are not exceeded as follows:</p> <ul style="list-style-type: none">Stage 1 1,600 tonnesStage 2 2,400 tonnesStage 3 3,200 tonnes <p>ensure dispatch of Phase 3 substrate does not exceed 1,920 tonnes per week;</p> <p>ensure sufficient resources are allocated such that the <i>ONMP</i> commitments are adopted; and,</p> <p>continual review and monitoring of environmental performance to ensure suitability and effectiveness of <i>ONMP</i> and objectives in conjunction with <i>Managing Director</i>.</p>
<i>Operations Manager</i>	<p>review, maintain, update and implement the <i>ONMP</i>;</p> <p>educate staff and contractors to ensure all relevant personnel are aware of their obligations under the <i>ONMP</i>;</p> <p>review identified noise issues or complaints and action;</p> <p>co-ordinate activities and duties required under this <i>ONMP</i>;</p> <p>act as an initial contact person in relation to any noise issues;</p> <p>provide advice on noise controls to manage noise exceedances/ complaints;</p> <p>designate an appropriately qualified person to provide specialist advice for managing noise as required; and</p> <p>periodic review to ensure the <i>ONMP</i> is being implemented.</p>
<i>Operational Staff</i>	<p>aware of their responsibilities under the <i>ONMP</i>;</p> <p>aware of the specific noise and vibration sources in their work area and requirements under this <i>ONMP</i> to minimise operational noise impacts; and,</p> <p>inform the <i>General Manager</i> or <i>Operations Manager</i> without delay where change in operations are required that may result in high levels of noise.</p>

6 OPERATIONAL NOISE MANAGEMENT

Notwithstanding the predicted compliance with the operational noise goals, to ensure that noise is managed and impacts minimised, the Atkins Acoustics' report recommended the following measures in the ONMP:

- Adoption of Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as encouraged by the *OEH*;
- Site developed generally in accordance with *Figure 1*;
- Site constructed with levels approximately RL16-17, building heights of approximately eight to twelve (8-12) metres for Phase 1 tunnels and hall and eleven (11) metres for new Phase 2/3 building;
- Plant and equipment selected on acoustic performance;
- Building walls (Materials Storage Shed and Bale Breaking Area) concrete to a min. height of two (2) metres above FFL followed by galvanised steel frame and galvanised wall/roof sheeting nominally 0.6mm BMT and a minimum R_w22 . Final details subject to acoustic review prior to final specification;
- Fan plant rooms for new Stage 1 processing tunnels to south (Tunnels 1-6) and north (Tunnels 7-10) constructed with concrete walls (min. R_w50) and composite roof/ceiling OR in-situ concrete (min. R_w40);
- Penetrations of fan rooms to be review by acoustic consultant and appropriately detailed to avoid de-rating the structure;
- New processing tunnels to be of concrete construction;
- Construction materials of working hall between processing tunnels (1-6 and 7-10) typically concrete wall construction nominal installed noise reduction in the order of 40dB (min. R_w46) and composite roof/ceiling nominal installed noise reduction in the order of 25dB (R_w31). Final details subject to acoustic review.
- Proposed external fans identified on current design drawings (No. 41, 42, 43, 44, 52, 53, 66, 67 and 68) to incorporate inlet / discharge attenuators. Details subject to acoustic review;
- Fan room intake for new Phase 2/3 building (Fan No. 110 - 134 inclusive x 25 fans subject to acoustic review);
- Internal walls and roof of tunnels within Phase 2/3 building precast or cast in-situ concrete and/or Hebel panels/blocks;
- Building wall cladding (Phase 2/3 building insulated colorbond sandwich panels consistent with existing Phase 2/3 building providing a nominal installed noise reduction in the order of 23dB (R_w28 or greater). Final details subject to review prior to final specification;
- Building roof cladding sheet metal (min. 0.42BMT) over fibreglass building blanket and medium duty thermofoil or similar and insulated colorbond sandwich panel (ceiling) consistent with existing Phase 2/3 building providing a nominal installed noise reduction in

the order of 28dB (R_w 34 or greater). Final details subject to review prior to final specification;

- The final design/tender documentation to be reviewed by Acoustic Consultant;
- Truck drivers instructed and contracted to operate on-site trucks at less than 20kph;
- Mobile plant fitted with low level or broadband 'quacker' reversing alarms;
- Site inductions and personnel/contractor training in correct use of plant and equipment to minimise noise impacts;
- Truck access arrangements to allow for forward travel throughout the site and minimise reversing or manoeuvring where possible;
- Inspection/maintenance/repair program for mobile mechanical plant;
- The existing Environmental Management Plan should be amended and updated to ensure the following items are incorporated:
 - procedures for residents to contact the Operations Manager in regard to complaints or additional information;
 - follow-up procedures to inform residents of actions implemented following any noise complaints;
 - regular inspections of site plant including trucks to ensure that the installed noise suppression systems are functioning and require no maintenance; and,
 - regular audits at sensitive receiver locations to identify additional procedures to minimise noise impacts from the site.

6.1 Noise Monitoring

Schedule 3 - Condition 22 requires noise monitoring to evaluate noise compliance. Accordingly this *ONMP* recommends that noise monitoring be incorporated into the site Environmental Management Plan.

The Atkins Acoustics' report recommends that within six (6) months of completion of each stage of the proposed upgrade of the substrate plant, noise monitoring be conducted at two (2) reference locations consistent with the closest residential receivers identified in *Table 1*, specifically Chisholm Place to the west and Railway Road/126 Mulgrave Road to the south-east. Where access to the identified receiver is not practical, alternative locations representative of the subject receiver/s could be considered.

Where practical, near-field measurements of fixed and mobile plant and equipment would also be conducted within six (6) months of completion of each stage of the proposed upgrade or when there is significant changes to site plant and equipment, to ensure compliance.

In addition to the noise monitoring within six (6) months of the commissioning of each stage, where noise complaints are received by the Operations Manager, the source of the noise

complaint will be identified and ameliorative measures considered if required. Following audits, control measures will be reviewed should additional ameliorative measures be required.

Complaints will be recorded, and include location of complainant, time/s of occurrence of alleged noise impacts, perceived source of noise, prevailing weather conditions and similar details that could be utilised to assist in the investigations of the noise complaint. All resident complaints will be responded to in a timely manner and action taken recorded.

6.2 Records

The results of all noise complaints and monitoring will be held onsite and maintained by the *Operations Manager*.