

SYNLAIT MILK LIMITED
REQUEST FOR PLAN CHANGE
Noise Assessment
Rp 002 R04 2013284c

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Project: REQUEST FOR PLAN CHANGE—NOISE ASSESSMENT**Prepared for: Synlait Milk Ltd
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1.0 INTRODUCTION

Synlait Milk Ltd (Synlait) is making a request for a plan change to the Selwyn District Plan (Rural Volume).

The proposed Change introduces provisions for a Dairy Processing Management Area (DPMA) covering an area of land containing, and immediately surrounding, the existing Synlait dairy plant at Heslerton Road, Dunsandel. The purpose of the DPMA is to recognise and provide for the continuing efficient use of the dairy plant and its future expansion.

The plan change request introduces new provisions which provide for activities associated with the processing of dairy products as well as rules which define the maximum buildable area within the DPMA and maximum noise levels. With the DPMA in place, it is anticipated that landuse consents to the Selwyn District Council will be minimised.

The area of land within the DPMA is intended to provide sufficient space for the future development of the dairy plant. This is anticipated to occur over a period of decades and will progress in response to a range of variable factors. These include the market demand for dairy products, developments in the dairy industry, operational requirements and the size of the catchment area serviced by the dairy plant. Accordingly, there is an optimal scale of development based upon the above considerations.

Whilst the ultimate development scenario for the plant is undefined, the DPMA is generically based upon a scenario which is informed by the existing plant layout and its activities. This scenario anticipates up to 8 dryers with associated drystores, reception, roading and servicing as the maximum scale of development that would occur at this site.

Marshall Day Acoustics has been engaged by Synlait Milk Ltd (Synlait) to assist with the development of appropriate noise rules for the DPMA. Specifically, the plan change proposes to introduce a noise control boundary around the DPMA, coupled with generic noise rules and an outline development plan specific to the Synlait site.

This report discusses the types of noise effects that can be anticipated from the DPMA if the plan change is implemented, the rationale for a noise control boundary and the effectiveness of the proposed rules in managing anticipated noise effects.

2.0 DISCUSSION

2.1 Background

Marshall Day Acoustics has been involved with the Synlait site at Dunsandel since 2005, at a time when it was still farm paddocks. We worked with Synlait, and the original team of consultants, to plan a site development that met the Company's initial development needs.

In the years since the first stage was constructed, we have undertaken a number of noise assessments to accompany resource consents for additional development at the site.

2.2 Noise Objectives of the Plan Change

With respect to noise, the objective of the proposed DPMA and its noise rules is to provide a clear "envelope" which defines the extent of acceptable noise effects for the surrounding community. Within the envelope, activities within the DPMA are able to develop in response to market and operational needs. All parties would have a clear, simple method for knowing what noise level can be expected when the site is fully developed.

2.3 Why a Noise Control Boundary?

Noise control boundaries have been used throughout New Zealand for many years, most notably around airports and ports, although they are increasingly becoming common around dairy processing plants. They provide a simple method for all parties to visualise the extent of noise effects.

A noise control boundary is represented by a line on the Outline Development Plan (ODP) beyond which noise from a site or activity must not exceed a pre-defined value. Whilst such a boundary can work equally well at any given noise limit, it is most useful if the limits reflect potential effects on residents on neighbouring land.

In essence, a noise control boundary is no different to the “boundary” at which noise limits apply. District Plan rules, and consent noise limits, apply at “site boundary”, “zone boundary”, or “notional boundary” locations, and in practice these are nothing more than lines on a page. The primary advantage in a noise control boundary for a dairy processing plant is that it allows a noise rule to be customised to address the effects of a specific site.

3.0 PROPOSED PLAN CHANGE NOISE RULES

3.1 Format of Noise Rules

The plan change proposes a very simple set of rules regarding noise, to provide appropriate control of noise effects. Refer to APPENDIX A for the current wording of the proposed rules. In summary, the plan change proposes rules to:

- Set a daytime and night-time noise limit at a noise control boundary shown in the Outline Development Plan,
- Define the use of the latest version of the New Zealand environmental noise measurement and assessment standards,
- Require confirmation by an acoustic engineer that compliance will continue to be achieved as/when additional processing or storage capacity is established,
- Adopt a Noise Management Plan to ensure best practice with respect to noise on site, and,
- Exempt noise from rail movements within the site.

In addition to these rules, the Outline Development Plan places a restriction on new sensitive activities inside the noise control boundary.

We will discuss the rationale behind each of these rules in the following sections.

3.2 Appropriate Noise Limit

There are a number of documents which provide guidance as to appropriate noise rules for a Dairy Processing Management Area, given the types of noise effects which can arise from this type of facility. Most noise sources in a dairy processing plant are continuous items of plant, such as pumps, cooling towers, and fans. In addition, there is noise from vehicle movements both in and around the site, most notably milk tankers.

3.2.1 District Plan Noise Limits

The Synlait site is located within the Rural (Outer Plains) zone of the Selwyn District Plan. The noise rules for permitted activities in that zone can be summarised as follows:

- 7.30am – 8.00pm 60 dBA L_{10} , 85 dBA L_{max}
- 8.01pm – 7.29am 45 dBA L_{10} , 70 dBA L_{max}

These rules apply at the notional boundary of any dwelling.

3.2.2 Existing Consented Noise Limits

There are a number of existing resource consents associated with activities on the Synlait site. The most recent, is Resource Consent 135590 (March 2014).

Conditions 8 through 13 of this consent relate to noise. The site noise limits are defined in Condition 8 and 9 as follows:

8. The cumulative noise from all activities on the site shall not exceed 50 dBA L_{10} at any of the following positions, as shown on plan SDC 135590 attached (Figure 4 of Marshall Day report dated 17 October 2013):

- *Any point along the boundary of the site across State Highway 1 within 480m of the State Highway 1/Old South Road corner. This excludes noise from any construction activities; and*
- *Any point along the boundary of the site across Heselton Road between the corner of Heselton Road and Old South Road and 20m to the south east of the site access. This excludes any construction activities and the noise for vehicles on the site entrance road.*

Noise shall be measured and assessed in accordance with NZS6801:1999 and NZS6802:1991.

9. Except where covered by condition 8 above, the noise from all activities on-site shall not exceed 45 dBA L_{10} at the noise assessment boundary shown on plan SDC 135590 (Figure 3 of Marshall Day report dated 17 October 2013). This excludes any construction activities and the noise of vehicles on the site entrance road.

These conditions are summarised in Figure 1. At rail or road reserves, the noise limits apply on the opposite side of the road or rail corridor, consistent with the Selwyn District Plan and industry best practice.

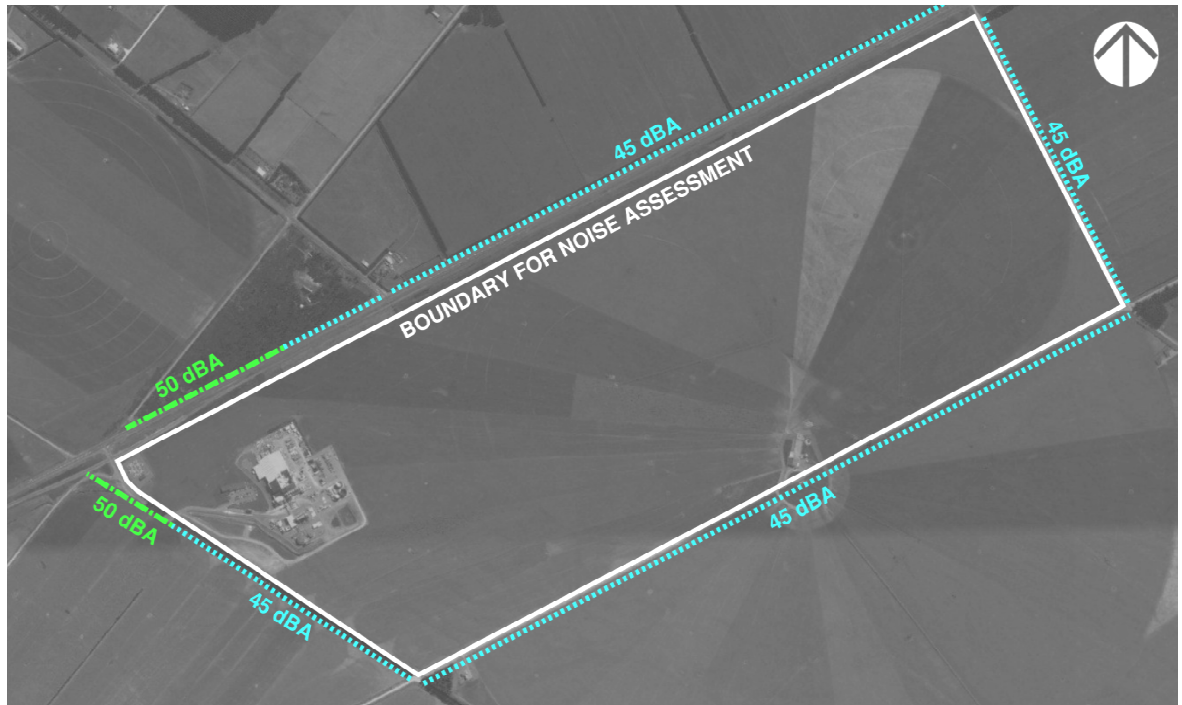
Of particular note is that the consented noise limits are **more stringent** than the underlying District Plan limits, in that they generally apply closer to the Synlait site than the notional boundary of existing dwellings. In addition, the consented noise limit for the Synlait site is consistent with night-time rules, with no provision for higher noise levels during the day.

This has arisen because the vast majority of major sources of noise at a Dairy processing plant operates 24 hours per day. As a result, overall noise levels are always controlled by the night-time noise limit, and this has always been the focus at the Synlait site.

Nevertheless, we consider it appropriate to provide a daytime noise limit. On a dairy processing site, this allows for activities such as repairs and maintenance, testing, and noise associated with administrative activities. It does not result in noticeably higher noise levels

during the day, because all of the plant is designed and operated to comply with the night-time noise limit.

Figure 1: Boundary for noise assessment and existing numerical limits



3.2.3 Other Guidance Documents

There are two key sources of guidance on acceptable limits for noise at residential dwellings. In summary;

- The World Health Organisation guidelines¹ recommend limits of 55 dB L_{Aeq} during daytime to avoid serious annoyance, and 45 dB L_{Aeq} at night to allow sleep with windows open for ventilation,
- New Zealand Standard 6802² also recommends limits of 55 dB L_{Aeq} during daytime and 45 dB L_{Aeq} at night.

Both of these guidance documents apply in the vicinity of dwellings, which is generally interpreted as being at notional boundaries. This guidance is consistent with the District Plan and existing Synlait consents at night, but is more stringent than the daytime District Plan rule of 60 dB L_{A10} .

3.2.4 Conclusion

It is our view that a noise rule of **55 dB L_{Aeq} during daytime, and 45 dB L_{Aeq} at night**, defines a level of noise consistent with good residential amenity in a rural area, particularly one that is influenced by a significant traffic noise source. We therefore recommend a noise control boundary based on these limits.

¹ Guidelines for Community Noise ed. B. Berglund, T. Lindvall, D H Schwela (prepared for World Health Organisation), 1999

² NZS 6802:1999, "Acoustics—Assessment of Environmental Noise", published by Standards New Zealand

For residents, the noise control boundary will represent a line beyond which they can have confidence a good standard of residential amenity will be maintained.

We support the proposed amendment to **Part C, 3 Rural Rules – Buildings, Rule 3.13.1.5** which imposes acoustic mitigation on new noise-sensitive activities located within the noise control boundary but outside the DPMA, given that residential amenity will deteriorate inside this line.

3.3 Latest New Zealand Standards

The current District Plan rules refer to the 1991 version of the New Zealand environmental noise standards (NZS 6801 and NZS 6802), consistent with the current “L₁₀” parameter in the rules.

Industry best practice is now to use “L_{eq}” based noise rules, measured and assessed in accordance with the 2008 version of the same standards.

We would anticipate that at some future date, should the District Plan be reviewed, that the noise rules will be updated to “L_{eq}” based rules. Accordingly, whilst the plan change will introduce a different parameter from that currently in the District Plan, the noise standards for the DPMA will be consistent with industry and environmental best practice and ultimately the District Plan will change to the same parameter. We therefore support the use of this best practice as part of this plan change.

We also note that there is no practical difference between L₁₀ and L_{eq} noise rules when considering noise from a dairy processing plant.

3.4 Ongoing Confirmation of Compliance

Any significant dairy processing expansion has the potential to generate noise. It is therefore appropriate to assess the parameters of possible site development within the DPMA, and confirm the ability of possible future development to comply with overall noise rules. In addition, it is imperative for the site operator to ensure this work is done by a competent acoustic consultant, to ensure that projects which increase noise levels do not use up all of the available noise budget. This would prevent further developments occurring at a later stage without resource consent.

Because administration and other ancillary buildings do not produce significant noise, we consider it appropriate to restrict the requirement for acoustic assessment to projects which will include noise generating activities. The proposed plan change suggests “...additional processing or storage capacity...” as a trigger for requiring a noise assessment.

An important consideration with this plan change is that the DPMA offers monitoring and ongoing compliance assessment beyond what is required in other parts of the District. This level of ongoing attention to noise isn’t normally part of an industrial site.

Confirmation that the site will continue to comply, will require a combination of monitoring of existing noise levels and detailed modelling of proposed noise sources. We consider this to be prudent and appropriate, and we therefore support proposed Rule 26.18.

3.5 Noise Management Plan

Noise management plans can successfully be used to manage noise effects on multi-use or complex sites.

A Noise Management Plan also offers a number of other benefits to Council. In particular;

- A formal complaints procedure is put in place to record and report on noise issues, giving transparency to all parties. In addition, complaints can often be about specific noise sources such as reversing beepers, which may well comply with site noise limits, but are appropriately addressed through use of other technology,
- Existing specific noise related conditions, if any, can be “transferred” to the noise management plan,
- Annual review of a noise management plan requires management and key staff of the dairy processing plant to think about noise on a regular basis, and demonstrates the commitment of a plant operator to good environmental practice,
- A noise management plan is a useful mechanism to implement best practice methodology, beyond simple compliance with noise rules,
- Additional development on an established site might require noise reduction on some existing plant items, and this could be dealt with through the noise management plan,
- Noise monitoring requirements can be established on a site-specific basis through the noise management plan. Sites close to dwellings, and those undergoing expansion or construction work, often require more frequent monitoring than a developed site. This type of responsive management is unlikely to be achieved through a rule based approach.

3.6 Rail Noise Exemption

Rail noise has been assessed in detail during the preparation of this plan change (see section 4.6). Our assessment confirms that rail noise effects resulting from the proposed siding at the Synlait site will be minor, and any change to the siding would require an additional plan change. The plan change also proposes to exempt rail movements from the noise standards for the following additional reasons;

- Rail noise, by virtue of being intermittent, can falsely affect the noise control boundary. If the site was modelled as the “noisiest 15 minutes”, and this included a train movement, site noise could increase, yet this increase might actually only occur once or twice per day. We consider this to be potentially misleading, and undesirable, with the inherent risk that compliance monitoring could be undertaken in the absence of a train movement, but the results compared to noise limits which include train noise,
- Noise from rail movements does not change significantly over time. Unexpected noises such as rail squeal, is a maintenance issue and best addressed through the noise management plan rather than relying on noise monitoring,
- Monitoring rail noise as part of the overall site noise is extremely difficult. Not only do freight trains not run to a fixed schedule, they generally arrive during daytime hours, when traffic noise is greatest, and on sites such as Synlait, it would be nearly impossible to obtain reliable noise measurements,
- A rail siding will be located in accordance with the outline development plan, and where a train enters and exits the DPMA it will move on and off land subject to a rail

designation where noise rules do not apply. Trying to separate this component out during measurements is also extremely difficult.

- Ongoing management of rail noise will be undertaken through the noise management plan provisions. For example, if rail squeal occurs on the siding, the noise management plan could address the regular greasing of tracks.

We have proposed that loading and unloading of trains on the site is included within the DPMA noise rules. This activity is of much longer duration than the train movement, occurs entirely within the DPMA, and may potentially be undertaken at night. As such, it is an important noise source and should be included. In addition, it is simpler to measure than trains, and is directly under the control of the site operators.

3.7 Restriction on New Sensitive Activities

A new rule 3.13.1.6 in Part C, 3 Rural Rules – Buildings, requires that “...any new sensitive activity within the Noise Control Boundary shall be designed to achieve an outside to inside noise level difference of not less than 20 dB $D_{tr,2m,nTw}$ to any bedroom...”.

The rationale behind this requirement is very simple. Detailed noise modelling shows that at night, any new dwelling in this area will be exposed to between 45 and 50 dB L_{Aeq} . Even at the upper limit of this, a noise reduction of 20 dB is sufficient to achieve the World Health Organisation recommended internal noise level of 30 dB L_{Aeq} inside bedrooms.

This requirement is not onerous. Any modern dwelling will comply with this rule, provided that bedroom windows remain closed. As such, an alternative means of ventilation is required.

4.0 OUTLINE DEVELOPMENT PLAN

The following sections of this report discuss the rationale behind the site-specific implementation of the proposed noise rules on the Synlait site, as shown on the Outline Development Plan.

4.1 Existing Noise Environment

One important consideration with this plan change is that it will apply to a site which already includes an operational dairy plant. In this respect, the existing noise environment in the surrounding area is already influenced to some extent by the consented activities on-site, including vehicle movements on the surrounding road network.

Of greater note, the noise environment in the areas surrounding the Synlait plant is dominated by traffic on State Highway 1, even late at night. The presence of the main trunk rail line further defines this area as a reasonably high noise environment.

Our noise monitoring in the area shows that plant noise levels at existing dwellings are only just audible during late evening lulls in traffic. Monitoring site noise emissions is extremely difficult as a result.

4.2 Location of the Noise Control Boundary

There are many consents throughout New Zealand that define noise controls/limits by use of a noise control boundary or contour drawn on an aerial photograph.

Whilst this approach seems to make sense at a resource consent hearing, the control boundary tends to be represented by a “wiggly line” on an aerial photograph. Consequently, this line is challenging to identify on the ground and this can make monitoring difficult, particularly given that noise measurements are often made in the middle of the night. In addition, if the contour is on third-party land, there are access issues.

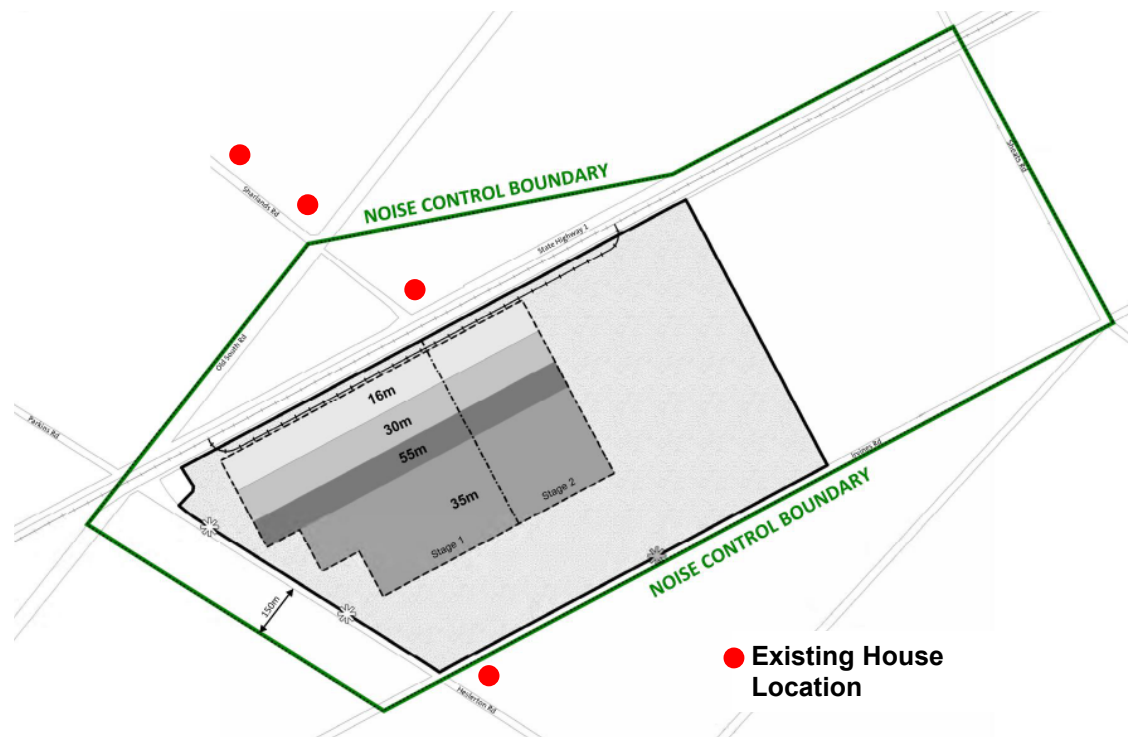
Because of this, we recommend that the following factors are applied when defining a noise control boundary;

- Locate the contour on the site, roads, or other publicly accessible land wherever possible,
- Use simple straight lines,
- Adopt fence lines,
- Avoid third-party property where possible.

As discussed in section 3.0, the plan change proposes a noise control boundary which represents a noise level of 55 dB L_{Aeq} daytime, and 45 dB L_{Aeq} night-time—limits consistent with residential amenity, as discussed in section 3.2.

The proposed noise control boundary for the Synlait site is shown on the Outline Development Plan, and repeated in Figure 2.

Figure 2: Proposed Noise Control Boundary



The rationale behind the location of this noise control boundary is as follows;

- The contour maintains, as practicably as possible, the existing consented noise limits (see Figure 1), extending to Sheats Rd to the east, and Irvines Road to the south, and pushing beyond the site boundaries in the northwest corner,

- The contour then makes allowance for future site expansion. This will be discussed in section 4.4,
- There are only two segments of the boundary which are not on public roads,
- Simple straight lines have been adopted where roads are not possible.

In our view, the proposed noise control boundary provides a practical and enforceable location for compliance monitoring, limiting the need for third party property access.

4.3 Effects on Neighbouring Properties

As can be seen in Figure 2, there is one existing dwelling within the proposed noise control boundary, and there are three sections of land not owned by Synlait within the boundary—the triangular land parcel bordered by Main South Rd, Old South Rd, and Sharlands Rd, a corner of the farmland to the north of the existing dwelling, and a strip of farmland on Heselton Road.

Based on our discussion in this report, we consider that there will be some adverse noise effects at night at the existing dwelling. In particular, at full development, noise levels could be up to 50 dB L_{Aeq} at night, and this could result in some sleep disturbance. However, we note that there is already a reasonably high level of traffic noise at this dwelling, and as such, additional sleep disturbance effects may actually be minimal.

There is also the potential for adverse noise effects if any of the other three areas of land are developed for residential use. However, the proposed reverse sensitivity rule will ensure that any dwelling built on these areas of land will be appropriately treated to avoid sleep disturbance.

On all other parts of the Synlait site, the noise control boundary is either at the notional boundary (at one location on Irvines Rd), or well away from existing dwellings. As such, it is our view that compliance with the proposed noise rules at the noise control boundary shown in Figure 2 will not result in any adverse noise effects other than at the specifically identified properties.

We also note that any noise effects which do arise will be as a result of future development on the Synlait site, and this could be some years away. In addition, we understand that Synlait is in discussion with the owner of the affected existing dwelling with respect to potential future noise effects.

We do not anticipate any adverse effects during daytime as a result of this plan change. The noise control boundary represents 55 dB L_{Aeq} during the day, and no dwelling could ever be exposed to greater than 60 dB—the level currently permitted in Selwyn rural areas. In addition, daytime noise levels will generally be much lower than the permitted level because the only sources which exist during the day that don't also exist at night are intermittent activities such as maintenance (see section 3.2.2).

4.4 Allowance for Future Expansion

With the proposed plan change in place, Synlait will need to comply with the noise rules at the proposed noise control boundary for the foreseeable future. As a result, it is important to ensure that Synlait can continue to comply, even if significant additional development occurs on the site.

To investigate this issue, we have prepared a detailed model of likely noise emissions from the development scenario assumed for the DPMA as described in section 1.0 of this report. For the purposes of the noise model, we have made further assumptions, and included the following;

- 6 drystores, with associated loading areas, clad with Coloursteel,
- 8 concrete dryer towers, with acoustic louvres to all openings,
- 4 boilers, clad with speedwall, and incorporating acoustically treated ash handling systems,
- 8 milk reception areas, with low-noise pumps,
- Workshop and ancillary spaces,
- Associated peak hour truck movements,
- Loading activity associated with a rail siding.

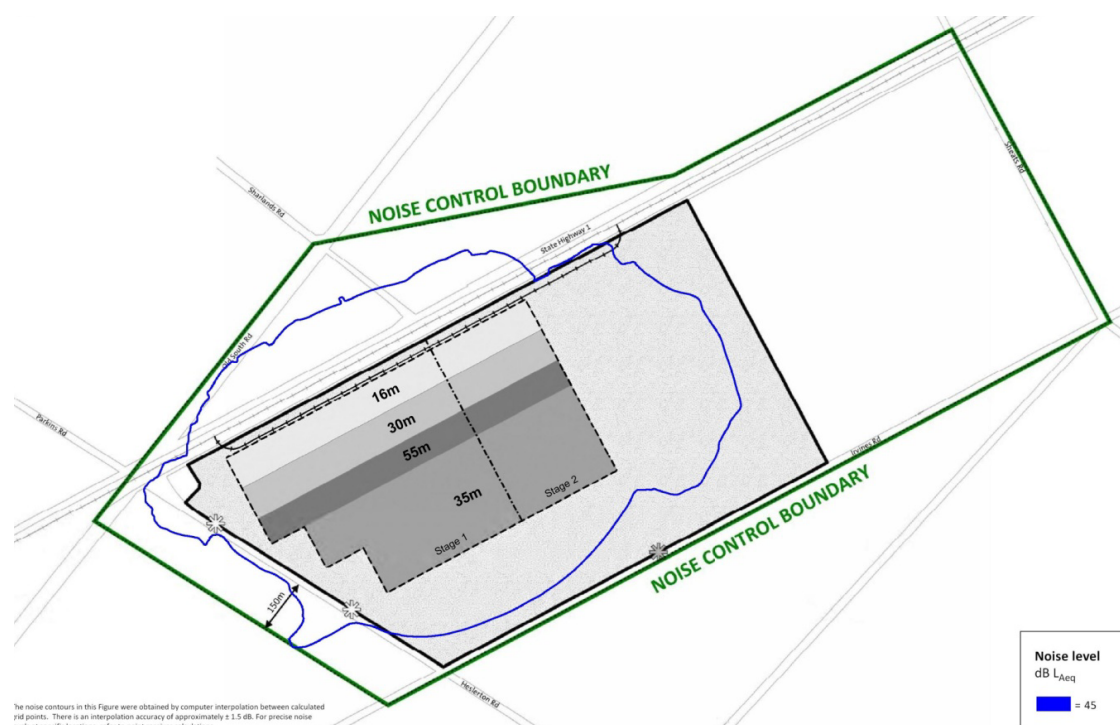
For each of these items, we have modelled current industry best practice with respect to noise control. We have placed each noise source in positions dictated by the proposed height limits and building footprint. For example, dryer towers can only ever fit in the 55 metre area. In addition, the existing site layout essentially dictates appropriate locations for various activities.

As already discussed, we have not modelled train movements, but we have included all loading and unloading activities. All truck movements on-site are included.

4.5 Noise Contours

Based on the assumptions discussed in section 4.4, we predict night-time noise levels from a fully developed DPMA to be as shown in Figure 3.

Figure 3: Predicted Noise Contour—Future Development



As can be seen, the predicted 45 dB L_{Aeq} noise contour is within the proposed noise control boundary at all locations.

Whilst this model does not prove that Synlait will comply with the proposed noise rules, it shows that by adopting current practice and technology, the proposed DPMA can be developed and used without adverse noise impacts. Future improvements in technology and noise control will provide further benefits. Accordingly, we are satisfied that development and use of the DPMA can and will continue to comply with the night-time noise rules for the foreseeable future.

During the day, noise levels will at times be slightly higher than the predicted 45 dB L_{Aeq} contour, but still noticeably less than 55 dB L_{Aeq} at the noise control boundary.

4.6 Assessment of Rail Noise Effects

As discussed in section 3.6, the proposed plan change will exempt rail noise, on the basis that any effects are appropriately assessed prior to establishing the DPMA.

There is no standard for assessing rail noise in New Zealand. In addition, noise from rail sidings may generate noise effects that are distinctive from an un-interrupted train pass, and it is therefore important to consider a wide range of factors in assessing potential effects from the proposed siding on the Synlait site.

Our assessment of potential noise effects from rail activity on the Synlait site is as follows, based on the siding location shown on the Outline Development Plan and indicated in Figure 3;

- Residents on the opposite side of State Highway 1 are already exposed to rail noise, and as such, whilst a new rail siding will change the character of noise from some rail activities, it will not introduce a new noise source per se. The only potential effects will be a result of the change from constant speed trains passing, to occasional trains stopping and starting as they move wagons onto the siding,
- Even at full site capacity, Synlait do not expect to require more than two train movements per day,
- The use of rail would result in a reduction in the number of truck movements, both on-site and on the State Highway,
- The entry and exit points of the siding have been located towards opposite ends of the site. These points are generally the noisiest points of a shunting operation, and the proposed locations ensure they are well removed from existing dwellings,
- The presence of the State Highway means that this area is not particularly quiet. As a result, noise from rail activity will be less noticeable than if the site was remote from major roads.

Other than the one existing dwelling within the proposed noise control boundary, the nearest dwelling is approximately 400 metres from the proposed siding. Based on our experience and measurements taken from siding activity at other dairy plants, we anticipate that at this distance, shunting noise³ will be in the order of 40 dB L_{Aeq} . There is likely to be

³ Based on measured noise levels during shunting of 66 dB L_{AFmax} and 48 dB L_{Aeq} at a distance of 160 metres.

some noise associated with this activity, and our measurements suggest this will be up to approximately 60 dB L_{AFmax} .

The predicted noise levels are below general guidance for night-time residential noise levels (see section 3.2). As such, even if shunting activity occurred during night-time at this site, we do not anticipate any adverse noise effects.

Residents of the one existing dwelling within the noise control boundary will experience some adverse noise effects if the rail siding is constructed and operated at night. We predict shunting noise levels in the order of 50 dB L_{Aeq} and 70 dB L_{AFmax} at this dwelling.

5.0 CONCLUSIONS

This plan change provides a simple, easy to understand set of noise rules. Coupled with the proposed outline development plan, the plan change will provide certainty for all parties within a defined envelope of noise effects, for the foreseeable future.

At full site development, one existing dwelling will experience adverse noise effects at night-time. It is understood that Synlait is in discussion with the property owner.

The proposed reverse sensitivity rules will ensure that any new dwellings built near the site will be appropriately protected from noise at night.

Daytime noise levels will remain sufficiently low during the day that we do not anticipate any adverse noise effects.

APPENDIX A PLAN CHANGE NOISE RULES

Noise

26.17 Noise arising as a result of any activity within a Dairy Processing Management Area shall not exceed the following limits at the Noise Control Boundary shown on the Outline Development Plan in Appendix 26A.

- Daytime (7.30am – 8.00pm) 55dB L_{Aeq} and 80 dB L_{Amax}
- Night-time (8.00pm – 7.30am) 45 dB L_{Aeq} and 70 dB L_{Amax}

Noise shall be measured in accordance with NZS6801:2008 "Acoustics-Measurement of Environmental Sound", and assessed in accordance with NZS6802:2008 "Acoustics-Environmental Noise".

26.18 Prior to the issue of a building consent for new buildings which will increase capacity for milk processing or storage within the Dairy Processing Management Area, a report from an acoustic engineer shall be received by Council confirming all activities within the Dairy Processing Management Area will, cumulatively, meet the noise standards.

26.19 A Noise Management Plan for the Dairy Processing Management Area shall be submitted to the Selwyn District Council at least every 12 months and shall be up-dated to include any new activities or increase in milk processing or storage capacity within the Dairy Processing Management Area. The Noise Management Plan shall include best practice procedures to ensure compliance with noise standards, including noise monitoring requirements, annual reporting to the Selwyn District Council and a noise complaints procedure.

26.20 Rail movements into, within and out of the Dairy Processing Management Area are excluded from compliance with the above rules.

Note: Rule 26.20 does not apply to the loading or unloading of goods.