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20 March 2019

Timaru District Council
C/ - BECA Ltd
P O Box 13960
Armagh Street
CHRISTCHURCH 8141

Attention: Paul Whyte

Dear Paul

Transpower New Zealand Limited: Notices of Requirement and Resource Consent Application

Thank you for your further information request on behalf of the Timaru District Council under section 92 of the RMA. Transpower responds to the information request as follows:

1. Section 4.2.2 Transmission Line Locations p17

- (i) *Where reference is made to “relocation” can you clarify whether the towers on the relocated positions are new towers rather than the existing towers.*

The towers in the relocated positions will be new towers. This is primarily due to the new towers generally needing to be constructed before the existing towers can be decommissioned.

- (ii) *Can more specific heights be applied to the individual 5 towers to be relocated given there is some variance between 28-41m?*

The maximum heights of the new towers are set out in the table below. The towers will not exceed these heights, but may be less than these heights where detailed design prior to construction determines a lower height is necessary.

New Tower Name	Designed Maximum Top of Structure Height (m)
BEN-ISL-A391A	41.2
BEN-ISL-A392A	35.4
BEN-ISL-A393A	33.8
ROX-ISL-A764A	30.7
ROX-ISL-A764B	32.3

- (iii) *What is the difference in height between the new and existing towers (second paragraph p 18)?*

The heights of the existing towers which are to be decommissioned are set out in the table below, which can be compared with the maximum heights of the new towers above.

Existing Tower Name	Existing Top of Structure Height (m)
BEN-ISL-A391	25.9
BEN-ISL-A392	25.6
BEN-ISL-A393	22.0
ROX-ISL-A764	24.3
ROX-ISL-A765	24.3

2. Section 4.3.2 Transmission Line Locations p19

- (i) *Where reference is made to “relocation” can you clarify whether the towers on the relocated positions are new towers rather than the existing towers.*

The towers in the relocated positions will be new towers. This is primarily due to the new towers generally needing to be constructed before the existing towers can be decommissioned.

- (ii) *Can more specific heights be applied to the individual towers to be relocated given there is some variance between 23-31m and 46-57m?*

The maximum heights of the new towers are set out in the table below. The towers will not exceed these heights, but may be less than these heights where detailed design prior to construction determines a lower height is necessary.

New Tower Name	Designed Maximum Top of Structure Height (m)
ROX-ISL-A747A	30.8
ROX-ISL-A747B	30.8
ROX-ISL-A747C	26.2
ROX-ISL-A749A	27.7
ROX-ISL-A749B	29.8
ROX-ISL-A749C	29.4
CHH-TWZ-A213A	56.9
CHH-TWZ-A213B	49.9
CHH-TWZ-A215A	49.9
CHH-TWZ-A215B	56.9



(iii) *What is the difference in height between the new and existing towers (second paragraph p 20)?*

The heights of the existing towers which are to be decommissioned are set out in the table below, which can be compared with the maximum heights of the new towers above.

Existing Tower Name	Existing Top of Structure Height (m)
ROX-ISL-A747	24.1
ROX-ISL-A748	19.5
ROX-ISL-A749	19.8
CHH-TWZ-A213	43.2
CHH-TWZ-A214	43.0
CHH-TWZ-A215	43.2

3. Section 5.1 Overview of the Applications p24

(i) *At the bottom of page 24 the comment is made that “no outline plans will be necessary for the designations protecting the corridors required for the transmission line relocations, as the resource consent under NESETA will authorise those physical works”. Is this an assumption and/or is it authorised by an RMA provision?*

This is authorised by an RMA provision. Section 176A(2)(a) of the RMA provides that an outline plan need not be submitted if the proposed public work, project, or work has been otherwise approved under this Act. In this instance, the relocation of the transmission lines within the designated corridors, will be otherwise authorised under the RMA by way of the resource consent applied for under NESETA. Consequently, no outline plan of works will need to be submitted for the transmission line relocations.

4. Section 5.7 NESETA Resource Consents p29

(i) *Please clarify why the towers will not be within the tower envelope (p30 second para)- is this because of height, width, occupied buildings etc?*

The towers will not be within the envelope for permitted activities under regulation 14(1) of NESETA as their position will be greater than the base width x 60% from the original tower positions, as set out in the NESETA schedule – “Envelopes for Activities Relating to Towers”. In addition, the heights of the towers will be greater than 15% of the base height of the original towers.

The towers will also not be within the envelope for controlled activities under regulation 15(1)(c) of NESETA as their position will be greater than the base width x 150% from the original tower positions, as set out in the NESETA schedule.

5. Section 8.6 Noise p62

- (i) *The MDA report on noise generally uses “LAeq’ in its assessment. Can you please confirm if there will be compliance with the Timaru District Plan noise limits which are measured in LA10 and LAFmax.*

The **attached** memorandum from Marshall Day Acoustics confirms that the Timaru District Plan noise limits (both LA10 and LAFmax) will be comfortably achieved. The recommended noise limits provided in the Noise Assessment in the application are based on a review of national and international standards and guidelines for environmental noise. These standards and guidelines use the LAeq metric which represents industry best practice. These have formed the basis for the proposed designation condition 22 for managing the operational noise from the substations (refer page 101 of the AEE).

- (ii) *The operational noise assessment appears to refer to the transformers on the substation sites only. Is the noise generated by the conductors particularly during times of high winds or atmospheric conditions relevant, and if so, what are the likely noise levels and degree of effect?*

Audible noise from conductors can either be of **electrical origin** (otherwise known as corona effect), or **non-electrical origin** (wind).

In regard to audible noise of **electrical origin**, conductors will discharge corona only when the surface voltage gradient on the conductors (SVG) exceeds a critical corona inception or onset voltage. This inception voltage depends on the voltage of the conductor, the conductor diameter, the surface roughness factor of the conductor, and atmospheric conditions.

An established mathematical relationship, known as Peek’s formula, is used to calculate the corona inception voltage. Generally corona does not initiate until the SVG is about 17 kV/cm to 18 kV/cm, at which point it manifests in the form of a broadband hissing/crackling sound (also known as random audible noise). If the SVG is higher than about 20 kV/cm to 21 kV/cm, the corona discharge becomes visible in the form of a pale yellow glow. Under foul weather conditions, such as fog and mist, this value of inception voltage is lower. Raised spots on the surface of conductors, such as those caused by bird droppings could also initiate localised corona.

Most transmission lines are generally designed so that the maximum SVG does not exceed about 15 kV/cm. Noise modelling undertaken by Transpower (contained in Appendix 8 of the AEE), has predicted SVG for the three duplex lines proposed to connect into the northern and southern substations as follows:

- ROX-ISL A = 10.975 kV/cm
- CHH-TWZ A = 11.128 kV/cm
- BEN-ISL A = 11.216 kV/cm

The SVG for all three lines is well below the level at which corona discharge and resulting audible noise would be expected to occur (17-19 kV/cm). The noise modelling in Appendix 8 of the AEE confirms that any noise emissions are generally less than 20dBA beyond 40 metres from the lines. The **attached** memorandum from Marshall Day Acoustics considers based on the modelling, that this level of noise is very low and no adverse noise effects are therefore anticipated.

In regard to **non-electrical** (wind) effects, conductors make noise when exposed to wind, this is often referred to as aeolian noise. Aeolian noise can be produced by laminar and non-laminar wind.

Conductors of a certain critical diameter, stranding, and tension, may vibrate and generate a strumming/whistling sound when exposed to laminar wind of a critical threshold speed. Generally laminar wind speeds in the range of 10m/s to 40m/s can cause the conductors to generate acoustic noise.

Steady laminar wind speeds of the magnitude required to generate noise are rare, particularly in New Zealand, where wind most often blows in gusts. In New Zealand laminar wind is anticipated at speeds between about 2 to 7m/sec.

Aeolian noise is also generated by non-laminar wind where the conductor creates turbulence as wind flows around the conductor. The volume of noise generated by this mechanism increases with wind speed.

As noted in the attached Marshall Day memorandum "*strong winds result in significantly elevated background noise levels (primarily due to the movement of tree branches and leaves) which masks wind-induced noise from transmission lines to an extent*".

The **attached** memorandum from Marshall Day Acoustics considers that no adverse noise effects are anticipated from wind induced noise from transmission lines.

6. Section 12 Notification p103

(i) *Could you please show the properties identified in Table 10 in Section 12 on a plan relative to the NORs.*

Plans showing the properties in Table 19 of Section 12 relative to the NORs are **attached**.

(ii) *Is TDC also considered an affected party given the transmission lines will cross local roads (NZTA is identified as an affected party)?*

It is accepted that the Timaru District Council may be an affected party, as the NORs for the line connections to the southern site cross legal road administered by the Council, and there may be minor adverse effects on the road network from construction traffic as assessed in section 8.10 of the AEE.

(iii) *It appears from section 7.2 that consultation has been undertaken with the parties identified in Table 10. Please confirm this and describe the outcome of the consultation undertaken.*

Transpower met individually with the majority of the property owners identified in Table 10, and these meetings are described as Stages 2 and 3 in Section 7.2 of the AEE. There has been no consultation undertaken with any other occupiers of these properties (i.e. tenants).

The purpose of consultation with affected parties was to discuss the project, with discussion driven by the stage at which consultation was undertaken. The outcome of the meetings was for both Transpower and the affected parties to become more informed, and to that end, Transpower considers that the consultation was successful. The meetings allowed Transpower

to explain the reasons for the project, the approach to assessing alternatives, and the challenges associated with implementation. The affected parties were given an opportunity to ask questions and provide feedback on the alternatives that were considered and advise on how best to mitigate environmental effects associated with the preferred sites. Transpower did not seek affected party approval from any landowners.

7. Landscape and Visual Assessment Report-Appendix 11

- (i) *In considering the assessment provided on Tables 1 and 2 (pages 12 and 14 respectively) and taking into account the “baseline” approach for the southern site (page 11) it is difficult to determine what ‘Year 1’ relates to in terms of assumed plant growth. Could you please clarify what provision for plant growth has been made (if any), particularly in giving effect to the adopted “baseline” approach? The Figures in the report only appear to relate to “10 years of maturity”.*

The assumed plant growths at Year 1 are set out in the table on Figures 5A (northern site), and 5C (southern site) of the Landscape and Visual Assessment graphic supplement attached as Appendix 9 to the AEE. It should be recognised that proposed designation condition 13 requires the landscaping for the southern site to be implemented in the first full planting season following the inclusion of the designation in the District Plan. The vegetation heights at the time the substation is ultimately constructed (currently estimated as commencing in 2025) will therefore be greater than those specified at Year 1 on which the assessment in Table 2 (page 14) has been based. Accordingly, the assessment in Table 2 should be seen as conservative.

We trust this answers your queries.

Yours faithfully
TRANSPower NEW ZEALAND LIMITED

A handwritten signature in dark ink, consisting of a stylized 'M' followed by a long horizontal stroke that tapers to the right.

Matthew Curran
Environmental Planner

Attachments: 1. Plans showing location of affected parties relative to Notices of Requirement.
2. Memorandum from Marshall Day Acoustics.