

Memo

To Chris Dowson
From Thato Mariti
Date 5 October 2023
Job No. 123391-103
Job name Taumatotara Wind Farm
Subject **Taumatotara Wind Farm - Transport Effects Peer Review**

1. Introduction

Bloxam Burnett & Oliver (BBO) were asked by Waitomo District Council (WDC) to review the transport information submitted by Taumatotara Wind Farm Limited (TWF)¹ for the proposed wind farm. An initial consent was granted to for wind turbines with tip heights of 110m. In 2011, WDC granted an approval to increase the turbine tip height of the northern 11 turbines to 121.5m. A lapse date extension was granted in 2016 extending the implementation and completion of the project to June 2024.

TWF is currently pursuing the project completion and seeking to change Conditions 1, 2, 3 and 11 of the current resource consent as follows:

- Reduce the number of turbines consented from 22 to 11 (Conditions 1 and 2), including reducing the on-site roading proposed. The proposal is to provide for 11 turbines (in the same location as turbines 1-11 in the original consent). The applicant has further reduced the number of turbines from 11 to 8.
- Increase the tip height of the 11 northern turbines to 172.5m, with rotor diameter increasing from 110m to 155m.
- If the application is approved then Condition 5, relating specifically to turbines 19 – 22, will no longer be relevant and can be deleted.

WDC has requested a peer review of the transportation effects of the proposal, and whether these have been adequately addressed by the applicant. This review primarily concentrates on the transportation effects of decreasing the quantity of wind turbines while simultaneously increasing their height.

2. The Subject Site

The proposed windfarm site is 10km south of Taharoa Village and above the Taumatotara Gorge in the Waitomo District, and is located on farms owned by three separate landowners. According to WDC online map, the subject site is zoned Rural with several rural residential properties located in the vicinity of the site. Figure 2.1 refers.

¹ Previous ownership was for Ventus Energy (NZ) Ltd (Ventus).





Figure No. 2.1

3. Proposed Wind Farm Peer Review

The structure of this peer review is as follows:

Section	Description
Overview of proposal	Summary of transport-related information received
Adequacy of provided information	Review of the transportation documents submitted to WDC
Submitters	Summary of transport-related concerns raised by Submitters
Conclusion and recommendations	Recommend further information be requested or conditions of consent to mitigate potential effects.
Appendix A	Summary of transport related submissions



4. Overview of Proposal

A comprehensive broad ITA report has not been submitted in support of the application. Instead, the applicant has only submitted Memos with summaries of the proposal and high-level transport assessment information. In response to s92 requests, the applicant has declined to provide an ITA and instead wishes to do so at a later stage of the project following approval of the S127 condition changes.

The following documents and items were submitted by the applicant and reviewed as part of this process:

1. **Taumatotara Wind Farm Application to change conditions of consent (July 2020):**
This document contains proposed changes to the conditions of consent for the wind farm due to changes in both size and number of wind turbines.
2. **Transportation of Turbine Components for Taumatotara Wind Farm Memo (July 2020):**
This memo details the transportation logistics for the turbine components in support of change of conditions application.
3. **Transportation Response to s92 – Taumatotara Wind Farm – RM200019 (December 2020):**
This memo was a response addressing specific transport related information that was requested by WDC and submitters after reviewing document 1 and 2 above.
4. **Transportation Response to s92 – Taumatotara Wind Farm – RM200019 (February 2021):**
Similar to the previous response, this document was a response to additional information requested from the applicant.
5. **Bridge Review – Taumatotara Wind Farm (April 2022):**
This document involves a review of bridges within WDC on the route that will be used for wind turbine transportation.
6. **Turbine Dimensions:**
This information details the dimensions of the wind turbines that will be installed for TWF.
7. **Taharoa C Tower Test Run (July 2009):**
This document presents the results of a tower test run conducted for the Taharoa C Wind Farm. The test was conducted to assess the ability of roads and bridges along between Waitomo Village and Taharoa Township to accommodate the oversized vehicles including the live weights of the turbine components.

The following additional information has been submitted for illustration and guidance purposes:

8. **Vestas Transport Guidelines:**
These guidelines may outline specific transportation requirements and best practices related to Vestas wind turbines.
9. **Special Transporter Wind blade adapter:**
This item describes a special transport truck that could be used for transporting wind turbine blades.



5. Adequacy of Applicants Documents relating to Transport Planning

5.1 Taumatotara Wind Farm Application to change conditions of consent (July 2020):

Section 4.4 of the TWF application to change conditions of consent briefly addresses the transportation effects of the proposed wind farm. The applicant mentions that:

- The amended proposal for the wind farm includes larger and heavier wind turbine components. However, it is expected that transportation will be made easier due to technological advancements in fabrication and transportation techniques.

I agree with the applicant regarding the potential benefits of employing advanced technology for facilitating the transportation of wind turbine components. Nevertheless, the applicant has yet to provide a clear plan on how they intend to further disassemble the turbine components. While the proposed change of conditions will have fewer turbines, the new turbines will rather have large components; and the applicant has mentioned that these will be broken into smaller components which effectively result in more generate traffic movements. Consent 23.

- It is not anticipated that any road widening beyond that which was previously approved for the existing consent will be necessary. This suggests that the existing road infrastructure should suffice for transportation.

The current condition of Taumatotara West Road is characterized by its narrowness and the presence of sharp curves. Therefore, the applicant shall adhere to the existing condition 23 and 24 for road widenings and alignment on this road.

- Together with application for over dimension and overweight permit, the applicant will submit a detailed route assessment including trailer tracking, road closures, timing, and other logistics to ensure safe and efficient transportation of the wind turbine component.

It should also be noted that the component sizes will also be governed by the bridge capacities which is discussed in the section 5.4 below.

I agree that the applicant should conduct a comprehensive route assessment, inclusive of detailed tracking curves, to demonstrate that the transportation of tower, nacelle, and blade components can be successfully accomplished without adverse effects on the environment per Conditions 22, 23 and 24.

5.2 Transportation of Turbine Components for Taumatotara Wind Farm Memo (July 2020):

I consider the applicant reiterates the use of technology and proposes to make use of narrow blade design and a cantilevered transporter in the Memo.

The applicant now mentioned that the anticipated port of entry will be from Maungatapu Port in Tauranga. Additional information pertaining to route test run from Maunt Mount Maunganui Port to Taharoa Township has been submitted for review.

The route test report identified a need for the following mitigation measures within WDC roads:



- Widening of a roundabout circulating lane on Te Anga Road / Tumutumu Road outside of Waitomo Caves, by 8m.
- Road widening at some isolated corners along the route to allow the passage of oversized loads.
- Transportation route may have a potential impact on some power lines along Taharoa Road.
- Highlighted the need for assessments and widening of few bridges on Te Anga Road to ensure that these bridges can safely accommodate the weight and dimensions of wind turbine components.

I acknowledge that the submitted reports adequately address the effects of transportation of large tower components along the route between port of entry and Taharoa Township. However, it's worth noting that these reports were conducted over 15 years ago and do not account for any changes that have potentially occurred along the mentioned route in the intervening years.

I therefore recommend that an updated assessment of a tower test route be conducted prior to turbine component transportation to address any changes that may have occurred along the preferred route since the initial reports were produced. This updated assessment should take into consideration any route alterations for the intended purpose. Any mitigation measures required (if any) should clearly demonstrated to the satisfaction of WDC. This is adequately documented in condition 22 – 24.

It's worth noting that the current Tauranga Port route differs from the initially preferred one originating from New Plymouth Port. Ideally, the applicant should have conducted a high-level analysis of various ports of entry and the route options, highlighting the associated challenges and considerations for each. The mitigation measures for the preferred route would then be dealt with in a detailed assessment prior to the application for transportation permits.

I acknowledge that the existing road network from Waitomo Village to Taharoa Road intersection can accommodate over dimensioned vehicles and that the identified roading issues such as power lines are consistent with the report. The applicant has not yet addressed any mitigation measures for the identified risk locations. I recommend a route test run once the vehicle size has been confirmed and detailed route assessment conducted; any mitigations measures required should be addressed to the satisfaction of WDC Condition 24.

5.3 Transportation Response to s92 (TES)

Two letters from Traffic Engineering Solutions Limited (TES), Transportation Response to s92 – Taumatotara Wind Farm – RM200019, dated 18 February and 17 December 2020 were submitted to WDC. The following are extracts from the information provided in the letters:

- Trip generation data for turbine delivery and construction incorporating the impact of reducing the number of wind turbines from 22 to 11.
- Discussion of the two proposed access points on Taumatotara West Road, considering safety aspects such as sight lines and road width to accommodate anticipated traffic movements.

It is important to note that the letter did not cover sightline or road geometry adequacy at the intersection of Taharoa Road and Taumatotara West Road. I therefore recommended that these issues be addressed in the detailed assessment and designs of the transportation route including improvements to the geometric design to enhance safety, particularly for unloaded over dimensioned trucks at this intersection to the satisfaction of Condition 24.



5.4 Bridge Review Report

The applicant has provided structural review by KINA Consulting Engineers dated 14 April 2022, along Te Anga Road and Taharoa Road. Feedback was given on the following critical bridges:

- Bridges 4,5,6, 7, 8 on Te Anga Road and
- Bridge (9) on Taharoa Road.

Figure 5.1 refers.

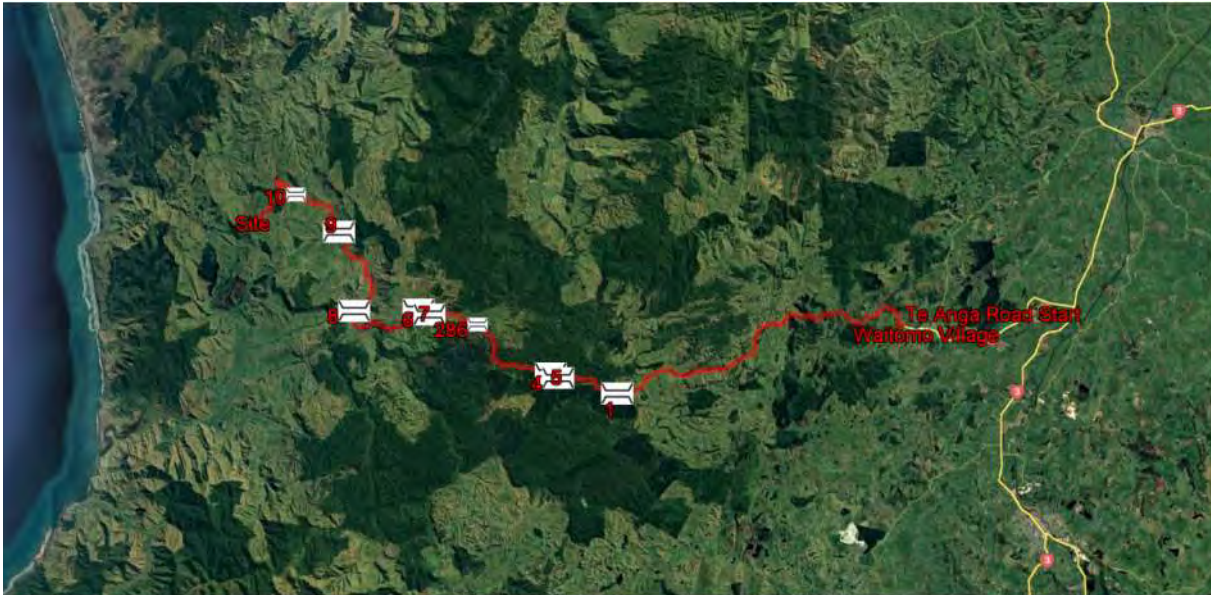


Figure No. 5.1

A bridge load ratio (BLR) methodology was used to assess the capacity of the bridges along the route. This assessment compared the proposed transport loading likely to be associated with the transportation of wind turbine components, against the current capacity of each bridge. The assessment employed the following threshold for oversized truck permit approval over the bridge:

- For bridge loading ratios exceeding 175%, the permit issuing officer needs to notify the approving engineer.
- In cases where BLRs exceed 200%, it is likely a detailed engineering assessment will be required.

Based on the findings from the bridge review report:

1. **Bridge 6** had a bridge load ratio (BLR) of 182%, which exceeds the threshold of 175%, but falls below the 200% threshold. As a result, the report concluded that the use of Bridge 6 will ultimately be left to the discretion of the Waitomo District Council (WDC) engineer, who will assess the safety and feasibility of allowing oversized trucks to pass over this bridge.
2. **Bridges 7 and 8** on the other hand, had BLRs that exceeded the 200% threshold. Consequently, the report concluded that a detailed engineering assessment is necessary for these bridges. Additionally, the report recommended the exploration of a bypass route as a potentially safer alternative, citing uncertainties about the condition and capacity of bridge 7 in particular. Figure 5.2 and Figure 5.3 refer.





Figure No. 5.2 – Bridge 7: Te Anga Road (Source: Google Earth)



Figure No. 5.3 – Bridge 8: Te Anga Road (Source: Google Earth)

- Bridges 4, 7 and 9** require widening to accommodate the over dimension trucks.

I acknowledge that most of the bridges along this route are single lane bridges, and by visual observation during the site visit appears very narrow to accommodate over dimensioned vehicles.

I recommend that a detailed bridge assessment as required by WDC be conducted to determine the necessary works to strengthen the bridges. The assessments should evaluate the structural integrity and capacity of these bridges and determine any necessary strengthening or modifications required to ensure their safe use for over-dimension and overweight loads, with specific reference to the related weights of the proposed wind turbine components. Full details of the required inspections and assessments are adequately described in Condition 23.



6. Submitters Transportation-related Concerns

A total of 15 submissions were received, approximately 6 of them were related to transportation effects. Table No.1 below summaries the key transportation concerns by the submitters. Overall, all submitters are opposing TWF and five of the submitters wish to be heard if there will be a hearing commission for this project.

Table No. 1

Summary of Submitters and key concerns			
Concerns Submitted	No. of Submitters	Oppose/Support	Wish to be heard
Lack of a Traffic Management Plan for review	2	Oppose	1
Insufficient Earthworks information is available for reviewing.	2	Oppose	1
No information about the impact of trucks on WDC roads	6	Oppose	5
Absence of documentation outlining the applicant's plans to reinstate road infrastructure affected by the project.	2	Oppose	1

6.1 Traffic Management Plan

Submitter number 8 and 12 identified concerns about the lack of a Construction Traffic Management Plan (CTMP) for both delivery and construction periods.

I agree that a CTMP is required and should be adhered to for the safety of all users of the affected district roads. A condition of consent is recommended to ensure an appropriate CTMP is submitted to WDC for review and certification as acceptable prior to any works commencing on site. The requirements for CTMP are adequately outlined and covered under Condition 19.

6.2 Nothing to review of earthworks

Submitter number 1, 8, and 12 identified concerns about the lack of assessment of construction related effects and earthworks.

The applicant has provided the expected site generated traffic during the construction phase. I acknowledge that the applicant would have no knowledge of construction traffic and the effects thereof at this stage.

I recommend that detailed information about earthworks and construction activities (construction phase) be submitted to WDC in line with the CTMP detailed under Conditions 19-21.

6.3 Impact of trucks on WDC roads

Submitter number 1, 5, 8, 12, and 15 stated that they are unable to understand the impact of trucks on the local road network due to a lack of information concerning the construction phase.

I acknowledge that the applicant has provided the anticipated trip generation during both delivery and construction phase. I agree that the applicant should submit a detailed route assessment addressing all



potential impacts of TWF on WDC roads prior to any turbine deliveries or construction. The applicant has also stated in Transportation Response s92 that a detailed route assessment will be conducted at a later stage following approval of the S127 condition changes. Requirements related to this submission are adequately discussed under Conditions 19-25 of the existing consent.

6.4 Reinstatement of WDC road infrastructure

Submitter number 4 is concerned about the lack of information on how the applicant intends to reinstate the road infrastructure in particular the pavement and bridge structures after the completion of the project.

I agree that the applicant has not submitted information regarding maintenance and reinstating of roading and infrastructure on WDC roads. I recommend that the applicant should conduct investigations including pavement deflection measurements and bridges review both before and after the construction period and make the necessary improvements (if any) to all the infrastructure. This is covered under condition 26 of the existing consent.

It is worth noting that a bond of \$86,000 was initially stipulated under the 2006 conditions. Given the advancements in environmental processes and the significant rise in construction costs due to inflation, I would recommend that the bond amount be adjusted to current 2023 costs of the anticipated road maintenance.

7. Conclusions and Recommendations

Below are the primary conclusions and recommendations from the review of transportation information provided by TWF:

- The information submitted by the applicant, which are high-level Memos of TWF transportation effects on WDC roads, suggests that the current WDC road infrastructure is largely sufficient to accommodate the transportation of turbines, including construction-related activities for TWF, pending a detailed route assessment.
- There is no comprehensive transport assessment report provided for the proposed activity. This should be provided prior to any turbine component deliveries or construction activities and should cover the following at the very least:
 - A current route feasibility assessment for the proposed transporters to be used for the proposed size of wind turbine components. A report from 2009 for different sized components is not adequate to confirm the likely impacts of the haulage activities to site.
 - Detailed design for all required road works along WDC to accommodate the over dimension trucks. Detailed design for the necessary road and bridge works should be in line with the existing Conditions 22, 23, 24 and 27.
 - A comprehensive bridge assessment along the proposed route on WDC roads should be conducted to the satisfaction of Conditions 23, 25 and 26.
- Construction Traffic Management Plan for both turbine component deliveries and construction phase should adequately satisfy Conditions 19-21 of the existing consent.
- Maintenance plan on WDC roads during both the construction period and post construction should be addressed by the applicant per Conditions 22, 25 and 26 of the existing consent. The applicant should comment on the 2006 bond amount under Condition 26 in relation to the 2023 construction and maintenance costs against the anticipated regular maintenance.
- The submitters concern about the impact of TWF transport effects including the CTMP and WDC roads maintenance should be adequately addressed by the applicant through the detailed route assessment and CTMP prior to commencement of any project work.



Yours sincerely

Bloxam Burnett & Oliver



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