

# Attachment 1: Supplemental Noise Responses

## Attachment 1: Supplemental Noise Responses

# Campo Wind Project with Boulder Brush Facilities – Response to Backcountry Against Dumps late comment letter

## Attachment 1: Supplemental Noise Responses

- to Feb. 26, 2021 Volker letter – Sections “E” and “F” for Noise and Cited Exhibits

### *Introduction*

The following narrative discusses a review of the February 26, 2021 Volker letter (Letter) and its noise-related comments under Sections “E” and “F”. The primary aim of this narrative is to clarify the following:

- where and how an individual Letter comment or group of related comments, specifically or its context, has already been addressed in the Project FEIR; or,
- if it represents an apparent new noise-related comment or references new information not previously disclosed or cited in earlier received comment letters, either:
  - how and where the Project FEIR already addresses the raised issue,
  - a brief response to the raised issue and/or cited reference material (e.g., research paper), or
  - why the raised issue or cited reference does not necessitate further response.

In summary, only Exhibit 8 and Exhibit 9 connected to the Volker letter represent “new” information, in that neither letter was previously received and reviewed—they are both, in fact, prepared in February 2021 and thus after the November 13, 2020 County of San Diego Planning Commission (PC) hearing.

For reader convenience, this narrative is arranged in the same order as the comments appear in the indicated Letter sections.

### *Section E*

#### *Paragraph 1*

This paragraph summarizes three claims of errors and omissions and introduces three Exhibits as follows:

- Exhibit 7 is the dBF letter to BAD dated February 3, 2020 – this has already been reviewed and discussed in previous response to comments (RTC) already incorporated in the Project FEIR.
- Exhibit 8 is a new dBF letter to BAD dated February 3, 2021, with content summary and suggested response under “Exhibit 8” herein.
- Exhibit 9 is a new Wilson Ihrig (WI) letter to BAD dated February 4, 2021, with content summary and suggested response under “Exhibit 9” herein.

#### *Paragraph 2*

This paragraph claims that the FEIR doesn’t “meaningfully analyze” amplitude modulation (AM), and cites three studies (Pohl, Schaffer, and Hansen) to argue that AM is a health problem. These studies have already been referenced in earlier received comments, and were reviewed and remarked upon in the FEIR. Please refer to “Exhibit 10”, “Exhibit 11”, and “Exhibit 12” remarks herein.

## Attachment 1: Supplemental Noise Responses

### Paragraph 3

This paragraph asserts the AAR “dismisses” the risk of AM by referring to the RSG study (that includes AM in its discussion of extensive field measurement findings), and attempts to claim there is “relevant evidence of *frequent*” (italics in the original comment) AM at Boulevard-area residences in the 5-6 dB range as documented by the 2019 WI and dBF reports. However, both reports have already been thoroughly reviewed and commented upon in recent RTC of the FEIR. Contrary to the letter’s indication of “frequent” AM evidence, pages RTC GR4-15 and GR4-16 of the FEIR correctly find that each of these cited reports contains no more than a single minute-duration measurement (or in the case of the WI report, only 26 seconds) and to which correlation with AM is not established.

### Paragraph 4

The paragraph begins with an acknowledgement that RTC GR4-16 of the FEIR critiques the aforementioned 2019 WI and dBF field survey reports with respect to the apparent lack of sufficient evidence for exhibiting AM, then asserts a “wrong-standard” argument and says the public doesn’t have this burden to prove significant impacts before trying to re-assert that the 2019 WI and dBF reports supply “substantial evidence” that supports a “fair argument” the Project might cause a significant impact and requires the County to analyze it. The paragraph then states it is “immaterial” that there might not yet be any significance standards to assess AM impact and cites the *Berkeley Keeps Jets* (BKJ) legal case.

First, the original AAR provides substantial evidence to support the conclusion that AM would be a “very rare event” and this the EIR’s conclusions are based on the correct legal standard. Second, Berkeley Keep Jets (BKJ) is inapposite here for the following reasons:

- BKJ regards an airport project, not a wind turbine project, adding night flights (over Berkeley) for which the court ruled that the use of Community Noise Equivalent Level (CNEL) or Day-Night sound level (LDN) gave a fair disclosure of the actual impacts, which appear to relate to multiple but distinct aircraft fly-overs. The quantity of these anticipated fly-overs was disclosed, and would be anticipated upon implementation of the proposed Airport Development Plan (ADP).
- AM is not even discussed in BKJ, but if one were to speculate that the ADP fly-overs are perhaps analogous to potential AM occurrences for the Project, such hypothecation would be very weak based on the following two important reasons:
  - Section 6.2.2.2 of the AAR in the FEIR summarizes the environmental conditions that must be met for AM to even occur, along with the low probabilities of such occurrence backed by reference to both the Bureau of Land Management (BLM) programmatic EIR on wind energy and the RSG study. The potential for AM cannot therefore be quantified or forecast like aircraft over-flights, it is instead a “very rare event” that may not occur at all.
  - The 2019 WI and dBF reports each rely on a single sub-minute duration measurement to assert AM present at one residence in the Boulevard area from *existing* wind turbine operation (i.e., unrelated to the Project), and offer little or no support linking the displayed data to AM causation factors.

## Attachment 1: Supplemental Noise Responses

### Paragraph 5

This paragraph says the FEIR didn't go far enough to describe WTG noise effects on health, stress, etc. The RTC GR2 section of the FEIR speaks these topics in great detail, where pages RTC GR2-4 through GR2-16 already address previously received comments in four apparent categories as follows: "(1) A-weighted sound levels, which refer to audible community noise and for which the County assesses annoyance vis-à-vis Section 36.404 et al. from its Noise Ordinance; (2) low-frequency noise, which can be audible and resides in the 20 hertz (Hz) to 200 Hz range of the sound spectrum; (3) infrasound, which is considered inaudible to human hearing; and (4) amplitude modulation."

### Paragraph 6

The paragraph begins incorrectly with "The FEIR here entirely fails to *even mention* "stress" or "sleep" (italics in original comment), since response on page RTC GR2-15 of the FEIR to previously received comment O5-16 includes rejection of "important implications" as being proof for possible sleep disruption from wind turbine AM. Quotations from the Morsing study is cited support for the letter's assertions; however, the reader is invited to see "Exhibit 14" remarks that include important excerpts that the Letter did not quote.

### Paragraph 7

The cited Morsing and Poulsen studies have been cited in previous received comments and have been reviewed and commented upon in the FEIR. Quotations from these studies are apparently used to support the letter's claims or assertions, but upon closer inspection are either partial, lack important context, or ignore important information such as excerpts disclosed herein under "Exhibit 14" and "Exhibit 15."

### Paragraph 8

This paragraph appears to be a re-iteration of the earlier Volker critique of the FEIR's reliance on the County's February 2019 Public Health Position Statement (PHPS)—please see "Exhibit 16" remark herein. These cited studies and reports do not change the PHPS conclusions as summarized on pages RTC GR2-2 through RTC GR2-4 of the FEIR.

## Section F

### Paragraphs 1 and 2

This paragraph mentions the previously Poulsen study again and introduces Carlile study as intended support to argue for infrasound and low frequency noise (ILFN) metrics in addition to audible wind turbine noise descriptors like A-weighted values. Please see detailed remarks on these studies, both of which have been reviewed and commented upon previously, under "Exhibit 16" and "Exhibit 17" herein.

### Paragraph 3

This paragraph claims ILFN from existing wind turbine(s) operation (Kumeyaay and Tule) was measured at residential locations and refers to Exhibit 13 that is the dBF December 2019 report that the FEIR already reviewed and discusses. For example, page RTC GR2-14 of the FEIR makes an important data analysis finding after careful review of the unweighted dB data presented by the December 16, 2019 dBF report and 2014 and 2019 WI reports: that the measured sound levels, converted to dBG, are all less than Salt's 60 dBG human ear outer hair cell (OHC) stimulation threshold for inaudible sound.

## Attachment 1: Supplemental Noise Responses

### Paragraph 4

This paragraph calls attention to the AAR and its citing the RSG study with respect to infrasound produced by wind turbines as being below an ISO 7196 perception threshold. It then excerpts part of Dr. Richard Carman's review, which references researcher Salt who provided the aforementioned threshold for evaluating potential stimulation of the human ear by inaudible sound. The excerpt does not mention any quantities concluding only with "the research by Salt and others shows that humans could be negatively impacted by sound levels significantly below the threshold of audibility." But the WI reports do specifically mention Salt's 60 dBG value, and since their measurement data—converted to G-weighting scale—appears to show existing ILFN at the studied residences does not exceed this implied standard, then the potential for negative impacts due to such inaudible sound appears to be non-existent.

Again the Berkeley Keep Jets is cited, implying that it provides support for asserting the County's reliance on lack of ILFN standards as a CEQA violation. But akin to the previous invocation of the BKJ legal case, the aforementioned County analysis of the WI and dBF-reported measurement data demonstrates that infrasound from existing wind turbines is not evident at levels at which one may even attempt to reach a conclusion of significant adverse effect—such as the Salt-suggested 60 dBG criterion for inaudible human ear OHC stimulation.

### Exhibit 8

The following is a detailed review of the February 3, 2021 dBF letter prepared by Mr. Steven Fiedler, as this document was not previously available prior to its attachment to the Volker February 26, 2021 letter studied herein. The order of bullets guides the reader through the dBF letter contents.

- *Page 1* – because the letter appears to be based on a review of only the DEIS, its AAR, the FEIS, and the "NAM", several subsequent assertions/claims are made that have already been addressed in the FEIR RTC.
- *Page 2 – Analysis, 1<sup>st</sup> paragraph* – asserts that by using a GE 2.X-127 model, being less powerful, would under-predict noise for 4.2 MW turbines. Page RTC GR4-9 of the FEIR explains the justification for using the GE 2.x-127 model data—it's louder than sound data for larger and/or more powerful WTG models under consideration for the project.
- *Page 2, Analysis, 2<sup>nd</sup> paragraph* – says the AAR doesn't address pure tones and NAM (Comments Addendum Memo) doesn't either. Pages RTC GR4-10 through GR4-12 of the FEIR illustrates the pure tone definitions (Figure GR-4-D) and provides supplemental analyses (results in Figure GR-4-E) showing that pure tone conditions from predicted Project WTG operations for multiple scenarios (and thus representative many more, if not all) will not occur.
- *Page 3 – critique of Piccolo SLM usage.* Page RTC GR4-3 of the FEIR reminds that Dudek re-sampled the baseline sound environment in 2019 with ANSI Type 1 instruments that were demonstrably capable of lower measured sound pressure levels (SPL).
- *Page 3 – Piccolo SLM windscreen criticism.* Page RTC GR4-2 describes microphone windscreens used during the 2019 baseline outdoor ambient sound level sampling survey.
- *Page 4 – critique on CadnaA and Excel-based techniques.* Page RTC GR4-9 provides support, via the cited RSG report and Datakustik website, for the ISO 9613-2 sound propagation modeling technique used by both the CadnaA software and Excel-based modeling techniques.

## Attachment 1: Supplemental Noise Responses

- *Page 4* – asserts “failure” of using wind turbine noise frequency spectrums for each wind speed condition. A similar comment appeared as O6-105 and was addressed therein on page RTC O6-81 of the FEIR.
- *Page 4* – asserts On-Reservation NSLUs should be disclosed. Response to similar comment O6-107 on page RTC O6-82 of the FEIR addressed this.
- *Page 5* – critiques baseline measurement locations and collected data, refers to dBF previous letters and information. Response to similar comment O6-103 on page RTC O6-79 of the FEIR addressed this.
- *Page 6* – asserts that “AAR, DEIS and FEIS should have evaluated the Project noise levels at the estimated hundreds of potential NSLUs, not just at thirteen single locations in a roughly 24-square mile area.” The FEIR and FEIS both include multiple figures displaying quantified evaluation of predicted aggregate Project WTG operation across the Project area and its surroundings.
- *Page 6* – conclusion includes “opinion” that the Project “poses a significant risk of harm...” Mr. Fiedler is making a bold statement here without evidence or support.

### *Exhibit 9*

The following is a detailed review of the February 4, 2021 WI letter prepared by Dr. Richard Carman, as this document was not previously available prior to its attachment to the Volker February 26, 2021 letter studied herein. The order of bullets guides the reader through the WI letter contents.

- *Page 1* – because the letter appears to be based on a review of only the DEIS and its AAR, several subsequent assertions/claims are made that have been addressed in the FEIR RTC.
- *Page 2 – Analysis* – Carman is pushing FTA guidance as the basis for an increase-over-ambient noise level standard that changes with the existing sound level of the environment at the receptor of interest. A similar comment O6-118 was addressed in our response on page RTC O6-84. In short, the County *does* incorporate increase-over-ambient thresholds such as its General Plan based 60 dBA CNEL (or up to 10 dB over existing ambient) and the Residual Background Sound Criterion (RBSC) in its wind turbine ordinance. Since it does not lack its own standards in this regard, the County has no need to defer to the Carman-suggested FTA guidance. Further, FTA-based criteria for assessing noise from operation of transit projects and their typical sources of noise (e.g., roadway traffic, rail operations, and multi-mode terminals) has little or no relation to assessing noise from wind turbine operation in a rural setting.
- *Page 3 – critique of Type 2 SLM usage.* Page RTC GR4-3 of the FEIR reminds that Dudek re-sampled the baseline sound environment in 2019 with ANSI Type 1 instruments that were demonstrably capable of lower measured sound pressure levels (SPL).
- *Page 4 – critique of only 24-hours for measurement.* This is similar to comment O6-120 that was addressed on page RTC O6-84 of the FEIR.
- *Page 5 – critique of low-frequency analysis and omni-directional noise prediction.* As mentioned on page RTC GR4-10, ISO 9613-2 conservatively assumes downwind conditions in all directions. In other words, even when wind may be blowing in an “upwind” direction (i.e., the noise from the source emanates in a direction opposite of the wind flow), the methodology applies a “downwind” condition (i.e., when noise emission and wind direction are the same... meaning

## Attachment 1: Supplemental Noise Responses

the noise is not, as one might say, swimming upstream and losing strength or being diffracted away from the distant receptor).

- *Page 6* – Most wind turbine manufacturers carefully adhere to appropriate portions of International Electrotechnical Commission (IEC) Standards such as 61400-11 and -14 with respect to describing wind turbine source sound levels, as stated on page 26 of the AAR under Section 6.1.3.1, the FEIR reliance on such manufacturer data is warranted and justification for GE 2.X-127 data is clear in RTC GR4-9 and GR4-10 of the FEIR.
- *Page 7* – discussion of low-frequency noise, mention of Salt research and outer hair cells (OHC). Low-frequency noise and infrasound is discussed in pages RTC GR2-8 through GR2-14 of the FEIR, including a presentation of WI data interpretation suggesting that its measured levels are less than the Salt-suggested inaudible 60 dBG OHC stimulation threshold.
- *Pages 7 and 8* – critique of lack of AM study. We discuss this in RTC GR4-14 through RTC GR4-16 of the FEIR.
- *Page 8* – claims CadnaA software not appropriate for wind turbine noise analysis. Page RTC GR4-9 provides support, via the cited RSG report and Datakustik website, for the ISO 9613-2 sound propagation modeling technique used by both the CadnaA software and Excel-based modeling techniques.
- *Page 10* – Carman says the impacts are understated.

### *Exhibit 10*

This is a Pohl study, and was already cited in comment letter O5 and for which RTC GR2-14 of the FEIR already provides remarks. On the last page (“127” of the Energy Policy journal in which it was published) of the Pohl study, it includes (bold emphasis added):

“The present study provides insight into the mechanisms causing noise annoyance. However, replication studies are needed to further explore why some residents are strongly annoyed by WT noise and others are not, especially in comparison to traffic noise. Furthermore, the long-term effects are to be probed, e.g., whether or not and under what conditions habituation or sensitization occurs. To explore the influence of WT noise on sleep the method of ambulatory sleep monitoring would be useful. In this respect, first steps were made in the Health Canada study (2014) and in a study by Jalali et al. (2016). **Both field studies did not find any relation between objective sleep parameters and WT noise exposure.**”

This last sentence is pretty important, because it implies that these two studies did indeed “explore influence of WT noise on sleep” and found no relation between objective sleep parameters and wind turbine noise exposure. It also negates the Letter’s implied connection between sleep disturbance potential and wind turbine noise AM via the Pohl study quotation.

### *Exhibit 11*

This is a Schaffer study, and was already cited in comment letter O5 and for which RTC GR2-15 of the FEIR already provides remarks. To review, the study showed amplitude modulation (AM) has the same least effect as playback order of the samples as an annoyance parameter... far less than other effects studied. In fact, AM is ignored in the final conclusory paragraph of the study. The second paragraph of Section E that mentions this study fails to make this clarification, saying only “even after accounting for visual impacts, amplitude modulation increased annoyance” without providing fair context as revealed in the FEIR.

## Attachment 1: Supplemental Noise Responses

### *Exhibit 12*

This is a Hansen study on AM, which was already cited in comment letter O5 and for which RTC GR2-15 and GR2-16 of the FEIR already provides remarks. In addition, the study only provides one 24-hour window of the actual measured SPL at one position (H5) for a narrow 40-50Hz band of spectrum. Hence, what was the background sound level of the environment? In the conclusions, ambient noise levels in rural South Australia are stated as “as low as 15 and 5 dBA, outdoors and indoors”. Even our lowest measurements from the 2019 survey of the Project vicinity didn’t get this very low outdoor background sound level, nor did dBF or WIA surveys as I recall. Hence, if the Hansen study’s AM quantities are based on such a 15 dBA outdoor environment, they would be of little or no value/relevance for applicability to Campo/BB vicinity—that is, higher background sound levels would reduce the apparent AM dB magnitudes.

### *Exhibit 13*

This is dBF’s 12/16/19 ILFN report – we’ve already discussed this.

### *Exhibit 14*

This is a Morsing study – although already cited by the O5 comment letter and appearing within the Letter as Exhibit 9, it apparently was not specifically remarked upon in the FEIR. The study’s conclusions state (emphasis added in **bold**):

“There were some indications that WTN led to objective sleep disruption, reflected by an increased frequency of awakenings, a reduced proportion of deep sleep and reduced continuous N2 sleep. This corresponded with increased self-reported disturbance. **However, there was a high degree of heterogeneity between the two studies presented, precluding firm conclusions regarding effects of WTN on sleep.** Furthermore, there was some limited evidence from the second study that wakefulness increase with strong amplitude modulation and lower rotational frequency, the deepest sleep was adversely affected by higher rotational frequency and strong amplitude modulation, and light sleep increased with high rotational frequency and acoustic beating. These findings will be used in the development of noise exposures for a larger-scale sleep study that will implement more naturalistic WTN and use a more representative study population.”

The bold sentence is a reminder that while the sixth paragraph under Section E of the Letter may provide sound-bite like quotations to support its assertions connecting wind turbine noise to sleep disturbance, the study itself cannot make “firm” conclusions connecting WTN to sleep.

### *Exhibit 15*

This is a Poulsen study that was already cited in comment letter O5 (as Exhibit 10) and for which RTC GR2 and response to O5-23 on page RTC O5-861 in the FEIR already provides remarks. Noteworthy excerpts from the study are as follows:

“Furthermore, our reliance on prescription data reduced specificity towards sleep and depressive conditions because some of the included drugs, particularly the antidepressants, also have other indications, primarily for anxiety-related conditions. Any bias resulting from this will depend on both the prevalence of these conditions among our cases and their association with WTN.”

And from the Conclusions... (emphasis added in **bold**):

“In conclusion, in a large nationwide population, we found suggestions of an association between exposure to high levels of outdoor nighttime WTN and increased risk of first-time redemption of sleep



## Attachment 1: Supplemental Noise Responses

medication and antidepressants. This association was strongest among the elderly. **We found no consistent associations for indoor nighttime LF WTN.** Given that this was the first prospective study on this topic and that we had only a few cases for many of the groups, independent replication is desirable.”

The first except is noteworthy because it provides context to the seventh paragraph under Section E of the letter, which quotes that “high levels of long-term nighttime exposure to outdoor” wind turbine noise (greater than or equal to 42 dBA) were “associated with redemption of sleep medication and antidepressants” (i.e. filling prescriptions for those medications), particularly amongst people aged 65 or older. In other words, these sleep and anti-depressant meds are also used for treatment of other conditions that may have nothing to do with wind turbine operation noise. The bold sentence would help erode claim(s) by the Project opponents that LF WTN indoors leads to health effects motivating sleep medication.

### *Exhibit 16*

This is an earlier Volker letter (4/15/19) critiquing the County’s February 2019 PHPS. Comment response to O5-21 appearing on pages RTC O5-860 and O5-861 speak to the PHPS, as does GR2.

### *Exhibit 17*

This is a Carlile study that was already cited in comment letter O5 (as Exhibit 11) and for which RTC GR2 and response to O5-25 on page RTC O5-862 in the FEIR already provides remarks. The study is a literature review and concludes more research should be done.